

transversely and longitudinally to allow each post to rest on the bottom independently of the others. These piers were loaded down by laying steel rails across the girts. The structure was remarkably rigid, and answered the purpose very satisfactorily.

The report is signed by J. P. Carty, Chairman; O. I.

other may be traced by following the line of the "industrial" railroad, which runs to every part of the works. This railroad, which is of 21 in. gage, is indicated on the plan by a solid line, with crosses in circles at the points where there are turntables. This track is for transferring heavy articles on four-wheel lorry cars and the mate-

250 h.p. Westinghouse engine, direct connected to a 200 k.w. General Electric generator of 250 volts. Steam is supplied by two boilers, each of 200 h.p., made by Altmann Taylor Company, and the fuel is bituminous coal. All the buildings are heated by exhaust steam. Water is supplied by driven wells and a supply is stored



Fig. 4.—Shops of the Pneumatic Signal Company, Rochester, N. Y.—Looking Southwest.

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New Shops of the Pneumatic Signal Co.

The Pneumatic Signal Company, of New York and Rochester, has lately completed at Rochester extensive new shops for making signals, and the plant is now running, employing about 360 men. The works are situated about two miles west of the center of the city, and the

material for it was furnished by Arthur Koppel. Beginning at the sand and coal storeroom, into which the material is deposited from freight cars, this track runs to the cupola room, to the molding room of the foundry, to the core room, to the tumbling room, to the casting store room, and thence to the machine shop. In this shop the track makes a complete circuit, as shown. The store room for finished materials has three tracks its whole length. The branch track between the machine shop and the store room runs to a lift bridge which connects the main shops with the carpenter shop. The location of this bridge is indicated by the dotted line.

All of the buildings are of brick with roofs supported by metal trusses. The floors in all of the buildings except the foundry and the carpenter shop are of cement, and the rails of the industrial tracks are laid with tops flush with the floor.

From the machine shop the lorry track runs to the forge shop. The line extending eastward from this shop runs through the metal store yard.

The power for running the machinery is produced by a

reservoir in the ground, as shown, and also in a tank holding 50,000 gallons which is on an iron tower 100 ft. high, providing pressure for fire purposes. The ordinary pressure is 50 lbs. per sq. in., and this is carried throughout the grounds by 8 in. pipe lines. There are 10 fire hydrants, each housed in a small cabin containing the hose and tools. In case of fire the pressure can be increased to 100 lbs. per sq. in. by the use of the larger of the two pumps in the engine-room. The water tower was built by the United States Wind Engine & Pump Co.

The iron for the foundry is melted in a 10-ton cupola and at present about 10 tons of castings are made daily. There is an overhead trolley track for distributing the loaded ladles. This appears in Fig. 3. Adjoining the cupola room is a separator for washing the slag and saving the iron therefrom.

The machine shop is so designed as to give an abundance of light in all parts. A transverse section of this building is shown in Fig. 2. The space beneath the gallery is used mostly as a storeroom for small finished articles and as tool room. Those parts of the main floor at the sides, beneath the side galleries, are well lighted by the windows in the wall, and on all other parts an abundance of light falls from the one center and two side skylights, as shown. These skylights are continuous the length of the building, and those on the sides are so situated that even the space under the central gallery is pretty well lighted.

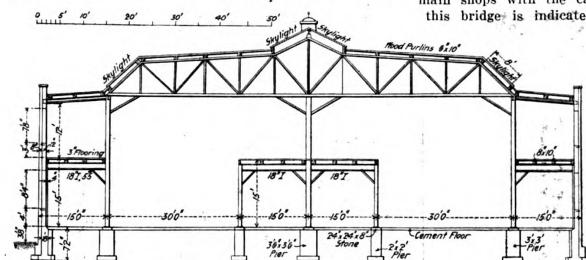


Fig. 2.—Transverse Section Through Machine Shop.

main line of the New York Central lies a few rods to the north. The arrangement of the buildings is shown in the drawing. The railroad tracks leading out of the yard at the east end converge into a connection with a freight track owned jointly by the three railroads entering Rochester—the New York Central, the Pennsylvania, and the Buffalo, Rochester & Pittsburg; so that the facilities for receiving and shipping freight are all that could be desired. The track connecting with the Charlotte line of the B. R. & P. at the west side of the grounds is on a trestle, level with the main line but 20 ft. above the level of the yard, so that coal, most or all of which is received by this line, is unloaded into the bins without lifting. All of the standard railroad tracks in the yard, except this coal track, are so graded as to bring the car floors on a level with the shop floors.

The principal buildings consist of a foundry 288 ft. x 60 ft., with adjacent store rooms, core room, tumbling room, and sand and coal storehouse; a machine shop 240 ft. x 120 ft., with galleries; a store room 240 ft. x 60 ft.; a carpenter shop 110 ft. x 60 ft.; a pattern shop 50 ft. x 60 ft., and a forge shop 135 ft. x 60 ft. The situations of the different buildings as related to each



Fig. 3.—Foundry.

