No. 763,822. PATENTED JUNE 28, 1904.

G. W. WHITEMAN.

FLUID PRESSURE ACTUATED RAILWAY SWITCH, &c.

APPLICATION FILED JAN. 13, 1904.

NO MODEL. 3 SHEETS—SHEET 1.

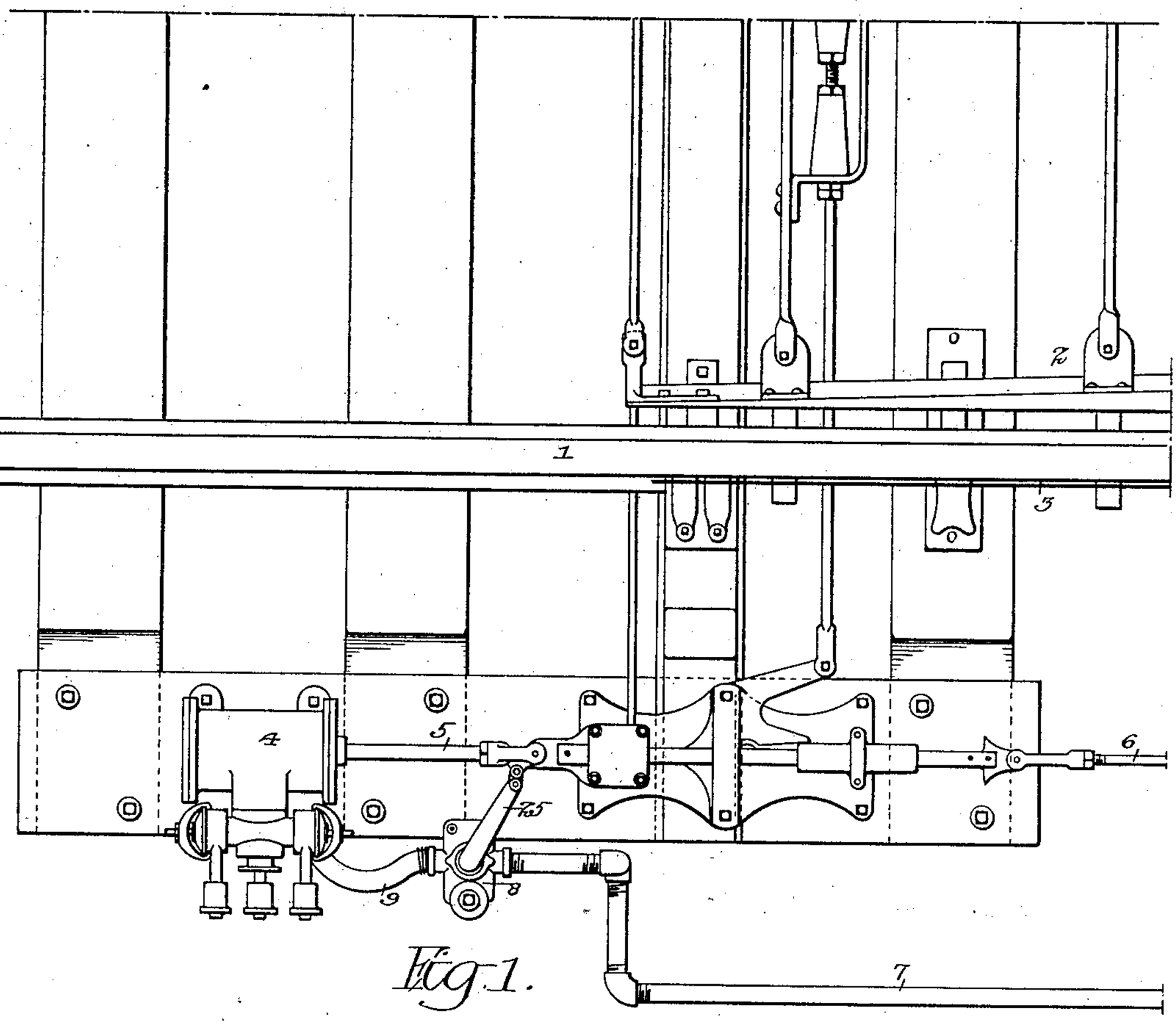
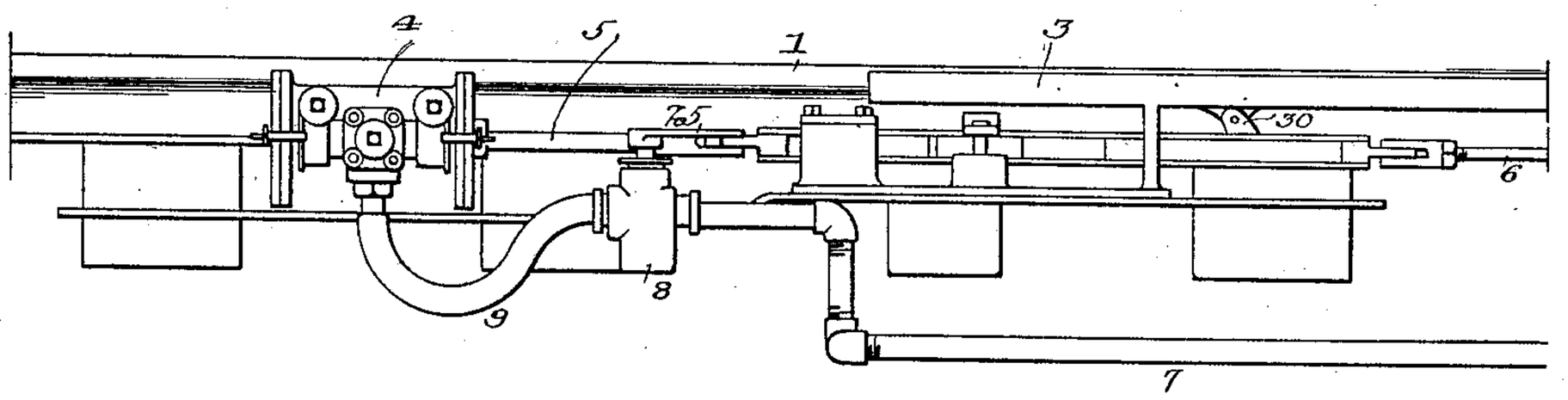


