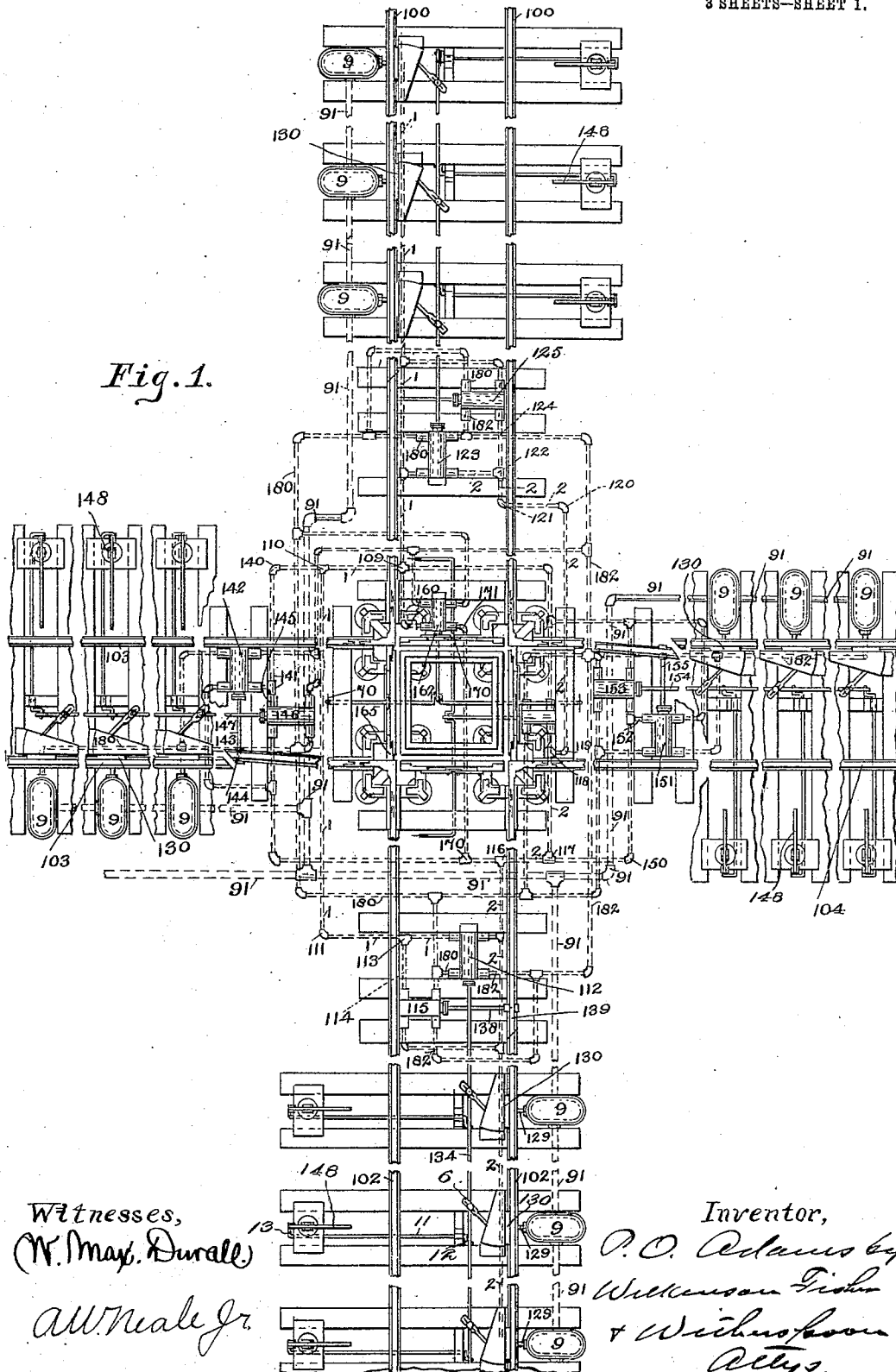


P. O. ADAMS.  
 AUTOMATIC SIGNAL SYSTEM.  
 APPLICATION FILED MAR. 22, 1909.

943,587.

Patented Dec. 14, 1909.

