No. 683,422. Patented Sept. 24, 1901.

C. S. DEAN.

DANGER SIGNAL FOR RAILWAYS.

(Application filed Oct. 2, 1900.)

(No Model.) 2 Sheets—Sheet 1.

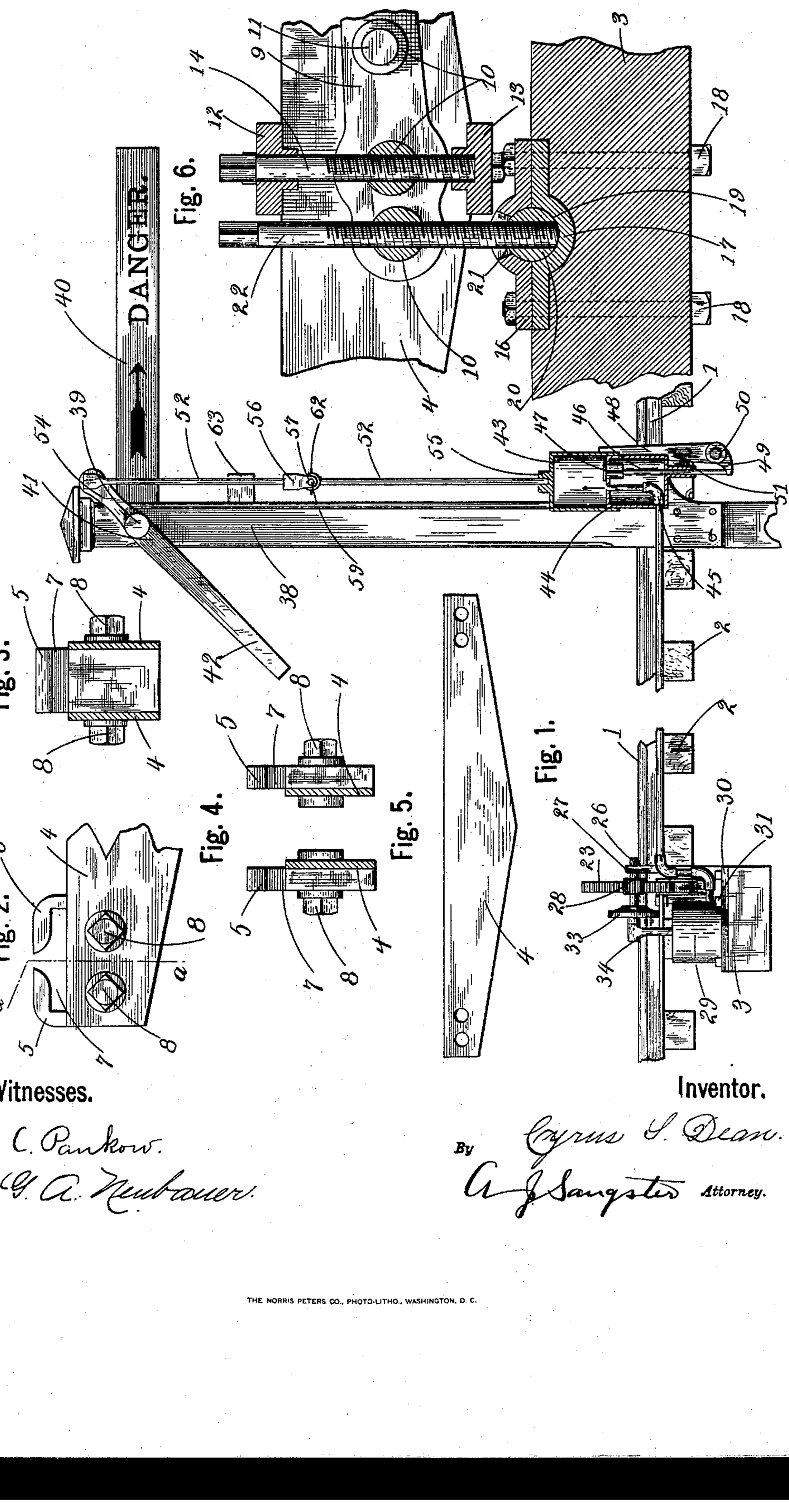

Fig. 6.

