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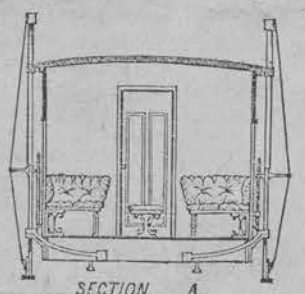
Mechanical.

WIARD'S STEAM ICE-BOAT.

THIS attempt to extend the area of steam-travel to a new field, that of frozen rivers and lakes or any district while covered with snow, is the invention of Mr. Norman Wiard, whose machine proper was, by aid of two railway companies of that region, built at Prairie du Chien, Wis., last winter, but just too late for trial. A working model, 1 inch to the foot, represented in the first of the cuts here given, was exhibited in the Fair of the American Institute, N. Y., during October past. Essentially, the Ice-boat consists of a cabin or car—the machine built carrying 50 persons,—resting on a sort of hull; the cabin being above the surface of water, when the boat is in an unfrozen stream, and the hull giving great buoyancy to the entire system, by containing 84 water-tight boxes of galvanized sheet-iron, 34 of which it is calculated must be crushed in before the boat could sink. On ice, the boat runs on the four short runners shown, which are provided with polished shoes of chilled cast iron, wide enough to prevent cutting into the ice. Its length is 48, width 11 feet.

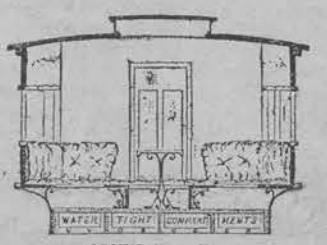
The motive power is derived from two high-pressure engines, of 7 to 8 inch piston and 16 to 18 inch stroke; the connecting-rods of these attach to the crank-shaft of the single driving



SECTION A.

wheel. This is situated in the middle of the back part of the boat; its periphery being furnished with short and sharp flanges that cut into the ice and give the required hold for driving. The elevated tower in front, overlooking the field of travel for some distance, contains the steering wheel, by which the forward runners are turned, and the course changed at the will of the steersman. Each boat is to have its steam-whistle, head-light, and bell. Section A, through the middle of the forward runners, and section B, through the middle of the boat, give an idea of the accommodations within. Section C, through the middle of the after runners, shows the connections of the driving wheel.

So far, the arrangements are such as meet the ordinary requirements of the case, and evince ordinary ingenuity. But it is in the contrivances hit upon for adapting the boat to circumstances apart from plain skating, that the genius and success of the inventor are especially shown. *Ice may be uneven;* and accordingly, the four runners have all needful freedom of movement about their centres; and the driving-wheel itself, instead of being rigidly fixed by the crank-shaft to the body of the boat, is attached to the frame of the after runners, and pressed upon the ice by springs, the degree of pressure adjusted by screws, so as just to secure the required traction, and yet yield when passing over hummocks or ridges. Besides, by an application of the power of the engines, the

