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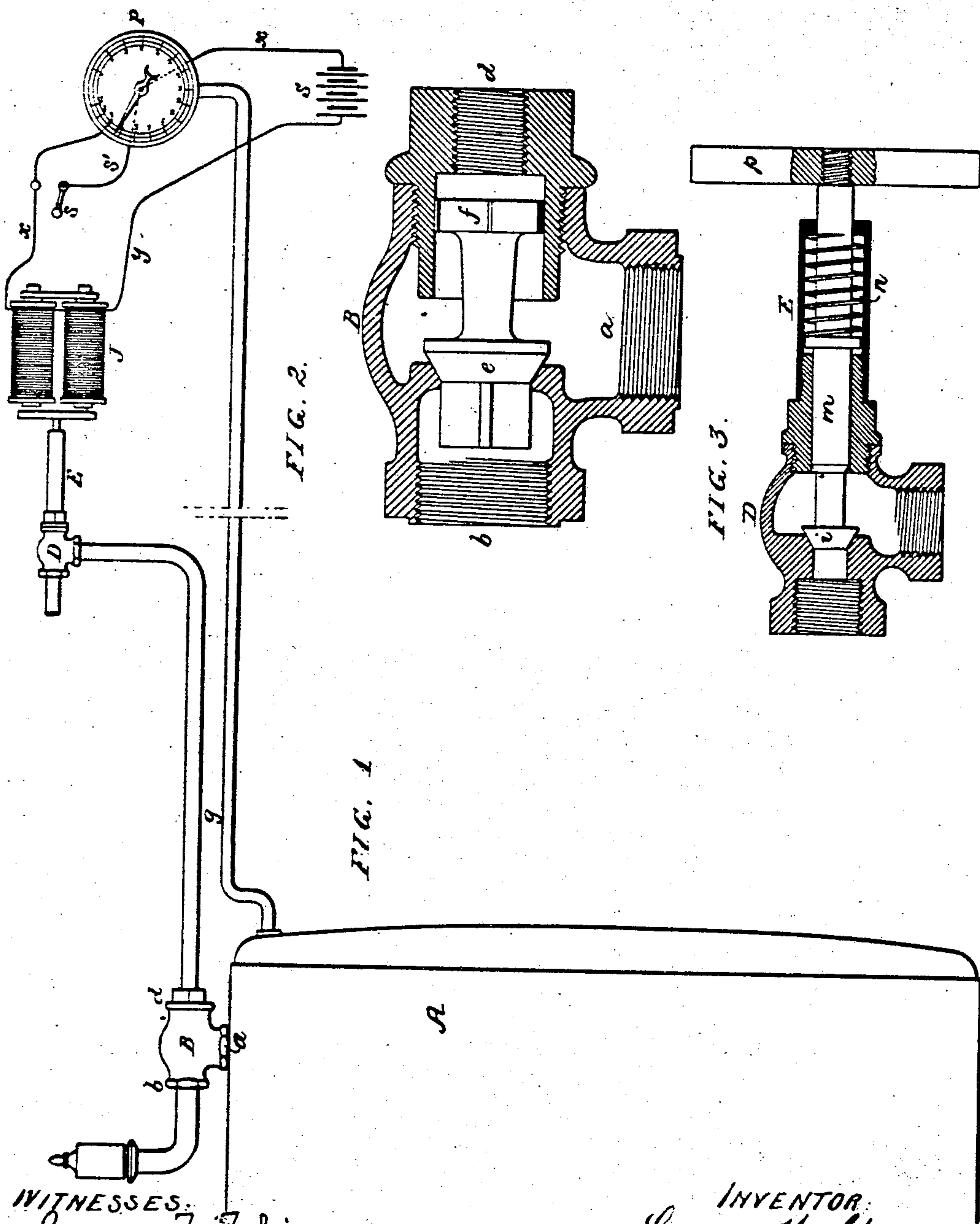
(No Model.)

G. W. STORER.

Device for Operating Valves on Steam Boilers.

No. 236,645.

Patented Jan. 11, 1881.



WITNESSES:  
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# UNITED STATES PATENT OFFICE.

GEORGE W. STORER, OF PHILADELPHIA, PENNSYLVANIA.

## DEVICE FOR OPERATING VALVES ON STEAM-BOILERS.

SPECIFICATION forming part of Letters Patent No. 236,645, dated January 11, 1881.

Application filed October 26, 1880. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. STORER, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented an Improvement in Devices for Operating Valves on Steam-Boilers, &c., of which the following is a specification.

The object of my invention is to provide simple and effective means for governing the operation of a pressure-actuated valve connected with a vessel or reservoir containing steam, air, gas, or liquid under pressure, and this object I attain in the manner hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1 is a diagram illustrating my invention in connection with the safety-valve of a steam-boiler; Figs. 2 and 3, sectional views, on an enlarged scale, of valves used in carrying out my invention.