Fig. 3.

Fig. 2.

Fig. 4.

Fig. 5.

Fig. 1.

Witnesses.

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2 Sheets—Sheet 2.

Fig. 11.

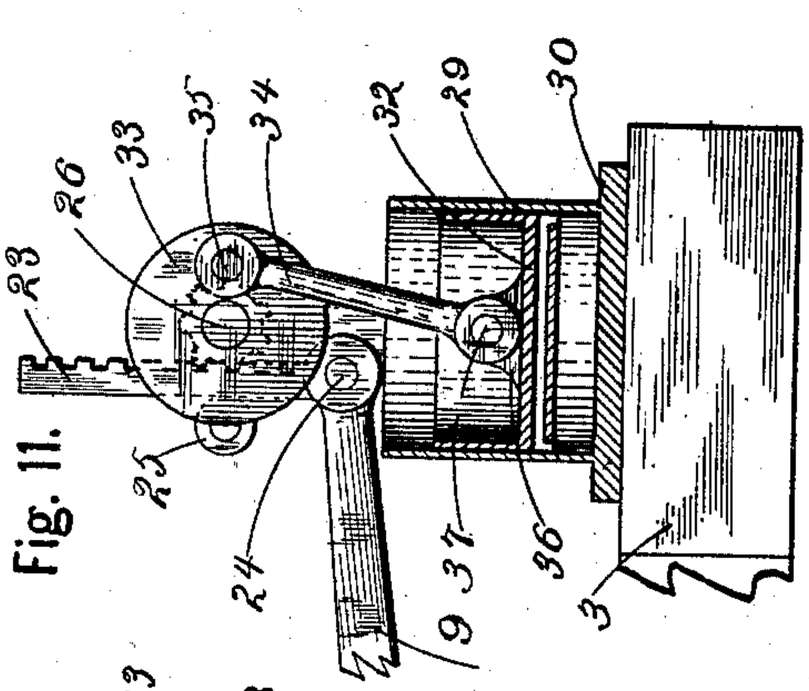


Fig. 12.

