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E. B. POWERS.

AIR BRAKE.

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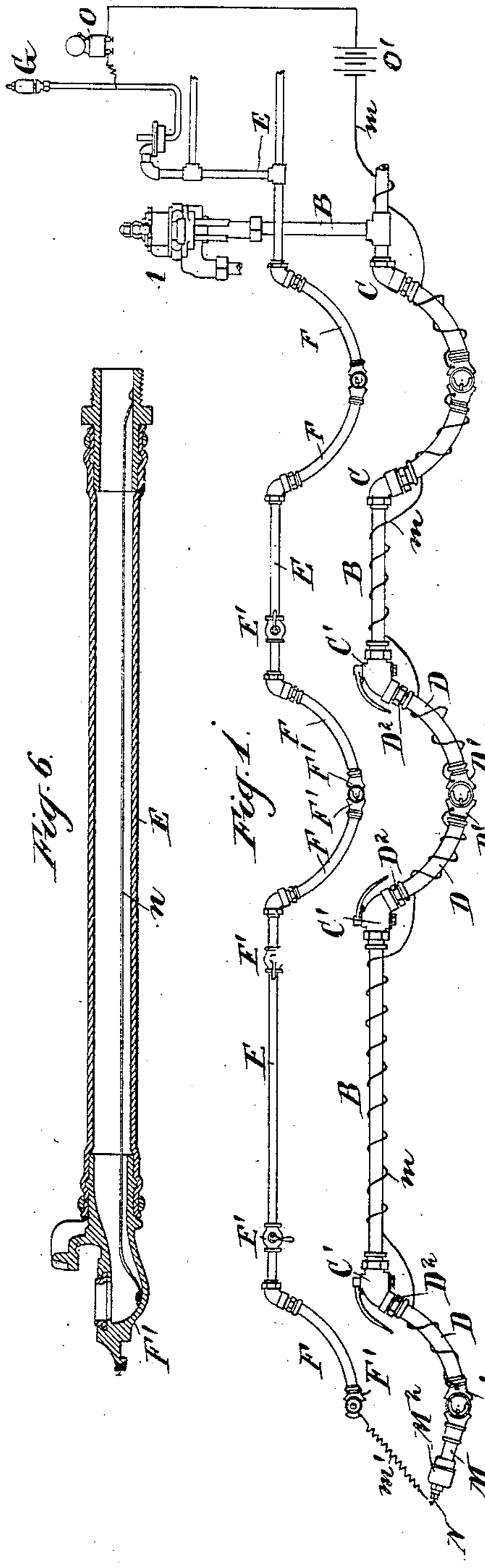

Fig. 1.

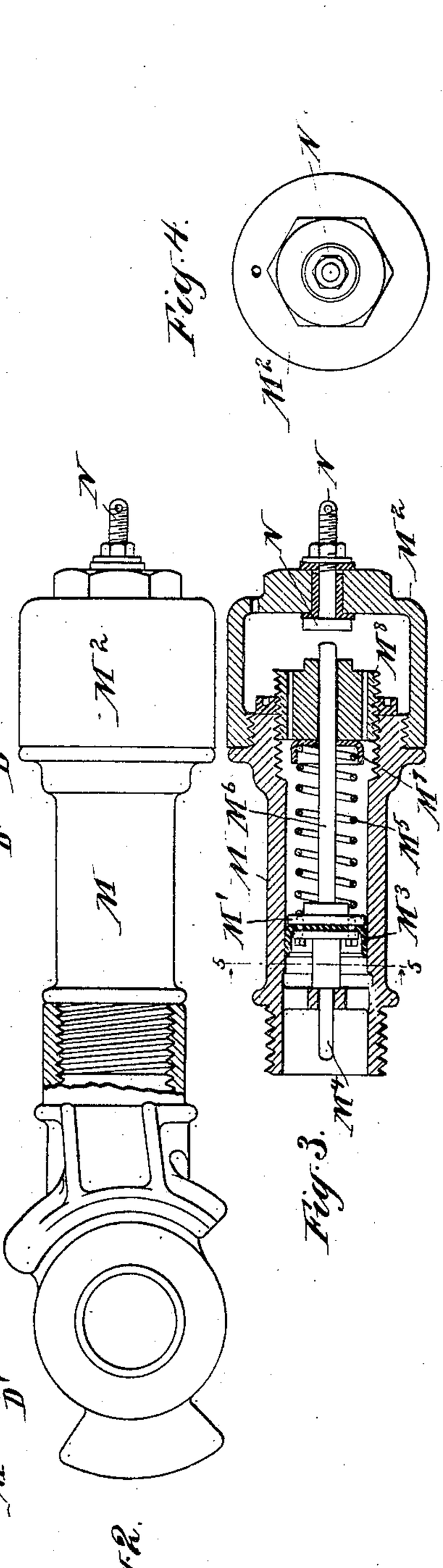

Fig. 3.

