

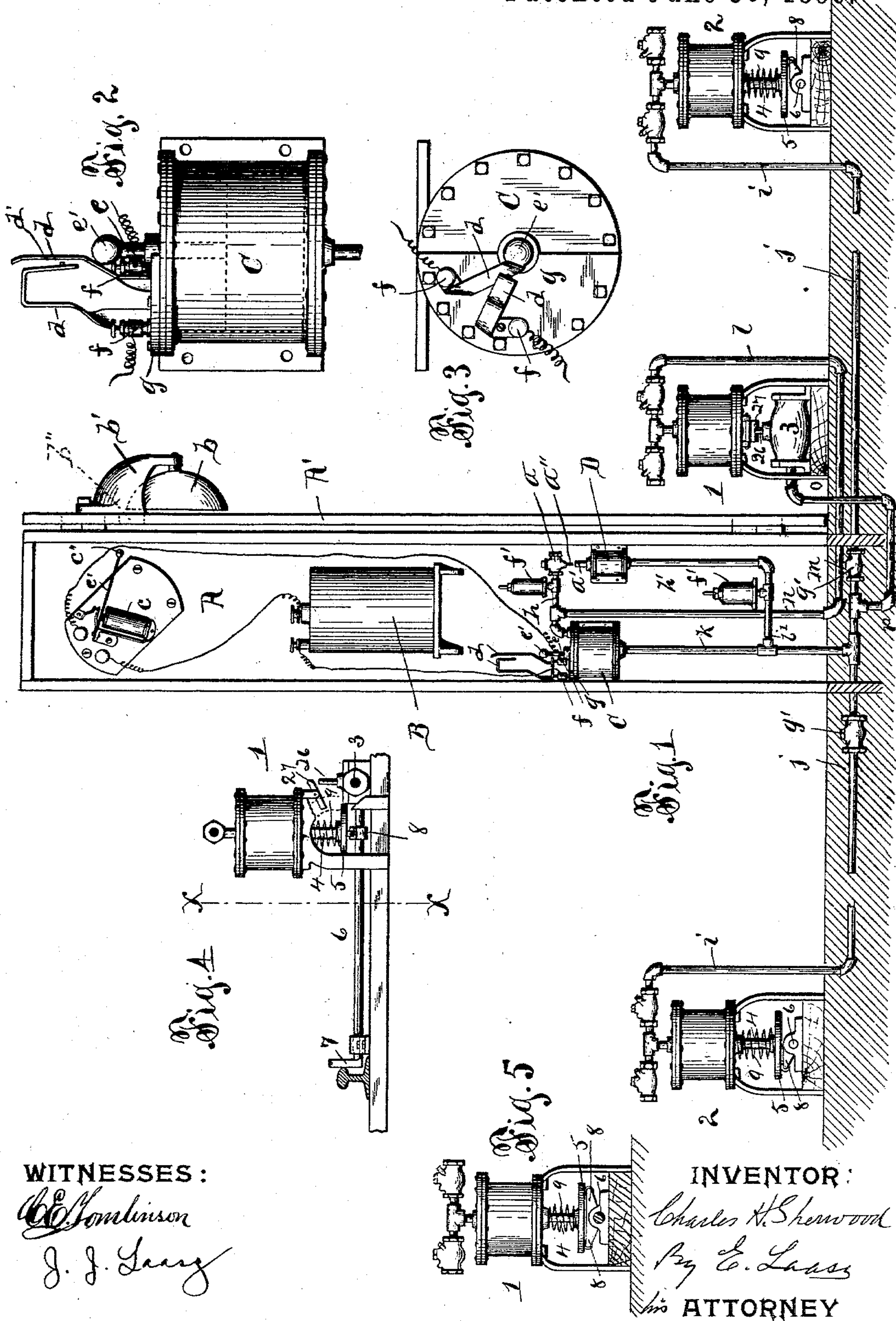
(No Model.)

2 Sheets—Sheet 1.

C. H. SHERWOOD.
ELECTRIC SIGNAL.

No. 562,929.

Patented June 30, 1896.



WITNESSES:

C. Robinson
J. J. Lacy

INVENTOR:

