J. P. FRANCE.

BLOCK SIGNAL SYSTEM FOR RAILROADS.

APPLICATION FILED FEB. 8, 1908.

912,371.

Patented Feb. 16, 1909.

2 SHEETS—SHEET 1.

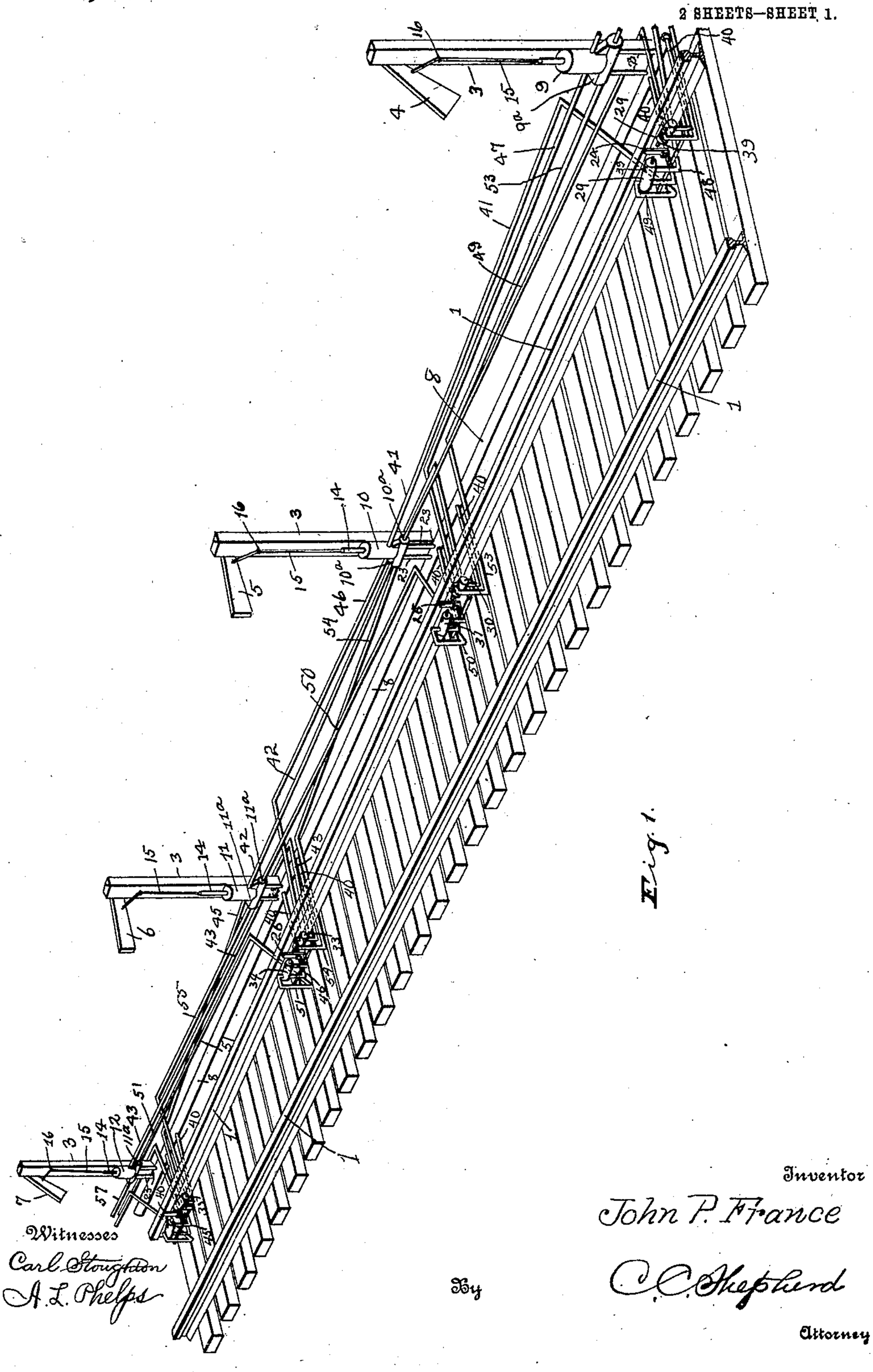

Fig. 1.

