

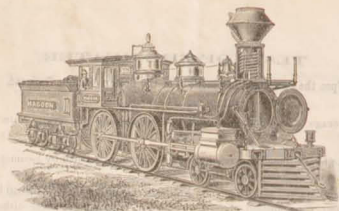
GENERAL CORRESPONDENCE

1878 UNDATED

FOLDER NO. 10-17

JAMES J. HILL PAPERS

PLEASE RETAIN
ORIGINAL ORDER



MAGOON FEED-WATER HEATER.

More Power with Less Fuel.

In almost any form of steam engine except the locomotive, feeding the boiler with cold water, and throwing away the heat of the exhaust steam would be considered reckless extravagance. But the locomotive has a cramped boiler, an artificial blast produced at the expense of back-pressure in the cylinders, sweeping the heat past the water surfaces, and carrying off the gases and much of the fuel unconsumed, so that it fails to make steam economically, and needs more than any other an arrangement for heating the feed-water.

The other heaters that have been tried were too small to be effective, too weak, too clumsy, or have produced foaming in the boiler.

The Magoon Heater succeeds. Receiving the water at a temperature varying with the season from 40° to 70° it heats it to an average of 205° before it enters the boiler. (See certificate A.) In other words it utilizes the waste heat of the exhaust steam to accomplish about 13 per cent. of the whole heating required to transform water into steam at a working pressure of 130 lbs. There being 13 per cent. less to be done in the overworked boiler, the evaporation is accomplished more economically, the draught of the fire can be reduced so as to allow complete combustion of the fuel and gases, and a transfer of more of the heat to the water, and softening the exhaust relieves the back-pressure in the cylinders, so that the actual saving of fuel due to heating the water may be 25 or 30 per cent. (See reported tests.)

Or a locomotive that is too light for its work, and so is always short of steam, will, by having 13 per cent. of the work of making steam done outside the boiler, not only burn less fuel, but will have its steaming qualities improved, and so its actual effectiveness and capacity for work increased, a 25 ton engine doing the work of one of 30 tons, saving the cost of machinery and wear of permanent way. (See Certificate C.)

The advantage of avoiding the unequal contraction of the boiler caused by injecting cold water is apparent.

The Magoon heater has been sufficiently tested to prove its endurance (See Certificates B. & C.) and, saving half a ton of coal a day, will pay for itself in a few months.

For further information, address

PROF. HENRY FAIRBANKS,
St. Johnsbury, Vt.

TESTS OF THE HEATER.

Upon the Passenger Locomotives of the Boston & Maine Railroad.

Average Amount (in pounds) of Coal Burned per Train Mile.

The heavy faced figures indicate the amount burned by locomotives when using the Feed-water Heater.

The "Saxon" and "Sachem" are twin engines, weighing 67,640 lbs., and their consumption of coal is so nearly equal, that, when either is fitted with heater, and they exchange trains, the effect of heating the water is clearly shown. The table also allows us to compare the amounts burned by each engine without and with the heater.

Their trains are among the heaviest upon this road.

		"Saxon."	"Sachem."	Average of 12 other large locomotives.
4 months.	Dec., 1872—Mar., 1873.	52.89		
4 "	August—November, "	54.95	52.57	
4 "	Dec., 1873—Mar., 1874.	38.13	56.89	51.10
1 "	November, 1873.	54.62	53.93	51.68
1 "	" 1874.	36.00	Exchanged trains daily 49.57	47.93
4 "	Feb.—May, 1875.	39.88	" " 48.73	47.64
1 "	June, "	42.03	" " 41.66	47.50
1 "	" 1876.	57.19	49.54	47.67
1 "	July, 1875.	In Shop.	42.18	Heater off July 20th 49.39
1 "	" 1876.	61.59	57.84	50.82
1 "	August, 1875.	45.17	Exchanged trains daily 56.90	53.92
1 "	" 1876.	64.33	68.87	54.60
1 "	September, 1875.	Heater off Sept. 2nd. 46.41	Exchanged trains daily 54.48	53.16
1 "	" 1876.	67.27	56.99	57.21
1-2 "	Nov. 1-15, 1875.	53.34	Exchanged trains daily 57.76	50.87
1-2 "	" 16-31, "	41.46		
2 "	March—April, 1876.	49.74	Exchanged trains daily 60.97	51.36
2 "	June—July, "	59.39	" " 53.44	49.25
1 "	December, "	54.97	Different trains 71.06	
1 "	January, 1877.	48.41	" " 74.60	
1 week.	Feb. 5-10, "	57.90	"Saxon" took train of "Sachem."	

