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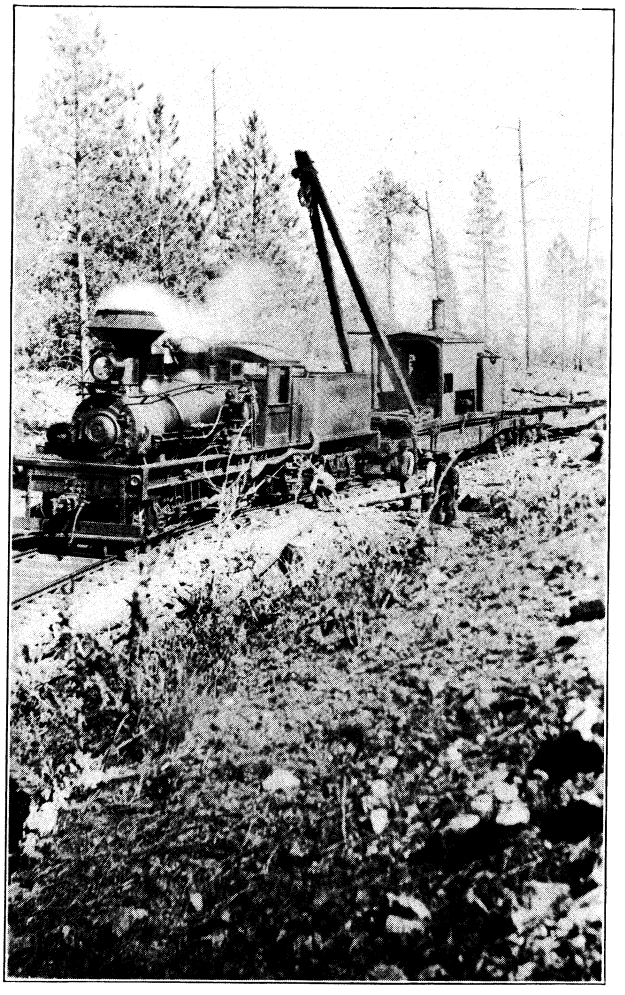
Logging, Plantation, Mining, Industrial & Standard Railroad Motive Power.

SHAY Locomotives



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Are Particularly Adapted for All Around Logging Work

Shay Locomotives have the greatest tractive power consistent with their weight. They are adapted for heavy grades, sharp curves and light rail. Their steady draft, due to the great number of exhausts, makes fuel combustion low—hence, unusually economical in fuel.

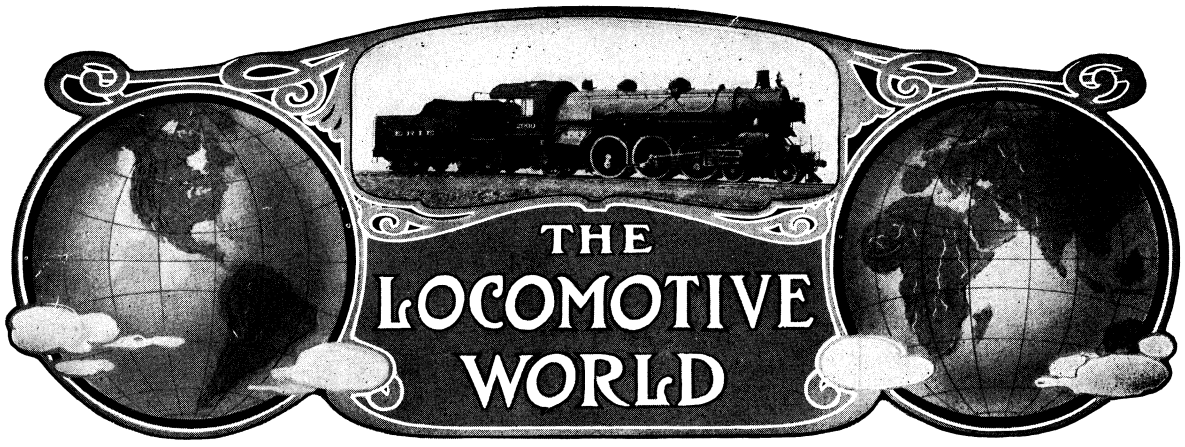
We've an unusually attractive catalog about Lima Locomotives. Shall we forward a copy?

Lima Locomotive Corporation

Builders of

Locomotives of All Types

Lima, Ohio



VOL. 7, No. 12 LIMA, OHIO April, 1915

THE LOCOMOTIVE WORLD

PUBLISHED MONTHLY BY

THE FRANKLIN TYPE AND PRINTING COMPANY

H. C. HAMMACK, Editor

WEST AND HIGH STREETS LIMA, OHIO.

