



[Alvin W. Boese Papers.](#)

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2,473,528 Hoover Non-Woven Filament Three Web and Method of Producing Same

2,503,024 Boese Decorative Rayon Fabric and Method of Making ✓

2,587-502 Prefabricated Hank of Ribbon for Making Ornamental Pom Pom Bows ✓

2,626,883 Boese Non-Woven Rayon Fabric

2,738,298 David Non-Woven Decorative Ribbons ✓

2,620,853 Boese Method of Making Decorative Tissues

Get no. on star bow patent

2933, 223

2/2/43

Patent

This invention relates to paper materials and a method of making them.

It is the object of this invention to produce unique papers and tissues from fibers of various synthetics which heretofore could not be used by processes known to the paper industry. This will be accomplished by a dry method of forming the fibrous webs and subsequent pressing and heating to make substantially unified sheets having the general appearance and properties of paper with other properties native to the fibrous materials used as additions. These properties would be given by the chemical character of the fibers and also by the physical form, fibers of textile length being highly desirable for some types of paper although only available at present in the handmade Japanese papers.

This invention involves the formation of a mechanically unified fiber web of synthetic fibers on a carding or garnetting unit or any other machine suitable for forming an even, mechanically unified web.

Building the web up to the desired thickness by folding and lapping or laying a plurality of carded webs in juxtaposition and passing through a heated area and compressing between rolls or as is preferred, passing through heated calender rolls. With the proper heating temperature and pressure a paper tissue is formed which is extremely porous, has good tensile strength and a hard-finished surface. In defining the hard-finished surface I wish to consider it as comparable to an unsized paper but not fibrous as a felt would be.

I am aware that prior art describes methods substantially the same as mine but the objective of the previous work is to produce loose flexible materials of felt-like character with low percentages of thermoplastic fibers and cannot be compared with the product which results from my method of using substantially 100% thermoplastic fibers in which the entire surfaces of the fiber unite to form a substantially bonded product.

A feature of our product is low caliper. For best results caliper should not exceed .010. The preferred caliper is in a range from .0015 to .006. Heavier calipers tend to leave the center portion in an ununified state. If temperatures are raised or pressure applied to carry the heat to the center of the sheet, a dense, board-like structure lacking a fibrous nature results.

In considering the present described method over those generally used in the paper making trade several advantages both as to economics and resulting products are apparent.

First the cost of a paper making unit is a tremendous investment. Vast quantities of water are necessary to produce papers. Even so, these machines are limited to use of fibers of exceedingly short lengths and only those fibers which have the property of developing a self-gelatinized surface upon beating and hydrating. Small units by which papers of the handmade types such as Japanese tissue could conceivably handle the long fibers possible by our method. However, again the lack of self-gelatin precludes the possibility of using synthetic fibers.

The fibers used in our process are those commercially available which are thermoplastic in nature as cellulose acetate, Nylon, Vinyon. Various small percentages of other fibers can be added to the above-mentioned but for the purposes of our invention, it is ~~desirable~~ desirable to keep the percentage of thermoplastic fibers at 70% or greater of the total amount. Fibers formed from many other thermoplastic materials known or unknown at present could be used without departing from the spirit of our invention.

In making the various types of paper, the fiber diameters are important. For thicker open papers, fibers of 3 denier can be used.

I have found that 50-50 mixtures of 3 denier and 1.5 denier cellulose acetate fibers give desirable results. It is to some advantage in carding to use fibers which have a crimp in them as they tend to form webs that have greater mechanical strength.

When making very fine tissues in the range of .002 and lowering, it is desirable to use small diameter fibers such as .0015 denier and lower. The papers of the type formed by this method can be used advantageously for many purposes which at present employ paper. Following are several examples:

Tea Bags

CARPENTER, ABBOTT & COULTER

COUNSELLORS AT LAW

PAUL CARPENTER
B. J. MCCANN (1921-1934)
WHITMAN TAYLOR (1924-1936)
WILLIAM H. ABBOTT
E. G. CARPENTER
ROBERT I. COULTER

140 SOUTH DEARBORN STREET
CHICAGO

900 Fauquier Avenue
Saint Paul, Minnesota

May 10, 1943

Mr. Boese

*Carded Products,
Patents*

NEW YORK
521 FIFTH AVENUE
J. T. BASSECHES
ASSOCIATE
WASHINGTON
915 FIFTEENTH ST. N.W.
CHAS. E. ORINDLE
ASSOCIATE

SAINT PAUL
332 MINNESOTA ST.
HAROLD J. KINNEY
ASSOCIATE
MARK SEVERANCE

Mr. R. G. Drew
Minnesota Mining & Manufacturing Company
900 Fauquier Avenue
Saint Paul, Minnesota

Re: DRY FELTED FABRIC PROJECT
Our File 5131

Dear Mr. Drew:

I enclose a copy of letter of instructions I have prepared for our Washington associate as regards the collection and infringement search which I have previously discussed with Al Boese and you.

If you or Al Boese have any further thoughts on what should be included, please let me know promptly. I will hold up the letter for a couple of days so that changes can be made.

Very truly yours,

ROBERT I. COULTER.

RIC:O

Copy to Mr. Alvin Boese

Mr. R. G. Drew

CARPENTER, ABBOTT & COULTER

COUNSELLORS AT LAW

PAUL CARPENTER
B. J. MCCANN (1921-1934)
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140 SOUTH DEARBORN STREET
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May 10, 1943

Mr. Chas. S. Grindle
815 Fifteenth St. N. W.
Washington, D. C.

NEW YORK
521 FIFTH AVENUE
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HAROLD J. KINNEY
ASSOCIATE
MARK SEVERANCE

Re: Dry Felted Fabric Project
(Our File 5131)
Collection and Infringement Search

Dear Mr. Grindle:

In your letter of June 6, 1941 (your docket No. 6092) you reported on a general exploratory collection search made in response to my letter of May 17, 1941. This project has now advanced to the point where a further and more detailed examination of the prior art is desired, both as to novelty and possible infringement. It is now possible to specify certain particular fields to be covered, as hereinafter set forth. These overlap so that they should be handled together.

A limit of \$500.00 is set although it is possible that an additional amount will be authorized if necessary. Do not send patent copies, but send a list from which we can order those we do not already have.

We would like to have a search of British patents included.

The field to be covered may be broken down as follows, and I have included notes on pertinent patents which we already have:

(A) - Paper or paper-like sheets comprised of interlaced or felted thermoplastic textile fibers, either dry-laid or wet-laid, with unification by autogenous interbonding of fibers produced by pressing, using heat and/or solvents to soften the fibers. Examples of fibers are those made of cellulose-derivatives (particularly cellulose acetate), nylon, vinyl resins, vinylidene resins, polystyrene, rubber hydrochloride (Pliefilm). A minor proportion of non-thermoplastic fibers (such as cotton) may be included. Conceivably a wet-laid paper-making process might be used (see Schwartz No. 2,011,914 and Dreyfus No. 1,829,585); but the most feasible process involves carding the fibers to form a web, superimposing

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Mr. Chas. S. Grindle

COUNSELLORS AT LAW

PAUL CARPENTER
B. J. MEAD, JR., 1924
WHITMAN TAYLOR (1924-1936)
WILLIAM H. ABBOTT
E. G. CARPENTER
ROBERT I. COULTER

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-2-
1943.
sufficient plies to give desired thickness, and hot-calendering. A copy of our recently filed Drew et al. application, Ser. No. 480,830, assigned to Div. 56, is enclosed for your information as to our present preferred product and method. The closest prior art we know deals with making thick felt-like sheets in which only a minor proportion of thermoplastic binder fibers are used (see Reed patent No. 2,277,049, Kleine patent No. 2,156,455 and Boeddinghaus No. 2,298,274). It is possible that our method has been applied to glass fibers and this should be checked.

(B) - A composite sheet which is a non-fibrous thermoplastic film on one face and the other face of which is fibrous or paperlike, composed of interbonded thermoplastic textile fibers which are autogenously bonded to the film. This product is broadly described in the Drew application, second full paragraph on page 17. Several methods can be employed in making this, such as:

(a) Heat laminating a preformed film and preformed tissue paper, or simultaneously forming the paper while laminating (see page 17 of Drew application).

(b) Hot calendering a tissue of thermoplastic fibers with greater heat on one side so as to film the fibers on that side (which may be facilitated by using fibers of lower softening point in the ply of this side).

The lamination of cellulose acetate cloth and film is old, but such product is quite different from the one mentioned above.

(C) - Film sheeting containing embedded fibers to increase tear-resistance, tensile strength, etc. A possible way of making such sheeting is to incorporate fibers in a solution or molten mass of the film material which is thereafter cast or extruded. However, we are particularly interested in making such a product by an extension of the paper-making method discussed above under "A". An example is to form a multi-ply carded web in which the outer plies are 100% cellulose acetate fibers, while the inner plies are formed of say 90% acetate fibers mixed with 10% nylon fibers or other fibers of higher softening point (glass fibers might be used). The web is then hot-pressed or hot-calendered with heat and pressure sufficient to melt the acetate fiber

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Mr. Chas. S. Grindle

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web into a clear film which, however, contains embedded within it the nylon or other fibers of higher softening point. Such film will be quite transparent when the fibers have the same refractive index. Strauss patent 2,281,635 describes forming a sandwich of two films and an interposed cloth web, followed by hot pressing to form a reinforced film sheet material. See also Ellis 2,176,837 and Slayter 2,311,613.

(D) - A new method of forming film sheeting by a dry mechanical method that avoids casting or extrusion. Scrap thermoplastic textile fibers (which can also be reclaimed from scrap cloth by using a picker machine) are carded or otherwise interlaced to form a fibrous web, which is then hot-calendered so as to melt the fibers into a smooth non-fibrous film of uniform caliper. The advantage is that scrap fibers (such as cellulose acetate or nylon) are available at a lower price per pound than the corresponding film material, and the method is a simple one. Woodman patent 1,716,255 is somewhat along this line but starts with a woven or knitted fabric, which would not permit of the cost-saving resulting from using scrap fibers.

(E) - Uses. The previously mentioned sheet materials can be used for a variety of purposes, either as such or after laminating, impregnating or coating - as indicated in the Drew application. An extensive search into art dealing with uses is probably not warranted at present. As regards adhesive tape backings, which are the chief interest at present, we would likely have already noticed any highly pertinent prior art. There might be some exploration in the packaging field as these film sheetings combined with fibers to improve tear-resistance and tensile strength should have great value for wrapping and packaging. Ten bags made of the self-sealing tissue described in the Drew application are very definitely of interest. Wet-proofed tissue paper has been used for this in the past as a substitute for cloth. Hence it would be desirable to see if any patents in this field would be infringed, and to collect patents on paper tea bags so that we can see how much development has taken place patent-wise.

Very truly yours,

RIC:O

ROBERT I. COULTER.

Copy to Mr. R. G. Drew
Mr. Alvin Boese

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COUNSELLORS AT LAW

PAUL CARPENTER
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900 Fauquier Avenue
Saint Paul, Minnesota

July 29, 1943

*Carded Products,
Patents*

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Mr. A. W. Boese
Minnesota Mining & Manufacturing Company
900 Fauquier Avenue
Saint Paul, Minnesota

Re: Dry Felted Fabric Project
(Our File 5131)

Dear Mr. Boese:

We have just received copies of the patent to Reed and Ryan, No. 2,277,050, issued March 24, 1942, assigned to The Kendall Company dealing with tea bags and the like. A copy is enclosed. This patent was referred to in my recent report on the infringement and collection search. The application was filed August 30, 1940. We are ordering the Patent Office brief history and a detailed report will not be made until that has been received and studied.

This patent is highly pertinent not only as to tea bags made of tissues formed of thermoplastic fibres such as cellulose acetate, but is important as prior art on the whole synthetic tissue paper program including the claims asserted in the Drew, Merrill and Boese application.

This patent goes beyond the previously considered Reed patents in that it does disclose a sheet material of tissue thinness and weight and it specifically mentions the use of high proportions of cellulose acetate fibres and the like.

The particular example given for illustration describes a sheet made by hot-calendering a web formed of three plies of carded fibres, of which 40% are cotton fibres and 60% are cellulose acetate fibres. It is said that this material weighs about one pound for each thirty square yards, which is equivalent to a ream weight of about eleven pounds.

The specification does emphasize the combining together of normal textile fibres with thermoplastic binder fibres and does not clearly and definitely, beyond question, describe a tissue containing 70% or more of interbonded thermoplastic fibres. It is possible that a distinction can be

Mr. A. W. Boese

-2-

July 29, 1943

drawn over the tissue claimed in the Drew, Merrill and Boese application which distinguishes the results obtained when 70% or more of interbonded thermoplastic fibres are used.

However, it should be noted that on page 2, column 2, lines 45-53, mention is made of substituting synthetic thermoplastic fibres for the cotton fibres to provide the so-called "body forming fibres". Hence it might be argued that this discloses compositions which range up to 100% of synthetic thermoplastic fibres. It would seem that in this connection Reed does not employ such thermoplastic "body forming fibres" to secure interbonding with each other, but merely uses them as a substitute for cotton and relies on the "binder" fibres for securing unification. For example, if he employed unplasticized cellulose acetate fibres as the "body forming fibres", and plasticized cellulose acetate fibres as the "binder fibres", and used a hot-calendering temperature insufficient to fuse or soften the unplasticized fibres, the resultant product would contain the unplasticized fibres as the equivalent of cotton fibres and might be distinguished from a product in which 70% or more of the fibres are softened or fused by the hot-calendering.

It will be evident that this is probably the most pertinent patent which has thus far come to our attention. It was evidently not located in the earlier preliminary search because of being classified in the tea bag art.

The claims of this patent are all limited to "porous envelopes", such as tea bags, and would not be infringed by the sale of sheet material in bulk. But it is of course important to consider whether persons buying and using M.M. & M. Co. tissue paper for making tea bags would infringe. The terms of the claims would clearly be infringed by using tissue paper of the mixed fibre type and claim 1, for example, might well be held to be infringed by a tea bag made of 100% cellulose acetate fibre tissue.

This question will be studied further when we have obtained the brief history and the many patents located by the recent search.

Very truly yours,

Robert I. Coulter

ROBERT I. COULTER

RIC/O

cc - Mr. R. G. Drew

CARPENTER, ABBOTT & COULTER

COUNSELLORS AT LAW

PAUL CARPENTER
B. J. MCCANN (1921-1934)
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September 2, 1943

*Carded products
patents*

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MARK SEVERANCE

Mr. A. W. Boese
Minnesota Mining & Manufacturing Company
900 Fauquier Avenue
Saint Paul, Minnesota

Re: Collection of Patents on Dry Felted
Fabric Project (Our File 5131)

Dear Mr. Boese:

I am sending you herewith a set of the U. S. patents which were located by our Washington associate in his recent comprehensive search on the prior art. These are in addition to the patents previously located and which you have in your binder. A list of these patents is also enclosed.

There are quite a large number of these patents and I have not yet had a chance to go through them. As you go through them, if you find one or more which are particularly pertinent please let me know so that I can give them prompt consideration.

In the near future we will be able to supply you with copies of the British patents which were located in the same search.

Very truly yours,

Robert I. Coulter

ROBERT I. COULTER.

RIC/O
Encls.

CC - Mr. R. G. Drew

(6)

July 26, 1943

Honorable Commissioner of Patents

Washington, D. C.

Sir:

Please send to me at 900 Fauquier Avenue, Saint Paul, Minnesota, charging the same to my Miscellaneous Fees Account, two (2) copies of each of the following patents:

Re. 22,147	1,867,575	2,033,855
Re. 22,215	1,871,046	2,036,855
Re. 22,320	1,884,069.	2,038,679.
590,842	1,889,061	2,039,312
602,588	1,892,939	2,040,320
713,999	1,897,712	2,041,974
1,247,906	1,897,793	2,044,937
1,295,148	1,898,601	2,046,741
1,358,799	1,908,341	2,046,763
1,458,592.	1,909,192	2,046,885.
1,538,030	1,910,429	2,046,886
1,554,801	1,923,322	2,047,239
1,631,750	1,926,063.	2,047,269
1,633,576	1,950,662	2,048,293
1,634,613	1,953,457.	2,048,895
1,640,596	1,957,611	2,050,156
1,646,605	1,971,274	2,053,270
1,655,677	1,989,885	2,053,773
1,719,173	1,995,187	2,054,131
1,725,598	2,000,013	2,055,411
1,745,557	2,008,984	2,055,412.
1,752,802.	2,009,139.	2,057,689
1,767,663	2,015,103	2,057,690
1,787,564	2,018,638	2,058,476
1,819,011	2,019,641	2,063,649
1,821,939	2,022,004	2,065,996
1,828,397	2,027,436	2,066,079
1,829,983	2,027,741	2,069,763
1,830,980	2,027,961	2,069,771
1,848,553	2,030,160	2,070,600
1,848,732	2,031,606	2,071,419
1,852,964	2,031,636	2,072,280
1,863,799	2,032,343	2,072,631
1,866,372	2,033,481	2,075,106

Honorable Commissioner of Patents

-2-

July 26, 1943

2,076,599	2,149,732	2,249,275
2,077,017	2,153,351	2,252,999
2,078,131	2,154,943	2,253,000
2,079,133	2,156,491	2,253,146
2,083,199	2,157,119	2,263,787
2,086,729	2,157,212	2,263,900
2,086,903	2,158,112	2,264,224
2,093,425	2,165,506	2,266,631
2,094,613	2,167,234	2,266,940
2,094,868	2,168,286	2,268,759
2,099,341	2,171,505	2,271,198
2,100,201	2,173,781	2,275,957
2,100,385	2,176,053	2,276,567
2,100,712	2,177,425	2,277,782
2,100,891	2,181,043	2,279,366
2,101,263	2,183,602	2,281,483
2,101,876	2,184,307	2,281,830
2,103,640	2,184,600	2,281,909
2,107,852	2,186,121	2,283,698
2,108,808	2,187,383	2,285,967
2,112,030	2,188,160	2,287,348
2,113,122	2,188,331	2,293,246
2,113,935	2,188,332	2,294,159
2,115,122	2,189,840	2,294,518
2,119,400	2,190,807	2,297,248
2,123,155	2,194,036	2,300,224
2,123,474	2,201,568	2,300,373
2,124,330	2,202,013	2,301,159
2,126,711	2,202,025	2,301,480
2,126,753	2,205,449	2,305,157
2,126,754	2,210,432	2,304,989
2,126,755	2,211,079	2,306,046
2,126,758	2,215,061	2,306,178
2,126,759	2,215,573	2,306,400
2,126,820	2,216,845	2,307,179
2,126,821	2,220,525	2,310,740
2,126,822	2,221,945	2,311,012
2,126,824	2,222,956	2,312,925
2,126,830	2,232,041	2,314,146
2,126,832	2,233,090	2,314,120
2,126,833	2,233,442	2,319,809
2,130,944	2,233,477	2,319,834
2,132,863	2,234,236	2,321,108
2,136,110	2,238,446	2,322,888
2,138,358	2,242,729	
2,139,543	2,244,704	
2,142,279	2,245,132	
2,147,757	2,245,708	

Respectfully,

RIC/O

CHARGE: DRY FELTED FABRIC PROJECT
File 5131

E. G. CARPENTER.

* not in

Mr. A. W. Boese

CARPENTER, ABBOTT & COULTER

COUNSELLORS AT LAW

PAUL CARPENTER
B. J. MCCANN (1921-1934)
WHITMAN TAYLOR (1924-1936)
WILLIAM H. ABBOTT
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ROBERT L. COULTER

140 SOUTH DEARBORN STREET
CHICAGO

(6)

September 20, 1943

Chas. S. Grindle, Esq.
Watson, Cole, Grindle & Watson
815 Fifteenth St. N. W.
Washington, D. C.

Re: Dry Felted Fabric Project
(Our File 5131)

Dear Mr. Grindle:

In your letter of August 31 you stated that the man who was going to make the search on parchmentizing webs of carded cotton fibers would be in a position to start in about three weeks.

There is another search which we would like to have made in this same general fabric project field. A search expense of \$50.00 is authorized, exclusive of the cost of patents. Please send two copies of each patent.

The present subject has to do with making highly absorbant sheets of carded cotton fibers characterized by the fact that free paper-making wood fibers are included in the sheet. This is accomplished by feeding the wood fibers into the carding machine along with the staple cotton fibers. The wood fibers can be obtained in the form of sheet material somewhat resembling blotting paper. By proper control of the carding machine technique, this paper becomes thoroughly broken up and the wood fibers are liberated in free form and distributed throughout the mass of staple cotton fibers.

The advantage of including such free paper-making wood fibers is that they provide a capillary action which will rapidly draw an aqueous fluid into the body of the sheet. A proportion of 50% by weight of wood fibers can be used, for example.

Such absorbant sheet material has various possible uses, such as in making bandages and in making diapers. It may for example be carded out in fluffy sheet form which is approximately 1/8 to 1/4 inch in thickness, although sheets thicker or thinner than this can also be made.

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Chas. S. Grindle, Esq.

-2-

September 20, 1943

Such sheet material can also be saturated or impregnated with desired binder solutions or dispersions and then compressed and dried to form a thin sheet of high density.

The broad idea of including paper-making wood fibers in carded cotton absorbant sheets is known to be old. However, as far as we know, no one has previously been able to distribute the wood fibers in a finely divided free form throughout the mass of cotton fibers. The prior expedients of which we are aware has involved putting the fibers in the sheet in the form of paper. So far as we know, no one has succeeded in carding the wood fibers along with the cotton fibers in such a way as to separate and distribute the wood fibers as free fibers. A considerable modification in the conventional carding or garneting procedure is required in order to accomplish our result.

Very truly yours,

ROBERT I. COULTER.

RIC/O

cc - Mr. R. G. Drew
Mr. A. W. Bosse
Mr. John W. Pearson

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*Patent
Jen.*

WATSON, COLE, GRINDLE & WATSON
815 Fifteenth Street, N. W.
Washington, D. C.

November 22, 1943

Robert I. Coulter, Esq.
Carpenter, Abbott, Coulter & Kinney
900 Fauquier Avenue
St. Paul 6, Minnesota

Re: Dry Felted Fabric Project
(Your File No. 5131)

Dear Mr. Coulter:

We have made a fairly exhaustive search in connection with the above matter as described in your letter of September 20.

We have found no patent in which wood fibers are carded with cotton fibers or other fibers. The closest patent to this idea, which was found in the search is the patent to Tillotson No. 1,395,877, which discloses a carding engine provided with two separate feeds for the purpose of mixing two or more fibers during the carding operation. Two varieties of fibers, cotton and asbestos, are given by way of illustration (line 39.) As asbestos fibers are entirely smooth on the surface, the problem of uniting these two fibers appears to be substantially the same as uniting cotton with wood fibers. It should be considered, however, as to whether the carding machine illustrated is operative for the purpose described.

It is possible, incidentally, that the invention is in the modification of a carding machine to adapt it for handling cotton fibers and a wood fiber sheet simultaneously to form the absorbent sheet described.

Two copies of the Tillotson patent are forwarded herewith. A number of other patents are referred to below as showing the state of the art, but otherwise have no substantial bearing on the subject matter of the search. These are as follows:

110,584
1,925,550
2,045,911
2,168,775
2,291,927

Robert I. Coulter, Esq.

-2-

November 22, 1943

The following field of search has been covered:

Class 19, subclasses 98 to 114, inclusive, 144, 157, 160, 161, and 163.

We are sorry this matter has been considerably delayed due to an unusual congestion of search work. In the future I feel sure that we will be able to handle your matters of this kind more promptly.

Yours very truly,

WATSON, COLE, GRINDLE & WATSON

per /s/ Chas. S. Grindle

CSG/ab
Encs.

Al Boes
U. S. DEPARTMENT OF COMMERCE
BUREAU OF FOREIGN AND DOMESTIC COMMERCE
WASHINGTON 25, D. C.

85 1
VII
OFFICE OF INDUSTRY AND COMMERCE

for your files
May 26, 1952

In reply refer to:
IC-14

Mr. L. E. Larson
Sales Office Manager, Tape Division
Minnesota Mining & Manufacturing Co.
900 Fauquier Avenue
St. Paul 6, Minnesota

Dear Mr. Larson:

The enclosed copy of Federal Specification
DDD-T-90b, Tape, Non-Woven (Parallel-Yarn Flat String)
is forwarded in view of your cooperation in this project.

Sincerely yours,

H. A. Ehrman

Herbert A. Ehrman, Vice Chairman,
Technical Committee on Textiles,
Federal Specifications Board.

Enclosure

United States Patents of Possible Interest
Issue of January 27, 1953

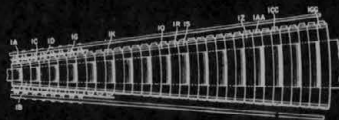
Copies of desired patents will be made available upon request to the office of patent counsel in Saint Paul (phone extension 205, 206 or 207; ask for Berenice Hutchinson).

These extracts of patents serve (1) to acquaint you with newly patented subject matter in your particular field and (2) to bring to your attention patents which may claim developments already made or now being made at the 3M Company.

In connection with the latter, it is requested that you immediately inform this office in the event that any listed patent appears to claim subject matter (apparatus, products or processes) now existing or in the process of being developed at the 3M Company, regardless of whether or not the said subject matter has already been disclosed to patent counsel, so that proper steps may be taken to preserve any rights which 3M may have in such matters.

2,626,422	2,626,666	2,626,873	2,626,941
2,626,486	2,626,705	2,626,876	2,626,945
2,626,489	2,626,707	2,626,877	2,626,946
2,626,490	2,626,760	2,626,883	2,626,957
2,626,528	2,626,865	2,626,886	2,626,963
2,626,588	2,626,866	2,626,934	2,626,968
2,626,589	2,626,867	2,626,939	

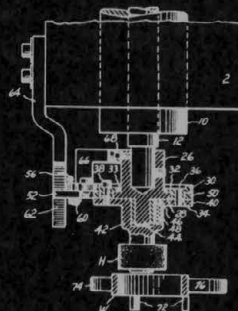
2,626,422
LATERAL STRETCHING OF THERMO-ELASTIC FILMS
Meindert Lammertse, Cuyahoga Falls, Ohio, assignor to Wingfoot Corporation, Akron, Ohio, a corporation of Delaware
Application February 28, 1950, Serial No. 146,689
10 Claims. (Cl. 18-1)



1. The method of stretching thermo-elastic film which comprises heating it and while in a heated condition maintaining it in contact with one expanding surface and after it has been stretched by contact with that surface, bringing it into contact with another expanding surface and thereby further stretching the film and maintaining the film which is stretched in contact with one of said surfaces at all times from the start to the finish of the entire stretching operation.

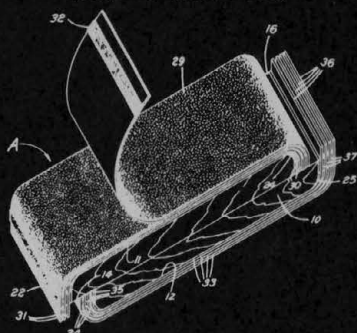
5. A stretching member which comprises an arcuate shaft of uniform circular cross section throughout and having rotatably mounted thereon adjacent one another a plurality of circular discs, each disc being of the same diameter and having a circular central opening just larger than the shaft through which the shaft passes, the discs all being thicker at the opening than at their circumferences, tapering toward their circumferences, and touching on the shorter side of said member only.

2,626,486
HONING
Theodore A. Olson, Pompton Plains, N. J., assignor to General Motors Corporation, Detroit, Mich., a corporation of Delaware
Application January 2, 1947, Serial No. 719,886
7 Claims. (Cl. 51-59)



6. In apparatus of the character indicated, a reciprocating member, a hone holder journaled on the reciprocating member for circumferential indexing movement, a honing member secured to the holder, a carrier to guide the reciprocating member, a support for guiding the carrier, means for shifting the carrier with respect to the support to carry the honing member into and out of operative relation to a work piece, a cam secured to the support, an arm journaled for angular movement on the reciprocating member adjacent to the hone holder, a one-way turning connection between the arm and the hone holder, and the cam being mounted in the path of the arm to turn the latter as the carrier is given its shifting movement.

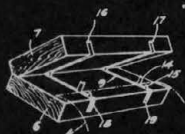
2,626,489
SANDING BLOCK CONSTRUCTION
 Richard G. Thompson, Stillwater, Minn.
 Application June 19, 1948, Serial No. 34,032
 4 Claims. (Cl. 51-186)



1. A sand paper block including an elongated body having a pair of parallel bearing surfaces, a

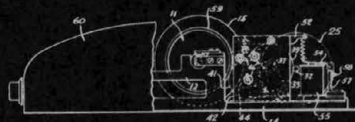
lip projecting from each end of said body, one of said lips being flush with one surface of the body and the other being flush with the opposite surface of the body, a series of abrasive sheets overlying each of said body surfaces, the sheets of each series having one end abutting one of said lips and extending over the end of the other of said lips.

2,626,490
HAND SANDER
 Leo J. Meers, Los Angeles, Calif.
 Application March 4, 1952, Serial No. 274,727
 8 Claims. (Cl. 51-187)



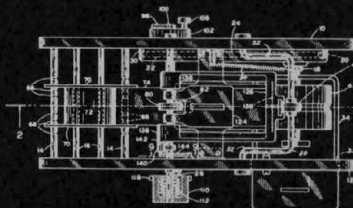
5. A pair of abutable blocks one of which is superposed upon the other, a pair of hinges having hinge wings hinging said blocks together at one side edge, the uppermost of said blocks having its hinged edge portion provided with a chamfer which extends the full length of the block to limit the angular opening of said superposed block in relation to the other block.