3 SHEETS—SHEET 1.

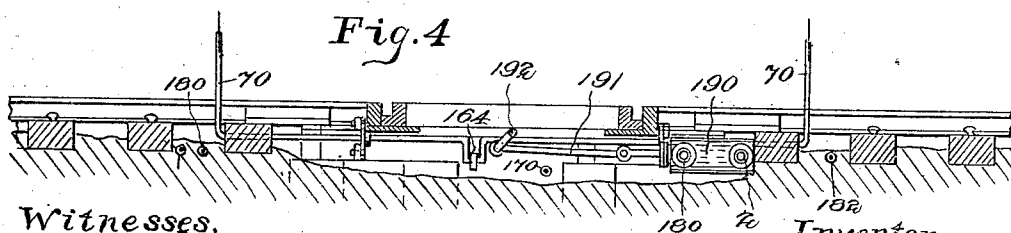
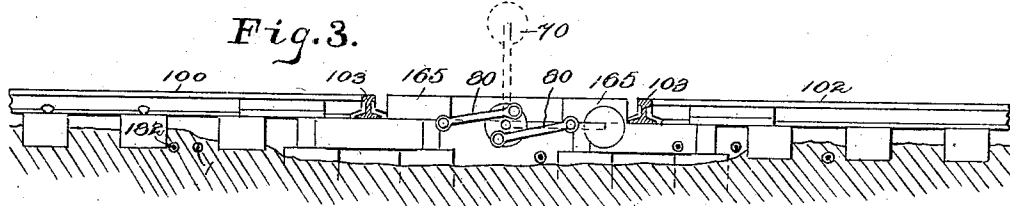
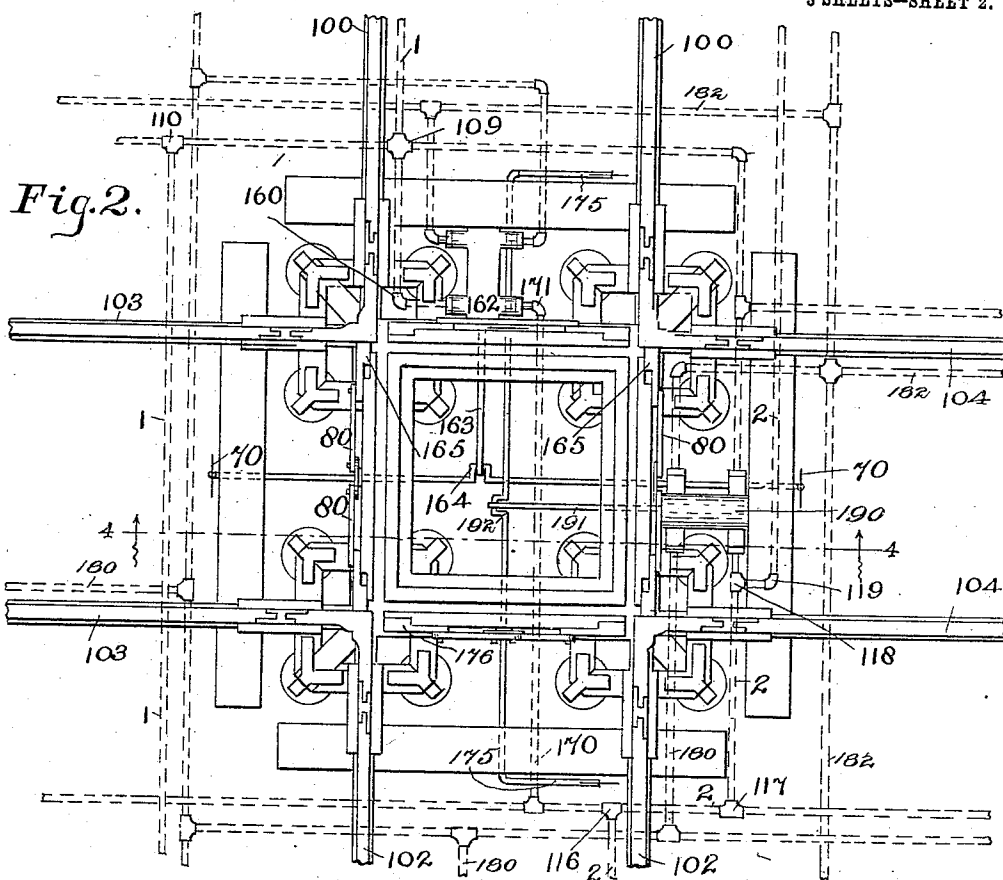


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3 SHEETS—SHEET 2.