Locomotive "Haverhill."

September, 1873.	Train uniform.	Total coal burned	100.610 lbs.
October, "	" " " "	" " " "	125.798 "

(Signed) JAS. T. FURBER,

Gen. Sup't B. & M. R. R.

The Foregoing Table Shows:

- 1st. The "Saxon" without Heater burning more than the "Sachem." In the 4 months, Aug.—Nov. 1873. "Saxon" 4 1-2 per cent. more.
- 2d. The "Saxon" with Heater (and no other change of engine or train) burning much less than the "Sachem" without.
4 months, December 1873—March 1874. "Saxon" 18.76 lbs. less, or 33 per cent. saved.
6 months, November 1874—August 1875. "Saxon" 10.12 lbs. less, or 20 per cent.
2 weeks, November 1875. "Saxon" 16.30 lbs. less, or 28 per cent.
2 months, March—April 1876. "Saxon" 11.23 lbs. less, or 18 per cent.
Exchanging trains weekly.
- 3d. The "Saxon" with Heater, burning much less than without.
4 months, Dec. '73—Mar. '74. 16.82 lbs. less than Aug.—Nov. '73.
Same train. or 30 per cent. less with than without.
1 month, November '74. 18.62 lbs. less than November '73, or 34 per cent.
3 months, Jun., Aug. & Sep. '75. 18.39 lbs. less than June—Sept. '76, or 29 per cent.
2 months, Mar. & April '76. 9.65 lbs. less than June & July, '76, or 16 per cent. less, in harder weather.
- 4th. The "Sachem" equally improved by the application of the Heater. See report for June and July, 1875.

Upon the Passenger Locomotive "Whately" of the Conn. River R. R.

Without Heater.

Oct. 7-12, 1872.	1 car drawn	2535 miles with	2305 feet wood.
or 1 "	" "	1 mile "	.908 "

With Heater.

Oct. 13-19, "	1 "	" 3210 miles "	2048 "
or 1 "	" "	1 mile "	.638 "

Upon a Freight Locomotive of the B. & O. Railway.

Without Heater.

June 14-19, 1875	1 car drawn	5702 miles with	12 17 cords wood.
or 1 "	" "	1 mile "	.0021 "

With Heater.

June 7-12, "	1 "	" 7166 miles "	12 50 "
or 1 "	" "	1 mile "	.0017 "

Upon the Freight Locomotive "N. Woods" of the Maine Central R. R.

Without Heater—18 days.

Mar. 1-25, 1877.	1 car drawn	33952 miles with	117000 lbs. coal.
or 1 "	" "	1 mile "	3.45 "

With Heater—18 days.

Feb. 5-28, 1877.	1 "	" 34201 miles "	97200 "
or 1 "	" "	1 mile "	2.84 "

CERTIFICATES.

A. *Boston & Maine Railroad,--Motor Department.*

BOSTON, MASS., JULY 10, 1873.

Manager Magoon Heater Co.

DEAR SIR:—In reply to your inquiry as to the temperature of the water as it passes into the boiler from the Magoon Heater, I say, that on the 30th of June, last, I made a test of the water on the large freight engine "Suffolk". The train consisted of thirty-five (35) cars loaded. The test was made with a thermometer placed about five inches from the entrance to the boiler, and was consequently exposed to the cold air more than if in a different place. The test was made between Boston and Lawrence, and during the entire trip I was on the running board of the engine, all the time watching the thermometer. While the engine was using steam the water from the Heater was never below 195°, and would average about 205°.