Fig. 1.

Fig. 2.



Witnesses:-
Titus H. Sons.
Louis H. Buck.

Inventor:-
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NO MODEL. 3 SHEETS—SHEET 2.

Fig. 3.

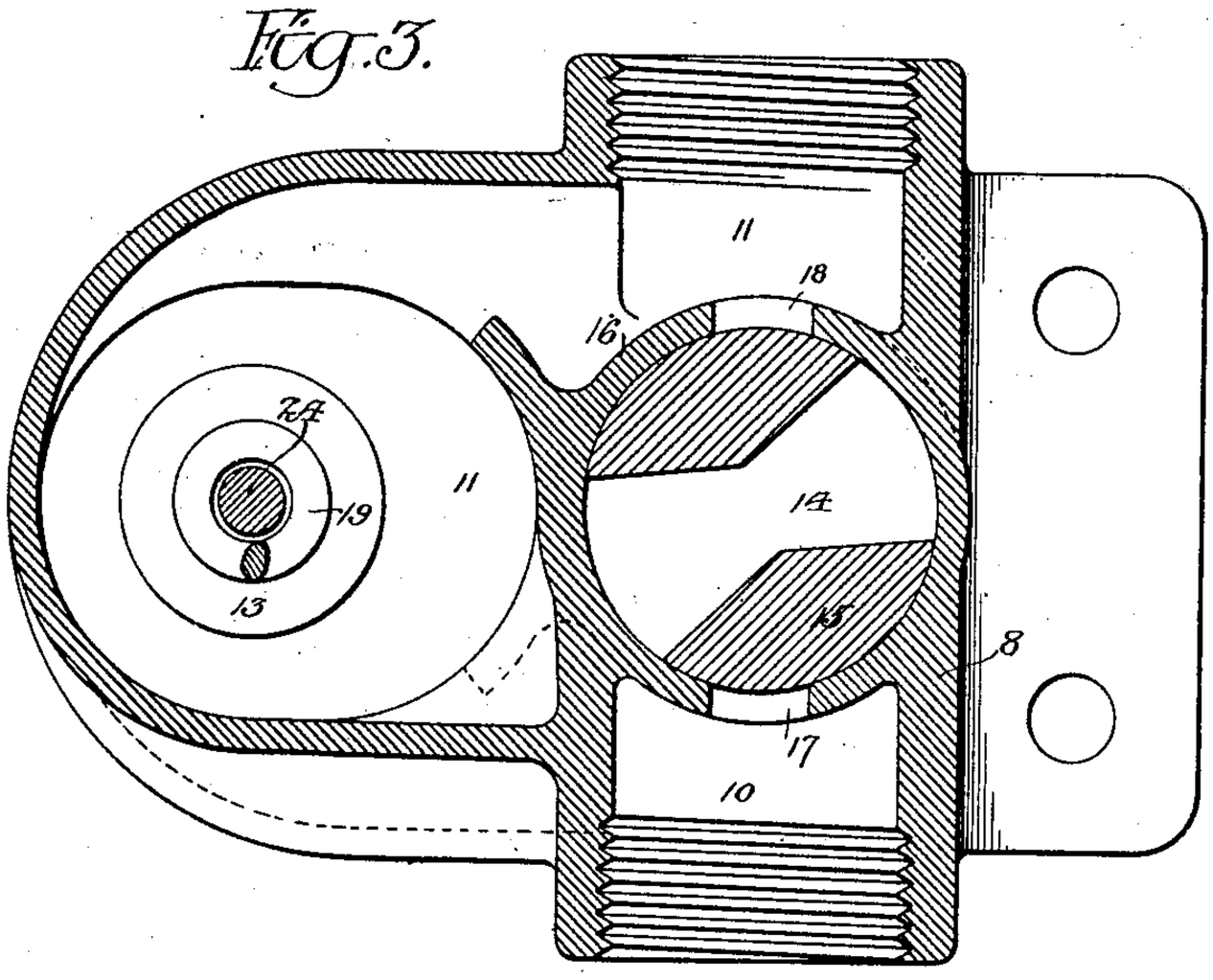
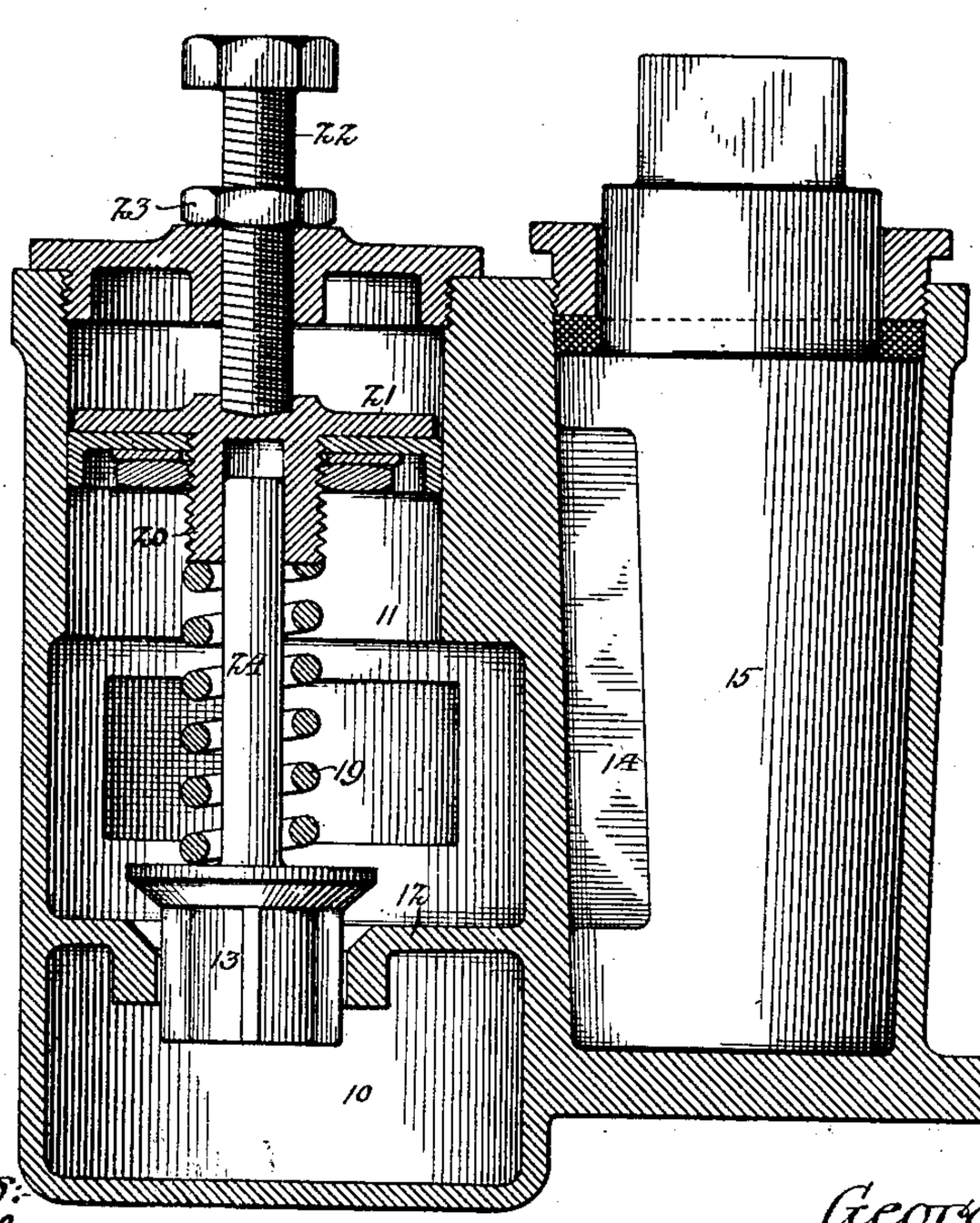