2,626,528
DRIVE FOR SOUND RECORDING AND REPRODUCING MACHINES
 Ernst Keller, New York, N. Y., assignor to Machine Tool Works Oerlikon, Administration Company, Zurich/Oerlikon, Switzerland, a company of Switzerland
 Application March 13, 1950, Serial No. 149,233
 3 Claims. (Cl. 74-210)



1. In a sound recording and reproducing machine having a driving roller and a driven drum, a drive comprising, in combination, a lever having a pivoted end, a rotary device upon the other end of said lever, a rotary member, a pivot carrying said rotary member, a plate carrying said pivot, means supporting said plate for a shifting movement in a direction at right angles to said pivot, and means shifting said plate and said rotary member from an inoperative position to an operative position and vice versa, said rotary device being in engagement with said rotary member, said rotary member in its operative position engaging said drum and causing said rotary device to engage said driving roller.

2,626,588
APPARATUS FOR COATING AND DISPENSING TAPE
 Erhard Klug, Montvale, N. J.
 Application June 17, 1948, Serial No. 33,564
 4 Claims. (Cl. 118-41)



1. A machine for applying stripes of adhesive to a strip of material comprising in combination, a support for a roll of the strip material, means for advancing the strip material from said support, means for guiding the advancing strip along a substantially straight path, an adhesive transfer roller positioned to project into the path of the advancing strip and formed with an outer cylindrical surface at least as wide as the strip and having a central relatively narrow peripheral groove therein, a former roller adjacent said transfer roller and having an axial width substantially equal to the width of said groove, an adhesive tank below said transfer roller in which the transfer roller is partly immersed, said former roller having a peripheral rib adapted to press the strip into the groove on the transfer roller to effect the transfer of a longitudinal stripe of adhesive from the transfer roller to the strip and to flex the side edge portions of the strip in a direction away from the transfer roller to prevent the transfer of adhesive to said side edge portions, intermittently operative cutting means located adjacent the path of the strip between said support and said transfer roller for severing the strip into lengths, and a transversely extending applying member connected to said cutting means for operation with the latter and mounted between said cutting means and said former roller to move normal to said path of the strip into pressing engage-

ment with the strip across substantially the entire width of the latter for pressing the trailing ends of the side edge portions of a severed length of the strip against the surface of said transfer roller so that a transverse stripe of adhesive is transferred by the latter to the trailing end of each severed length of the strip.

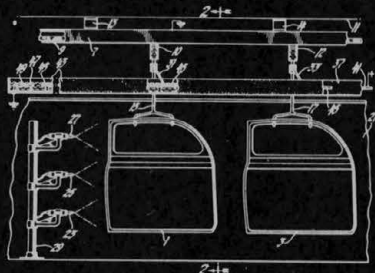
2,626,589
ELECTROSTATIC SPRAY PAINTING
APPARATUS

Lewis J. Lamm, Detroit, Mich., assignor to General Motors Corporation, Detroit, Mich., a corporation of Delaware

Application December 1, 1948, Serial No. 62,913
3 Claims. (Cl. 118-51)

1. In electrostatic spray coating apparatus for coating two articles of manufacture simultaneously including, a conveyor capable of transporting simultaneously a multiplicity of pairs of articles to be coated in two spaced parallel paths, means for projecting coating material into a zone between said pairs of articles, two stationary electrical contact members arranged parallel to each other and to the direction of travel of the conveyor and adjacent each of said parallel paths of travel respectively, electrical contact means

for said articles to be coated carried by said conveyor and electrically insulated therefrom and carrying said articles to be coated in electrical connection therewith, means for surrounding



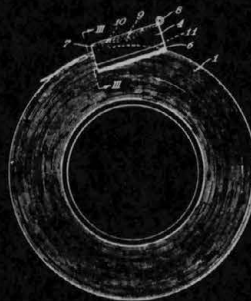
said stationary contact members with inert fluid, and means for bringing said electrical contact means into electrical contact with said stationary contact members during the time said articles are in said zone.

2,626,666
TAPE CUTTER
Harold A. Coldiron, Chicago, Ill., assignor to The Scholl Mfg. Co., Inc., Chicago, Ill., a corporation of New York

Application April 16, 1949, Serial No. 87,919
1 Claim. (Cl. 164-84.5)

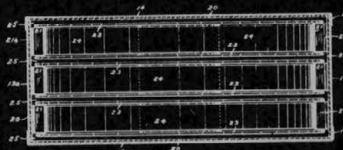
As an article of manufacture, a tape cutting device for slip-on frictional engagement with a roll of tape, said device comprising an integral

channel-shaped member having a rectangular web portion provided with a cutting edge at one end and flanges depending from the sides of said web portion and converging toward each other to directly and frictionally engage the sides of said tape roll with the web portion overlying the outermost layer of tape, a spacer extending transversely of said web portion against the under side of said portion adjacent to but spaced backwardly of said cutting edge to rest against the outermost layer of tape, and a second spacer



extending transversely of said web portion and secured in said flanges adjacent the end thereof away from said cutting edge and spaced from said web portion a distance such that when said spacers both rest against the outermost layer of tape said cutting edge is substantially spaced from said roll and prevented from coming into direct contact therewith so long as both spacers are held in contact with the outer surface of said roll, said web having a depressed finger rest intermediate said spacers.

2,626,705
FILM SHIPPING CASE
John J. Ash, Santa Monica, Calif.
Application March 4, 1950, Serial No. 147,666
5 Claims. (Cl. 206-52)



5. In a motion picture film reel and case of the class wherein a reel has two substantially parallel circular flanges supported by and extending radially outward from a hub, said flanges being spaced apart to receive a film of predetermined width, the case having two substantially parallel end walls of greater perimeter than said reel, a plurality of sides connected with and spacing said end walls, said case being divided adjacent a diameter of said reel into upper and lower sections, and means separately joining said sections; the combination with said case of a plurality of spring strips mounted one on the interior face of each of said sides and projecting along its associated side, each of said spring strips being of half-elliptical configuration convex inwardly to engage the periphery of a film wound on said reel, said spring strips being of a width less than the separation of said flanges of said reel but greater than the predetermined width of the film, each of said spring strips being attached to a side on one end and having a distance from end to end of said spring less than the length of the associated side, whereby said flanges form a bridge between said hub and the unyielding dimension of said springs when said reel is placed in said case, and whereby said spring strips resiliently mount the reel in spaced relation to said side and end walls.

2,626,707
CLASSIFICATION OF CALCINED CON-
DITIONED TITANIUM DIOXIDE PIGMENT
SLURRIES

Walter R. Whately, Lynchburg, Va., assignor to
American Cyanamid Company, New York,
N. Y., a corporation of Maine

No Drawing. Application April 3, 1951,

Serial No. 219,117

3 Claims. (Cl. 209-5)

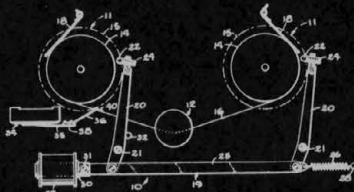
1. A method of separating +4 micron particles of sintered titanium dioxide from a highly flocculated, calcined, conditioned, rutile titanium dioxide pigment formed by calcination of titania hydrate in the presence of about 1% of a member of the group consisting of zinc oxide and tin oxide, which comprises forming a mobile aqueous slurry from said titanium dioxide and an aqueous alkali metal silicate solution, the alkali metal silicate content of said slurry, calculated as SiO_2 , being more than 0.1% and less than 1.0% of the weight of the titanium dioxide in said slurry, agitating said slurry to liberate said +4 micron particles, and subjecting said slurry to hydroclassification including centrifugal hydroclassification to remove said particles therefrom, all of said hydroclassification being performed within about 10 minutes after cessation of said agitation and while said particles are in a state of liberation.

2,626,760
PROTECTIVE DEVICE FOR MAGNETIC
RECORDERS

Lloyd E. Chick, Chicago, Ill.

Application April 7, 1949, Serial No. 86,084

2 Claims. (Cl. 242-54)



1. In a magnetic recorder having a recording head and a pair of reels adapted to store thereon a recording medium, said recorder also having electrically driven drums for rotating said reels and thereby effecting the transfer of said recording medium under tension from one reel to the other, the combination comprising a pivotally mounted brake linkage associated with said drums, said linkage having an engaged position and a disengaged position, a biasing spring adapted to urge said brake linkage toward its engaged position, a solenoid having an armature attached to said brake linkage, said solenoid when energized being adapted to maintain said linkage in its disengaged position in opposition to the force of said spring means, a control switch actuable in response to loss of tension in said recording medium, said switch being interposed in the power supply circuit of said solenoid and said recorder, a swingable actuating arm on said control switch, and a non-magnetic extension rigidly fixed to said actuating arm and disposed so that it bears transversely against said recording medium and substantially parallel to the general plane of said reels when said medium is under tension, said extension being electrically insulated from said actuating arm.

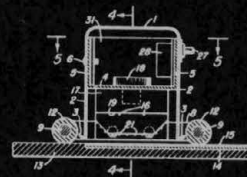
2,626,865
PORTABLE ELECTROPHOTOGRAPHIC
POWDER-IMAGE TRANSFER MECH-
ANISM

Clyde R. Mayo, Brighton, and Robert W. Benson,
Brockport, N. Y., assignors to The Haloid Com-
pany, Rochester, N. Y., a corporation of New
York

Application May 8, 1951, Serial No. 225,234

9 Claims. (Cl. 95-1.9)

1. A portable electrophotographic powder-image transfer mechanism comprising a carriage movable over a sheet of transfer material and including rolls coextensive in length with the width of the carriage and having continuous contact with the transfer material perpendicularly of their path of movement, and electrical discharge means comprising corona discharge wires connected to an external high voltage source and mounted on said carriage above the lowermost portions of the carriage entirely between said rolls whereby the electrical discharge means is movable in a selected path and over any portion of a sheet to which a powder-image



is to be transferred whereby the sheet of transfer material is engaged and held throughout its width by said rolls.

2,626,866
PROCESS OF FIXING LITHOGRAPHIC DI-
AZOTYPE PRINTING FOILS WHICH HAVE
BEEN EXPOSED TO LIGHT

Wilhelm Neugebauer, Wiesbaden-Biebrich, and
Jakob Barthenheier, Eddersheim-on-the-Main,
Germany, assignors to Kalle & Co. Aktiengesell-
schaft, Wiesbaden-Biebrich, Germany

Application January 13, 1949, Serial No. 70,802

In Germany October 1, 1948

8 Claims. (Cl. 95-5.4)



1. In a process for making a lithographic printing material, from photosensitive material sensitized with a light sensitive diazo compound which upon exposure to light decomposes into a fatty ink receptive substance, by exposing the photosensitive surface of said material to light through an original, the fixing method comprising the steps of treating said exposed surface of the material with an aqueous solution containing a water soluble organic colloid substance to coat said exposed surface of said material with a layer of said water soluble organic colloid substance and subjecting said coated material once more to the action of light without using an original, whereby said material will be no longer capable of being affected by light but upon removal of said water soluble organic colloid substance said material will be capable of functioning as a lithographic printing plate.

445 Woodlawn
Baltimore

2,626,867
**LIGHT-SENSITIVE PHOTOGRAPHIC
 ELEMENT**

Lawrence J. Webster, Rochester, N. Y., assignor to
 E. I. du Pont de Nemours & Company, Wil-
 mington, Del., a corporation of Delaware
 Application December 4, 1947, Serial No. 789,769
 5 Claims. (Cl. 95-7)



1. A photographic element comprising a sup-
 port bearing a gelatin silver halide emulsion
 layer containing finely divided particles of porous
 magnesium silicate having a particle size of 2 to
 10 microns, a dry bulk density of 2 to 13 pounds
 per cubic foot and a specific gravity of 2.00 to
 2.35, said particles being present in an amount of
 0.005 to 0.6 part per part of gelatin by weight.

2,626,873
**METHOD OF IMPREGNATING CLOTH FOR
 REPAIRING METAL SURFACES**

Charles H. Allen, Upper St. Clair Township, Alle-
 gheny County, Pa., assignor to Atomized Mate-
 rials Company, Pittsburgh, Pa., a corporation
 of Pennsylvania

No Drawing. Application November 2, 1949,
 Serial No. 125,172
 2 Claims. (Cl. 117-7)

1. The method of making composite sheet
 material which comprises impregnating a textile
 fabric with a solution consisting of polyvinyl chlo-
 ride acetate maleic acid resin copolymerized to
 contain approximately an 86-13-1 ratio of the
 three components and vinyl chloride acetate
 copolymer without the maleic acid modification
 dissolved in a thinner consisting essentially of a
 ketone or ester type solvent and an aromatic
 hydrocarbon diluent in 40-60 ratio by weight of
 solvent to diluent, blended 90 per cent or more
 with a solution having 20 per cent ethyl meth-
 acrylate polymer, 10 per cent methyl methacry-
 late polymer and 10 per cent normal butyl meth-
 acrylate polymer with 60 per cent of aromatic
 hydrocarbon, removing the excess solution from
 the impregnated fabric and driving off the solvent
 to produce a stiffened fabric composition which
 may be resoftened by use of a ketone solvent.

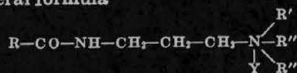
2,626,876
**ANTISTATIC TREATMENT OF ARTICLES
 COMPRISING A VINYL RESIN AND
 TREATED ARTICLES**

Joseph J. Carnes, Greenwich, Conn., assignor to
 American Cyanamid Company, New York, N. Y.,
 a corporation of Maine

No Drawing. Application August 17, 1951,
 Serial No. 242,433

11 Claims. (Cl. 117-138.8)

1. The method of conditioning a shaped article
 comprising a thermoplastic vinyl resin to lessen
 its tendency to accumulate static charges of elec-
 tricity thereon, said method comprising applying
 to the said article a volatile liquid containing a
 quaternary ammonium compound represented by
 the general formula



wherein R is a member of the group consisting of
 aliphatic and alicyclic radicals containing at least
 7 carbon atoms, R' and R'' are members of the
 group consisting of alkyl and hydroxyalkyl radi-
 cals having from 1 to 3 carbon atoms, inclusive,
 R''' is a hydroxyalkyl radical having from 1 to 3
 carbon atoms, inclusive, and Y is an anion, and
 the amount of the said liquid containing the said
 quaternary ammonium compound which is ap-
 plied to the said article being such that the fin-
 ished article has associated therewith from, by
 weight, 0.2% to 10% of the said quaternary am-
 monium compound, based on the weight of the
 dry, untreated article, and drying the thusly
 treated article.

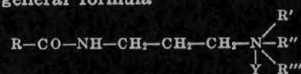
2,626,877
**TREATMENT OF ARTICLES COMPRISING A
 VINYL RESIN WITH AN ANTISTATIC
 AGENT AND TREATED ARTICLES**

Joseph J. Carnes, Greenwich, Conn., assignor to
 American Cyanamid Company, New York, N. Y.,
 a corporation of Maine

No Drawing. Application August 17, 1951,
 Serial No. 242,434

13 Claims. (Cl. 117-138.8)

1. The method of conditioning a shaped article
 comprising a thermoplastic vinyl resin to lessen
 its tendency to accumulate static charges of elec-
 tricity thereon, said method comprising apply-
 ing to the said article a volatile liquid containing
 a quaternary ammonium compound represented
 by the general formula



wherein R represents an aliphatic hydrocarbon
 radical containing at least 7 carbon atoms, R'
 and R'' each represents an alkyl radical con-
 taining from 1 to 5 carbon atoms, inclusive, R'''
 represents a radical of the group consisting of
 alkyl, alkenyl and aralkyl radicals, and Y rep-
 represents an anion, and the amount of the said
 liquid containing the said quaternary ammonium
 compound which is applied to the said article
 being such that the finished article has associ-
 ated therewith from, by weight, 0.2% to 10%
 of the said quaternary ammonium compound,
 based on the weight of the dry, untreated article,
 and drying the thusly treated article.

2,626,883
NONWOVEN RAYON FABRIC
 Alvin W. Boese, White Bear Township, Ramsey
 County, Minn., assignor to Minnesota Mining
 & Manufacturing Company, St. Paul, Minn., a
 corporation of Delaware

Application June 3, 1950, Serial No. 166,031
 3 Claims. (Cl. 154-53.6)



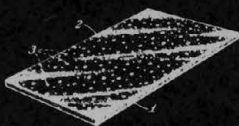
1. A non-woven rayon fabric of the character
 described, essentially consisting of a tissue-like
 web serving as the base layer and formed of a
 compacted carded mixture of staple viscose rayon
 fibers and plasticized staple acetate rayon fibers
 which both have a length of at least approxi-
 mately one inch, said acetate rayon fibers being in
 the proportion of about 50 to 65% by weight and
 being autogenously interbonded at their cross-
 ing points to form a network within which the
 viscose rayon fibers are distributed, and a mono-
 layer of aligned yarns of non-plasticized con-
 tinuous acetate rayon filaments laminated to one
 face of said tissue-like web by autogenous bond-
 ing to said plasticized acetate rayon fibers, the
 composite rayon fabric being impregnated by a
 flexible water-resistant sizing that superficially
 coats the yarns without materially stiffening the
 fabric, and the fabric having a high sheen on the
 yarn side.

2,626,886
**LAMINATED SHEET AND METHOD OF
 MAKING SAME**

William M. Scholl, Chicago, Ill.
 Application November 22, 1949, Serial No. 128,749
 3 Claims. (Cl. 154-103)

1. A laminated material including a relatively
 thick sheet of flexible, cellular foam latex one
 side of which has coarser pores than the other,
 and a relatively thin thermoplastic film adhered
 to said latex sheet over said one side to seal
 the coarser pores.
 2. The method of making a laminated sheet,
 including the step of spraying a thermoplastic

resinous film over the more porous side of a



cellular latex layer having a relatively porous side and a relatively non-porous side.

2,626,934

ALKALINE-SETTING RESIN ADHESIVE AND METHOD OF MAKING SAME

Carl C. Kesler, Cedar Rapids, Iowa, assignor to Penick & Ford, Ltd., Incorporated, Cedar Rapids, Iowa, a corporation of Delaware
No Drawing. Application November 17, 1948,
Serial No. 60,641

20 Claims. (Cl. 260-9)

17. In a process of preparing starch and dextrin adhesives capable of forming water-resistant films on drying, the steps of forming in water a mixture of a material selected from a group consisting of starch, dextrin, and mixtures of starch and dextrin, with from 2 to 10% by weight on the basis of the total amount of said material of a water-soluble resin capable of setting to a water-resistant state at a pH within the range 7.0 to 9.0, said resin being selected from the group consisting of phenol-aldehyde, ketone-aldehyde, and resorcinol-aldehyde resins, adding sufficient alkali to bring the pH of the mixture substantially above pH 9 and thereby within the alkaline range for reaction between said material and said resin, and raising the temperature of said mixture above the temperature required to gelatinize said material.

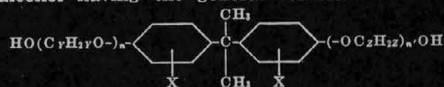
2,626,939

ALKYDS AND VARNISHES COMPRISING SAME

Harold M. Hoogsteen and Norman R. Peterson, Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich., a corporation of Delaware
No Drawing. Application December 27, 1949,
Serial No. 135,308

17 Claims. (Cl. 260-22)

1. A method of making an alkyd which comprises reacting together an alkylidene-bis-aryloxy alcohol having the general formula:—



wherein X represents a member of the group consisting of hydrogen and the phenyl radical, n and n' individually represent one of the integers 1 and 2, Y and Z individually represent integers of from 2 to 3, at least one saturated aliphatic polyhydric alcohol including such alcohol having more than three oxy groups attached to a single hydrocarbon radical of the molecule, a member of the group consisting of saturated polycarboxylic acids and their anhydrides, and at least one member of the group consisting of drying oils having a degree of conjugation not greater than 35 per cent and corresponding drying oil acids, the member of the group consisting of saturated polycarboxylic acids and their anhydrides being in a proportion providing from 65 to 80 per cent of all carboxy radicals of the reacting materials, the polyhydric alcohols being present in amount at least as great as that theoretically required for complete esterification of all of the carboxylic acids in the mixture, the alkylidene-bis-aryloxy alcohol being in a proportion such as to provide from 18 to 50 per cent of all of the oxy groups of the polyhydric alcohols and esters thereof in the mixture, and any drying oil present being in amount not greater than 50 per cent of the combined weight of the starting materials just mentioned.

2,626,941

WATER IMPERMEABLE, WATER VAPOR PERMEABLE COATING

Bruce W. Habeck, Akron, Ohio, assignor to Wing-foot Corporation, Akron, Ohio, a corporation of Delaware
No Drawing. Application August 15, 1949,
Serial No. 110,473

22 Claims. (Cl. 260-33.6)

14. A coating composition for use in preparing water impermeable, water vapor permeable coatings which is the product obtained by dispersing in a dispersion of a rubber a finely divided, solid, non-porous filler having a wet density in toluene of not more than 80 pounds per cubic foot, in an amount not less than that represented by the formula

$$x=45.87+21.44y-0.938y^2+1.625y^3$$

in which x equals grams of filler per 100 cubic centimeters of the rubber and y equals one-tenth the wet density, in pounds per cubic foot, of the filler in the dispersing medium of the dispersion.

2,626,945

INTERPOLYMERIZATION OF POLYOLEFINIC ESTERS OF 2-ALKENYL ALCOHOLS WITH CERTAIN MONOOLEFINIC HYDROCARBONS

Frank J. Carlin, Upper Saddle River, N. J., assignor to United States Rubber Company, New York, N. Y., a corporation of New Jersey
No Drawing. Application July 11, 1949,
Serial No. 104,155

3 Claims. (Cl. 260-78.5)

1. In a method of polymerizing (A) a polyolefinic ester selected from the group consisting of poly-unsaturated esters, said unsaturation being ethylenic unsaturation, of alcohols of the formula $\text{R}^*\text{CH}=\text{CR}^*\text{CH}_2\text{X}$ in which one R^* is hydrogen and the other R^* is a radical selected from the group consisting of hydrogen,

chlorine, methyl, ethyl and phenyl and X is a radical selected from the group consisting of hydroxyl and hydroxyalkoxy radicals of the formula $-\text{O}-\text{CHR}^0-\text{CHR}^0-\text{OH}$ wherein R^0 is a radical selected from the group consisting of hydrogen and alkyl, to form a soluble, unsaturated polymer by heating at 25 to 150° C. in the presence of a free radical type polymerization initiator, the step of carrying out the said polymerization in the presence of at least 0.2 mole of (B) a liquid copolymerizable monoolefinic hydrocarbon selected from the group consisting of cyclohexene and acyclic alkenes having from 5 to 10 carbon atoms, per mole of said ester, whereby the conversion of said ester to soluble, unsaturated polymer is substantially increased.

3. A soluble, unsaturated interpolymer of (A) diallyl fumarate, (B) diisobutylene, and (C) styrene, said interpolymer being formed by heating the said materials in proportion of from 0.2 to 8 moles of (B) and from 0.1 to 8 moles of (C) per mole of (A) in the presence of a free radical type polymerization initiator.

2,626,946

**POLYMERIZABLE AND POLYMERIZED
ACRYLONITRILE COMPOSITIONS**

John A. Price, Stamford, and Walter M. Thomas
and John J. Padbury, Springdale, Conn., as-
signors to American Cyanamid Company, New
York, N. Y., a corporation of Maine
No Drawing. Application December 12, 1950,
Serial No. 200,486

8 Claims. (Cl. 260—80.5)

5. A copolymer of a mixture of copolymerizable ingredients including (1) acrylonitrile, (2) monoallyl amine and (3) an alkyl acrylate containing not more than four carbon atoms in the alkyl grouping thereof, the acrylonitrile constituting a preponderant proportion by weight of the total weight of copolymerizable ingredients in the said mixture and the monoallyl amine constituting from about 1.5% to about 15% of the total weight of the acrylonitrile and monoallyl amine in the said mixture, and all of the nitrogen-containing radicals in the said copolymer being cyano and amino radicals.

2,626,957

**HEXA(ALKOXY) AND HEXA(ALKYLTHIO)
DISILOXANES**

Bernard A. Orkin, Philadelphia, Pa., assignor to
Socony-Vacuum Oil Company, Incorporated,
a corporation of New York
No Drawing. Application September 1, 1948,
Serial No. 47,343

4 Claims. (Cl. 260—448.8)

1. A compound having the formula,
(RT)₆SiOSi(TR)₆

wherein R is a radical selected from the group consisting of alkyl, cycloalkyl, aryl, aralkyl, and thienyl, 2-ethylthienyl, 5-methyl-thienyl, pyridyl, furfuryl, and quinolyl radicals, and T is a divalent atom selected from the group consisting of oxygen and sulfur atoms, in which the total number of carbon atoms and heterocyclic atoms in each molecule varies between about 42 atoms and about 60 atoms.

2,626,963

PRODUCTION OF VINYL FLUORIDE

Jared Wilson Clark, Charleston, W. Va., assignor
to Union Carbide and Carbon Corporation, a
corporation of New York
No Drawing. Application January 6, 1951,
Serial No. 204,833

13 Claims. (Cl. 260—653)

1. Process for producing vinyl fluoride, which comprises briefly contacting a mixture containing hydrogen fluoride and acetylene at an elevated temperature above 100° C. with a cuprous cyanide deposited upon a porous solid substantially inert to attack by the reactants under the conditions of the resultant reaction.

2,626,968

EXPANDED PLASTICS

Isaac L. Newell, Wethersfield, Conn., assignor to
United Aircraft Corporation, East Hartford,
Conn., a corporation of Delaware
No Drawing. Application May 5, 1950,
Serial No. 160,395

7 Claims. (Cl. 260—724)

1. A process of making an expanded plastic selected from the group consisting of rubber and synthetic resins comprising, combining said plastic to be expanded with an organic ammonium nitrite selected from the group consisting of di-isopropyl ammonium nitrite, di-isobutyl ammonium nitrite, di-cyclohexyl ammonium nitrite, di-n-butyl ammonium nitrite, di-phenyl ammonium nitrite, monophenyl ammonium nitrite, monoethyl ammonium nitrite and tri-n-butyl ammonium nitrite, and subjecting said plastic and nitrite to an elevated temperature.

Minnesota Mining & Manufacturing Company

INTER-OFFICE CORRESPONDENCE
ST. PAUL, MINNESOTA

Subject: A. W. Boese
Patent 2,626,883
SASHEEN

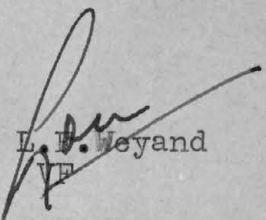
February 18, 1953

MR. A. W. BOESE:

Dear Al -

Before me is a letter from Mr. Coulter advising that the subject patent was issued on January 27th and I have read it with great interest. It is contributions such as this which continue to keep 3M recognized as a growth company and many of us see excellent possibilities in the sale of Sasheen Ribbon.

Allow me to thank you for your contributions and continued constructive efforts on behalf of 3M.



L. D. Heyand

cc-Mr. Borden
Mr. Coulter
Mr. McKnight
Dr. Oakes
Mr. Poole
Mr. Smith

CARPENTER, ABBOTT, COULTER & KINNEY

PATENT AND TRADE-MARK CAUSES

PAUL CARPENTER, (1908-1941)
WILLIAM H. ABBOTT
E. G. CARPENTER
ROBERT I. COULTER
HAROLD J. KINNEY
MARK SEVERANCE
MARK W. GEHAN
C. B. GEHRENBECK
PATENT AGENT

900 FAUQUIER AVENUE
SAINT PAUL 6, MINNESOTA

VAN BUREN 6037
TWX-STP 147

February 11, 1955

3/14
Jan
Get my patent
on decorative fabric
all

TO: Mr. A. W. Boese

Enclosed herewith is a typed translation of the
claims of German patent Application No. S 33,912.

This patent is being forwarded to you prin-
cipally so that you may let us know if the claims thereof
purport to cover any work done by Minnesota Mining and
Manufacturing Company. If they should, please let me
know promptly. Please return this patent to us when you
are through with it.

Yours very truly,

Mark W. Gehan
MARK W. GEHAN *re*

MWG:rb

Encl.

97.00
26.00
111.00
11.00
148.00

CARPENTER, ABBOTT
COULTER & KINNEY
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FEB 8 1955

Referred to _____

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Translation

German Patent Application S 33,912

Application filed: June 17, 1953

Published : November 4, 1954

Opposition until : March 4, 1955

Alme 2/11/55
a Base

12

Inventors: Leslie Herbert Griffiths, of London, and
Walter Saul, of Sutton Goldfield, Warwickshire,
(Great Britain)

Applicant: SEMTEX Limited, of London

"Process for Producing Inherently Patterned
Webs or Plates from Thermoplastic Synthetic
Substances"

Claims:

1. A process for producing inherently patterned webs or plates from thermoplastic synthetic substances, particularly from polyvinyl chloride or the copolymerizates thereof, characterized by the feature that a mixture of differently colored shreds of thermoplastic mixtures is rolled out into a web, or is rolled into a single-color web of a thermoplastic mixture, whereafter one or more of such pre-patterned webs and a web of a thermoplastic mixture that is compatible therewith and is of the ground color of the pre-patterned web or webs, are united, preferably under heat and pressure the combined webs then being calendered in the hot state with reduction of their thickness.

2. A process according to claim 1, characterized by the feature that the pre-rolled webs, after being combined, are passed through the final roll train at right angles to the first rolling operation.

3. A process according to claims 1 and 2, characterized by the feature that the pre-patterned webs are produced with a content of 20 to 80% of shreds in the color of the base web.

4. A process according to claims 1 to 3, characterized by the feature that pre-patterned webs are placed upon a base web having five to twenty times their thickness, and are further treated together with said base web.

5. A process according to claims 1 to 4, characterized by the feature that the combined webs are divided into sections which are then passed into the final roll train after being turned through 90° .