Fig. 5.

Fig. 4.

Fig. 2.

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UNITED STATES PATENT OFFICE.

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No. 875,454. Specification of Letters Patent. Patented Dec. 31, 1907.

Application filed February 26, 1907. Serial No. 359,356.

To all whom it may concern:

Be it known that I, EDMUND B. POWERS, a citizen of the United States, residing in the city of New York, in the borough of Brooklyn, in the county of Kings and State of New York, have invented a certain new and useful Improvement in Air-Brakes, of which the following is a specification.

The invention relates to brake systems for railway trains in which air pressure is employed to operate the brakes.

The object of the invention is to provide means whereby the engineer may test the entire length of train-pipe for obstructions, the result being indicated by a signal in the cab.

The invention consists in certain novel features and arrangements, and details of construction by which the above object is attained, to be hereinafter described.

The accompanying drawings form a part of this specification and show a preferred manner of carrying out the invention.

Figure 1 is a diagrammatic elevation showing the invention with so much of the usual air-brake and signal equipment as is necessary to understand the relation of the present invention thereto. Fig. 2 is a side view of the signal-actuating valve on a larger scale, attached to a train-pipe hose coupling, the latter being partly in section. Fig. 3 is a corresponding axial section through the valve alone, certain portions being shown in elevation. Fig. 4 is a corresponding end view, and Fig. 5 is a transverse section on the line 5—5 in Fig. 3. Fig. 6 is a longitudinal section through one of the air-signal hose connections.

Similar letters of reference indicate the same parts in all the figures.

A is the engineer's brake-valve located in the locomotive cab, B the train-pipe having angle fittings C and angle-cocks C^1, flexible hose connections D and hose-couplings D^1 and nipples D^2, all of which may be understood to be as in the usual automatic brake equipment and provided with the usual reservoirs, valves, brake-cylinders and other brake-mechanism, not shown.

E is the usual air-signal pipe having cocks E^1 and hose connections F with hose couplings F^1, terminating in the signal whistle G in the engineer's cab.

In order to apply the brakes throughout the train the train-pipe with its hose connections must of course be unobstructed through its entire length. It is the duty of the train-inspector and engineer to see that such is the case before the train starts, but during a run under the present practice the engineer can test the condition only by applying and releasing the brakes. The present invention enables the engineer to ascertain at any time the condition of the train-pipe.

M is a casing which I have termed a signal valve attached to the hose coupling at the rear end of the last car of the train and forming in effect a continuation of the train pipe, it incloses a plunger M^1 having a valve-stem M^6 adapted to strike a contact-piece N mounted in and insulated from the cap M^2 of the casing. The plunger M^1 is equipped with a cup-leather M^3 and a guide-stem M^4 received in the hub of a spider cast in the casing. A spring M^5 encircles the valve-stem M^6 and abuts at one end against the plunger and at the other, through a cap M^7, against a screw-plug or follower M^8, perforated to permit the escape of air which if imprisoned might affect the movements of the plunger, the cap M^2 is also perforated for the same reason.

The casing is in an electric circuit including a battery O^1 and electric bell O in the cab or in the vicinity of the engineer's brake-valve. When the pressure in the train-pipe exceeds the normal sufficiently to overcome the resistance of the spring M^5, the plunger is moved and the valve-stem M^6 forced into contact with the contact-piece N to complete the circuit and causes the bell to ring. This excess pressure is induced as usual by throwing the engineer's brake valve to the "release" position.

