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J. G. SCHREUDER.

RAILWAY SIGNAL.

APPLICATION FILED SEPT. 25, 1902.

NO MODEL.

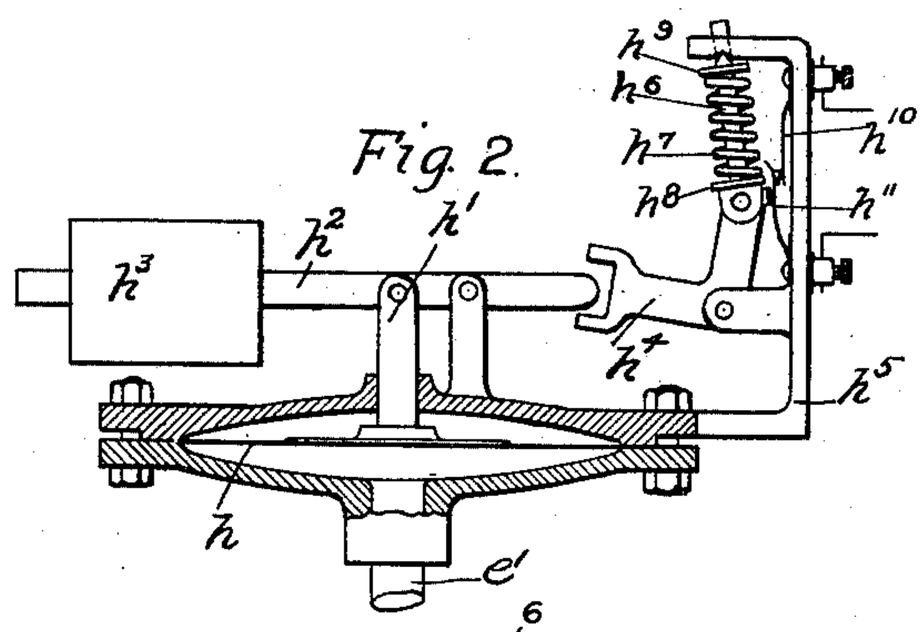

Fig. 2.

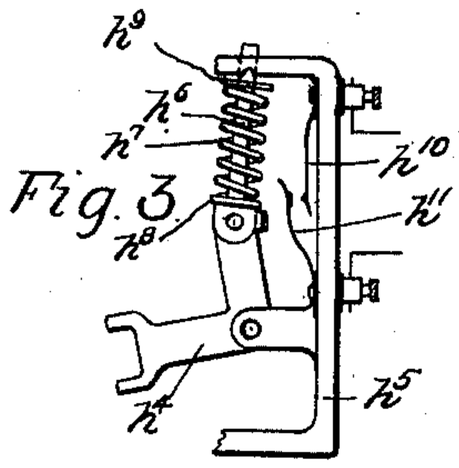

Fig. 3.