Witnesses,  
 W. Map. Durrall  
 A. W. Neale, Jr.

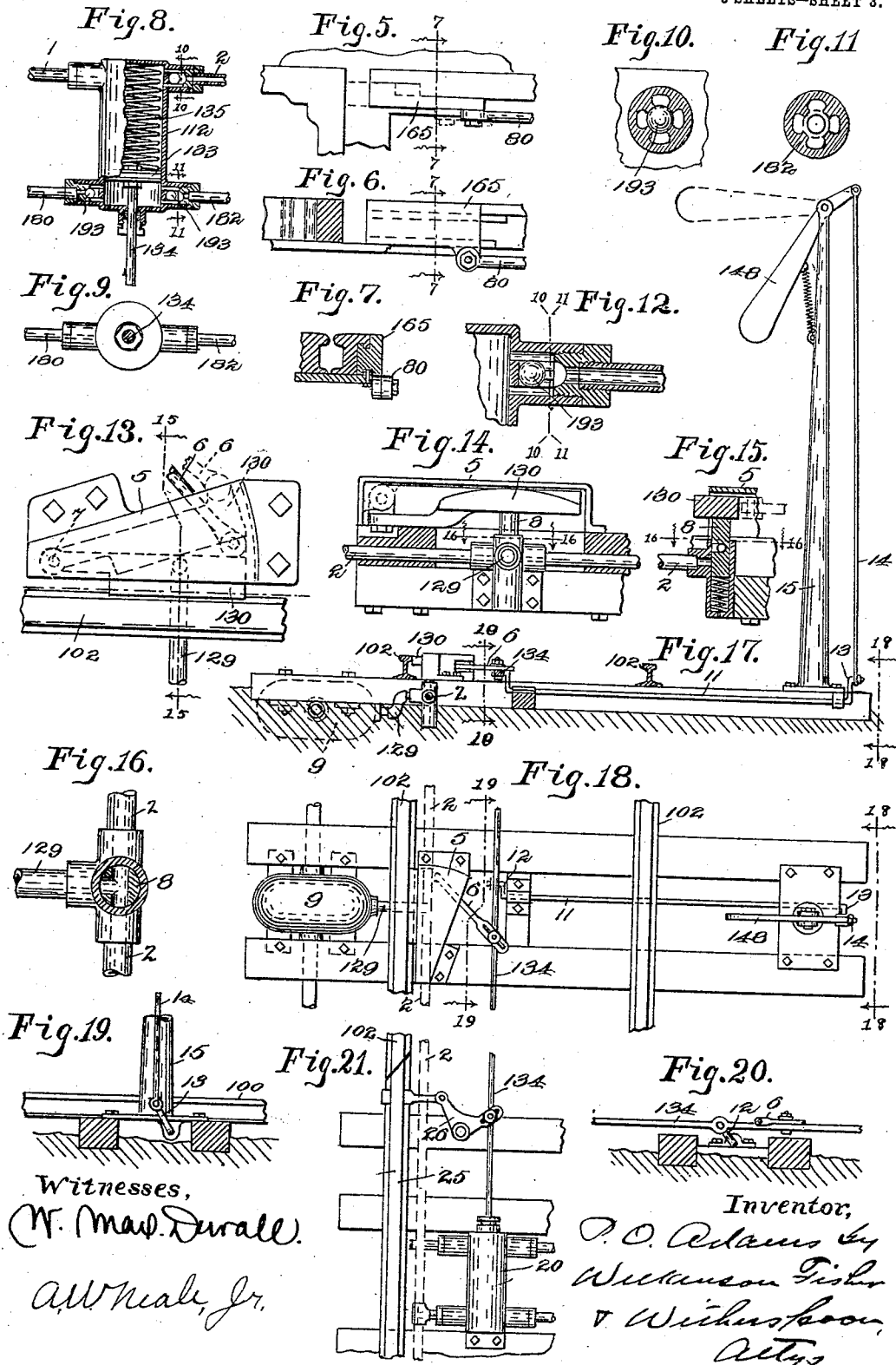
Inventor,  
 P. O. Adams by  
 Williamson Fisher  
 & Witherspoon  
 Attys

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3 SHEETS—SHEET 3.