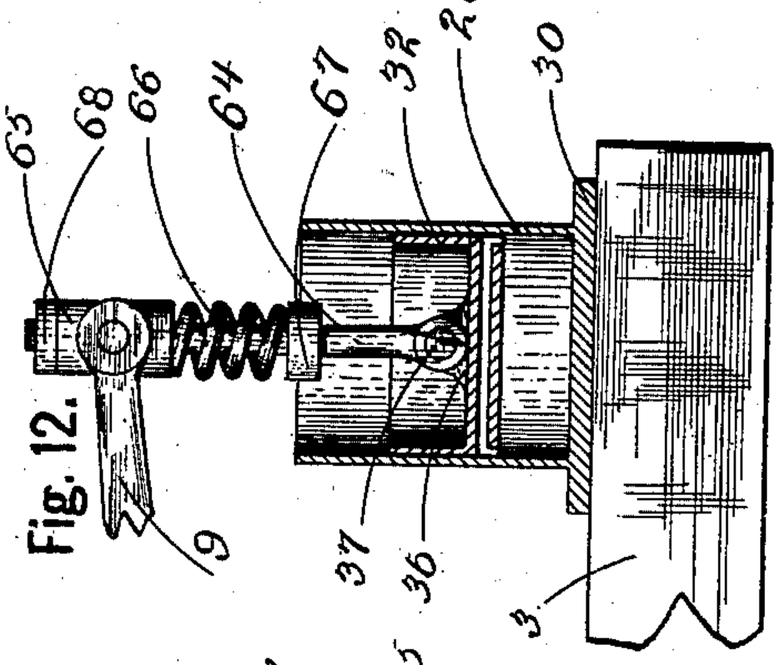
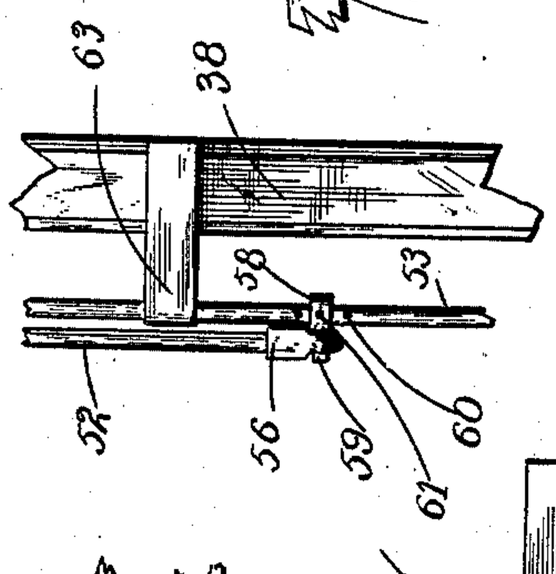
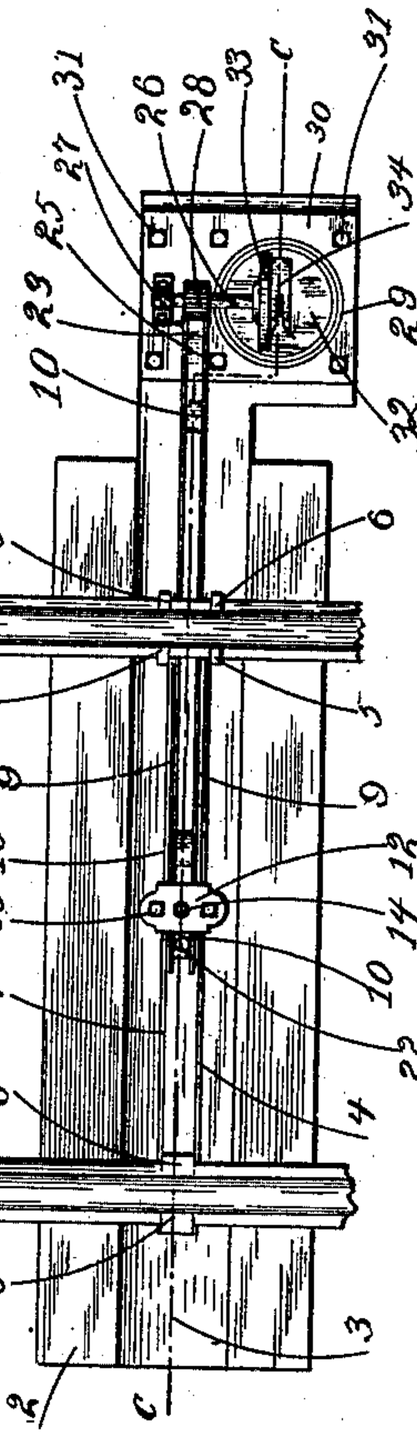


Fig. 10.





