(No Model.) 2 Sheets—Sheet 1.

G. S. HODGINS.

MEANS FOR TESTING FLUID PRESSURE SYSTEMS.

No. 602,009. Patented Apr. 5, 1898.

Fig. 1.

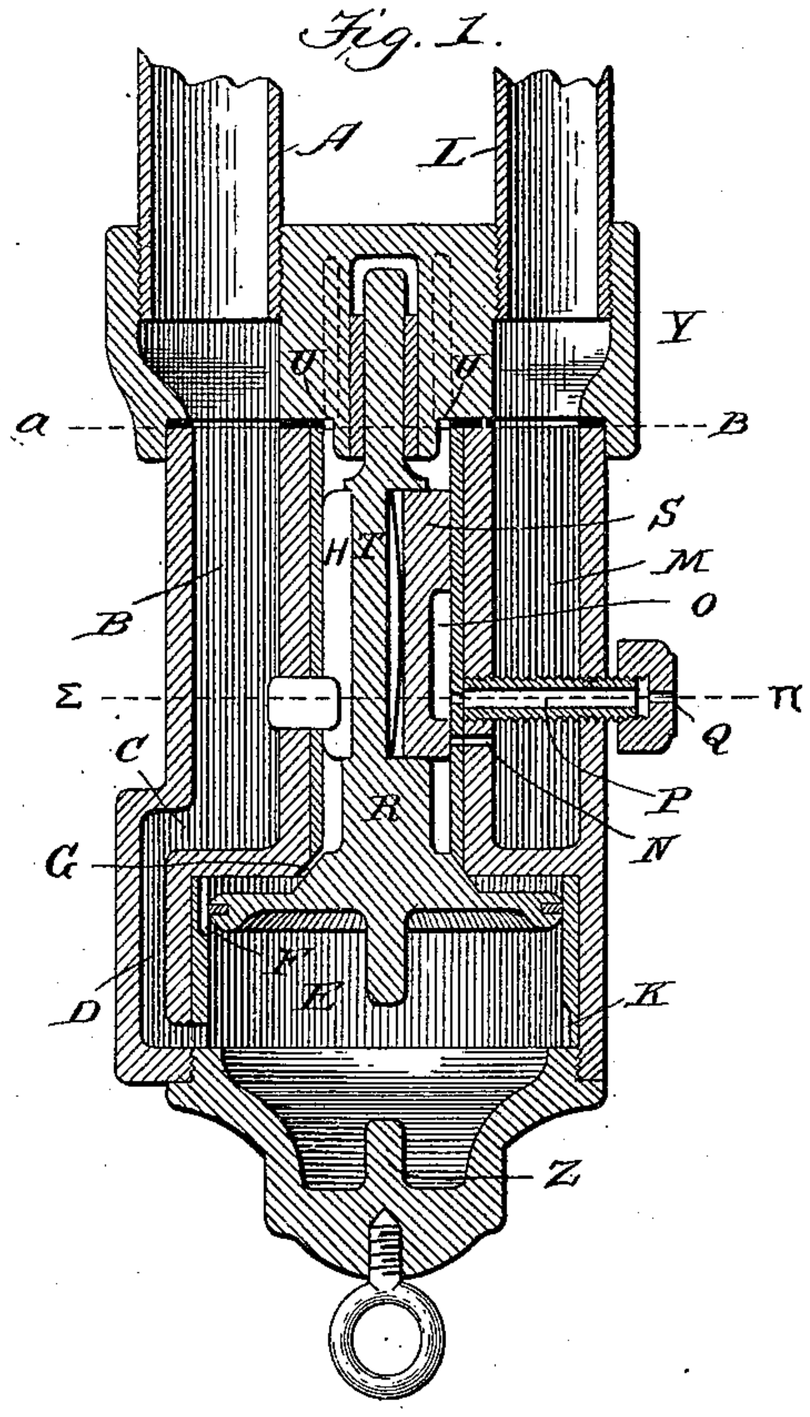


Fig. 4.