The circuit may be wired in various ways; for convenience in coupling cars in a train I prefer to wire each car by attaching one end of an insulated wire *m* to the hose coupling and supporting the intermediate portion of the wire upon the hose and pipe, or otherwise, so that an unbroken line from the cab to the valve-casing M is provided. The other line I have shown as composed of the air-signal pipe, each hose connection being equipped with an interior wire *n* extending from the hose-coupling to the nipple; thus arranged the two lines are completed by connections in the cab and by the act of coupling the air-brake hose and air-signal hose as usual between the cars. The signal-valve I have shown as attached to one of the usual

couplings so that it may be easily joined to the corresponding coupling at the rear end of the last car, and connection between the contact-piece N and coupling F^1 of the air-signal hose is made in any convenient manner as by the wire m^1.

Any obstruction in the train-pipe due to accidental closure of an angle-cock, constriction of the hose connections, or other cause sufficient to affect the working of the brake, will prevent the application of pressure to the plunger M^1, and if on making such test the bell fails to respond the engineer is apprised of the fact that the train-pipe is obstructed somewhere in its length and can take the proper steps to find and correct the fault.

By removing the cap M^2 the follower M^8 may be engaged by a socket-wrench or the like and advanced or withdrawn as required and held in the new position by the lock-nut M^9. The resistance of the spring may be thus adjusted to correspond to the pressure employed in either the "quick-action" or the "high-speed" air equipments, or to suit other conditions of pressure. It is only necessary that the plunger shall move under an increase of pressure, say five pounds, above the normal. When the engineer throws his brake-lever to the "release" position the pressure in the train-pipe is raised above the normal or "running" pressure and if the pipe is clear the bell is rung.

Another advantage of the invention is in indicating an over-pressure in the train-pipe; during a run it sometimes happens that an excess pressure obtains in the train-pipe, which although indicated on the air-pressure gage may not be noted by the engineer, the result being that the brakes cannot be applied until the excess pressure has been reduced, the time consumed in such reduction may be the cause of an accident. By my invention such over-pressure will ring the bell and call the attention of the engineer to the condition.

It will be understood that other signals or indicating devices may be employed in place of or in conjunction with the bell, and any system of wiring may be substituted for that shown. If the train-pipe and air-signal pipe are insulated and their hose connections wired as in Fig. 6, they will offer an economical and easily coupled circuit. Instead of a closed circuit an open circuit may be employed.

By attaching the signal-valve M to one of the usual coupling connections it is easily attached to or removed from the train-pipe as required, but it may be otherwise joined to the train-pipe if preferred.

The construction of the signal-valve may be varied within wide limits; it is only necessary that a signal be made in the cab when an excess pressure exists in the rear terminal of the train-pipe.

Although I have described the invention as applied to brake systems in which compressed air is employed, it is obvious that a reversal of the valve arrangement will adapt it for service with the vacuum system.

I claim:—

1. In an apparatus of the character set forth, portable means separably attached to the rear terminal of the train-pipe and actuated by changes of pressure in the latter, and an electric signal operated by said means.

2. In an apparatus of the character set forth, portable means separably attached to the rear terminal of the train-pipe and actuated by changes of pressure in said pipe, an electric signal located adjacent to the engineer's brake valve, and connections from said means to said signal for operating the latter.

3. In an apparatus of the character set forth, a train-pipe, an electric circuit, a signal in said circuit, and portable means separably attached to the rear terminal of said train-pipe and actuated by changes of pressure in said train-pipe for making and breaking said circuit and operating said signal.

4. In an apparatus of the character set forth, a train-pipe, a portable casing separably attached to the rear terminal of said train-pipe, a yielding plunger in said casing constructed to be moved by an increase of pressure in said train-pipe, a contact-piece in the path of said plunger, an electric circuit including said plunger and contact-piece, an engineer's brake valve controlling the pressure in said train-pipe, and a signal located adjacent to said valve and in said circuit.

5. In an apparatus of the character set forth, a train-pipe, a portable casing separably attached to the rear terminal of said train-pipe, a plunger in said casing constructed to be moved by changes of pressure in said train-pipe, a contact-piece in the path of said plunger, an electric circuit including said plunger and contact-piece, and a signal in said circuit.

6. In an apparatus of the character set forth, a train-pipe, a hose connection attached to the rear terminal of said train-pipe and forming a continuation thereof, a casing separably attached to the free end of said hose connection, a plunger in said casing constructed to be moved by changes of pressure in said train-pipe, and an electrically operated engineer's signal actuated by the movement of said plunger.

In testimony that I claim the invention above set forth I affix my signature, in presence of two witnesses.

EDMUND B. POWERS.

Witnesses:
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