Witnesses

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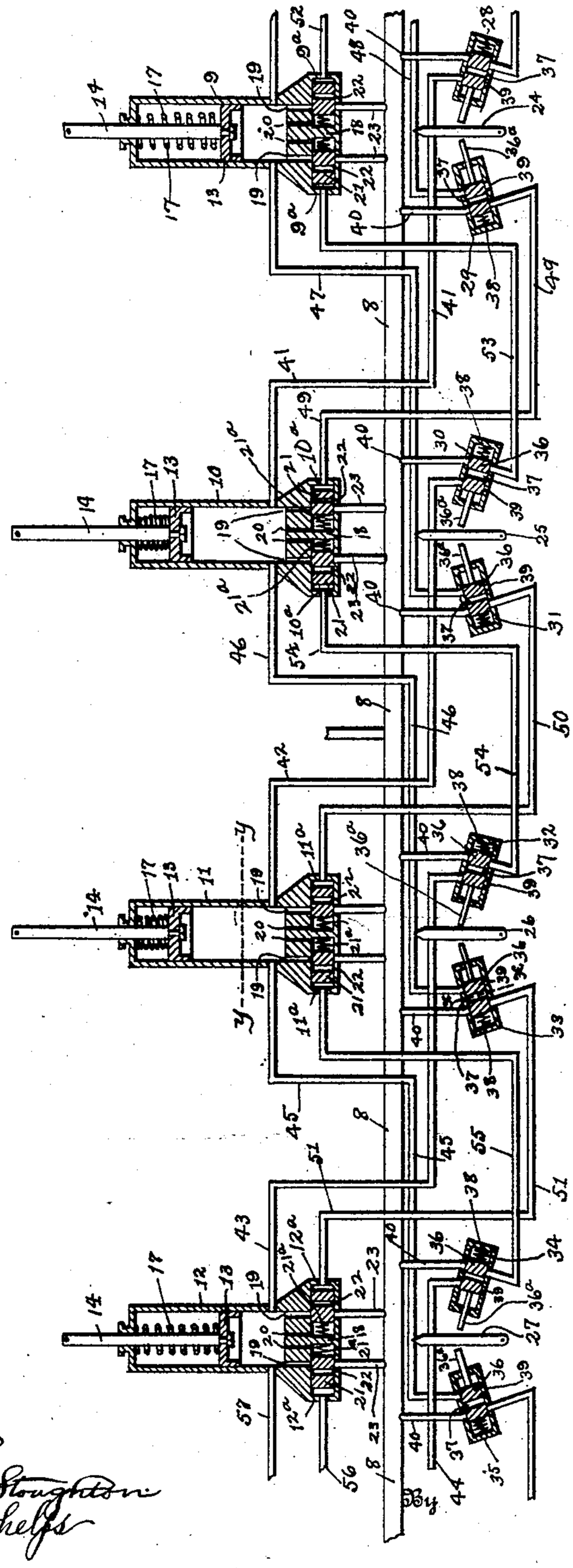

Fig. 2.

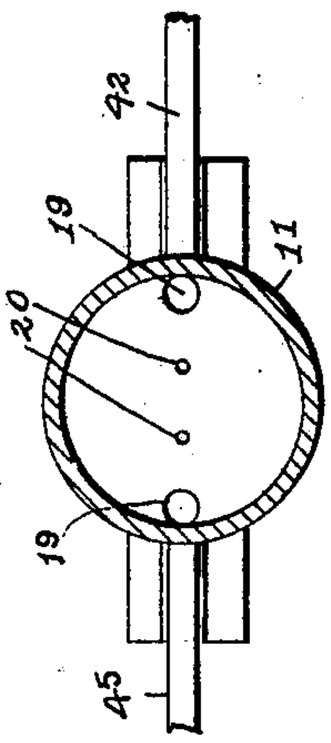

Fig. 4.

Fig. 3.

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UNITED STATES PATENT OFFICE.

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BLOCK-SIGNAL SYSTEM FOR RAILROADS.

No. 912,371. Specification of Letters Patent. Patented Feb. 16, 1909.

Application filed February 8, 1908. Serial No. 414,923.

To all whom it may concern:

Be it known that I, JOHN P. FRANCE, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Block-Signal Systems for Railroads, of which the following is a specification.

