No. 810,609.

PATENTED JAN. 23, 1906.

W. J. BELL.

ELECTROFLUID PRESSURE MECHANISM FOR OPERATING RAILROAD APPLIANCES.

APPLICATION FILED DEC. 1, 1903.

3 SHEETS—SHEET 1.

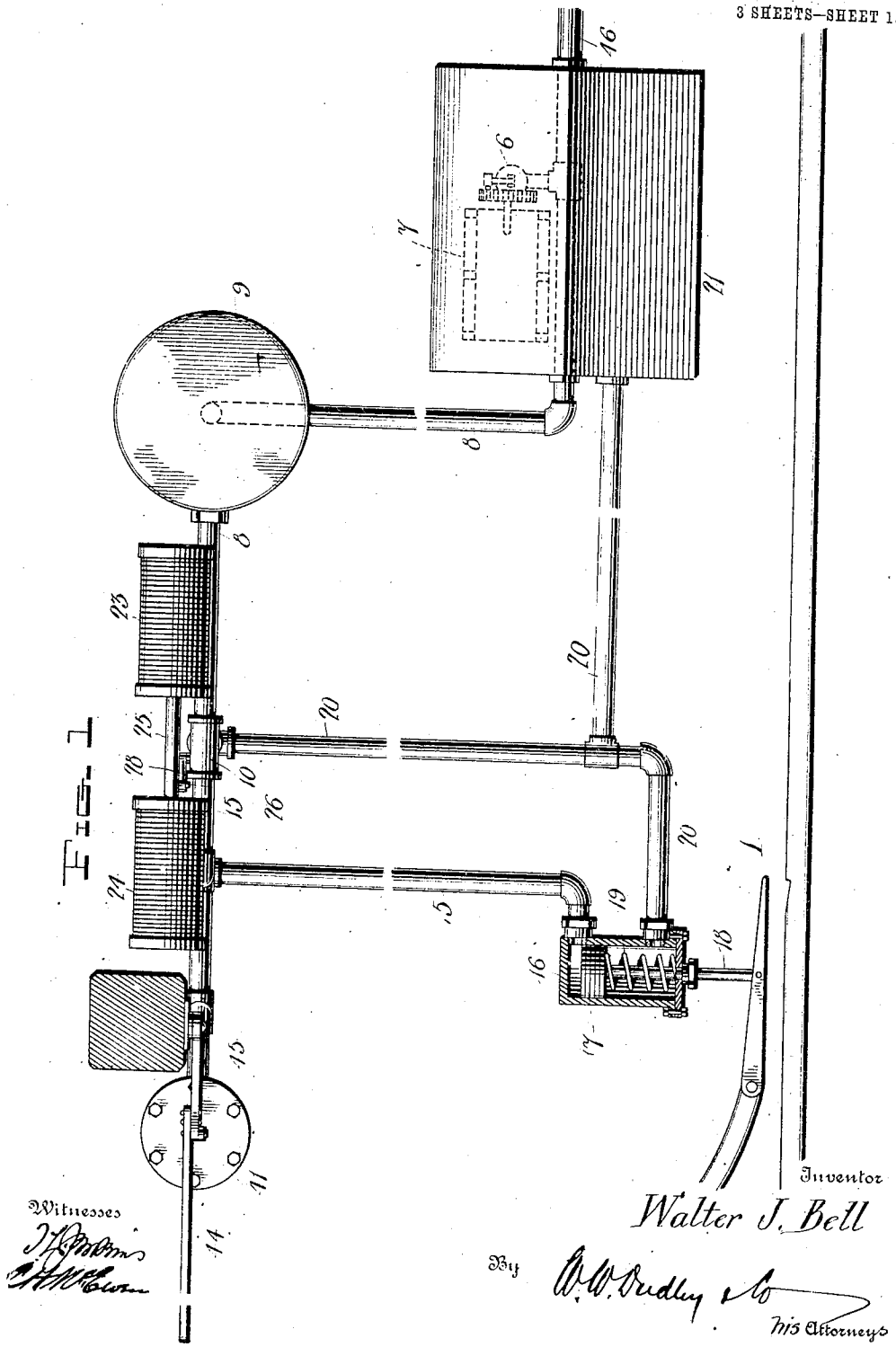

FIG. 1.

Witnesses

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3 SHEETS—SHEET 2.