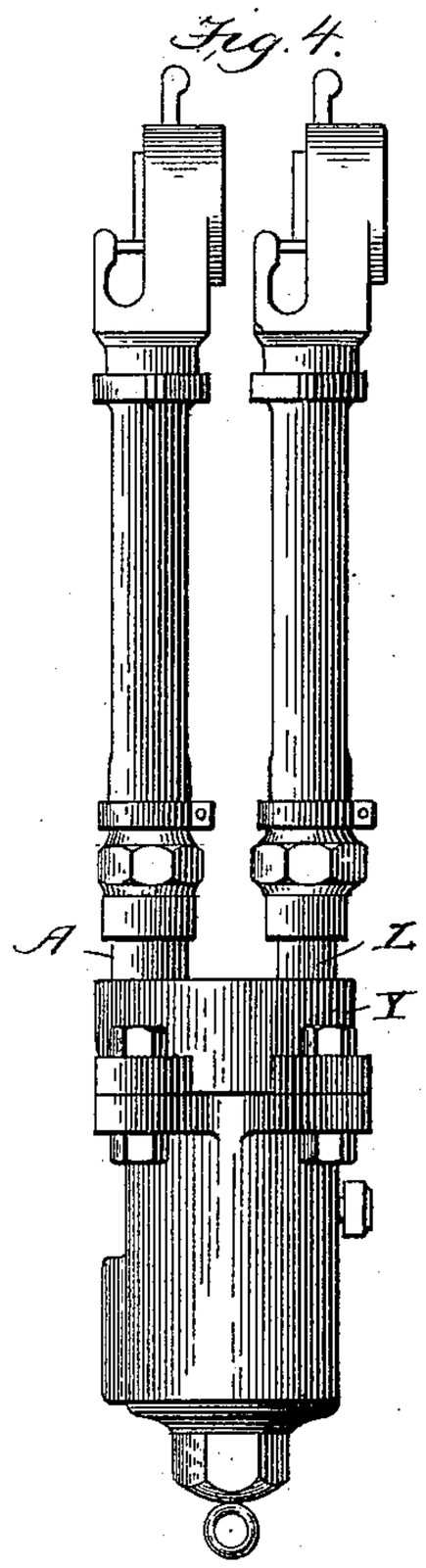


Fig. 2.

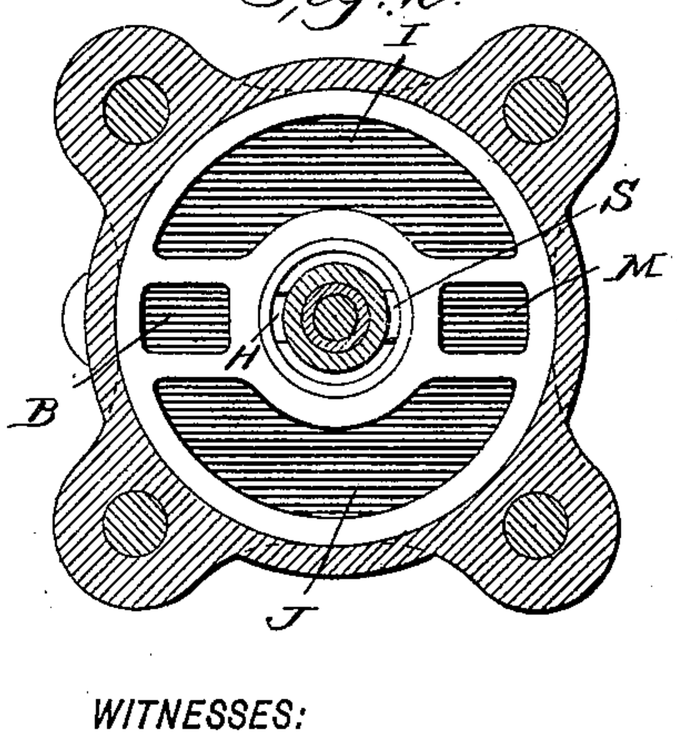
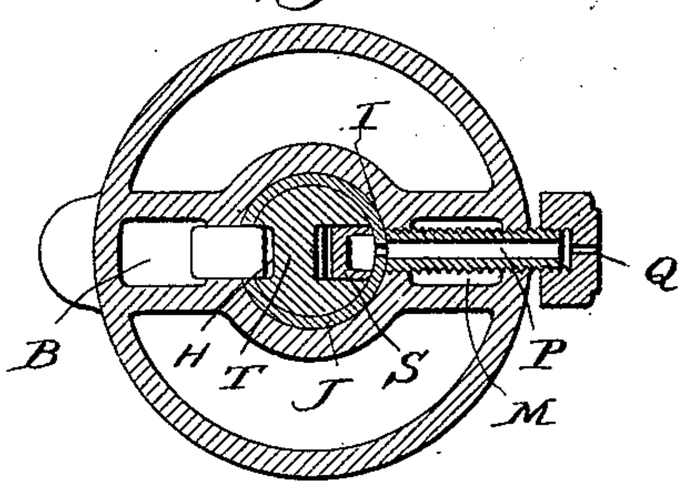


Fig. 3.