Fig. 4.



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NO MODEL. 3 SHEETS—SHEET 3.

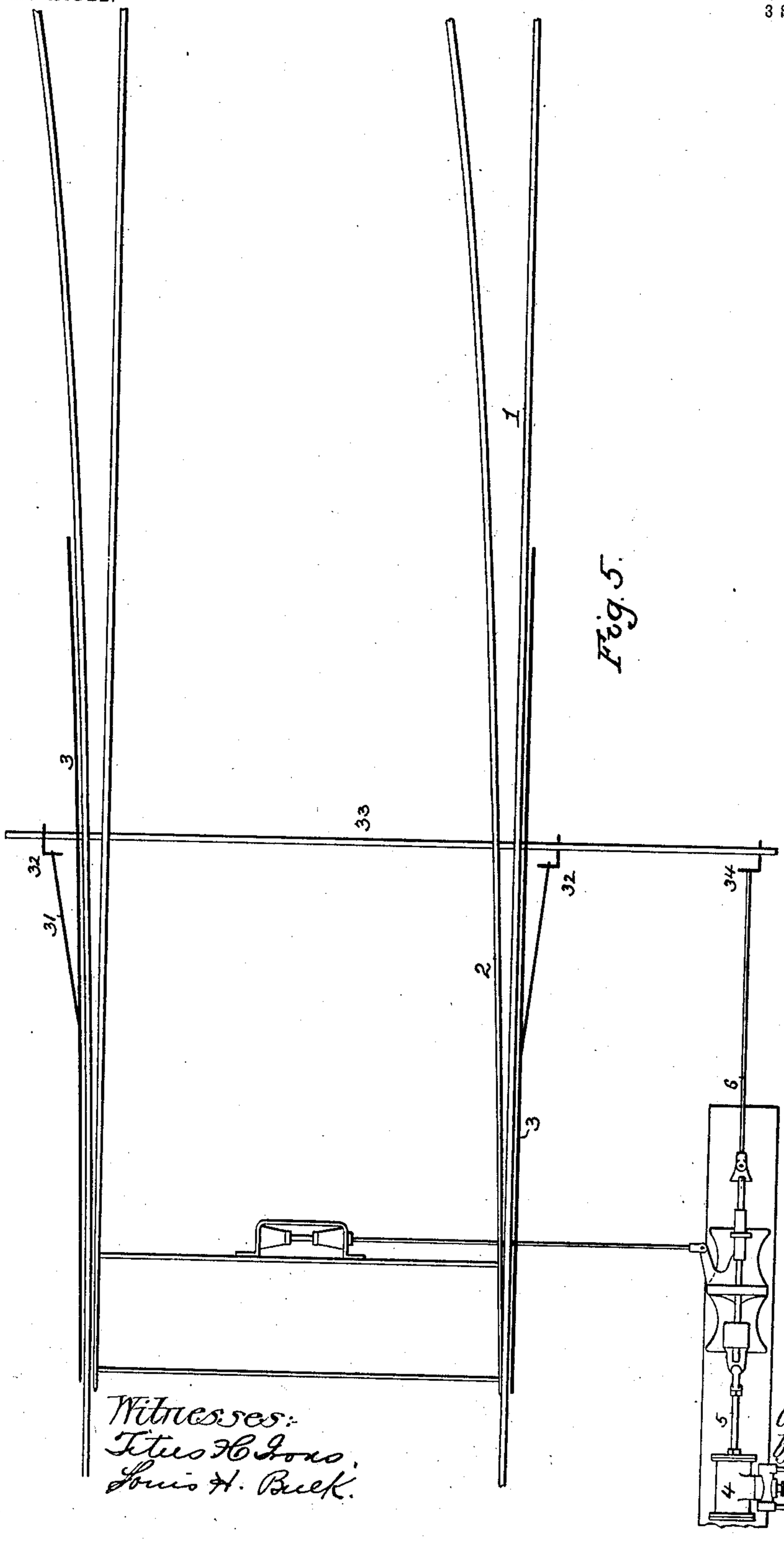

Fig. 5.

Witnesses:
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No. 763,822. Patented June 28, 1904.

UNITED STATES PATENT OFFICE.

GEORGE W. WHITEMAN, OF PHILADELPHIA, PENNSYLVANIA.

FLUID-PRESSURE-ACTUATED RAILWAY-SWITCH, &c.

SPECIFICATION forming part of Letters Patent No. 763,822, dated June 28, 1904.

Application filed January 13, 1904. Serial No. 188,863. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. WHITEMAN, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Fluid-Pressure-Actuated Railway-Switches, &c., of which the following is a specification.

My invention consists of certain improvements in that class of railway switches or crossings which are operated by fluid-pressure, usually under control of electrical devices, one object of my invention being to so regulate the power applied as to accord with the amount of work to be performed and another object being to prevent injury to the detector-bars or other portions of the mechanism such as is sometimes caused by the application of excessive power to said detector-bars when the latter are prevented from moving in the intended direction by reason of the presence of the wheel of a locomotive or car on the rail alongside of which the detector-bar is disposed. These objects I obtain in the manner hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1 is a plan view of sufficient of a power-actuated switch to illustrate my present invention. Fig. 2 is a side elevation of the same. Fig. 3 is a sectional plan view of a valve-casing and valve constituting one of the features in my invention. Fig. 4 is a vertical sectional view of said valve-casing, showing the valves in position therein; and Fig. 5 is a diagrammatic representation of a switch and of the detector-bars and operating mechanism used in connection therewith.