Very truly,
(Signed) Wm. H. STOODLEY,
Foreman Machine Shop.

B. *Canada Central and B. & O. Railways.*

MECHANICAL SUPERINTENDENT'S OFFICE,
BROCKVILLE, ONT., SEPT. 25, 1876.

Henry Fairbanks, Esq.

DEAR SIR:—Your favor of the 16th came duly to hand. In reply to your inquiries as to how the Magoon Heater is working on our road, will say: It continues working successfully, apparently heating the water as usual, causing no trouble or inconvenience whatever to Engineers or Company. No occasion for stopping the engine for repairs on account of Heater. In fact the Heater seems to be as durable and reliable as any part of the engine.

I remain, truly yours,

(Signed) H. A. ALDEN, *Mechan'g Supt.*

C. *Connecticut River Rail Road.*

SUPERINTENDENT'S OFFICE,
SPRINGFIELD, MASS., FEB. 24, 1877.

Henry Fairbanks, Esq.

DEAR SIR:—I find from our books that Mr. Magoon applied the "Feed-water Heater" in March, 1871. Since making some changes in the track, in 1874, this Heater has never required repairs, or given any trouble whatever. It is now working in a very satisfactory manner, and is saving fuel, at the same time making the engine steam freely. In Feb. 1873, a Heater was applied to the "Doverfield," on which it did good service, improving its steaming and making quite a saving in fuel. The "Doverfield" was sold in 1875, but the Heater was retained, and a year since was applied to the locomotive "Harris," a 20-ton engine with cylinders 14 x 22 and 34 foot drivers, where it is now doing well. Before the Heater was put on we called the "Harris" a hard steamer, scarcely able at best to make its running time, but since the application of the Heater it has steamed splendidly, with a large saving of fuel. Indeed, with the summer increase of travel, it became necessary to use a 20-ton engine upon the corresponding train, but the train of the "Harris" was run in shortened time, making more stops than before, and even then, if delayed, could easily make up time upon the road. Our whole experience proves that we not only save fuel by the use of these Heaters, but also considerably increase the working capacity of a locomotive. We are adding others, one new one having just started well.

Yours truly,

(Signed) J. MULLIGAN, *Supt.*

139/1

RETURN TO
HILL & ACKER,
12 E. Third Street.

Wiley C S
" "
Caplan & Wadkins

1877-1878

It being in our judgment highly important to obtain at as early day if possible, a per final judgment against the Trust Div & the R.R.s & the probabilities of obtaining one in the foreclosure ^{suit} now pending in U.S. Circuit Court apt this Co & the ST & P R.R.s being against getting over the trust to trust, if over this, we would suggest that a suit be instituted at once (as soon as possible) against the Trust Div Co in Compan of the Bonds secured by the U.S. Circuit Court. The right to sue pending foreclosure; at least so far as Compan maturity before principal of bonds was declared due; has been decided in the Court so that ^{it} is probable to get as many of the Compan maturity before that date as possible, at same time withholding in the suit so far as a requisite Compan failing here after that date; we might then to accomplish purpose of suit say \$200,000 of Compan. The object to be accomplished would be 1st selling out, on the prob to be obtained, the Trust Div Lines, especially the Branch, & thus cut out Mr. Jeffet's right of redemption in the foreclosure sales, if he has any as representing the Co; and 2nd to obtain an early decision in all questions affecting the substanty of this issue of bonds, as the only defense to the action on the Compan of this issue would be the one now interposed in the foreclosure suit. Should we get a judgment on the Compan notwithstanding their defense, we

[1872]

2
 Cried all at once, unless an appeal were taken
 to the Sup. Ct. which could only be done by their going
 back to stay proceedings, which would be not less than
 a sort of judgment. The suit is one of the first
 U.S. Court would not be subject to the delays in-
 cident to State Courts in similar cases, by way of
 decision ^{delating} a motion & could doubtless be brought to
 an issue at June Term this year if commenced at
 once, probably in being the suit is of the first
 importance & will also make as some terms at
 a point where we could attack the ability of the Litch-
 field judges.

