

this long stretch of shed, the danger of great loss and delay due to fires constitutes a continual menace to operation. To take care of this an elaborate system of watchmen has been devised, who are in communication with each other and with various intermediate points by telephone. There are seven of such watching or look-out stations, at which watchmen are stationed day and night, and from one of these stations—Red Mountain—several miles from the track and 2,000 ft. above it, nearly the entire line of sheds is visible. There are maintained at all times three fire trains, one at Blue Canyon, one at the Summit and one at Truckee, and a fourth, during the driest part of the summer at Cisco, making one fire train at each end of and two near the middle of the sheds. These fire trains are always ready, with steam up and crews at hand. Each consists of a locomotive, fire fighting brigade and water cars which, with the prompt notice received, can reach any point in the snow-sheds within a very few minutes and extinguish a fire with little difficulty; for instance, during the past summer, the total fire loss has been negligible—not over \$100.

In spite of all precautions, however, a blaze will sometimes get under way and destroy some miles of shed before it can be checked. In such cases it has been found by the Southern Pacific that the only sure way to head it off is to tear down 50 to 100 ft. of the sheds, which prevents the remainder from acting as a chimney and drawing the flame along.

The recurrence of these fires, with heavy property loss and traffic delays, suggested the idea of supplying gaps at suitable intervals along the line of snow-sheds which can be closed up before the winter snow storms set in. This consideration brought out the design illustrated in the accompanying photographs and drawing. The gaps, or telescopic sheds, consist of either one or two sections, 50 ft. long, of movable shed run on wheels on a track having a gauge of 16 ft. 8 in., the rails being supported on sills outside the regular track ballast line of the main railroad track. These telescopic pieces are arranged to run inside a section at one or both ends of the gap, built larger for that purpose.

During the winter, the sections are closed, and extra braces are bolted on, so that the shed is then continuous and of practically the same construction throughout. As soon as the heavy storms are over and the snow has about ceased falling for the winter, the braces are removed and the telescopic shed is slid into the adjacent large section. A switch engine, a few men with block and tackle or a work train furnishes the power.

These movable or telescopic snow sheds are intended eventually to be placed at distances of from 2,000 ft. to a half mile apart, in places favorable to their location. They are not necessarily built upon tangents; in fact, several of them are upon curves, but the curvature of the track must be unchanged over the gap and within the enlarged section of the adjacent shed. The Southern Pacific now has in position some 16 telescopic sections, and so far they have proved successful in stopping the progress of any fire which has gotten beyond control and should be an efficient means of preventing the destruction of more than one section at a time.

A New Type of Air Compressor.

The Chicago Pneumatic Tool Company is making a new type of air compressor at its works at Franklin, Pa. It is designed to meet a demand for an efficient, simple and compact compressor at a moderate price. It is made in

cross-head guide is bored out and provision is made for catching and removing the drip from the bearings and stuffing boxes. Compressors having cylinders, 8 in. in diameter and larger are furnished with or without a sub-base. With the sub-base, the compressor is self-contained, is easy to erect and requires a less costly foundation.

The air cylinder and heads are completely water jacketed. The steam valves on cylinders under 12 in. in diameter are of the plain slide type. Cylinders larger in diameter than 12 in., have the Meyer gear with adjustable cut-off valves. The air valves are poppet valves, made from high grade steel, with removable seats and guides. They are easily renewed or repaired and are effectually prevented from entering the cylinder in case of breakage. They are placed radially in the cylinder and seat themselves accurately, thus reducing the wear to a minimum.

The pistons are solid, with cast-iron spring rings, accurately fitted; and the piston rods are of the best machinery steel. The shaft has heavy crank arms, is of ample diameter and is made of the best open-hearth steel. The cross-head is cast-iron and has adjustable shoes, top and bottom. Open-hearth steel is used for the connecting rod which has bronze cross-head pin boxes with wedge adjustment. The crank-pin end has a marine type box, lined with babbit metal.

