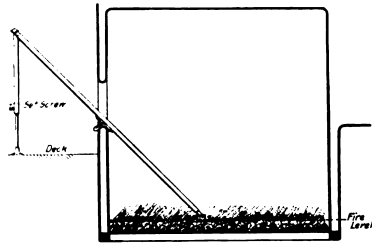


the shoe on the inside can always be brought in contact with the coal upon the grate. Graduations on this standard serve to show the distance between the under surface of the shoe, and the upper surface of the grate, which is assumed to be the thickness of the fire.

It is to be noted that this device gives the thickness of the fire at a single point only, but as in all cases where tests were made, the fire was maintained at a very uniform thickness throughout the area of the grate, it is believed that the values obtained are fairly representative. In each case the test was commenced with a clean fire and generally was not prolonged for more than two or three hours. The fuel used was Indiana washed lump. The firing was done in the usual manner, no attempt being made to control its thickness in any way, the effort being to maintain good steaming conditions.

The results, both as to thickness of fire and as to other important facts affecting boiler performance, are given in the table.



Method of Measuring Thickness of Fire Upon Grate of Locomotive.

The data represent conditions for which the power developed varies from 3000 to something over 5000 h.p., the latter being near the maximum limit for the boiler under test. The data are not free from inconsistencies, but are interesting in the range of values presented. They show that the maximum thickness of fire observed was but little in excess of four inches, and that a range of between three and four inches is sufficiently wide to cover almost every condition observed. Locomotive men generally assume that thicknesses much greater than these are necessary; estimates frequently running to values as great as 10 and 12 in. While it is possible that such thicknesses may be realized in practice, they could not be maintained with satisfactory results under the conditions of the experiments herein described.

Ten Observations of the Thickness of the Fire on a Locomotive Grate.

Thickness of Fire, in.	Power developed by boiler, h.p.	Evap. per sq. ft. of grate, lbs. per hr.	Evap. per sq. ft. of grate, lbs. per hr.	Evap. per sq. ft. of grate, lbs. per hr.	Evap. per sq. ft. of grate, lbs. per hr.	Evap. per sq. ft. of grate, lbs. per hr.	Evap. per sq. ft. of grate, lbs. per hr.	Evap. per sq. ft. of grate, lbs. per hr.	Evap. per sq. ft. of grate, lbs. per hr.
3.00	296	2.74	80.04	7.73	8.43	7.42	7.42	7.42	7.42
3.28	322	3.03	83.92	8.4	8.4	8.4	8.4	8.4	8.4
3.83	400	3.73	105.58	10.44	10.44	10.44	10.44	10.44	10.44
4.29	355	4.28	100.05	9.22	9.22	9.22	9.22	9.22	9.22
3.33	455	4.88	115.5	11.88	11.88	11.88	11.88	11.88	11.88
3.56	555	5.33	125.11	12.54	12.54	12.54	12.54	12.54	12.54
2.90	520	4.75	100.15	10.75	10.75	10.75	10.75	10.75	10.75
4.29	518	6.24	165.24	13.52	13.52	13.52	13.52	13.52	13.52
3.80	527	6.43	163.26	13.70	13.70	13.70	13.70	13.70	13.70
4.00	723	6.66	152.64	13.8	13.8	13.8	13.8	13.8	13.8

TECHNICAL

Manufacturing and Business.

The White Enamel Refrigerator Co., St. Paul, Minn., makers of the Bohn system of refrigerators, has closed its Chicago office.

Mr. H. M. Perry, who was employed by the Algoma Central & Hudson Bay Ry. Co. to build their new car shops, at Sault Ste. Marie, Ont., organize their car department and design their equipment, has completed his work and reopened his office in the Monadnock Block, Chicago, on Sept. 1, 1902. Mr. Wm. Apps, formerly of the Canadian Pacific Ry., has succeeded Mr. Perry as Master Car Builder.

R. C. Fraser, for several years with the Railroad Gazette and for the past three years Eastern Sales Agent of the Monarch Brake-Beam Co., has been appointed manager of the railroad department of the U. S. Metal & Mfg. Co., 25 Broad street, New York City. The company is selling agent for the Johnson hopper, flush, and refrigerator car doors; the Combination steel draft rigging and underframe; the U. S. steel truck, and the National adjustable journal bearing; and sole railroad agent for the Cliff & Gilbert automatic hose reel.

