TECHNICAL.

Locomotive Building.

The Rhode Island Locomotive Works, Providence, R. I., are engaged upon an order for 10 locomotives for the Union Pacific.

The Richmond Locomotive & Machine Co., Richmond, Va., are enlarging their works by adding six new pits and other additions. They report the business outlook very encouraging, the orders so far this year being $20,000 more than for the same period last year.

Car Notes.

The Michigan Car Co., Detroit, Mich., is building 100 refrigerator cars of the Wickes pattern for the Fitchburg.

The Laconia Car Works, Laconia, N. H., have contracted with the Boston & Maine for 15 passenger cars with the Mann roof and also for 200 box cars.

The Keith Manufacturing Co., Sagamore, Mass., has contracted with the Boston & Maine for 200 flat cars, with the Fitchburg for 50 gondolas of 30 tons capacity and with the Shepaug, Litchfield & Northern for 50 box cars.

Osgood Bradley & Sons, Worcester, Mass., are building 15 passenger cars with the Mann roof for the Boston & Maine.

The Cincinnati, Indianapolis, St. Louis & Chicago has contracted with the Terre Haute Car Works, Terre Haute, Ind., to build 50 large cars for carrying carriages, furniture, etc.

The General Manager of the Canadian Pacific is reported as stating that his company will this year build 4,000 additional freight cars to meet the increased demand upon the rolling stock.

The Schenectady Locomotive Works has received an order from the Cincinnati, Hamilton & Dayton for a locomotive to weigh 97,000 lbs., to be used on the main line for hauling heavy passenger trains

Bridge Notes.

Two large bridges will be built on the extension of the Cape Fear & Yadkin Valley from Fayetteville, N. C., to Wilmington, one over the Cape Fear River at Fayetteville, and the other over the Black River near Wilmington.

The Mt. Vernon Bridge Works, Mt. Vernon, O., has been awarded the contract for building the bridges on the line of the Kansas City & Rich Hill, which is now under construction.

A bridge of iron superstructure, 12 ft. wide and 40 ft. long, will be erected at Knoxville, Tenn. Address T. A. Rambo, of Knoxville.

A bridge is to be erected over the Missouri River by the counties of Monora, Ia., and Burt, Neb.

The County Commissioners will erect a 60-ft. iron bridge at Wilkins, Wyo. No date specified.

The County Commissioners will erect a bridge, to cost $33,000 at Vernon, Tex.

An iron bridge will be erected over Pinhook Creek, at Huntsville, Ala. Address the Town Clerk of this place for details.

A 468 ft. bridge is to be erected over the Wisconsin River at Tomahawk, Wis.

Kerrick & Watson, of Minneapolis, Minn., have received the contract for bridge work on the Eastern Railroad of Minnesota.

The Union Bridge Co., of New York City, who have the contract for the Mexican National iron bridge over the Rio Grande, at Laredo, Tex., have commenced work on it and the sections will arrive in a few days.

The Louisville Southern is preparing plans for the bridge, 1,300 feet long, to be erected over the Kentucky River.

The Pittsburgh Bridge Works, Pittsburgh, Pa., have contracted to erect an iron bridge at Selbysport, Md., to cost $5,500.

Manufacturing and Business.

During the month of February the works of the Sharon Steel Casting Co., of Sharon, Pa., made nearly 150 tons of castings.

The Chicago Tire & Spring Works, of Chicago, Ill., which were taken out of the hands of the Receiver last December, have been turned over to the Chicago Tire & Spring Co., which is now operating them. The new company has a capitalization of $300,000, and started without liens or any other indebtedness. Substantial improvements in the plant have been made and the prospects for the future are now excellent, as litigation over the ownership of the works has been completely ended. The main office of the company has recently been removed to the Phœnix Building, corner Clark and Jackson streets, Chicago. Chas. H. Ferry is President and Treasurer.

The Wainwright Manufacturing Co., of Boston, report the following shipments of its feed-water heaters during the month of February: two to Fall River, Mass.; three to New York City; two to Providence, R. I.; two to Philadelphia; two to Louisville, Ky., and one each to Ware and Orange, Mass.; Portland, Me.; Rochester and Brooklyn, N. Y.; Port Richmond, Staten Island; Greenpoint, L. I.; Newark and Paterson, N. J.; Burlington, Vt.; Fayetteville, Tenn., and Fort Smith, Ark. The company has also recently issued a new illustrated circular.

The boats used on the Pennsylvania ferry across the Hudson River at New York have all been supplied with the Williamson steam steering apparatus. This is also to be put on the ferry-boats of the Hoboken Land & Improvement Co.