A represents part of a steam-boiler, and B a valve-casing, the interior of which communicates with the steam-space of the boiler through a suitable branch, *a*. The casing B has two other branches, *b* and *d*, the branch *b* forming the discharge branch, and being closed under ordinary circumstances by the valve *e*, the stem of which is furnished with a piston, *f*, fitting in the branch *d* of the chest, said branch being bored out for the reception of the piston, which fits so loosely therein, or is provided with such grooves or openings, that steam can pass through or around the piston, so as to act on both faces of the same. The area of the inner face of the piston is slightly greater than the effective area of the valve *e* exposed to the pressure of the steam; hence when the steam is allowed to escape from the branch *d* of the chest faster than it can pass through or around the piston *f* the pressure on the outer face of the same is reduced, and the pressure on the inner face of the piston overcomes the pressure on the valve *e*, the latter being thereby opened, so as to permit the escape of steam from the branch *b*, which is preferably furnished with a pipe having a steam-whistle, so that the escape of steam will cause the sounding of an alarm or signal.

When the escape of steam from the branch *d* of the casing A is cut off, however, the pressure exerted on the outer face of the piston *f*

is sufficient to effect the closing of the valve *e*, and thus stop the flow of steam through the discharge branch *b*.

An automatic discharge-valve of this character has been heretofore devised, and my present invention relates to the means of controlling the operation of the valve by regulating the escape of steam from the branch *d* of the valve-casing. Said branch *d* communicates through a pipe, *g*, with the interior of a valve-chest, D, to the discharge branch of which is adapted a valve, *i*, the pressure on which should be balanced as nearly as possible by pressure in the opposite direction, so that the opening of the valve can be effected with but little exertion. In the present instance the balancing of the valve is effected by the pressure of steam on an annular flange on the valve-stem; but this construction is not essential, as many of the common forms of balanced valves may be used in place of that shown, if desired.

The stem *m* of the valve *i* is adapted to a bearing in the chest D and projects through a cap, E, on said casing, said cap containing a spring, *n*, which acts upon a collar on the valve-stem and serves to keep the valve *i* in its seat under ordinary circumstances and prevent the accidental opening of said valve.

The outer end of the valve-stem *m* is provided with a transverse bar, *p*, which forms the armature of an electro-magnet, J, of which *x* is the positive and *y* the negative wire. The positive wire *x* terminates at any desired point on the dial of a pressure-gage, P. It may, for instance, terminate at the graduation representing the pressure at which it is desirable to open the safety-valve of the boiler A, with which the pressure-gage should communicate. The wire *x* is, of course, insulated from the dial, or the latter may be made of non-conducting material. The negative wire leads from the magnet J to the negative pole of the battery S, the positive pole of which is connected with the pointer of the pressure-gage. As long as the pressure in the boiler A does not reach the height indicated by the graduation at which the wire *x* terminates the circuit through the magnet will not be completed and the armature *p* will not be attracted, the valve *i* consequently remaining closed, and thus prevent-



ing the escape of steam from the branch *d* of the valve-chest *B*, the valve *e* of which must therefore also remain closed. When the pointer of the gage has moved so far, however, as to complete the circuit through said pointer and the wire *x*, the armature of the magnet will be attracted and the valve *i* opened, thereby permitting the escape of steam from the branch *d* of the chest *B* and the opening of the valve *e* to its full extent, so as to permit the free escape of steam from the boiler *A*, such escape continuing until the pressure is so far reduced that the pointer of the gage *P* moves away from the wire *x* and again breaks the circuit through the magnet *J*—a result followed by the immediate closing of the valves *i* and *e*.

The circuit may be completed independently of the gage *P* by means of the switch *s* and wire *s'* when it is desired to test the working of the valve *e* or to sound the alarm or signal connected therewith.

Although I have shown my invention in connection with a steam-boiler, it may be used in connection with reservoirs containing air, gas, or liquid under pressure, or the valve *e* may be used to control the flow of steam, air, gas, or liquid under pressure through pipes or passages, in which case the circuit through the magnet *J* may be closed or broken by means of the switch *s*, or a suitable knob or button in place thereof, the automatic making and breaking of the circuit through the medium of the pressure-gage not being essential in such case; or, when the pressure-gage is used, it may be caused to govern the admission of steam, &c., into a vessel, instead of regulating the discharge therefrom, the gage in this case

operating to permit the opening of the valve and the admission of steam into the vessel when the pressure in the latter falls below a certain point, as will be readily understood.

I claim as my invention—

1. The combination of a vessel or reservoir containing steam, air, gas, or liquid under pressure, an inlet or discharge valve connected therewith and actuated by pressure, a supplementary valve governing said pressure-actuated valve, an electro-magnet for operating said supplementary valve, and means for making and breaking the circuit through said electro-magnet, as set forth.

2. The combination of a reservoir of steam, air, gas, or liquid under pressure, a pressure-actuated valve connected therewith, a supplementary valve governing said pressure-actuated valve, an electro-magnet for operating said supplementary valve, and a pressure-gage constructed to make and break the circuit through said electro-magnet, as specified.

3. The combination of the reservoir, the pressure-actuated valve, the supplementary governing-valve, the electro-magnet for operating said supplementary valve, the pressure-gage constructed to make and break the circuit through the electro-magnet, and a switch whereby the circuit may be controlled independently of the pressure-gage, as described.

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

GEORGE W. STORER.

Witnesses—

JAMES F. TOBIN,  
HARRY SMITH.