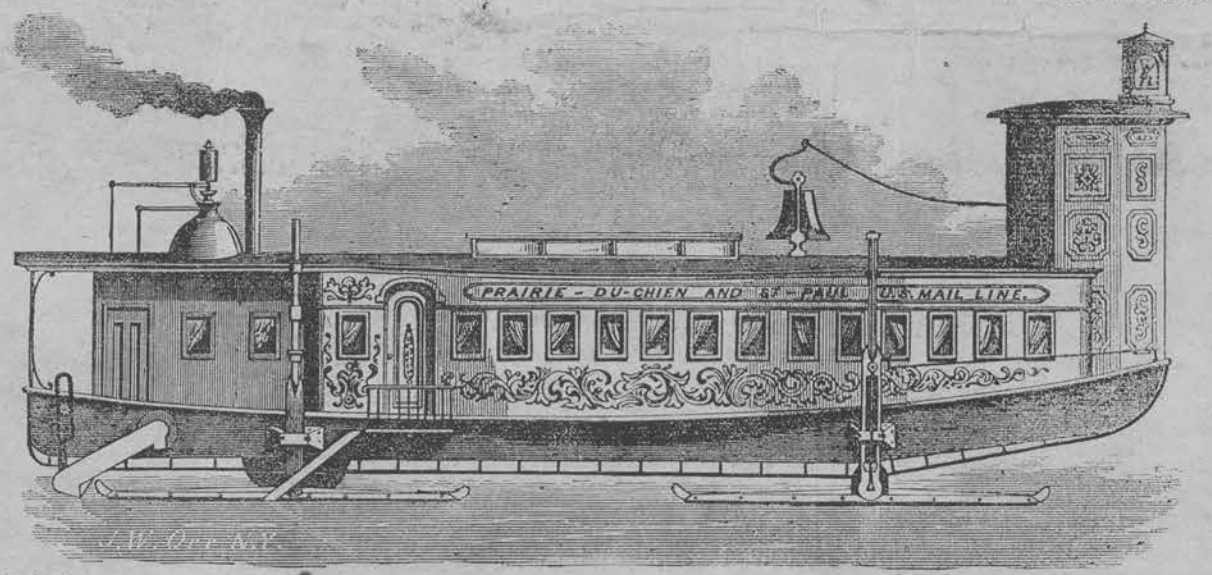


SECTION B.

whole boat, either in motion or at rest, can be elevated along the pedestals of the runners, so as to pass snow, leaving the wheel bearing as before on the ice; or, when desired, the wheel can be lifted so as to clear the surface.

The *shoes may need adjusting*, or *extra bearing surface may be required* to prevent cutting into thin ice, or to pass over holes: in either of these cases the body of the boat is lowered between the pedestals, so as to bring upon the ice a fixed pair of runners extending the whole length of the hull. Again, with a side-wind, the boat *may make lee way;* and when it is to be turned, the mere friction of the forward runners does not suffice: in either case, a pair of blades, one in each forward pedestal, can be forced down, operated by the foot of the steersman, so as to cut into the ice. To prevent *lee-way*, this is sufficient; to turn the boat from its course, the runners must first be turned, to get direction, and the blades then entered to give the hold required.

The boat *may have to cross or navigate water;* and this it does at a slow rate by a set of paddles ready upon the wheel. It *may break through thin ice*, and require to be drawn out, or to be brought upon shore. To accomplish these purposes, the fixed runners and bottom of the boat rise through 16 feet, forward, forming an inclined plane, height about 1 foot; the short runners are so loaded behind as, when not on a solid surface, to throw up their forward ends; and the power is applied by sending to some distance forward two anchors, each



of which a man can carry, cutting a hole or the fluke of each in the ice or some firm basis, and applying the engines to wind up the cables of the anchors upon winch-heads projecting at the ends of the shaft. Thus the boat is readily drawn again upon ice, or up inclines, or even backward on ice when required. But parts of the journey *may have to be made on snow;* and to allow of this, broad *snow-shoe* attachments are ready for the runners, to insure skimming over the more yielding surface.

If the wheel, or the curb around it, becomes coated with ice, these are hollow, and steam can be admitted to thaw them clear. The larger light-colored incline shown near the stern, represents a hollow box, at the bottom of which a cutter continually chips up ice or snow over which the boat is moving, while through it runs an endless band having boxes that carry up the material thus obtained, depositing it in a tank on board. Into this tank the exhaust steam, after being made to warm and ventilate the cabin, is discharged, melting the mass and furnishing the feed-water for the boiler; while if needs be, the steam can be thrown also down the boxes and to the cutters, to clear them of ice.

This boat weighs about 3½ tons; costs about $2,000, or near that of a railroad passenger car; and can be run 24 hours with 4 to 6 cords of wood. It can be managed by three, or at most four men, so that the running expenses are light; but the grand saving consists in the fact that nature herself lays and keeps in order all the *tracks* required, and wholly free of expense! Of course, there may be less certainty in the *time-table*, and passengers must allow for variations of some miles per day; but as off-

BEDDING FOR CATTLE.

The importance of this is conceded for the horse, and most humane owners provide straw or refuse hay to put the nag at his ease when he lies down in his stable. It is quite as important for all the ruminant animals that we have domesticated. Instinct prompts them to seek the driest, warmest spot in the pasture for their repose, and Nature spreads for them the soft green turf, quite as much for their rest, as for their sustenance.

Bedding favors the accumulation of fat and muscle, by helping to retain the animal heat, and promoting quiet and comfort. It also promotes the secretion of milk in cows, for the same reasons. Any one can satisfy himself on this point, by experimenting with a cow a week in a well bedded stable, and a second week upon the bare ground in the barn yard. Cows in milk are kept much cleaner with a good bed, and this is an item of prime importance, with all who love clean milk. Quite a variety of substances are used for bedding. Straw and hay are the most common, as they are the most convenient, especially to farmers who raise grain largely, or who have a good deal of swamp land, yielding poor hay.