[1898]

R.R. capitulation

Total miles of track completed	45 $\frac{3}{4}$ ✓
" " grading nearly "	21 $\frac{1}{2}$ ✓
Red River Valley R.R.	10% ✓

Sums already accrued

Branch & Main	1,354,482.57 ✓
Extension	<u>896,000.00</u> 5,225,482.57
Total Accrued	2,250,482.57 ✓

Sums to accrue

End of track to St Vincent	384,000
Branch to Branch	<u>358,000</u>
	Accrued 742,000 ✓

Estimated value of property other than
Road bed, Lands, Stations, Telegraph lines &c

Rolling stock of every kind	410,544.45 ✓
Machinery, tools, supplies, &c	
Lumber, wood, ties &c	289,174.52 ✓
Real Estate St Paul, Minneapolis & St Anthony, Grand	390,000.00 ✓
Land rights on main line	160,000.00 ✓
R.R. Iron &c belonging to Extension lines	183,500.00 ✓

In
dispute

[WITH RECAPITULATION]

1874]

Am't of Principal }
Bonded debt } \$15,000,000.

Am't of Interest due }
since Jan 1st 1874 } $\frac{4,725,000}{19,725,000}$

Or about \$142,000. per mile of

Completed roads
Am't of Annual interest \$1,050,000.
Am't of Annual interest on
bonded ^{debt} per mile \$7.554.

Deduct value of Completed
roads from present debt
at \$12,000. per mile for $\frac{19,725,000}{1,668,000}$
139 miles
Excess over value of roads \$18,057,000

Area of Land undisputed at 350,000.
After deducting value of road at \$12,000. per mile
Average mortgage proceeds per acre \$51.542

64.00	22
64.12	23
32.00	19200
256	192
374	2,71,000
413,800	

2,12,800
1,12,000
2,24,000
2 1/2
1,12,000
4,48,000
5,60,000

Branch		1872	Main
	Gross	Expenses	Quint. Loss
Jan	14649.53	10628.25	4021.28
Feb	15449.79	11704.90	3747.89
Mar	16621.91	10622.18	5999.73
Apr	20369.82	11060.84	9308.99
May	25237.12	19998.35	5238.77
June	23293.72	11425.68	11868.04
July	26879.86	19192.49	7687.37
Aug	24215.63	14616.70	9628.93
Sept	26582.45	12628.27	14093.28
Oct	32092.64	14396.58	17690.06
Nov	23369.21	12839.62	10529.62
Dec	20229.74	19150.59	1079.15

Jan	17963.03	29862.73	
Feb	15701.03	39052.60	
Mar	17007.45	11016.31	11899.70
Apr	34285.18	34106.29	23928.56
May	39168.86	36268.92	152.79
June	36064.92	28752.60	2899.94
July	41761.67	38037.46	7312.32
Aug	36394.03	32905.70	3724.21
Sept	41857.20	31672.99	3498.33
Oct	50886.49	31048.67	10181.21
Nov	36713.46	29989.32	19837.82
Dec	33762.46	37713.68	16744.17
			3948.22

61072.60	512866
5861.50	51929.54
70266.61	48312.35
78803.32	43388.80
76058.20	47187.84
10406.18	53057.10
91152.77	53802.02
72671.90	55710.34
74017.38	51775.95
19975.51	23450.36
66697.52	30402.28
81541.27	23901.79

846675.89	54599.15
7556.54	40745.61
557875.14	53294.10
585099.15	
366576.74	

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200
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7/600
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6000
1100.000

Branch Line
Exp
1878

[1873]

Get permission of Judge Dillon to issue debentures
for say \$12000 per mile of road to be built and debentures
bearing interest at rate of 8% -