FIG. 4

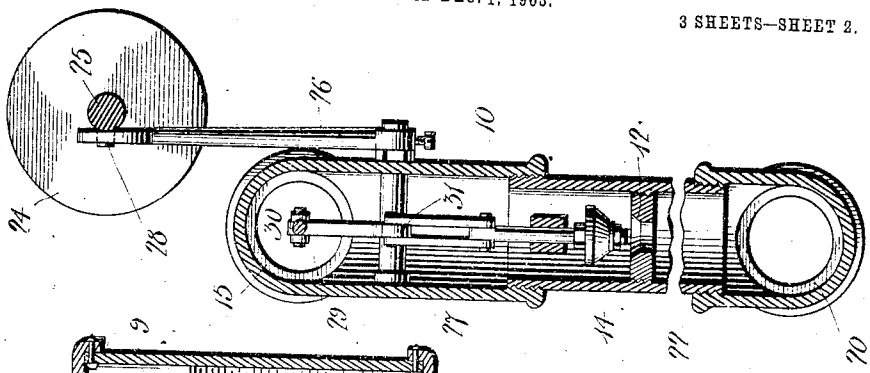
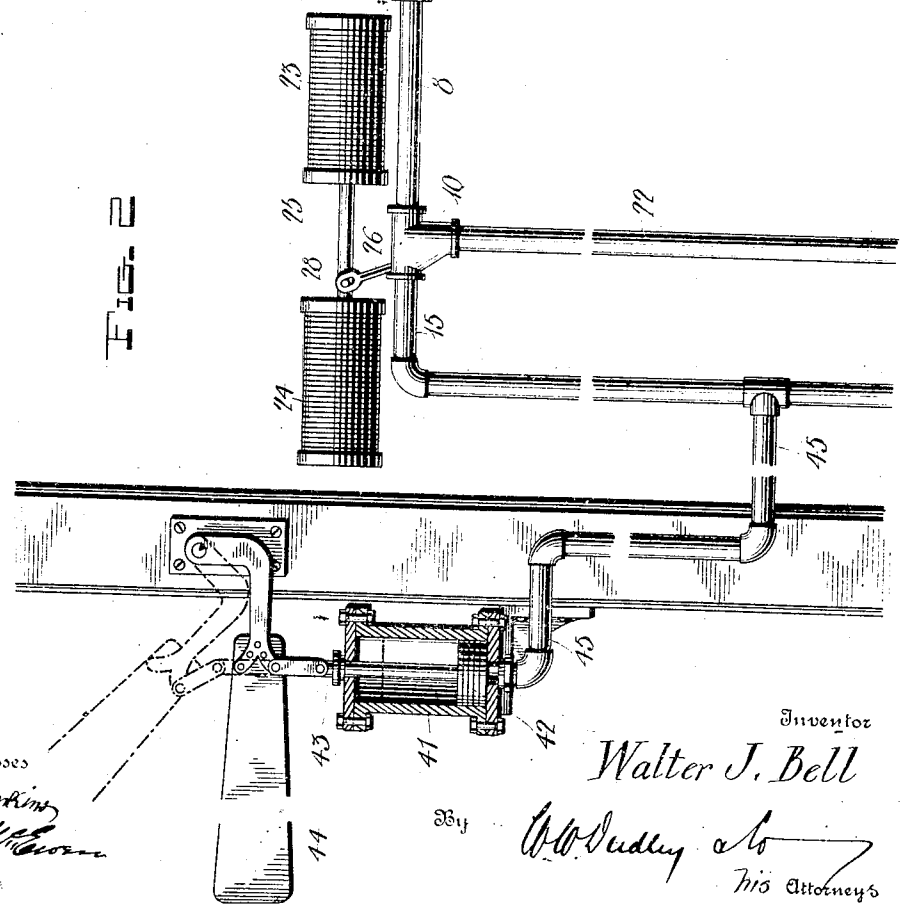