6. A process according to claim 1, characterized by the feature that the shreds serving to produce the pre-patterned web, are produced by dividing correspondingly differently dyed webs of thermoplastic synthetic substances.

CARPENTER, ABBOTT
COULTER & KINNEY
RECEIVED by

FEB 8 1955

Referred to

Copies to

Auszug

P a t e n t a n m e l d u n g : 39a,14. S 33 912.

Erfinder: Leslie Herbert Griffiths, London und Walter Saul,
Sutton Coldfield, Warwickshire (Großbritannien).

Anmelder: Semtex Limited, London.

Bezeichnung:

Verfahren zum Herstellen von in sich gemusterten
Bahnen oder Platten aus thermoplastischen Kunst-
stoffen.

Eingereicht: 17. 6.53.

Bekanntgemacht: 4.11.54.

Einspruchsfrist bis zum: 4. 3.55.

Patentansprüche:

1. Verfahren zum Herstellen von in sich gemusterten Bahnen oder Platten aus thermoplastischen Kunststoffen, insbesondere aus Polyvinylchlorid oder dessen Mischpolymerisaten, dadurch gekennzeichnet, dass ein Gemisch von unter sich verschiedenfarbigen Schnitzeln thermoplastischer Mischungen zu einer Bahn oder in eine einfarbige Bahn einer thermoplastischen Mischung aus- bzw, eingewalzt, eine oder mehrere dieser vorgemusterten Bahnen und einer Bahn aus einer damit verträglichen thermoplastischen Mischung vorzugsweise durch Druck- und Wärme- einwirkung vereinigt wird, die in der Grundfarbe der vorgemusterten Bahn oder Bahnen gehalten ist, und die vereinigten Bahnen in warmem Zustand unter Verringerung der Stärke kalandriert werden.

2. Verfahren nach Anspruch 1, dadurch gekennzeichnet, dass die vorausgewalzten Bahnen nach der Vereinigung im rechten Winkel zu der Erstauswalzung durch das Endwalzwerk geführt werden.

3. Verfahren nach Anspruch 1 und 2, dadurch gekennzeichnet, dass die vorgemusterten Bahnen mit einem Gehalt von 20 - 80 % Schnitzeln in der Farbe der Grundbahn hergestellt werden.

4. Verfahren nach Anspruch 1 - 3, dadurch gekennzeichnet, dass vorgemusterte Bahnen auf eine Grundbahn mit der fünf- bis zwanzigfachen Stärke aufgelegt und mit dieser weiterverarbeitet werden.

5. Verfahren nach Anspruch 1 - 4, dadurch gekennzeichnet, dass die vereinigten Bahnen in Abschnitte aufgeteilt und diese nach Verdrehen um 90° dem Endwalzwerk aufgegeben werden.

6. Verfahren nach Anspruch 1, dadurch gekennzeichnet, dass die zum Herstellen der vorgemusterten Bahn dienenden Schnitzel durch Aufteilen entsprechend verschieden eingefärbter thermoplastischer Kunststoffbahnen erhalten werden.

Aus der Beschreibung:

Das Verfahren gemäss der Erfindung ist nachstehend anhand einiger Ausführungsbeispiele näher erläutert.

Beispiel 1:

Für das Herstellen eines Fussbodenbelags wird eine Reihe von verschiedenen eingefärbten Mischungen folgender Zusammensetzung hergestellt:

Polyvinylchlorid	22,0 GT
Weichmacher	16,0 "
Asbestfasern	29,0 "
Farbstoff	5,0 "
Kalksteinpulver	26,5 "
Bleikarbonat	1,5 "

Diese Grundstoffe werden in einem beheizten Mischer miteinander vermischt, und das erhaltene Produkt wird auf einem Walzwerk zu einer Bahn von etwa 6,25 mm ausgewalzt, die dann durch eine Schneidmaschine in Brocken von 5 mm Breite aufgeschnitzelt wird. Die verschieden farbigen Brocken werden dann miteinander vermischt.

Wenn etwa ein elfenbeinfarbiger Belag, der mit einer grünen Maserung durchzogen ist, hergestellt werden soll, werden 80 % elfenbeinfarbiger Brocken mit 20 % grüner Brocken miteinander gemischt. Nach gleichmässiger Durchmischung der verschieden farbigen Brocken wird das Gemisch auf etwa $60 - 80^{\circ}$ erhitzt und auf den oberen Einzugsspalt eines Dreiwalzenkalenders aufgegeben, dessen Walzen so eingestellt sind, dass sich eine Kunststoffbahn mit einer Stärke von 1,0 - 1,5 mm ergibt.

gibt. Die Temperatur der Walzen wird dabei auf etwa 135 - 140° gehalten. Die auf diese Weise erhaltenen Bahnen können bis zur endgültigen Verarbeitung gelagert werden.

In einem zweiten Arbeitsgang wird aus lediglich elfenbeinfarbigem Brocken oder einer nur den dahingehenden Farbstoff enthaltenden Grundmischung eine Bahn mit einer Stärke von etwa 1 mm auf einem Walzwerk ausgewalzt, dessen Walzen mit einer Umfangsgeschwindigkeit im Verhältnis 1 - 1,3 angetrieben sind.

Unmittelbar im Anschluss an die Bildung dieser Grundbahn, bevor diese sich also abgekühlt hat, wird auf sie eine der in dem anderen Arbeitsgang vorgemusterten Bahnen aufgelegt, die auf die Austrittstemperatur der Grundbahn aufgeheizt ist, worauf die beiden aufeinanderliegenden Bahnen nochmals durch ein Walzwerk od. dgl. geführt werden, um die Gesamtstärke auf etwa 1 cm zu bringen. Die erhaltene Bahn wird dann in der Breite entsprechende Stücke aufgeteilt, und die Teilstücke werden im rechten Winkel zu der bisherigen Durchlaufrichtung durch einen Dreiwalzenkalender geführt, wobei die Stärke beim Durchgang zwischen dem ersten Walzenpaar auf 1,25 mm und zwischen dem zweiten Walzenpaar auf 0,75 mm gebracht wird.

Für das Herstellen langer Bahnen werden die Abschnitte so auf den Walzenkalender aufgegeben, dass sie nach dem Durchgang eine fortlaufende Bahn ergeben.

Beispiel 2:

Es werden drei verschiedenfarbige Grundmischungen folgender Zusammensetzung hergestellt:

Asbestfasern	42 Teile
Polyvinylchlorid	27 Teile
Triäresylphosphat	16 Teile
Bleikarbonat	0,75 Teile
Kalksteinpulver und Farbstoff	14,25 Teile

Diese Grundbestandteile werden nach dem Beispiel 1 miteinander vermischt und zu Bahnen mit einer Stärke von etwa 0,75 mm ausgewalzt. Es werden somit drei Bahnen, etwa in den

Farben

Farben Gelb, Rot und Blau erhalten. Die rote und die blaue Bahn werden völlig und die gelbe Bahn wird zu $\frac{1}{3}$ aufgeschnitzelt. Es werden dann 15 Teile der gelben mit je 25 Teilen der roten und blauen Schnitzel gemischt, und das Gemisch wird gleichmässig auf die verbliebene gelbe Bahn derart aufgestreut, dass die gemischten Schnitzel etwa 35 % der Gesamtmasse betragen.

Die mit den Schnitzeln bestreute Bahn wird dann durch einen Zweiwalzenkalanders geführt, der so eingestellt ist, dass sich eine vorgemaserte Bahn mit einer Stärke von etwa 1,25 mm ergibt. Die Oberwalze des Kalanders wird dabei auf einer Temperatur von etwa 90° gehalten, während die Temperatur der Unterwalze bei etwa 130° liegt.

Die auf diese Weise erhaltene vorgemusterte Bahn wird dann wie im Beispiel 1 auf einer gelben Grundbahn weiterverarbeitet.

Beispiel 3:

Eine vorgemusterte Bahn wird, wie im Beispiel 2 angegeben, hergestellt, und es werden zwei Lagen dieser Bahn auf eine Grundbahn von 1 cm Stärke aufgelegt und wie im Beispiel 1 weiterverarbeitet. Es ergibt sich hierdurch eine noch bessere Marmorierung des Endproduktes.

CARPENTER, ABBOTT, COULTER & KINNEY

PATENT AND TRADE-MARK CAUSES

PAUL CARPENTER (1908-1941)
WILLIAM H. ABBOTT
E. C. CARPENTER
ROBERT I. COULTER
HAROLD J. KINNEY
MARK SEVERANCE
MARK W. CEHAN
G. B. GEHRENBECK
PATENT AGENT

**900 FAUQUIER AVENUE
SAINT PAUL 6, MINNESOTA**

**VAN BUREN 6037
TWX-STP 147**

August 30, 1955

MR. A. W. BOESE 27-1

Re: Application of ALVIN W. BOESE
for "Nonwoven Polyester Fabrics
Useful for Electrical Insulation"
(Our file No. 9495)

Dear Mr. Boese:

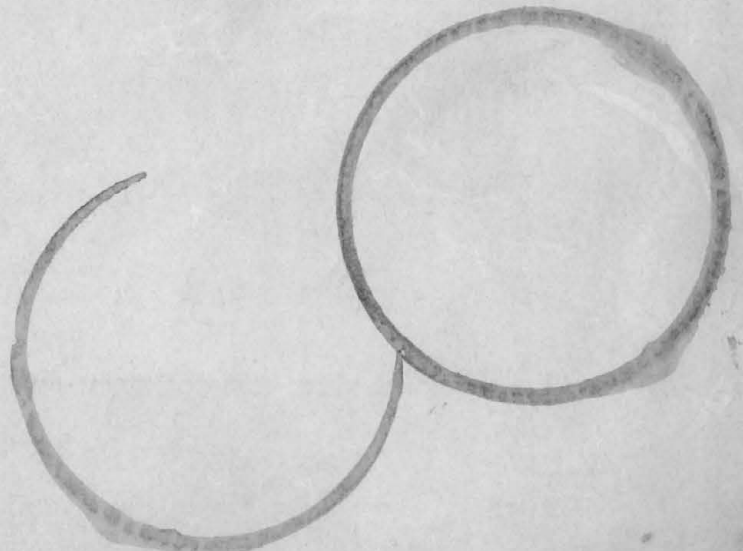
Enclosed is a copy of this application in the final form executed by you today, which you can retain for your files. It will be mailed to the Patent Office tomorrow.

Very truly yours,

ROBERT I. COULTER

RIC:O
Enc.

cc.: Mr. A. H. Redpath



209858

COMMONWEALTH OF AUSTRALIA

PATENT SPECIFICATION

20,165/56.

Complete Specification Lodged 25th July, 1956.

Application Lodged (No.20, 165/56.) 25th July, 1956.

Applicant.....Minnesota Mining and Manufacturing Company.

Actual Inventor..... Alvin W. Boese.

Convention Application.

(United States of America, 2nd September, 1955).

Complete Specification Published 31st January, 1957.

Complete Specification Accepted 16th August, 1957.

Classification 47.2; 41.7; 41.9; 04.1.

No drawing.

COMPLETE SPECIFICATION.

**"IMPROVEMENTS IN OR RELATING TO NON-WOVEN
POLYESTER FIBROUS FABRIC."**

The following statement is a full description of this invention, including the best method of performing it known to us:-

This invention relates to a novel nonwoven fibrous fabric having exceptional utility for electrical insulation purposes on account of the combination of physical, chemical and electrical properties which inhere in its structure; and to impregnated and laminated products incorporating the fabrics.

It is composed of a mixture of two different types of staple polyester fibers which are combined into a unified flexible web without need of using extraneous adhesive or bonding agents. The product is not a "paper" in the usual sense and is not manufactured by employing a paper-making procedure or paper-making fibers. The fiber structure as a whole, and the relationship of the individual fibers, are quite different from those of papers and those of woven cloths, with resultant advantages in respect to usage for electrical insulation purposes.

The web has a porous open structure in which the relative-

ly long staple fibers are heterogenously mixed and contact each other only at their crossing points, being otherwise free from contact along their axes. This makes not only for greater flexibility but provides a fabric in which a high percentage of the individual fiber surfaces can be contacted by an impregnant. The fabric is well adapted for impregnation by electrical insulating varnishes and has a high "pick up ratio" (ratio of impregnant weight to fiber weight). The structure permits of free access to substantially the complete surface area of each fiber and avoids the possibility of air being trapped. This is in contrast to the structure of woven cloths formed of threads composed of twisted fibers spun together, wherein the fibers of each thread contact each other along their axes, and air can be trapped in amongst the fibers. The present fabric can be impregnated with varnish prior to use to provide a varnished fabric type of insulation, and such manufactured products are embraced by the invention. The term "varnish" is employed in its broad sense and is not restricted to oleoresinous varnishes. The varnish impregnant can be a soft and stretchable polymer composition, such as a heat-curing polyester or epoxy resin composition, which is adapted to be fully "cured" at a subsequent time by heating the impregnated fabric after application, for instance after the winding of a coil with impregnated tape.

A further feature of the present nonwoven fabric is that it can be slit into ribbons or tapes having a precise width and having non-ravelling edges. Such tapes are stretchable to the extent of at least about 20% without rupturing. They lend themselves to the winding of coils and other objects with good conformation. Moreover, the structure limits fiber motion to the area required for obtaining conformation. In contrast, a woven tape has less elongation ability (about 6.5% in the case of woven cotton tapes) and the woven structure requires bundles of fibers (yarns or threads) to move over considerable distances in seeking conformation. Conformation with minimum fiber motion is desirable in order to minimize loss of continuity of an impregnant.

The polyester fibers have excellent electrical properties. They are non-corrosive and are highly resistant to absorption of moisture. They are insoluble in oils and common organic solvents. They have good thermal properties and stability and are highly resistant to deterioration. Although these characteristics were previously known, the utilization of polyester fibers in self-unified nonwoven fabrics is believed to be an innovation of the present invention.

An important feature of the present nonwoven fabric is that it can be laminated to a polyester film to provide a composite flexible film-fiber sheet or tape that has excellent properties

for electrical insulation usages, as for instance for slot insulation, with or without impregnation. These laminated film products are embraced by the invention.

The novel nonwoven polyester fiber fabrics of the invention comprise one or more plies of a self-unified tissuelike web formed of a compacted carded mixture of two types of staple polyester fibers which both have a length of at least approximately one inch (25.4 mm.). One type provides fibers that are autogenously interbonded at their crossing points to form a network that unifies the structure. Autogenous interbonding means that the fibers are united at their crossing points without the use of an extraneous adhesive agent, the fibers being fused together, as by being pressed together at a temperature at which they are soft and mutually cohesive. The other type of polyester fiber provides fibers that are not interbonded to each other at their crossing points, and which are only lightly bonded if at all at the points at which they cross the fibers of the first-mentioned type, being held in the structure mainly by mechanical restraint. The interbonded fibers provide a network within which the non-interbonded fibers are interlaced. This result is obtained by using a carded mixture of "undrawn" fibers and "drawn" fibers to provide the two types of polyester fibers just mentioned, each being present in the proportion of about 40 to 60% by weight (based on a total of 100%).

"Polyester" fibers are well known by that designation in the synthetic textile fiber trade and are commercially available. They are formed by melting and extruding through spinnerets a high molecular weight linear polyester of a dihydric alcohol and a dicarboxylic aromatic acid. The extruded filaments are subjected to drawing (stretching) in manufacturing the regular commercial product, the drawn filaments having a higher softening temperature and increased tensile strength and elasticity, and decreased stretchability, resulting from orientation of the polymer molecules in the direction of the fiber axis and the development of crystallinity. Continuous fiber filaments are chopped to produce staple fibers. As noted, the commercial product (whether sold in the form of continuous filament yarns or as staple fibers) is of this drawn type, and it alone possesses the combination of properties desired for conventional textile usage.

The "undrawn" type of polyester fiber is an intermediate product which is amorphous (non-crystalline) and has a non-oriented molecular structure. So far as is presently known, it had not been produced as an end product for commercial usage prior to this invention, although considerable quantities were accumulated as waste material in the course of manufactur-

ing the "drawn" type constituting the usual desired end product. This waste material was commonly discarded or sold as scrap. Continuous filaments thereof can be chopped into staple fibers and these are utilized in fabricating the product of the present invention.

Polyester fiber is manufactured in the United States by the Du Pont Company and sold under the trade-mark "Dacron". It is produced from a polyester of ethylene glycol and terephthalic acid and has been subjected to drawing.

Fibers of the commercial "drawn" type cannot be employed as the sole fiber constituent of the non-woven fabric of this invention. The melting point of "Dacron" polyester fiber is approximately 480°F. (240°C.) and the temperature range over which the fiber softens and melts is very narrow. This makes it impossible autogenously to interbond the fibers in a satisfactory manner by heating and pressing, for the fibers either will not be softened so that they can fuse together or else they will be so plastic that they will become mashed.

Polyester fibers of the "undrawn" type also cannot be employed as the sole fiber constituents of the non-woven fabric of this invention. These fibers, such as those made from undrawn filaments produced intermediately in the manufacture of "Dacron" fibers, have a thermal softening characteristic that would result in excessive machining when subjected to heating and pressing that is adequate firmly to fuse together the fibers at their crossing points.

It has here been discovered, however, that a carded tissue-like mixture of the two types of fibers can be unified by heating and soft-pressing so as autogenously to interbond the undrawn type of fibers at their crossing points without machining any of the fibers, each type being present in the proportion of about 40 to 60% by weight. If the proportion of undrawn fibers is substantially less than 40% there will be inadequate unification of the fabric structure. If the proportion is substantially greater than 60%, the fabric will have too much stiffness and inadequate strength and elasticity. A temperature is used which is sufficient to fuse together the undrawn filaments but insufficient to soften the drawn filaments.

The undrawn type of fiber made from intermediate undrawn "Dacron" polyester filaments has a wide softening range of approximately 300 to 450°F. (150 to 230°C.) within which satisfactory autogenous interbonding can be obtained. This range is below the temperature range within which the drawn type of fiber softens and melts. It has been found that the undrawn fibers can be autogenously interbonded (when intermingled with the drawn fibers in a carded web) by heating and soft-pressing without causing the unsoftened drawn fibers to cut into and weaken

or sever the softened undrawn fibers at the crossing points, and without fusing together, the two types of fibers becoming lightly or superficially bonded together if at all. The drawn fibers are not interbonded at each other and can slide over each other at their crossing points. The result is that the interbonded undrawn fibers form a unified network that unifies the composite fabric, the interlaced drawn fibers passing under and over each other and under and over the undrawn fibers and being held in the structure by mechanical restraint and to a certain extent by interbonding with the undrawn fibers. Adequate tensile strength is achieved, which would not be the case if the fabric were not unified. Autogenous bonding is achieved without the need of a plasticizer, due to the inherent properties of the undrawn polyester fibers.

The value of the combination of the two types of polyester fibers does not reside merely in the obtaining of a unified nonwoven fibrous structure as described above. The two types have materially different physical properties and conjointly function to produce a fabric having novel and useful properties.

A typical single-ply fabric product has a ream weight of 15 pounds (weight of 320 square yards). A two-ply unified fabric, having a ream weight of 30 pounds, can be readily manufactured by laminating a previously made unified single-ply web with a second carded web by simultaneously heating and soft-pressing which internally unifies the second web and unifies it to the first web due to interbonding of the undrawn fibers at their crossing points of contact. This two-ply web can then be made into a three-ply web, and so on, by repetition of the process. The products of principal interest are those consisting of one to four plies, having ream weights of about 15 to 60 pounds, respectively. For electrical insulation tapes, two-ply and three-ply structures are presently preferred, having ream weights of about 30 to 45 pounds, respectively.

The fabric product can be treated with a dilute solution or emulsion in a volatile vehicle of a coating material which upon drying will provide superficial impregnation by a waterproof insulating varnish, forming a thin sizing coating on the fibers, so as to obtain a modified fibrous fabric product that is still adequately porous, stretchable and conformable. An example is an aqueous emulsion of polyester monomer containing a polymerization catalyst which will dry and set-up on heating of the impregnated fabric to provide a sizing on the fibers of polyester varnish. The sizing eliminates any tendency to fuzziness and increases the tensile strength. A fabric that has been sized with polyester resin can be autogenously bonded to a polyester film by suitable heating and pressing.

Complete impregnation of the porous fabric, whether or not previously given a sizing treatment, with any suitable electrical insulating varnish, results in a flexible varnished insulating fabric having desirable properties attributable both to the characteristics of the fibrous fabric and to the relatively high proportion of varnish relative to the volume or weight of the fibers. Similarly, if a fabric tape is employed for winding on electrical coils, for example, subsequent impregnation with insulating varnish results in a desirable insulating covering due to the combination of favorable factors.

Process of Making. The apparatus employed for making the nonwoven fibrous fabric of the invention in continuous fashion consists essentially of a carding machine to mix and intermingle the fibers and form a carded tissue-like web thereof; a rotating heated drum provided with suitable pressing rolls which subjects the carded web to heating and soft-pressing adapted to compact the fibrous structure and cause the undrawn polyester fibers to become autogenously interbonded so as to unify the structure; and a wind-up mechanism for winding the finished web into rolls. In addition means are provided for feeding a previously made fabric from a roll thereof so as to lie on top of a carded web as it is carried by the rotating heating drum, thereby building up a multi-ply fabric by lamination of plies.

The term "carding machine" includes not only those which are technically termed carding machines, but also Garnett machines which operate to form carded webs. The carding procedure straightens out the fibers and forms a loose open-mesh fluffy web of non-parallel interlaced fibers which pass over and under each other in a heterogeneous fashion. Each fiber is crossed by numerous other fibers along its length. The mixture of fibers is preferably prepared for carding by throwing the fibers, in the desired relative proportion, into a "picker" which blends the mixture and opens the fibers.

The heating drum with its pressing rolls exerts a light-pressure soft-roll pressing action upon the carded web which is entirely different from the pressure effect produced by the calendars used in textile mills, which have hard rolls forming the nips through which sheet material is passed under heavy pressure. A gentle pressing is essential to prevent mashing of the softened fibers.

The heating drum may be a horizontal polished steel drum having a diameter of 30 inches (762 mm.) and a length of 66 inches (1676.4 mm) to handle a web 60 inches (1584 mm.) wide. It is internally heated to provide a surface temperature in the range of 420 to 445°F (215 to 229°C.). It is rotated at a speed of approximately 7.65 revolutions per minute so as to have

a peripheral speed of 60 feet per minute, thereby producing the product at the rate of 1,200 yards per hour. There are two horizontal pressing rolls mounted so as to bear against the heating drum, spaced apart by a distance of approximately two-thirds of the periphery. The carded web from the carding machine is fed into the nip between the first pressing roll and the drum and then travels along in contact with the surface of the rotating drum until it passes through the nip between the second pressing roll and the drum, involving a travel distance of approximately two-thirds of the periphery of the drum. The web is drawn up and around the latter roll and is thus separated from the surface of the heating drum, the web being pulled by pull rolls through which it passes en route to a wind-up roll. The stripping of the web from the drum is facilitated by a thin coating of silicone parting agent on the surface of the drum.

The movable pressing rolls are hollow steel cylinders having a diameter of 5 inches (127 mm.), and mounted in bearings so as to turn freely, and the desired pressure is exerted upon the bearings through air-activated cylinders, the pressure being controlled by control of the air pressure. The second pressing roll, which contacts the carded web when the latter is in a heated condition with the undrawn polyester fibers in a soft state, and which exerts a soft-pressing action to cause autogenous interbonding of fibers without mashing them, is covered with 20 turns of smooth glass cloth wound on in a direction so that the outer end will trail through the nip. The glass cloth provides a soft flexible surface which will not stick to the heated web and furnishes a substantial contact area at the nip. No covering is needed on the first pressing roll since the web passes through the nip before it has had a chance to heat up to a fiber-softening temperature; this roll serving to compact the fluffy carded web and holding the trailing portion of the web in good contact with the rotating drum as the web travels toward the nip of the second roll.

In typical manufacturing operations, the total pressure on the first pressing roll has been maintained at about 250 pounds (which is slightly more than 4 pounds per inch width of the web); while the total pressure on the second roll has been in the range of 250 to 1,000 pounds, depending on conditions.

In making a two-ply product the procedure is the same except that a previously manufactured one-ply bonded web is also fed into the first pressing roll nip, so as to overlie the web from the carding machine, the latter contacting the surface of the heating drum. The drum temperature is increased about 15°F. and the pressing roll pressures are also increased somewhat, so as to insure interbonding of the two webs. Similarly in making a three-ply or four-ply product, a two-ply or three-

ply bonded web is fed into the first pressing roll nip along with the unbonded web from the carding machine, thereby adding one ply and simultaneously bonding the web from the carding machine.

Final adjustments of temperature and pressures during manufacturing are made so that the product has the desired structure, which is readily ascertainable by inspection.

EXAMPLE Typical preferred types of product for electrical insulation usage are two-ply and three-ply polyester fiber fabrics manufactured in the manner just described and consisting of equal parts by weight of drawn "Dacron" staple fibers ($1\frac{1}{2}$ inch (38.10 mm.) average length and $1\frac{1}{2}$ denier size) and of undrawn polyester staple fibers ($1\frac{1}{4}$ inch (31.75 mm.) average length) chopped from filaments produced in the "Dacron" manufacturing operation but not subjected to the drawing procedure. These latter fibers have a diameter of 0.001 to 0.002 inch (.0254 to .0508 mm.), which is approximately twice that of the corresponding drawn fibers.

The resultant two-ply product has a ream weight of 30 pounds (weight of 320 square yards), corresponding to 1.5 ounces per square yard. The caliper thickness averages approximately 0.0065 inch (.1651 mm.). The lengthwise tensile strength is at least 4 pounds per inch width and the crosswise tensile strength is approximately 1 pound (this difference being due to the fact that the lengthwise components of fiber direction exceed the crosswise components in total magnitude). The elongation before rupture is 25 to 31%.

The three-ply product has a ream weight of 45 pounds (2.25 ounces per square yard); the caliper thickness is approximately 0.008 inch (.2032 mm.); the lengthwise and crosswise tensile strength are 10 (at least) and 2.5 pounds, respectively; and the elongation is 20 to 26%.

The bonded fabric product can be calendered if desired further to compact the structure and improve the uniformity of thickness. Temperatures and pressures should be low enough to avoid mutilation and cutting of fibers. For example, the two-ply product described above was satisfactorily calendered by being passed through the nip of a pair of 18 inch (457.20 mm.) diameter crowned steel rolls driven at a peripheral speed of 40 feet per minute. The surface temperature of the rolls was 230°F. (110°C.). The pressure was adjusted so as to reduce the caliper of the fabric from an average value of 0.0065 inch (.1651 mm.) to a value of 0.0045 inch (.1133 mm.).

The fibrous polyester fabric can be autogenously laminated to a polyester film. For example, a three-ply fabric was laminated to a "Mylar" polyester film of 0.0005 inch (.0127 mm.) thickness by passing the webs together through the pressing and

heating drum apparatus previously described, the film being on the inside in direct contact with the drum. This results in a superficial autogenous interbonding of the polyester film to the undrawn polyester fibers of the fabric which are in contact with the film. The film is of the drawn type and has an elevated softening temperature above that of the undrawn fibers, so that interbonding can be achieved at a temperature below the softening temperatures of the drawn fibers and the film, avoiding impairment of the physical and electrical properties of the film. There is no interbonding between the film and the drawn fibers, which facilitates flexibility and conformability. The "Mylar" polyester film is a product of the Du Pont Company and is produced from a polyester of ethylene glycol and terephthalic acid.

The claims defining the invention are as follows:

1. A nonwoven polyester fibrous fabric of the character described, having a ream weight of about 15 to 60 pounds and consisting essentially of a unified compacted carded mixture of drawn and undrawn staple polyester fibers which both have a length of at least approximately one inch (25.40 mm.), the said undrawn fibers being in the proportion of about 40 to 60% by weight and being autogenously interbonded at their crossing points to form a network within which the said drawn fibers are interlaced without being interbonded to each other. (2nd September, 1955)
2. A fabric according to claim 1 which is impregnated with an electrical insulating varnish. (2nd September, 1955)
3. An article comprising a polyester film laminated to a polyester fabric specified in claim 1. (2nd September, 1955)
4. A nonwoven polyester fibrous fabric substantially as herein described. (2nd September, 1955)

SPRUSON & FERGUSON.
Patent Attorneys for Applicant.

References:

<u>Serial No.</u>	<u>Application No.</u>	<u>Classification</u>
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COMPOSITE FILM-FABRIC ELECTRICAL INSULATING SHEET

Alvin W. Boese, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn., a corporation of Delaware
No Drawing. Filed Feb. 19, 1960, Ser. No. 9,674
12 Claims. (Cl. 161—150)

This application is a continuation-in-part of my co-pending application Ser. No. 532,369, filed Sept. 2, 1955, now abandoned.

This invention particularly relates to a composite film-fabric sheet having exceptional utility for electrical insulation purposes, which sheet comprises an improved non-woven fabric and a film of electrical insulating resin inseparably united to the fabric.

The improved fabric is composed of a mixture of two different types of staple polyester fibers which are combined together into a unified flexible web without need of using extraneous adhesives or bonding agents. The fabric is not a "paper" in the usual sense and its manufacture does not require the employment of paper-making procedure or paper-making fibers. The fiber structure as a whole, and the relationship of the individual fibers, are quite different from those of previously known nonwoven fabrics and those of woven cloths, with resultant outstanding advantages in respect to usage for electrical insulation purposes.

The fabric has a porous open structure in which the relatively long staple fibers are heterogeneously mixed and contact each other only at their crossing points, being otherwise free from contact along their axes. This makes not only for greater flexibility but provides a fabric in which a high percentage of the individual fiber surfaces can be contacted by an impregnant. The fabric is well adapted for impregnation by electrical insulating varnishes and has a high "pick up ratio" (ratio of impregnant weight to fiber weight). The structure permits of free access to substantially the complete surface area of each fiber and avoids the possibility of air being trapped.