The University of Illinois has taken advantage of the perfection of the 220-volt incandescent lamp and the recent revision of the National Electrical Code of the Fire Underwriters, permitting the use of 200-volt distribution within buildings, by installing a 440-volt plant for the lighting of the five new buildings at Champaign. Two-phase alternating current will be used and each phase will be treated as a single-phase circuit operated on the three wire system, the neutral wire being supplied with current from an auto-transformer. Although the 220-volt lamp is somewhat less efficient than the 110-volt lamp, the difference will be of very little moment, in this case, since the exhaust from the steam engine plant operating the generators is to be used in heating the buildings. The generating station contains two-belt two-phase generators, one of 50 K.W. and one of 75

K.W., operated at 440 volts, to which will shortly be added an engine-type, revolving field, 120-K.W. alternator, bought from the Westinghouse Electric & Mfg. Co.

Iron and Steel.

A mortgage of \$10,000,000 has been made by the Bethlehem Steel Co., of Pennsylvania, in favor of the Colonial Trust Co., of New York, to secure an issue of a similar amount of 20-year 5 per cent. gold bonds issued by the United States Shipbuilding Co., and bought by the New York Security & Trust Co. It is dated Aug. 20 and bears interest at 4 per cent.

Steel Castings.

The greatest surprise of the year comes in the large number of steel foundries that have been projected since the beginning of 1902. At that time there were 73 establishments in the United States and Canada making steel castings, this number including those using the Tropenas and similar processes. We find that exactly 20 new concerns have been organized in this branch of the trade since then, which, as far as numbers are concerned, shows an increase of over 27 per cent. This is to all appearances an abnormal expansion, although it is a well-known fact that the demand for steel castings is constantly increasing. The malleable industry in the first six months of the year shows 10 new shops, building or proposed, an increase of 9 per cent.—The Foundry.

Steel for Battleship "Connecticut."

Proposals for steel for use in building battleship "Connecticut" at the Navy Yard, Brooklyn, N. Y., will be received at the Navy Department until 12 o'clock noon, on Wednesday, Sept. 10. Specifications and all information may be obtained on application to the Bureau of Construction and Repair, Navy Department. Chas. H. Darling, Acting Secretary of the Navy.

Midland Three-Cylinder Compound.

The new Midland Railway compound, three-cylinders, designed by Mr. N. W. Johnson, is running now and giving good results, hauling good loads at high speeds.

Standard Details.

The June number of the Proceedings of the Pacific Coast Railway Club contains among other things some interesting answers to the question, "What steps have the leading railroads in the United States taken to introduce standard details for locomotives and cars?" The work done in this direction on the Southern Pacific is considerable, and shows the money saving in a properly applied system of standards. In one case 41 new patterns have displaced 592 old patterns, and in many instances the same standards for cars have been applied to locomotive tenders and other locomotive parts.

Ten-Wheel Compounds for the Canadian Pacific.

In our issue of August 15th we published a photograph and description of a ten-wheel, two-cylinder compound built at the shops of the Canadian Pacific for that company. The American Locomotive Company have recently built at their Schenectady works three engines for the same company with quite similar proportions but with certain essential differences worthy of note. The total weight of engine and tender is 8,575 lbs. less than the Canadian Pacific build, while the total weight of the engine is 2,525 lbs. greater. The American Locomotive Company's engine has 22 in. and 35 in. x 26 in. cylinders with piston valves as against 22 in. and 33 in. x 26 in. cylinders and slide valves on the engine described. The fire-box heating surface is 19,36 sq. ft. greater on the Schenectady engine, and the location of the sand-box, bell and whistle is slightly changed. The air reservoirs are in the usual place and not under the tender, and the guides of the Schenectady engines are of the four-bar type instead of the alligator type.

New Naval Dry Dock.

Bids have been asked by Rear Admiral Endicott, Chief of the Bureau of Yards and Docks, Navy Department, for the construction of a stone and granite dry dock for the new naval station at Charleston, S. C., the bids to be opened on Oct. 11 next. The dock proper and entrance will be of concrete with granite facing and coping with continuous waterproof courses of felt laid in asphalt, unless in the progress of the work it is found preferable to use piles under the entire dock. The dimensions of the dock are to be 643 ft. long and 144 ft. wide, with an entrance depth of 42 ft. The entire dock, including pumping plant and other apparatus, is to be \$1,200,000, and the amount appropriated and available for the work under the specifications now to be issued is \$850,000.

Pneumatic Ballast Spreaders.

The Chicago, Burlington & Quincy is building four Jordan earth and ballast spreaders with pneumatic attachments at its Aurora shops. Three of these will be for the road's own use and the fourth is for H. H. McDuffee, Sole Agent, Chicago. The Burlington has had one of these spreaders in use already for about a year. The Pittsburgh & Lake Erie is also building one with pneumatic attachments, and the St. Louis, Iron Mountain & Southern one with hand gear attachments. The Grand Trunk has six of these machines, three of which are operated pneumatically, and three by hand gear.

Troy Steel Company Reorganized.