FIG. 2



Witnesses

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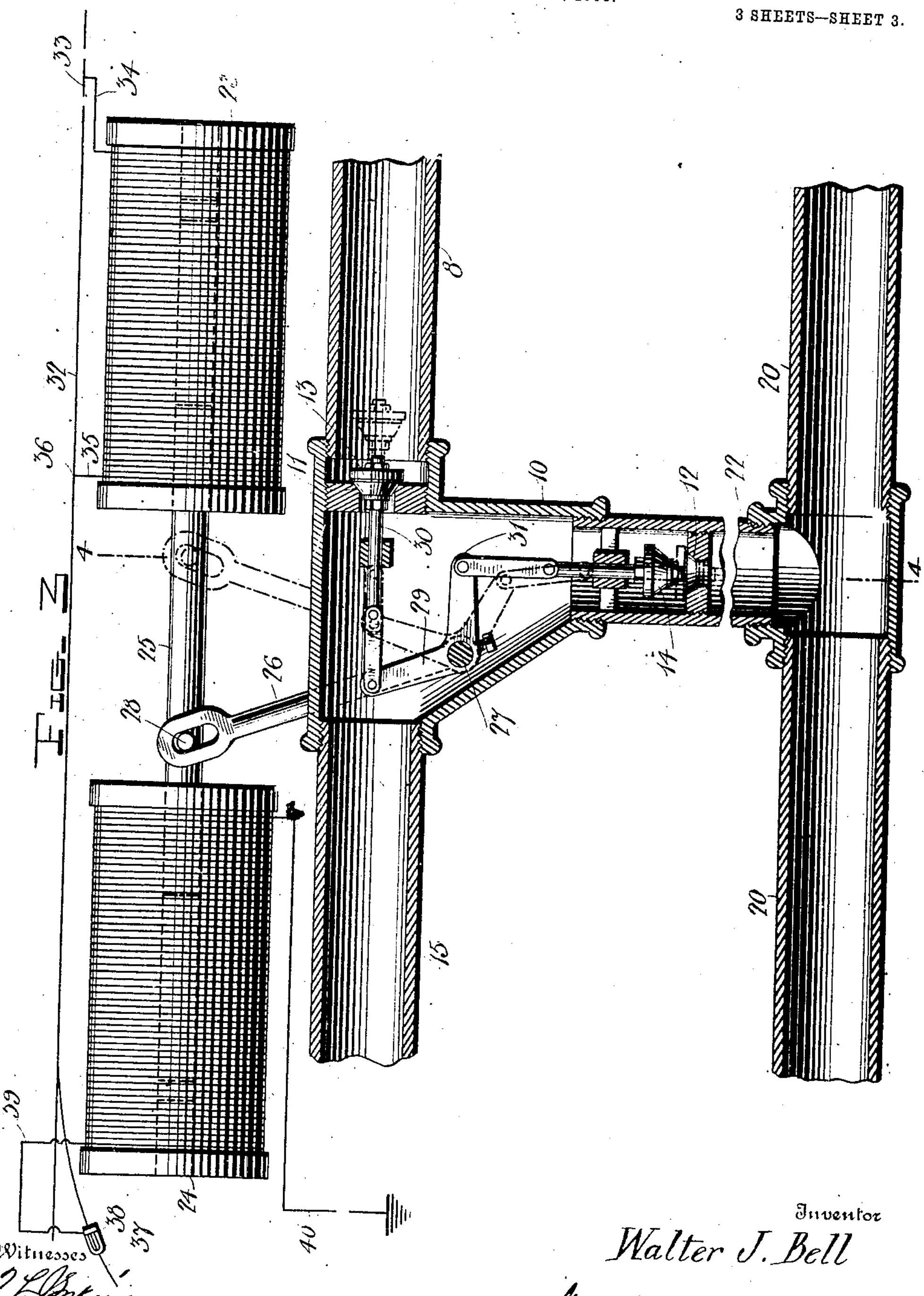
3 SHEETS—SHEET 3.



Witnesses

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UNITED STATES PATENT OFFICE.

WALTER J. BELL, OF LOS ANGELES, CALIFORNIA, ASSIGNOR OF ONE-HALF TO LEON F. MOSS, OF LOS ANGELES, CALIFORNIA.

ELECTROFLUID PRESSURE MECHANISM FOR OPERATING RAILROAD APPLIANCES.

No. 810,609. Specification of Letters Patent. Patented Jan. 23, 1906.

Application filed December 1, 1903. Serial No. 183,355.

To all whom it may concern:

Be it known that I, WALTER J. BELL, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented certain new and useful Improvements in Electrofluid Pressure Mechanism for Operating Railroad Appliances; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable other skilled in the art to which it appertains to make and use the same.

This invention relates to an improved electrofluid pressure mechanism for employment in the operation of switches, gates, signals, and other railroad appliances, and contemplates among other features the production of automatic and manually-controlled means forming a part of said improved mechanism for effecting such operation through the medium of fluid under constant pressure.

For an understanding of the invention reference is to be had to the following statement descriptive of the construction and operation of said mechanism and of the results attained and to the accompanying drawings, which illustrate the mechanism in its preferred form of embodiment, it being understood that the illustrated construction may be variously modified without departing from the spirit of invention defined by the concluding claim.

In the drawings, Figure 1 is a plan view of a railroad-track equipment to which the present invention is adapted. Fig. 2 is an enlarged view, partly in section and partly in elevation, of the fluid-controlling valves and electrical means for effecting the movements of said valves. Fig. 3 is a further enlarged sectional view of said valves and electrical controlling means. Fig. 4 is a sectional view on line 4 4 of Fig. 3.

Referring to the drawings by numerals, 1 denotes a switch-point at the junction, for example, of a straight track and a divergent track, and 2, 3, 4, and 5 are switch-points at the junctions of a number of tracks, such as may be found at a street-railway crossing. It will be apparent that by reason of the employment of compressed fluid for the transmission of motion the switch-points to be moved may be located at a distance from each other or all at a single intersection or crossing dependent upon the track equipment. In the drawings it may be assumed that the four switch-points 2, 3, 4, and 5 are all at one railroad-crossing equipped with four divergent tracks or curves and that the switch-point 1 is located one or more blocks away, although it will be understood that my improvements are applicable to any number of switches at one or more crossings or at one or more junctions between straight and divergent tracks.