This is in contrast to the structure of woven cloths formed of threads composed of twisted fibers spun together, wherein the fibers of each thread contact each other along their axes, and air can be trapped in amongst the fibers. The present fabric can be impregnated with polymeric resin varnish prior to use to provide a varnished fabric type of insulation, and such manufactured products are embraced by the invention. The term "varnish" is employed in its broad sense and is not restricted to oleo-resinous varnishes. The varnish impregnant can be a soft and stretchable polymer composition, such as a heat-curing polyester or epoxy resin composition, which is adapted to be fully "cured" at a subsequent time by heating the impregnated fabric after application, for instance, after the winding of a coil with impregnated tape.

A further feature of the present nonwoven fabric is that it can be slit into ribbons or tapes having a precise width and having non-ravelling edges. Such tapes when impregnated with a stretchable resin are stretchable to the extent of at least about 20% without rupturing. They lend themselves to the winding of coils and other objects with good conformation. Moreover, the structure limits fiber motion to the area required for obtaining conformation. In contrast, a woven tape has less elongation ability (about 6.5% in the case of woven cotton tapes)

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and the woven structure requires bundles of fibers (yarns or threads) to move over considerable distances in seeking conformation. Conformation with minimum fiber motion is desirable in order to minimize loss of continuity of an impregnant.

In the presently preferred form of the invention all of the fibers of the improved fabric are formed of the same identical chemical composition e.g. polyethylene terephthalate polyester. This identity of chemical composition is of particular advantage in the field of electrical insulation, it being effective to minimize electrical stress gradients at the interfaces between adjacent fibers. It has the further advantage of affording a fabric in which all of the fibers have substantially the same dielectric constant. Polyester fibers have excellent electrical insulating properties, are non-corrosive and substantially non-hygroscopic, are insoluble in oils and common organic solvents, and have good thermal properties and stability, as well as high resistance to deterioration. Although these characteristics of polyester were previously known, the utilization of polyester fibers in self-unified nonwoven fabrics as herein described is believed to be an innovation of the present invention.

An important feature of the present nonwoven fabric is that it can be formed as a single ply, or as a component of an autogenously bonded laminate including one or more other sheets which may take the form of like fabrics, webs of unidirectional continuous filament polymeric yarns, woven webs, or preformed polymeric films, all preferably of the same chemical composition for the reasons aforesaid. A composite flexible film-fabric sheet or tape of such laminated construction has excellent properties for electrical insulation usages, as for instance for slot insulation, with or without impregnation. These laminated products are all embraced by the invention.

My novel composite film-fabric sheet comprises one or more plies of a self-unified tissue-like fabric formed of a compacted carded mixture of interlaced staple bonding and structural fibers which both preferably have a length of at least approximately one inch. The bonding fibers are of thermoplastic polyester material and are initially in a substantially amorphous state. As a result of the application of heat and pressure in the formation of the improved fabric by the improved method to be described in detail hereinafter, the bonding fibers soften and autogenously bond to each other and to the structural fibers at their crossing points without the use of an extraneous adhesive agent. The temperature at which the bonding is effected is substantially below that which would soften or otherwise affect the structural fibers which are therefore substantially unaffected by the heat application referred to. The application of heat as required in carrying out the improved method effects, following the bonding aforesaid, sequential crystallization of the amorphous bonding fibers. Crystallization substantially raises the softening temperature range of the bonding fibers so that the finished fabric will withstand temperatures substantially higher than the softening temperature range of the bonding fibers in their initial amorphous state. Crystallization of the amorphous bonding fibers renders said bonding fibers substantially less susceptible to moisture absorption than said fibers were in their initial amorphous state and thus affords this further advantage over fabrics based on amorphous fibers.

In forming the improved fabric entirely of fibers of the same polyester, the desired result is obtained by starting with a carded mixture of "undrawn" amorphous un-

oriented bonding fibers and "drawn," i.e. crystalline, oriented structural fibers, each being present in the proportion of about 40 to 60% by weight (based on a total of 100%). Although both types of fibers are formed of the same polyester and neither is plasticized, the desired result is obtainable because use is made of amorphous "undrawn" fibers which inherently have a softening temperature range which is below the temperature range within which the "drawn" fibers soften and melt.

"Polyester" fibers are well known by that designation in the synthetic textile fiber trade and are commercially available. They may be formed by melting and extruding through spinnerets a high molecular weight linear polyester of a dihydric alcohol and a dicarboxylic aromatic acid. The extruded amorphous filaments are subjected to drawing (stretching) in manufacturing the regular commercial product; the drawn filaments having a higher softening temperature and increased tensile strength and elasticity, and decreased stretchability, resulting from orientation of the polymer molecules in the direction of the fiber axis and the development of crystallinity. Continuous fiber filaments are chopped to produce staple fibers. As noted, the commercial product (whether sold in the form of continuous filament yarns or as staple fibers) is of this drawn type, and it alone possesses the combination of properties desired for conventional textile usage.

As aforeindicated, the "undrawn" type of polyester fiber is an intermediate product which is amorphous (non-crystalline) and has a non-oriented molecular structure. So far as I am aware, it had not been produced as an end product for commercial usage prior to my invention, although considerable quantities were accumulated as waste material in the course of manufacturing the "drawn" type constituting the usual desired end product. This waste material was commonly discarded or sold as scrap. Continuous filaments thereof can be chopped into staple fibers and these are utilized in fabricating my product.

Polyester fiber is manufactured in the United States by the Du Pont Company and sold under the trademark "Dacron." It is produced from a polyester of ethylene glycol and terephthalic acid and has been subjected to drawing. Fibers of the commercial "drawn" type polyester cannot be employed as the sole fiber constituent of my nonwoven fabric, however. The softening point of "Dacron" polyester fiber is approximately 480° F. (250° C.) and the temperature range over which the fiber softens and melts is very narrow. This makes it impossible to autogenously interbond the fibers in a satisfactory manner by heating and pressing—for the fibers either will not be softened so that they can fuse together or else they will be so plastic that they will become mashed.

Polyester fibers of the amorphous "undrawn" type also cannot be employed as the sole fiber constituent of my nonwoven fabric. These fibers, such as those made from undrawn filaments produced intermediately in the manufacture of "Dacron" fibers, have a thermal softening characteristic that would result in excessive mashing when subjected to heating and pressing that is adequate to firmly fuse together the fibers at their crossing points. Moreover, these fibers, being unoriented, lack the necessary strength to serve as structural fibers and are extremely frangible. The amorphous undrawn type of fiber made from intermediate undrawn "Dacron" polyester filaments has a wide softening range of approximately 300 to 450° F. (150 to 230° C.) within which satisfactory autogenous bonding can be obtained. This range is below the temperature range within which the drawn type of fiber softens and melts.

A carded tissue-like mixture of the two types of fibers can be unified by heating and pressing so as to autogenously bond the amorphous undrawn bonding fibers to each other and to the drawn structural fibers at their crossing points without mashing any of the fibers; each

type being present in the proportion of about 40 to 60% by weight. If the proportion of amorphous undrawn fibers is substantially less than 40% there will be inadequate unification of the fabric structure. If the proportion of undrawn amorphous fibers is substantially greater than 60%, the fabric will have too much stiffness and inadequate strength and elasticity.

Microscopic examination shows that in addition to the autogenous bonding which is effected by the bonding fibers during the heating and pressing operation, another phenomenon unexpectedly occurs. Whereas the bonding fibers are initially amorphous in character, said fibers, after effecting the bonding aforementioned, undergo crystallization as a further result of the applied heat. Microscopic examination indicates that in the finished fabric the crystalline bonding fibers make their principal contribution as a means for interbonding the structural fibers crossed thereby. The resulting bond has remarkable strength, particularly when it is realized that the bonding medium is crystalline in character and highly frangible. Even when the fabric is subjected to repeated rumpling sufficient to fracture the frangible bonding fibers between the bonds for the structural fibers, the bonds remain intact and the fabric, though now more flexible and conformable, retains most of its initial strength. Moreover, tests have shown that the softening temperature range of the bonding fibers in the finished fabric is typical of crystalline, rather than amorphous polymer. Whereas there is a substantial difference in the softening temperature ranges of the bonding fibers in their initial amorphous state and the crystalline oriented structural fibers, in the finished fabric the bonding fibers and the structural fibers have substantially the same softening temperature range when made of the same chemical composition.

A typical single-ply fabric product has a ream weight of 15 pounds (weight of 320 square yards). A two-ply unified fabric, having a ream weight of 30 pounds, can be readily manufactured by laminating a previously made unified single-ply fabric with a second carded web or bat by simultaneous heating and pressing which internally unifies the second web and unifies it to the first fabric due to bonding by the amorphous undrawn fibers of the second web at their points of contact with the first fabric. This two-ply fabric can then be made into a three-ply fabric, and so on, by repetition of the process. The products of principal interest are those consisting of one to four plies, having ream weights of about 15 to 60 pounds, respectively. For electrical insulation tapes, two-ply and three-ply structures are presently preferred, having ream weights of about 30 and 45 pounds, respectively.

The fabric product can be treated with a dilute solution or emulsion in a volatile vehicle of a coating material which upon drying will provide superficial impregnation by a waterproof insulating varnish, forming a thin sizing coating on the fibers, so as to obtain a modified fibrous fabric product that is still adequately porous, stretchable and comfortable. An example is an aqueous emulsion of polyester monomer containing a polymerization catalyst which will dry and set-up on heating of the impregnated fabric to provide a sizing on the fibers of polyester varnish. The sizing eliminates any tendency to fuzziness and increases the tensile strength.

Complete impregnation of the porous fabric, whether or not previously given a sizing treatment, with any suitable electrical insulating varnish, results in a flexible varnished insulating fabric having desirable properties attributable both to the characteristics of the fibrous fabric and to the relatively high proportion of varnish relative to the volume or weight of the fibers. Similarly, if a fabric tape is employed for winding on electrical coils, for example, subsequent impregnation with insulating varnish results in a desirable insulating covering due to the combination of favorable factors.

Process of making

The apparatus employed for making my nonwoven fibrous fabric in continuous fashion includes a carding machine to straighten out, mix and intermingle the fibers and form a carded tissue-like web or bat thereof in which the fibers are preferably disposed in random orientation, though they may be otherwise as suitable and desired. A rotating heated drum is provided with suitable pressing rolls which subject the carded web to heating and pressing adapted to compact the fibrous structure and cause the undrawn polyester fibers to become autogenously bonded as aforesaid so as to unify the structure and also to effect the aforementioned sequential crystallization of the undrawn fibers. A wind-up mechanism is also provided for winding the finished web into rolls. In addition means are provided for feeding a previously made sheet, such as a preformed woven or nonwoven polyester fabric or an oriented polyester film from a roll thereof so as to lie on top of a carded web or bat as it is carried by the rotating heating drum, thereby building up a multi-ply fabric or a film-fiber composite by lamination.

By a carding machine is meant not only those which are technically termed carding machines, but also Garnett machines and other which operate to form carded webs. The carding procedure straightens out the fibers and forms a loose open-mesh fluffy web of non-parallel interlaced fibers which pass over and under each other in a heterogeneous fashion. Each fiber is crossed by numerous other fibers along its length. The mixture of fibers is preferably prepared for carding by throwing the fibers, in the desired relative proportion, into a "picker" which blends the mixture and opens the fibers.

The heating drum with its pressing rolls exerts a light-pressure soft-roll pressing action upon the carded web which is entirely different from the pressure effect produced by the calendars used in textile mills, which have hard rolls forming the nips through which sheet material is passed under heavy pressure. A gentle pressing is essential to prevent mashing of the softened fibers.

The heating drum which I have employed is a horizontal polished steel drum having a diameter of 30 inches and a length of 66 inches to handle a web 60 inches wide. It is internally heated to provide a surface temperature in the range of 420 to 445° F. It is rotated at a speed of approximately 7.65 r.p.m. so as to have a peripheral speed of 60 feet per minute, thereby producing the product at the rate of 1,200 yards per hour. There are two horizontal pressing rolls mounted so as to bear against the heating drum, spaced apart by a distance approximately two-thirds the periphery. The carded web from the carding machine is fed into the nip between the first pressing roll and the drum and then travels along in contact with the surface of the rotating drum until it passes through the nip between the second pressing roll and the drum, involving a travel distance of approximately two-thirds the periphery of the drum. The web is drawn up and around the latter roll and is thus separated from the surface of the heating drum; the resultant heat-pressed fabric being pulled by pull rolls through which it passes en route to a wind-up roll. Stripping of the fabric from the drum may be facilitated by a thin coating of silicone parting agent on the surface of the drum.

The movable pressing rolls are hollow steel cylinders having a diameter of 5 inches and mounted in bearings so as to freely turn, and the desired pressure is exerted upon the bearings through air-activated cylinders, the pressure being controlled by control of the air pressure. The second pressing roll is covered with 20 turns of smooth glass cloth wound on in a direction so that the outer end will trail through the nip. The glass cloth provides a soft flexible surface which will not stick to the heated web and furnishes a substantial contact area at the nip. No covering is needed on the first pressing roll, this roll this roll serving to compact the fluffy carded web and

holding the trailing portion of the web in good contact with the rotating drum as the web travels toward the nip of the second roll.

In typical manufacturing operations, the total pressure on the first pressing roll has been maintained at about 250 pounds (which is slightly more than 4 pounds per inch width of the web); while the total pressure on the second roll has been in the range of 250 to 1,000 pounds, depending on conditions.

In making a two-ply product the procedure is the same except that a previously manufactured one-ply bonded fabric is also fed into the first pressing roll nip, so as to overlie the web from the carding machine, the latter contacting the surface of the heating drum. The drum temperature is increased about 15° F. and the pressing roll pressures are also increased somewhat, so as to insure interbonding of the web to the previously manufactured one-ply fabric. Similarly in making a three-ply or four-ply product, a two-ply or three-ply bonded fabric is fed into the first pressing roll nip along with the unbonded web from the carding machine, thereby adding one ply and simultaneously bonding or unifying the web from the carding machine.

Final adjustments of temperature and pressures during manufacturing are made so that the product has the desired structure, which is readily ascertainable by inspection.

Example

Typical preferred types of product for electrical insulation usage are two-ply and three-ply polyester fiber fabrics manufactured in the manner just described and consisting of equal parts by weight of drawn "Dacron" staple fibers (1½ inch average length and 1½ denier size) and of undrawn polyester staple fibers (1¼ inch average length) chopped from filaments produced in the "Dacron" manufacturing operation but not subjected to the drawing procedure. These latter fibers have a diameter of 1 to 2 mils, which is approximately twice that of the corresponding drawn fibers.

One resultant two-ply product has a ream weight of 30 pounds (weight of 320 square yards), corresponding to 1.5 oz./sq. yd. The caliper thickness averages approximately 6.5 mils. The lengthwise tensile strength is at least 4 pounds per inch width and the crosswise tensile strength is approximately 1 pound (this difference being due to the fact that the lengthwise components of fiber direction in the particular web tested exceed the crosswise components in total magnitude). The elongation before rupture is 25-31%.

One resultant three-ply product has a ream weight of 45 pounds (2.25 oz./sq. yd.); the caliper thickness is approximately 8 mils; the lengthwise and crosswise tensile strength are 10 (at least) and 2.5 pounds, respectively; and the elongation is 20-26%.

The bonded fabric product can be calendered if desired to further compact the structure and improve the uniformity of thickness. Temperatures and pressures should be low enough to avoid mutilation and cutting of the fibers. For example, the two-ply product described above was satisfactorily calendered by being passed through the nip of a pair of 18 inch diameter crowned steel rolls driven at a peripheral speed of 40 feet per minute. The surface temperature of the rolls was 230° F. The pressure was adjusted so as to reduce the caliper of the fabric from an average value of 6.5 mils to a value of 4.5 mils.

The improved nonwoven polyester fabric can be autogenously laminated to a preformed oriented polyester film. For example, a two-ply fabric was laminated to a "Mylar" polyester film of ½-mil thickness by passing said fabric and film through the pressing and heating drum apparatus previously described with a web from the carding machine interposed therebetween, and with the film on the inside in direct contact with the heating drum. This results in unification of the carded web or bat and autog-

enous bonding of the amorphous undrawn polyester fibers of said web to the fibers of the two-ply fabric as well as to the film at the points of contact of said amorphous fibers therewith. The film is of the "drawn" or oriented type and has an elevated softening temperature above that of the amorphous undrawn fibers of the carded bat or web, so that interbonding can be achieved at a temperature below the softening temperatures of the drawn fibers and of the film, avoiding impairment of the physical and electrical properties of the film. There is no interbonding between the film and the drawn fibers except that provided by the undrawn bonding fibers, and this facilitates flexibility and conformability. The "Mylar" polyester film is a product of the Du Pont Company and is produced from a polyester of ethylene glycol and terephthalic acid.

What is claimed as the invention is:

1. A composite film-fabric sheet comprising (1) a heat-pressed tissue-like fabric of heterogeneously interlaced drawn and undrawn staple unplasticized polyester fibers, said undrawn fibers being formed of the same polyester as said drawn fibers and having been converted from an initial relatively low softening amorphous state to a crystalline state affording substantially the same softening temperature range as that of the drawn fibers, said crystallized undrawn fibers being autogenously interbonded at their crossing points to form a network within which said drawn fibers are interlaced without being interbonded to each other, said fabric having a ream weight of about 15 to 60 pounds, and (2) a film of electrical insulating resin inseparably united to said fabric.

2. A composite sheet as defined by claim 1 wherein the electrical insulating resin is varnish.

3. A composite sheet as defined by claim 1 wherein the electrical insulating resin is a preformed oriented polyester film.

4. A composite flexible film-fabric sheet which can be wound on electrical coils with good conformation with substantially no loss of continuity of the resin impregnant to provide uniform electrical insulating characteristics over both stretched and relatively unstretched areas, said sheet comprising (1) a heat-pressed tissue-like fabric of heterogeneously interlaced drawn and undrawn staple unplasticized polyester fibers which both have a length of at least approximately one inch, said undrawn fibers being formed of the same polyester as said drawn fibers and having been converted from an initial relatively low softening amorphous state to a crystalline state affording substantially the same softening temperature range as that of the drawn fibers, said crystallized undrawn fibers being autogenously interbonded at their crossing points to form a network within which said drawn fibers are interlaced without being interbonded to each other, said fabric having a ream weight of about 15 to 60 pounds, and (2) a film of electrical insulating resin inseparably united to said fabric.

5. A composite sheet as defined in claim 4 wherein said polyester is polyethylene terephthalate, said electrical insulating resin is a preformed oriented polyethylene terephthalate film, and said drawn and undrawn fibers are each present in the proportion of about 40-60 percent by weight of total fiber.

6. A composite electrical insulating sheet of at least two plies comprising (1) a first heat-pressed fabric of heterogeneously interlaced drawn and undrawn staple unplasticized polyester fibers, said undrawn fibers being formed of the same polyester as said drawn fibers and having been converted from an initial relatively low softening amorphous state to a crystalline state affording substantially the same softening temperature range as that of the drawn fibers, said crystallized undrawn fibers being autogenously interbonded at their crossing points to form a network within which said drawn fibers are interlaced without being interbonded to each other, said first

fabric having a ream weight of about 15 to 60 pounds, and (2) a second heat-pressed fabric of heterogeneously interlaced drawn and undrawn staple unplasticized polyester fibers of the same polyester as said drawn fibers of said first heat-pressed fabric, said undrawn fibers of the second fabric having been converted from an initial relatively low softening amorphous state to a crystalline state affording substantially the same softening temperature range as that of the drawn fibers, said crystallized undrawn fibers being autogenously bonded at their crossing points and to fibers of said first fabric, said second fabric having a ream weight of about 15 to 60 pounds.

7. A composite sheet as defined in claim 6 carrying a film of electrical insulating resin inseparably united thereto.

8. A composite film-fabric electrical insulating sheet comprising a preformed oriented polyester film and two layers of nonwoven fabric, each of said fabric layers being inseparably united to one surface of the film and comprising heat-pressed interlaced drawn and undrawn staple unplasticized fibers, said undrawn fibers being formed of the same polyester as said drawn fibers and having been converted from an initial relatively low softening amorphous state to a crystalline state affording substantially the same softening temperature range as that of the drawn fibers, said crystallized undrawn fibers being autogenously interbonded at their crossing points and bonded to said film at points of contact therewith, each of said fabrics having a ream weight of about 15 to 60 pounds.

9. A composite sheet as defined in claim 8 wherein the two layers of nonwoven fabric are impregnated with electrical insulating varnish.

10. A composite film-fabric sheet comprising (1) a heat-pressed tissue-like fabric of heterogeneously interlaced drawn and undrawn staple unplasticized polyester fibers consisting of polyethylene terephthalate, said undrawn fibers having been converted from an initial relatively low softening amorphous state to a crystalline state affording substantially the same softening temperature range as that of the drawn fibers, said crystallized undrawn fibers being autogenously interbonded at their crossing points to form a network within which said drawn fibers are interlaced without being interbonded to each other, said fabric having a ream weight of about 15 to 60 pounds, and (2) a film of electrical insulating resin inseparably united to said fabric.

11. A composite sheet as defined by claim 10 wherein said drawn and undrawn fibers are each present in the proportion of about 40-60 percent by weight of total fiber.

12. A composite electrical insulating sheet of at least two plies comprising (1) a first heat-pressed fabric of heterogeneously interlaced drawn and undrawn staple unplasticized polyester fibers consisting of polyethylene terephthalate, said undrawn fibers having been converted from an initial relatively low softening amorphous state to a crystalline state affording substantially the same softening temperature range as that of the drawn fibers, said crystallized undrawn fibers being autogenously interbonded at their crossing points to form a network within which said drawn fibers are interlaced without being interbonded to each other, said first fabric having a ream weight of about 15 to 60 pounds, and (2) a second heat-pressed fabric of heterogeneously interlaced drawn and undrawn staple unplasticized polyester fibers consisting of polyethylene terephthalate, said undrawn fibers of the second fabric having been converted from an initial relatively low softening amorphous state to a crystalline state affording substantially the same softening temperature range as that of the drawn fibers, said crystallized undrawn fibers being autogenously bonded at their crossing points and to fibers of said first fabric, said second fabric having a ream weight of about 15 to 60 pounds.

(References on following page)

References Cited by the Examiner

UNITED STATES PATENTS

2,060,665 11/1936 Durant et al. 117—143
 2,234,252 3/1941 Homan 117—86
 2,388,319 11/1945 Fuller.
 2,497,376 2/1950 Swallow et al.
 2,503,024 4/1950 Boese et al. 156—35

2,676,128 4/1954 Piccard 161—156
 2,725,309 11/1955 Rodman.
 2,836,576 5/1958 Piccard et al. 154—46 X

ALEXANDER WYMAN, *Primary Examiner.*

CARL F. KRAFFT, EARL M. BERGERT, W. F. ZAGURSKI, W. J. VAN BALEN, *Assistant Examiners.*

DDD-T-90b

18 APRIL 1952

SUPERSEDING

Fed. Spec. DDD-T-90

29 May 1947, and

Int. Fed. Spec. DDD-T-90a (GSA-FSS)

17 October 1951

FEDERAL SPECIFICATION

TAPE, NON-WOVEN (PARALLEL-YARN FLAT STRING)

This specification was approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.

1. SCOPE AND CLASSIFICATION

1.1 Scope.—This specification covers non-woven textile fiber tape primarily used for tying packages, identification purposes, and as a removal strip in packaging.

1.2 Classification.

1.2.1 Types and classes (thicknesses).—

The tape shall be of one type and of the following classes (thicknesses), as specified:

Class 1.—0.0045 inch

Class 2.—0.006 inch

Class 3.—0.010 inch

1.2.2 Widths and lengths.—The tape shall be furnished in the widths and lengths shown in table I, as specified:

TABLE I.—Width and length

Class 1 (0.0045 inch)		Class 2 (0.006 inch)		Class 3 (0.010 inch)	
Width	Length	Width	Length	Width	Length
<i>Inch</i>	<i>Yards</i>	<i>Inch</i>	<i>Yards</i>	<i>Inch</i>	<i>Yards</i>
--	--	$\frac{3}{8}$	500, 1,000 or 2,000	$\frac{3}{8}$	500, 1,000 or 2,000
--	--	$\frac{1}{4}$	500 or 1,000	$\frac{1}{4}$	500 or 1,000
$\frac{1}{8}$	50	$\frac{1}{8}$	100 or 1,000	$\frac{1}{8}$	100 or 1,000
$\frac{3}{8}$	50	$\frac{3}{8}$	100 or 1,000	$\frac{3}{8}$	100 or 1,000
$\frac{1}{2}$	50	$\frac{1}{2}$	100 or 500	$\frac{1}{2}$	100 or 500
$\frac{5}{8}$	50	$\frac{5}{8}$	100	$\frac{5}{8}$	100
$\frac{3}{4}$	50	$\frac{3}{4}$	100	$\frac{3}{4}$	100
1	50	1	100	1	100

1.2.2.1 Tolerances.—A tolerance of 0.0005 inch in thickness and $\frac{1}{32}$ inch in width will be allowed.

1.2.3 Grade.— The grade shall be that known commercially as firsts.

2. APPLICABLE SPECIFICATIONS

2.1 The following Federal Specification, of the issue in effect on date of invitation for bids, forms a part of this specification:

CCC-T-191—Textile Test Methods.

(Copies of Federal specifications and the Federal Specifications Index may be obtained upon application, accompanied by money order, coupon, or cash to the Superintendent of Documents, Government Printing Office, Washington 25, D. C., or to the GSA Regional Offices in Boston, New York, Atlanta, Chicago, Kansas City, Mo., Dallas, Denver, San Francisco, and Seattle. Prices may be obtained from the Superintendent of Documents or from the GSA Regional Offices.)

2.2 Specifications and other publications applicable only to individual departments are listed in section 7.

3. REQUIREMENTS

3.1 Materials.

3.1.1 Yarns.—The yarns shall be made of thoroughly cleaned natural or synthetic fibers or any mixture thereof.

3.1.2 Bonding material.—The yarn shall be bonded with a suitable adhesive or any suitable backing or coating substance.

3.2 Construction.—The tape shall be a flat strip of closely paralleled yarns bonded by a suitable binding agent. If a water-resistant binding agent is required, it shall be so specified in the invitation for bids.

3.3 Printed tape.—When specified in the invitation for bids, the tape shall have printed on one or both sides in black or colored ink, any lettering, insignia, or serial number.

3.4 Color. — Unless a specific color is specified in the invitation for bids, non-woven tape shall be furnished in white, natural, or any color.

3.4.1 Colorfastness.—The dyed tape shall be uniform in color. The tape, both printed and unprinted, shall show fair colorfastness to crocking. In addition, the tape shall show

fair colorfastness to water when a water-resistant binding agent is specified.

3.5 Physical requirements.—The number of yarns per width, and the breaking strength for the various widths and classes shall be as shown in table II.

TABLE II.—Physical requirements

Class	Width	Yarns per width ¹	Breaking strength (length direction) minimum
	<i>Inch</i>		<i>Pounds</i>
1--	$\frac{3}{8}$	16	16
	$\frac{1}{4}$	21	21
	$\frac{5}{16}$	27	27
	$\frac{3}{8}$	32	32
	$\frac{1}{2}$	46	46
	$\frac{5}{8}$	60	60
	$\frac{3}{4}$	73	73
	1	97	97
2--	$\frac{3}{8}$	17	21
	$\frac{1}{4}$	23	28
	$\frac{5}{16}$	30	35
	$\frac{3}{8}$	37	43
	$\frac{1}{2}$	48	55
	$\frac{5}{8}$	58	70
	$\frac{3}{4}$	75	85
	1	100	115
3--	$\frac{5}{16}$	16	65
	$\frac{3}{8}$	21	93
	$\frac{1}{2}$	27	124
	$\frac{5}{8}$	33	155
	$\frac{3}{4}$	40	186
	1	53	248

¹ A minus tolerance of 2 yarns and any plus tolerance will be permitted.

3.6 Winding.—The tape in $\frac{3}{8}$ -, and $\frac{1}{4}$ -inch widths shall be wound on spools; tape in $\frac{5}{16}$ -, $\frac{3}{8}$ -, and $\frac{1}{2}$ -inch widths shall be wound on spools or bolts, as specified; tapes in $\frac{5}{8}$ -, $\frac{3}{4}$ -, and 1-inch widths shall be wound on bolts.

3.7 Workmanship. — The tape shall be clean, and free from defects which affect the appearance or which might impair the serviceability.

4. SAMPLING, INSPECTION, AND TEST PROCEDURES

4.1 Sampling. — Not less than one full-width sample 5 yards in length shall be taken from each 1,000 running yards or fraction thereof offered for delivery except that when the shipment is over 10,000 yards, a full-width sample 5 yards in length shall be taken from each one-tenth of the shipment.

4.2 Inspection.—Inspection shall be made at the point of delivery or at the factory, at the discretion of the purchasing agent.

4.3 Tests. — Tests shall be conducted in accordance with the following applicable methods described in Federal Specification CCC-T-191:

Test	Method
Width -----	5020
Thickness -----	5030
Yarn per width -----	5050
Breaking strength (length) -----	5102
Color fastness to water -----	5630
Cracking -----	5650

5. PREPARATION FOR DELIVERY

5.1 Packaging. — Unless otherwise specified, commercial packages are acceptable.

5.2 Packing.—Unless otherwise specified, the subject commodity shall be prepared for shipment to permit acceptance by carrier for transportation at the lowest applicable rate, and to afford maximum protection from normal hazards of transportation.

5.3 Marking.

5.3.1 Issue packages. — Issue packages shall be marked with the name of the item, the class, width, length, color, the lettering or insignia if printed, and the name or trademark of the contractor.