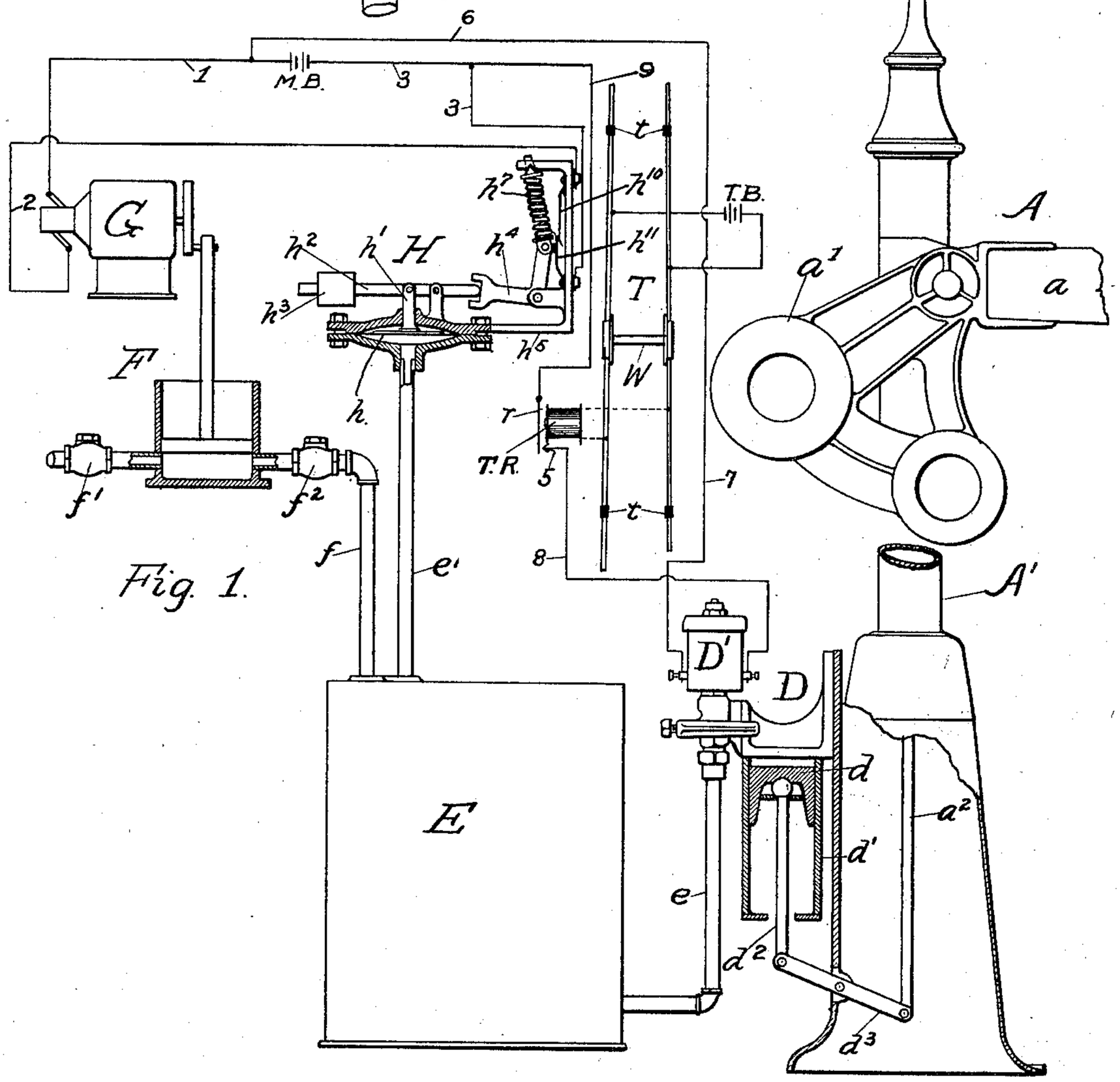

Fig. 1.

WITNESSES:

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No. 736,554. Patented August 18, 1903.

UNITED STATES PATENT OFFICE.

JENS G. SCHREUDER, OF EDGEWOOD, PENNSYLVANIA, ASSIGNOR TO THE UNION SWITCH AND SIGNAL COMPANY, OF SWISSVALE, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

RAILWAY-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 736,554, dated August 18, 1903.

Application filed September 25, 1902. Serial No. 124,733. (No model.)

To all whom it may concern:

Be it known that I, JENS G. SCHREUDER, a subject of the King of Sweden and Norway, residing at Edgewood, in the county of Allegheny and State of Pennsylvania, have invented new and useful Improvements in Railway-Signals, of which the following is a specification.

My invention relates to railway-signals, and particularly to that class of signals in which fluid-pressure is employed as a motive power.

I will describe a railway-signal embodying my invention and then point out the novel features thereof in the claim.

In the accompanying drawings, Figure 1 is a view, partly in elevation and partly in vertical section, of a railway-signal embodying my invention. Fig. 2 is a detail view, partly in vertical section, of a part of the mechanism shown in Fig. 1. Fig. 3 is a detail view. In Fig. 1 I have diagrammatically illustrated a section of railroad-track and such apparatus and circuits as may be necessary to automatically control a signal device comprised in the railway-signal.

Similiar letters of reference designate corresponding parts in all of the figures.

I will premise that wherever I herein use the term "railway-signal" I mean to include a visual signal device which by its color or position relatively to its support gives indication of the service condition of the railroad track or section of railroad-track which it governs and the apparatus or mechanism which moves the signal device from one position of indication to another; also, wherever I use the term "fluid-pressure" I mean a liquid or gas under pressure. I preferably employ a gas—as for example, air under pressure, or, as it is generally termed, "compressed air."

