

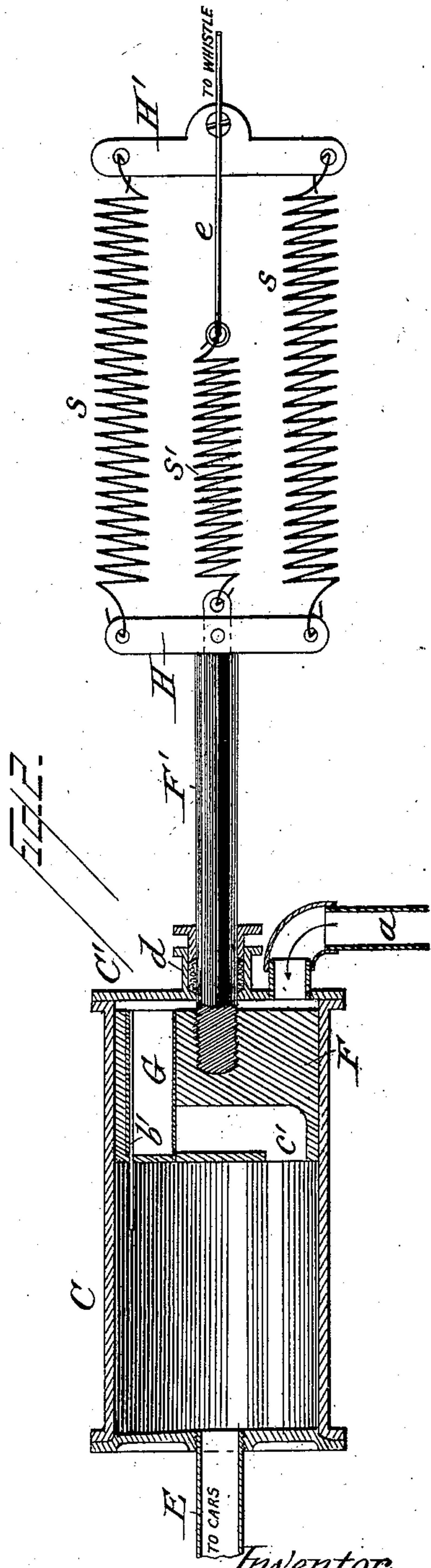
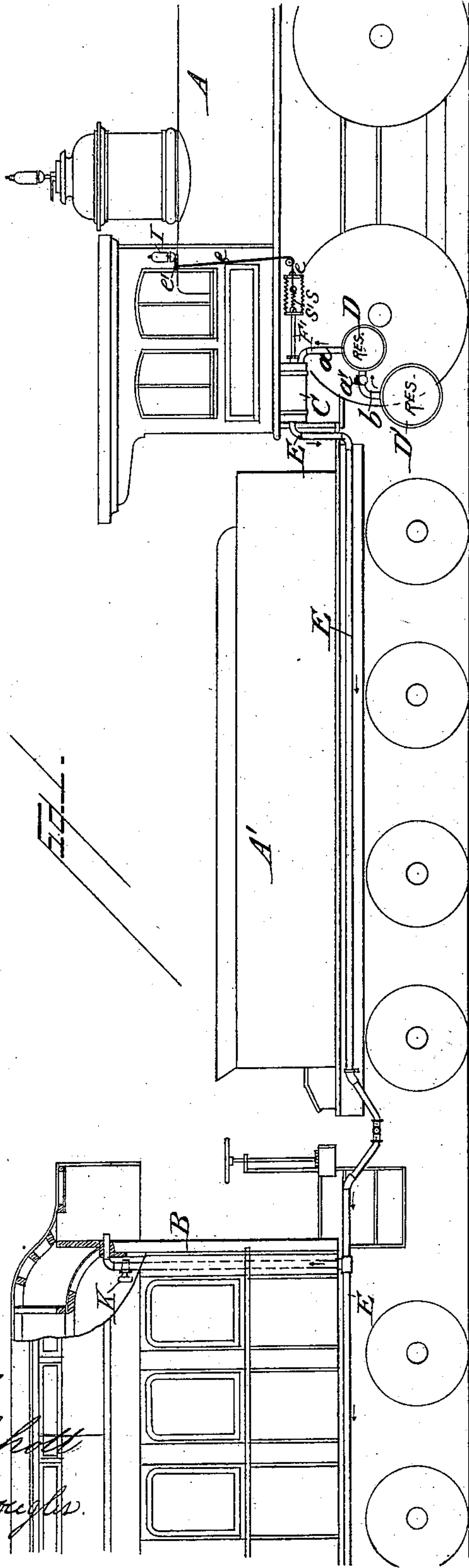
(No Model.)