It will be noticed that the brick side walls of this building rise about 2 ft. above the level of the roof; rain water is conducted to the sewers by pipes running down inside the main wall. The machines in the machine shop proper number 69, and the total number in the works is about 150. There are seven planers, 16 lathes and 28 drill presses. Of electric motors there are eight, and there are no long lines of shafting.

The largest multiple drill press, No. 30, made by Prentice Brothers, drills at once eight holes each $1\frac{1}{2}$ in. in diameter. This and the other presses of this size also turn $\frac{7}{8}$ -in. pins at the same rate. Each of these machines is run by a 5 h.p. motor. Smaller machines are grouped and run by motors of suitable size. Planer No. 5, made by Putnam, has an attachment to plane on curved lines, and is used to finish the inside surfaces of the links for mechanical signal levers and also for planing the segments. Two 48-in. planers made by G. A. Gray & Co. are used for planing locking plates. One of these machines planes 36 surfaces at once. Each machine has an independent motor.

Many of the machines are new, though a large number came from the shops at the company's former headquarters in Troy. The care and discrimination with which machines have been selected for particular uses is indicated by the fact that the inventory shows the names of 48 makers, and there are numerous items marked "no name" or home made.

The office building is of brick, three stories and base-

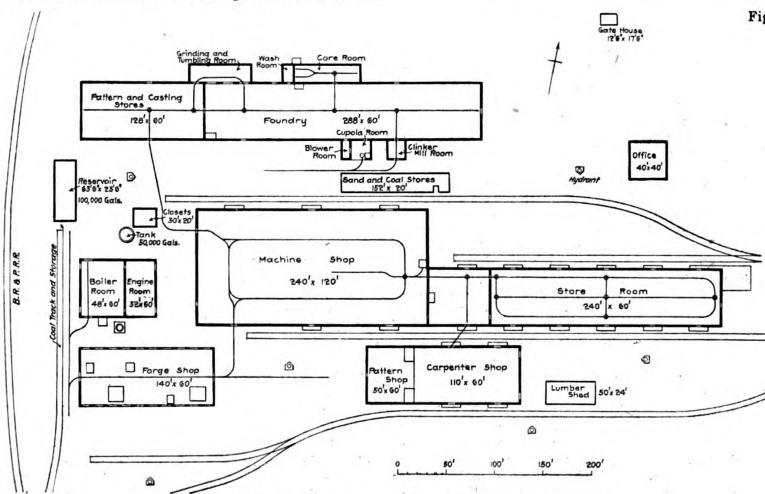


Fig. 1.—Plan of Pneumatic Signal Company's Shops, Rochester, N. Y.

ment. This building is occupied by Vice-President Charles Hansel, Chief Engineer F. L. Dodgson, Superintendent W. W. Lavarack, Assistant Treasurer J. R. Coleman, and Purchasing Agent H. C. Frey; and by the drafting and electrical testing departments. The latter is well equipped for making all desired tests of electric signal apparatus. •

You Can't Have Too Many Grab Irons."

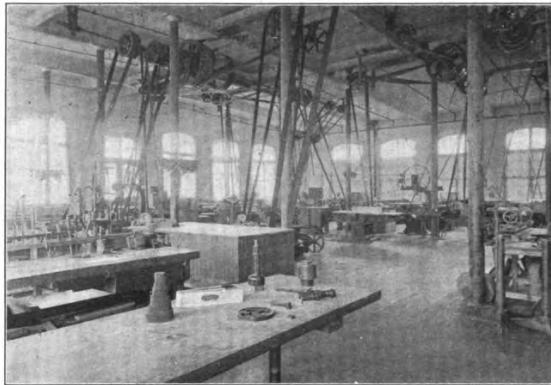
At the Northwest Railway Club's discussion of grab irons on locomotive front ends, an old trainman on the Northern Pacific, J. S. Page, was invited to speak, which he did fluently in a breezy address that is mainly valuable for its picture of a trainman's work.

"Mr. President and gentlemen, as a trainman I have been in service about 21 years. My experience is you can't have too many grab irons, if you have them all over the car. I have seen many a man killed because there were no grab irons. A grab iron is a very small expense. A grab iron on the front of the engine, I think, is a necessity. There will never be a time when men won't get on the front of the engine unless there is an order from the superintendent that he will be discharged if he does. I am running a train where we have nearly all spurs, and we make a great many 'flies,' and the brakeman has got to stand on the pilot somewhere, or on the car ahead of it in order to cut the car off. Now, if he has no grab iron or steps on the pilot, and no lever to lift the lock to open the coupler, he has got to get on the front car; he stands on the brake with his feet, if it is an outside hung brake and holds onto the end of the grab iron and pulls the lever out and releases the car

amount of work as a switch engine you have to work a great deal quicker. I can't see but what the more grab irons you get on cars, no matter where you get them, the safer it makes it for the men to handle the cars. You don't need more irons on the side of the cars; the ladders on the cars make a grab iron; you don't need a grab iron on the side, unless it is a flat car. The new style of flat car has got a step for a grab iron on the end; it is called the ladder step, where they get on the end of the car. My experience is you want knuckles on both ends. I have had experience with all of them, and you need all of them; more on the road than you do on a switch engine."