Charles H. Sherwood
By E. L. Lacy
ATTORNEY

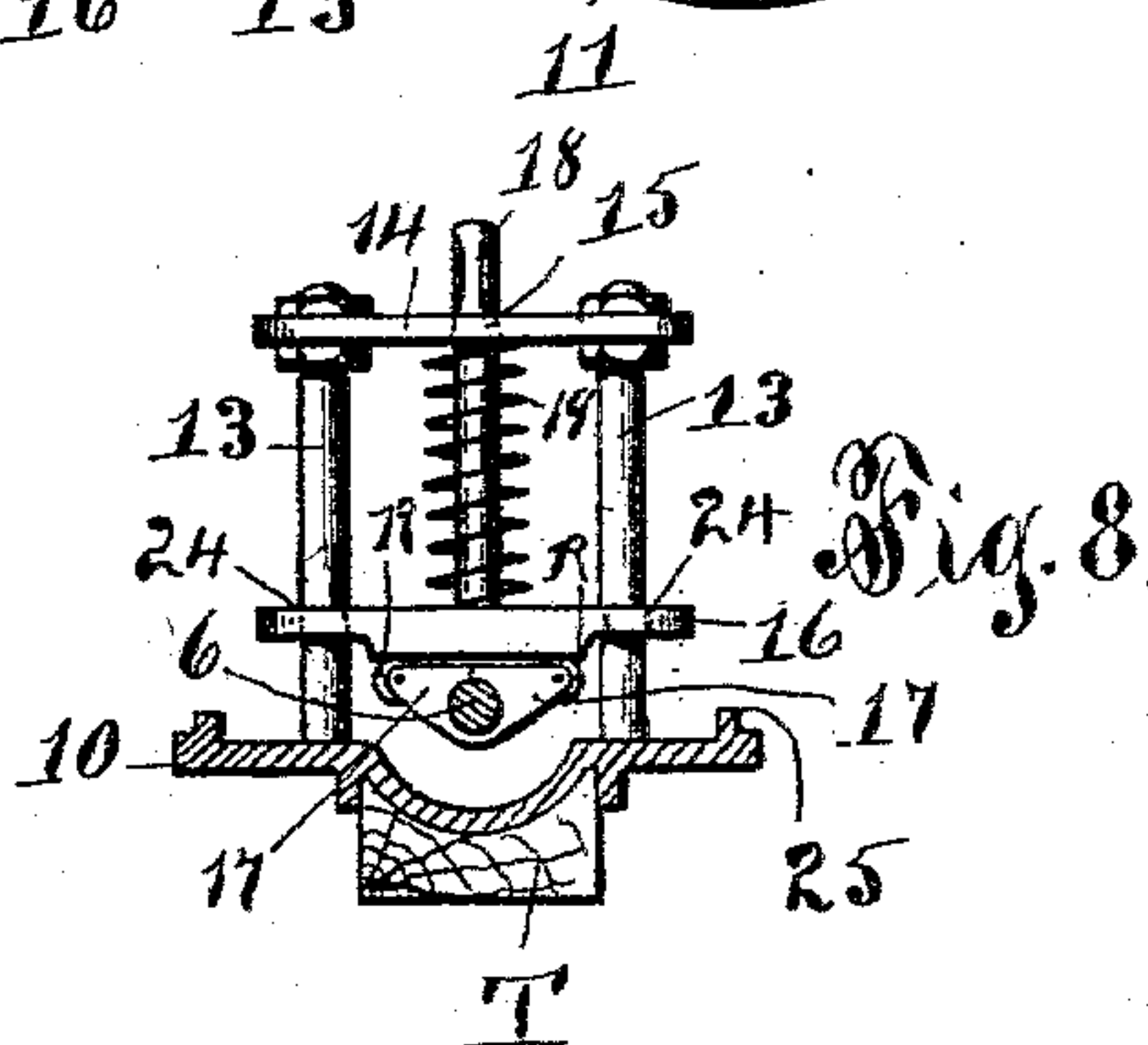