2 Sheets—Sheet 1.

M. E. COMPANY.
TRAIN SIGNALING APPARATUS.

No. 407,279.

Patented July 16, 1889.



Attest:
H. H. Schott
J. B. Worthington.

Inventor
M. E. Company
By W. C. Chandler
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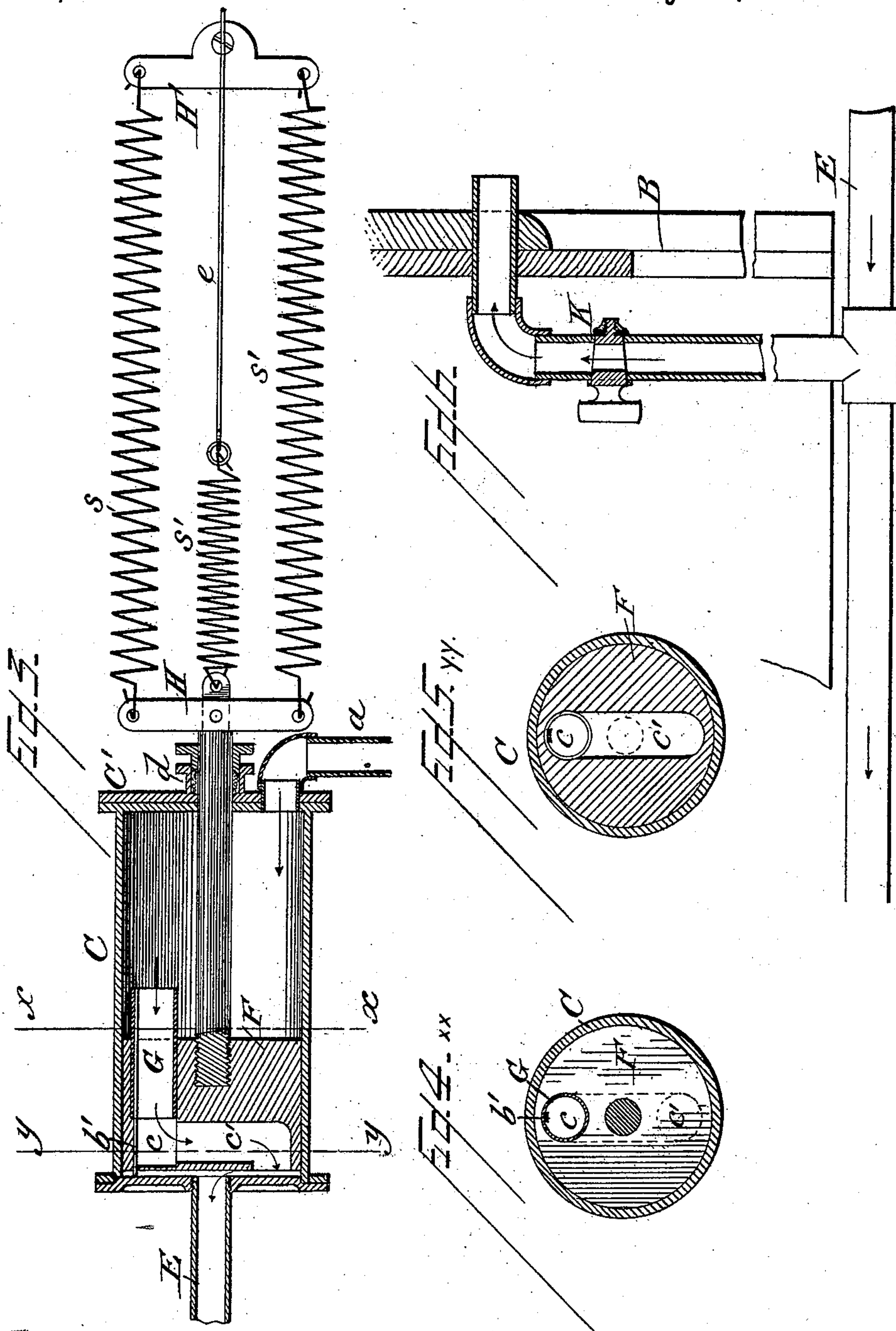
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TRAIN SIGNALING APPARATUS.