The North & South Rolling Stock Co., of East St. Louis, Ill., has been incorporated with a capital stock of $300,000, J. S. Barthold and others as incorporators.

Since Jan. 1, 1888, the Babcock & Wilcox Co., whose Chicago office is at No. 64 South Canal street, have, among many others, placed the following orders for boilers: Seaboard & Roanoke Railroad, Portsmouth, Va., 146 h. p.; American Tube & Iron Co., Middletown, Pa., 51 h. p.; Brazil, 88 h. p.; Edison-Swan United Electric Light Co., Limited, Loudon, England, 468 h. p.; Woodward Iron Co., Woodward, Ala., 3d order, 102 h. p.; Bird-Coleman furnaces, Cornwall, Pa., 3d order, 150 h. p.; Schenectady Locomotive Works, Schenectady, N. Y., 146 h. p.

Giles Bros. & Co., Chicago, Ill., report that the sales for their anti-magnetic shield for watches are rapidly increasing. They have recently received an order for 50,000 from a prominent case maker in Philadelphia, Pa. They further state that they are being officially adopted by various railroads for their employés, and an active demand exists from among engineers, mechanics, electricians, etc.

The Hussey Re-Heater & Steam Plant Improvement Co., 15 Cortlandt street, N. Y., are doing a general engineering and steam fitting business. They report business very brisk. They use the Hussey re-heater as a basis. The buildings of the American Starch Co., Columbus, Ind.; the Dutchess Hat Works, Fishkill Landing, N. Y.; the Nonotuck Paper Co., Holyoke, Mass.; the Fulton Sugar Refinery, Brooklyn, were piped according to the plans of this company. The company states that wherever the system has been applied an average saving in fuel has been made of over 25 per cent. This system can also be seen in operation at the Welles Building, 18 Broadway, N. Y.; at the Eagle Fire Insurance Co.'s building, 71 Wall street, N. Y., and at the Central Trust Co.'s building, 54 Wall street, N. Y.

The company is at present figuring on reducing the boiler capacity used in a large car shop. It is believed that one-half the present boiler capacity will do the work that is now being done. The company is making a specialty of erecting and remodeling steam plants, in connection with its system of re-heating exhaust and superheating live steam.

Proposals are wanted at Washington, D. C., until March 27, for furnishing at the Navy Yard, Washington, D. C., of five boilers of the Babcock & Wilcox pattern, having an aggregate of 1,040 horse-power, the boilers to be arranged in three batteries, there being four boilers in two batteries and one single boiler. Address James Fulton, Paymaster General U. S. Army.

The Bucyrus Foundry & Mfg. Co., of Bucyrus, O., has shipped the first of two powerful steam shovels for the Lake Shore & Michigan Southern. The company has a large number of other orders for steam shovels, dredges, wreckers and other machinery in this line, and the year opens with bright prospects. The company is also building a very large and powerful dredge for the United States government, and another for the Commissioners of the South Park, Chicago.

The Pratt & Whitney Co., Hartford, Conn., at the annual meeting elected the old board of directors.

Iron and Steel.

The Indianapolis Rolling Mill, Indianapolis, Ind., have contracted to furnish the Lake Erie & Western with 4,000 tons of steel rails, to be delivered at the rate of 1,000 tons a month, commencing in March.

The Chicago, Burlington & Quincy has ordered from the North Chicago Rolling Mill Co. 20,000 tons of steel rails.

P. Jones, Decatur, Ala., will receive bids for 72 tons of 16-lb. steel rails, 2¼ tons spikes, ½ ton of splice bars, 6,000 sawed oak ties, etc.

The Rail Market.

Steel Rails.—Eastern prices are given at $32 to $32.50, and little doing.

Old Rails.—Quotations are $21.25 to $21.50.

Truck Fastenings.—Spikes, 2.2c.; bolts and nuts, 3.1c., and splice bars, 2c., delivered.

Union Switch & Signal Co.

This company announces that it has determined to make a departure in the manner of supplying interlocking and signal apparatus. Heretofore it has been the custom for the company to contract to supply not only material, but the labor to erect the work ready for operation. Hereafter all bids will be for material with superintendence. In case it is desired that the company also erect the work, two bids will be made; one for material and one for erection. The company is led to take this step by the fact that managers of several railroad companies have asked it to furnish superintendents and allow the railroad company to utilize its own labor in erection, and thus make the cost of application less than it has generally averaged. The company will be glad to furnish plans and estimates for interlocking from those for a single switch to the most complicated combination, as well as plans for the arrangement of tracks and yards with reference to the use of interlocking apparatus. It asks particular attention to an improved apparatus for the protection of draw-bridges and grade crossings. The company also announces the perfection of an illuminated semaphore signal; that is, with the blade illuminated, so as to give a position signal at night as well as by day.

