(No Model.)

E. J. LEWIS.

VALVE FOR FLUID PRESSURE SIGNALING APPARATUS.

No. 435,758. Patented Sept. 2, 1890.

FIG. 2.

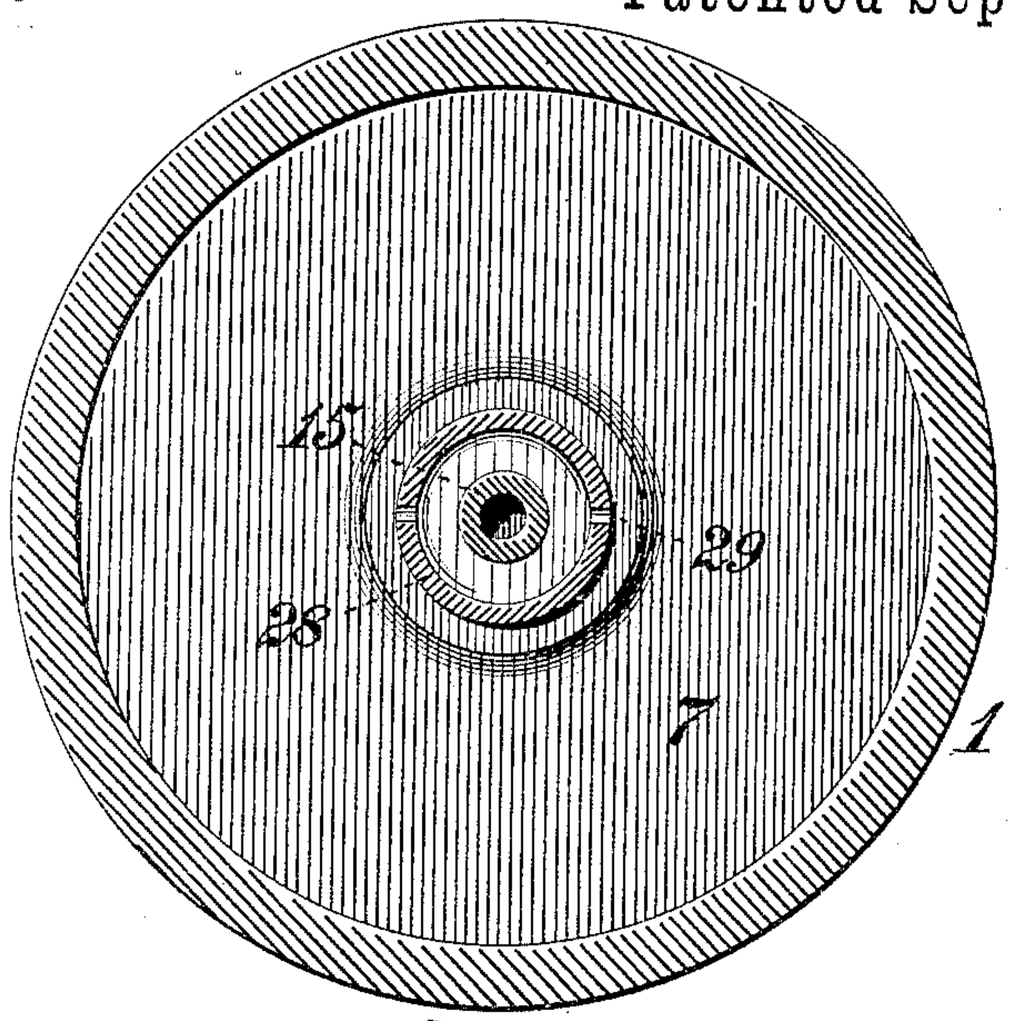
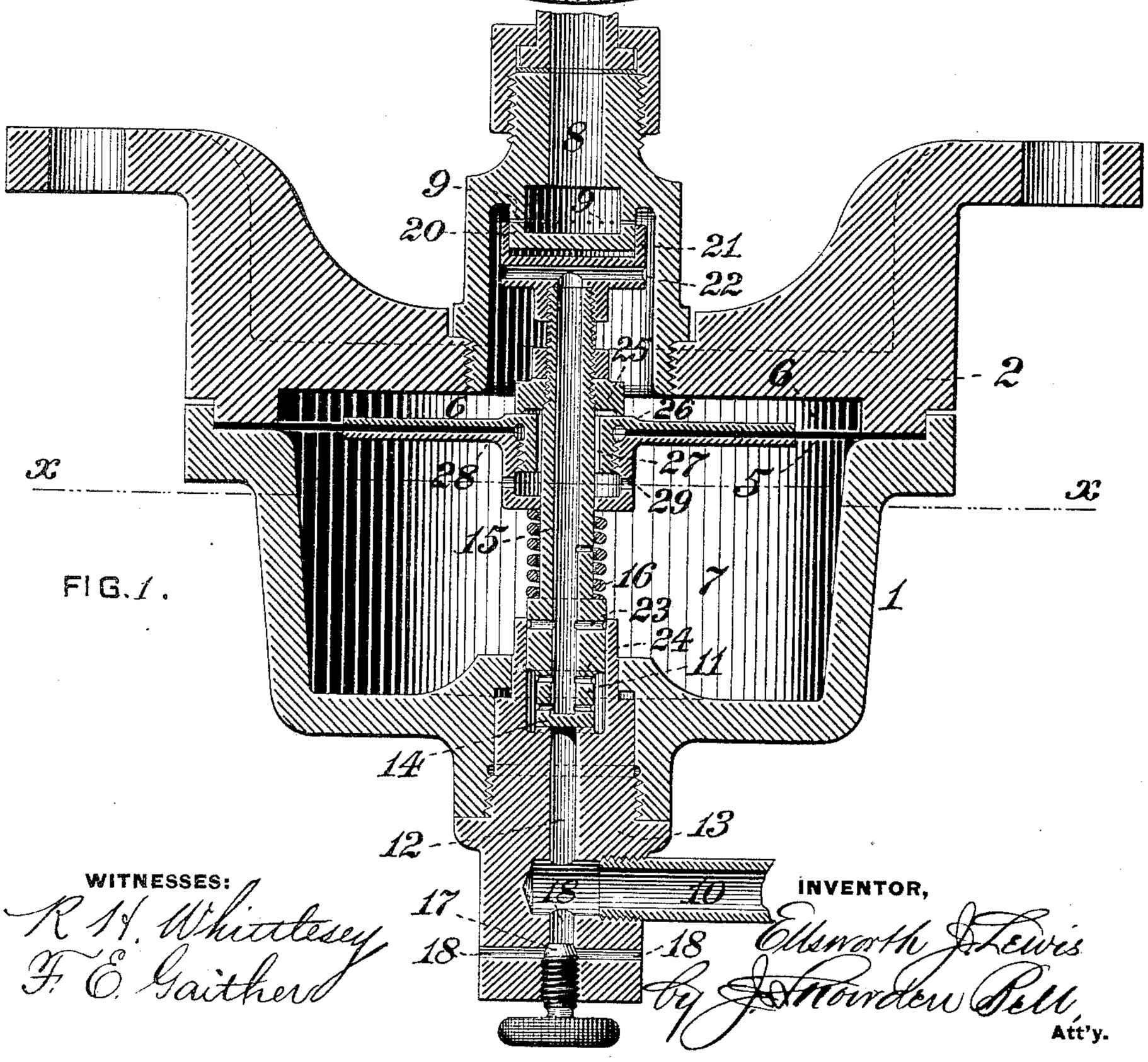