Witnesses,  
 (N. Max. Duralle.)

A. W. Neale, Jr.

Inventor,  
 P. O. Adams by  
 Williamson Fisher  
 & Williamson,  
 Attys

# UNITED STATES PATENT OFFICE.

POWELL O. ADAMS, OF CAMERON, TEXAS.

AUTOMATIC SIGNAL SYSTEM.

943,587.

Specification of Letters Patent.

Patented Dec. 14, 1909.

Application filed March 22, 1909. Serial No. 485,117.

*To all whom it may concern:*

Be it known that I, POWELL O. ADAMS, a citizen of the United States, residing at Cameron, in the county of Milam and State of Texas, have invented certain new and useful Improvements in Automatic Signal Systems; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an automatic signal system for railways and has for its object the production of a system that will be certain in action, comparatively inexpensive to manufacture and simple in operation.

To these ends the invention consists in the novel details of construction and combination of parts more fully hereinafter disclosed, and particularly pointed out in the claims.

Referring to the accompanying drawings forming a part of this specification, in which like numerals relate to like parts in all the views:—Figure 1, is a plan view of my signal system when applied to a crossing; Fig. 2, is an enlarged plan view of a crossing with my pipe system shown in dotted lines; Fig. 3, is a side elevational view partly in section of a track and crossing showing portions of my means for closing the flange ways of the crossing; Fig. 4, is a sectional elevational view taken on the line 4—4 of Fig. 2, showing the block signals in their danger position; Figs. 5 and 6 are plan and elevational views respectively of a detail for closing the flange ways of the crossing; Fig. 7, is a sectional view taken on the line 7—7 of Figs. 5 and 6; Fig. 8, is a partly sectional view of an air engine; Fig. 9, is an end view of the engine shown in Fig. 8; Figs. 10, 11 and 12, show details of check valves used in the engine; Figs. 13, 14, 15 and 16, are detail views of treads and their coacting parts employed in my signal system, Fig. 16, being taken on the line 16—16 of Figs. 14 and 15; Fig. 17, is an elevational view of a semaphore and its coacting parts; Fig. 18, is a plan view of the mechanism shown in Fig. 17; Figs. 19 and 20, are detail views of parts shown in Figs. 17 and 18, and Fig. 21, is a view of a modified means for operating the semaphores, the treads and the derailer.

Referring to Fig. 1, 100 represents a track

or pair of rails leading to a crossing, 102, a continuation of said track or rails leading from the crossing, 103, a second track or pair of rails leading to said crossing at an angle to the tracks 100 and 102; and 104, represents a continuation of the track or rails 103, leading from the crossing.

Placed at suitable points along each of the tracks 100, 102, 103 and 104, are compressed air reservoirs 9, which are connected by suitable supply pipes 91, which in turn are joined to any suitable compressed air supply not shown. Each of the reservoirs 9, along the track 100, is provided with a short pipe 129, which connects with the main air pipe 1, leading along said track toward the crossing to the point 109, thence along the track 103, to the point 110, thence across the track 103, to the point 111, thence along the track 103, and across a portion of the track 102, to the engine 112. At the point 113, near said engine 112, a branch pipe 114, connects said pipe 1, with the engine 115. In like manner along the track 102, is a similar main compressed air pipe 2, joined to the air reservoirs 9, by their short pipe connections 129, and which leads toward the crossing to the point 116, thence along the tracks 104, to the point 117, thence across one rail of the tracks 104, to the point 118, thence along said rails to the point 119, thence across the other rail to the point 120, thence across one rail of the track 100, to the point 121, thence along said rail to the point 122, thence into the engine 123. A short pipe 124, joins the main air pipe 2, at the point 122, and connects the same with the engine 125.

Each connection 129, between the reservoirs 9, and the main air pipes 1 and 2, is controlled by a reciprocating valve stem 8, as best shown in Figs. 14 and 15, and each stem 8, is in turn depressed by a tread 130, when a wheel passes thereover. Each of the engines and its connections employed in my system are duplicates of the engine 112, and its connections illustrated in Fig. 8, and therefore a description of this latter engine will suffice for all. Said engine 112, is provided with a cylinder in which is housed a spring 135, for keeping the piston 133, and piston rod 134, in their normal or extreme positions. This engine is also provided with connections on the spring side of the

piston for the main air pipes 1, and 2, as illustrated. Similar connections exist, as shown in Fig. 1, for each of the other engines 115, 123 and 125, so that when air is admitted into the main air pipes the only effect will be to aid the spring 135, in forcing or holding the respective piston rods in their normal or extreme positions.