Referring now to the drawings, A designates a visual signal device, here shown as being of the semaphore type and comprising, as usual, a blade a and a counterweight a', which moves the blade to a horizontal position of indication when the signal device is free to move. The signal device is therefore biased to one position of indication, generally to a horizontal position, which position indicates "danger." The signal device is pivoted, as usual, on a post or other support A', and it is operated through an up-and-down rod a^2. One end of the rod is operatively connected with the signal device, and the other end of the rod is operatively connected with a fluid-pressure mechanism.

D designates the fluid-pressure mechanism for moving the signal device from one position of indication to another, and the mechanism as here shown is of such a character as to permit under certain conditions—that is, when the fluid-pressure is cut off from the mechanism—the signal device through its counterweight to move to the horizontal position of indication. The fluid-pressure mechanism is here shown as comprising a motor and an electrically-operated valve which controls the supply of fluid-pressure to the motor. The type of motor shown is that of a piston d and a cylinder d', in which the piston moves. The piston-rod d^2 is connected to one end of a lever d^3, which is pivoted at a point between its ends, and the other end of the lever is connected to the rod a^2. The electrically-operated valve D' is substantially of the form illustrated and described in United States Patent No. 357,109, issued February 1, 1889, to George Westinghouse, Jr., for electrical interlocking mechanism for switches and signals, to which reference may be had for details of the construction. It is only necessary to here state that the electrically-operated valve D' operates to open the fluid-pressure supply to the motor when the magnet comprised therein is energized and to close the fluid-pressure supply when its magnet is deënergized. In the last operation of the valve—that is, when the magnet is deënergized—the fluid-pressure in the cylinder is opened to an exhaust in order that the piston of the cylinder may move back to one end of the cylinder to be in a position to be again operated. The piston, as is well known, will be forced back by the rod a^2 when the signal device is being moved by its counterweight a'. Fluid-pressure for the motor is supplied from a reservoir which is kept charged with fluid-pressure from a pump.

The pump is preferably operated by an electric motor, and the operation of the motor is automatically controlled by the fluid-pressure in the tank. Each railway-signal is provided with a reservoir, pump, motor, and controlling device for the motor, thus avoiding the necessity of a compressor and pipe-line leading from the compressor to a number of railway-signals.

E designates the reservoir, which is connected with the fluid-pressure mechanism by a pipe or conduit *e*.

F designates the pump, here shown as being of the single-acting type, which is connected with the reservoir by a pipe or conduit *f*.

f' f^2 represent, respectively, the inlet and outlet valves of the pump.

G designates the electric motor, which is operatively connected with the piston of the pump.

H designates the controller for the electric motor, which is operated by the fluid-pressure in the reservoir E. It is here shown as comprising a diaphragm *h* and a switch or make-and-break device which is included in the circuit for the electric motor. The diaphragm is acted upon on one side by the fluid-pressure in the reservoir E, which passes through a pipe or conduit e'. The other side of the diaphragm is provided with a lug or projection h', which is connected with a lever h^2, suitably fulcrumed between its ends upon the diaphragm-casing. The lever h^2 is provided with a weight h^3, which may be moved to any position on its end of the lever and thus vary the amount of resistance to be offered to the fluid-pressure in the reservoir. The opposite or other end of the lever h^2 is adapted to operate a switch or circuit-breaker mechanism controlling the motor-circuit. This mechanism is here shown as comprising a bell-crank lever h^4, pivoted upon a bracket h^5 and having one of its ends forked to receive the end of the lever h^2. The other arm of the bell-crank lever is hinged to one end of a rod h^6, which is movable through an opening provided in an extension of the bracket h^5. A spring h^7 surrounds the rod h^6, and the spring is held compressed between a plate or disk h^8, fast on the rod h^6, and a disk or plate h^9, loose upon the rod and abutting against the extension of the bracket.

