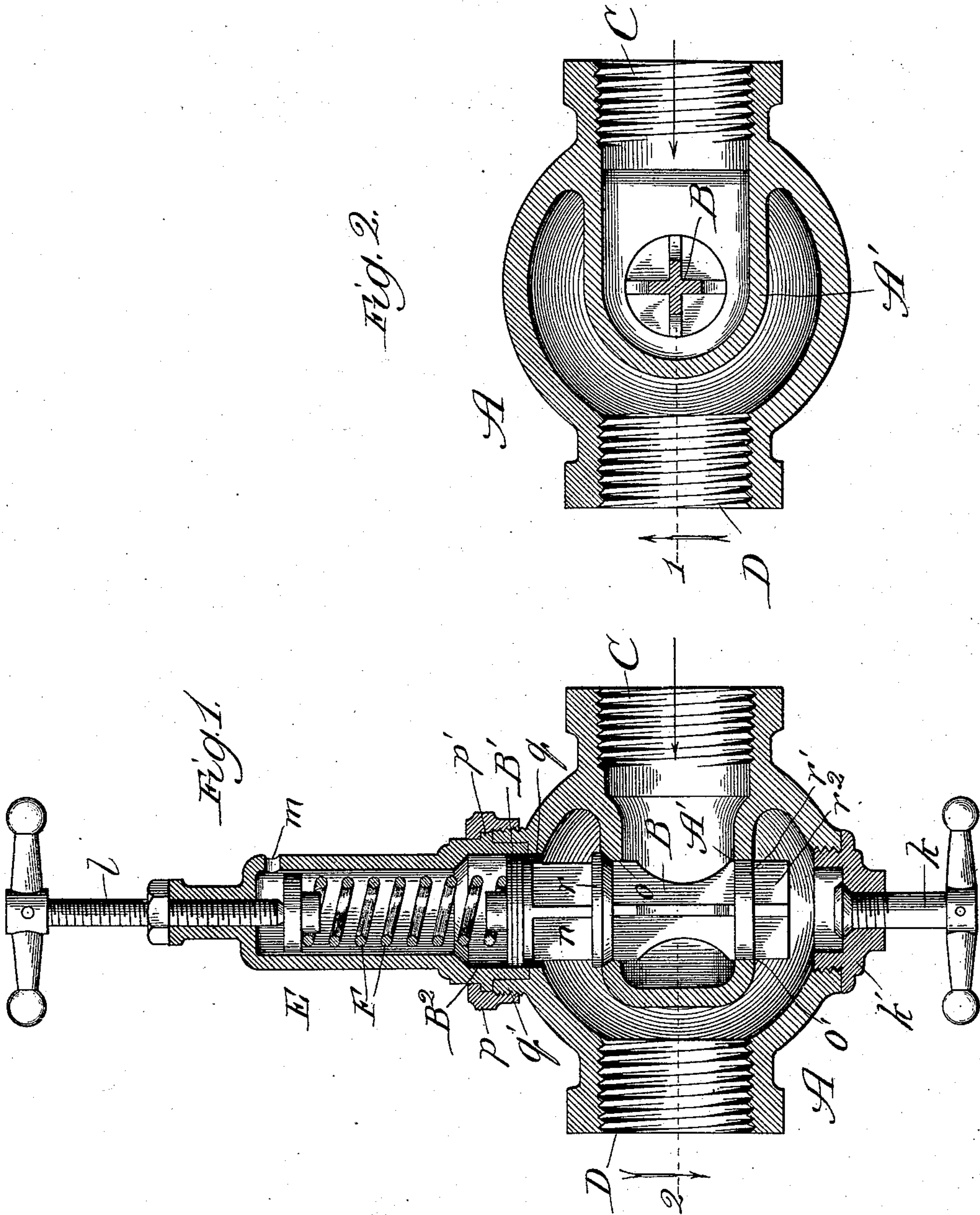


(No Model.)

F. HENNEBÖHLE.
SAFETY VALVE.

No. 572,297.

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SAFETY-VALVE.

SPECIFICATION forming part of Letters Patent No. 572,297, dated December 1, 1896.

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To all whom it may concern:

Be it known that I, FRANK HENNEBÖHLE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Safety-Valves, of which the following is a specification.

My invention relates to an improvement in automatic-stop safety-valves.

10 My object is to provide such a valve of novel construction adapting it to be used for automatically shutting off the fluid-pressure supply as the consequence of a material leak occurring in the delivery-pipe; and my object is also to enable the same construction of the valve to be used, by merely reversing its position to constitute the inlet the outlet, as an automatic-stop safety-valve for air-reservoirs to effect the stoppage of machinery driven by compressed air from a reservoir when the pressure in the latter falls below a predetermined degree.

Referring to the accompanying drawings, Figure 1 shows my improved valve device by a view in sectional elevation, the section being taken at the line 1 on Fig. 2 and viewed in the direction of the arrow; and Fig. 2 is a section taken at the line 2 on Fig. 1 and viewed in the direction of the arrow.

30 A is the valve-shell or valve-chamber, shown as of approximately globular form, with the valve-seat A' inside it cast integral with the shell to cause the plane of the openings *o* and *o'*, in which the valve is seated, to cross that of the inlet C and outlet D.