5.3.2 Shipping containers.—Unless otherwise specified, shipping containers shall be marked with the name of the item, the class,

width, length per spool or bolt, color, the lettering or insignia if printed, the quantity contained therein, as defined by the contract or order under which shipment is made, the name of the contractor, and the number of the contract or order.

6. NOTES

6.1 Ordering data. — Purchasers should specify the class (see 1.2.1), width and length (see 1.2.2), water-resistant binding, if required (see 3.2), and should exercise any desired option offered herein. (See 3.3, 3.4, 3.6, 4.2, 5.1, 5.2, 5.3.2, and 7.2.8.)

6.2 It is to be noted that tape covered by this specification is not woven and splits or separates easily in the length direction if pulled apart.

6.3 Transportation description.

6.3.1 Transportation description applicable to these items is:

Tape, cotton, not knit nor woven (flat twine), printed or not printed
In barrels or boxes
Carload weight (none)
Truckload weight (none)

Note.—This commodity is rated the same for any quantity.

Patent notice.—When Government drawings, specifications, or other data are used for any purpose other than in connection with a definitely related Government procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data, is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

7. DEPARTMENTAL REQUIREMENTS

7.1 The following specifications and

standards of the issue in effect on date of invitation for bids, and special requirements, form a part of this specification for purchases made under this specification by the respective departments:

7.2 Army, Navy, and Air Force.

7.2.1 Applicable specifications and standards.

Federal Specifications:

- NN-B-591—Boxes; Fiberboard, Wood-Cleated (for Domestic Shipment).
- NN-B-601—Boxes; Wood-Cleated-Plywood, for Domestic Shipment.
- NN-B-621—Boxes; Wood, Nailed and Lock-Corner.
- NN-B-631—Boxes; Wood, Wirebound (for Domestic Shipment).
- UU-P-268—Paper; Kraft, Wrapping.
- UU-T-116—Tape; Paper, Gummed, Water-Resistant.
- LLL-B-631—Boxes; Fiber, Corrugated (for Domestic Shipment).
- LLL-B-636—Boxes; Fiber, Solid (for Domestic Shipment).

Military Specifications:

- JAN-P-103—Packaging and Packing for Overseas Shipment — Boxes, Wood Cleated, Solid Fiberboard.
- JAN-P-105—Packaging and Packing for Overseas Shipment — Boxes, Wood, Cleated, Plywood.
- JAN-P-106—Packaging and Packing for Overseas Shipment — Boxes, Wood, Nailed.
- MIL-B-107—Boxes, Wood, Wirebound (Overseas type).
- JAN-P-108—Packaging and Packing for Overseas Shipment — Boxes, Fiberboard (V-Board and W-Board), Exterior and Interior.
- JAN-P-125—Packaging and Packing for Overseas Shipment — Barrier-Materials, Waterproof, Flexible.

JAN-P-138—Packaging and Packing for Overseas Shipment — Boxes, Wood, Fiberboard-Lined.

MIL-A-140—Packaging and Packing for Overseas Shipment — Adhesive, Water-Resistant, Waterproof Barrier-Material.

Navy Department Specifications:

General Specifications for Inspection of Material.

Military Standards:

MIL-STD-105—Sampling Procedures and Tables for Inspection by Attributes.

MIL-STD-129—Marking of Shipments.

(Copies of specifications, standards, and drawings required by the contractor in connection with specific procurement functions should be obtained from the procuring agency or as directed by the contracting officer.)

7.2.2 Sampling (Army & Air Force).—Sampling shall be conducted in accordance with Military Standard MIL-STD-105.

7.2.3 Inspection procedures (Navy).—For Naval purchases the general inspection procedures shall be in accordance with Navy Department General Specifications for Inspection of Material.

7.2.4 Unit packaging (Navy). — Unless otherwise specified in procurement documents the tape shall be individually wrapped with kraft paper conforming to Federal Specification UU-T-116.

7.2.5 Intermediate packaging (Navy).

7.2.5.1 For domestic shipment. — Unless otherwise specified in procurement documents, 10 unit packages of tape of the same type, size, color and quantity shall be packaged together in snug-fitting corrugated fiberboard or solid fiberboard boxes conforming to Federal Specification LLL-B-631 or LLL-B-636, respectively. Suitable cushion-

ing shall be provided to prevent movement within the boxes. The gross weight of the boxes shall be subjected to the limitation of the box specification. All joints and seams, including those occurring in the manufacture of the boxes, shall be covered with minimum 3-inch wide gummed tape conforming to Federal Specification UU-T-116, extending over all corners and edges at least 3 inches.

7.2.5.2 For overseas shipment. — Unless otherwise specified in the procurement documents, 10 unit packages of tape of the same type, size, color, and quality shall be packaged together in the manner specified in 7.2.5.1 except the fiberboard boxes shall conform to Military Specification JAN-P-108, compliance symbol W6s or W6c, style optional.

7.2.6 Packing.

7.2.6.1 For domestic shipment.

7.2.6.1.1 Army and Air Force. — Tape packaged in cartons or boxes shall be packed in corrugated or solid fiberboard containers, conforming to style RSC of Federal Specification LLL-B-631 or LLL-B-636. Only one type and width of tape shall be packed per shipping container. Gross weight of each shipping container shall not exceed 40 pounds.

7.2.6.1.2 Navy. — Intermediate packages of tape shall be packed in wood-cleated-fiberboard, wood-cleated-plywood, nailed wood, wirebound wood, corrugated fiber, or solid fiber boxes conforming to Federal Specification NN-B-591, NN-B-601, NN-B-631, LLL-B-631 or LLL-B-636, respectively. The gross weight of wood boxes shall not exceed approximately 200 pounds. The gross weight of fiberboard boxes shall be subject to the limitation of the box specification.

7.2.6.2 For overseas shipment.

7.2.6.2.1 Army and Air Force.—Two fiber-

board containers of tape packed as specified for domestic shipment, shall be overpacked in a shipping container constructed and strapped in accordance with style A or B of Military Specification JAN-P-103; style A or B of Military Specification MIL-B-107. Each shipping container shall be provided with a sealed case liner or prefabricated bag made of waterproof barrier material conforming to type L-2 or M of Military Specification JAN-P-125. Closure and seams shall be completely sealed with a continuous seam at least 3/4-inch wide of water resistant adhesive conforming to Military Specification MIL-A-140.

7.2.6.2.2 Navy.

7.2.6.2.2.1 Intermediate packages of tape shall be packed in cleated-plywood, nailed wood, wirebound, fiberboard, or fiber-lined wood boxes conforming to Military Specification JAN-P-105, JAN-P-106, MIL-B-107, JAN-P-108, or JAN-P-138, respectively. The gross weight of wood boxes shall not exceed approximately 150 pounds, and of fiberboard boxes approximately 70 pounds.

7.2.6.2.2.2 Contents shall be enclosed within a sealed waterproof bag, or its equivalent, made from material conforming to Military Specification JAN-P-125, for case-liner material. Seams and closures shall be sealed with adhesive conforming to Military Specification MIL-A-140.

7.2.7 Marking.

7.2.7.1 Unit packages (Navy).—Each unit package shall be marked or labeled as follows:

Size
Length
Color
Quality
Quantity

7.2.7.2 Intermediate packages and shipping containers. — In addition to any special

DDD-T-90b

marking required by the contract or order, intermediate packages and shipping containers shall be marked in accordance with Military Standard MIL-STD-129.

7.2.8 *Ordering data.* — Procurement docu-

ments should specify whether domestic or overseas packaging, packing, and marking are required. (See 7.2.5, 7.2.6, and 7.2.7.)

NAVY INTEREST: Md S

This specification is a part of Section IV, Part 5, of the Federal Standard Stock Catalog.

☆ U. S. GOVERNMENT PRINTING OFFICE: 1952

For sale by the Superintendent of Documents, Washington 25, D. C. Price 5 cents.

CARPENTER, ABBOTT, COULTER & KINNEY

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August 2, 1957

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PATENTS

G. B. GEHRENBECK
PATENT AGENT

Mr. Alvin W. Boese
27-1
Minnesota Mining & Manufacturing Co.
Saint Paul 6, Minnesota

Dear Mr. Boese:

A printed copy of the following Canadian patent is attached:

Patent No.	541,934
Inventor:	Alvin W. Boese
Date:	June 4, 1957
Title:	Non-woven rayon fabric

Very truly yours,

Mark Severance (cc)

MARK SEVERANCE

MS:11
encl.

Minnesota Mining & Manufacturing Company

INTEROFFICE CORRESPONDENCE

ST. PAUL, MINNESOTA

cc: A. W. Boese

Subject: Molded non-woven fabrics
Process description for
patent purposes

July 11, 1958

TO: P. H. CAREY

FROM: W. M. WESTBERG

Briefly stated, the process can be described as a method of molding to three dimensional shapes and bonding by heat a non-unified non-woven web. This preforming process can be, and usually is, followed by a resin-impregnation for further bonding of the web.

General description of the process

The fiber mix contains a thermo-plastic, heat-sealing fiber component such as vinyon, plasticized acetate, undrawn polyester or polyethylene in sufficient proportion, when it bonds to itself and the other fibers in the blend, to provide adequate strength, rigidity and dimensional stability for the molded article, allowing it to be further handled, impregnated with resin, etc. The percentage of binder fiber needed will vary, depending upon the strength of its bond to itself and the other fiber components. For instance, less undrawn polyester would be needed for a binder fiber in a blend where the other fiber was a drawn polyester rather than a cellulosic fiber such as viscose rayon. The fiber blend also will be influenced by the nature of the resin treatment to which the molded article will be subjected. The heat seal bond must withstand satisfactorily the effects of water and the solvents in which the resin is dispersed.

To mold satisfactorily, the fiber batt must be compacted as little as possible. Careful handling and the use of crimped fiber in as heavy denier as possible will make a lofty, low-density web. The deeper the draw anticipated in the molding process the more important the above batt characteristic becomes. *Random fiber orientation is usually required for uniform strength characteristics of the* The molding of the web can be accomplished in two ways. One way is by the use of heated, matched male and female metal molds. The web is placed over the female mold and the male mold engaged. If the web has been properly prepared it will shrink and gather into itself as necessary to conform to the contours of the mold. A dense, compacted web, however, will wrinkle and fold over in accommodating itself to curved surfaces. The heat of the mold bonds the web together which can be removed after the molds are disengaged.

Another method of molding which is more versatile and doesn't require the use of expensive matched molds is vacuum forming. In this method the male metal mold is placed on a suction table which is connected to a vacuum pump. The fiber batt is laid over the mold and a frame holding a rubber diaphragm is held down over all, making an air seal at the table edges. The vacuum pulls the rubber into conformance with the mold, molding and bonding the web at the same time. Again, for minimum wrinkling and uniform molding, the web should be lofty, loose, and of low density. When the web is bonded the vacuum is released, the frame lifted up and the molded article can be removed. In the above operation, heat can also be applied to the rubber to assist in bonding. Neoprene and silicone rubber withstand the heat the best.

molded & bonded web.

MINNESOTA MINING AND MANUFACTURING COMPANY

SAINT PAUL 6, MINNESOTA

INTEROFFICE CORRESPONDENCE

cc: R. G. Drew - 41-2
L. A. Hatch - 21-2W
J. G. Kruse - 21-2E
W. E. Northrup - 53-3

SUBJECT: Transferable Stencils
U. S. Patent 2,374,524
&
U. S. Patent 2,429,936

April 20, 1961

TO: A. W. BOESE - GENERAL MANUFACTURING MANAGER - R.T. & G.W. DIV. - 42-2E
FROM: E. C. BOWERS - GIFT WRAP & FABRIC LABORATORY - 27-1

I have been asked to write you regarding the release of the subject letters patent from the 3M Company. Please refer to my letter to W. E. Northrup, dated January 24, 1961.

As you know, the letters patent in question were consigned to the 3M Company on March 31, 1947 on a stipulated royalty basis. Materials were made for evaluation on sale during 1948-49, but operations were suspended by executive order on July 29, 1949. Since this time nothing has been done by the 3M Company relative to leasing of the patent rights or returning them to me voluntarily until February 22, 1960.

My reason for suggesting that I would desire the return of these patents at a meeting in our new products laboratory was that I may be able to file an improved patent on these depleted letters patent before their termination. On going over my reports for the year 1948-49, I have found that the improvement was conceived while in the employment of the 3M Company and of course is the property of the 3M Company.

In view of these facts a new patent may be obtained by the 3M Company which would provide protection for the manufacture of products specified within its claims. In case the 3M Company still does not desire to manufacture these products, it may be leased by me to supplement a self-owned enterprise after my retirement in a few years.

Certainly I do not want to do anything that would either inconvenience or bother you or anyone else in the 3M Company in view of my appreciation of the wonderful treatment I have received throughout my employment with the company for the past 15 years.

Please forget this request unless you believe reassignment will be good for the 3M Company or perhaps give me a hobby to work on after retirement in a few years.

I desire that you do what is best for all concerned regarding this request for the release of these letters patent.

E. C. Bowers

ECB:seg

cc: H. R. Courtney 27-1
A. H. Redpath 42-2W
W. M. Westberg 27-1

June 1, 1961

TO: P. H. CAREY - RETAIL TAPE & GIFT WRAP LABORATORY - 27-1
✓ FROM: A. W. BOESE - NON-WOVEN PRODUCTS MANAGER - 42-2E

I have Mr. Coulter's letter of May 29 relative to your patent application S.N. 834,799 filed August 19, 1959. In it he states that the examiners allowed Claim 4, and that because of cited patents he has disallowed other claims.

As Mr. Coulter states, he will have no difficulty in preparing a suitable reply with the exception that the Piccard Patent No. 2,836,576 issued May 27, 1958, may have some application. As I understand his statement, we should be aware of this patent, although it does not touch directly on our application.

I would appreciate it if you would discuss with Mr. Coulter and precipitate at the fastest possible time the reply.

Please advise.

AWB:js

cc: A. W. Boese
P. H. Carey
D. J. MacDonald
W. M. Westberg
R. E. Weddell

Boese Application
on Nonwoven Polyester
Fabrics

December 13, 1961

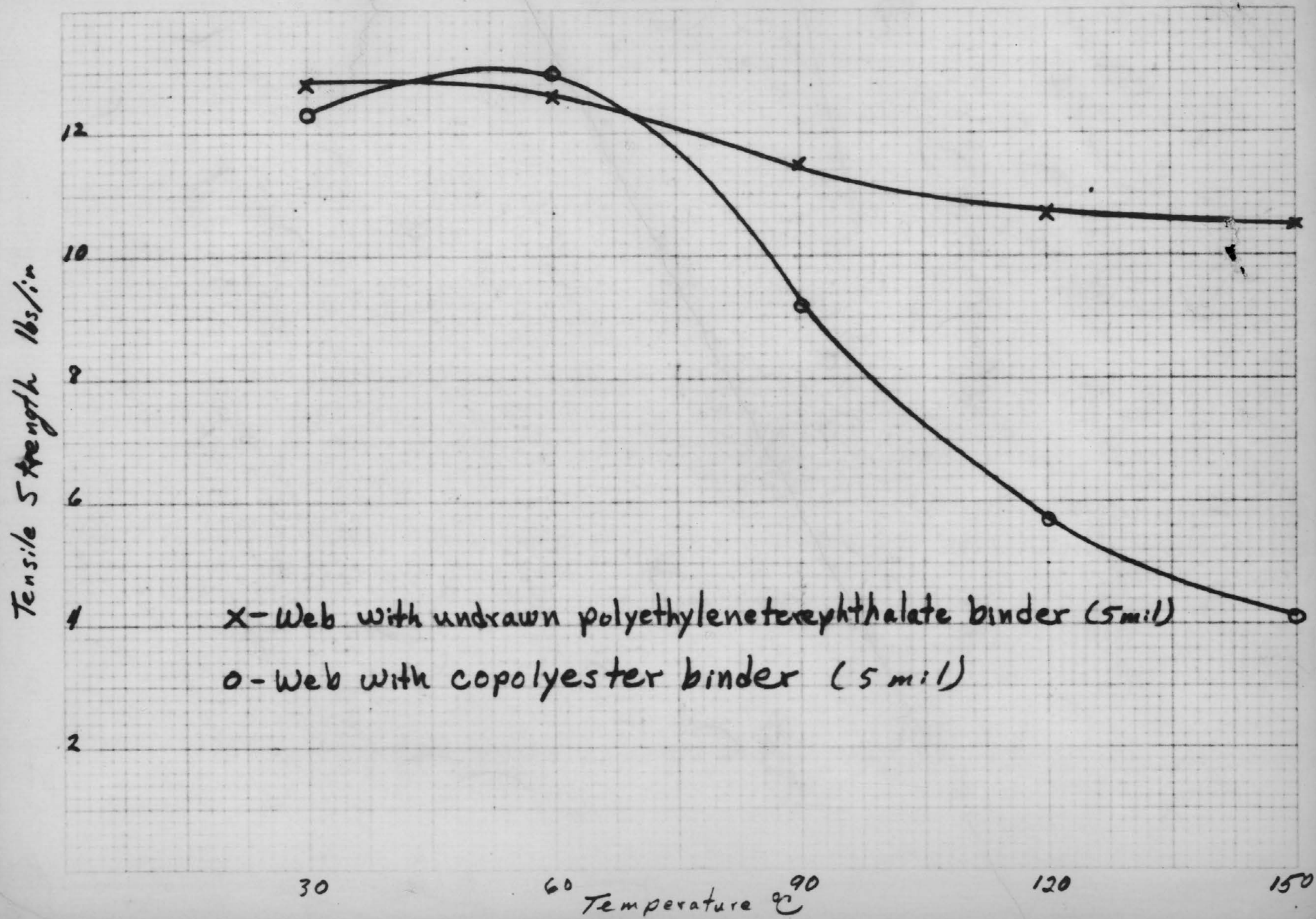
TO: J. C. SCHWALBACH - PATENT COUNSEL - 21-1W
FROM: R. R. CHARBONNEAU - IRVINGTON DIVISION - 207-1SC

The Rodman Patent (2,725,309) which has been cited against the above application refers to coated non-woven webs which employ copolyester binders. In the paragraph starting on line 32, column 2, of the Rodman Patent, the copolyester binder is described as a polymethylene glycol ester of aromatic and acyclic dibasic acids wherein the aromatic acid comprises at least 30% of the total acid reacted and not more than 70%. The preferred range is 55-65% aromatic acid.

In my letter to you dated February 2, 1960, paragraphs 2 and 3, the shortcomings of webs produced with copolyester binders are discussed. The melting points and second order transition temperatures for a series of copolyesters are listed in the attached table, including those in the preferred range of the Rodman Patent.

In applying coatings suitable for electrical insulation to webs, temperatures are required which exceed or approach the melting temperatures of the copolyester binder fibers; therefore, at normal processing temperatures the physical strength of the web is seriously impaired. The low strength of these webs at normal processing temperatures makes coating difficult, if not impossible. This will become more apparent by an examination of the attached graphs which compare the tensile values at various temperatures of a web employing a typical copolyester binder with a web employing the undrawn polyethyleneterephthalate binder. You will note that at low temperatures in the range of 25° to 60°C, the webs are of comparable strength, but as the temperature is increased, the web with the copolyester binder loses strength rapidly until at 150°C, a slightly lower than normal processing temperature for electrical coating resins, the web has retained less than one-third of its 30°C tensile strength; whereas, the web employing the undrawn polyethyleneterephthalate fiber binder has retained more than 80% of its 30°C tensile at 150°C.

R. R. Charbonneau
RRC/bf



bcc: S. G. DeLaHunt
J. R. Lane
R. J. May
E. B. Moffet
A. H. Redpath

December 3, 1962

Mr. O. F. Richardson
8512 Boerregard
Dallas, Texas

Dear Fred:

It was nice to see you again at Chuck's house after all these years.

We have studied all aspects of your pin as a product to be marketed by 3M along with other gift wrap items. I have discussed with our patent attorneys, in a general way, the patent potential of your product. It did not seem advisable in our discussions that 3M would want to pursue the filing of a patent application in your name.

As you will undoubtedly want to pursue this area yourself through your own attorneys, it did not seem feasible for us to conduct any searches as your own attorneys would want to pursue this in their own way.

In discussing all the ramifications of your product (a two-pointed pin with a platform on the shaft between the pin) as a product for 3M to sell along with its other gift items and in light of our decision not to pursue in your name a patent application, we did not feel that there would be sufficient interest for us to go ahead with the program.

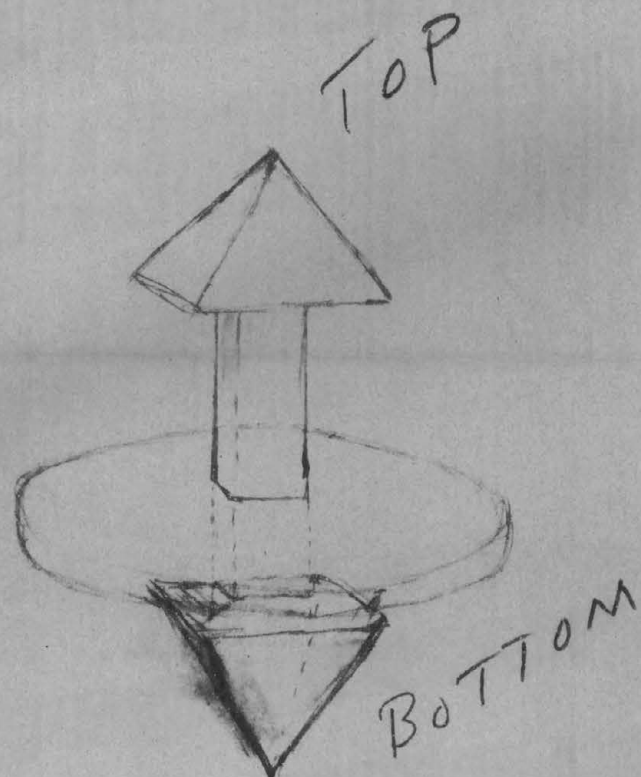
There is a question of how long it would be before we had wide competition in the field with your product which would make it difficult to pursue a program of longevity. Undoubtedly, as we discussed, the minute we would come out with this pin with either no and/or uncertain patent protection, many competitors would immediately enter into the field. This is a major stumbling block, which we did not feel we could overcome.

We do appreciate your coming to us with your product, Fred, and I am only sorry that we cannot pursue the objective with you.

I am returning your drawing of the pin and under separate cover the pin which you left with me. I wish you the best of luck in the future, Fred, and with best personal regards, I remain,

Very truly yours,

A. W. Boese
Manager
Non-Woven Products



A. L. Richardson
8512 - Burgeard
Dallas Texas

Em 36053

4
2.000 for mold

A W Boese
Note & attach to
your file. I assume
you'll advise Fred
our findings
Al

8512 Beauregard
Apt. # C
Dallas, Texas

November 18, 1962

Mr. A. H. Redpath
Minnesota Mining Mfg. Co.
St. Paul, Minnesota

Dear Al:

I want to take this opportunity to thank you, Jack, and Al for being so receptive and liberal with your time yesterday morning.

As you could see, I am very enthusiastic about the possibility of a tie-in with 3M on the "Bo-tyr". (For future reference--I should like to refer to this instrument as a "Botyr"). Al, there are several important points that I wish to reemphasize.

1. This "Bo-tyr" if properly marketed can create a million or more dollars of new business for 3M next year in the syndicate's, chain stores alone.
2. The small bow which I demonstrated for free gift wrapping could be worth the total investment in itself. The potential in large gift wrap departments for free gift wrap and in small stores where they have no use for a bow machine offers another huge potential.
3. The use of the "Bo-tyr" in the house is a virtually untapped market. Everything done in the last few years in gift wrapping, for the greater part, has been pointed toward the miracle bow and more recently to the star bow and machine. My "Bo-tyr" is a completely new approach in that it starts with the gift wrapped package itself, and would be very appealing in its simplicity and workability.

From your own experience in the gift wrap field, you know that the house wife is trying to achieve new designs in a gift package. All people like to think of themselves as creative, and this "Bo-tyr" will give them that opportunity because, as you know, one is limited only by imagination.

Al, there is one thing I forgot to tell you. The Bow-kit that Texlon is selling this year enabled them to increase their profit in resale merchandise because the Bow-kit and those items related to it were sold on shorter yardage and a fifty and ten discount while all other resale merchandise required a fifty and twenty-five discount.

Mr. A. H. Redpath

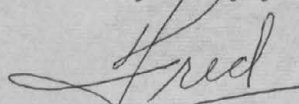
-2-

November 18, 1962

This is for the record--if, after the search is completed and the findings prove to be mutually satisfactory, our discussion had to do with 3M making a \$10,000 initial payment plus 1/2 cent per unit royalty to be negotiated.

If there are any further points you would like to discuss, please don't hesitate to contact me. I sincerely hope this entire proposition is acceptable to you and your people at 3M. I feel this can result in a mutually profitable and satisfactory arrangement. I will certainly do all I can to make it successful.

Very truly yours,

A handwritten signature in cursive script, appearing to read "Fred", written over a horizontal line.

O. F. Richardson

OFR:bh

November 18, 1962

Dear Al:

Thanks very much for your time on Saturday, and I sure hope this little bow maker works out to our mutual advantage.

Al, it was sure nice seeing you, and I'll look forward to seeing you again real soon.

Fred

WILLIAM H. ABBOTT
E. G. CARPENTER
ROBERT I. COULTER
HAROLD J. KINNEY
MARK SEVERANCE
CRUZAN ALEXANDER
MARK W. GEHAN
FRANK A. STELDT
ERNST A. JAFFRAY
ROBERT C. BAKER
ROBERT E. GRANRUD
STANLEY G. DELAHUNT
JAMES A. SMITH
J. DAN STICE
RICHARD E. BRINK
CHARLES H. LAUDER
DONALD C. GIPPLE
DAVID A. RODEN
EDWARD T. OKUBO
JOHN C. BARNES

CARPENTER, ABBOTT, COULTER & KINNEY

PATENT AND TRADE-MARK CAUSES

2501 HUDSON ROAD

SAINT PAUL 19, MINNESOTA

November 28, 1962

(Dict. 11/27/62)

TELEPHONE
733-1500

CABLE ADDRESS
PATENTS

G.B. GEHRENBECK
TEMPLE CLAYTON
PATENT AGENTS

Mr. A. W. Boese
Minnesota Mining and Manufacturing Co.
2501 Hudson Road
St. Paul 19, Minnesota

Re: Suggestion submitted by
O. F. Richardson
8512 Boeregard
Dallas, Texas
(Telephone: EM 3-6053)

Dear Mr. Boese:

This morning you brought up to my office a somewhat peculiar looking plastic pin on which decorative ribbon bows can be formed, together with an undated sheet showing a pencil sketch of a similar pin and bearing the name "O. F. Richardson, 8512 Boeregard, Dallas, Texas, Em 36053", and in the left-hand bottom corner "\$2,000 for Mold". A copy of the sheet is attached hereto.

I returned the pin to you at the close of the discussion, and return the original sheet herewith.

You indicated that Mr. Richardson used to work for the 3M Company as a salesman and sales manager in the Tape Division; and that he resigned from 3M around 1959.

Mr. Richardson apparently approached Mr. C. C. Smith with an idea in respect to a plastic pin, as shown in the sketch above referred to. On or about November 17, 1962, Mr. Richardson met with Messrs. Smith, Redpath, Boese and Lane of 3M at Mr. Smith's home.

I understand that memoranda recording the discussion have been or are being prepared; but in essence Mr. Richardson disclosed the pin as shown in the sketch and in the form of the physical embodiment he left with you.

Briefly, the pin comprises a shaft having a conical tip or point on each end thereof, the base of the conical tips being larger in diameter than the shaft (so that a "barb" effect is present). Between the two ends of the shaft (but nearer to one end than the other) is a disc concentrically positioned on the shaft, the disc having a diameter several times that of the shaft and conical tip. The pin given to you by Mr. Richardson was made of plastic, all parts were formed integrally. In use, a bow would be formed on the pin on one side of the disc, and the thus formed bow would be fastened to the package by piercing the pointed end on the other

11/28/62

side of the disc through the cover of a package. The pin thus comprises one specific way of combining into a one-piece element a means for both holding bow loops together, and for fastening the bow to a package.

I understand that there was no discussion at the meeting of any type of pin or means for assembling and fastening a bow to a package, other than this particular type of pin.

Some time following the meeting, someone at 3M (apparently Mr. Lane) came up with the idea of combining a pressure sensitive adhesive coated sheet (such as that employed currently on the S-73 bow-tying machine) with the single pointed pin as used with the S-71 bow-tying machine (and disclosed in the Kravig and Johnson patent No. 2933223). The pressure sensitive adhesive sheet would be impaled on the pin and pushed against the head, adhesive coated side facing toward the head and away from the point. The bow would then be formed on the pin. The bow could then be fastened to the package by means of the pressure sensitive sheet. This is thus another specific form of a combined means for unifying and mounting a decorative bow, but involves two physical elements in combination.

The broad concept of a means serving such a combined function is not new. 3M has combined the pressure sensitive sheet with a staple, in bows made on the S-73 machine, for at least more than one year. Others also have done this. We consider the pin as disclosed in the Kravig et al patent (which Mr. Lane contemplates using) to be essentially the equivalent of a staple. There seems to be very little difference, therefore, in substituting the pin for the staple in the combination with the pressure sensitive adhesive sheet, so as to combine their respective similar functions.

I understand that you have no commercial interest in Mr. Richardson's idea; but that you may have a commercial interest in the concept of Mr. Lane. In respect to the latter, you are considering selling a package containing several loose pins of the Kravig & Johnson type, several pressure sensitive adhesive coated sheets or discs, and some decorative ribbon.

I have a great deal of difficulty in seeing how 3M would be liable to Mr. Richardson if Mr. Lane's idea is commercially exploited, on any theory of appropriation of trade secrets, breach of confidence, etc. This assumes the facts concerning the discussion of the meeting to be consistent with the foregoing.