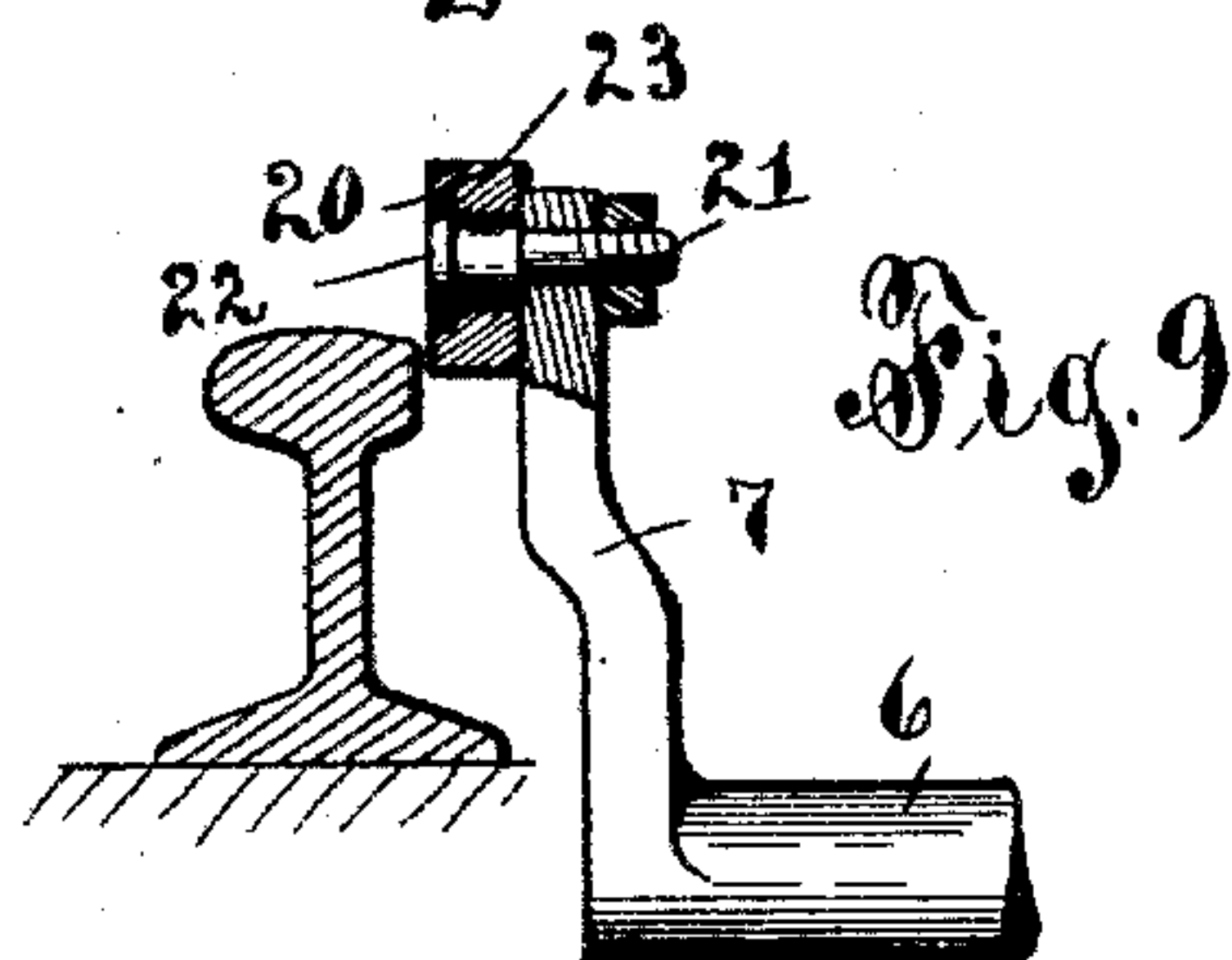
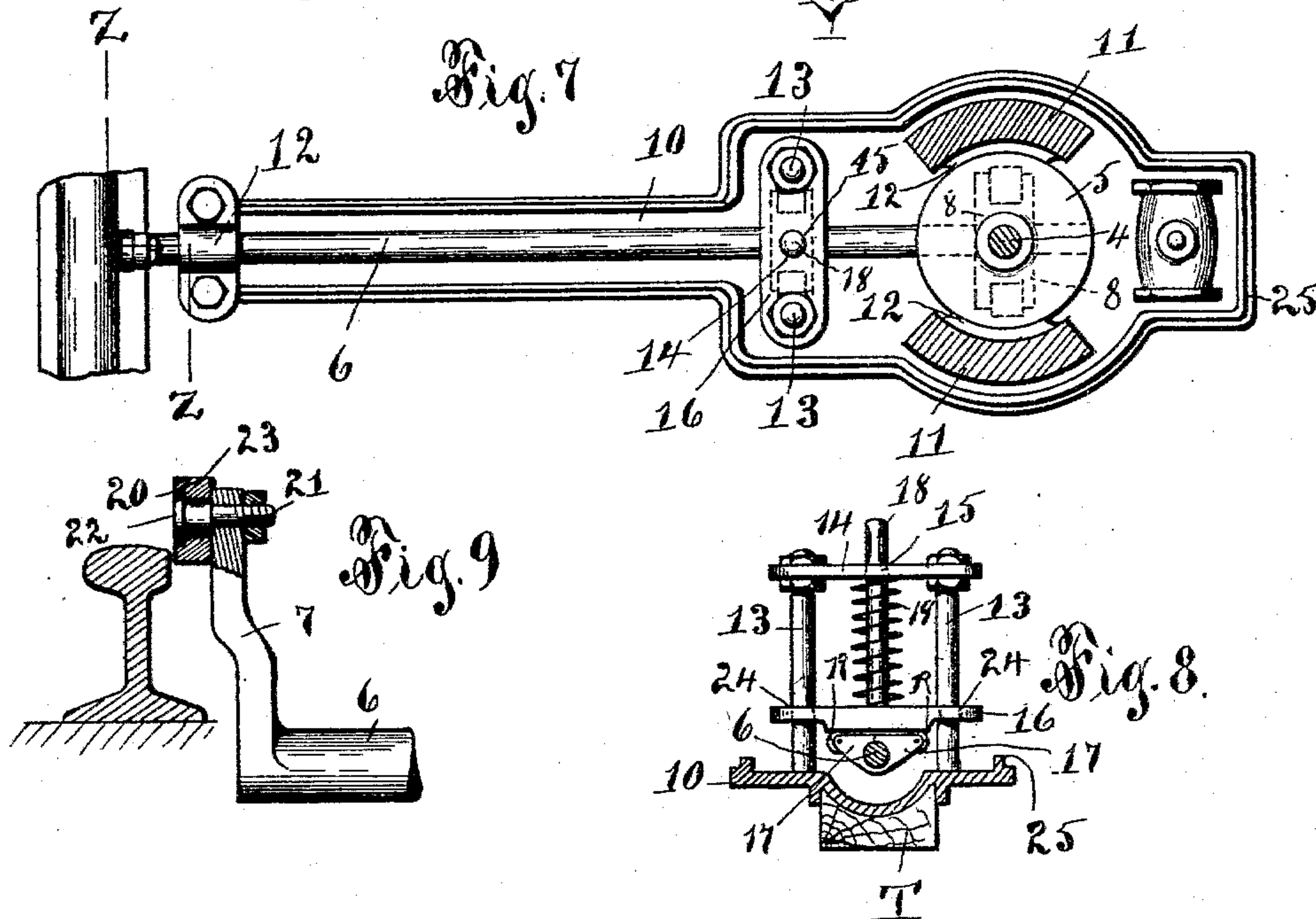