End of track to St Vincent 64 miles
Melrose to Alexandria 35 "

Day 100 miles road to be built Cost say (low) 650,000.00
Or should Congress refuse to extend the grant longer than the
present year and it was considered advisable to try and go to
Fergus Falls the distance would be 145 miles and the cost would
be from \$1,000,000. to \$1,050,000. - The debentures would
amount to

St Vincent and Alexandria 100 miles	1.200,000
Fergus Falls 45	540,000
	<u>1,740,000</u>
Interest at 8% per annum	139,200
Cost of road without equipment	1,050,000
Interest at 7%	73,500
	<u>\$755,700</u>

Could not the debentures be made as collateral ~~for~~ ^{on line}
upon which to raise money at rate of 7% on dollars at 7%
which would give

Have made lease of ~~Extensive~~ ^{Extensive} sites from Receiver and
have been approved by Comptroller of Red River Valley or Red
River & Manitoba RR and pay about \$15,000 per annum
for rental -

176250
182200

$$\begin{array}{r} 1575 \\ 3400000 \\ \hline 550000000 \\ 4125 \\ \hline 467500.00 \end{array}$$

$$\begin{array}{r} 64 \\ 63000 \\ \hline 192000 \\ 384 \\ \hline 403200 \\ 216000 \\ 360000 \\ \hline 979200 \end{array}$$

$$\begin{array}{r} 500.000 \\ \hline 33 \\ 104 \\ 64 \\ \hline 201 \end{array}$$

[WITH "JUDGE DILLON" 1878]

$$\begin{array}{r} 64 \\ 36 \\ \hline 100. = \\ 45 \\ \hline 145 \\ 12000 \\ \hline 1740000 \\ 70 \\ \hline 121800000 \end{array}$$

$$\begin{array}{r} 58000 \\ \hline 360000 \end{array}$$

$$\begin{array}{r} 145 \\ 104 \\ 37 \\ \hline 286 \end{array}$$

$$\begin{array}{r} 266/174000000 \\ 1716 \\ \hline 64.8 \end{array}$$

15,000

$$\begin{array}{r} 36 \\ 35 \\ 45 \\ \hline 116 \\ 76 \\ \hline 1920 \\ 11620 \end{array}$$

150.

1878

Sec 3.

George Stephen & Co. hold \$11,541,000
of bonds, and will agree
to build road at a cost not exceeding
\$1200 per mile and take debentures at par
therefor, and will build Road from
Melrose to Tugus Falls and from Snake
River to St. Vincent according to terms of
adoption of the same of 1878. Com-
pleting to Abbeville & St. Vincent before 1st
of January 1879. Will give their written a-
greement a bond with proper penalty, to
carry out above agreement.

Sec 4.

To guarantee the performance of work
& completion of Road as above, in addition
to above proposition, it may be provided by

the order of the Court that debentures shall only issue to Contractors upon completion of ten mile sections of road, as work progresses -

Sec 5. This as noted sufficiently provides for protection of all parties interested

Sec 6 - If sufficient money be furnished to complete the intervals between Melrose & Tugm Falls, and Snake River & St Vincent then the debentures should be a prior lien to ^{this part of} ~~the~~ issue on each interval upon entire line of Road and upon Lands earned by completion thereof respectively, as provided in each of Legislation; if only portions of each interval completed then lien of debenture to

Stand as now provided in modified order of
September 1st 1878 & as amended by Sec 5

Sec 7 Form of debentures shall be sub-
stantially as in former order, & redeemable
within five years with 8 per cent. semi annual
interest, with lien security as above men-
tioned.

Sec 8 Bondholders of former issue, who
do not join in this application, to have
the right at any time within 30 days
after the entry of decree of foreclosure to
come into this scheme upon the same foot-
ing, as moving parties upon payment to the
Receiver of their proportionate share of cost of
Road with 8 per cent interest from date of order
and upon such payment to receive their share

of redemption shall in such manner as may be provided in the order, and to become thereby, to the extent of bonds represented by them jointly interested with the parties furnishing the money to build the road in the first instance. Public notice shall be given by publishing a notice of the making of the order to be granted herein, for 30 days in a newspaper of ^{the cities} New York & Amsterdam, immediately after the signing ^{of the} said order.