The valve B is of the wing-valve variety, (though other varieties of valve may be used,) shown as formed with four wings extending between the heads *r* and *r'*, the former of which seats in the outer edge portion of the opening *o*, while the latter closely fits inside the opening *o'*, and the outer surfaces of the heads present the same area and the inner surfaces thereof present the same area. Between the inlet and outlet is provided in one side of the shell an opening *q*, surrounded by a threaded collar *q'*, in which is seated at its lower end a tube E, secured in place at a circumferential flange *p'* by a coupling *p*, engaging the threads of the collar *q'*, and in the lower portion of the tube is formed a cham-

ber B² for a piston B', which is connected with the head *r* of the valve B by a winged neck *n*. The tube E, which is preferably cylindrical, is closed at its outer end except for a vent *m*, and the closed end of the cylinder affords a bearing for a set-screw *l*, which extends into the cylinder to confine therein between the inner headed end of the set-screw and the piston-valve a regulating-spring F, for which latter, however, a weight may be substituted without departure from my invention. An extension *r²* of the head *r'* is presented to the inner headed end of an adjusting-screw *k*, having its bearing in a screw-plug *k'*, closing an opening in the shell A opposite the opening *q* therein.

To use the device for controlling steam-pressure by shutting off the supply in case a leak occurs in the delivery or distributing system, as by bursting of a pipe, the spring F is set to a tension to overcome any degree of pressure lower than the lowest pressure at the outlet D, at which the valve is connected with the delivery-pipe or pipe system, while it is connected at its inlet C with a boiler or a header for a battery of boilers.

The construction of the valve B renders it a balanced valve, whereby when it is seated the equal pressure against its opposite heads from the inlet retains it closed. To fill the delivery from the inlet, the screw *k* is employed to unseat the valve B until the delivery-pipe is filled with a pressure equal to the boiler-pressure, when the screw *k* is withdrawn to its normal position illustrated and the valve B remains open by the pressure in the shell exerted against the piston B'.

Should any material leak occur in the delivery-pipe, the consequent lowering of the pressure therein will reduce it below the tension of the spring F and cause the recoil of the latter to force the piston B' from its seat in the chamber B² and close the valve B, thereby shutting off the supply from the boiler to the delivery.

The vent *m* in the spring-housing E prevents the accumulation of pressure, beyond atmospheric pressure, against the outer surface of the piston, as by steam entering the cylinder about the piston, which would accordingly escape at the vent. Obviously such

pressure against the piston, by supplementing the tension of the spring, would impair the action of my improved device.

Where machinery is driven by compressed air supplied to it from a reservoir, it is important that the pressure in the latter should never be allowed to fall below a predetermined degree; the surplus above which is used for driving the machinery. If the pressure in the reservoir be allowed to fall below this predetermined degree, the matter of raising it again is attended with so much trouble and causes waste of so much time that it is preferable to stop the machinery before the pressure falls so far. My improved valve device may be used to accomplish this purpose reliably and effectively by connecting it at the opening D with the air-reservoir and at the opening C with the delivery to the air-driven machinery. By then having the spring F set to cause the piston B' to effectually resist the desired minimum pressure in the reservoir all surplus pressure therefrom will maintain the valve B open by compressing the spring F, which, however, will close the valve B whenever the pressure in the reservoir falls to such minimum.

Owing to the operation of my valve device in the last-named connection the adjusting-screw *k* is not required, and may therefore be omitted when the device is constructed for that particular use.

It may be suggested that the construction of my improved valve device adapts it to be placed, for equally reliable and effective operation, in any position, thus with the head *r* up or down or at any angle to the position in which it is illustrated. Moreover, in the same relation in which my improved device is used for controlling the supply from an air-receiver it may be used to advantage as an automatic full-open check between the header and a boiler, whereby should the boiler or any pipe leading to or from it burst, with the effect of decreasing the pressure, the supply from that particular boiler will immediately be shut off.

What I claim as new, and desire to secure by Letters Patent, is—

1. An automatic-stopsafety-valve comprising, in combination, a chamber having an inlet and an outlet, a balanced valve seating in said chamber to close under a reduction of pressure therein, a piston extending from said balanced valve and exposed to the pressure in said chamber, and a regulating-spring opposing said piston to said pressure, substantially as and for the purpose set forth.

2. A valve device comprising, in combination, a chamber having an inlet and an outlet, a balanced valve seating in said chamber, a spring-housing extending from an opening in said chamber and containing, near its inner end, a piston-chamber, a piston extending from said balanced valve toward its seat in said piston-chamber, and a regulating-spring confined in the housing against said piston, substantially as and for the purpose set forth.

3. An automatic-stopsafety-valve comprising, in combination, a chamber having an inlet and an outlet, a balanced valve seating in said chamber to close under a reduction of pressure therein, a piston extending from said balanced valve and exposed to the pressure in said chamber, a regulating-spring opposing said piston to said pressure, and a set-screw adjustable against the balanced valve to open it in opposition to said spring, substantially as and for the purpose set forth.

4. A valve device comprising, in combination, a chamber A provided with an inlet and an outlet and containing the valve-seat A', a balanced wing-valve B seating in said chamber and carrying at one end a neck *n* terminating in a piston B', a tubular spring-housing E extending from an opening *q* in said chamber and provided with a bearing at its outer end for a set-screw *l* projecting into the housing, a valve-chamber B² near the inner end of said housing for the piston, and a spring F confined in said housing between the set-screw and piston, substantially as and for the purpose set forth.

5. A valve device comprising, in combination, a chamber A provided with an inlet and an outlet and containing the valve-seat A', a balanced wing-valve B seating in said chamber and carrying at one end a neck *n* terminating in a piston B', a tubular spring-housing E having a vent *m* and extending from an opening *q* in said chamber and closed at its outer end where it affords a bearing for a set-screw *l* projecting into the housing, a piston-chamber B² near the inner end of said housing for the piston, a spring F confined in said housing between the set-screw and piston, and a set-screw *k* adjustable against the balanced valve in opposition to said spring, substantially as and for the purpose set forth.

FRANK HENNEBÖHLE.

In presence of—

J. H. LEE,

R. T. SPENCER.