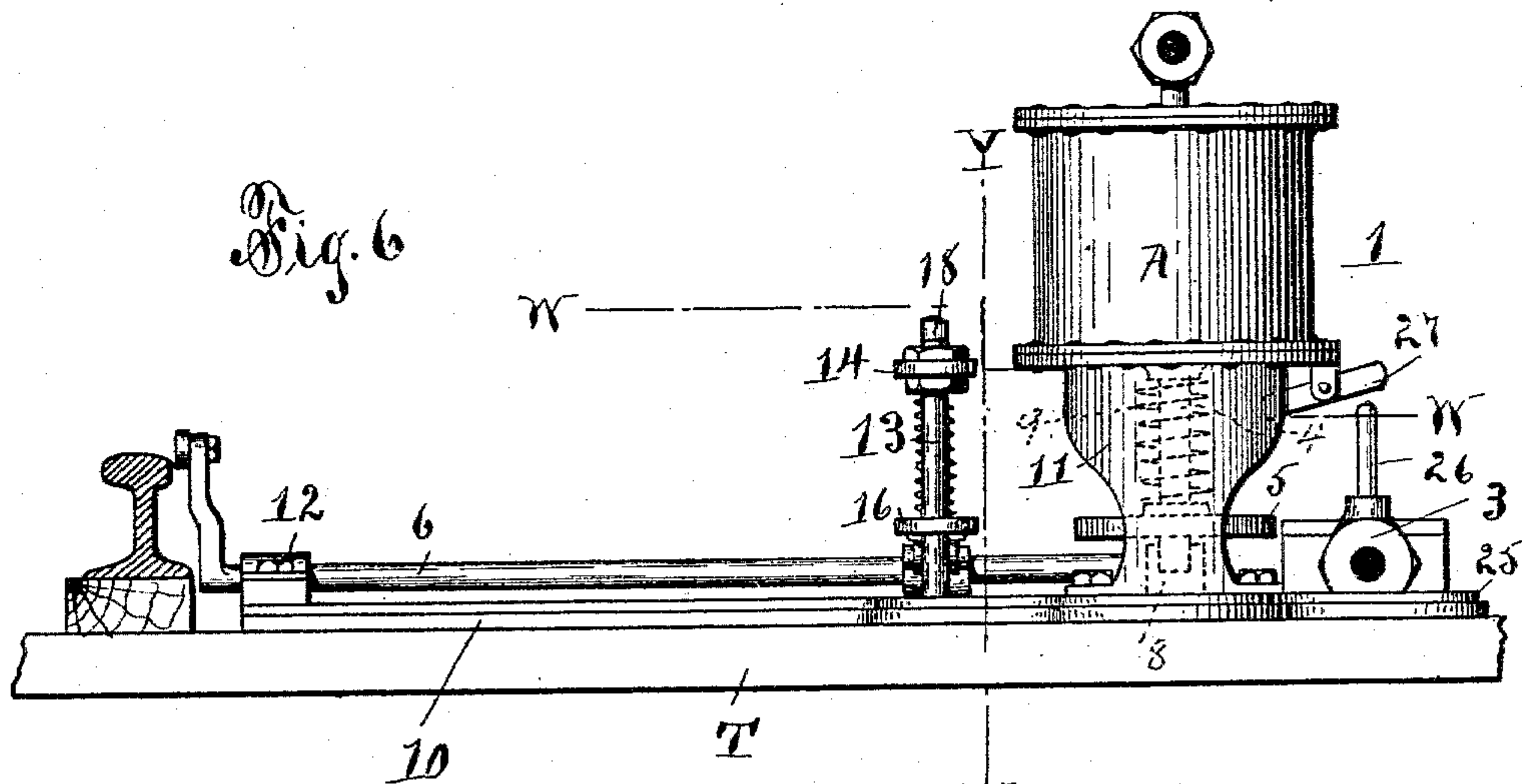
(No Model.)