FIG. 1.



WITNESSES:

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UNITED STATES PATENT OFFICE.

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VALVE FOR FLUID-PRESSURE SIGNALING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 435,758, dated September 2, 1890.

Application filed March 10, 1890. Serial No. 343,288. (No model.)

To all whom it may concern:

Be it known that I, ELLSWORTH J. LEWIS, a citizen of the United States, residing at Warrenton, in the county of Jefferson and State of Ohio, have invented or discovered certain new and useful Improvements in Valves for Fluid-Pressure Signaling Apparatus, of which improvement the following is a specification.

My invention relates to apparatus designed more particularly for train-signaling, in which signals are given at a desired point by instituting a difference of pressure upon opposite sides of a movable abutment, and thereby opening a passage for fluid under pressure to a signal-indicating device.

The object of my invention is to provide a simple and effective signaling-valve mechanism in the operation of which the undue repetition of signals or the giving of more than one signal indication as the result of each preliminary actuation will be effectually prevented.

The improvement claimed consists in certain novel devices and combinations hereinafter fully set forth.

In the accompanying drawings, Figure 1 is a vertical central section through a signaling-valve mechanism embodying my invention, and Fig. 2 a transverse section through the same at the line *x x* of Fig. 1.

In the practice of my invention I provide a chamber or casing 1, which is of substantially cylindrical form, the same having an integral bottom plate and being closed at top by a removable head 2, properly secured by bolts and nuts. The casing 1 is divided by a movable abutment 5, which is preferably, as shown, a flexible diaphragm, secured peripherally between the body of the casing and the head into two compartments 6 and 7, the upper of which 6 is of comparatively small volume relatively to the lower 7.

A signaling-pipe connection or nozzle 8 is formed upon the head 2 for attachment to an ordinary line of signaling-pipe extending to the farthest location from which signals are to be communicated—as in train service the last car of a train—the casing 1 being mounted upon the locomotive-engine hauling the train, and the signaling-line being provided at proper intervals—as on each car of the train—with an actuating or discharge valve for effecting the reduction of pressure in the line which causes the signal to be given. The signaling-pipe connection 8 communicates with the smaller compartment 6 of the casing by a series of small supply-openings 9 formed in a cylindrical chamber 20 at the inner end of the connection 8. An annular check or non-return valve 21, secured upon the end of a tubular stem 15, which passes centrally through the diaphragm 5, fits truly around the chamber 20, so as to close the openings 9 and thereby cut off communication between the signaling-pipe connection 8 and compartment 6, when the stem 15 is raised. The central bore of the stem 15 communicates with the chamber 6 by lateral passages 22 below the valve 21, and the stem carries upon its lower end a discharge-valve 14, which seats on the upper end of and controls a discharge-passage 12, formed in a discharge connection or nozzle 13 secured centrally in the bottom of the casing, the discharge-passage 12 communicating with a pipe 10 leading to a signal-indicating device, which is ordinarily a whistle located at some convenient point near the casing. A series of escape-ports 18 leads from the discharge-passage 12 to the atmosphere, said ports being normally closed by a regulating-valve 17, formed on the upper end of a screw-plug engaging a thread in the lower end of the nozzle 13. The discharge-passage 12 opens at its upper end into a cylindrical valve-chamber 11, formed in the nozzle 13, and the stem 15 is increased in diameter so as to fit truly in said chamber at and near the top thereof. Lateral passages 23 extend from the bore to the periphery of the stem 15, in such position that when the discharge-valve 14 is seated said passages are closed by the wall of the chamber 11, and when the valve 14 is opened by the raising of the stem, said passages establish communication between the compartment 7 of the casing and the bore of the stem, and thence through lower lateral passages 24 with the valve-chamber 11 and discharge-passage 12.

A supply-valve 25 is secured upon the stem 15 above the diaphragm 5, said valve seating

upon a plate 26 secured upon the top of the diaphragm and having a central passage 27 surrounding the stem 15 and of greater diameter than the latter. The plate 26 is connected to a plate 28, fitting against the lower side of the diaphragm and provided with a lower bearing-face for a spring 16, which abuts against a shoulder on the stem 15 and holds the discharge-valve 14 normally to its seat. Lateral passages 29 in the central hub of the lower plate 28 act in connection with the passage 27 to establish communication between the chambers 6 and 7 of the casing when the valve 25 is unseated.