It may be that Mr. Richardson's pin is patentable either per se or in combination with the bow. But even if it is, it seems most unlikely that the patent would be broad enough to cover Mr. Lane's idea, particularly in view of the similarity to the p.s.a. sheet-staple combination above referred to. That bridge, however, can be crossed when and if Mr. Richardson obtains any patent. It certainly presents no liability unless and until Richardson obtains a patent; and then only if such patent is validly entitled to a scope far beyond that which seems possible in view of the present state of art.

11/28/62

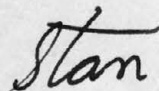
I do not see the necessity for conducting a novelty patent search in respect to Mr. Richardson's two-headed pin, if you are not interested in the subject matter commercially. Mr. Richardson, if he is going to file a patent application on his two-headed pin would undoubtedly want to seek his own counsel, who will independently look into these aspects. In view of the foregoing, I believe you or Mr. Redpath should write to Mr. Richardson along the following lines:

This will follow up the discussion attended by yourself and Mr. C. C. Smith, and Messrs. Redpath, Boese and Lane of 3M, held at Mr. C. C. Smith's home on November 17, 1962. We have discussed the commercial aspects of the subject matter you disclosed; namely the two-pointed plastic pin containing an integrally formed disc disposed on the shaft between the two pointed ends (and bows formed thereon). It is our conclusion that the subject matter does not fit realistically into our commercial picture. Since we indicated to you that we would also discuss the matter of possible patentability with our patent attorneys, such discussion was held, but in a general way only. Inasmuch as we had already reached our decision that we are not interested commercially, we did not ask our attorneys to proceed further.

We are enclosing the sketch which you signed together with the one sample plastic pin which you left with us.

You undoubtedly would want to add some pleasantries to this letter, but something along these lines should be included.

Yours very truly,



Stanley G. DeLaHunt

SGD:mc

Encl.

cc: A. H. Redpath
J. R. Lane

MINNESOTA MINING AND MANUFACTURING COMPANY

June 27, 1963

Mr. Bert W. Bock, Vice President
Paterson Instrument Corporation
271 Buffalo Avenue
Paterson, New Jersey

Comment
7/12/63

Dear Mr. Bock:

C
O
P
Y
At the conference here in St. Paul on June 11th we undertook to submit to you a proposed license under the Kravig et al U.S. Patent No. 2,933,223.

Due to unanticipated demands on the time of our Patent Counsel the preparation of this agreement has been delayed, but we now send herewith for your consideration the proposed agreement in duplicate together with two work copies.

If you find this agreement to be satisfactory, please obtain the execution of the duplicate copies on behalf of your company and return both copies to me for execution by Minnesota Mining and Manufacturing Company and the return of one fully executed copy to you.

Execution for your company should be by your president or a corporate vice president having proper authority, and your corporate seal should be impressed and attested by your secretary or assistant secretary. Also the date of execution and the state in which you are incorporated should be inserted in the blanks in the first paragraph.

We will await hearing from you.

Very truly yours,

A. W. Boese,
Manager, Non-Woven Products
Retail Tape and Gift Wrap Division

K. J. Smith
84

A G R E E M E N T

THIS AGREEMENT, made and entered into as of the 12th day of July , 1963 by and between MINNESOTA MINING AND MANUFACTURING COMPANY, a Delaware corporation, having an office at 2501 Hudson Road, Saint Paul 19, Minnesota, hereinafter called "Licensor", and PATERSON INSTRUMENTS CO., INC., a New Jersey corporation, having an office at 271 Buffalo Avenue, Paterson, New Jersey, hereinafter called "Licensee";

W I T N E S S E T H T H A T:

WHEREAS, Licensor is the owner of the entire right, title and interest in, to and under United States Letters Patent No. 2,933,223 for "Decorative Bows and Method and Machine for Fabricating the Same" granted to it on April 19, 1960 upon application Serial No. 750,396 of Robert S. Kravig and Arnold E. Johnson filed July 23, 1958; and

WHEREAS, Licensee is desirous of obtaining the right and license under said United States Letters Patent No. 2,933,223 to make machines covered by the claims of said Letters Patent and to sell said machines; and

WHEREAS, Licensor is willing to grant such license of scope and nature and subject to the terms and conditions hereinafter set forth.

NOW, THEREFORE, in consideration of the premises and the promises of the respective parties to each other as

than the successor in business of this Licensee as above provided) except with the written consent of Licensor.

IN WITNESS WHEREOF, the parties hereto have caused their respective corporate seals to be hereunto affixed and duly attested and these presents to be signed by their respective duly authorized officers the day and year first above written.

MINNESOTA MINING AND MANUFACTURING COMPANY

By _____
Vice President

ATTEST:

Ass't. Secretary

PATERSON INSTRUMENTS CO., INC.

By _____
President

ATTEST:

Secretary

Original & one copy
of agreement to
Dr. Carpenter

sent of file
discuss

IMPORTANT MESSAGE FOR YOU

FOR _____

FROM _____

OF _____

PHONE _____ EXT. _____

TELEPHONED	
CALLED TO SEE YOU	
WANTS TO SEE YOU	
PLEASE PHONE HIM	
WILL CALL AGAIN	
RETURNED YOUR CALL	

REMARKS _____

DATE _____ TIME _____

NAME OF PERSON RECEIVING MESSAGE

ANTHONY R. LA DUCA

Counsellor at Law

126 MARKET STREET

PATERSON, N. J.

SHERWOOD 2-0776

July 12, 1963

Minnesota Mining Company
2501 Hudson Road
St. Paul 19, Minnesota

Attention: A. W. Boese
Manager, Non-woven Products

Re: License Contract
Paterson Instruments Corp.

Dear Mr. Boese:

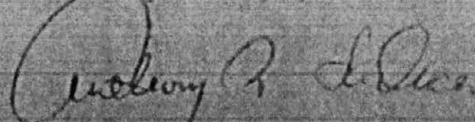
I am enclosing herewith an Original and copy of the proposed License Agreement, both of which are fully executed by my client Paterson Instruments Corporation.

Will you kindly have the proper corporate officers of Minnesota Mining Company execute said contracts and return a fully executed copy to my office.

It is understood that this Agreement will be inoperative until a fully executed copy is actually received in my office.

Thank you for your kind cooperation in this matter.

Very truly yours,



ANTHONY R. LA DUCA

APL/mv
Encls. 2

*File
Kovach
Patent Division*

A G R E E M E N T

THIS AGREEMENT, made and entered into as of the
day of , 1963 by and between MINNESOTA MINING AND
MANUFACTURING COMPANY, a Delaware corporation, having an
office at 2501 Hudson Road, Saint Paul 19, Minnesota, herein-
after called "Licensor", and PATERSON INSTRUMENT CORPORATION,
a corporation, having an office at 271 Buffalo
Avenue, Paterson, New Jersey, hereinafter called "Licensee";

W I T N E S S E T H T H A T:

WHEREAS, Licensor is the owner of the entire right,
title and interest in, to and under United States Letters
Patent No. 2,933,223 for "Decorative Bows and Method and Ma-
chine for Fabricating the Same" granted to it on April 19,
1960 upon application Serial No. 750,396 of Robert S. Kravig
and Arnold E. Johnson filed July 23, 1958; and

WHEREAS, Licensee is desirous of obtaining the right
and license under said United States Letters Patent No.
2,933,223 to make machines covered by the claims of said
Letters Patent and to sell said machines; and

WHEREAS, Licensor is willing to grant such license
of scope and nature and subject to the terms and conditions
hereinafter set forth.

NOW, THEREFORE, in consideration of the premises
and the promises of the respective parties to each other as

hereinafter set forth, and of other valuable considerations, the parties hereto have agreed and do hereby agree as follows:

ARTICLE I

Definitions

1. "Licensed Patent" means United States Letters Patent No. 2,933,223 and any extension or reissue thereof.
2. "Licensed Machine" means any machine or apparatus coming within the scope of any claim of Licensed Patent, or the use of which comes within any claim of Licensed Patent; provided however, that only such machines as shall be suitable only for manual operation as distinguished from operation by some other source of power such as an electric motor shall be included within the term Licensed Machine for purposes of this Agreement.
3. "Net Selling Price" means the summation of all amounts of money billed to purchasers of Licensed Machines sold by or for Licensee without reduction for cash discount or any allowance for transportation but less returns and other allowances actually made with respect to any such sales.

ARTICLE II

License Granted

1. Subject of the terms, conditions and limitations herein elsewhere set forth in this Agreement, Licensor hereby

grants to Licensee a non-exclusive right and license under Licensed Patent to make Licensed Machines and to sell said Licensed Machines.

2. The license above granted is limited to the manufacture and sale of Licensed Machines where the selling price per machine received by Licensee without any reduction for cash discount or allowance for transportation is not more than two hundred fifty dollars (\$250.00).

3. The license above granted is limited to the manufacture of Licensed Machines in the United States of America. Such machines may be sold or used throughout the world but no license is granted by this Agreement under any Letters Patent of any country foreign to the United States of America.

ARTICLE III

Royalty

In consideration of the license granted in Article II above, Licensee agrees to pay to Licensor as royalty amounts of money determined as follows:

1. Fifteen Dollars (\$15.00) for each Licensed Machine where the selling price received by Licensee without any reduction for cash discount or allowance for transportation is less than One Hundred Fifty Dollars (\$150.00).

2. Ten percent (10%) of the Net Selling Price of Licensed Machines where the selling price per machine received by Licensee without any reduction for cash discount or allowance for transportation is One Hundred Fifty Dollars (\$150.00) or more.

3. In the event that, with respect to the calendar year 1964 or any calendar year thereafter Licensee shall sell less than one thousand (1000) Licensed Machines as to which royalty shall be paid or payable to Licensor as above provided, Licensee agrees to pay to Licensor, at the time of making its report and payment for the fourth quarter of such calendar year, the further amount which shall be: One thousand (1000) minus the number of Licensed Machines as to which royalty is paid or payable times Fifteen Dollars (\$15.00); provided however that any such amount paid by Licensee shall be applied as a prepayment credit with respect to any royalty payable by Licensee with respect to any Licensed Machines in excess of one thousand (1000) per year in each of the three calendar years immediately following the year with respect to which such additional payment shall have been made.

ARTICLE IV

Records, Reports and Dates of Payment

1. Licensee agrees to keep in the United States, full, true and accurate records and books of account of all of its sales

of Licensed Machines, to which records and books of account Licenser, through certified public accountants of its own selection or employees of such accountants, as its duly accredited representatives, shall have access during reasonable business hours in order to check, at its own expense, the royalties due hereunder.

2. Licensee agrees to report to Licenser not later than the last day of January, April, July and October in each year, in respect to all Licensed Machines sold during the preceding quarter calendar year. Said reports shall set forth separately as to each of the price ranges set out in Article III the number of Licensed Machines sold and the Net Selling Prices thereof; and shall be accompanied by full payment of the total royalties due to Licenser from Licensee.

ARTICLE V

Marking

Licensee shall mark all Licensed Machines manufactured and sold by it, after the date of this Agreement, on each machine and on all primary containers thereof:

"Licensed Under U. S. Patent 2,933,223"

ARTICLE VI

Cancellation, Termination, Bankruptcy, Etc.

1. Violation by Licensee of any of the terms, conditions and agreements herein contained (which violation is persisted

in or not rectified within ninety (90) days after notice in writing by Licensor), shall be valid ground for cancellation of this Agreement by Licensor by a final notification in writing, and no such cancellation shall in anywise affect any of the rights of Licensor that have accrued prior to such cancellation.

2. The rights of Licensee hereunder shall not pass to third parties either by act or deed of Licensee or by operation of law, or by order of court, bankruptcy, receivership or insolvency which proposes or results in the lessening of Licensee's liability to any creditor or creditors (and the adjudication of like involuntary proceedings), and dissolution or any pretended or attempted transfer on the part of Licensee, shall ipso facto, cause all and several the rights of Licensee hereunder to cease.

3. Unless otherwise terminated as provided in this Article VI or elsewhere in this Agreement, this Agreement shall continue in force until the expiration of Licensed Patent.

ARTICLE VII

Miscellaneous

1. Licensee agrees that it will, during such time as this Agreement shall continue in force, refrain from aiding any third parties to infringe Licensed Patent by the manufacture, and/or sale of any Licensed Machine or to contest the validity or infringement of Licensed Patent.

2. Any notice required hereunder shall be made in writing by posting prepaid registered or certified mail to Licensor at 2501 Hudson Road, Saint Paul 19, Minnesota, and to Licensee at 271 Buffalo Avenue, Paterson, New Jersey.

3. These Articles of Agreement, and each and every one of the terms and conditions thereof, shall be available to and binding upon the assignees and legal representatives of the Licensor, and the successor in business of the Licensee, where such successor is a corporation domiciled in and organized under the jurisdiction of the United States, or one of the political subdivisions thereof, and actually carrying on a manufacturing business within the continental United States. This Agreement shall not be assignable by Licensee to any third party (other than the successor in business of this Licensee as above provided) except with the written consent of Licensor.

IN WITNESS WHEREOF, the parties hereto have caused their respective corporate seals to be hereunto affixed and duly attested and these presents to be signed by their respective duly authorized officers the day and year first above written.

MINNESOTA MINING AND MANUFACTURING COMPANY

ATTEST:

By _____
Vice President

Secretary

PATERSON INSTRUMENT CORPORATION

ATTEST:

By _____
President



BOX 550 • DERBY, CONN.

Interoffice Correspondence

Subject

*Jack Lane
Al Boese*

Please note

APK

*Competitive
how market fit
WB*

July 29, 1963

To: A. H. Redpath - Retail Tape & Gift Wrap - 220-8W

From: A. P. Krueger - Derby Sealers Division

Dear Al:

Looking over the Patent Gazette, I noticed two patents issued recently in which you might be interested. They are as follows:

W. A. Harvey, Jr.	No. 3,095,967
J. E. Kerrigan et al	No. 3,097,772

I am enclosing copies of each, herewith.

Best personal regards.

APK

APK/rb
Encs.

Extra.
Ridpath.

REFERENCE FILE

July 2, 1963

W. A. HARVEY, JR

3,095,967

PROTECTIVE DEVICE FOR A BOW ON GIFT-WRAPPED PACKAGES

Filed March 30, 1960

FIG. 1.

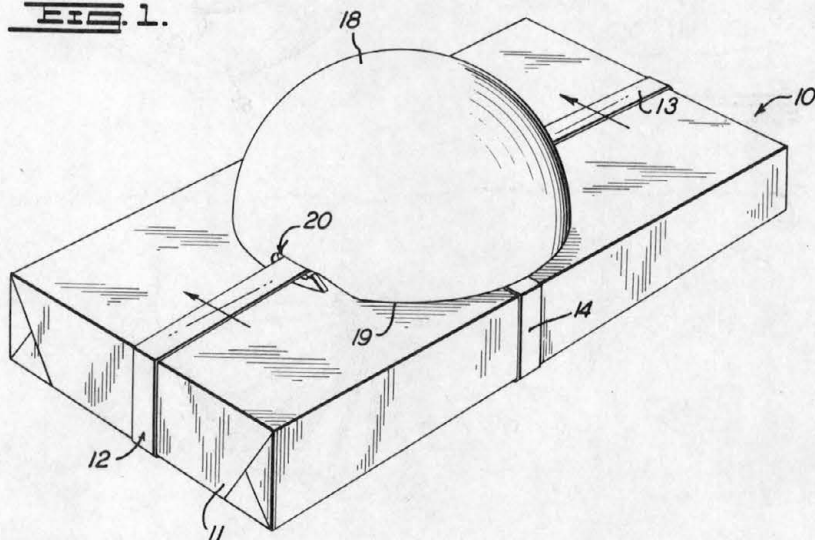


FIG. 2.

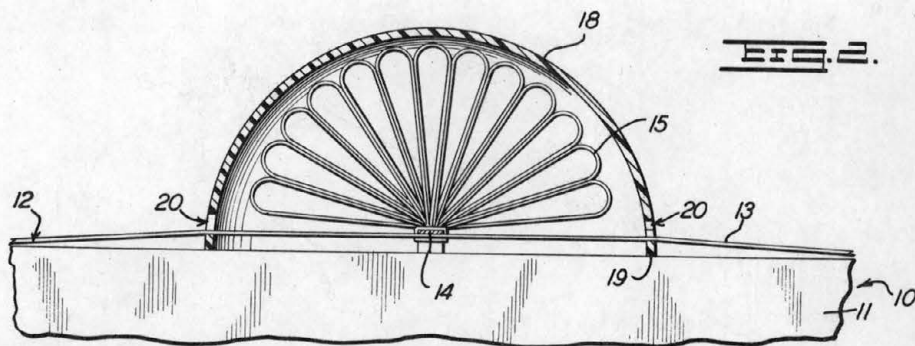
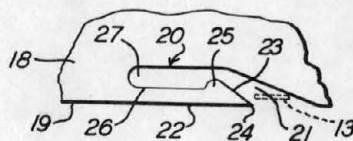
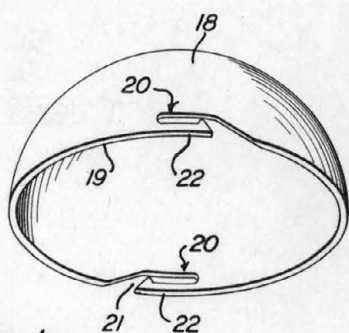


FIG. 3.



INVENTOR
WALLACE A. HARVEY, JR.

FIG. 4.



BY

John V. Phillips

ATTORNEY

1

3,095,967
**PROTECTIVE DEVICE FOR A BOW ON
GIFT-WRAPPED PACKAGES**
Wallace A. Harvey, Jr., 1626 N. Fort Myer Drive,
Arlington, Va.
Filed Mar. 30, 1960, Ser. No. 18,622
3 Claims. (Cl. 206—45.33)

This invention relates to a protective or ornamental device for use with gift-wrapped packages.

It is the common practice in wrapping gifts to finish off the package, after it has been tied with ribbon, to apply to the top of the package a highly ornamental bow. Such bows, of course, are extremely fragile and, if handled to any substantial extent, for example in delivery or shipment, the bows become distorted or mashed, and accordingly must be protected. This is commonly done in department and other stores by surrounding the bow with a cardboard or similar "fence" attached to the package by adhesive tape. The application of such protective means adds greatly to the time required by a worker in wrapping the package, tying the ribbon therearound, applying the bow and then the protector.

An important object of the present invention is to provide a novel device which may be made highly ornamental in itself so as to eliminate the use of a bow, or which may be employed as a protector for the bow to prevent distortion or mashing of the same in handling the package.

A further object is to provide a device of this character which may be manufactured very economically, and which may be applied to a gift-wrapped package in a fraction of the time normally required for applying protective devices to the package.

A further object is to provide a device of the character referred to which may be supplied with means for engaging portions of the ribbon with which a gift package is tied to anchor the device relative to the package.

A further object is to provide such a device having bottom edge portions corresponding in shape to the top surface of the gift-wrapped package to seat therein, and to provide the device with novel types of slots adapted to engage the ribbon with which the package is tied to maintain the device effectively seated on the top of the package, the tension of the ribbon holding the device in proper position.

A further object is to provide the device with oppositely facing slots at opposite sides thereof, the slots being of such character that the device may be placed in proper position on the package and rotated to engage the slots with the ribbon to hold the device in position.

A further object is to provide a device of the general nature referred to which is capable of being formed in a variety of shapes and sizes one of which, for example, may be substantially dome-shaped to act as a protector for the ornamental bow on a gift package, but which may be made, in itself, highly ornamental to serve as a finishing device for the package without the use of the usual ornamental bow.

A further object is to provide in combination with a gift package tied with a flexible element and provided with an ornamental bow or other fragile ornamental device, a protector for the ornamental device in the nature of a relatively rigid hollow protective device having an open bottom seating on the package and provided with a slot means engageable with the flexible element to fix the protective device in position, the protective device being attachable to the flexible element by placing it in position on the package and then rotating it so that points at the ends of the slots will slide beneath the flexible element upon turning movement of the protective device, thus attaching the protective device to the flexible element.

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Other objects and advantages of the invention will become apparent during the course of the following description.

In the drawing I have shown one embodiment of the invention. In this showing:

FIGURE 1 is a perspective view of a gift package showing the device applied;

FIGURE 2 is an enlarged fragmentary side elevation of the same, the present device being shown in section;

FIGURE 3 is an enlarged fragmentary side elevation showing one of the ribbon-engaging slots; and

FIGURE 4 is an under-side perspective view of the device.

Referring to FIGURE 1, the numeral 10 designates a gift package as a whole, wrapped with paper or other material 11 and tied by a flexible element such as a ribbon 12 shown in the present instance as having one strand extending longitudinally of the package as at 13 and a cross strand 14 extending transversely of the box. The box may be finished in the usual manner by the application to the top thereof, at the junction of the ribbon strands 13 and 14, of an ornamental bow 15 of any desired type.

As stated above, it is the common practice upon the completion of such gift package to surround the ornamental bow with a cardboard or similar "fence" attached to the package by adhesive tape. The present device eliminates the necessity for using such protective means and may be applied in a fraction of the time required for the application of such means.

The device has been illustrated in the present instance as a substantially hemispherical body 18, preferably formed of a suitable plastic which is relatively rigid when the device is formed hollow and rather thin-walled, as shown in FIGURE 2. The device is formed with lower edge portions 19 shaped to conform to the shape of the top of the package and to lie thereagainst. In the present instance, the package is shown as having a flat top, in which case the lower edge portions of the device will lie in a plane to seat flat against the top of the package. For packages which curve from side to side, the edge portions 19 may be similarly curved, or such edge portions may be made of any desired shape so as to snugly fit against one face of the package.

In the present instance, the device 18 is shown as being provided with diametrically opposite slots, each indicated as a whole by the numeral 20. The slots are identical and are provided with entrance openings 21, and each such opening is defined at one side by the end of a tongue 22 the free extremity of which slopes upwardly as at 23 from a lower pointed tongue end 24. At the upper extremity of each sloping edge 23, each tongue 22 is provided with a hump or lug 25 back of which the slot is provided with a straight edge 26, lower than the top of the hump 25, the edge 26 being the bottom edge of a straight inner circumferential portion 27 of each of the slots. The tongues 22 at opposite sides of the device extend circumferentially in the same direction, as will be apparent from FIGURE 4.

Operation

The package 10 is tied in the usual manner by wrapping it, usually with ornamental paper 11, after which the package is tied tightly with the ribbon 12, as described above. Any type of bow 15 then may be applied to the ribbon at the crossing points of the strands 13 and 14 so that the finished package will be highly ornamental in appearance in accordance with the usual practice. The person wrapping the package will then apply one of the devices 18 over the top of the package with the mouth of the slot opening 21 directly over one of the ribbon

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strands 13 or 14. The device is then pressed downwardly against the package, flexing the top surface portion of the paper 11 downwardly slightly beneath the plane of the ribbon strand over which the device is being applied. Under such conditions, the bottom of the ribbon strand will lie slightly above the plane of the bottom of the device as indicated in dotted lines in FIGURE 3. Accordingly, the point 24 will lie slightly below the bottom of the ribbon strand.

It will be noted that the horizontal dimension of the mouth of the slot opening 21 from the point 24 across the mouth of the slot opening is made substantially greater than upper portions of the slot opening 21. This is done to accommodate the device to application to ribbons of various widths. If the ribbon is wider than the mouth of the slot opening, the left-hand edge of the ribbon as viewed in FIGURE 3 will be maintained to the right of the point 24 and the opposite edge of the ribbon may extend beneath the edge portion 19 beyond the opening 21. In such case, downward pressure on the device will depress the right-hand edge of the ribbon, but the tension of the ribbon will maintain the left-hand edge thereof at a level slightly above the point 24. The device having been placed in position as stated, it is then rotated counterclockwise and the pointed end 24 of the tongue 22 at the bottom of each slot 20 will slide beneath the adjacent ribbon strand and the latter will be caused to slide upwardly over the inclined face 23. Since the left-hand edge of the ribbon strand as viewed in FIGURE 3 engages the slope 23, downward pressure on the device may be released. The rotational action of the device is continued until the ribbon strand comes to rest on the slot edge 26. The device will then be held by the tension of the ribbon, and no other fastening means is required for holding the device against separation from the package. Rotation of the device in one direction is prevented by the closed inner end of the slot portion 27, while rotation in the opposite direction is prevented by the hump 25.

It will be apparent that in the form illustrated the device serves perfectly as a protecting means for the bow 15. Obviously, however, the device need not be made in the shape illustrated, but may be made in itself of any desired ornamental design to serve as a finishing ornament for the package. In such case, the bow 15 may be eliminated. In the form shown in FIGURE 1, the device is, of course, too large in proportion to the size of the package to present an ornamental appearance, but in this case it is intended to be purely functional in operation as a protective means for the body 15. Where the device is molded into ornamental shapes and variously colored, it may be made in a variety of sizes for application to a package tying ribbon so as to impart a highly ornamental finished appearance to the package. The device obviously forms in itself a novel article of manufacture, and it is also novel in its combination with the flexible elements with which a gift or other package is tied. The combination is formed, as will be apparent above, by placing the device 18 in position with a straight run of the flexible element, such as the strand 13, in position in the open bottoms of the slots 21. With the bottom edge

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19 in contact with the package, rotation of the device counterclockwise as viewed in FIGURE 1, will cause the strand 13 to be lifted by the points 24, so that the strand slides upwardly over the inclined edges 23 and into the closed ends of the slots. The strand 13 will be tightly tied but will "give" sufficiently to be moved upwardly into the slots and the tension of the strand 13 will hold the device 18 against the package while the humps 19 prevent free movement of the strand 13 out of the slots. Thus the device acts in combination with the strand 13 to be maintained in a position on the package to protect the fragile bow 15 or other ornamental device.

The tying of gift packages is a rather tedious time-consuming operation which is substantially lengthened by the usual practice of applying a protective "fence" around an ornamental bow on the package. It obviously requires no more than a second or two to apply and lock the present device relative to the package.

It is to be understood that the form of the invention shown and described is to be taken as a preferred example of the same and that various changes in the shape, size, and arrangement of the parts may be made as do not depart from the spirit of the invention or the scope of the appended claims.

I claim:

1. In combination with a package having a flexible element tied therearound and a fragile ornament fixed with relation thereto, a unitary body having a substantially vertical bottom edge shaped to seat upon the package over said ornamental and said flexible element, said bottom edge having diametrically opposite slots provided with closed ends arranged above said bottom edge and entering ends extending from said closed ends downwardly through said bottom edge, the entering end of each slot having opposite edges, one of which is inclined at an angle to the vertical and intersects said bottom edge in a point, the points of the two slots extending circumferentially in the same direction whereby rotation of said body in said one direction with said bottom edge in engagement with the package will cause portions of said flexible element to slide upwardly over said inclined edges and move into the closed ends of said slots.

2. The combination defined in claim 1 wherein the closed end of each slot has a lower supporting edge for the flexible element and is provided between such edge and said inclined edge of the slot with a hump to retain said flexible element within the closed end of the slot.

3. The combination defined in claim 2 wherein said opposite edges of each slot diverge downwardly to provide each slot with a relatively wide bottom opening whereby, if said flexible element is a ribbon, the width thereof can be accommodated wholly within the bottom openings of said slots when said bottom edge is placed in contact with the package.