WITNESSES:

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(No Model.) 2 Sheets—Sheet 2.

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MEANS FOR TESTING FLUID PRESSURE SYSTEMS.

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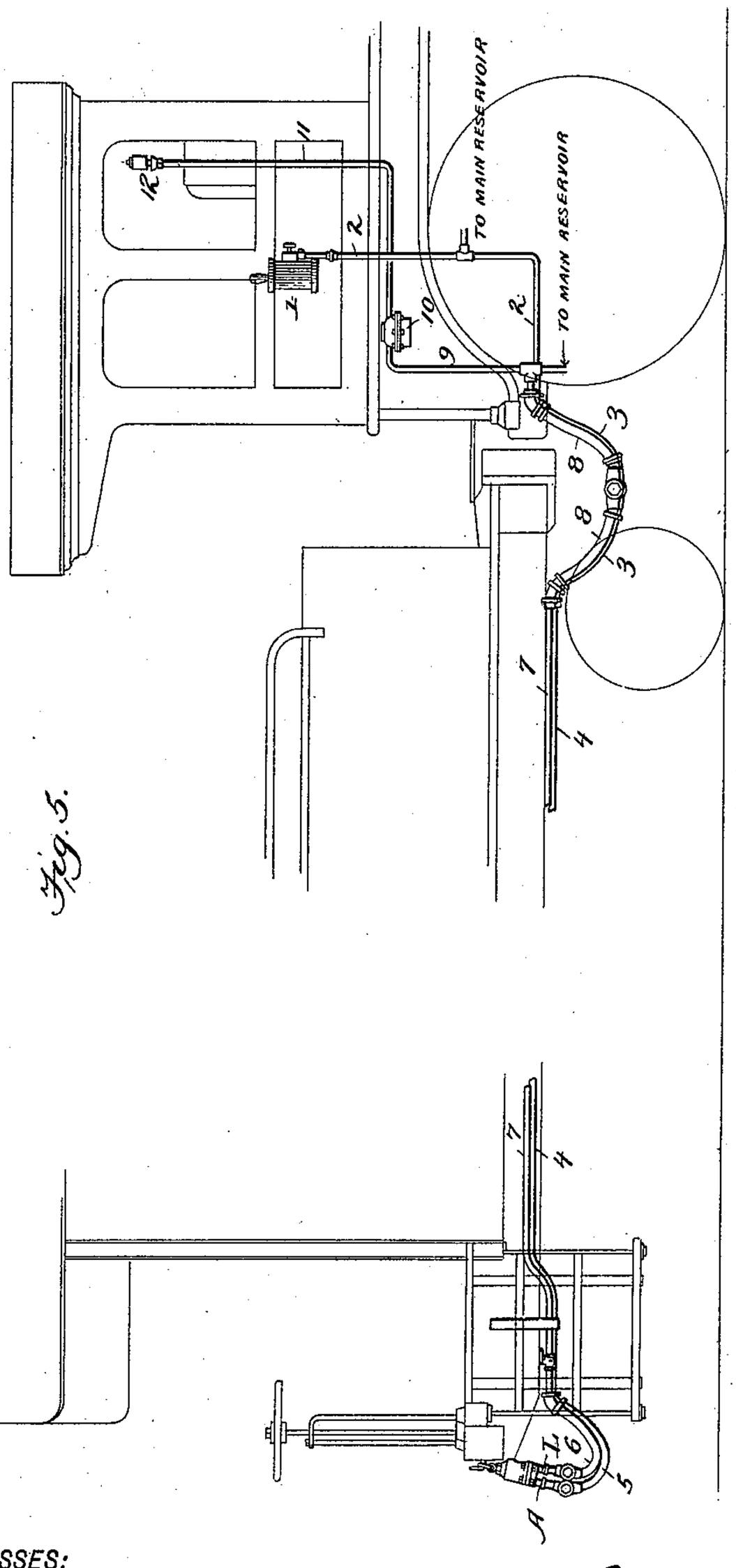

Fig. 5.