In Figs. 1 and 2 of the drawings, 1 represents one of the main rails of the track; 2, a switch-rail, and 3 a detector-bar disposed along the outer side of the main-track rail 1. As shown in Fig. 5, two detector-bars are usually employed in connection with the switch, one alongside of each rail of the track, these bars being usually mounted upon swinging arms—such, for instance, as shown at 30 in Fig. 2—or acted upon by cams, wedges, or the like, so that longitudinal movement of either bar is accompanied also by vertical movement tending to raise the top of the detector-bar above the top of the rail. The longitudinal movement is usually imparted to the detector-bar by connection of the same, as by rods 31, to cranks 32 on a transverse shaft 33, which has another crank 34, connected to the same power devices which operate the switch. In the case of a crossing four, six, or sometimes more detector-bars are used, all operated from the same transverse shaft. The power-cylinder is shown at 4, this cylinder having a piston-rod 5, which is connected to the mechanism for shifting the switch-rail 2, the said mechanism also having a rod 6, which operates the transverse shaft 33, whereby the detector-bars are actuated, the operation of the parts being such that the upper edge of said detector-bar is raised above the tread of the rail 1 before movement is imparted to the switch-rail, whereby if the rising movement of the detector-bar is obstructed, as by the presence of a wheel on the track, which would interfere with the movement of the switch-rail, said movement cannot be effected. All of these parts are common to ordinary fluid-pressure-actuated switches and crossings as now constructed; but an objection to the present constructions is that high power must be employed to operate simultaneously a considerable number of detector-bars, as in the case of a cross-over, and this high power if applied to the movement of only a pair of such bars will, if the movement of said bars is obstructed, cause injury to the same or to other parts of the mechanism. One object of my invention has therefore been to combine with fluid-pressure-actuated switch or dector-bar mechanism a power-reducing device, located between the piston of the power-cylinder and the main fluid-pressure pipe or reservoir and of such character that the power exerted will be proportionate to the amount of work to be performed, whereby no part of the mechanism will in the case of obstruction to its movement be subjected to such strain as to cause injury to the same, and a special object of my invention has been to so apply the power that while a limited amount of power only is exerted to effect the preliminary lift of the detector-bars a greater amount of power may be subsequently exerted to effect movement

of the switch-rails or the actuation of other parts of the mechanism. These objects I obtain by the employment of a pressure-reducing valve, whereby the amount of pressure admitted to the cylinder of any particular one of a number of mechanisms supplied by one pressure-pipe may be regulated to accord with the amount of work which said cylinder has to perform. Preferably this reducing-valve operates only during the earlier portion of the stroke of the piston in the cylinder, which portion of the stroke is devoted to the operation of the detector-bars, the full pressure being subsequently permitted to act upon the piston in the cylinder if the conditions are such that said detector-bars meet with no obstruction to their movement.

In Figs. 1 and 2 the main pressure-pipe is represented at 7, this pipe communicating with a valve-chest 8, with which also communicates a pipe 9, leading to the valve-chest of the power-cylinder 4. The pipe 7 communicates with a chamber 10 in the chest 8, and the pipe 9 communicates with a chamber 11 in said chest, and there are two separate and independent means of communication provided between these two chambers, one of such communications being through an opening in a partition 12, which is controlled by a regulating-valve 13, and the other communication being through a passage 14 in a plug-valve 15, which is adapted to a tubular partition or casing 16 in the chest 8, said casing 16 having opposite ports 17 and 18. The valve 13 is acted upon by a coiled spring 19, interposed between the back of the valve and the hub 20 of a piston 21, which is suitably guided in the upper portion of the chamber 11 and is restricted in its upward movement by a set-screw 22, adapted to a threaded opening in one of the caps of the valve-chest and retained in position after adjustment by means of a lock-nut 23. The hub 20 of the piston 21 has a central opening, which serves as a guide for a stem 24 of the valve 13, the vertical position of the piston 21 in the chamber 11 determining the tension of the spring 19, and hence the pressure exerted thereby upon the valve 13. Two influences are thus exerted to close the valve 13, the first being the tension of the spring and the second the pressure of fluid maintained in the chamber 11. Hence this fluid-pressure is less than the pressure maintained in the chamber 10 to the extent of the pressure exerted by the spring 19, and as this latter pressure can be readily increased or diminished by depressing the piston 21 or permitting it to rise under control of the set-screw 22 the fluid-pressure maintained in the chamber 11 can consequently be increased or diminished with equal ease. The pressure of fluid admitted to the cylinder 4 can, therefore, be accurately gaged to accord with the amount of work which said cylinder has to perform. For instance, if but a single pair of detector-bars has to be operated a minimum pressure may be employed, a greater degree of pressure being used if four detector-bars are to be operated, and a still higher pressure being employed if six bars are to be moved. In some cases, therefore, the reducing-valve alone may be employed, but I much prefer in carrying out my invention to combine the reducing-valve with the supplementary valve 15 in such a manner that full pressure may be admitted to the cylinder 4 after the piston in the latter had been moved to such an extent as to lift the detector-bars to the level of the tread of the rail, such full pressure being exerted to continue this movement if no obstruction thereto is presented. This result is obtained by connecting the plug-valve 15 to some moving part of the mechanism actuated by the piston in the cylinder 4, whereby the passage through said valve 15, which is normally closed, will be opened after the piston has completed its predetermined extent of travel. This is accomplished in the present instance by providing the stem of the valve 15 with an arm 25, so connected to some part of the structure actuated by the piston-rod 5 that as the latter moves inward in the cylinder a swinging movement will be imparted to the arm 25 and the valve 15 will be moved from the normally closed position shown in Fig. 3 and will permit direct flow of fluid under pressure from the chamber 10 to the chamber 11 of the valve-chest 8 through the ports 17 and 18 and passage 14. Instead, however, of employing a direct mechanical connection between the piston-rod 5 and valve 15 other devices, either electrical or mechanical, may be used for the purpose.