Signaling and Interlocking.

Mr. Charles R. Johnson, whose connection with the Union Switch & Signal Co. is severed, has established an office at No. 280 Broadway, New York, as consulting engineer in all matters relating to railroad signal appliances. He announces that he is prepared to furnish plans and estimates for signaling yards, junctions, stations, grade crossings, drawbridges, etc., and furnish bids and enter into contracts for the erection of the work.

He has decided to build works near New York, on the line of the Pennsylvania Railroad, where he has 12 acres of land adapted to the purpose, for the manufacture of signaling material, and when these are in successful running order, to build similar ones at Chicago. He states that he is satisfied, after a three years' residence in Pittsburgh, that the advantage in fuel there for this business is more than counterbalanced by the distance material has to be shipped, as most of the work is done at New York and the East, or at Chicago and West; and the new company will be formed under very favorable conditions.

Car Heating Notes.

A new system of continuous heating has been invented by Mr. Jas. E. Lewis, of Oil City, Pa., and will probably be shortly tried on the Allegheny Valley. Hot air is used instead of steam. An air pump, with steam and air cylinders much similar to that used for the air-brake apparatus, is located on the side of the boiler immediately in front of the cab. The cold air drawn into the pump is forced by the return stroke of the pump through a coiled pipe located in the steam space of the boiler, preferably in a special dome built for this purpose. The air is here heated and forced onward by the continuous action of the pump through well-protected pipes into other pipes which traverse the floor of the coaches. The car is warmed by the heat radiated from these pipes, which are open at the end of the train, allowing the escape of air that has parted with its heat and served its purpose. The patent includes also the use of a supplementary heater, consisting of a water-table with air-space; situated in the fire-box and directly over the fire, and taking the place of the brick fire-arch. The advantages claimed over the use of steam are: 1. The avoidance of condensation of moisture and consequent troublesome dripping or freezing of pipes. 2. The absolute control of the temperature of the circulating current by the regulation of the speed of the air pump and the possibility of quickly forcing the heat (or heated air) to the furthest portion of a very long train. It is also thought that, in cases of accident to pipes, the escape of hot air would contribute less to accident or panic among passengers, than the escape of a blinding cloud of steam. Mr. Lewis is a locomotive engineer of more than 20 years' experience, and feels assured that the general principle, aside from minor details of construction, is the correct one for the heating of cars, especially in very long trains.

Snow Screens on Russian Railroads.

The present winter has been one of the coldest Russia has experienced since the Crimean War. In the south, particularly, violent snowstorms have been of constant occurrence, and many railways have been blocked for days together. Russian railways only use to a limited extent the steam snow ploughs and other appliances in vogue in Russia, and for the most part reliance is placed on large detachments of laborers drafted into the district where the drifts prevail. Labor in winter time being cheap in Russia, no difficulty is experienced in obtaining a plentiful supply of men. Alongside those sections of the line where snow has a tendency to drift, of late years it has been the custom to erect rough screens of wood, consisting of palisades 2 in. apart, and extending sometimes for miles. This is found very serviceable for the protection of cuttings. Still better are hedges formed of fir trees planted closely together and kept well trimmed. These hedges, adopted first by the German railways in East Prussia, have proved very successful. The fir tree is very sturdy, enabling it to stand great pressure from the accumulated snow behind it, and its drooping branches readily shed the snow. When well planted and well trimmed, fir hedges form the best snow screens it is possible to have. The Germans, who are naturally careful foresters, have reared some splendid hedges along their eastern lines. In general, however, the Russian hedges are very carelessly kept.—*Engineering.*

A Steam Motor in Philadelphia.

A steam motor consuming its own smoke is about to be tried on the lines of the Cable Traction Co., in Philadelphia. Similar motors are largely used in England and the English Colonies, and are claimed to be cheaper, more reliable and better adapted to frequent curves and changes of grade than either electrical or cable traction. The speed is also said to be higher than can be obtained with horses, and the cost per mile is less, wherever fuel can be procured at a reasonable price. The cars can also be constructed of larger size, capable of giving seats to all who desire to ride.

The New Departure in Puddling Iron.