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UNITED STATES PATENT OFFICE.

GEORGE S. HODGINS, OF WINDSOR, CANADA.

MEANS FOR TESTING FLUID-PRESSURE SYSTEMS.

SPECIFICATION forming part of Letters Patent No. 602,009, dated April 5, 1898.

Application filed March 26, 1894. Serial No. 505,206. (No model.)

To all whom it may concern:

Be it known that I, GEORGE SHERWOOD HODGINS, a citizen of the Dominion of Canada, residing at Windsor, in the county of Essex and Province of Ontario, Canada, have invented certain new and useful Means for Testing Fluid-Pressure Systems, of which the following is a specification sufficiently full, clear, and accurate to enable persons skilled in the art to make, apply, and practice the same.

The objects of my invention are, first, to enable the engineer at all times to ascertain the condition of the brake system and also of the signal system throughout the entire length of a train; second, to inform the engineer when the brake in either "service" or "emergency" applications is applied to the last car of a train.

With these objects in view my invention consists in providing a railway-train with a fluid-pressure pipe-line, which may be a fluid-pressure signal-line, substantially parallel with the fluid-pressure brake-pipe line and connecting with the said lines means whereby the fluid-pressure in one of the pipe-lines can be varied and effect a variation of fluid-pressure in the other line and thereby operate a signal.

Further, it consists in a proving-valve provided with couplings for attaching the same to two pipe-lines.

Finally, it consists in certain novelties of construction and combinations of parts hereinafter set forth and claimed.

The best mode in which I contemplate the practice and application of my invention is hereby set forth in connection with the accompanying drawings, in which like letters and figures of reference designate similar parts.

Figure 1 is a perpendicular section of a brake-proving valve; Fig. 2, a sectional plan of Fig. 1 on line $\alpha\ \beta$; Fig. 3, a sectional plan of Fig. 1 on line $\Sigma\ \pi$; Fig. 4, an elevation of the brake-proving valve complete with couplings attached; and Fig. 5 is a view of a locomotive-cab, a tender, and the rear end of a car provided with air-brake and signal appliances and also with a proving-valve attached in operative position.

Referring to Fig. 5 and the brake system, 1 is the engineer's brake-valve, and 2 a pipe leading therefrom and connected through the couplings 3 3 with the train-pipes 4 4, extending to the rear of the train.

In the signal system, 12 designates a whistle; 10, a signal-valve; 11, a pipe joining them; 9, a pipe which, in connection with the couplings 8 8 and pipes 7 7, conveys air under pressure to the rear car of the train. The air-brake and signal systems are of any well-known construction and do not require detailed description.

A proving-valve is attached to the brake-hose 5 and signal-hose 6, as shown in Fig. 5, and may be supported from the platform or car-body in any convenient way.

The particular proving-valve illustrated consists of a main body-piece, as shown, having cavities I J, a lower cap Z, an upper cap Y, pipes and couplings A L, the former of which is adapted for attachments to the train air-brake hose and the latter to the signal-hose piston R, valve S, spring T, pipe P, nut Q, and suitable bushings and guides. While I have shown and described but this one specific construction of valve adapted to perform the functions necessary in the practice of my method of "testing," I do not confine myself to said construction or form, inasmuch as other constructions or forms which perform the desired or equivalent functions may be employed in place of that shown.

When the brake and signal systems are in operative condition and the proving-valve attached, air from the main brake-pipe at seventy pounds pressure, more or less, enters the proving-valve through pipe A, passes to the chamber B, and thence through passages C D into chamber E. The pressure of the air raises piston R up to the position shown in Fig. 1, and air then flows past the piston through the small groove F, cut in the brass bushing which forms the wall of chamber E. The air passes on through groove G into chamber H and thence through appropriate openings U U, under or in the cap Y, into the

cavities I and J, Figs. 2 and 3. The same pressure will therefore exist on both sides of piston R—that is, in chamber E and chamber H. The piston R will remain in equilibrium in the position shown in Fig. 1. At the same time air from the signal-pipe enters through pipe L and fills chamber M. The port N is blocked by a portion of a small slide-valve S. The cavity O in the under side of the valve is in direct communication with the atmosphere through small pipe P, with nut Q, forming a diminutive orifice. Valve S is kept tight by the pressure of air in chamber H and by the spring T. The pressure of air in chamber M never being greater than forty pounds to the square inch and the normal pressure in chamber H being approximately seventy pounds valve S has no tendency to rise from its seat.