The piston rod 134, of engine 112, is connected to and operates the treads and semaphores along the track 102, while the piston rod 138, of engine 115, operates the derailing section 139, along said track. In like manner the piston rod of engine 123, operates the semaphore and treads along the track 100, while the piston rod of engine 125, operates the derailing section along said track, all as will be more fully disclosed hereinafter.

It will be obvious from what has now been said that should a train depress the treads on either of the tracks 100 or 102, the only effect on the engines would be a tendency to hold tighter the parts operated thereby in their normal positions, so that a clear passage would be afforded in either direction. The semaphores, treads and derailing sections on the tracks 103 and 104, however, will be given a different operation upon the passage of trains on the tracks 100 and 102, as will now be described.

Going back to the point 110 in Fig. 1, a pipe 140, leads from said point to a point 141, on the track 103, and thence into the engine 142, provided with a piston rod 143, which operates the derailing section 144. Connected with the pipe 141, is a branch pipe 145, which leads into the engine 146, provided with a piston rod 147, connected to the semaphores 148, and treads associated with said track 103. These pipes 141 and 145 lead into their respective engines on those sides of the pistons that are opposite to the springs in said engines, and therefore are the sides that will cause the piston rods 143 and 147, to respectively place the derailing section and the semaphores in their danger positions all as will be more fully disclosed below in connection with engine 112. In the same way going back to point 117, in pipe 2, a pipe 150, leads to engine 153, provided with a piston rod 154, and a branch pipe 152, leads to engine 151, provided with a piston rod 155. These pipes enter the cylinders of their engines on the sides of the pistons opposite to those of the springs, and therefore, air in said pipes will cause the piston rods 155 and 154, to respectively move the derailing section and the semaphores associated with track 104, into their danger positions. In other words, so far as has been now disclosed, if a train is on track 100 or 102, a clear passage thereover will be pro-

vided as above explained, but the semaphores on tracks 103 and 104, as well as the derailing sections associated therewith will be moved into their danger positions.

Referring now more particularly to Fig. 2, the pipe 1, is joined at the point 109, by a branch pipe 160, leading into the engine 162, provided with a piston rod 163, operating a crank 164, connected with the links 80, operating the sliding parts 165, see Figs. 5, 6 and 7, adapted to bridge the flange ways of the crossing. In the same way main air pipe 2, is provided with a branch pipe 170, leading to the point 171, and into said engine 162, but on the opposite side from the pipe 160; and therefore if air is admitted through either or both of these pipes the flange ways of the crossing will be bridged over. Connected with the crank 164 are the danger signals 70 which will be operated whenever said crank is operated to block any trains that might come over the track 103 or 104. I will now suppose no train is on the tracks 100 or 102, but a train appears on the tracks 103 or 104. I provide a main air pipe 180 for the track 103, in all respects similar to the main air pipe 1, and a main air pipe 182, for the track 104, in all respects similar to the main air pipe 2. The pipe 180, passes over to the track 104, and is there connected to the spring side of the pistons in the engines 152 and 151, precisely as the pipe 1, connects with similar sides of the pistons in the engines 112, and 115, associated with the track 102. And the pipe 182, passes over to the track 103, and is there connected to the spring sides of the pistons in the engines 142 and 146, precisely as the pipe 2, connects with the engines 123 and 125, associated with the track 100. It follows from this that trains on tracks 103 or 104, will have a clear passage. But the action of the engines associated with the tracks 100 or 102, will be such as to block trains passing thereover. This is brought about by leading pipes 180 and 182, into engine 112, see Fig. 8, on that side of the piston opposite to the spring 135, and therefore causing said engine to move the semaphores associated with track 102, to their danger position. In like manner the said pipes 180 and 182, or their connections are led into the proper end of the engine 115, to move the derailing section controlled thereby into its danger position. Also, similar connections are made between the said pipes 180 and 182, and the engines 123 and 125, so that the semaphores and derailing section associated with track 100 will be moved into their danger positions. It is useless to say all these connections are duplicates of connections already described between the main air pipes 1 and 2, and the engines 142, 146, 151 and 152. In like man-