2 Sheets—Sheet 2.

C. H. SHERWOOD.
ELECTRIC SIGNAL.

No. 562,929.

Patented June 30, 1896.



WITNESSES:

W. H. Robinson.
J. J. Laess.

INVENTOR:

Charles H. Sherwood
by E. Laess
his ATTORNEY

UNITED STATES PATENT OFFICE.

CHARLES H. SHERWOOD, OF UTICA, NEW YORK, ASSIGNOR OF ONE-HALF
TO HENRY C. LYMAN, OF SHERBURNE, NEW YORK.

ELECTRIC SIGNAL.

SPECIFICATION forming part of Letters Patent No. 562,929, dated June 30, 1896.

Application filed October 21, 1895. Serial No. 566,291. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. SHERWOOD, of Utica, in the county of Oneida, in the State of New York, have invented new and useful Improvements in Electric Signals, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to the class of electric signals which are employed on railroads and operated automatically by a passing train; and it consists usually of a bell located at a street-crossing, an electric circuit, bell-ringing mechanism and battery in said circuit, a circuit-maker remote from the signal and a circuit-breaker adjacent to the signal, both operated by the wheels of a passing train or engine. Said systems require a great deal of wiring and a great number of batteries which require a great deal of care and repairing and are expensive.

My invention consists of a bell located at the street-crossing, an electric circuit, bell-ringing mechanism, and a single battery in said circuit, a circuit maker and breaker adjacent to the bell, an air-cylinder having its piston operating said circuit maker and breaker, air-pumps and relief-valves controlling the movement of said piston-rod, and a track instrument at each pump actuated by a passing train or engine operating said pumps.

The invention is fully illustrated in the accompanying drawings, in which—

Figure 1 is a view showing my improved system. Fig. 2 is a detail side view of the main air-cylinder having the circuit maker and breaker located thereon. Fig. 3 is a plan view of the same. Fig. 4 is a side view of the pump adjacent to the signal and a relief-valve operated thereby and showing the track instrument which operates the same. Fig. 5 is a view on line X X in Fig. 4. Fig. 6 is an enlarged side view of a modification of the pump adjacent to the signal and track instrument operating the same. Fig. 7 is a longitudinal section on line W W, Fig. 6. Fig. 8 is a transverse section on line Y Y, Fig. 6; and Fig. 9 is an enlarged transverse section on line Z Z, Fig. 7.

Similar letters and numerals of reference indicate corresponding parts.

A represents a case which is suitably located at the street-crossing and is provided with the laterally-swinging door A'. Within said case is located the bell-ringing mechanism, consisting of the usual magnet *c* and its armature *c'*, provided with the bell-hammer *c''*. A battery B and a circuit maker and breaker are also located within said case and all in circuit.

The bell *b* is secured to the outer face of the door A' and is provided with a shield *b'*. Said door is shown thrown part way open and presenting a face view of its free edge thereof. Near the bell the door is provided with a hole or slot *b''* (shown in dotted lines) for the reception of the bell-hammer *c''*.

In a suitable portion of the case is located a main air-cylinder C, disposed in a vertical position and having its piston-rod *e* extending upward. On the upper end of said cylinder is located the circuit maker and breaker, consisting of two flexible metal plates *d d*, secured on the insulating-plate *g* by means of the binding-post *f f*, to which one end of each of the two wires of the electric circuit is fastened. The upper end of the piston-rod *e* is provided with a ball *e'*, by which it bears against one of the aforesaid flexible plates *d* and insulated therefrom, as shown at *d'* in the drawings.

Adjacent to the main cylinder C is a vertically-disposed relief air-cylinder D, having its piston-rod *a'* extending upward. Directly above the relief-cylinder is a relief-valve *a*, having its stem *a''* axially in line with the piston-rod *a'*, which valve communicates with the top of the interior of the main cylinder C by means of the pipe *h*.

Remote from the case A in opposite directions are two air-pumps 2 2, communicating with the bottom of the interior of the main cylinder by means of the pipes *i, j*, and *k*. Adjacent to the case A is a similar pump 1, communicating with the top of the main cylinder by means of the pipes *l, m, n*, and *h*. Adjacent to the pump 1 is a relief-valve 3, having its stem 26 extending upward and operated by the vertically-swinging finger 27, pivoted to the lower end of the cylinder of the pump, said finger being swung to force down the stem of said valve with its outer end by means of the plate 5, secured on the lower

end of the piston-rod 4 of said pump-cylinder, striking the inner end of said finger in the upward movement of said plate.