Sec 9 ^{already earned} Lands ^{shall} be appraised at their fair value by ^{an} appraiser appointed by the Receiver, as speedily as possible, appraisals to be filed with Clerk of Court as soon as made or from time to time as completed - Receiver shall be authorized to contract & sell these lands at not less than appraised values for cash, or on time, with

a reasonable cash payment down, credit to be given not to exceed 5 years at 7 per cent annual interest, & all payments to be made in cash, (bonds of \$10000000 issue not to be used in payment for lands), money from land sales to be deposited in Registry of Court subject to further order; Lands covered north only from $\frac{1}{2}$ to $\frac{1}{4}$ p. sec.

Sec 10

Receiver should be authorized to contract for building road with parties willing to take debentures at par, in payment for work & materials furnished in building road, at lowest obtainable price, ^{not exceeding \$12000 per mile} Payments in debentures to be made to such Contractors on completion of section of ten consecutive miles from either end of Road, payments to be made upon certificate of Receiver's Engineer that a consecutive section of ten miles is fully

Complete road for cars

Debitures should in form proper be
Requesting by Receiver in Book kept for
that purpose by him, which should also
show all transfers -

Other matters should be covered by the
order to be granted by the County

\$1154.050

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300 100 28
170
300

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200 250 250
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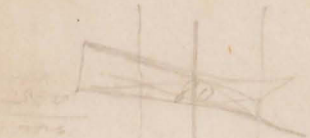
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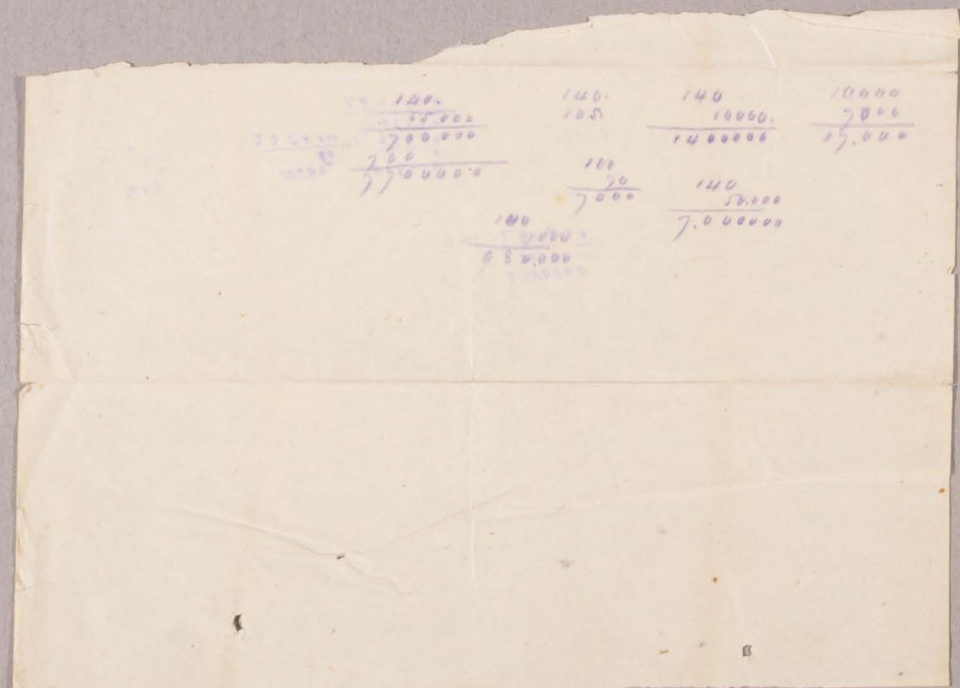
agreement



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1.80 0000
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20 12.10





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