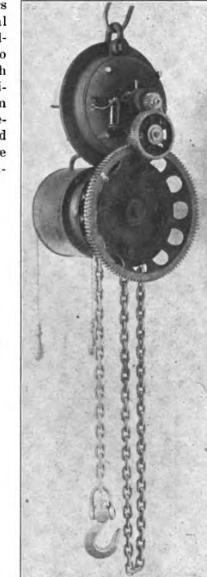
New Foundry and Pattern Shops of the B. F. Sturtevant Company.

A plan of the new plant of the B. F. Sturtevant Company at Hyde Park, Mass., was shown in the *Railroad Gazette*, Oct. 17, 1902. The article accompanying the plan explained the controlling conditions and the reasons for the arrangement and construction of buildings adopted; also a general description of the buildings and the methods to be used was given. With two or three slight modifications the plan then shown has now been executed. The foundry and pattern departments were the first to be put in opera-



Pattern Shop.

when it is going, and the other man pulls the switch. I never ran a train on the N. P. that didn't make from one to five 'flies'; and lots of times one brakeman makes the 'fly' alone. It is all down hill; he can start the car, standing on the pilot, pull the bar, let the engine run down, jump off and throw the switch. Now, they stand on the pilot, and they will stand on the pilot just as long as there is a pilot on an engine. My men do it every day in the week, and half a dozen times a day. There is a space runs down from the draw-head to the pilot—about that far; it makes a good step right on the nose of the pilot; they will get on there just as sure as the engine comes to them, and if you have got no grab iron there, there is nothing to catch, but they grab the chain that lifts the block, or grab around the drawbar itself. If you have not got a grab iron, or step there for them to stand on, there is just that much more danger. Now, a switching engine in a switching yard where they have time, and have good ground to go over, is not like a road engine. A road engine should have better appliances for saving the men than a switch engine; they have to make all kinds of plays to do the work quickly; they need all these appliances much more than a switching engine. A road engine ought to have a footboard all around to make it safe. They have got to get onto the engine; they will get on the cab, and when they come up to the car they have got to run the length of the tank to get back to the car they're coming up to; they don't want to stop the engine in all cases; sometimes they will stumble when the snow is sliding down on the bank; if there is a footboard there they will get on and they will run the length of the engine, pull the knuckle pin when the engine is going and they won't have to stop the engine. Now, if you are going to have a solid drawbar, that engine has got to stop, because he has got to go to the box car and open the knuckle. Now, on the front end of the engine, if it is a solid knuckle, there is a loss of time; you are coupled onto the car, the block won't raise, the block won't disconnect; what are you going to do? You have got to take a bar and work five or ten minutes before you could get that lock block up. Very frequently that happens; take 10 or 15 minutes on the road; you are delaying trains. If you come to a sharp curve you have got to open both knuckles in order to make your coupling on the curve. If one knuckle is solid, you have got to back the train down to the straight track before you can uncouple the engine. If a road engine does the same



Sturtevant One-Ton Electric Hoist.

tion prior to the removal of the entire plant from Jamaica Plain, Mass.

The pattern building is divided midway of its length by fire walls enclosing stairs, elevators, etc. One-half the building, with stories respectively 17 and 15 ft., is devoted to the flask and pattern-making rooms, while the other half, provided with intermediate floors—four in all—is for pattern storage. The flask-shop, 60 ft. by 80 ft., is equipped with band, cross-cut and splitting saws, boring machine and lathe, all driven by a 10-h.p. Sturtevant motor suspended from the ceiling. An industrial railroad runs directly into this room from the foundry, and together with an over-head transfer truck reduces to a minimum the cost of handling flasks. This room also includes the metal pattern-makers' department equipped with the necessary machine tools. Adjacent to it is the locker, wash and toilet room for the building.

Immediately above, is the pattern shop abundantly lighted upon three sides and equipped with a full complement of tools including one single and two double saw benches, two band saws, a buzz planer and a double surface planer, five lathes—one a 66 in. x 11½ in. gap lathe—drill press, a core-box machine, numerous wood trimmers, etc. All the power machines are driven by two 10-h.p. Sturtevant motors, both being required for ordinary work, but always serving as a possible relay in case of accident.