h^{10} h^{11} designate two contact-springs. These springs are secured to the bracket and are suitably insulated apart in the bracket. The contact-springs are so arranged as to be separate and thus have the circuit in which they are included open, and these contact-springs are adapted to be brought into engagement by the bell-crank lever when it is moved in one direction and allowed to separate when the bell-crank lever is moved in the opposite direction. Figs. 1 and 2 show the position of the parts comprised in the switch or circuit-breaking mechanism when the contact-springs are in engagement and Fig. 3 the position of the parts when the contact-springs are out of engagement. The circuit in which the motor and contact-springs h^{10} and h^{11} are included, starting from the battery MB, is wire 1, armature of the motor-wire 2, contact-springs h^{10} h^{11}, wire 3, back to battery. The operation of the controller, therefore, is as follows: Assuming the parts to be in the position shown in Figs. 1 and 2, in which position the circuit for the motor is complete and the motor is operating the pump to fill or charge the reservoir with fluid-pressure, as soon as the fluid-pressure in the reservoir is sufficient to raise the diaphragm, and consequently rock the lever h^4, the bell-crank lever will be moved in the position as shown in Fig. 3, allowing the contact-springs h^{10} and h^{11} to become separated, thus opening the motor-circuit. The parts will remain in the position shown in Fig. 3 so long as the fluid-pressure is sufficient to hold the diaphragm in an elevated position. As soon as the fluid-pressure falls, the weight h^8 on the lever h^2 will rock the lever h^2 to again have it operate the bell-crank lever to bring contact-springs h^{10} h^{11} into contact and again close the motor-circuit and have the motor operate the pump. It will be seen, therefore, that this construction is automatic in its operation, and the controller can be adjusted through the weight to be actuated within certain pressure limits—that is to say, it may be so regulated as to close the motor-circuit when the pressure is low, say twenty pounds, and to open the motor-circuit when the pressure is high, say at sixty pounds. Within these figures the fluid-pressure mechanism may be successfully operated three times.

T designates a section of railroad-track the rails of which are divided into block-sections by means of insulation *t*.

TB designates a battery the opposite poles of which are connected to the opposite lines of rail-section of the railroad-track. The track-battery is preferably located at one end of the block-section, and at the other end of the block-section a track-relay magnet TR is located, the ends of the winding of which are connected to the opposite lines of the rail-sections.

r designates an armature for the track-relay. If the parallel lines of the rail-sections comprised in the block-section are not short-circuited in any manner or broken, the current from the track-battery will flow through the relay-magnet, thus energizing it and causing it to attract its armature *r* and hold it against a contact-point 5. Should, however, the flow of the current through the parallel lines of the rail-section be interrupted or short-circuited—as, for example, by a pair of wheels W—the track-relay will be deënergized, and thus the armature will fall away from the contact-point 5. The armature *r* and contact-point 5 are included in a circuit comprising the electrically-operating valve

device D'. The circuit for this device starting from the battery MB is wires 6 and 7, through the magnet comprised in the controlling device D', wire 8, contact-point 5, armature *r*, wires 9 and 3, to battery. It will be seen, therefore, that when the track-relay becomes deënergized for any reason whatsoever the circuit through the controlling device D' will be opened, thus permitting the valve of the device to cut off the supply of fluid-pressure from the motor comprised in the railway-signal and allowing the signal device to be moved to a horizontal position of indication by the counterweight *a'*. As soon as the track-relay again becomes energized the valve of the controlling device will be again operated to permit fluid-pressure to operate the motor, and thus move the signal device to a position indicating "clear." As rapidly as the fluid-pressure in the reservoir is exhausted by reason of the continued operation of the motor of the railway-signal the controller will be operated to close the motor-circuit and thus have the motor operate the pump to again supply fluid-pressure to the reservoir.

What I claim as my invention is—

The combination with a railway-signal comprising a signal device, of a fluid-pressure mechanism for moving the signal device from one position of indication to another, and an electrically-operated valve device for controlling a supply of fluid-pressure to the fluid-pressure mechanism, a reservoir for containing the supply of fluid-pressure, an electric motor and a pump operated thereby for furnishing the fluid-pressure to the reservoir, a circuit for the motor including a circuit-breaker mechanism, and a diaphragm affected by the fluid-pressure in the reservoir for operating said circuit-breaker mechanism.

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

JENS G. SCHREUDER.

Witnesses:

GEO. E. CRUSE,

W. L. MCDANIEL.