ner the pipes 180 and 182 actuate the engine 190, having the piston rod 191 controlling the crank 192, connected to the slide pieces 176 bridging over the flange ways of the crossing and to the danger semaphores 175. The connections between the pipes 1 and 2, and the engine 190 are on the spring side of the piston, and therefore are such that the said engine is not operated when a train is on tracks 100 or 102, as will be readily understood from what has been said above; and the same remarks apply to the engine 162 and its connections with pipes 180 and 182, when trains are on track 103 or 104.

Referring again to Fig. 8, check valves 193 are provided for the connections 180 and 182, as shown. The function of these valves will be now explained:—Suppose one of the treads 130 associated with the track 104 should be entirely passed over by a train, if no valves were provided air entering the engine through pipe 180 would escape through pipe 182, and owing to the resulting decrease in pressure in said engine the semaphores operated thereby might be lowered from their danger position before the train had passed. To prevent this occurring, should the pressure be lowered in either pipe, I provide check valves in each pipe which will close when the pressure suddenly gets low in either of said pipes, and therefore will cause the pressure to be kept up in the engine, and the semaphores to be maintained in their danger position. Again, should the treads be down on both sides of the crossing, air will enter the engine through both pipes 180 and 182, and the pressure will still be kept up and the semaphores held in their danger position until the train leaves the block.

Referring now to Figs. 13 to 20, the treads 130 are pivoted at 7, and since they are separate from the stems 8, as shown in Fig. 15, they can swing laterally away from the rail, as indicated in dotted lines in Fig. 13. The links 6 connected to the piston rods serve to impart this lateral motion to the treads, and when they are so swung away from the rails the wheels do not depress them. 5 represents housings or covers for the treads and associated parts. 11 represents semaphore actuating rods provided with cranks 12 connected with the piston, and with cranks 13 connected with the links 14 leading up the masts 15 and connected with the semaphores 148.

In Fig. 21, I have shown a single engine 20, adapted to operate both the piston rod 134 and the derailing section 25. The piston rod is connected by a bell crank 26 to the derailing section, as shown.

The operation of my signal system will be clear from the foregoing, but may be

summarized as follows:—I will suppose each of the four tracks 100, 102, 103 and 104 to be in separate blocks. Should a train come in either direction over the tracks 100, 102, the treads 130 of said tracks will be depressed, but the engines associated with said tracks will not operate the semaphores, treads, nor derailing sections to which they are connected, but will merely tend to hold said parts together in their normal or unoperated positions, thereby leaving a clear track for the passage of the said train. In the same way, should a train pass over the tracks 103, 104 in either direction the engines associated with said latter track will merely tend to hold the semaphores, treads and derailing sections to which they are connected tighter in their normal or unoperated positions, thereby leaving a clear passage for said train over the tracks 103, 104. When, however, a train passes over tracks 100, 102 in either direction, the engines associated with the other blocks or tracks 103, 104 move the semaphores and derailing sections to which they are connected into their danger positions, and also laterally move the treads associated with said last mentioned blocks or tracks out of the way of any train that might be stopped thereon. The same operation to danger positions of the semaphores, treads and derailing sections takes place on the tracks 100, 102, when a train passes over the tracks 103, 104. In addition to the above, when a train has a clear passage over tracks 100, 102, the engine 162 associated with the crossing closes the flange ways thereof by means of the sliding pieces 165; and when a train has a clear passage way over the tracks 103, 104 the engine 190 likewise closes the flange ways for said train by means of the sliding pieces 176. In all cases after the parts have been operated to their danger positions, the springs 135 in the several engines restore said parts to their normal or safety positions.

It is evident that those skilled in the art could make changes in the arrangement and disposition of parts without departing from the spirit of my invention, for example, the engines, semaphores, derailing sections and treads associated with tracks 103, 104, could be placed on another block of track 100, 102, and thereby make my system serve as a single track system if desired. Therefore, I do not wish to be limited to the exact details of arrangement and construction except as may be necessary from the claims.