My invention relates to the improvement of block signal systems for railroads and the objects of my invention are to provide improved means for automatically operating semaphores arranged at intervals alongside of a railway, the positions of the semaphore arms which are controlled by my improved mechanism indicating the particular block or space between semaphores in which a train is located and to produce certain improvements in details of construction and arrangement of parts which will be more fully pointed out hereinafter. These objects I accomplish in the manner illustrated in the accompanying drawings, in which:

Figure 1 is a view in perspective of a section of railway showing my improved block signal apparatus in connection therewith, Fig. 2 is a detail view partly in section and partly in elevation showing the means employed in operating the semaphores illustrated in Fig. 1, Fig. 3 is an enlarged transverse section on line *x*—*x* of Fig. 2, and, Fig. 4 is a similar sectional view on line *y*—*y* of Fig. 2.

Similar numerals refer to similar parts throughout the several views.

1 represents the usual parallel rails of a section of railway track and on the outer side of one of these rails throughout the line of railway are arranged at suitable distances one from the other, vertical semaphore posts 3, these posts carrying the usual pivoted semaphore or signal arms, those shown in the drawing being indicated respectively at 4, 5, 6 and 7.

8 represents an air supply pipe which leads from a tank or compressed air containing cylinder located at a suitable point and which is not herein shown.

Adjacent to each of the semaphore posts 3 is supported a vertical cylinder, these cylinders being indicated at 9, 10, 11 and 12. Each of these vertical cylinders has formed therewith in its base two opposing horizontal cylinders each pair of said horizontal cylinders being indicated respectively at 9^a, 10^a, 11^a and 12^a and the cylinders of each pair being separated by a partition 18 and within each of the vertical cylinders is provided a piston 13 which is carried on a vertically reciprocating piston rod 14 which extends upward and outward through the top of said vertical cylinder and with the upper end of which is connected the lower end of a wire or other suitable connecting device 15 which passing through a suitable guide 16 in the upper portion of the post, has its upper end connected with the semaphore arm of said post.

Within each of the cylinders 9 to 12 the piston rod is surrounded by a spring 17 which normally presses the piston downward. Each cylinder 9^a is connected with the lower portion of the vertical cylinder which is above the same by a port 19 which passes through the bottom of the vertical cylinder adjacent to the outer wall thereof. The inner end of each of the cylinders 9^a is also connected with the interior of the cylinder above, through the medium of smaller ports 20. In each of the small cylinders 9^a is provided a piston 21 which is normally pressed toward the outer end of its cylinder by a coiled spring 21^a, and said piston has formed therethrough a vertical port or passage 22. From the lower side of each of the small cylinders 9^a lead air pipes 23 which connect with the main supply pipe 8.

Opposite each of the semaphore posts and on the inner side of the adjoining track rail, I pivot the lower end of an upwardly projecting trip bar, these bars being indicated in the drawing at 24, 25, 26 and 27. On each side of each of the trip bars 24, I support an inclined cylinder, these cylinders being numbered consecutively from 28 to 35 inclusive. Each of the cylinders contains a piston 36 each of which has formed centrally therethrough a substantially vertical port 37. Each of said pistons has projecting through the inner end of the cylinder a rod 36^a. In the outer end of each of the cylinders 28—35 and between said cylinder end and the piston therein is a spring 38. In the lower side of each of the cylinders is an outlet port 39, the latter being located at one side of the center of the length of the cylinder.

40 represents air pipes, one of which leads to each of the cylinders 28—35 from the main air pipe 8.

41, 42 and 43 represent pipes which lead respectively from the cylinders 28, 30 and 32 to the lower portions of the cylinders 10,

11 and 12. A similar pipe 44 leads from the cylinder 34 to the next succeeding cylinder (not shown, corresponding to the cylinder 12.)

From the cylinders 35, 33 and 31, pipes 45, 46 and 47 lead respectively to the lower portions of the cylinders 12, 11, 10 and 9, while a similar pipe 48 leads to the next cylinder corresponding with the cylinder 9 (not shown) and to the right thereof. From the lower sides of each of the cylinders 29, 31 and 33 pipes 49, 50 and 51 lead respectively to the outer ends of the cylinders 10^a, 11^a and 12^a which are to the right of the partitions 18, while a similar pipe 52 connects the corresponding cylinder 9^a with the next cylinder to the right corresponding with the cylinders 28—35.

53, 54 and 55 represent air pipes which lead respectively from the undersides of the cylinders 30, 32 and 34 from points opposite the entrance of the pipes 40 to the ends of the cylinders 9^a, 10^a and 11^a which are at the left of the partitions 18. A similar pipe 56 leads to the cylinder 12^a at the left from the next cylinder to the left (not shown) corresponding with the cylinders 28—35. A pipe 57 corresponding with the pipes 45, 46 and 47 also leads from said cylinder to the left (not shown) to the lower portion of the cylinder 12.