In operation fluid under pressure, ordinarily compressed air, passes from the signaling-pipe through the connections 8 and supply-openings 9 into the compartment 6, charging the same and depressing the movable abutment 5, so as to unseat the supply-valve 25 and pass through the passages 27 and 29 into the compartment 7, charging the same and instituting an equilibrium of pressure on opposite sides of the abutment 5, which is thereby raised to the normal position shown in Fig. 1, seating the supply-valve 25 and cutting off communication between the compartments 6 and 7. Upon a reduction of pressure in the signaling-line connected to the nozzle 8, effected by opening any one of the series of actuating-valves which afford a discharge from said line, the then greater pressure in the compartment 7 raises the abutment 5 and stem 15 and coincidently unseats the discharge-valve 14, fixed upon the latter, opens the ports 23 of the stem 15 to the compartments 7, and closes the supply-openings 9 by the check-valve 21. Fluid under pressure is thereupon and thereby discharged from the compartments 6 and 7 through the passages 22 and 23, the central bore of the valve-stem, and the passages 24 and 12 into the pipe 10, and thence to the whistle or other signal-indicating device, causing a single signal indication to be given by the same, communication with the signaling-line being meanwhile cut off by the check-valve 21. The length of the blast of the whistle may be decreased to a greater or less degree by opening the regulating-valve 17 and permitting a portion of the air to be discharged through the escape-passages 18. Upon the restoration of pressure in the signaling-line and nozzle 8 the stem 15 and abutment 5 are forced downwardly, thereby opening the supply-passages 9 and seating the discharge-valve, and the compartments 6 and 7 are recharged, as before described, reinstating the normal equilibrium of pressure on opposite sides of the abutment 5 in readiness for another signal to be given. Communication with the signaling-line being cut off by the check-valve 21 when the discharge-valve 14 is opened, the equalization of pressure in the signaling-line which follows the closure of the actuating-valve is effected before the closure of the discharge-valve, thus obviating the objection, which has been heretofore experienced, of a reopening of the discharge-valve and the effection of another and undesired signal-indication by the institution of a slight difference of pressure on opposite sides of the abutment occasioned by an equalization of pressure in the signaling-line after the discharge-valve has been closed.

I claim as my invention and desire to secure by Letters Patent—

1. In a fluid-pressure signaling mechanism, the combination of a chamber or casing, a fluid-pressure-supply passage leading thereinto, a movable abutment fitted to work in the casing, a pipe leading from the casing to a signal-indicating device, a stem actuated by the movable abutment, and a check-valve and a discharge-valve, each connected to said stem and respectively controlling communication between the supply-passage and the casing and between the casing and the signal-indicating pipe, substantially as set forth.

2. In a fluid-pressure signaling mechanism, the combination of a chamber or casing, a fluid-pressure-supply passage leading thereinto, a movable abutment fitted to work in the casing, a pipe leading from the casing to a signal-indicating device, a stem actuated by the movable abutment, a discharge-valve connected to said stem and controlling communication between the casing and the signal-indicating pipe, and a check-valve connected to the stem and controlling communication between the supply-passage and the casing, said valves being located in relation to effect the opening of one coincidently with the closure of the other in either direction of movement of the stem, substantially as set forth.

3. In a fluid-pressure signaling mechanism, the combination of a chamber or casing, a fluid-pressure-supply passage leading thereinto, a movable abutment fitted to work in the casing, a discharge-passage leading from the casing to a signal-indicating-device pipe, a stem actuated by the movable abutment, a discharge-valve connected to said stem and controlling the discharge-passage, an escape-passage leading from the discharge-passage to the air, and a regulating-valve controlling said escape-passage, substantially as set forth.

4. In a fluid-pressure signaling mechanism, the combination of a chamber or casing, a movable abutment dividing said casing into two compartments, a fluid-pressure-supply passage leading into one of said compartments, a pipe leading from the other compartment to a signal-indicating device, a tubular stem actuated by the movable abutment, a supply-valve connected to said stem and controlling communication between the compartments of the casing through a passage in the abutment, a check-valve connected to the stem and controlling communication between

the supply-passage and one compartment of the casing, a discharge-valve connected to the stem and controlling communication between the other compartment of the casing and the signal-indicating pipe, and passages leading from each compartment of the casing into the bore of the tubular stem, substantially as set forth.

In testimony whereof I have hereunto set my hand.

ELLSWORTH J. LEWIS.

Witnesses:
J. SNOWDEN BELL,
F. E. GAITHER.