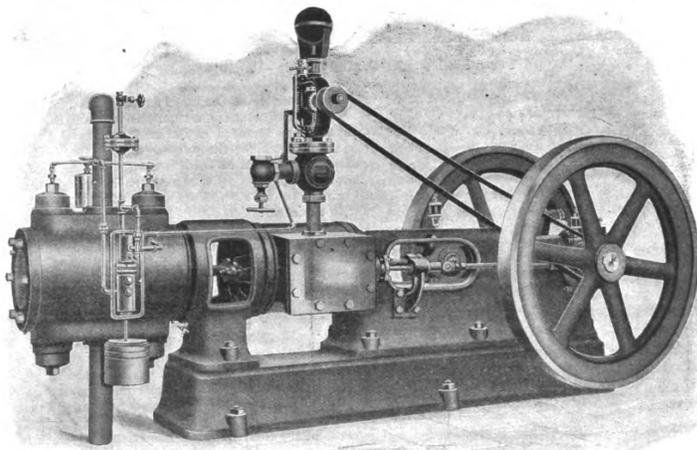
Each compressor has two fly wheels, keyed to the shaft and of sufficient weight to insure smooth operation. An unloading device is provided to relieve the machine of all load when the desired air pressure is obtained and to automatically cause it to resume delivery when the storage pressure becomes reduced. In addition a pressure-regulating governor, working in connection with a speed governor on the steam end, controls the speed and output of air of the machine in accordance with the demands made on it. Provision for indicator connections is made on both the steam and air cylinders.

Each compressor is subjected to a working test before shipment. Although designed primarily to supply air for pneumatic tools in railroad and machine shops, foundries, ship yards, and stone yards, they are equally suitable for actuating rock drills, coal cutters and other machinery in mines, tunnels, and quarries, for pumping water by the air-lift system and for similar purposes.

Progress in the Use of the Block System.

On the opposite page is a table bringing up to the present year the data concerning the use of the Block System for spacing trains which has been given in the *Railroad Gazette* in past years (Feb. 27, 1903; Jan. 11, 1901; etc.). The totals of the several columns may be summarized as follows (miles of road):

Automatic—		
Single track	964.6	
Double track	3125.7	
Four track	301.0	
		4391.3
Manual—		
Single track	28508.2	
Double track	5796.3	
Four track	702.6	
		35007.1
Automatic and manual, total		39298.4
Deduct three-track lines entered twice	116.5	
Deduct joint lines included twice	18.0	
		134.5
Total on which block signals are used		39263.9



New Type of Air Compressor of the Chicago Pneumatic Tool Company.

a variety of sizes and styles, either single, duplex or compound, and steam, belt, chain, or electric-motor driven. The smallest size has a capacity 30 cu. ft. of free air per minute. The frame of these machines is of box section, designed with a large factor of safety to withstand the stresses induced when running under maximum load. The

Deduct lines on which block signals are used partially or only for pass. trains, namely:

Buffalo, Rochester & Pittsburg	362.0
Chicago & Alton	518.8
Chicago, Milwaukee & St. Paul	4301.3
Delaware, Lackawanna & Western	699.1
Grand Trunk	197.9

Michigan Central	180.0
Norfolk & Western	180.4
Rio Grande Western	7.0
Southern	5935.0
	12382.5

Net mileage of road worked wholly by the block system 28881.1
Some comparisons with the totals of one year ago will be found in the editorial column.

NOTES ON THE TABLE.

Atchison, Topeka & Santa Fe.—Of the manual block signaling on single track, about 41 miles is controlled manual, being worked by the electric train staff.

Baltimore & Ohio.—The item representing proposed new work is the same as that reported last year. No definite date has yet been set for carrying out the improvements.

Boston & Albany.—Of the 137.9 miles double track 51.4 miles represents sections, mostly short, where in many cases the eastbound track is signaled but the westbound is not, or vice versa. The total mileage reported by this company appears to indicate that there was an error in last year's figures.

Buffalo, Rochester & Pittsburg.—On this road the block signals are used ordinarily for the protection of passenger trains, but in thick weather freight trains also are run by the block system.

Central of Georgia.—In this item is included six miles of line used jointly with the Atlanta & West Point, and six jointly with the Southern Railway.