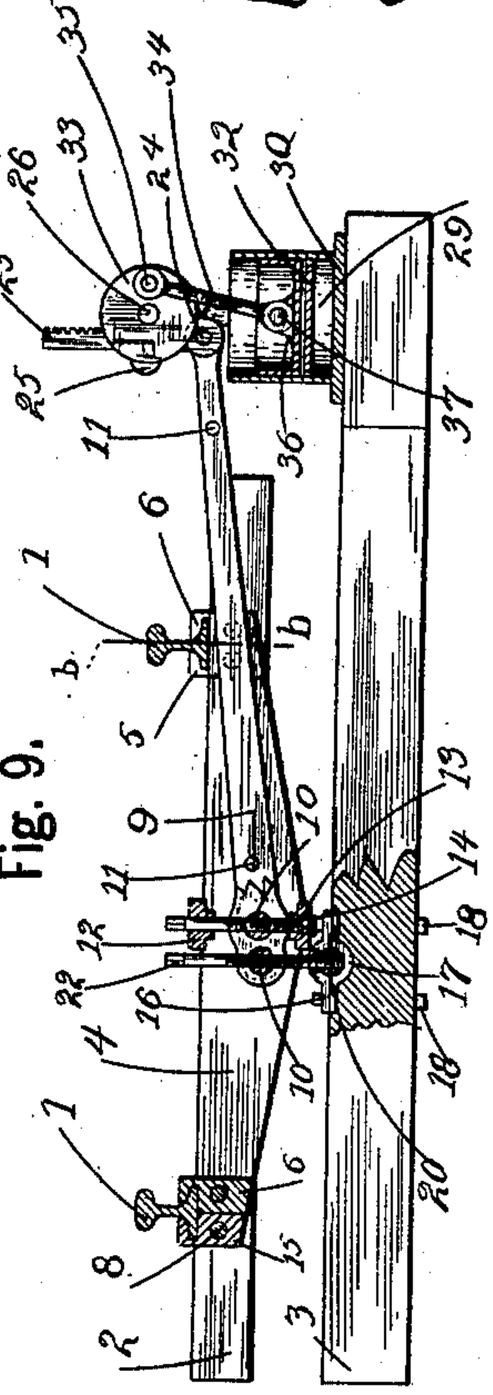


Fig. 7.

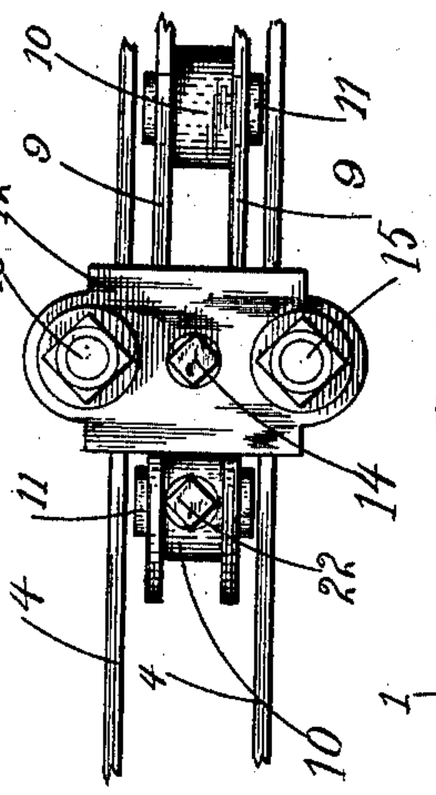


Fig. 8.

Fig. 9.

Witnesses.

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DANGER-SIGNAL FOR RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 683,422, dated September 24, 1901.

Application filed October 2, 1900. Serial No. 31,803. (No model.)

To all whom it may concern:

Be it known that I, CYRUS S. DEAN, a subject of the Queen of Great Britain, residing at Fort Erie, county of Welland, Province of Ontario, Dominion of Canada, have invented certain new and useful Improvements in Danger-Signals for Railways, of which the following is a specification.

My invention relates to an improved danger-signal which is automatically operated by the depression of rails on the passage of trains; and the object of the invention is to arrange a pneumatic device so that the depressing of the rails on the passage of trains will automatically compress air in said pneumatic device and through a system of piping actuate a danger-signal placed at a crossing or other locality requiring a signal.

For a full understanding of the merits and advantages of the invention reference is to be had to the accompanying drawings and the following description.