Having thus described my invention, I claim and desire to secure by Letters Patent—

1. The combination, in a fluid-pressure-actuated switch, detector-bar, or like structure, of a fluid-pressure pipe, and a pressure-reducing valve between said pipe and the piston of the operating-cylinder, substantially as specified.

2. The combination, in a fluid-pressure-actuated switch, detector-bar, or like structure, of a fluid-pressure pipe, a reducing-valve between said pipe and the piston of the operating-cylinder, and a valve whereby communication between the fluid-pressure pipe and the piston, independent of said reducing-valve, is permitted, substantially as specified.

3. The combination, in a fluid-pressure-actuated switch, detector-bar, or like structure, of a fluid-pressure pipe, a power-cylinder, a reducing-valve between said pipe and the piston in the cylinder, a valve whereby communication between the pipe and piston, independent of the reducing-valve, is permitted, and means for operating said second valve after the piston has completed a portion of its stroke, substantially as specified.

4. The combination, in a fluid-pressure-ac-

tuated switch, detector-bar, or like structure, of a power-cylinder, a main pressure-pipe, and a chest containing a pressure-reducing valve, and a straightway-valve, through either of which communication may be established between the piston in the power-cylinder and the pressure-pipe, substantially as specified.

5. The combination, in a fluid-pressure-actuated switch, detector-bar, or like structure, of a power-cylinder, a main pressure-pipe, and a valve-chest having two chambers, one communicating with the main pressure-pipe, and the other with the piston of the power-cylinder, the said chambers being separated by two casings, each with passage therethrough, one passage being controlled by a pressure-reducing valve, and the other by a plug-valve, substantially as specified.

6. The combination, in a fluid-pressure-actuated switch, detector-bar, or like structure, of a power-cylinder, a main pressure-pipe, a valve-chest having two chambers, one communicating with the main pressure-pipe and the other with the piston of the cylinder, said chambers being separated by two casings, each having a passage therethrough, one of such passages being controlled by a pressure-reducing valve and the other by a plug-valve, and means for operating said plug-valve after the piston has completed a portion of its stroke, substantially as specified.

7. The combination, in a fluid-pressure-actuated switch, detector-bar, or like structure, of a power-cylinder, a main pressure-pipe, a valve-chest having two chambers, one communicating with the main pressure-pipe and the other with the piston of the cylinder, said chambers being separated by two casings, each with passage therethrough, a pressure-reducing valve controlling one of said passages, and a plug-valve controlling the other passage, an arm on said plug-valve, and a connection between said arm and an element operated by the piston, the passage in said plug-valve being so disposed that flow therethrough will not be permitted until the piston has completed a portion of its stroke, substantially as specified.

8. The combination in a fluid-pressure-actuated switch, detector-bar or like structure, of a fluid-pressure pipe, an operating-cylinder with piston therein connected to the structure to be actuated, and means whereby said piston can first be subjected to moderate pressure, and, after it has completed a portion of its movement, to heavier pressure, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEORGE W. WHITEMAN.

Witnesses:

MURRAY C. BOYER,

JOS. H. KLEIN.