The method of testing the brake and signal systems, which consists in varying the fluid-pressure in the pipe-lines, is as follows: The engineer rotates the handle of the engineer's valve through the required arc and allows a small quantity of air to escape from the train-pipe. The pressure in this pipe is reduced and also in chambers B and E of the proving-valve. The pressure in chamber H and cavities I J being greater than in chamber E and the passages G and F being too small to allow the pressure to become quickly equalized the piston R is forced downward, and with it is carried slide-valve S, bringing cavity O over port N. An open passage from chamber M through N P Q to the atmosphere is thus made. The escape of air from the chamber M reduces the pressure in the signal-pipe and sounds the whistle in the locomotive-cab. The transmission of the signal is thus successively through the elements designated 1 2 3 4 5 A L 6 7 8 9 10 11 12. The signal informs the engineer that the brake and signal systems are throughout operative and unobstructed.

When piston R is in the lower or position for sounding the whistle, the air in the chamber H (and cavities I and J) is allowed to slowly equalize through minute groove K into chamber E and then into the train brake-pipe. This equalization of pressure will add only a small volume to that in the brake-pipe and may be disregarded; but all possible danger of releasing the brakes by this means is obviated by the improved Westinghouse engineer's valve now in use.

The information that the brake has been applied to the rear car of the train in service or emergency applications is imparted to the engineer by almost the identical method employed in testing, the only difference being that in the former case more air is allowed to escape from the engineer's valve, sufficient to bring into action the triple valves in systems which employ such valves, while in testing the pressure is not enough reduced in the train-pipe to apply the brakes.

When the brakes are released in the well-known way, a sudden and powerful rush of air passes along the brake-pipe and instantaneously forces piston R upward into its raised position, the gust of air being too strong to slowly pass up through small groove K. Air will then pass into chamber H and cavities I and J, as before. Slide-valve S is also moved up, cutting off all flow of air from chamber M to the atmosphere by blanking the port N, as shown in Fig. 1. The signal-pipe can then be recharged from the engine in the usual way.

In the particular physical embodiment illustrated and described by way of specific example I have referred to the auxiliary fluid-pressure pipe-line as a "signal-line," meaning thereby the ordinary signal-pipe line in common use; but my auxiliary pipe-line need not be adapted for the purpose of ordinary signaling.

The foregoing method of testing and apparatus for effecting the same constitutes what I believe to be the best mode for carrying out the invention; but I do not exclude other modes or means which are equivalents thereof and consider them as falling within the scope of my invention.

What I claim is—

1. The combination with two fluid-pressure pipe-lines and a signal, of testing mechanism operatively connected thereto, such mechanism being arranged to operate by a variation of fluid-pressure in one pipe to vary the fluid-pressure in the other, and thereby operate the signal; substantially as described.

2. The combination with two fluid-pressure pipe-lines extending from the locomotive throughout the length of the train, and a signal, of testing mechanism operatively connected thereto, such mechanism being arranged to operate by a variation of fluid-pressure in one pipe to vary the fluid-pressure in the other, and thereby operate a signal; substantially as described.

3. The combination with two fluid-pressure pipe-lines on a railway-train, one of them being an air-brake pipe-line, and a signal, of testing mechanism operatively connected thereto, such mechanism being arranged to operate by a variation of fluid-pressure in one pipe to vary the fluid-pressure in the other, and thereby operate the signal; substantially as described.

4. The combination with two fluid-pressure pipe-lines, means for varying the pressure at one end of said pipe-lines, and a signal, of testing mechanism operatively connected thereto, such mechanism being arranged to operate by a variation of fluid-pressure in one pipe to vary the fluid-pressure in the other, and thereby operate the signal; substantially as described.

5. The apparatus for testing the air-brake and signal systems, consisting of the following elements in combination, to wit: a train-

pipe; a signal-pipe; a proving-valve; means for discharging air from the train-pipe; and a signal; in substance as set forth.

6. A proving-valve having fluid-pressure pipe-couplings, one of which communicates with a chamber in a valve-casing, a piston in said chamber, and said piston controlling an opening from a second chamber which communicates with the other pipe-coupling; substantially as described.

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Witnesses:
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