The invention is susceptible to various changes in the form, proportion, and minor details of construction without departing from the principle or sacrificing any of the advantages thereof, and to a full disclosure of the invention an adaptation thereof is shown in the accompanying drawings, in which—

Figure 1 represents a side elevation of a fragment of a railway equipped with my improved signaling appliance. Fig. 2 is an enlarged fragment of the two-part metal support, showing the clamps for tying it to the rail. Fig. 3 is a transverse section on line *a a*, Fig. 2. Fig. 4 is a transverse section through the support on line *b b*, Fig. 9, the rail and lever being omitted. Fig. 5 is an enlarged detached view of one of the parts of the transverse beam. Fig. 6 is an enlarged fragment, partly in section, to illustrate in detail the connection of the lever, metal support, and wooden beam. Fig. 7 is a fragmentary top plan view of the metal support and the lever. Fig. 8 is a top plan view of a fragment of a railway having the improved signal. Fig. 9 is a section on line *c c*, Fig. 8. Fig. 10 is an enlarged fragment of the signal-supporting post and the rods connecting the signal to the pneumatic operating device. Fig. 11 is an enlarged fragmentary section on line *c c*, Fig. 8. Fig. 12 is a fragment, partially in section, showing a modified form of piston connection.

In referring to the drawings in detail like numerals designate like parts.

1 designates the rail of an ordinary railway, and 2 the ties upon which the rails are supported.

In the preferred adaptation of my invention as illustrated in the drawings a beam 3 is rigidly embedded in the ground beneath the ties, which forms a foundation-support for an operating-lever. A support composed of two parallel metal plates 4, formed substantially as shown in Fig. 5 and slightly separated from each other, is arranged between two of the ties and extends transversely between the rails, being clamped to the rails at its ends. The clamps employed for this purpose are preferably formed in two sections 5 and 6, as shown in Figs. 2, 3, 4, and 9, and have recesses 7, in which the side flanges of the rail fit. One clamp made as above described is fitted between the plates 4 at one end, being sufficiently thick to fill the space between the plates and being fastened to said plates by the bolts 8, and two clamps are fitted upon the outside of the opposite end of the plates and fastened in place by similar bolts 8. A lever is supported between the metal plate 4 and consists of two parallel parts 9, which are maintained in separated arrangement by the blocks 10, fitted between, each block having reduced side portions 11, circular in cross-section, which fit into openings in the parts 9. Upper and lower metal brackets 12 and 13 are placed at about the middle of the plates 4, and a vertical screw-bar 14 is passed through these brackets and one of the blocks 10 in the lever. (See Fig. 6.) The brackets 12 and 13 are fastened rigidly in place by the side bolts 15, (see Fig. 7,) which pass through the ends of the brackets and on the exterior of the plates 4. A box formed in upper and lower sections 16 and 17 is rigidly fastened to the beam 3 by bolts 18, and each section has a recess forming part of a socket 19, in which a ball 20 is fitted, and the upper section has a slot or opening 21, extending from the recess through the section. A second screw-bar 22 passes vertically down through the block 10, arranged between the