The Troy Steel Products Company, a reorganization of the Troy Steel Company, on Breaker Island, N. Y., was incorporated Aug. 30 with a capital of \$1,750,000. The directors are Everett D. Arnold, of Yonkers; William Francis Donovan, of St. Louis; J. Russell Clarke, George

L. Olney and J. Hollis Gibson, of Brooklyn; Louis E. Freeman, of Orange, N. J., and Francis L. White, of Summit, N. J. Work was recently begun on rebuilding with the expectation of being ready Jan. 1.

Sterlingworth Car Company.

The new plant of the Sterlingworth Car Co., which is being built in Eddystone, Pa., will have a main building about 300 x 600 ft. The plant will be equipped with all modern appliances, and it is planned to build about 30 steel cars a week.

Second Track on the Chicago & North Western.

Probably the statement of the important increase of second track on the Chicago & North Western was obscured in our review of the annual report, by statements of more important facts. The company's main line from Chicago to the Missouri River at Council Bluffs (490 miles) is now a double-track road. The present double-track of the system amounts to 797 miles; namely, from Chicago to a point a little north of Milwaukee, from Chicago to a connection with the "Omaha" road at Elroy, Wis., and from Chicago to Council Bluffs.

The Iron City Spring Co.

D. C. Noble, for some 20 years Secretary and Treasurer of the A. French Spring Co., now a part of the Railway Steel Spring Co., associated with a number of Pittsburgh capitalists, has formed the Iron City Spring Co., with \$500,000 capital. The company was chartered under the laws of Pennsylvania some time ago, and the entire capital has been subscribed. The Fox plant of the Pressed Steel Car Co. at Fifty-third street, and the Allegheny Valley R. R., Pittsburgh, has been bought and arrangements are now being made to get the necessary machinery. It is expected to have the plant ready for operation about Jan. 1. The annual capacity will be between 12,000 and 15,000 tons of springs.

THE SCRAP HEAP.

Notes.

Passenger train No. 3 of the Northern Pacific was stopped by robbers near Sand Point, Idaho, on the night of August 25. The express car was blown open with dynamite, but it is said that the robbers failed to open the safe and went off without any booty.

On Saturday last the conductors and motormen of the Hudson Valley road, an electric line north of Albany, all struck, completely tying up the road. The press despatches say that the strike is due to an order by which the pay of the men has been reduced about one-third, or from \$1.87 to \$1.25 a day.

The capacity of even a four-track railroad has its limits, and we read that the New York Central is now putting in long side-tracks at three stations between Buffalo and Rochester, for the use of fast freight trains which run on the passenger tracks, and which, of course, must sometimes turn out for passenger trains.

According to St. Paul newspapers demurrage is to be systematically collected on freight cars at St. Paul and Minneapolis beginning Sept. 7, the Terminal Dispatch Association having been revived. On cars containing grain the rate is to be \$2 a day, which is twice the rate on other freight. A railroad officer tells the reporter that since July 1 the number of cars held by shippers for more than a reasonable length of time has been reduced 80 per cent.

A party of machinists from Indianapolis have secured the arrest of the President of the Union Pacific for false imprisonment, claiming that they were kept in a passenger car by an armed guard. The men were engaged at Indianapolis to work in the shops of the Union Pacific at Omaha and places farther west. They claim that they were misinformed as to the existence of a strike in the shops of the road, and that they were unreasonably deprived of their liberty after passing Council Bluffs.

Traffic Notes.

The Illinois Central has bought two steamships, formerly belonging to the Southern Pacific, which will be used to start a regular line between New Orleans and Havana.

The Interstate Commerce Commission has begun suit in the Federal Court at Los Angeles, to enforce its order, issued last June, requiring the Southern Pacific and the Atchison to abolish the rule forbidding shippers of oranges and lemons to designate the route over which their shipments to the East shall be sent.

A Philadelphia paper claims that the number of passengers carried between New York and Philadelphia over the Reading road, in July, was double the number carried in the same month last year. This increase is attributed chiefly to the increase in the number of express trains and the adoption of the uniform one-hour interval between trains.

Passes.

The propensity of some railroad officers to be very liberal with passes when politicians apply for them was recently referred to in these columns. In this connection, a New York passenger man says that since the restriction in exchange passes, which was adopted by the trunk lines at the beginning of this year, some politicians have gone so far as to obtain passes for railroad men, where the latter could not have got them directly. The Grand Trunk has caused renewed discussion of the exchange-pass agreement by inviting all of the members of the General Passenger Agents' Association to take a free ride over its lines to the annual meeting of the Association, which is to be held in Portland, Me., next month. According to a press despatch from Pittsburgh, Pa., Recorder Brown, of that city—the "Recorder" is, we believe, the Mayor—receives from 40 to 100 applications daily for railroad passes; and, from the tenor of the newspaper item, we judge that a good many of these applications are filed, by one railroad or another. Mr.