The relief-valve 3 communicates with the bottom of the interior of the air-cylinder C by means of the pipes *o*, *p*, *j*, and *k*, and with the bottom of the interior of the cylinder D by means of said pipes and the pipes *i'* and *h'*, extending from the pipe *k*. Said pumps are each operated by a track instrument consisting of a horizontal rock-shaft 6, extending from beneath the plate 5 on the piston-rod 4 to the railway-track and provided with a vertical arm 7 on the end adjacent to the track and a horizontal arm 8 and arms 8 8 at, respectively, the remote and adjacent pumps.

Between the plate 5 and pump-cylinder is interposed a spring 9 for the purpose of forcing down the plate 5, thereby drawing down the pump-piston and also throwing the track instrument to its normal position.

The pipes *h* and *i* are provided with pop-valves *f' f'* to relieve any excess pressure, and the pipe *j* is provided with check-valve *g' g'* at opposite sides of the connection with the pipe *k*.

The operation of my improved signal system is as follows: As a train from either direction approaches the street-crossing at which is located the signal and passing a remote pump 2, the wheels of said train strike the vertical arm 7, which rocks the shaft 6, thereby throwing up the horizontal arm 8, secured on the inner end of said shaft, which pushes up the plate 5 and the piston-rod 4 and piston of said pump, whereby the air is forced through the pipes *i*, *j*, and *k* into the bottom of the interior of the main cylinder C, and also from the pipe *k*, through the pipe *i'* and *h'*, into the bottom of the interior of the relief-cylinder D, whereby its piston-rod *a'* is forced up and pushes up the stem *a''* of the relief-valve *a*, operating the same, releasing the air from the cylinder C above the piston through the pipe *h*. By forcing the air into the bottom of the cylinder C and releasing the air from the top thereof its piston and rod *e* are moved up, and said rod, bearing against one of the flexible plates *d*, forces the same into contact with the other plate *d*, thereby closing the electric circuit, whereby the bell at the street-crossing is rung as an indication of the approach of a train. The piston-rod *e* remains in its outward position and holding said plates in contact until the train reaches the crossing and is passing the pump 1. In passing the adjacent pump 1 the track instrument is actuated precisely the same as at pump 2, and the rock-shaft 6 being provided with two horizontal arms 8 8 on its inner end, beneath the plate 5 on the piston-rod of the pump, said pump will be operated by a train moving in either direction. When the adjacent pump 1 is operated, the air is forced through the pipes *i*, *m*, *n*,

and *h* into the top of the interior of the main cylinder C to force down its piston and rod *e* in order to allow the adjacent flexible plate *d* to spring away from the other plate *d* to open the circuit, whereby the bell ceases to ring. In order to allow the piston of said cylinder to move down, the air is released from the bottom thereof by means of the relief-valve 3, operated by the pump 1, as aforesaid, through the pipes *o*, *p*, *j*, and *k*, and the air in the bottom of the cylinder D is released at the same time through the pipes *h'* and *i'* into the pipe *k*. By releasing the air from the cylinder D its piston is allowed to descend, drawing the rod *a'* away from the valve-stem *a''* of the relief-valve *a* to allow the same to close.

The system as herein shown is designed for a single-track road. On a double-track road the described mechanism and arrangement of the cylinder, valves, pumps, &c., is doubled.

The herein-described case A may be of any suitable form or design so as to protect the bell-ringing mechanism, battery, the circuit maker and breaker, &c., from the weather. I prefer to employ a dry battery in my improved system to avoid freezing of same.

The pumps 1 and 2 and track instrument I prefer to construct in the form shown in the modification, which construction is as follows: From the track-rail extending outward is a horizontal plate 10, suitably secured on the tie T, and on the outer end portion of said plate are bolted the two legs 11 11, which support the pump-cylinder *a'*. The inner side of each leg is formed with a segmental guide 12, in which slides the annular horizontal plate 5, secured to the lower end of the piston-rod 4 of the pump-cylinder A'. On the outer end of the horizontal rock-shaft 6 of the track instrument and bearing against the under side of the plate 5 are the two horizontal arms 8 8 at the pumps adjacent to the signal, and a single arm 8 at the pumps remote from the signal, as shown in Fig. 1 of the drawings. Said shaft is mounted in suitable journal-boxes 12 12, the lower half of said boxes being formed on the plate 10. In front of the pump-cylinder and secured to the plate 10 are two vertical posts 13 13, and on the tops of said posts is secured a horizontal plate 14, provided with a hole or guide 15. Below the plate 14 is a plate 16, provided with two holes or guides 24 24 at its end portion, by which it slides up and down on the posts 13 13. Below the plate 16 extends the rock-shaft 6 and has secured thereon two horizontal arms 17 17, provided with rollers R R, which bear against the under side of the plate 16, said plate being provided with a rubber or rawhide facing on its under side. In the center of said latter plate is secured or provided a vertical piston-rod 18, which moves in the guide 15, formed in the plate 14, as aforesaid, and between said plates is interposed a spiral spring 19. The vertical arm 7 on the

end of the rock-shaft adjacent to the track I provide with a roller 20, which is preferably secured thereto by means of a bolt 21, the head 22 of which is countersunk in the roller formed with a shoulder 23. The object of this arrangement is to retain the track instrument in its position in case the pump becomes accidentally displaced, thereby preventing the arm 7 from being tipped toward the track and thereby cause a train or engine to be derailed.