In cities and villages, they are often too costly, and this has led to various substitutes, some of them quite as good as straw, and having this advantage, that they add very much to the manure heap. Dry saw-dust, from saw and shingle mills, and the fine chips and shavings from planing mills, all make good bedding. Spent tan bark, when dried in the sun, also serves the same purpose, and makes a much more valuable manure. Eel-grass is also much used for this purpose, by the sea shore farmers, and answers well. Leaves from the forest, especially those of hard wood trees make a still better bed, and form one of the best composts for the garden or field.

Dried turf from a salt marsh is, on the whole, the best bedding we have ever used in our stable. It is cut in summer, in blocks of about a cubic foot each, dried in the sun a few weeks, and then stored under cover for use. It is very light, spongy, and absorbs urine better than anything we have ever tried. A layer of it under a horse will last about two weeks before it is saturated. It is then thrown into the barn cellar, to undergo fermentation.

One great advantage of this, and of the saw-dust and tan bark is, that they put the animal heat of the stock to such valuable use. It promotes the decomposition of the vegetable matter, and swells the manure heap very rapidly.—*Am. Agriculturist.*

STEAM PLOWING IN ENGLAND.

J. Allen Ransom, of Ipswich, writes B. P. Johnson, Esq., Corresponding Secretary of the New-York State Agricultural Society: "Fowler's plans of steam plowing progress satisfactorily—no other plan for moving the engine along on the cultivated land finds favor, either with the agriculturist or the mechanic. One permanent advantage in using the tractor rope, is, that no poaching, or treading, or kneading the wet clay land, mars the effect of the tillage; and it is very obvious that if an engine requires ten horse power, to move itself on cultivated land, all the power required to sever and turn over the soil must be added. It is found in practice that a tractor engine, (in use here), passing over the land and drawing four plows after it, will consume from thirty to forty horse power, while the Fowler engine, traveling only along the head land, and hauling four plows through the land by an endless rope, will not require to consume more than ten or twelve horse power. Agriculture has made considerable advance in this country since thy last visit."

Carrying the Crops.—*The Terre Haute* (Ind.) *Express* has the following illustration of the way pretty large loads of produce have moved about that inland town. We think if the editor will come here he may see loads, compared with which his are only as one grain to a bushel. But, in the way of showing how big a load one woman can carry upon her back, his idea is very good:

"Here is lady No. 1., with ten acres of wheat gracefully thrown around her person—twelve bushels to the acre. Ten times twelve are one hundred and twenty, at eighty cents a bushel; 120x80—$96.

"Lady No. II. toddles under four tuns of hay at seven dollars and a half per tun: 4x$7 50—$30. She stands erect, as stiffly as I see Norwegian women every day with a load of kindling-wood on their heads.

"Lady No. III. sweeps the path and the circumjacent dogfennel with a train in which are exhibited two yoke of steers at $35—$70.

"Lady No. IV. is enrobed in twenty acres of corn, forty bushels to the acre, worth thirty cents to the bushel; 800x30—$240.

"Lady No. V. has a mule colt suspended from each ear, at $15—$30.

"Gentleman No. 1 wears in his fob a span of matched bays, $300

"Gentleman No. II. studs his shirt-bosom with three hogsheads of tobacco, and is oiled and perfumed with six bushels of onions.

"Gentleman No. III. gets fuddled on 1 cwt. of hemp, begins dinner with dessert, and eats up to fish.

"Gentleman No. IV. flourishes a cue, and busies himself from morning until night and from night until morning, with bagging a splendid crop of wheat—in the pockets of a billiard-table."

Sanitary Laws as Regards Children—During a long experience we have often noticed with pain the loss of life which has resulted from the neglect of the most simple sanitary laws; it is through want of this knowledge that numerous children are smothered by wrapping them in bedclothes, shawls, &c.; the atmospheric air is kept from them, and they are poisoned by their own breath. Ignorance causes nurses and mothers to swaddle up infants in tight bindings, which prevent the proper action of the heart and lungs, which leave the chest exposed to the weather, and allow young children in the hot sunshine to be exposed to the burning rays. Hundreds of young children, even among people who are well-to-do, are killed annually by improper feeding. Some are fed with animal and vegetable food before the teeth have appeared and the stomach has become sufficiently strong for the reception of such matters. Others are suckled long after milk ceased to be sufficiently nutritious, nay, has become injurious to health. Again, opiates, if they have the effect of producing temporary quietness, surely act injuriously on the constitution. Medical men in large practice amongst the middle and poorer classes say that, on the night after Christmas-day, they do not expect to have much rest in consequence of being called to attend upon children seized with convulsions, in consequence of improper food. If knowledge of these matters were general, parents would surely not risk the lives of their children through mistaken kindness.