What I claim is:—

1. In a signaling system the combination of a plurality of blocks constituting a continuous track; a source of compressed air; a semaphore and a depressible tread asso-

ciated with each block; an engine in each block adapted to move said semaphore into its danger position and to move said tread out of its normal position; and connections  
5 controlled by said treads between said engines and said source of compressed air whereby said semaphores and said treads will be held more tightly in their normal or unoperated positions when said treads are  
10 depressed, substantially as described.

2. In a signaling system the combination of a pair of blocks constituting a continuous track; a third block; a source of compressed air; a semaphore and a depressible tread in  
15 each block; an engine in each block connected with and adapted to move the semaphore and tread of its own block to their danger positions; and pipe connections controlled by said treads extending between said  
20 source of air and each of said engines whereby when the treads in said pair of blocks are depressed, the engines associated therewith will cause their respective semaphores and treads to be held more tightly in their  
25 safety positions, while the engine associated with said third block will cause its semaphore to be moved to its danger position, substantially as described.

3. In a signaling system the combination  
30 of a pair of blocks constituting a continuous track; a third block; a source of compressed air; a semaphore and a depressible and laterally movable tread in each block; an engine in each block connected with and adapted  
35 to move the semaphore and tread of its own block to their danger positions; and pipe connections controlled by the depression of said treads extending between said source of air and each of said engines whereby  
40 by when the treads in said pair of blocks are depressed the engines associated therewith will cause their respective semaphores and treads to be held more tightly in their safety positions, while the engine associated  
45 with said third block will cause its semaphore to be moved to its danger position and its tread to be laterally moved to its danger position, substantially as described.

4. In a signaling system the combination  
50 of a pair of blocks constituting a continuous track; a third block; a fourth block; a source of compressed air; a semaphore and a depressible tread in each block; an engine in each block connected with and  
55 adapted to move the semaphore and tread of its own block to their danger positions; and pipe connections controlled by said treads extending between said source of air and each of said engines whereby when the  
60 treads in said pair of blocks are depressed, the engines associated therewith will cause their respective semaphores and treads to be held more tightly in their safety posi-

tions, while the engines associated with said third block and the engine associated with  
65 said fourth block will cause its semaphore to be moved to its danger position, substantially as described.

5. In a signaling system the combination of a pair of blocks constituting a continu-  
70 ous track; a third block, a fourth block; a source of compressed air; a semaphore and a laterally movable depressible tread associated with each of said blocks; an engine mechanically connected with said semaphore  
75 and tread in each block and adapted to move the same into and out of their danger positions; pipes connected with said source of compressed air; means whereby said connections are controlled by said treads; and  
80 connections between said pipes and said engines whereby when the treads in said pair of blocks are depressed the engines belonging to said blocks will hold their semaphores and treads in their safety positions, and the  
85 engines in the said third and fourth blocks will move their semaphores and treads to their danger positions, substantially as described.

6. In a signaling system the combination  
90 of a plurality of blocks constituting a continuous track; a source of compressed air; a semaphore and a depressible tread associated with each block; an engine in each block adapted to move said semaphore into its dan-  
95 ger position, and to move said tread out of its normal position; connections controlled by said treads between said engines and said source of compressed air whereby said semaphores and said treads will be held more  
100 tightly in their normal or unoperated positions when said treads are depressed; a crossing between two of said blocks; an engine associated with the crossing; and means connected with said engine for bridging over  
105 the flange ways of the crossing, substantially as described.

7. In a signaling system the combination of a pair of blocks constituting a continuous  
110 track; a third block; a source of compressed air; a semaphore and a depressible tread in each block; an engine in each block connected with and adapted to move the semaphore and tread of its own block to their  
115 danger positions; pipe connections controlled by said treads extending between said source of air and each of said engines whereby when the treads in said pair of blocks are depressed, the engines associated therewith  
120 will cause their respective semaphores and treads to be held more tightly in their safety positions, while the engine associated with said third block will cause its semaphore to be moved to its danger position; a crossing  
125 between said pair of blocks; an engine associated with the crossing and means connect-

ed with said engine for bridging over the flange ways of the crossing, substantially as described.

8. In a signaling system the combination  
5 of a pair of blocks constituting a continuous track; a second pair of blocks constituting a second continuous track crossing said first track; depressible and laterally movable treads, semaphores and engines, associated  
10 with said blocks; an engine and signals associated with said crossing; a source of air supply; and means by which when the treads of either continuous track are depressed, the treads of said track will be held by their res-  
15 pective engines in their normal positions while the treads and semaphores of the other track as well as the signals associated with the crossing will be moved into their danger positions, substantially as described.