References Cited in the file of this patent

UNITED STATES PATENTS

807,286	King	Dec. 12, 1905
1,806,162	Hahn	May 19, 1931
2,780,403	James	Feb. 5, 1957

Extra
Respaths

REFERENCE FILE

July 16, 1963

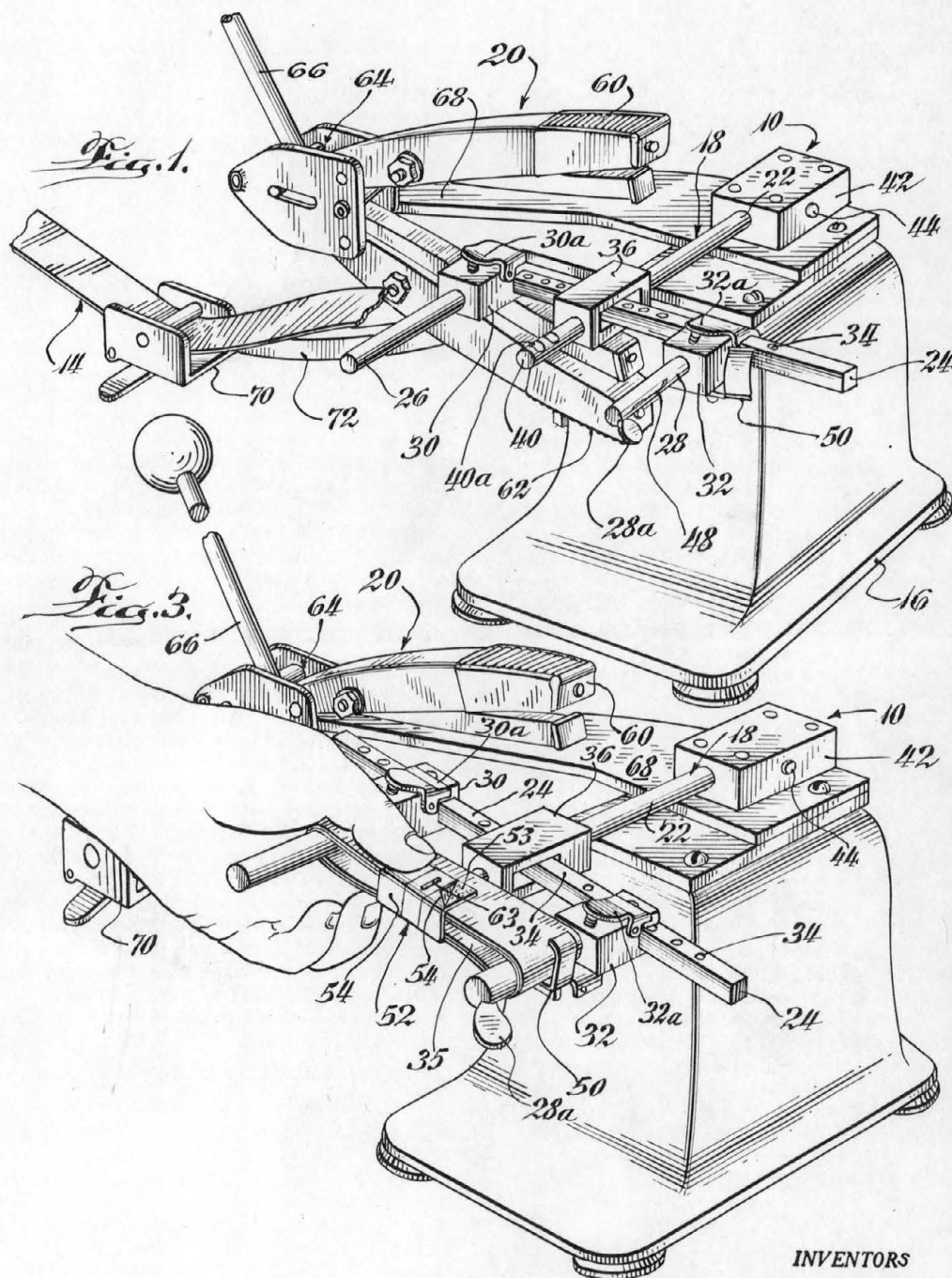
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3,097,772

BOW FORMING MACHINE

Filed Dec. 30, 1960

3 Sheets-Sheet 1



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BOW FORMING MACHINE

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3 Sheets-Sheet 2

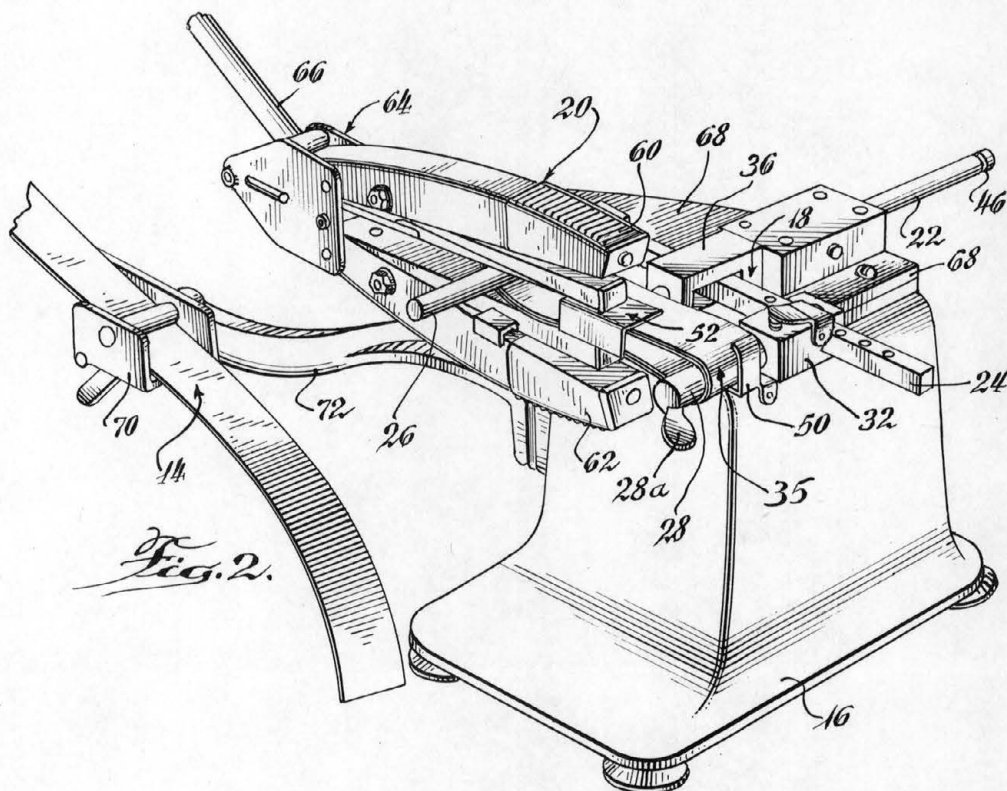
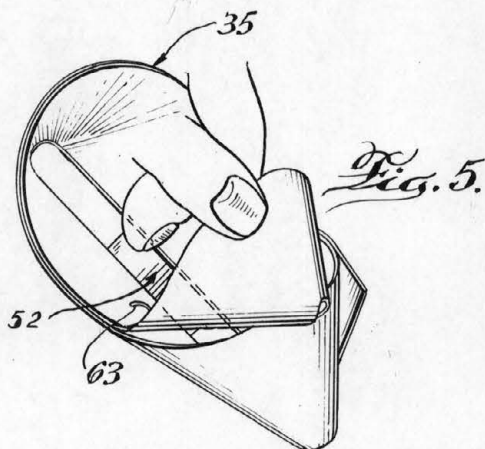
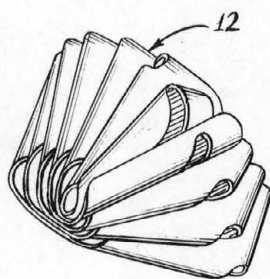


Fig. 6.



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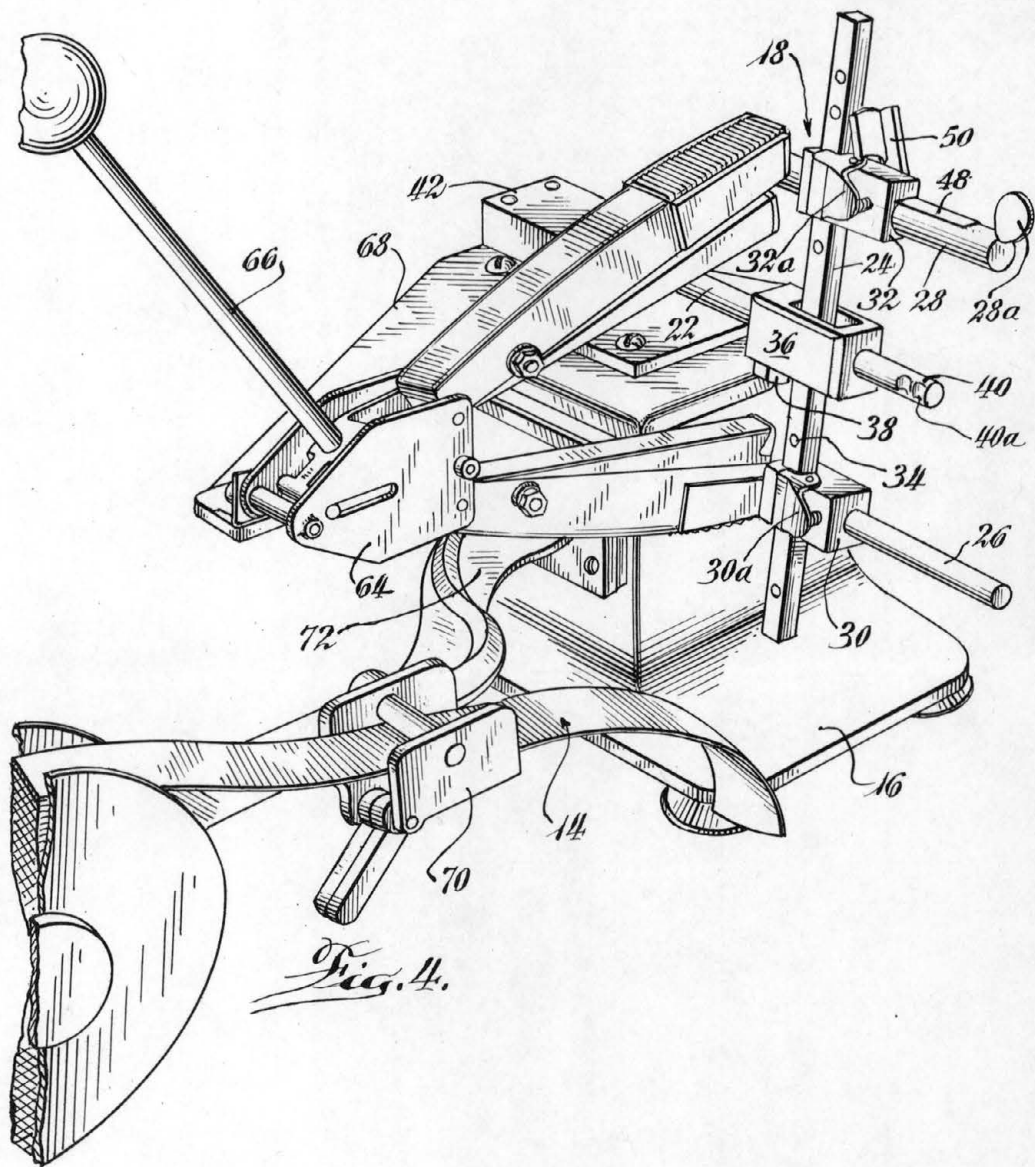
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BOW FORMING MACHINE

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3 Sheets-Sheet 3



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3,097,772

BOW FORMING MACHINE

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13 Claims. (Cl. 223-46)

This invention relates to a bow forming machine and more particularly to a portable mechanism for mechanically manipulating a length of ribbon to facilitate forming a bow therefrom.

Gift wrapping of packages has become one of the important services of department stores and the like. Due to the increasing number of packages being gift-wrapped and due to the time necessary to manually form each decorative bow for such packages, the need has arisen for an inexpensive, versatile, and portable bow forming machine. Most of the bow forming machines which have been developed heretofore have in general been very complex and correspondingly very expensive, and most have been quite large. While some of these machines are very ingenious and are capable of forming a large number of decorative bows in a very short time, very few have been designed for the smaller gift-wrapping operations of the variety and gift shops or the operations of the smaller department stores. Also, bow machines of previous design have been rarely constructed in such a manner that they could be adjusted either to accommodate ribbon of various widths or to form bows of various styles and sizes.

It is, therefore, one object of this invention to provide a portable bow forming machine which is particularly adapted for variety store gift-wrapping operations.

It is another object of this invention to provide a portable bow tying machine which is very versatile and easy to operate and which represents a relatively small capital investment.

It is still another object of this invention to provide a portable machine which may be operated easily and rapidly to facilitate producing a large number of decorative bows.

It is an additional object of this invention to provide a portable bow forming machine which may be adjusted to handle ribbon of various widths and may be further adjusted to aid in producing bows of various styles and sizes.

It is a further object of this invention to provide a portable bow forming machine which is relatively inexpensive, has a minimum number of parts and is very easy to maintain in working order.

Other objects will be seen, and a further understanding of the invention may be had by referring to the following description and claims taken in conjunction with the accompanying drawings.

The mechanism constructed in accordance with this invention is adapted to facilitate forming a decorative bow having a mounting strip for attaching it to a package or the like. This mechanism comprises means for winding a length of ribbon into a composite loop of several co-extensive contiguous layers, and means for fastening the mounting strip to the composite loop of ribbon and for fastening the contiguous layers of the composite loop together on opposite sides thereof while the loop is on the winding means. The thus joined composite ribbon loop may then be removed from the winding means, and the intermediate unfastened end portions of each layer of ribbon may be removed from the corresponding end portions of the adjacent overlying layer to form the decorative bow.

The winding means preferably includes a pair of substantially parallel fingers and a ribbon holder for maintaining a free end portion of the ribbon in fixed position

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with respect to these fingers. This winding means is connected to a base member or stand for translative movement between two predetermined positions and for rotative movement about an axis which is intermediate and substantially parallel to the fingers of the winding means. As the fingers are rotated about this axis, successive portions of the ribbon will be wound thereon to form the elongate composite loop. The structure of this winding means or unit is one of the features of this invention. The unit is adjustable to accommodate ribbons of various widths and is further adjustable to permit various sizes and styles of bows to be formed thereon.

Another feature of this invention is the means for fastening the mounting strip to the ribbon and for simultaneously fastening the contiguous layers of the composite ribbon loop together on opposite sides thereof. This fastening means preferably includes two fasteners disposed on opposite sides of the axis of rotation of the winding unit and an associated anvil which is mounted on the winding unit. The translation of the winding unit is such as to position the composite loop and the anvil between the oppositely disposed fasteners. The fasteners may then be actuated simultaneously to fulfill their function.

With reference to the drawings:

FIGURE 1 is a perspective view of an apparatus constructed in accordance with this invention;

FIG. 2 is a perspective view of the apparatus after the ribbon has been wound onto the fingers of the winding unit to form the composite loop, after the winding unit has been translated to its retracted position and as the fastener mechanisms are actuated to interconnect the mounting strip and the various layers of ribbon of the composite loop;

FIG. 3 is a perspective view of the apparatus after the fasteners have been applied to the composite loop and after the winding unit has again been translated to its extended position;

FIG. 4 is a perspective view of the mechanism taken at a slightly different angle and showing the winding unit partially rotated;

FIG. 5 is a perspective view of the composite loop of ribbon formed on the machine illustrating the manner in which the unfastened end loop portions of each layer of ribbon may be removed from the corresponding unfastened end loop portions of the adjacent overlying layer; and

FIG. 6 is a perspective view of a finished bow.

The mechanism 10 is adapted to facilitate the formation of a bow 12 (see FIG. 6) from a length of ribbon 14. The mechanism 10 includes a relatively heavy base or stand 16 which is adapted to rest upon a table surface. Attached to the base 16 are a winding unit 18 and a fastening mechanism 20.

The winding unit 18 includes an elongate shaft 22 about the axis of which the winding unit 18 is adapted to rotate, and along the axis of which the winding mechanism is adapted to translate. Attached to one end of this shaft 22 is a cross bar 24. Two substantially parallel finger elements 26 and 28 are operatively connected to the bar 24 on opposite sides of the juncture of this bar with the shaft 22. To effect this connection of the finger elements to the cross bar 24, two slide blocks 30 and 32 are employed. Finger element 26 is mounted on slide block 30, and finger element 28 is mounted on slide block 32. The slide blocks 30 and 32 may be moved toward and away from each other to vary the distance between the parallel finger elements without varying the orientation of the finger elements. The spacing of the fingers 26 and 28 is determinative of the length of the composite ribbon loop 35 and of the ultimately formed bow. A latch 30a on the slide block 30 and a corresponding latch 32a on the slide block 32 cooperate with

recesses 34 formed in the cross bar 24 to effect locking of these slide blocks and their associated finger elements in their desired position of adjustment on the bar 24.

The outer ends of the slide blocks 30 and 32 at the juncture with their finger elements are flat and define a plane substantially parallel to the cross bar 24. As will be further described, the ribbon 14 is guided onto the fingers 26 and 28 in such a manner that the inner edge thereof will abut the slide blocks 30 and 32.

The finger element 26 is somewhat longer than the finger element 28, for it is adapted to act as an operating handle to facilitate the rotation of the winding unit 18, as will be seen. The finger element 28 is eccentrically connected to its slide block 32 and may be rotated relative to this slide block. To facilitate this relative movement a tab 28a is provided at the end of this finger element. The eccentric connection permits the finger 28 to be moved slightly toward or away from the finger 26 without effecting the positioning of the slide blocks 30 or 32. This slight movement is employed to effect release of the composite ribbon loop 35 which has been tightly formed about the fingers. In the drawings, the finger 28 is in its operative or holding position, and the tab 28a is positioned outwardly. When this finger has been rotated to its released position, the spacing between the fingers will be slightly less and the tab 28a will be positioned inwardly to permit the composite loop 35 to be easily removed.

A stop 36 is slidably connected to the shaft 22 adjacent the juncture of this shaft with the cross bar 24, and this stop is locked in its desired position of adjustment with respect to the shaft 22 by means of a setscrew 38 (see FIG. 4). The stop 36 is slotted to accommodate the cross bar 24 at its juncture with the shaft 22, and a rodlike anvil element 40 is connected to this stop on the opposite side thereof. This anvil element 40 is aligned with the shaft 22 and is functionally a part of the fastening mechanism 20. Pairs of dishlike deflecting recesses 40a in the opposite sides of the anvil element facilitate the application of the fastener to the ribbon wound on the winding element 18, as will be herein-after more fully described.

The shaft 22 of the winding element is operatively connected to the base 16 by means of a connecting block 42 which is apertured to accommodate this shaft. The shaft 22 may be freely rotated within the aperture of the connecting block 42; and it may be translated, that is, moved axially, from its extended or ribbon winding position, as illustrated in FIGS. 1, 3, and 4, to a retracted or fastening position, as illustrated in FIG. 2. The retracted position of FIG. 2 is determined by the adjustment of the stop 36 on the shaft, for when in the retracted position, the stop 36 will abut the connecting block 42.

The extended position of the shaft 22 is determined by the engagement of a spring-actuated detent 44 within a peripheral groove 46 in the shaft adjacent the free end thereof (see FIG. 2). When the detent 44 is engaged in the groove 46, the shaft 22 is resiliently held in position and resists further axial translation, nevertheless, this shaft is free to rotate about its axis.

A resilient clip 48 mounted against either finger element 26 or 28 of the winding unit 18 is adapted to hold the forward end of the ribbon 14 in position for winding onto the fingers 26 and 28. A ribbon retaining element 50 pivotally mounted on the slide block 32 may be moved from its retracted position, as illustrated in FIG. 1, to the operative position, as illustrated in FIGS. 2 and 3. In its operative position, this element is adapted to prevent the loosening or unwinding of the composite loop of ribbon 35 on the fingers 26 and 28 after this loop has been severed from the remainder of the ribbon 14 and before the fastening operation occurs. The winding unit 18 may then be translated to its retracted position for the application and fastening of a mounting strip 52

thereto. The mounting strip 52, which is placed about the central portion of the composite loop 35, is preferably constructed of heavy paper and has an adhesive substance 53 on its exterior surface which is protected by means of removable wax paper sheet 54 (see FIG. 3).

The fastener mechanism 20 comprises a pair of fastener driving elements or staplers 60 and 62 which are positioned opposite each other. These staplers 60 and 62, which are of common and well-known construction, are connected to an actuating mechanism 64, also of well-known construction and having an operating handle 66. The actuating mechanism 64 is connected to the base 16 by means of a mounting bracket 68. When the operating handle 66 is depressed, the actuating mechanism 64 causes the staplers 60 and 62 to be actuated toward each other to effect the simultaneous application of staples 63 or other similar double-pronged members to the opposite sides of the composite ribbon loop 35 and the surrounding mounting strip 52. The deflecting recesses 40a in the anvil 40 effect closing of these staples after they have penetrated the ribbon.

The anvil 40 is always in the same position with respect to the staplers 60 and 62 when the winding unit 18 has been translated to its retracted position. This is so regardless of the position of adjustment of the stop 36 which carries the anvil element 40, because the stop member 36 is always in abutting position with respect to the connecting block 42 when the winding unit 18 has been translated. The location of the slide blocks 30 and 32 and of the composite loop of ribbon in the translated position of the winding unit is, however, dependent upon the adjustment of the stop 36.

A ribbon guide 70 which is connected to the base 16 by means of a bracket 72 guides the ribbon 14 onto the fingers 26 and 28 and against the slide blocks 30 and 32 when the winding unit 18 is in its extended position, so that the ribbon may be properly positioned for the formation of the composite loop 35.

In order to best hide the fasteners in the finished bow, as illustrated in FIG. 6, the fasteners should be positioned toward the center of the bow, which is along the exterior edge of the composite loop 35 when it is on the winding unit 18. The location of this edge, of course, will depend upon the width of the ribbon, for the inner edge of the composite loop will always abut the slide blocks 30 and 32 as previously indicated. It will be noted that stop 36 and the anvil 40 are movable relative to all portions of the winding unit 18. This, therefore, permits ribbons of differing widths to be used in the device; for regardless of the ribbon width, the stop 36 and the anvil 40 may be adjusted to properly position the fasteners in the finished composite loop.

In operation, the winding mechanism 18 is brought to its extended position, and the eccentric finger 28 is moved to its operative holding position, as illustrated in FIG. 1. The ribbon 14 is engaged in the spring clip 48 on finger 28, and the free end of the ribbon preferably extends over the anvil 40. The elongated finger 26 is then gripped by the operator, and the winding unit 18 turned through five or six complete revolutions. This produces a composite ribbon loop on the fingers 26 and 28 which has five or six layers of ribbon. This composite loop is then severed from the remainder of the ribbon by means of a knife or razor blade (not shown), and the retainer 50 is swung into its operative or holding position illustrated in FIGS. 2 and 3 to prevent the severed loop from loosening or unwinding. The entire winding unit 18 with the composite loop of ribbon thereon is then translated to the position illustrated in FIG. 2; the mounting strip 52 is positioned; and the handle 66 of the actuating mechanism 64 is depressed to effect the simultaneous driving of staples 63 into the opposite sides of the composite loop after first passing through the mounting strip positioned thereabout. The staples 63 are cammed closed by the engagement of the ends thereof with the recesses 40a of the anvil 40.

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The handle 66 is then released, and the eccentric finger 28 is rotated by its projecting tab 28a to its released position. The interconnected composite loop and mounting strip may then be removed from the winding unit, and the stapled side portions thereof may be laid flatly, as illustrated in FIG. 5. The looped unfastened end portions of each layer of the composite loop may then be removed from within the corresponding loop ends of the adjacent overlying layer to form the decorative bow, as illustrated in FIGS. 5 and 6.

It may be seen that with the mechanism constructed in accordance with this invention, the formation of a decorative bow can be accomplished quickly and with ease without requiring any substantial degree of skill on the part of the operator. The mechanism is rugged and may be adjusted for making bows of different sizes (length) and may be further adjusted to accommodate ribbons of different sizes. By varying the size of the bow, two or more bows may be artistically combined to provide very decorative bows of different styles.

Although the invention has been described with a certain degree of particularity, it is understood that the present disclosure has been made only by way of example and that many modifications and changes in various details may be resorted to without departing from the spirit and scope of the invention, as hereinafter claimed.

What is claimed is:

1. A device adapted for use in forming a decorative bow having a mounting strip for attaching said bow to a package or the like, said device comprising means for winding a length of ribbon into a composite loop of several coextensive contiguous layers and having opposite ends and opposite sides, means for fastening the mounting strip to said ribbon and for fastening said contiguous layers together at each of said opposite sides, independently of such fastening of the layers at the other of said opposite sides, while said composite ribbon loop is on said winding means, whereby when said composite ribbon loop is removed from said winding means, the intermediate unfastened portions of each layer of ribbon may be removed from the corresponding unfastened portions of the adjacent overlying layer to form a decorative bow.

2. A device adapted for use in forming a decorative bow having a mounting strip for facilitating the attachment thereof to a package or the like, said device comprising a base, winding means for sequentially winding successive portions of a continuous length of ribbon to form an elongate composite loop of several contiguous circumjacent layers and having opposite ends and opposite sides, means operatively connecting said winding means to said base for translational movement between a winding position and a fastening position, and fastening means in operative association with said winding means for fastening the mounting strip to said composite loop and for joining the contiguous layers of ribbon together at each of said opposite sides, independently of such joining of the layers at the other of said opposite sides, when said winding means is in its fastening position, whereby when said ribbon loop is removed from said winding means, the joined side portions may be disposed flat on said mounting strip and the looped ends of each layer may be removed from within the corresponding looped ends of the adjacent overlying layer to form a decorative bow.

3. A device adapted for use in forming a decorative bow having a mounting strip for facilitating the attachment thereof to a package or the like, said device comprising a base; a ribbon winding unit including a pair of substantially parallel fingers and ribbon-engaging means for maintaining a free end portion of the ribbon in fixed position with respect to said fingers, said winding unit being operatively connected to said base for translational movement between a retracted and an extended position and for rotative movement about an axis intermediate and substantially parallel to said fingers, whereby as said fingers are rotated, successive portions of the ribbon will

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be wound thereon to form an elongate composite loop of several contiguous circumjacent layers and having opposite ends and opposite sides; and means for fastening the mounting strip to said composite loop and for joining the contiguous layers of ribbon together at each of said opposite sides, independently of such joining of the layers at the other of said opposite sides, while said ribbon loop is on said winding unit, whereby when said ribbon loop is removed from said winding unit, the joined side portions may be disposed flat on said mounting strip and the looped ends of each layer may be removed from within the corresponding looped ends of the adjacent overlying layer to form a decorative bow.

4. A device adapted for use in forming a decorative bow having a mounting strip for facilitating the attachment thereof to a package or the like, said device comprising a base; a ribbon winding unit including a pair of substantially parallel fingers, ribbon-engaging means for maintaining a free end portion of the ribbon in fixed position with respect to said fingers, said winding unit being operatively connected to said base for translational movement between a retracted and an extended position and for rotative movement about an axis intermediate and substantially parallel to the axes of said fingers, whereby as said fingers are rotated, successive portions of the ribbon will be wound thereon to form an elongate composite loop of several contiguous circumjacent layers and having opposite ends and opposite sides; and fastening means including two fastener-driving elements operatively connected to said base and disposed on opposite sides of the axis of rotation of said winding unit, whereby when said winding unit is in one of its positions the ribbon wound thereon will be positioned between said fastener-driving elements, and manually operable means for effecting simultaneous application of separate fasteners by said fastener-driving elements to opposite sides of the ribbon loop and to the mounting strip positioned centrally thereabout, whereby when said ribbon loop is removed from the fingers of said winding unit, the fastened portions thereof may be disposed flat on said mounting strip and the looped ends of each layer may be removed from within the corresponding looped ends of the adjacent overlying layer to form a decorative bow.

5. A device adapted for use in forming a decorative bow having a mounting strip for facilitating the attachment thereof to a package or the like, said device comprising a base; a ribbon winding unit including a cross bar, a pair of substantially parallel fingers mounted on and extending outwardly from one side of said cross bar, ribbon-engaging means for maintaining a free end portion of the ribbon in fixed position with respect to said fingers, and an elongate shaft connected to and extending outwardly from the opposite side of said cross bar in intermediate, substantially parallel relationship with respect to said fingers, said shaft being operatively connected to said base for axial translative movement between an extended and a retracted position and for rotative movement, whereby said winding unit may be rotated and successive portions of the ribbon may be wound onto the fingers thereof to form an elongate composite loop of several contiguous circumjacent layers and having opposite ends and opposite sides; and means for fastening the mounting strip to said composite loop and for joining the contiguous layers of ribbon together at each of said opposite sides, independently of such joining of the layers at the other of said opposite sides, while said ribbon loop is on said winding unit, whereby when said ribbon loop is removed from said winding unit, the joined side portions may be disposed flat on said mounting strip and the looped ends of each layer may be removed from within the corresponding looped ends of the adjacent overlying layer to form a decorative bow.

6. The device recited in claim 3 and including means for resiliently locking said shaft in one of its translative positions while permitting the free rotation thereof.

7. A device adapted for use in forming a decorative bow having a mounting strip for facilitating the attachment thereof to a package or the like, said device comprising a base; a ribbon winding unit including a cross bar, a pair of substantially parallel fingers mounted on and extending outwardly from one side of said cross bar, ribbon-engaging means for maintaining a free end portion of the ribbon in fixed position with respect to said fingers, and an elongate shaft connected to and extending outwardly from the opposite side of said cross bar in intermediate, substantially parallel relationship with respect to said fingers, said shaft having a peripheral groove adjacent its free end, a connecting block mounted on said base and apertured to accommodate said shaft and to permit both the axial translative movement thereof between an extended and a retracted position and the rotative movement thereof, whereby said winding unit may be wound onto the fingers thereof to form an elongate composite loop of several contiguous circumjacent layers and having opposite ends and opposite sides, said connecting block having a spring-actuated element within the aperture thereof for engaging the peripheral groove of said shaft, whereby said shaft may be resiliently locked in one of its translative positions while free rotation thereof is permitted, and means for fastening the mounting strip to said composite loop and for joining the contiguous layers of ribbon together on each side of said loop substantially midway between the ends thereof while said ribbon loop is on said winding unit, whereby when said ribbon loop is removed from said winding unit, the joined side portions may be disposed flat on said mounting strip and the looped ends of each layer may be removed from within the corresponding looped ends of the adjacent overlying layer to form a decorative bow.

8. A device adapted for use in forming a decorative bow having a mounting strip for facilitating the attachment thereof to a package or the like, said device comprising a base; a ribbon winding unit including a cross bar, a pair of substantially parallel fingers mounted on and extending outwardly from one side of said cross bar, ribbon-engaging means for maintaining a free end portion of the ribbon in fixed position with respect to said fingers, and an elongate shaft connected to and extending outwardly from the opposite side of said cross bar in intermediate, substantially parallel relationship with respect to said fingers, said shaft being operatively connected to said base for axial translative movement between an extended and a retracted position and for rotative movement, whereby said winding unit may be rotated and successive portions of the ribbon may be wound onto the fingers thereof to form an elongate composite loop of several contiguous circumjacent layers and having opposite ends and opposite sides; and fastening means including two fastener-driving elements operatively connected to said base and disposed on opposite sides of the axis of said winding unit shaft, whereby when said winding unit is in one of its translative positions, the ribbon wound thereon will be positioned between said fastener-driving elements, an anvil element aligned with and connected to said shaft and extending outwardly on the opposite side of said cross bar therefrom, and manually operable means for effecting simultaneous driving of separate fasteners by said driving elements through opposite sides of the ribbon loop and through the mounting strip positioned centrally thereabout, whereby when said ribbon loop is removed from the fingers of said winding unit, the fastened portions thereof may be disposed flat on said mounting strip and the looped ends of each layer may be removed from within the corresponding looped ends of the adjacent overlying layer to form a decorative bow.