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NOTICE TO ADVERTISERS

Advertising rates furnished upon application. Change in advertisements intended for a particular issue should reach the office of the Locomotive World no later than the 20th of the month prior to the date of issue. New advertisements requiring no proof can be received up to the 1st of the month of date of issue.

THE FRANKLIN TYPE AND PRINTING COMPANY

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RAILROAD EARNINGS IN 1914

A Loss of 53 per cent. Compared with Last Year, With Decrease in Every Section

Gross earnings of United States railroads so far received in 1914 make quite an indifferent comparison with those of the previous year the total for ten months ending October 31, according to the statement prepared by DUNN'S REVIEW, which is divided into sections and includes over 155,000 miles of roads, amounting to $1,774,727,841, a falling off of 5.3 per cent. Every section into which the statement is divided shares to a greater or less extent in the decrease, although in some instances moderate expansion early in the year partially offset subsequent sharp contraction; others in the later months displayed an improving tendency, so that several divisions make a fairly satisfactory exhibit, taking into consideration the irregularity in general conditions that has prevailed throughout the year. The most pronounced reduction is shown in the returns of the Eastern and Western Trunk roads, the former reporting a loss of 8.2 and the latter 8.8 per cent., which is evidently a reflection of the smaller movement of freight incident to the depression in many departments of business during the past twelve months. The earnings of the anthracite Coal roads are 6.2 per cent. less than for the corresponding ten months in 1913, much of which was due to interruption to traffic in January and February and to unusually mild weather in the early fall. Other Eastern roads show loss in every month except September, with the total decrease for the ten months amounting to 7.9 per cent., a considerable portion of which can probably be accounted for by the moderate movement of coal and the situation in the iron and steel industry. On the other hand, the Central Western and Granger roads report decreases respectively of 2.5 and 1.5 per cent., which are comparatively favorable and reflect generally prosperous conditions. Early gains by Southern roads were lost later in the year, conditions in the cotton markets accounting almost entirely for the falling off of 2.5 per cent. The roads in the Southwest made a moderately satisfactory comparison with last year with a loss of only 3.8 per cent., but those on the Pacific Coast show a decrease of 6.4 per cent., much of which is attributed to the in-

creasing competition of the Panama Canal. The marked contraction on the railroads in Canada of 14.9 per cent. reflects the quietness in almost all commercial and industrial lines in that country, due mainly to conditions arising from the war in Europe, and it may be noted that the losses have been especially severe since the beginning of hostilities.

The figures in detail follow:

Ten Months	Mileage 1914	Mileage 1913	Gross Earnings 1914	Gross Earnings 1913	P. C.
Trunk Eastern	14,224	14,058	$355,571,354	$387,198,016	—8.2
Trunk Western	10,037	10,027	164,030,112	179,910,070	—6.2
Anthracite Coal	3,133	3,137	85,438,560	91,130,237	—6.2
Other Eastern	2,548	2,521	48,968,164	53,170,405	—7.9
Central West	8,546	8,920	77,707,679	79,686,191	—2.5
Granger	30,940	30,848	209,899,559	213,095,600	—1.5
Southern	30,020	29,737	269,224,694	276,218,217	—2.5
Southwest	28,496	27,835	261,461,487	271,715,358	—3.8
Pacific	27,985	27,664	301,805,599	322,603,747	—6.4
U. S. Roads	155,929	154,347	$1,774,107,208	$1,874,727,841	—5.3
Canadian	17,609	16,997	145,564,692	171,176,929	—14.9
Mexican	7,196	7,181	.....	.....	.....
Total	180,734	178,525	$1,919,671,900	$1,045,904,770	—6.0

The table opposite shows the fluctuations in railroad earnings during the first ten months of 1914. The greatest depression was in February, due in part to weather conditions,but this was followed by substantial improvement in March and April. In May the contraction was again very marked, while moderately better returns in the next four months were succeeded by a strong tendency towards contraction in October.

	1914	1913	P.C.
January	$171,337,668	$184,630,145	— 7.2
February	153,448,770	171,936,209	—10.7
March	183,311,686	184,283,417	— 0.5
April	174,160,886	179,245,314	— 2.8
May	174,037,155	194,046,169	—10.3
June	177,740,280	187,164,064	— 5.0
July	190,049,824	195,644,795	— 2.8
August	197,646,701	204,190,060	— 3.2
September	202,877,971	209,565,110	— 3.2
October	202,559,744	217,719,701	— 7.0

—*Dunn's Review.*

QUESTION AND ANSWER.