Central of New Jersey.—Only a part of the new work proposed a year ago has yet been carried out.

Chesapeake & Ohio.—Of the single track mileage on the Chesapeake & Ohio, 256 miles is manual controlled, and seven miles is manual controlled by means of the electric train staff.

Chicago, Burlington & Quincy.—Of the proposed new signaling, which is to be manual, 300 miles is for single track lines and 270 miles for double track.

Chicago, Milwaukee & St. Paul.—The two items set against this road, aggregating 6,848 miles, represent the whole of the lines of that company. On the mileage shown in the second item, passenger trains are block signaled at all times, but freight trains are spaced by the time interval when it is not convenient to enforce the block system.

Cincinnati, New Orleans & Texas Pacific.—A small part of the 306 miles single track is worked by the electric staff, and not by automatic signals.

Delaware, Lackawanna & Western.—On the 699.1 miles where manual signals are used the block system is ordinarily employed only to protect passenger trains.

Erie.—Forty-four miles, including the four-track portion, is worked by controlled manual signals.

Erie.—In the table published last year, the New York, Susquehanna & Western mileage was included in the Erie. The difference between the present and the former figures is accounted for partly by this and partly by the correction of an error.

Grand Trunk.—Block signaling on the lines of this company is employed for the protection of passenger trains only. This method is in force on all of the lines of the Grand Trunk east of the Detroit River; that is to say, all of the mileage in Canada and that in the table, which represents the lines in Maine and New Hampshire.

Illinois Central.—The six-track and eight-track lines are so entered as to make the total too large; the actual length of line represented is 151 miles.

Michigan Central.—On the 180 miles signaled with manual signals the block system is used ordinarily to protect the rear of passenger trains only.

New York Central & Hudson River.—The proposed new signaling is for 96 miles of single track and five miles, double track, manual signaling; and five miles, double track, automatic signals.

New York, New Haven & Hartford.—Of the manual block signals on the double track and on the four-track road of this company, 229 miles is controlled manual. Of the proposed new work, 20 miles represents automatic signals, double track, and 11½ miles represents manual signals, part double track and part four-track.

Norfolk & Western.—The proposed new mileage represents automatic signals for the Radford division.

Pennsylvania.—The 18 miles of proposed new work represents automatic signals for four-track lines, presumably to take the place of manual signals.

Pennsylvania Lines West of Pittsburg.—The proposed new work is the same as that shown in the table of last year. The apparatus and equipment has been partly made ready, but none is yet in use.

Pittsburg & Lake Erie.—The proposed new work is automatic signaling for double track lines, to supersede manual block signals.

Pere Marquette.—The proposed new work is automatic signaling for single track lines.

Rio Grande Western.—The block signals are used only for the protection of passenger trains, at the rear, moving in one direction only.

Southern Pacific.—Of the new work proposed, 97 miles will be single track, automatic, and 24 miles double track, automatic. The new signals in Texas are to be automatic, on single track.

Southern Railway.—On the 5,935 miles represented in the second item, the block systems are used for the protection of the rear of passenger trains only.

Wabash.—Of the proposed new work, which is all manual signaling, 404 miles will be single track and 10 miles double track.

MILES OF RAILROAD WORKED BY THE BLOCK SYSTEM. JANUARY 1, 1904.