No. 407,279.

Patented July 16, 1889.



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UNITED STATES PATENT OFFICE.

MILTON E. CAMPANY, OF HAMILTON, MICHIGAN.

TRAIN-SIGNALING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 407,279, dated July 16, 1889.

Application filed December 20, 1888. Serial No. 294,145. (No model.)

To all whom it may concern:

Be it known that I, MILTON E. CAMPANY, a citizen of the United States, residing at Hamilton, in the county of Allegan and State of Michigan, have invented certain new and useful Improvements in Train-Signaling Apparatus; and I do 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, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to an improvement in devices for the conveyance of signals from any one of a train of cars to the engine attached to said train through the agency of compressed air supplied from the reservoir, which is commonly employed to furnish air for operating the brakes of the train, or from a reservoir especially adapted to the purpose, the objects being to so simplify and improve the construction of the several parts of the apparatus as to render it effective and not liable to derangement from the various accidents to which this system of signaling is so much exposed in the ordinary method of construction and application now in use. These objects are accomplished by placing in a convenient position upon the locomotive a cylinder provided with a piston having an automatically-operating valve therein. The rod attached to the piston is connected with a system of springs, which, when the air of the cylinder is in equilibrium, draws the piston to one end of the cylinder and retains it in this position until the equilibrium is destroyed in said cylinder by allowing air to escape from the same in front of the piston when the latter is forced to the opposite end of the cylinder from that in which it is retained by the spring. The valve in said piston is then automatically opened, allowing the air to pass through and equalize the pressure upon both sides of the piston, when the springs attached to the rod which had been extended by the movement of the piston react and draw it back to the opposite end of the cylinder into the first position. Then the valve closes and the apparatus is in condition to repeat the signal.

In order to furnish the train-hands with the desired control of these devices, the forward end of the cylinder is connected by a pipe with an air-chamber communicating by another pipe with the compressed-air reservoir in common use for operating the train-brakes; and from the rear end of the cylinder extends a pipe that by means of suitable connections is continued through the train. This pipe is provided with escape-valves in such positions as to be controlled from either car of the train. It is evident that when one of these valves is opened the air will escape, reducing the pressure in front of the piston in the cylinder, and that the air from the air-chamber, being in full force, will cause the piston to move to the opposite end of the cylinder, where it will remain until the closing of the escape-valve in the train-pipe restores the equilibrium in the cylinder and allows the piston to be drawn back by the spring.

By means of this apparatus a variety of signals may be communicated to the engineer from any part of the train, as each opening of an escape-valve will give one blow upon the gong or blast of the whistle, and by repeating any desired number of blows or blasts may be given.

In the drawings illustrating the construction of this apparatus, Figure 1 is a side elevation of a locomotive and train provided with this signaling apparatus. Fig. 2 is a longitudinal section through the cylinder showing the construction and arrangement of the piston, its automatic valve, and the air-connections with the piston at the front end of the cylinder. Fig. 3 is a similar view of the piston, it being at the opposite or rear end of the cylinder. Figs. 4 and 5 are sections upon the lines x and y , which show details of construction, upon an enlarged scale, of the piston and automatic valve. Fig. 6 is a section through a portion of the train-pipe showing the preferred construction of the escape-valves.

In the figures, A represents a locomotive, A' its tender, and B a car attached thereto. Secured to the locomotive is a cylinder C, one end of which is connected by a pipe a with the air-chamber D, which may be placed in any suitable position, preferably upon the frame at one side of the engine. This air-

chamber D is connected by the pipe *b* with the reservoir of compressed air *D'*, and intended to supply power for the braking mechanism of the train. The pipe *b*, connecting the reservoir and air-chamber, is supplied with a check-valve *a'*, which allows free passage for the air from the reservoir to the chamber, but prevents its return, thus equalizing the pressure of air in said chamber by preventing the withdrawal of air from the reservoir *D'* for use in the brakes from affecting that in the chamber D. A pipe E is connected with the cylinder C at its rear end. This pipe extends through the train, and may be placed in any desired position as may be considered most convenient. In freight-cars this will generally be beneath the floor of the car; but in passenger-coaches it may sometimes be found more convenient to place it near the top of the car. The sections of pipe attached to the cars are of metal, and their connections between the cars are made by any of the types of flexible couplings now in use for analogous purposes.