Starting Lubricator

"Which valve should be turned on first and which should be closed first with the Detroit Lubricator? I understand they have issued some new instructions. I have always been taught to open the steam valve first and then the condensing valve, but I believe they say to do the opposite way,—condensing first then steam valve."

Answer—The latest instructions which we have seen referring to the operation of the Detroit Bull's Eye Lubricator contain the following paragraph: "Caution. Always open steam valve first and water valve last at a terminal or elsewhere. Always close water valve first and steam valve last. If these instructions are followed there never will be any occasion to report the lubricator syphoning." If the Detroit people have gotten out any instructions differing from the above, they have failed to make them generally known.

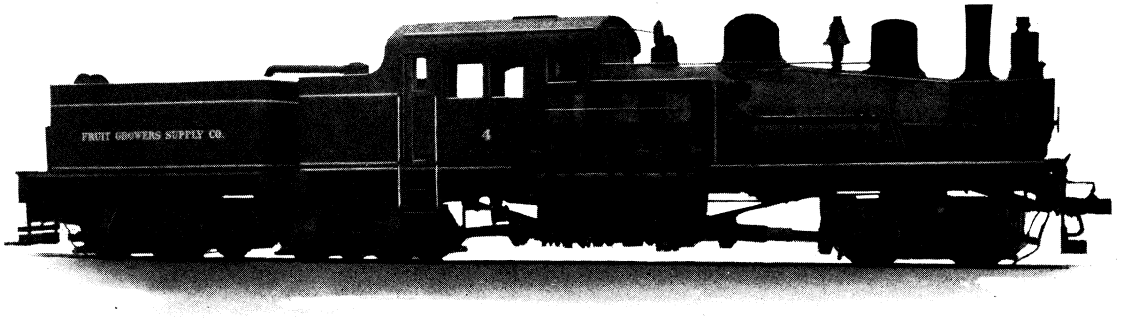
It may be possible that our correspondent has the instructions governing the operation of the Detroit Bull's Eye and the Nathan Bull's Eye Lubricators mixed. The Nathan instructions issued in 1914 are as follows: "Immediately after filling lubricator open water valve, open steam valve, wait until sight feed chambers are filled with water, then start the regulating feed by opening regulator valve." And, again, they emphasize "Open water valve immediately after filling, whether the feed is started again or not," and, also, "always keep the water valve open except during the period of filling the cup as per directions."

This, as you will note, is again in direct contradiction to instructions issued by the Detroit people, who, in directions for operating, to start lubricator state "Always start lubricator about fifteen minutes before leaving a terminal. Be sure that the regular boiler valve is open, then open wide the steam valve at the top of the condensor and keep it wide open while the lubricator is in operation. Allow sufficient for condensor and sight-feed glasses to fill with water, and then open valve." —*Locomotive Firemen and Enginemen Magazine.*

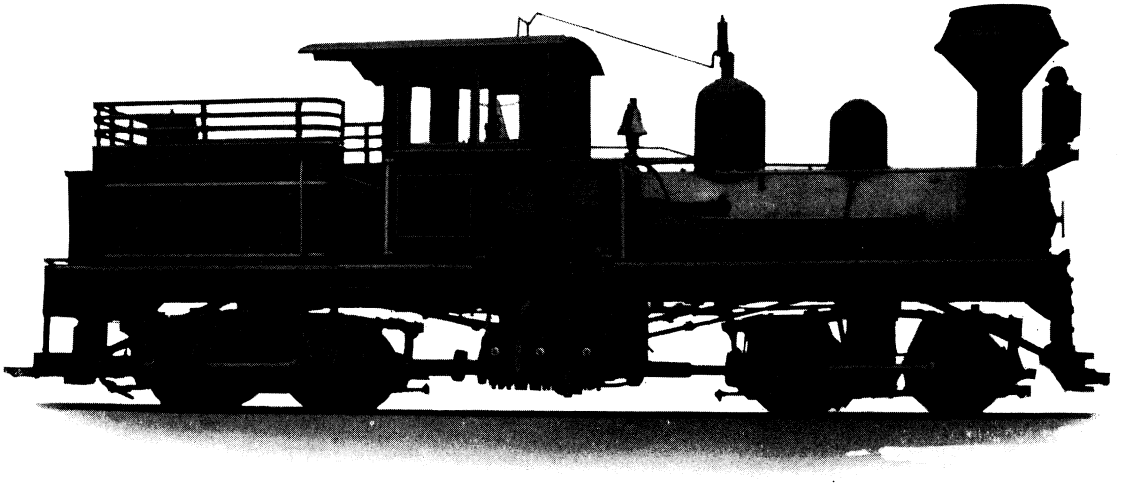
Shay Locomotive for California Also Siam

THE illustrations shown on this page represents the latest improved Shay locomotives of the two sizes referred to.