The plate 10 is preferably formed with a rib 25 around its edge, by which to retain a case or covering over the instrument and pump, not necessary to be shown.

What I claim as my invention is—

1. In a railroad electric signaling apparatus or system, the combination with the circuit maker and breaker, of an air-cylinder having its piston-rod in proximity to said circuit maker and breaker, air-pumps remote from the signal communicating with the bottom of the interior of said cylinder and moving its piston and piston-rod to operate the circuit maker and breaker to close the circuit, a pump adjacent to the signal communicating with the top of the interior of said cylinder to move its piston and piston-rod to open the circuit, relief-valves relieving said cylinder from compressed air in front and back of its piston and track instruments actuated by a passing train operating said pumps as described and shown.

2. In a railroad electric signaling system, the combination with the circuit maker and breaker, of an air-cylinder having its piston-rod in proximity to said circuit maker and breaker, air-pumps remote from the signal communicating with the bottom of the interior of said cylinder and a relief-valve communicating with the top of the interior of the cylinder to move its piston and operate the maker and breaker to close the circuit, a pump adjacent to the signal communicating with the top of the interior of the cylinder and a relief-valve operated by the adjacent pump communicating with the bottom of the interior of said cylinder to move its piston-rod to allow the maker and breaker to automatically open the circuit and track instruments operated by a passing train operating said pumps as described and shown.

3. In a railroad electric signaling system, the combination with the circuit maker and breaker, of a main air-cylinder having its piston-rod in proximity to said circuit maker and breaker, air-pumps remote from the signal communicating with the bottom of the interior of the main cylinder, a relief-valve communicating with the top of the interior of the main cylinder, a relief-cylinder having its piston-rod operating said relief-valve, a pump adjacent to the signal communicating with the top of the interior of the main cylinder, a relief-valve operated by the adjacent pump communicating with the bottoms of the interior of both cylinders and track instru-

ments actuated by a passing train operating said pumps as shown for the purpose described.

4. In an electric signaling system, the combination of a bell, a normally open electric circuit, bell-ringing mechanism and a battery in said circuit, an air-cylinder, a circuit maker and breaker on said cylinder and insulated therefrom, the piston-rod of said cylinder operating said circuit maker and breaker to close the circuit in its outward movement, said maker and breaker automatically closing the circuit in the inward movement of said piston-rod, and air-pumps and relief-valves communicating with opposite ends of the interior of said cylinder to control the movement of said piston-rod as described and shown.

5. In an electric signaling system, the combination of a bell, a normally open electric circuit, bell-ringing mechanism and a battery in said circuit, an air-cylinder, the circuit maker and breaker consisting of two flexible plates secured on and extending from the end of said cylinder and insulated therefrom, the piston-rod of said cylinder moving and pressing said plates into contact in its outward movement to close the circuit, and air-pumps and relief-valves communicating with opposite ends of the interior of said cylinder controlling the movement of its piston-rod as described and shown.

6. In a railroad electric signal system, the combination with the normally open circuit maker and breaker, consisting of two flexible plates *dd*, of a main air-cylinder C having its piston-rod *e* operating said circuit maker and breaker, air-pumps 2 2 remote from the signal communicating with the bottom of the interior of the main cylinder and bottom of the interior of the relief-cylinder D, a relief-valve *a* operated by the piston-rod *a'* of the cylinder D, an air-pump 1 adjacent to the signal communicating with the top of the interior of the main cylinder C, a relief-valve 3 operated by the adjacent pump and communicating with the bottoms of the interior of both air-cylinders, a plate 5 on the piston-rod 4 of the cylinders of the pumps, a rock-shaft 6 extending from the railroad-track to each pump beneath the plate 5, an arm 7 on the end of said shaft adjacent to the track, a single arm 8 on the inner end of the rock-shaft at the remote pump 2 2, two arms 8 8 on the inner end of the rock-shaft at the adjacent pump 4 and a spring 9 interposed between the plate 5 and pump-cylinder for the purpose described.

7. In an electric signaling system, the combination of a vertically-disposed air-cylinder, the circuit maker and breaker located thereon, the piston-rod on said cylinder moving said maker and breaker to close the circuit in its upward movement, said maker and breaker automatically opening the circuit when released by the downward movement of the piston-rod, a vertically-disposed relief air-cylinder

der adjacent to the main cylinder, a relief-valve above the relief-cylinder having its stem axially in line with the piston-rod of the latter cylinder, and communicating with the top of the interior of the main cylinder, remote air-pumps in opposite directions from the signal communicating with the bottom of the interior of both said cylinders, said pumps operated by a track instrument actuated by a passing train approaching the signal only, a pump adjacent to the signal communicating with the top of the interior of the main cylinder, a relief-valve operated by the latter pump and communicating with the bottom of the interior of both air-cylinders, a track instrument actuated by a train moving in either direction operating the latter pump and suitable pipe connections between all of said pumps and cylinders as described and shown.