At 6 is shown a pump or compressor operated, preferably, by an electric motor 7 to compress fluid, preferably oil. The pump or compressor may, however, be operated by hand or by any motive power other than that shown—as, for instance, by solenoid-magnets, by a steam-engine, gasolene-engine, or their equivalent. Leading from the compression side of the pump or compressor is an oil-pipe 8, in which is an air-chamber 9 for equalization of pressure. The pipe 8 is connected with one end of a valve-casing 10, in which are seats 11 and 12 for two valves 13 and 14, the construction and purpose of which will presently be described. A pipe 15 leads from the opposite end of the valve-casing to one end of a cylinder 16, in which is slidably arranged a piston 17, connected by a rod 18 with the switch-point 1, a coiled spring 19 operating to retract the piston and switch-point after movement of the latter to close the straight track.

20 is a return-pipe connected at one branch with the cylinder at its opposite end and at another branch with the oil-reservoir, in which latter is the pump or compressor. A branch return-pipe 22 leads from the pipe 20 to a lateral extension or branch of the valve-casing 10, in which branch or extension is located the valve-seat 12, above referred to.

23 24 denote solenoid-magnets slidably confining the ends of an armature-rod 25.

26 is a lever fixed at its lower end to a rod 27, journaled to rock in the valve-casing, said lever having a slotted upper end receiving a pin 28 on the armature-rod. Fixed to the rod 27 within the valve-casing are two arms, one of which, 29, is connected by a rod 30 with the valve 13 and the other one of which, 31, is connected to the stem of the valve 14. By reference more especially to Fig. 3, it will be seen that the valve 13 controls the passage of compressed fluid to the cylinder 16 through the pipes 8 and 15, and the valve 14 controls the passage of the fluid returning

to the reservoir through pipes 15, 22, and 20. Any fluid in the spring end of the cylinder passes in the forward stroke of the piston into the reservoir through the pipe 20. The valve 13 is normally seated and the valve 14 is normally unseated, and said valves are coincidently moved to effect the opening of the pipe 8 and the closing of the pipe 22 in a manner hereinafter to be explained.

In the trolley-wire 32 is an insulated section 33, and leading from said section to the coils of magnet 23 is a wire 34, a constantly-charged wire 35 connecting the other end of said coils with the trolley-wire at the point 36. In the divergent trolley-wire 37 is a circuit-maker 38, of suitable construction, to effect the closing of a circuit through the medium of the trolley-wheel, and leading from said circuit-maker to the coils of magnet 24 is a wire 39, the coils being grounded by a wire 40.

In operation, if a car is to be switched onto the divergent track the controller of the car or train is left on, and when the trolley-wheel engages the section 33 the magnet 23 is energized by current flowing from the trolley-wire through wire 35, the coils of said magnet, and the wire 34, whereupon the armature-rod is moved to the right to rock the lever 26 and shaft 27 and unseat the valve 13 and seat the valve 14. Oil under pressure now passes through pipe 15 to the cylinder 16 and moves the piston to effect the throwing of the switch-point 1 to close the straight track and open the divergent track. When the trolley-wheel comes into engagement with the circuit-maker 38, current flows from the divergent trolley-wire through wire 39, through the coils of magnet 24, and is grounded through the wire 40, and during such engagement the magnet 24 is energized and draws the armature-rod to the left, seating the valve 13 and unseating the valve 14. The compressed fluid being cut off and the valve 14 being unseated, the pressure of the spring 19 overcomes the pressure of the fluid in the pipes 15 20 22 and the switch-point returns to normal position.

The fluid-pressure may be employed to operate a semaphore-signal at the switch to indicate the closed or open condition of the latter, a convenient operating means consisting of a cylinder 41, in which is a slidable piston 42, connected by a rod 43 with the semaphore-board 44. The cylinder communicates with the pipe 15 through a pipe 45, and when fluid under pressure is admitted to the cylinder the board is raised to indicate that the divergent track is open. The board is weighted at its outer end to insure its return to normal depressed position when the pressure in the pipe 15 is reduced by closing the valve 13.

I claim as my invention—

In combination with means for supplying fluid under constant pressure and with a railroad appliance operated by compressed fluid, of a compressed-fluid-supply pipe, a fluid-return pipe, a valve at the supply-pipe, a valve at the return-pipe, a connection between said valves to effect their simultaneous movement, an armature operatively connected with said valve connection, a solenoid-magnet slidably receiving said armature and electrically connected with the trolley-wire and an insulated section thereof, and a second solenoid-magnet slidably receiving said armature and having ground connection and connection with a divergent branch of said trolley-wire.

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

WALTER J. BELL.

Witnesses:

G. P. ADAMS,

H. L. SHEPSTON.