Within the cylinder C is placed the piston F. This piston is packed so as to fit snugly without much friction, and is pierced by an opening or recess *c*, in which is fitted the valve G. This valve G consists of a hollow metallic cylinder open at both ends and fitting snugly into the opening *c* in the piston and capable of longitudinal movement therein, but prevented from passing wholly through the piston or recess by coming in contact with the bottom of the opening or recess *c*. A stem *b'* is attached to the valve G, and extends a short distance into the cylinder through an opening in the bottom of the valve-recess. By this construction it will be seen that when the piston approaches the rear end of the cylinder the rod will strike the cylinder-head and force the valve G forward in its recess, thus opening the passage *c'*, which allows air to flow freely through said passage and the valve from one side of the piston to the other, restoring the equilibrium of pressure upon both sides of the piston, which had been disturbed in producing the movement of said piston. Attached to the piston is a rod *F'*, passing through a suitable stuffing-box *d* in the cylinder-head *C'*. This rod is provided with a fixed cross-head H near its outer end. To each end of this cross-head is attached one end of a spring *s*, the opposite end of said springs being secured to the opposite ends of a pivoted lever *H'*. These springs are for the purpose of keeping the piston normally in the position shown in Fig. 2 of the drawings—that is, nearly in contact with the cylinder-head *C'*. To the outer end of the rod *F'* is attached the spring *s'*, and to the free end of this spring the cord or chain *e*, connected with the lever *e'* of the whistle I; or, instead of the whistle, a gong may be substituted. By this arrangement it will be seen that a movement of the piston in the cylinder will actuate the lever *e'*, by a yield-

ing pull caused by the interposition of the spring *s'*, and give the desired signal.

At suitable points in the several cars composing the train escape-valves K are placed, with handles or other means of opening them within convenient reach of a person upon or in the car. By opening either of these valves air is allowed to escape from the train-pipe, which instantly produces a movement of the piston in the cylinder and operates the signal. Upon closing the escape-valve the equilibrium of the air in the cylinder and train-pipe is restored by the passage of air through the piston and valve, and the springs *s s* draw the piston from its place behind the opening of said train-pipe to the opposite end of the cylinder, when the projecting end of the valve strikes the cylinder-head *C'* and closes the valve, when the apparatus is ready for another movement if it becomes necessary to repeat the signal.

Having thus described my invention, I claim as new, and desire to secure by Letters Patent, the following:

1. The combination of the compressed-air reservoir employed to supply the brakes of a train, an air-chamber connected with said reservoir by a pipe containing a check-valve for maintaining an equable pressure in said chamber, a cylinder and a piston moving therein, the piston provided with an automatically-operating valve having a longitudinal sliding movement, an independent train-pipe connecting with the chamber and cylinder and provided with escape-valves, and devices, substantially as herein shown and described, for connecting the piston with the gong or whistle, as set forth.

2. As an improvement in train-signaling apparatus, the cylinder connected at one end to an air-chamber and at the other to a train-pipe, said cylinder containing a movable piston capable of being moved in one direction by compressed air and provided with an automatically-moving valve in combination with the piston-rod, its cross-head and the springs connecting said cross-head to the opposite ends of a swinging lever adapted to return said piston to its normal position when the air-pressure within the cylinder is equalized, as set forth.

3. As an improvement in train-signaling apparatus, the combination of the cylinder, the perforated piston, the hollow cylindrical valve moving in said perforation, the piston-rod, the spring *s'*, attached to said rod, the cord *e*, attached to the spring, and the whistle I, all arranged, as shown and described, to operate the whistle by a yielding pull upon its lever, as set forth.

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

MILTON E. CAMPANY.

Witnesses:

F. W. WINS,
DAVID D. ERWIN.