	Automatic			Manual			Total	Proposed
	Single track.	Double track.	Four track.	Single track.	Double track.	Four track.		
Atchison, Topeka & Santa Fe.....	11.0	25.0	.....	960.8	68.0	.....	1064.8	.....
Atlanta & West Point—jointly with Central of Georgia.....	.....	.....	.....	.....	6.0	.....	6.0	.....
Atlantic City.....	.....	55.0	.....	38.2	.....	.....	93.2	.....
Atlantic Coast Line.....	.....	.....	.....	302.0	.....	.....	302.0	30
Baltimore & Ohio.....	2.5	96.6	.....	131.8	516.1	1.5	748.5	200
Baltimore & Ohio Southwestern.....	.....	.....	.....	.....	27.8	2.8	30.6	.....
Bessemer & Lake Erie.....	.....	.....	.....	153.7	37.9	191.6	383.3	.....
Boston & Albany.....	.....	137.9	16.0	.....	.....	.....	153.9	some
Boston & Maine.....	2.5	101.5	2.2	.....	111.7	.....	217.9	.....
Buffalo, Rochester & Pittsburg.....	.....	.....	.....	363.0	.....	.....	363.0	.....
Central of Georgia.....	.....	.....	.....	64.0	.....	.....	64.0	.....
Central of New Jersey.....	.....	138.4	32.0	.....	.....	.....	170.4	50
Chesapeake & Ohio.....	.....	.....	.....	870.9	154.4	.....	1025.3	.....
Chicago & Alton.....	272.0	44.7	.....	518.8	81.8	.....	917.3	.....
Chicago, Burlington & Quincy.....	.....	4.0	6.0	200.0	200.0	.....	410.0	570
Chicago & Eastern Illinois.....	8.0	.....	.....	604.0	113.0	.....	725.0	.....
Chicago Great Western.....	.....	.....	.....	190.0	4.0	.....	194.0	580
Chicago, Milwaukee & St. Paul.....	9.0	24.5	.....	2157.5	355.7	.....	2546.7	.....
Chic., Milwaukee & St. P. for passenger trains and part of time for freights..	.....	.....	.....	4301.3	.....	.....	4301.3	.....
Chicago & North Western.....	.....	254.7	.....	1082.2	491.8	.....	1828.7	.....
Chicago Terminal Transfer R. R.....	0.6	5.0	.....	.....	.....	.....	5.6	.....
Chicago, Rock Island & Pacific.....	.....	15.0	.....	1521.0	.....	.....	1536.0	.....
Chicago & Western Indiana.....	.....	.....	.....	.....	19.8	.....	19.8	.....
Chicago, St. Paul, Minneapolis & Omaha.....	3.5	1.1	.....	442.6	20.0	.....	467.2	.....
Cincinnati, Hamilton & Dayton.....	.....	.....	.....	.....	25.0	.....	25.0	.....
Cincinnati, New Orleans & Texas Pacific.....	306.0	2.5	.....	.....	.....	.....	308.5	18
Cleveland, Cincinnati, Chicago & St. Louis.....	.....	.....	.....	670.0	124.0	.....	794.0	44
Delaware & Hudson.....	5.3	33.2	.....	.....	.....	.....	38.5	.....
Delaware, Lackawanna & Western.....	2.5	242.1	.....	699.1	.....	.....	943.7	.....
Delaware, Lackawanna & Western—three track—equal to.....	4.1	4.1	.....	.....	.....	.....	4.1	.....
Erie.....	.....	.....	.....	823.1	572.2	12.0	1407.3	.....
Erie & Wyoming Valley.....	.....	.....	.....	.....	.....	.....	.....	.....
Grand Trunk (Portland Line).....	.....	.....	.....	197.9	.....	.....	197.9	.....
Hannibal & St. Joseph.....	.....	.....	.....	6.0	.....	.....	6.0	.....
Illinois Central.....	6.0	130.0	.....	.....	.....	.....	136.0	.....
Illinois Central, four-track (6), six-track (4), and eight-track (4)—equal to.....	.....	.....	20.0	.....	.....	.....	20.0	.....
Kentucky & Indiana Bridge & Railroad Co.....	.....	.....	.....	7.4	2.0	.....	9.4	.....
Lake Shore & Michigan Southern.....	.....	36.0	9.5	885.8	418.8	10.4	1410.5	.....
Lake Shore & Michigan Southern, three-track, equal to.....	.....	.....	.....	40.7	40.7	.....	40.7	.....
Lehigh Valley.....	40.0	426.9	.....	597.9	69.6	.....	1134.4	20