extreme end of the parts of the lever and into the ball journaled in the box mounted on the beam. (See Fig. 6.) A vertical rack-bar 23 is pivoted at its lower end to the forward end of the lever by a pintle 24 and is supported in vertical position by a roller 25. A horizontal shaft 26 is journaled in a support 27 and has a gear-wheel 28, which meshes with the teeth in the rack-bar 23. An air-compressor is mounted on the beam 3 at one side of the track and consists of a cylinder 29, having a closed lower end, and a base 30, bolted to said beam by the bolts 31, and a piston 32, sliding in said cylinder. A disk 33 is mounted on the horizontal shaft 26, and a crank-arm 34, pivoted to the disk by a crank-pin 35, has its lower end pivoted to ears or lugs 36, projecting from the piston by the pin 37. A vertical post 38 is mounted on one side of the track at the desired point, and a shaft 39 is horizontally journaled in the upper portion of the post. A danger-signal 40 is mounted on this shaft, and a lever 41, mounted on the shaft, has its long end 42 arranged opposite the signal or approximately opposite the signal, so as to partially counterbalance the signal, and thus permit it to be operated more easily. An air-bell 43 is arranged upon a hollow support 44 so that it can telescope thereon, and a pipe 45, communicating with the air-compressor, extends through the hollow support to permit the compressed air to pass beneath the air-bell 43 and force the same upward. A valve device is arranged in the hollow support 44 and is automatically operated by the passage of the train to permit the air to escape and the bell to telescope upon the support. This valve preferably consists of a vertical rod 46, having a valve part 47 at its upper end, which fits in an opening in the top of the hollow support 44, and a lever-arm 48, having an angular crank or offset 49 at its lower end, which engages with the lower end of the rod 46. The lever-arm 48 is pivoted on a pin 50 and is arranged in a vertical position, being normally held in said position by a spring 51. The air-bell 43 is operatively connected to the shaft from which the danger-signal is hung by an extensible connecting-rod. The connecting-rod is preferably formed in two parts 52 and 53, the upper part 52 being pivoted to the short extension 54 of the lever 41, and the lower end of the lower part 53 is rigidly fitted in the socket in an enlargement 55 on the top of the air-bell 43. The lower end of the upper part 52 has an enlargement 56, provided with an eye 57, and a collar 58, fitted on the lower part so as to slide thereon, has an extension 59 fitting in the eye 57. A series of holes 60 are arranged longitudinally in the lower part 53, and the collar 58 has a hole or opening 61, adapted to register with any one of the holes in the lower part 53. A pin 62 is passed through the hole in the collar and the registering hole in the part 53 to lock the two parts in their adjusted position. To support the connecting-rod in approximately horizontal position, a horizontal bracket 63 is extended laterally from the post 38, and the lower part 53 of the connecting-rod is made long enough to extend up through and slide in a vertical opening in said bracket. The upper part or member 52 of the connecting-rod turns slightly on the extension 59 of the collar 58 as the lever 41 turns, owing to the curved path of movement of said lever.

In the modification shown in Fig. 12 the piston-rod 64 is pivoted to the piston of the air-compressor, and the end of the operating-lever is pivoted to a sleeve 65, mounted on the upper end of the piston-rod 64. This sleeve is supported upon a coiled spring 66, which is mounted upon a collar 67, rigidly fastened to the rod. The upward movement of the sleeve is limited by a collar 68, rigidly secured to the top end of the rod.

The purpose of the spring is to prevent the operating-lever from forcing the piston through the lower end of the compressor-cylinder when the forward end of said lever is moved a greater distance downward than usual, the sleeve moving downward on the piston-rod against the tension of the spring when the piston is at its lowest position to allow for the additional downward movement of the operating-lever.

The operation of my improved signaling device is as follows: When the locomotive reaches the rail directly above the operating-lever, the rails and the connecting-beam are pressed downward. This carries the operating-lever downward and through the connecting mechanism compresses the air in the air-compressor. The compressed air passes through the pipe and raises the air-bell, which in turn partially rotates the shaft and elevates the danger-signal into the position shown in Fig. 1. When the locomotive reaches the post, it presses the lever operating the release-valve downward, opening said valve and permitting the air-bell and danger-signal to resume their former inoperative position. As the point at which the lever is supported from the two-part metallic support is very near the point at which it is supported from the beam, a slight movement of the rails is sufficient to give quite a movement to the end of the operating-lever. The lever is regulated and adjusted relatively to the beam 3 and the two-part metal support hung from the rails by turning the vertical screw-bars 14 and 22, the screw-bars being provided at their upper ends with hexagonal or similarly-formed portions to receive a wrench or other tool. (See Fig. 6.)

I claim as my invention—

1. In a railway signaling device, rails, a signal, mechanism for operating said signal, a rigid beam, a support secured to the rails, a lever formed in two parts pivoted to the support and fulcrumed to the beam; said lever having operative connection with the mechanism for operating the signal.