The 80 ton Shay locomotive built for the Fruit Growers Supply Company of Hilt, California, is fitted with oil burner, Westinghouse E. T. air brake and modern throughout. This engine has great tractive power and has proven very efficient for hauling heavy loads on steep grades and sharp curves.



EIGHTY TON SHAY LOCOMOTIVE, OIL BURNER



EIGHTEEN TON SHAY LOCOMOTIVE, 29½" GAUGE

The smaller engine illustrated is a standard 18 ton, built for 29½" gauge, wood burner. This was constructed for the Borneo Company, Ltd. at Bankok, Siam, and is to be placed in lumbering service in Siam where the modern methods of logging used in America have been adopted.

The following is a general description of each one of these locomotives:

80 TON SHAY

Gauge	56½"
Fuel	Oil
Tractive Power	35100 lbs.
Weight in average working order	183000 lbs.
Weight on Drivers	183000 lbs.
Rigid.Wheel Base	56"
Total Wheel Base	44'-6"
Cylinder number	Three
Cylinder Diamteer and Stroke	13½x15"
Valves—kind	Slide
Type	Allen Richardson —balanced
Greatest Travel	3½"
Outside lap	45-64"
Inside lap	0
Lead	1-32
Wheels—diameter over tires	36"
Thickness of tire	3½"
Driving Journals— diameter and length	6"x8"
Boiler—Style	Extended Wagon Top
Working pressure	200 lbs.
Outside Diameter first ring	50"
Firebox—Length and Width	72¼"x54¼"
Firebox—Water Space	3"
Tubes—Number and Outside diameter	194-2"
Tubes—Length	149-¼"
Heating Surface—Tubes	1254
" " Firebox	108.5
" " Total	1362.5
Grate Area	27.1
Center of Boiler above rail	82-½
Water Capacity	3500 gallons
Fuel Capacity	1500 "

18 TON SHAY

Gauge	29-½"
Fuel	Wood
Tractive Power	8330 lbs.
Weight in average working order	40000 lbs.
Weight on Drivers	40000 lbs.
Rigid Wheel Base	50"
Total Wheel Base	21'-2"
Cylinder—Number	Two
Cylinder—Diameter and Stroke	7"x12"
Valves—Kind	Slide
Type	Balanced D
Greatest Travel	2-½"
Outside lap	15-32"
Inside lap	0
Lead	1-32
Wheels—Diameter over tires	27-½"
Thickness of tire	2-¼"
Driving Journals— Diameter and Length	3-½"x6"
Boiler—Style	Straight Top
Working Pressure	160 lbs.
Outside Diameter first ring	31-½"
Firebox—Length and Width	36"x25-½"
Firebox—Water Space	2-½"
Tubes—Number and Outside Diameter	44-2"
Tubes—Length	107-¼"
Heating Surface—Tubes	204
" " Firebox	34.1
" " Total	238.1
Grate Area	6.46
Center of Boiler above rail	61-½"
Water Capacity	730 gallons
Fuel Capacity	¾ cord

RESULTS OF THE LOCOMOTIVE BOILER INSPECTION LAW

By Frank McManamy

Chief Inspector, Locomotive Boilers,
Interstate Commerce Commission,
Washington, D. C.

A resume of the work of the locomotive boiler inspection service during the three years and eight months since the law became effective shows results for which we have not one word of apology to offer. The following table shows in concrete form the inspection work performed each year since the passage of the law; and the decrease in the percentage of locomotives reported defective indicates in a measure the improvement in conditions:

	1914	1913	1912
Number of locomotives insp'td	92,716	90,346	74,234
Number found defective	49,137	54,522	48,768
Percentage found defective	52.9	60.3	65.7
Number ordered out of service	3,365	4,676	3,377

It does not, however, fully show the improved conditions resulting from the operation of the law, because, as pointed out in our 1913 report, our attention was first concentrated on the more serious defects, so that the number of fatalities might be reduced; therefore, the improvement is more accurately indicated by the reduction in the number of casualties, as shown by the following table:

	1914	1913	1912
Number of accidents	555	820	856
Decrease from previous year %	32.3	4.2	.....
Decrease from 1912 %	35.1	.....	.....
Number killed	23	36	91
Decrease from previous year %	36.1	60.4	.....
Decrease from 1912 %	74.7	.....	.....
Number injured	614	911	1,005
Decrease from previous year %	32.6	9.3	.....
Decrease from 1912 %	38.9	.....	.....