The benches, which accommodate two men each and are 2 ft. 6 in. wide by 16 ft. long, are so arranged along the sides of the building that the men receive a left-shoulder light. Behind each bench is a working table 4 ft. wide by 16 ft. long. The benches are supported by cast-iron legs of special design, built by the Sturtevant Co., the same design being used throughout the plant. They are equipped with Emmeri vises and their tops are heavy maple plank. A drying chamber for glued work is provided.

Around the pipe columns which support the floors of the pattern storage end of the building are clamped the pattern shelving brackets which are adjustable to any height. All patterns are consecutively numbered upon the drawings as made. When the patterns are delivered to the pattern storage department proper locations are assigned and records made upon cards, one for each pattern. These cards are filed in the order of the pattern numbers. Four figures with the addition of a letter are sufficient to locate a pattern. A given location, for instance, may be 2125B; that is, it is upon the second floor,

as shown by the first numeral, it is in the twelfth row of shelves and the fifth division of that row, and on the B level, the floor level being A, and the letters B, C, D, etc., indicating the shelves in their order above.

The first floor is concrete and is for heavy cast-iron patterns. It is served by an industrial railroad and turntable for transfer to the elevator and thence to other floors. Communication between the pattern shop and storage department is direct, while the fire risk is reduced to a minimum by a double system of fire doors.

Brick division walls 3½ ft. high running lengthwise of the foundry separate the floors on the lines of the columns. Lighting is secured through monitors in both of the craneways and through side windows. Each line of monitor transoms is operated in unison by a novel device of the G. Droune Co. The western side of the foundry is for bench and small floor moulding, the bench moulders' floors being separated at the bench ends by wooden partitions. The floors in this side of the building as well as those in the storage bins and center runways are concrete. Alongside the industrial railroad, which serves iron from ladle trucks to the bench floors, is a sunken trench, laid with common brick, for drippings and for piling hot castings.

In the center line of each of the craneways and in the bent between them is an industrial railroad with turntables connecting with the cross aisles, for the distribution of metal, etc., to all parts of the building. The floor between the craneways is supplied with a series of 1½-ton small traveling cranes of 10-ft. span equipped with Sturtevant electric hoists built especially for this work. All materials are received from a track which runs along one side of the foundry and are delivered through wall openings to bins.

An ingenious system of charging has been devised by which the charging cars pass at floor level in front of the bins, are loaded, weighed, and passed to the elevator to be raised to the charging floor. As each car is unloaded it is pushed forward and started down an incline in a direction opposite to that traversed on the floor beneath. A novel apparatus gradually brings it to a standstill while yet on the incline, and then releases it so that it may, by its own weight, roll onto an elevator which is



Bench Moulder's Floor.

automatically tripped and descends to the ground floor level.

There are two Whiting cupolas 56 in. and 72 in. in diameter respectively. A No. 8 and a No. 10 Sturtevant pressure blower driven respectively by a 30 and a 40-h.p. Sturtevant belted motor are supported upon the charging platform and discharge directly downward to the cupolas. It is intended to make this installation the subject of critical experiment for the establishment of important principles.

The entire transportation equipment, including tracks, turntables, cars, trucks, etc., was designed and built by the Sturtevant Co. The tracks in the foundry are imbedded in concrete runways and all changes of direction are by turntables, there being no switches in the works, and therefore no radial truck cars, all cars having rigid bases. The cars have a special type of ball bearing which is practically devoid of machine work, but with chilled wearing surfaces. The ordinary flat cars as well as the charging cars are built of structural steel. The geared ladle cars have malleable-iron frames and enclosed spur gear mechanism. Similar construction is used in the case of the transfer cars for geared crane ladies of medium size, while a simple low-platform truck is used for the largest crane ladies. The dump cars are in the form of inverted cones and so balanced as to be tipped with the utmost ease. The taper of the cone is such that these cars are practically self-dumping.

The brass foundry, at one corner of the main building, has four crucible furnaces and a special form of reverberatory furnace designed principally for the melting of babbitt or similar soft metals. An overhead traveler with interlocking transfers on the side floors serves the moulding area of the room. Blast for the furnaces is furnished by a No. 3 Sturtevant "Monogram" blower and the entire machinery, consisting of a sprue cutter, a magnetic separator, a tumbling barrel and emery wheels is driven by a 5-h.p. Sturtevant motor attached to the wall. The entire floor is concrete in which is imbedded a section of the industrial railroad communicating with the rest of the foundry.

In the middle of the end of the foundry is the core room. There are six ovens, three being 7 ft. in diameter, of the reel type, and three being respectively 4, 5 and 7 ft. wide by 8 ft. 10 in. long, provided with cars. An overhead traveling crane serves these latter ovens. A part of the room is partitioned off for the women core-makers employed. The floor is concrete. The tops of the ovens