2. In a railway signaling device, rails, a signal, an air-compressor, a two-part transverse support secured to the rails, an operating-lever connected to the air-compressor, and formed in two sections pivoted to the parts of the transverse support, and mechanism operatively connecting the air-compressor to the signal.

3. In a railway signaling device, rails, a signal, an air-compressor, an operating-lever having one end connected to the air-compressor and the opposite end fulcrumed on a fixed point, a two-part support secured to the rails and between the parts of which the lever is pivoted, an air-bell, a pipe between the air-bell and the air-compressor, and a connecting-rod between the signal and the air-bell, as set forth.

4. In a railway signaling device, a signal, a two-part transverse support secured to the rails and moving with the rails, a beam rigidly mounted beneath the rails, a lever pivoted between the parts of the support, and having its end supported from the beam and signal-operating mechanism connected to the opposite end of said lever.

5. In a railway signaling device, a signal, a support formed of two plates in parallel separated arrangement and secured to the rails, a beam beneath the rails, a lever pivoted between said plates, a box mounted on said beam, a ball in said box, and a screw-bar passed through the lever and the ball, substantially as set forth.

6. In a railway signaling device, a signal, a support formed of two plates in parallel separated arrangement and secured to the rails, a beam beneath the rails, a lever pivoted between said plates, upper and lower brackets mounted on the plates, a screw-bar passed through said upper and lower brackets and the lever, a beam beneath the rails, a box mounted on said beam, a ball in said box and a second screw-bar passed through the lever and the ball, substantially as set forth.

7. In a railway signaling device, a signal, a transverse support between the rails, a beam beneath the rails, a lever adjustably pivoted to said support and having an adjustable support on the beam and mechanism operatively connected to the signal and lever.

8. In a railway signaling device, a signal, a transverse support between the rails, a beam beneath the rails, a lever supported from the beam, a block pivoted to the lever, a screw-bar secured to the support and passed through the block and mechanism operatively connected to the signal and lever.

9. In a railway signaling device, a signal, a transverse support between the rails, a beam beneath the rails, a lever, two screw-bars; one pivoting the lever to the support and the other supporting the lever from the beam, and operating mechanism connected to the lever and signal.

10. In a railway signaling device, a signal, a transverse support secured to the rails, a lever pivoted to said support, a rack-bar pivoted to said lever, a shaft, a gear-wheel on said shaft meshing with the rack-bar, an air-compressor, a piston in said compressor, a crank-rod on the shaft pivoted to said piston, and operating connections between the air-compressor and the signal.

11. In a signaling device, the combination with the rails, of a support, clamps secured to said support, and having recesses in which the rails seat, a lever operated by the movement of said support, and a signal operated by the movement of said lever.

12. A railway signaling device, comprising a signal, a lever operated by the depressing of the rails on the passage of trains, a vertical rack-bar connected to said lever, a horizontal shaft, a gear-wheel on said shaft meshing with the rack-bar, a disk on said shaft, a cylinder forming an air-compressor, a piston in said cylinder, a crank-rod pivoted to the piston and disk and forming a piston-rod, and mechanism controlling the signal operatively connected to the air-compressor.

13. A railway signaling device, comprising a signal, a lever operated by the depressing of the rails on the passage of trains, a vertical rack-bar connected to said lever, a horizontal shaft, a gear-wheel on said shaft meshing with the rack-bar, a roller behind said rack-bar, a disk on said shaft, a cylinder forming an air-compressor, a piston in said cylinder, a crank-rod pivoted to the piston and disk and forming a piston-rod, and mechanism controlling the signal operatively connected to the air-compressor.

14. In a railway signaling device, a post, a shaft journaled in the upper portion of said post, a signal mounted on said shaft, a bar mounted on said shaft and having its longer end extending approximately opposite the signal and partially counterbalancing the said signal, operating mechanism, and a connecting-rod connecting the operating mechanism to the shorter end of said bar.