Very Cheap Ice-House.—A subscriber of Rockford, Illinois, sends us the following plan for a cheap Ice-House:—"For the benefit of those who wish to enjoy a little cool luxury during long, hot summer days, I send you the plan of a cheap Ice-House in which I kept ice from February to October, using from it every day after warm weather commenced. Nailed up a pen, 10 by 12 feet, four feet on the ends, seven feet on the sides, leaving the gable ends open—the ground descended about one foot in twelve—filled in saw-dust about six or eight inches deep—sawed the ice as square as possible with a cross-cut saw and packed it in, leaving a space of a foot on the sides all around. Pounded the cracks between the ice full of fine ice, filled the space around with saw-dust, stamping it down so as to make it close as possible; then covered the whole 12 or 15 inches deep with saw-dust and put on the roof. After warm weather commenced I generally went over it once a week to see if there was any melting; if there was I pounded the place full of saw-dust. This house will hold from 2½ to 3½ cords. If it is allowed to freeze solid, more will be wasted than used. I have tried that plan, but if left as it is packed you can roll out a block and saw off with a hand-saw as much as is wished."

Summer Sours.—Physiological research has fully established the fact that acids promote the separation of the bile from the blood, which is then passed from the system, thus preventing fevers, the prevailing diseases of summer. All fevers are "bilious," that is, the bile is in the blood. Whatever is antagonistic to fever is "cooling." It is a common saying that fruits are "cooling," and also berries of every description; it is because the acidity which they contain aids in separating the bile from the blood, that is, aids in purifying the blood. Hence the great yearning for greens and lettuce, and salads in the early spring, these being eaten with vinegar; hence also the taste for something sour, for lemonades, on an attack of fever. But this being the case, it is easy to see, that we nullify the good effects of fruits and berries in proportion as we eat them with sugar, or even sweet milk, or cream. If we eat them in their natural state, fresh, ripe, perfect, it is almost impossible to eat too many, to eat enough to hurt us, especially if we eat them alone, not taking any liquid with them whatever. Hence also is buttermilk or even common sour milk promotive of health in summer time. Sweet milk tends to biliousness in sedentary people, sour milk is antagonistic. The Greeks and Turks are passionately fond of sour milk. The shepherds use rennet, and the milk-dealers alum to make it sour the sooner. Buttermilk acts like watermelons on the system.

Good Butter.—A correspondent of the *New England Farmer* says that the following is one way to make good butter. Skim the milk as soon as it sours, and before it thickens, if possible; stir the cream faithfully, especially when new is added. Set the jar in a cool place; if the cellar is not cold and sweet, set it in the spring, or hang it in the well—any way to keep it cool. After the last cream is added before churning, then "go a visiting" if you please, as cream should not be churned the day it is taken off. At night-fall fill the churn with cold water, and start the churn at early dawn, and my word for it, you will soon find a solid mass of golden colored butter, free from white specks and when properly salted and packed, fit for the table of our friend the Farmer, or any other. After the buttermilk starts, pour in cold water a little at a time, turning the crank slowly and carefully back and forth; this prevents the butter from closing too rapidly, does not break the grains, and gives every particle of the cream a chance to form into butter.

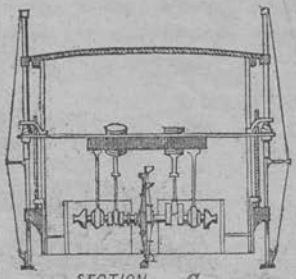
Fertilizing Properties from the Air.—A quantity of ammonia and nitric acid, equal, perhaps, on an acre, to one hundred pounds of guano, is annually brought down to the soil by the rain, for the benefit of vegetation. Let not, however, the farmer deceive himself, and imagine that he may indulge in idle repose, while nature is thus keeping up the fertility of his lands. But he may profit by this newly discovered bounty of nature, if he will take full advantage of the atmospheric manure by means of drainage, which promotes the equal flow of water *through* instead of *over* his soil; by deep cultivation of the land, which brings every part of it in contact with the air. The atmosphere is to the farmer like the sea to the fisherman—he who spreads his nets the widest will catch the most.