8. The combination with the main air-cylinder C, of an insulating-plate *g* secured to the end of said cylinder, the circuit maker and breaker consisting of two vertical flexible plates *d d* normally apart, secured to said insulating-plate by means of binding-posts *f f*, the piston-rod *e* provided with the ball *e'* on its outer end and bearing against one of plates *d*, remote air-pumps 2 2 communicating with the bottom of the interior of said cylinder to force its piston and rod out to spring the adjacent plate *d* against the other plate *d* to close the circuit, an adjacent air-pump 1 communicating with the top of the interior of said main cylinder to force down its piston and rod, to allow the adjacent plate *d* to spring away from the other plate, a relief-cylinder D adjacent to the main cylinder, a relief-valve *a* having its stem *a''* axially in line with the piston-rod *a'* of the relief-cylinder and releasing the air from the top of the interior of the main cylinder, a relief-valve 3 operated by the adjacent pump 1 releasing the air from the bottom of the interior of both cylinders and track instruments operating all of said pumps and actuated by a passing train as described.

9. In combination with the case A having a swinging door A' of a bell *b* secured to the outer face of the door and having a shield *b'* over the same, an electric circuit bell-ringing mechanism, a battery B, a circuit maker and breaker consisting of two plates *d d* secured to the air-cylinder C, a relief-cylinder D and a relief-valve *a* communicating with the top of the interior of the cylinder C all within said case, the piston-rod *e* of said latter cylinder operating said circuit maker and breaker, air-pumps 2 2 remote from the case communicating with the bottom of the interior of both cylinders C and D, an air-pump 1 adjacent to the case and communicating with the top of the interior of the cylinder C, a relief-valve 3 operated by the adjacent pump and communicating with the bottom of the interior of both cylinders, and track instruments

actuated by a passing train operating said pumps as described and shown.

10. In the combined air-pump and track instrument, a combination of an air-cylinder, supports for said cylinder, an annular horizontal plate or disk secured to the lower end of the piston-rod of said cylinder, a rock-shaft extending outward from the track-rail beneath the cylinder and provided with a horizontal arm or arms bearing against the under side of said annular plate, a vertical arm secured to the end of said shaft adjacent to the track-rail to be actuated by the wheels of a passing engine or train, a spring between the aforesaid cylinder and plate, and guides in said supports for said annular plate as set forth and shown.

11. In the combined pump and track instrument, the combination of an air-cylinder, supports for said cylinder, an annular horizontal plate or disk secured to the lower end of the piston-rod of said cylinder, segmental guides formed in said supports for said plate, a horizontal rock-shaft extending outward from the track-rail and beneath said plate and formed with two horizontal arms bearing against the under side of said plate, a vertical arm secured to the end of said shaft adjacent to the track-rail and provided with a roller arranged in position to come in contact with the wheels of a passing train or engine, and a spring between the aforesaid plate and air-cylinder throwing said shaft and arms to their normal position as set forth and shown.

12. In the combined pump and track instrument, the combination of a horizontal supporting-plate extending outward from the track-rail, two vertical legs forming supports mounted on the outer end portion of said plate and formed with guides in their inner side, an air-cylinder mounted on said legs, an annular horizontal plate or disk secured to the lower end of the piston-rod of said cylinder and moving in the aforesaid guides, a horizontal rock-shaft extending from the track-rail outward beneath said plate or disk and having two horizontal arms thereon provided with rubber or rawhide faced rollers bearing against the under side of said plate, said shaft being mounted in suitable journal-boxes on the supporting-plate, two vertical posts secured to the supporting-plate in front of the cylinder, a horizontal plate secured on top of said posts and provided with a guide in the center, another plate below the latter plate and provided with two guides at its end portion by which it slides up and down on the aforesaid posts, the aforesaid rock-shaft being beneath said sliding plate and provided with two additional horizontal arms having rollers bearing against the under side of the latter plate, which plate is provided with a rubber facing or rawhide cushion, a vertical piston-rod secured to the sliding plate and moving in the guide in the center of the plate

above, a spiral spring interposed between the
two latter plates, a vertical arm secured on
the end of the rock-shaft adjacent to the
track-rail and provided with a roller to come
5 in contact with the wheels of a passing train
or engine as set forth.
In testimony whereof I have hereunto

signed my name this 10th day of September,
1895.

CHARLES H. SHERWOOD. [L. s.]

Witnesses:

D. L. ATKYNS,
H. M. LOOMIS.