The data shown above is taken from the records up to July 1, 1914. A check of the first six months of the present fiscal year, that is from July 1, 1914, to January 1, 1915, in comparison with the corresponding period in the preceding year shows that during the period ended January 1, 1914, there was a total of 349 accidents which resulted in injury, with 15 killed and 385 injured thereby. During the period ended January 1, 1915, there

was a total of 253 accidents which resulted in injury, with 6 killed and 271 injured thereby, or a decrease of 27.5 per cent in the number of accidents, 60 per cent in the number of killed, and 30 per cent in the number injured by the failure of locomotive boilers and their appurtenances.

Going back further and making a comparison with the corresponding period for 1912, we find that during the six months' period ended January 1, 1913, there were 470 accidents which resulted in injury, with 24 killed and 512 injured thereby. In other words, the number killed by failure of locomotive boilers and their appurtenances during the first half of our fiscal year which began on July 1, 1912, was 12½ per cent greater than for the corresponding periods in the two following fiscal years, with almost as great a decrease in the number injured and the number of accidents. Or, to state the whole matter briefly, in three years the number killed by failure of locomotive boilers and their appurtenances has been reduced from about 100 per annum to less than one-fourth that number, and the number injured from more than 1000 per annum to less than one-half that number, with a corresponding decrease in the number of accidents.

These are the direct results of the operation of the locomotive boiler inspection law, and indicate the manner in which it is fulfilling the purpose for which it was enacted; namely, to promote safety. The question will no doubt arise as to just what the law has done to produce such results. The results are due to a number of reasons, among which are more careful inspection, more prompt repairs and attention to minor defects, investigation and classification of every accident that resulted in injury, with a view to determining the cause and remedying it, and giving publicity to the information collected.

No railroad man with a trace of honesty and a knowledge of conditions and practices prior to the passage of the law can question the fact that, generally speaking, inspections are now made more carefully and more regularly, and repairs are more promptly made, and further that the question of repairs is less apt to be determined by the number of loads in the yard awaiting movement, although unfortunately that is still occasionally considered to be the deciding factor; an illustration being a recent request by a master mechanic to operate a locomotive with 43 broken staybolts a distance of 312 miles, because they needed the power. It must be admitted, however, that such instances are becoming more rare, although we still occasionally find a superintendent or trainmaster who in spite of the fact that he is at the other end of the division considers himself a better judge of the condition of a locomotive than an inspector or foreman who is on the ground, and orders it into service regardless of its condition.

The importance of giving attention to minor defects can be shown by a single illustration. During the last fiscal year 18 persons were injured due to studs blowing out of firebox or wrapper sheets. The practice of repairing leaky studs by caulking, or permitting them to continue in service without repairs, should be discontinued.

I have recently had occasion to read very carefully statements made before Congressional committees at the time the boiler inspection law was pending, to the effect that all boiler explosions were really crown sheet failures due to low water; therefore, were man failures. In order to correct this misapprehension, attention is directed to the records of such accidents since July 1, 1911.

During the year 1914, as compared with 1912, accidents which are usually termed boiler explosions which resulted in injury have decreased 44 per cent, or from 97 in 1912 to 54 in 1914, and the number of killed and injured has decreased 64 per cent, or from 290 to 104. During the same period crown sheet failures due to low water decreased 48 per cent, or from 92 to 48. I am directing attention especially to this class of accidents, first to show that the class of accidents which were said to be unpreventable have been materially reduced, and also because our investigations have shown that by proper application and

maintenance of boiler appurtenances they can be still further reduced.

Rule 42 provides that, "Every boiler shall be equipped with at least one water glass and three gauge cocks. The lowest gauge cock and the lowest reading of the water glass shall be not less than 3 in. above the highest point of the crown sheet." While it may be a compliance with the letter of the law to locate these appurtenances where they can be most easily applied, regardless of their convenience to the enginemen, it is manifestly not a compliance with the intent of the law, and is not conducive to safety, as an improper or inconvenient location may seriously interfere with their proper use. A certian type of locomotive has the water glass located directly behind the engineer and entirely out of sight of the fierman. In other instances glasse are found so obscured by other boiler apputrenances or by an improper shield that it is difficult, and under certain conditions impossible, to see the water level. A recent investigation of a crown sheet failure showed that the cab arrangement was such that the water glass and gauge cocks were 9 in. above the engineer's head and that he regularly carried a small keg to climb upon to try the gauge cocks. Can it be seriously questioned that such conditions cause accidents, particularly when operating in a busy terminal? Using a shield that obstructs the view of the water glass is also to common. The manner of application is also important, both as to water glasses and gauge cocks.