Save the Sweepings.—The sweepings of a blacksmith's shop, where charcoal is used and horses shod, are excellent for manure. Every thing of a horny or bony substance is of great value. So woolen rags, old boots and shoes, hair, wool, feathers, all should be carefully saved, and put in the compost heap.

Dirt under buildings, particularly under barns and stables, is often worth more per load than the droppings and straw in the stable or manure pile. Take up the floors and dig out.

A Handsome Mantel Ornament.—An acorn suspended by a piece of thread within half an inch of the surface of water in a hyacinth glass, will, in a few months, burst and throw a root down into the water, and shoot upwards its straight and tapering stem, with beautiful little green leaves. A young oak tree, growing in this way on the mantle shelf of a room, is a very elegant and interesting object.

sets, the runs will often be as noiseless, with as pure and exhilarating air, as that of the sport of skating; and the fare can be profitably fixed at lower than railroad rates. Mr. Wiard hopes on ice to make from 20 to 30 miles per hour; and he intends to modify his plan, so as to produce *cutters* for two persons, *passenger sleighs*, or *freight sleighs*, for land, canals, etc. Thus he hopes to be able, for instance, first to steam up the Missouri from Omaha to Fort Ben-



SECTION C.

ton, 2750 miles, then by land by a wagon route already under way, across to the head waters of the Columbia river, then by ice down this river,—opening in this way the first practicable and speedy communication with the Pacific.

The practical test of this invention remains to be made; but within a few months of the winter now setting in, the question should be decided. If Mr. Wiard has succeeded, the 26,000 miles of rivers in the Northern and Northwestern States, the 19,000 miles in British America, and the 57,000 miles in Russia,—especially such thoroughfares as the St. Lawrence, Ottawa and the chain of rivers and small lakes to Green Bay, the Amoor, the proposed Pacific route, and the importance of communication with the Lake Superior mining region, give some hints of the immense capabilities and value of the new invention.

ROGRESS OF SCIENCE, ARTS, AND INVENTIONS.

J. M. GRUMMAN, a practical surveyor, of n, N. Y., has invented and patent of Surveyor's Chain, for which

LUBRICATION.

The lubrication of machinery is usually effected by pouring oil into the bearings, but the joints and bearings cannot be uniformly lubricated in this way, and there is a great waste of oil. By the adoption of the following contrivance, one third of the oil used in the ordinary method, will be sufficient, and the machinery will be better oiled. Take a tin cup with a tube of the same metal passing through the bottom and extending little more than half way to the top of the cup. This tube is intended to be put into the bearings of shafts, and may be made of any required size. Through the tube pass a worsted or cotton thread, allowing one end to remain in the cup and the other to extend through the tube. Insert the tube into the required joint or bearing, and pour oil into the tin cup, and the capillary attraction will always keep the part properly oiled. To arrest the process when the machinery is not in action, a screw pressing against the inside of the tube is generally used, but it is better to fasten the thread in the cup to a bolt, which slides up and down a small tube inserted in the cover of the cup. By raising the bolt to the cover the capillary attraction is stopped. Before raising the cover to supply oil, or to see how much oil is in the cup, the bolt must be dropped, otherwise the thread will break or be pulled out of the tube.—*Practical Machinist.*

MALLEABLE IRON.

Malleable Iron is a trade name given, not to pure iron, for that is always malleable, but to articles made of cast-iron which have been subjected to a certain process after being cast into their particular forms which shall reduce or take away a portion of the carbon which they contain, and they consequently become less brittle, or, in other words, more tough than cast iron, and, of course, less liable to break by the wear and concussion when used. The term malleable iron, however, is not very appropriate; for it is well known that this is not very malleable, and can bear no comparison with iron in its pure state, for that valuable property. It would be more appropriate to call it *bastard steel*, which it in fact is, rather than malleable iron.

The best of steel is made by combining pure iron with carbon. The rods of iron are kept in contact with heated or burning charcoal a certain length of time, when it is found that it has become a union of carbon with the iron, steel is the result. If it be desirable to [illegible] uniform blending of the iron and