The experiments at the Milwaukee works of the North Chicago Roling Mill Co., showing that molten iron direct from the blast furnace can be as successfully puddled as by the old way of remelting pig iron, promise a notable economy in fuel and in labor. Although the economies are not yet made public the success of the operation seems assured, as the quality of the iron produced is excellent. A muck bar is shown which was drawn down in the blacksmith shop to about ½ in. by 2½, one end of which was bent over and hammered flat hot, and the other end bent over and hammered flat cold. The bar was made from Lake Superior ores, but showed no evidence of red shortness, though such irons are usually red short when puddled in the ordinary way. The cold test showed the tough, fibrous structure characteristic of Lake Superior iron. In addition to the saving of fuel and puddlers, time, there is less silicon to dispose of than where the iron is run into pigs. So far the furnace, which is tapped much oftener than usual, is working well, and there seems no reason why this method should not continue to be successful. It will cheapen rolled iron and enable it to continue competition with the softer grades of steel which have so seriously injured the rolled iron trade in England.

A Method for the Estimation of Manganese in Steel.

The following note by Frank Julian was read at the Boston meeting of the Am. Inst. of Mining Engineers.

The determination of manganese by precipitation with potassium chlorate from a solution in concentrated nitric acid, filtration through asbestos, and solution in a reducing agent whose excess is estimated, is open to the objections that the filtration and subsequent solution of the binoxide are apt to be very slow, and that the asbestos may (according to Trollius), unless perfectly purified, affect the titration. In the following modification, filtration is avoided. I give the method as I use it for Bessemer steel.

In an 8-ounce Griffen beaker dissolve 1 gramme drillings in 15 c.c. nitric acid (1.2 sp. gr.). Evaporate to 5 c.c.; add 20 c.c. concentrated nitric acid and precipitate with chlorate as usual, avoiding a large excess; then add successively 5 c.c. concentrated nitric acid, about 60 c.c. warm water and 10 c.c. of the oxalic solution; stir until of a clear light yellow color, and titrate with permanganate while the solution is at about 70° C.

The binoxide should dissolve immediately when the oxalate is added. The titration is rapid, and the end-reaction easily caught after a little practice. The standard solutions used are: 15 grammes crystallized ammonium oxalate to a litre, and 1.6 grammes potassium permanganate to a litre.

For standardizing the permanganate, to 10 c. c. of the oxalic solution is added 50 c. c. of hot water, and a solution of 1 gramme of steel in concentrated nitric acid, from which the manganese has been removed by potassium chlorate and filtration through asbestos.

I have made a large number of determinations in steel, pig-iron and ore with very satisfactory results for technical work, these being generally from .02 to .05 per cent. lower than by standard gravimetric methods; and the rapidity with which results can be obtained is greater than in any other method with which I am acquainted.

Stampede Tunnel.

Nelson Bennett during the month of February made a great record in this work. The east end was driven 263 feet and the west end 262 ft., a total of 525 ft. Both ends carried wall plates and were timbered close to the heading the entire distance.

A Canal between Lake Michigan and Lake Superior.

A canal is projected of some 40 miles, from the head of Big Bay de Noc, Lake Michigan, to South Bay, in Lake Superior. The aim is to enable the traffic between Lake Superior and Lake Michigan to avoid the Sault and the Straits of Mackinaw, and it is said that fully one day of steaming would be saved. The newspaper reports put the estimated cost of the canal at 5 millions, but it does not appear that anything but the most superficial surveys have been made.

Westinghouse Brake.

The Westinghouse Brake Co., finding that their 8 in. pump gives considerably better results than the 6 in. style, have adopted the former as their standard pump, and will furnish it in all cases hereafter, unless otherwise ordered.

Hereafter all orders for new equipment for engines and tenders or for cars will be filled with the new improved form of apparatus, quick acting triple valve, etc., unless instructions are given to the contrary. It is found that this apparatus will work in a satisfactory manner in connection with the existing system. The triple is now inclosed in a casing solid with the back cover, instead of being placed on the auxiliary reservoir.

The Delaware, Lackawanna & Western is about to fit a large number of refrigerator cars with the Westinghouse freight brake.

The Westinghouse Train Signal.

This pneumatic signal has been introduced on the Louisville & Nashville, and on the East Tennessee, Virginia & Georgia.

A Single Rail Line in Ireland.

A writer in a late number of the London *Daily News* describes a single rail railroad of 10 miles working from Listowel to Ballybunnion, in County Kerry, Ireland. The engine and cars are hung saddle-bag wise on a centre rail, with side rails below, against which horizontal rollers bear, keeping the vehicle upright. The floor of a carriage is said to be about 3 ft. below the level of the centre rail. The arrangements for road crossings and switches are not very clearly described, but a section of the track structure is evidently turned aside for either purpose. The locomotives weigh in working order 0½ tons without the tenders. The rolling-stock is fitted with the Westinghouse brake. The writer states that the oscillation of the cars was slight, but