In describing the operation of my device, it will be understood that semaphores heretofore referred to may be set at points a number of miles apart. In Fig. 1 of the drawing, it will be observed that the semaphore arms 5 and 6 are set to the horizontal or "blocked" position which indicates that the train is at a point on the track between these two semaphore arms. Assuming that the train is moving in the direction of the full line arrow shown in Fig. 1 of the drawing, it will be understood that in passing into the block referred to, the flange of the front locomotive wheel will come into contact with the projecting trip bar 25 pressing the latter downward in the direction in which the train is moving and causing it by contact with the piston rod of the piston 36 of the cylinder 31 to press said piston toward the outer or opposite end of the cylinder, thereby bringing the opposite port 37 into communication with the air pipes 40 and 50, with the result that air under pressure from the main supply pipe 8 passes through said pipe 50 to the right hand cylinder 11^a, forcing the piston 21 thereof inward until the port 22 is in communication with the port 19 of the cylinder 10 and in communication with the pipe 23 of the main supply pipe 8. The pressure of air thus introduced into the cylinder 10 raises the piston 13 thereof to the position indicated in Fig. 2 of the drawing, thereby raising the piston rod 14 and permitting the semaphore arm 6 which was previously depressed to rise to the horizontal position through the action of the weight with which the outer end of the semaphore is provided in the usual manner. Previous to the entrance of the train to the block between the semaphore arms 5 and 6, the semaphore arm 4 has been supported in a horizontal or "blocked" position in the manner prescribed for the setting of the arm 6. In the operation of setting said arm 6, however, it will be understood that the piston 36 of the cylinder 31 will be forced outward in said cylinder a sufficient distance to unclose the opening from said cylinder to the pipe 47 and to also unclose the outlet port 39, thereby permitting the compressed air within the cylinder 9 to escape through said pipe 47, cylinder 31 and outlet port 39 to the atmosphere and permitting the spring 17 of the cylinder 9 to force the piston 13 thereof downward, thereby pulling the semaphore arm 4 downward to the safety position. When the train reaches the point where the flange of its locomotive wheel depresses the trip bar 26, it is obvious that the operation described in connection with the cylinder 31 will take place in the cylinder 33, with the result that through the opening of the pipes 51, and 46 and port 39, the semaphore arm 7 will be set to the horizontal position, while the arm 5 will be dropped to the safety position. It will thus be seen that both ends of the block in which the train is located, will be protected by the semaphore arms being set to the danger position, while the other semaphore arms will be set to the safety position.

Assuming that the train is traveling in the opposite direction to that heretofore described and that its locomotive car wheel contacts with the trip bar 26 and depresses it in the direction of the moving train, it is obvious that the piston 36 of the cylinder 32 will be pressed inward, with the result that the port 39 and entrance to the pipe 43 will be uncovered permitting air contained in the cylinder 12 to escape through said pipe 43, cylinder 32 and port 39 to the atmosphere, thereby allowing the semaphore arm 7 to be pulled to the safety position. At the same time air from the supply pipe 8 will pass through the pipe 40 to the port 37, thence into the pipe 54 to the cylinder 10^a at the left of the partition 18 of the cylinder 10, thereby supplying a pressure of air in said cylinder 10, elevating its piston to the position shown in the drawing and at the same time permitting the semaphore arm 5 to assume the block position shown in Fig. 1.

In the construction of the cylinders 9, 10, 11 and 12, I have provided the comparatively small bottom port 20 in order to permit air to slowly enter the lower cylinders 10^a and assist the springs 21^a in returning to

their normal positions after having been forced inward by the pressure of air from the pipes 49—51 and 53—55.

What I claim, is:

A block signal apparatus, comprising a plurality of successively arranged swinging semaphore arms, a cylinder and piston rod therein controlling each of said semaphore arms, a main supply pipe connecting with said cylinders and containing air under pressure, a railway track, a pivoted trip bar adjacent thereto for each of said semaphore arms, a cylinder on each side of said trip bar, an air controlling piston and piston rod in each of said last named cylinders, pipe connections between said last named cylinders and certain of said semaphore cylinders, and means whereby the movement of the air controlling pistons controls the supply of air to and release of air from the semaphore cylinders.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN P. FRANCE.

Witnesses:
C. C. SHEPHERD,
L. CARL STOUGHTON.