9. A device adapted for use in forming a decorative bow having a mounting strip for facilitating the attachment thereof to a package or the like, said device comprising a base; a ribbon winding unit including a cross

bar, a pair of substantially parallel fingers mounted on and extending outwardly from one side of said cross bar, ribbon-engaging means for maintaining a free end portion of the ribbon in fixed position with respect to said fingers, and an elongate shaft connected to and extending outwardly from the opposite side of said cross bar in intermediate, substantially parallel relationship with respect to said fingers, said shaft being operatively connected to said base for axial translative movement between an extended and a retracted position and for rotative movement, whereby said winding unit may be rotated and successive portions of the ribbon may be wound onto the fingers thereof to form an elongate composite loop of several contiguous circumjacent layers and having opposite ends and opposite sides; a stop member adjustably mounted on said shaft to limit the translative movement of said winding unit in one direction and thereby to define one of said positions for the accommodation of ribbons of differing widths, said stop member being slotted to accommodate said cross bar, and fastening means including two fastener driving elements operatively connected to said base and disposed on opposite sides of the axis of said winding unit shaft, whereby when said winding unit is in one of its translative positions the ribbon wound thereon will be positioned between said fastener-driving elements, an anvil element connected to said stop member in alignment with and extending on the opposite side of said cross bar from said shaft, whereby the position of said anvil element after said winding unit has been translated in said one direction will be constant regardless of the adjustment of said stop member, and manually operable means for effecting simultaneous driving of fasteners by said driving elements through opposite sides of the ribbon loop and through the mounting strip positioned centrally thereabout, whereby when said ribbon loop is removed from the fingers of said winding unit, the fastened portions thereof may be disposed flat on said mounting strip and the looped ends of each layer may be removed from within the corresponding looped ends of the adjacent overlying layer to form a decorative bow.

10. A device adapted for use in forming a decorative bow having a mounting strip for facilitating the attachment thereof to a package or the like, said device comprising ribbon winding means, fastening means in operative association with said winding means, and means operatively interconnecting said winding means and said fastening means for relative translative movement between two predetermined positions, one of said positions being a position wherein said winding means is effective for sequentially winding successive portions of a continuous length of ribbon to form an elongate composite loop of several contiguous circumjacent layers and having opposite ends and opposite sides, the other of said positions being a position wherein said fastening means is aligned with said winding means, said fastening means being adapted for fastening the mounting strip to said composite loop and for joining the contiguous layers of ribbon together at each of said opposite sides, independently of such joining of the layers at the other of said opposite sides, while said composite loop is on said winding means, whereby when said ribbon loop is removed from said winding means, the joined side portions may be disposed flat on said mounting strip and the looped ends of each layer may be removed from within the corresponding looped ends of the adjacent overlying layer to form a decorative bow.

11. A device adapted for use in forming a decorative bow having a mounting strip for facilitating the attachment thereof to a package or the like, said device comprising a base, winding means for sequentially winding successive portions of a continuous length of ribbon to form an elongate composite loop of several contiguous circumjacent layers and having opposite ends and opposite sides, means operatively connecting said winding means to said base for movement between a winding position

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and a fastening position, and fastening means in operative association with said winding means for applying separate fasteners to opposite sides of said composite loop for fastening the mounting strip to said composite loop and for independently joining the contiguous layers of ribbon together at each side of said loop when said winding means is in its fastening position, said fastening means including means for driving a separate fastener through each of said opposite sides of said composite loop, an anvil member connected to said winding means and positionable in alignment with said driving means and between said opposite sides of a composite loop on said winding means when said winding means is in its fastening position, whereby when the ribbon loop is removed from said winding means, the joined side portions may be disposed flat on said mounting strip and the looped ends of each layer may be removed from within the corresponding looped ends of the adjacent overlying layer to form a decorative bow.

12. A device as recited in claim 11 and wherein said fastening means includes a pair of staplers disposed to

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apply staples against opposite sides of said anvil member.

13. A device adapted for use in forming a decorative bow, comprising: means for winding a length of ribbon into a composite loop of several coextensive contiguous layers and having opposite ends and opposite sides; and securing means including a member associated with said winding means and disposed to lie between such opposite sides of a loop on said winding means, and fastener applicator means in operative association with said member for fastening said contiguous layers together at each of said opposite sides, independently of such fastening of the layers at the other of said opposite sides, while said composite ribbon loop is on said winding means.

References Cited in the file of this patent

UNITED STATES PATENTS

2,542,222	Welch	Feb. 20, 1951
2,654,980	Dexter	Oct. 13, 1953
2,884,169	Sperry	Apr. 28, 1959
2,905,368	Runyan	Sept. 22, 1959

Mr. A.W. Boese

WILLIAM H. ABBOTT
E. G. CARPENTER
ROBERT I. COULTER
HAROLD J. KINNEY
MARK SEVERANCE
CRUZAN ALEXANDER
MARK W. GEHAN
FRANK A. STELDT
ERNST A. JAFFRAY
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DAVID A. RODEN
EDWARD T. OKUBO
JOHN C. BARNES

CARPENTER, ABBOTT, COULTER & KINNEY

PATENT AND TRADE-MARK CAUSES

2501 HUDSON ROAD

SAINT PAUL 19, MINNESOTA

August 2, 1963
(dictated 8-1-63)

TELEPHONE
733-1500

CABLE ADDRESS
PATENTS

G.B. GEHRENBECK
TEMPLE CLAYTON
PATENT AGENTS

Mr. John F. Schneider
Minnesota Mining and Manufacturing Company
Saint Paul 19, Minnesota

Re: Method of Making a Simulated Rose
from Decorative Ribbon

Dear Mr. Schneider:

This will confirm our conversation of this morning.
We are still together as this letter is being dictated.

You demonstrated the use of a device for making a simulated rose comprising a cylindrical block, a blade, and a slotted tapered turning tool. The block was essentially solid and cylindrically shaped, having a diameter of about 3 inches, a thickness of about $1\frac{1}{2}$ inches, a diametral slot extending to a depth of about one-half the thickness, and a tapered center hole essentially co-extensive with the depth of the slot. With the block as just defined, you employed a flat blade and a tapered slotted turning tool, shaped to fit within the center hole. (Although the blade and the turning tool were separate, as you demonstrated them, you indicated the two would undoubtedly be combined in any commercial form of the device.)

The device was used to make a simulated rose, as follows: An approximately 20-inch length of $1\frac{1}{4}$ -inch wide red "Sasheen" ribbon was removed from a supply roll, folded in half lengthwise, dull side in, and creased along the folded edge. One end of the folded strip was squared-off with the scissors,

Two lines or parallel chords had been drawn across the upper (slotted) surface of the block, the chord line nearest the center being spaced $\frac{3}{8}$ -inch therefrom. The other chord line was spaced approximately one inch from the center. The chord lines intersected the slot on the same side (in respect to the center), at an angle of about 45 degrees.

The strip of ribbon was laid across the upper surface of the block so that it also crossed the slot approximately $1\frac{1}{2}$ -inches from the squared-off end. The folded edge coincided with the inner chord line.

Mr. John F. Schneider

- 2 -

August 2, 1963

(dictated 8-1-63)

The blade was then positioned over the ribbon where the latter crossed the slot and depressed into the slot, carrying the ribbon with it. The squared off end of the ribbon then protruded from the slot, at center of the block, and at an angle of about 45 degrees in respect to the upper surface.

The turning tool was then slipped over the protruding end of the ribbon with the ribbon engaged within the slotted end of the tool. The turning tool was then inserted into the center hole of the block, and rotated in a counterclockwise direction (looking downwardly). As the turning tool was rotated, ribbon wrapped therearound within the block below the surface, thereby drawing the ribbon within the slot toward the center. Rotation was continued until the ribbon just reached the turning tool.

At this point the "long end" of the ribbon (which extended perpendicularly from the slot) was creased along the line where it protruded from the slot. The long end was then folded upon itself at a 90 degree angle so that the long end now extended parallel with the slot, with the edges of the ribbon opposite the original lengthwise fold being closest to the slot.

Another 90 degree fold was then made like the first, so that the long end now extended perpendicular with respect to the slot. Further 90 degree folds were similarly made until the total equaled about twelve, that is, until about three complete 360 degree "revolutions" around the center tool had been completed.

At this point the long end of the ribbon (now only about 5 inches in length) was folded back upon itself toward the center of the block, until it reached the tool, whereupon it was allowed to extend upwardly along the tool.

Both ends of the ribbon, with the turning tool interposed between, were grasped firmly, and the assemblage was removed from the block. Then, the two ends of the ribbon were held not so firmly against the turning tool, and the tool was rotated in the same direction as initially. As the tool was turned, the folds (in the surface of the folded ribbon which had faced against the block) moved to form a fluted configuration strikingly similar to that of rose petals. The turning tool was then removed, and the "stem" (i.e., the free ends of the ribbon) was tied firmly together with a little strip of ribbon.

Mr. John F. Schneider

- 3 -

August 2, 1963
(dictated 8-1-63)

At this point green floral tape (having lightly tacky surfaces) was wrapped in partially lapped fashion around the long end of the ribbon to form a green "stem". The ends of the tie ribbon used to unify the rose were left protruding. This tie ribbon was green and the protruding ends were trimmed to resemble leaves.

I have no idea, at this time, as to the state of the prior art on methods of making simulated roses and such like. Assuming the prior art is not too close, however, I think there would be a good chance of obtaining some patent claims to the method of manufacturing the simulated rose.

You indicate that an essentially similar simulated rose has for a long time been made manually. Thus, there would seem to be no chance to obtain patents to the simulated rose itself.

I don't hold out much hope for obtaining significant patent coverage on your device, since (apart from the method by which it is used) it involves only a slotted cylinder having a tapered center hole, and a separate slotted blade and turning tool. I am not saying there is no chance, however.

You indicate that some devices are being made of plastic, in a form which you might sell. Perhaps when those have been made, we can take a further look at the device.

In weighing the considerations of whether an application should be filed, possible protection or benefit to 3M by having a patent issue would want to be considered. Of course, if the patent were to contain only method claims, the only direct infringers would be the ultimate user (e.g., the housewife or the department store gift wrap technician) who actually "follows" the method steps. On the other hand, I would think that the sale of a device such as yours, by some competitive ribbon manufacturer, with directions describing the method, would involve an inducement to infringe, and some protection against the actual ribbon competitor who made and sold the devices would thus likely be afforded.

Also, a patent containing method claims would cover the use of a production machine which followed the steps of the method defined in automatically, or semi-automatically, making simulated roses.

Mr. John F. Schneider

- 4 -

August 2, 1963
(dictated 8-1-63)

If your division desires to file a patent application on this subject, it should be authorized by the division. You probably will want to discuss this with Mr. Courtney and Mr. Boese. We ought to have their views on this before an application is filed.

Before any applications are filed, assuming it is desired to file one, I recommend that we have a novelty search made to get some idea of the state of the art on methods of making simulated roses. To facilitate a novelty search, I think it would be good if you or one of your colleagues could sketch, in step-wise form, the procedure for fashioning the bow. In this way, when we advise our searcher of the nature of the subject matter, he will have not only a written description, but a sketch to follow in understanding the technique involved.

Very truly yours,

Stanley G. DeLaHunt

SGD:mer

cc - Messrs. H. R. Courtney
A. W. Boese ✓

WILLIAM H. ABBOTT
E. G. CARPENTER
ROBERT I. COULTER
HAROLD J. KINNEY

MARK SEVERANCE
CRUZAN ALEXANDER
MARK W. GEHAN
FRANK A. STELDT
ERNST A. JAFFRAY
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CARPENTER, ABBOTT, COULTER & KINNEY

PATENT AND TRADE-MARK CAUSES

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G. B. GEHRENBECK
TEMPLE CLAYTON
PATENT AGENTS

Al Boese
Please discuss
August 23, 1963
WJR

Mr. Al Redpath
Minnesota Mining and Manufacturing Company
Saint Paul, Minnesota

Re: Kravig et al v. Henderson
Interference No. 92,874
Involving Kravig et al U.S.
Patent No. 2,933,223 for
Bow Tying Machine

*Further request
3 weeks denial*

Dear Mr. Redpath:

This will advise you that we are in receipt today of a decision of the First Assistant Commissioner of Patents, dated August 19, 1963, denying Henderson's Petition in the above-identified interference, which petition sought the reversal of the decision of the Primary Examiner holding that Henderson was barred to make the claims of the Kravig et al patent in the interference.

Unless there is an attempt to get the Commissioner to reconsider the petition, which seems unlikely (and which in any event must be made in the next few days), the interference can be considered terminated.

I believe you have requested that when the interference was terminated in our favor, as it has been, I should contact Henderson's attorney inquiring as to Henderson's plans for continuing the manufacture and use of the machines covered by the Kravig patent. Perhaps we should chat a few minutes about this at your convenience, to review the subject before I contact Henderson's attorney.

Very truly yours,

Stan

STANLEY G. DELAHUNT

SGD:O

cc: Messrs. Ernie Moffet
Robert May
A. E. Johnson

9/3/63
Talked DeLaHunt

Henderson has requested that the commissioner reconsider the petition. DeLaHunt expects a denial to them in about 3 weeks, will advise them and we can determine next steps as

patents

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August 19, 1963

Mr. Robert B. Ripin
93 Tioga Avenue
Atlantic Beach, New York

Dear Mr. Ripin:

I am attaching to this letter a proposed license agreement for a bow
tyer machine covered by our letter of Patent No. 2,933,233 for your
perusal. After you have had a chance to review this agreement; and
if it is satisfactory to you, we will then send signed copies for your
signature validating the agreement.

I await your comments on the attached suggested agreement.

Yours very truly,

A. W. Boese
Manager, Non-Woven Products
Building 220-8W

~~AWB~~:seg

Attachment

bcc: E. G. Carpenter - 220-12W
A. H. Redpath - 220-8W

WILLIAM H. ABBOTT
E. G. CARPENTER
ROBERT I. COULTER
HAROLD J. KINNEY

MARK SEVERANCE
CRUZAN ALEXANDER
MARK W. GEHAN
FRANK A. STELDT
ERNST A. JAFFRAY
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PATENT AND TRADE-MARK CAUSES

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PATENTS

G. B. GEHRENBECK
TEMPLE CLAYTON
PATENT AGENTS

August 17, 1963

Mr. A. H. Redpath 220-8W
✓ Mr. A. W. Boese 220-8W
Minnesota Mining and Manufacturing Company
Saint Paul, Minnesota

Re: Proposed License to Roger B. Ripin
under Kravig et al Patent 2,933,223

Gentlemen:

Since I expect to be away from the office until August 26, I have prepared the attached draft of the license agreement for your consideration.

The facts that Mr. Ripin is acting as an individual and proposes to operate through agents has made this agreement somewhat unusual.

I have prepared it on the basis of available notes but there are certain points as to which I had no notes, and I was unable to reach either of you at your homes today (Saturday).

Please note that Section 3 of Article VI gives Ripin the right of termination after three (3) full calendar years. If you want to change the term or eliminate this right, Miss Ostrand can rewrite the necessary pages.

Also note Section 4 of Article VI.

If you find extensive changes desirable and cannot await my return please see Stanley DeLa Hunt.

If you find this draft satisfactory as is or after revision and want to send it to Mr. Ripin I suggest you send him only dry work copies for his consideration and comments.

If you want to reach me by phone, I can be reached at the G. N. Slade place out of Little Marais. Phone: Baldwin 6-4863 via Silver Bay.

Very truly yours,

EGC:O
Enc.

E. G. CARPENTER

August 9, 1963

TO: A. H. REDPATH

FROM: A. W. BOESE

I have not been able to get in touch with Gil Carpenter to get the draft of the license for Mr. R. Ripin. I am attaching a copy of the telegram which I sent him. Presume you will want to have this followed through next week while I am on vacation.

AWB:en

Enclosure

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WRSV TADM 30 8/6/63
MR ROBERT RIPIN
93 TIOGA AVE
ATLANTIC BEACH, N Y

DRAFT OF LICENSE AGREEMENT WILL BE IN YOUR HANDS IN FEW DAYS. TERMS
HAVE BEEN ALTERED.

MINN MINING AND MFG CO A W BOESE

TADM 1500

THE DORCHESTER



LONDON

Draft of license agreement will
be in your hands in few days
Terms have been altered

W Boese ✓

THE YORK HILLS



UNIVERSITY OF YORK

es
11

ROBERT B. RIPIN

93 TIOGA AVENUE

ATLANTIC BEACH, N.Y.

516-CE9-8485

September 30, 1963

Mr. Jeffries
Handee-Pack Corporation
2051 Randolph
St. Paul, Minnesota

Dear Mr. Jeffries:

We have reviewed your applicator with the different people who might develop an interest in it at 3M and I am sorry to advise you that for the present we would not be interested in pursuing it further.

We appreciate the time you spent with us presenting your products to us, and if, in the future, any interest does develop and you are still of a mind to deal with us, we will get in touch with you.

The samples that you so kindly left with us as well as the patent copies will be returned to your home shortly.

Yours very truly,

A. W. Boese
Manager,
Non-Woven Products

AWB:en

CARPENTER, ABBOTT, COULTER & KINNEY

PATENT AND TRADE-MARK CAUSES

2501 HUDSON ROAD

SAINT PAUL 19, MINNESOTA

October 4, 1963

**Mr. A. H. Redpath
Minnesota Mining and Manufacturing Company
Saint Paul 19, Minnesota**

**Re: Kravig and Johnson
Serial No. 228,497**

Dear Mr. Redpath:

Pursuant to your letter of October 3, 1963, and particularly in view of the footnote thereto, I have this day forwarded the final fee to the Patent Office in the above identified application, with a request that the patent be issued at the earliest practicable date.

Very truly yours,

Stanley G. DeLaHunt

SGD:mer

**cc - Messrs. C. B. Sampair
R. W. Mueller
R. J. May
A. W. Boese ✓
E. B. Moffet
R. S. Kravig
A. E. Johnson**

OCTOBER 16, 1963

MR. JONAS MONTOYA, PRESIDENT
CHICAGO MATRIX CORPORATION
22422 MERRILL AVENUE
SAUK VILLAGE, ILLINOIS

DEAR MR. MONTOYA:

I ENJOYED YOUR RECENT VISIT TO DISCUSS YOUR BOW TYING TEMPLATE, IN WHICH WE ARE INTERESTED. AFTER DISCUSSING THIS MATTER WITH OUR COUNSEL, THEY ADVISED ME THAT TO EVALUATE THE TRUE POTENTIAL OF THE PATENT APPLICATION THEY WOULD NEED THE FOLLOWING INFORMATION.

- (A) COPY OF MR. MONTOYA'S PARENT APPLICATION SERIAL NO. 184,755, AS FILED ON APRIL 3, 1962, TOGETHER WITH TRANSMITTAL LETTER, OATH, DRAWINGS, AND ORIGINAL CLAIMS.
- (B) COPY OF ALL ACTIONS OR COMMUNICATIONS BY THE PATENT OFFICE IN RESPECT TO THE PARENT MONTOYA APPLICATION.
- (C) A COPY OF ALL COMMUNICATIONS TO THE PATENT OFFICE IN RESPONSE TO PATENT OFFICE ACTIONS, OR OTHERWISE.
- (D) COPY OF ALL PRIOR ART REFERENCES CITED IN THE PROSECUTION OF THE MONTOYA PARENT APPLICATION, AS WELL AS COPIES OF ANY OTHER PRIOR ART WHICH MR. MONTOYA OR HIS ATTORNEY ARE AWARE OF, WHICH MAY HAVE A BEARING ON THE PATENTABILITY OF THE SUBJECT MATTER.
- (E) COPY OF THE LETTER OF TRANSMITTAL AND OATH IN RESPECT TO THE RECENT MONTOYA APPLICATION, THE COPY OF WHICH MR. MONTOYA FURNISHED YOU THIS MORNING, (SEPTEMBER 30TH).
- (F) IDENTIFICATION OF THE SERIAL NUMBER AND DATE OF FILING OF THE RECENT MONTOYA APPLICATION.
- (G) A COPY OF ALL COMMUNICATIONS FROM THE PATENT OFFICE IN RESPECT TO THE CURRENT APPLICATION, IF ANY.
- (H) COPY OF ANY COMMUNICATIONS TO THE PATENT OFFICE IN RESPONSE TO PATENT OFFICE ACTIONS, ETC. IN THE MORE RECENT MONTOYA APPLICATION.
- (I) COPY OF ALL PRIOR ART REFERENCES CITED IN THE PROSECUTION OF THE MORE RECENT MONTOYA APPLICATION, OR WHICH

(1) CONTINUED

MR. MONTOYA OR HIS ATTORNEY KNOW ABOUT, AND WHICH HAVE A BEARING ON THE PATENTABILITY OF THE SUBJECT MATTER.

IF YOU WOULD BE GOOD ENOUGH TO FURNISH THIS INFORMATION TO US, WE WILL QUICKLY GIVE YOU AN ANSWER REGARDING OUR INTEREST IN YOUR PRODUCT. IF, BY ANY CHANCE, IT IS NOT POSSIBLE TO FURNISH US SOME OR ALL OF THIS INFORMATION, I WOULD APPRECIATE YOUR ADVISING ME.

YOURS VERY TRULY,

A. W. BOESE
MANAGER
NON-WOVEN PRODUCTS

AWB:EN

WILLIAM H. ABBOTT
E. G. CARPENTER
ROBERT I. COULTER
HAROLD J. KINNEY

MARK SEVERANCE
CRUZAN ALEXANDER
MARK W. GEHAN
FRANK A. STELDT
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CARPENTER, ABBOTT, COULTER & KINNEY

PATENT AND TRADE-MARK CAUSES

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CABLE ADDRESS
PATENTS

G. B. GEHRENBECK
TEMPLE CLAYTON
PATENT AGENTS

September 30, 1963

Mr. A. W. Boese
Minnesota Mining and Manufacturing Company
Saint Paul 19, Minnesota

Re: Suggestion Submitted by
Jonas L. Montoya
For: Apparatus or Forming Card
on which to Form Decorative
Ribbon Bows

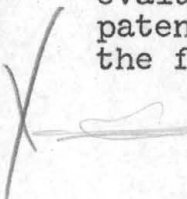
Dear Mr. Boese:

This morning you brought up a copy of a Montoya patent application, together with a copy of a letter dated September 6, 1963, from Mr. Montoya's lawyer (William A. Marshall) in Chicago, covering a transmittal of formal drawings, presumably for this Montoya application. (From this it would seem that the Montoya application has been very recently filed.)

Mr. Montoya, you indicate, gave you copies of these papers this morning.

The application refers at page 2 to an application Serial No. 184,755, filed April 3, 1962, of which the recent Montoya application purports to be a continuation-in-part.

If you are interested in basing your commercial evaluation of this subject matter in any way on Mr. Montoya's patent situation, at the very least we would need copies of the following papers:

- X  (a) Copy of Mr. Montoya's parent application Serial No. 184,755, as filed on April 3, 1962, together with transmittal letter, oath, drawings, and original claims.
- (b) Copy of all actions or communications by the Patent Office in respect to the parent Montoya application.
- (c) A copy of all communications to the Patent Office in response to Patent Office Actions, or otherwise.

Mr. A. W. Boese

- 2 -

September 30, 1963

- (d) Copy of all prior art references cited in the prosecution of the Montoya parent application, as well as copies of any other prior art which Mr. Montoya or his attorney are aware of, which may have a bearing on the patentability of the subject matter.
- (e) Copy of the letter of transmittal and oath in respect to the recent Montoya application, the copy of which Mr. Montoya furnished you this morning.
- (f) Identification of the serial number and date of filing of the recent Montoya application.
- (g) A copy of all communications from the Patent Office in respect to the current application, if any.
- (h) Copy of any communications to the Patent Office in response to Patent Office Actions, etc. in the more recent Montoya application.
- (i) Copy of all prior art references cited in the prosecution of the more recent Montoya application, or which Mr. Montoya or his attorney know about, and which have a bearing on the patentability of the subject matter.

The foregoing information would at least tell us the basis upon which Mr. Montoya filed his applications.

Very truly yours,



Stanley G. DeLaHunt

SGD:mer

OCTOBER 25, 1963

TO: A. H. REDPATH

FROM: A. W. BOESE

THE PRIMARY EXAMINER WAS ASKED TO REVIEW HIS DECISION. THIS REQUEST WAS GRANTED HENDERSON.

DELAHUNT'S GUESS IS POSSIBLY A MONTH OR SO FOR THE EXAMINER TO COMPLETE HIS REVIEW. STAN FEELS IT WILL BE IN OUR FAVOR.

THE REASONING THE EXAMINER USES TO SUSTAIN HIS PREVIOUS DECISION, IF HE DOES, MIGHT CONCEIVABLY LEAVE HENDERSON AN OPENING FOR A REQUEST FOR REVIEW BY THE COMMISSIONER.

INCIDENTALLY, AS OF NOVEMBER 26TH, HENDERSON, IF STILL IN PRODUCTION, WILL BE INFRINGING ON THE BOW PATENT.

I WILL KEEP UP TO DATE ON PROCEEDINGS.

AWB:EN

ATTACHMENT



GENERAL OFFICES • 2501 HUDSON ROAD • ST. PAUL 19, MINNESOTA • TEL: 733-1110

Interoffice Correspondence

Subject:

October 24, 1963

MR. A. H. REDPATH

I think, in view of the issuance of the Kravig and Johnson patent for decorative bows and based on our conversation some time ago, a decision should be reached regarding infringers.

When you have given this some thought, let's discuss.

R. W. MUELLER

RWM:RL

Al Redpath
The primary examiner was asked to review his decision. This request was granted. Henderson was asked for the examiner's possibly a month. He felt it will be in our favor. The reasoning of the examiner was to sustain his previous decision if he does not feel it will be in our favor. Henderson is opening for a request for review by the Commissioner. Sincerely as if Mr. Redpath Henderson if still in production will be infringing the bow patent. I will keep up to date on proceedings.
Al Redpath

When will the Henderson interference case be closed up?
ALR

November 8, 1963

TO: R. I. COULTER - PATENT COUNSEL - 220-12W

FROM: P. H. CAREY - TECHNICAL MANAGER - NEW PRODUCTS - 27-1

I am enclosing a copy of Patent #3,106,715 issued on October 15, 1963, to John Danowsky, and copies of the references cited in the file of this patent.

We would appreciate having your opinion of this patent as soon as possible.

PHC:seg

Enclosures

cc: A. W. Boese - 220-8W
H. R. Courtney - 27-1
R. E. Emery - 220-12E
K. H. Tuggle - 220-8W



GENERAL OFFICES • 2501 HUDSON ROAD • ST. PAUL 19, MINNESOTA • TEL: 733-1110

Interoffice Correspondence

November 25, 1963

Subject: Filter Face Mask Patent Application
SN 91,367

[Handwritten signature]
12/26/63

TO: R. I. COULTER - PATENT COUNSEL - 220-12W

FROM: P. H. CAREY - TECHNICAL MANAGER - NEW PRODUCTS - 27-1

I have just read a British Patent Specification 937,799 issued to Johnson & Johnson on September 25, 1963. It deals with their filter mask.

The specification notes the J & J United States application was made on March 28, 1961 (ours was filed February 24, 1961).

The mask they are selling appears to me to be illustrated in this specification. It is produced from a blend of viscose and vinyon fibers that are molded between hot matched dies. The specification also describes the use of a polyvinyl alcohol spray to improve the properties of the mask after autoclaving.

After you have had an opportunity to review this specification, I would appreciate knowing what effect, if any, this will have on our patent applications.

[Handwritten signature: P. H. Carey]
PHC:seg

cc: A. W. Boese - 220-8W
H. R. Courtney - 27-1
J. J. LaBuda - 24-2
L. W. Lehr - 220-8W
W. M. Westberg - 27-1



GENERAL OFFICES • 2501 HUDSON ROAD • ST. PAUL 19, MINNESOTA • TEL: 733-1110

Interoffice Correspondence

cc: A. W. Boese
P. H. Carey - 27-1
A. L. Fry - 24-2
D. W. Davis - 220-3E
R. F. How

Subject Patent Application for #8420

December 9, 1963

TO: S. E. CLEVENGER - 220-8W

FROM: R. R. MARTIN - 220-8W

Since we have just applied for a patent to cover #8420, please make certain that any future packaging, advertising or promotional copy makes note of this fact.

Thank you.


RRM:lvq

bcc: A. W. Boese
R. J. May
E. B. Moffet
A. H. Redpath

December 23, 1963

Mr. Stanley G. DeLaHunt
Carpenter, Abbott, Coulter & Kinney
2501 Hudson Road
St. Paul 19, Minnesota

Dear Mr. DeLaHunt:

This is in addition to my letter of December 6 with reference to the plastic bow pins which we currently market for use with our S-71 Bow Maker.

We currently have many competitors who manufacture a star bow but do not necessarily use the plastic bow pin, but who, instead, use a staple for impaling the ribbon. The largest manufacturers of these types of bows are Chicago Printed String, Wright Ribbon Company, and Artistic Ribbon Company. As far as we know, these bows are manufactured on some type of automatic equipment.

One of the commercial machines is referred to as an Augsburg Bow Maker. We also know that there are other types of smaller, non-commercial machines which use a staple concept -- the bow maker developed by Chicago Printed String as an example.

The star bows made by these companies and on these competitive machines are sold to all trade classes, such as Variety Stores, department stores, gift shops, drug stores, specialty shops, etc. Specific names of large retailers in these trade classes would be the F. W. Woolworth Company, Neisner Brothers, S. S. Kresge, J. L. Hudson Company, Marshall-Fields, and so forth.

If there is additional information which you might require, please advise me.

Yours very truly,

J. R. Lane
Merchandising Manager
Retail Tape & Gift Wrap Division

JRL:bes