Lehigh Valley, third track.....	2.5	2.5	.....	.....	.....	.....	2.5	.....
Long Island.....	.....	39.5	.....	6.5	32.5	.....	78.5	.....
Los Angeles Terminal.....	.....	2.0	.....	.....	.....	.....	2.0	.....
Michigan Central.....	20.0	333.0	.....	.....	180.0	.....	533.0	.....
Mobile & Ohio.....	.....	.....	.....	20.0	.....	.....	20.0	.....
Nashville, Chattanooga & St. Louis.....	.....	.....	.....	37.0	5.6	.....	42.6	.....
New York Central & Hudson River.....	.....	80.7	12.5	1527.9	352.6	.....	1973.7	108
New York Central & Hudson River, controlled manual.....	.....	.....	.....	.....	156.2	299.9	456.1	.....
New York, New Haven & Hartford.....	25.0	214.5	.....	195.8	170.7	68.8	674.8	31
New York, Ontario & Western.....	62.0	12.0	.....	.....	.....	.....	74.0	12
New York, Susquehanna & Western.....	.....	.....	.....	1.4	22.2	.....	23.6	.....
New York & Long Branch.....	.....	37.0	.....	.....	.....	.....	37.0	.....
Norfolk & Western.....	2.9	.....	.....	1038.6	116.7	.....	1158.2	70
Norfolk & Western, for passenger trains only.....	.....	.....	.....	180.4	.....	.....	180.4	.....
Northern Central (included in P. R. R.).....	.....	.....	.....	.....	.....	.....	.....	.....
Northern Pacific.....	.....	.....	.....	328.0	.....	.....	328.0	.....
Ohio River Bridge.....	.....	.....	.....	1.5	3.2	.....	4.7	.....
Oregon Short Line.....	23.0	.....	.....	.....	.....	.....	23.0	.....
Pennsylvania.....	4.2	77.2	159.4	175.2	550.6	112.6	1079.2	18
Pennsylvania, three-track line, equal to.....	3.0	3.0	.....	53.9	53.9	.....	56.9	.....
Pennsylvania Lines West of Pittsburg.....	2.0	10.0	24.0	.....	398.0	3.0	437.0	548
Peoria & Pekin Union.....	.....	1.0	.....	.....	5.4	.....	6.4	.....
Peré Marquette.....	9.5	.....	.....	.....	.....	.....	9.5	50
Philadelphia & Reading.....	20.2	282.6	2.7	103.8	116.0	.....	525.3	.....
Philadelphia & Reading, three-track line, equal to.....	12.3	12.3	.....	.....	.....	.....	12.3	.....
Philadelphia, Baltimore & Washington (included in P. R. R.).....	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburg & Lake Erie.....	.....	96.5	16.2	30.5	23.6	.....	166.8	24
Richmond, Fredericksburg & Potomac (including Washington Southern).....	.....	.....	.....	75.2	38.8	.....	114.0	.....
Rio Grande Western.....	.....	.....	.....	7.0	.....	.....	7.0	.....
South Side Elevated, Chicago.....	.....	8.7	.....	.....	.....	.....	8.7	.....
Southern Railway.....	.....	2.0	.....	97.0	32.0	.....	131.0	.....
Southern Railway, passenger trains only.....	.....	.....	.....	5935.0	.....	.....	5935.0	.....
Southern Pacific.....	90.0	11.2	0.5	172.0	26.0	.....	299.7	121
Southern Pacific, Texas lines.....	.....	.....	.....	.....	.....	.....	.....	55
St. Louis, Keokuk & Northwestern.....	.....	16.0	.....	.....	.....	.....	16.0	.....
St. Louis & San Francisco.....	2.0	4.0	.....	81.0	17.0	.....	104.0	.....
Terminal Railroad Association of St. Louis.....	.....	.....	.....	.....	12.0	.....	12.0	.....
Staten Island Rapid Transit.....	.....	8.7	.....	.....	.....	.....	8.7	.....
Union Pacific.....	13.0	43.1	.....	.....	.....	.....	56.1	.....
Wabash Railroad.....	.....	.....	.....	604.7	23.0	.....	627.7	414
West Jersey & Seashore (included in P. R. R.).....	.....	.....	.....	.....	.....	.....	.....	.....
Wisconsin Central.....	.....	.....	.....	6.1	.....	.....	6.1	.....
Total	964.6	3125.7	301.0	28508.2	5796.3	702.6	39281.9	2961