We also find that the manner in which gauge cocks and gauge cock drippers are applied indicates that the purpose for which they were applied did not receive sufficient consideration. While the application of a dripper is important to prevent the discharge from the gague cocks from scalding anyone in the cab, it should not be located so close to the gauge cocks that the nipples extend down into the dripper, preventing enginemen from seeing the discharge, as dripper pipes occasionally become obstructed and fill with water, in which event the sound of water and steam are identical.

Failure of injector steam pipes continues to be one of the most frequent causes of serious accidents, and is the only one which shows an increase during the present fiscal year over the corresponding period for the previous year. To bring out clearly the cause of these failures, the following is a complete list of all that have occured since July 1, 1914, and which resulted in one killed and 15 injured, showing the cause of each:

INJECTOR STEAM PIPE FAILURES,
JULY 1, 1914, TO MARCH 1, 1915

1. Collar broke on right injector steam pipe, due to old crack in collar.

2. Steam pipe to left injector blew off where brazed to collar.

3. Injector steam pipe blew off; union nut broke while being tightened under pressure; due to defective nut and use of improper tools for making repairs.

4. Threads stripped in injector steam pipe union nut while being tightened under pressure; nut too light and threads badly worn.

5. Injector steam pipe blew off; union nut broke while being tightened under pressure.

6. Union to left injector steam pipe blew off, fatally scalding fireman who was attempting to tighten it under pressure; spanner nut too large.

7. Steam pipe to left injector pulled loose at turret connection due to defective brazing and injector not properly braced.

8. Left injector steam pipe collar broke at injector throttle connection; old crack in flange of collar and wrapped with asbestos to stop leak.

9. Injector sream pipe collar broke; defective collar.

10. Injector steam pipe spanner nut broke while being tightened under pressure.

11. Spanner nut on injector steam pipe broke while being tightened under pressure. Nut had been badly damaged previous to accident by use of hammer and set.

12. Injector steam pipe pulled out of collar; improperly brazed.

13. Spanner nut on left injector steam pipe broke while being tightened under pressure; due to use of improper tools.

14. Injector steam pipe broke at brazing.

15. Right injector steam pipe collar broke; defective collar.

16. Injector steam pipe collar broke; defective collar.

The nine failures, four of which were due to poor brazing and five to collar or sleeve breaking, can, I believe, be prevented by extending the pipe through the collar or sleeve and flanging or beading it, thus reinforcing the collar and reducing the strain on it, as the end of the pipe itself will be solidly held in the joint; therefore, it will carry the load. If properly applied in this way, brazing is not necessary, although it can be done if desired. This method of application is at least as cheap as brazing, and defective or improper workmanship can be discovered by inspection, which is impossible with the brazed connection.

In view of the statements occasionally made relative to the expense to the carriers of complying with the Locomotive Boiler Inspection Law, it may be pertinent to inquire if proper entries are always made on the credit side of the ledger and a trial balance taken. I will confess that we do not feel ourselves competent to place a value on human life; but an estimate based on the average cost to the carriers of an accident resulting in the loss of a life multiplied by the decrease in the number of such accidents during the past three years will be at least as nearly correct as the average estimate of the cost of the law, and will give a substantial item to start with. As injured employees usually receive pay from the company or compensation from the relief department for the time lost, an estimate of the saving from this source based on the decrease in the number injured would be another important item.

There are other results, more or less indirect, but of substantial benefit to the carriers, among which are a reduction in the number of engine failures, as we have numerous records of locomotive performance which show an increase of from 200 to 800 per cent in the miles per failure since the law became effective, which it is admitted is largely due to improved conditions resulting from the stimulating effect of the law. A saving in fuel is another result of the improved conditions brought about by compliance with the requirements, among which are prohibiting the use of flue plugs and providing that boilers must be more carefully washed, and must have all scale removed when in shop for repairs, and that leaks both in and outside of firebox must be kept down to the minimum.

In this connection it is not out of place to state that few, if any, railroad men realized the extent to which the use of flue plugs had been carried prior to the passage of the law. It is true their use was admitted to be general, and our records of the bearings prior to the approval of the rules contains numerous statements made by prominent mechanical officers that a rule prohibiting the use of flue plugs would cripple their road. On one prominent road indifference to the rule was expressed, as they stated they were the first to apply for relief from its provisions until they could prepare to meet its requirements, showing conclusively that they did not realize the extent to which they had been depending on flue plugs.

Failure to properly wash and scale boilers is another evil which had grown to alarming proportions, due perhaps to the fact that washing or scaling a boiler is among the most disagreeable tasks around a shop, and is too often performed by incompetent or indifferent labor not properly supervised. In addition to being one of the chief causes of leaking crown and staybolts, tests have shown that 1/3 in. of scale on heating surfaces results in a loss of approximately 15 per cent. of the value of the fuel; therefore, clean boilers mean in addition to increased efficiency a saving in cost of fuel as well as in cost of repairs.