15. In a signaling device, the combination with the rails, of a transverse support, clamps secured to said support and having recesses in which the side flanges of the rails fit, a lever pivoted to the support and having one end fulcrumed beneath the rails and a signal operated by the movement of said lever.

16. In a signaling device, the combination with the rails, of a transverse support formed of two parallel plates, clamps secured to said support, and having recesses in which the side flanges of the rails fit, a lever pivoted between the plates of said support, and having one end fulcrumed beneath the rails and a signal operated by the movement of said lever.

17. In a signaling device, the combination with the rails, of a transverse support secured to said rails and composed of two separated parallel plates having transverse openings, a lever composed of two separated parallel plates having openings, blocks between said plates, and one of said blocks having side ex-

tensions fitting through the openings in the plates of the lever and the plates of the support, and a signal controlled from said lever.

18. In a railway signaling device, a signal, a transverse support secured to the rails and moving with said rails, a beam rigidly mounted beneath the rails, a lever pivoted to the support and fulcrumed on the beam and mechanism connecting the lever to the signal.

19. In a railway signaling device, a signal, a transverse support secured to the rails and moving with the rails, a beam rigidly mounted beneath the rails, a lever pivoted to the transverse support and having its end supported from the beam and signal-operating mechanism connected to the opposite end of said lever.

20. In a railway signaling device, a signal, a support secured to the rails, a beam beneath the rails, a lever pivoted to the support, a box mounted on said beam, a ball in said box, and a screw-bar passed through the lever and the ball, substantially as set forth.

21. In a railway signaling device, a signal, a support secured to the rails, a beam beneath the rails, a lever pivoted to the support, upper and lower brackets mounted on the support, a screw-bar passed through said upper and lower brackets and the lever, a beam beneath the rails, a box mounted on said beam, a ball in said box and a second screw-bar passed through the lever and the ball, substantially as set forth.

22. In a railway signaling device, a signal, a transverse support beneath the rails, a beam beneath the rails, a lever supported from the beam, a block secured to the support and pivoted to the lever, and mechanism operatively connecting the signal and lever.

23. In a railway signaling device, rails, a signal, a support, an unmovable beam, a lever, two screw-bars; one pivoting the lever to the support and the other supporting the lever from the beam, and operating mechanism connected to the lever and signal.

24. In a railway signaling device, a signal, a transverse support secured to the rails, a lever pivoted to said support, an air-compressor, a piston in said compressor, a crank-rod on the shaft pivoted to said piston, and operating connections between the air-compressor and the signal and the crank-rod and the lever.

25. A railway signaling device, comprising a signal, a lever operated by the depressing of the rails on the passage of trains, a vertical rack-bar connected to said lever, a horizontal shaft, a gear-wheel on said shaft meshing with the rack-bar, a disk on said shaft, a cylinder forming an air-compressor, a piston in said cylinder, a crank-rod pivoted to the piston and disk and forming a piston-rod, an air-bell, a pipe between the air-bell and air-compressor, and a rod connecting the signal and air-bell.

26. A railway signaling device, comprising a signal, a lever operated by the depressing of the rails on the passage of trains, a vertical rack-bar connected to said lever, a horizontal shaft, a gear-wheel on said shaft meshing with the rack-bar, a disk on said shaft, a cylinder forming an air-compressor, a piston in said cylinder, a crank-rod pivoted to the piston and disk and forming a piston-rod, an air-bell, a pipe between the air-bell and air-compressor, and a rod connecting the signal and air-bell; said rod consisting of two pivotally-jointed sections.

27. In a signaling device, the combination with the rails, of a transverse support, secured to said rails and formed in two parts, a lever pivoted between the parts of said support and operated by the movement of said support, and a signal operated by the movement of said lever.

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