9. In a signal system the combination of a pair of blocks constituting a continuous track; a plurality of semaphores and de-  
20 pressible laterally movable treads associated with each of said blocks, a derailing section associated with each of said blocks; means to move said semaphores, treads and derail-  
25 ing sections associated with said pair of blocks into and out of their danger positions; a source of air supply controlled by said  
30 treads; and connections between said air supply and said means whereby upon the depression of said treads associated with said pair of blocks said semaphores treads and  
35 derailing sections pertaining to said pair of blocks will be held tighter in their normal positions, substantially as described.

10. In a signal system the combination of a pair of blocks constituting a continuous track; a plurality of other blocks consti-  
40 tuting a second continuous track; a plurality of semaphores and depressible laterally movable treads associated with each of said blocks; a derailing section associated with each of said blocks; means to move  
45 said semaphores, treads and derailing sections associated with said pair of blocks into and out of their danger positions; a source of air supply controlled by said  
50 treads; connections between said air supply and said means whereby upon the depression of said treads associated with said pair of blocks said semaphores, treads and  
55 derailing sections pertaining to said pair of blocks will be held tighter in their normal positions; engines associated with said other blocks; and connections between said source of air pressure and said engines whereby  
60 when there is a clear passage over said pair of blocks, the semaphores, treads and derailing sections in said other blocks will be moved to their danger positions, substantially as described.

11. In a signal system the combination of

a pair of blocks constituting a continuous track; a crossing between said blocks; a  
65 third and a fourth block joining the crossing and constituting a second continuous track; a pair of signals associated with the crossing for each track; a source of power; an engine in each block connected to said  
70 source of power; treads, semaphores, and a derailing section in each block, joined to said engines; and means whereby when there is a clear passage over one of said tracks, the semaphores, treads, derailing sections,  
75 and crossing signals pertaining to the other track will be moved to their danger positions, substantially as described.

12. In a signal system the combination of a pair of blocks constituting a continuous  
80 track; a crossing between said blocks; a third and fourth block joining the crossing and constituting a second continuous track; a pair of signals associated with the crossing for each track; means for bridging over  
85 the flanges of the crossing for each track; a pair of engines for operating the signal and flange bridging means of the crossing; a source of power; an engine in each block connected to said source of power; treads,  
90 semaphores, and a derailing section in each block, joined to said engines; and means whereby when there is a clear passage over one of said tracks, the semaphores, treads, derailing sections, and crossing signals per-  
95 taining to the other tracks will be moved to their danger position, substantially as described.

13. In a signal system the combination of a source of compressed air; an engine pro-  
100 vided with a piston, a piston rod, and a spring to maintain said parts in their normal positions; and a pair of connections between said engines and said source of compressed air whereby said air through said  
105 connections tends to maintain said piston in its normal position, substantially as described.

14. In a signal system the combination of a source of compressed air; an engine pro-  
110 vided with a piston, a piston rod, and a spring to maintain said parts in their normal positions; a pair of connections between said engine and said source of compressed air whereby said air through said connec-  
115 tions tends to maintain said piston in its normal position; and a second pair of connections between said engine and said compressed air source adapted to oppose the action of said spring, substantially as de-  
120 scribed.

15. In a signal system the combination of a source of compressed air; an engine pro-  
125 vided with a piston, a piston rod, and a spring to maintain said parts in their normal positions; a semaphore and a movable

tread connected to said rod; a pair of connections between said engine and said source of compressed air whereby said air through said connections tends to maintain said piston in its normal position; and to thereby hold said semaphore and tread in their safety position, substantially as described.

16. In a signal system the combination of a source of compressed air; an engine provided with a piston; a spring adapted to move said piston in one direction; a pair of connections with said source of air through which said air is adapted to move said pis-

ton in the same direction as said spring; another pair of connections with said source provided with valves the air through which is adapted to move said piston against the tension of said spring; and movable parts of a signal system mechanically connected with said piston, substantially as described.

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

POWELL O. ADAMS.

Witnesses:

A. W. TABER,  
S. D. TYSON.