While it can not be doubted that the remarkable decrease in the number of casualties and the improved conditions noted, as well as many others, are a direct result of the operation of the law, I do not wish to be understood as claiming that those who are administering the law are entitled to all credit for the improvement shown. Such results could not

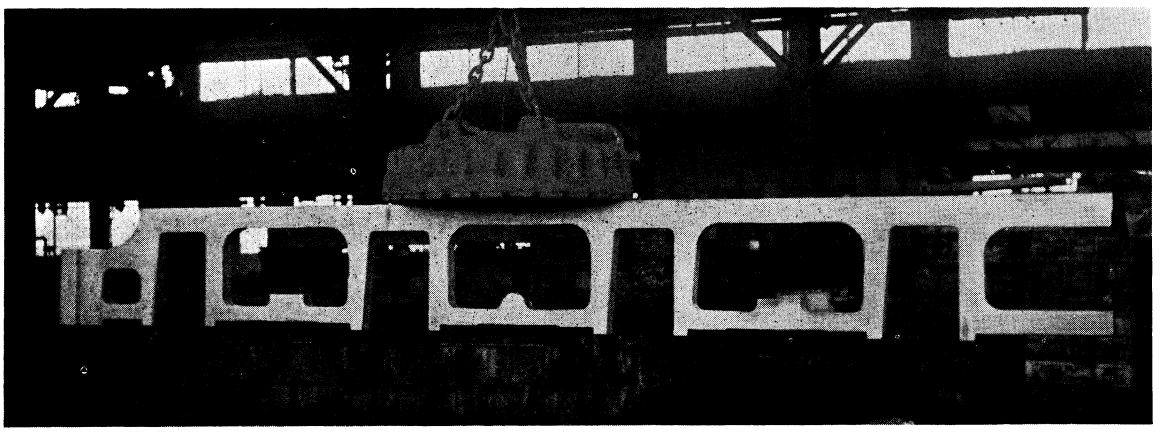
(Continued on page 9)

Vanadium Steel Frames for Southern Pacific Mikados

IN the illustration on page 9 is shown one of the vanadium cast steel main frames applied to the twenty Mikado type locomotives recently built for the Southern Pacific Company, which were illustrated and described in "Facts" (December 1914 issue). On these engines, the main frames, front rails and rear sections for the trailers were made of the above material.

The castings were made by the Ohio Steel Foundry Co., Lima, Ohio.

As will be seen from report of tensile tests given in the following table, the castings show uniform and high physical properties. With an average of 50,940 lbs. per sq. in. elastic limit, 83,570 lbs. per sq. in. tensile strength, 24% elongation in two inches and 45.4% reduction of area, these tests are among the highest of any vanadium steel castings of which we have record.



ONE OF FORTY VANADIUM CAST STEEL FRAMES FOR SOUTHERN PACIFIC MIKADOS
OHIO STEEL FOUNDRY COMPANY, MAKERS

The width of the main frame section is 4½ inches, and of the trailer frame 4 inches. Over the driving pedestals, the frame is 6¾ inches deep; while the top rail between pedestals is 5½ inches deep, and the bottom rail 3¾ inches deep. Over all, the frame is 24 feet 9⅛ inches long. In the rough casting, the main frames weighed 6,450 lbs. each, the trailer frames 2,978 lbs. each, top front rails 1,375 lbs. each, and bottom rails 1,125 lbs. each.

	PHYSICAL PROPERTIES				CHEMICAL ANALYSIS					
Heat No.	Elastic Limit,lbs. per sq. in.	Tensile Str'gth,lbs. per sq. in.	Elongation in 2 in.	Reduction of Area	Carbon Per Cent.	Manganese Per Cent.	Silicon Per Cent.	Phosphorus Per Cent	Sulphur Per Cent.	Vanadium per Cent.
4310	53,000	84,500	25%	48.3%	.28	.65	.29	.030	.030	.200
4313	48,000	74,080	28%	53.3%	.26	.65	.29	.034	.029	.205
4342	51,000	88,200	23%	46.0%	.24	.67	.27	.025	.026	.195
4345	52,500	88,300	23%	42.5%	.26	.70	.26	.027	.029	.185
4345	51,500	83,700	27%	41.6%	.26	.70	.26	.027	.029	.185
4345	49,500	86,200	20%	41.3%	.26	.70	.26	.027	.029	.185
4358	51,100	79,300	27%	44.8%	.28	.65	.30	.037	.028	.195

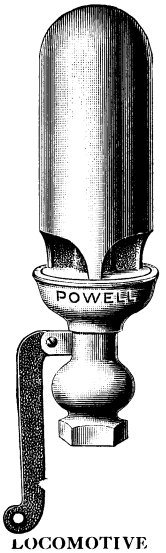
The engines in questoin have a total weight of 282,000 lbs., with 26-inch diameter cylinders and a working pressure of 200 lbs. per sq. in.

For an engine of this size and capacity, these vanadium frames are considerably lighter, as shown by the above weights, than is ordinary practice for plain carbon steel frames on many roads—*American Vanadium Facts.*

THE POWELL "LOCOMOTIVE" CHIME WHISTLE.

Single Bell With Vertical Valve.

A railroad is not the unfeeling and relentless devourer of automobiles and little children at grade crossings described by impassioned advocates in crowded court rooms. The "Locomotive" Whistle of DANGER is an engineer's use of a piece of machinery, but it is also the echo of a man's thought for his own babies left at home. A railroad has been likened to an Octopus by those who do not know the flesh and blood and personality of railroads. The soul of a railroad is fidelity, and if a railroad is an Octopus it is an Octopus with a soul. A railroad is a disciplined power; owning rails, and cars, and locomotives, etc. Engaging the highest quality of mechanical skill and expert knowledge; but the glory of a railroad is the united adjustment of its living nerves to patience, courtesy, speed and safety-first.



LOCOMOTIVE STYLE

The use of Single Bell Chimes for Locomotive Service has greatly increased during the past few years and the necessity of a practical strong and durable valve connection, has been met and is appreciated by all users of Powell "Locomotive" Whistles.

They are made in sizes 3″-3½″-4″-5″-6″.

These whistles are manufactured by the Wm. Powell Co., Cincinnati, Ohio, who are makers and inventors of the celebrated "White Star" valve. Write for interesting literature on whistles which shows their general line.

Sparks Cause of Forest Fires.

Sixty per cent., or 319 of the 503 fires reported by the Forest Service as having occurred in 1914 on the national forest purchase areas in the White Mountains of New England and the southern Appalachians, were caused by sparks from locomotives. More than half of these fires, or 272, occured in Virginia alone, and of these 227 were from locomotive sparks. Three hundred and seventy-nine of the fires were confined to areas of less than ten acres each, and 296 were extinguished before one-quarter of an acre had been burned. The total loss amounted to $2,192 and the cost of fire-fighting to $1,300, an infinitesimal sum compared with the value of the timber and reproduction protected. As the areas swept by fire were mostly cutover, the greater part of the damage was suffered by young growth.

—*American Lumberman*

(Continued from page 7)

have been accomplished without the co-operation of the railroad officers, which we have in a great measure received. However, co-operation does not mean that we should ignore defective conditions and permit locomotives to remain in service in violation of the law, and that will not be done; it does not mean that attempts should be made to conceal defects by making improper inspections or by certifying to reports which do not represent actual conditions.—*Ry. Age Gazette.*

In the period of August 15th to November 15th, 1914, there passed through the Panama Canal from the Pacific to the Atlantic 102 vessels carrying 621,080 tons of cargo, and from the Atlantic to the Pacific 110 vessels carrying 457,991 tons.

INDEX TO ADVERTISERS AND WHAT THEY HAVE TO SELL

SECOND HAND LOCOMOTIVES

This
18 Ton
Second Hand
Shay
Locomotive

For Sale at a
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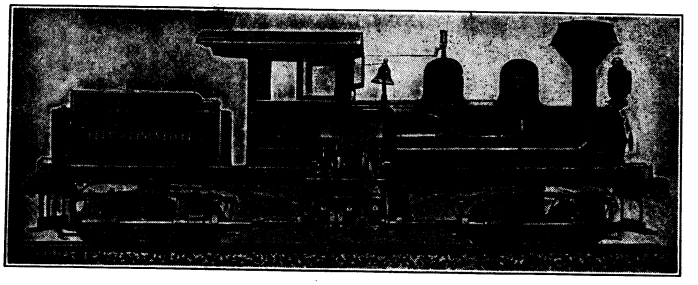

This Locomotive is built for 56½" Gauge

PARTIAL LIST OF SECOND-HAND LOCOMOTIVES

	Tonnage	Type	Gauge	Location	Reference No.
1	55	Shay	56½"	New Mexico	0832
1	65	Shay	36 "	New Mexico	083
1	65	Shay	56½"	New Mexico	0831
1	40	American	56½"	Alabama	134
1	24	Shay	42 "	Pennsylvania	138
1	24	Shay	36 "	Pennsylvania	0138
1	30	Shay	56½"	Pennsylvania	139
1	42	Shay	56½"	Louisiana	140
1	50	Shay	56½"	Wisconsin	141

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