T. A. BROOKS.

SAFETY GAS VALVE.

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Fig. 2.

Fig. 1

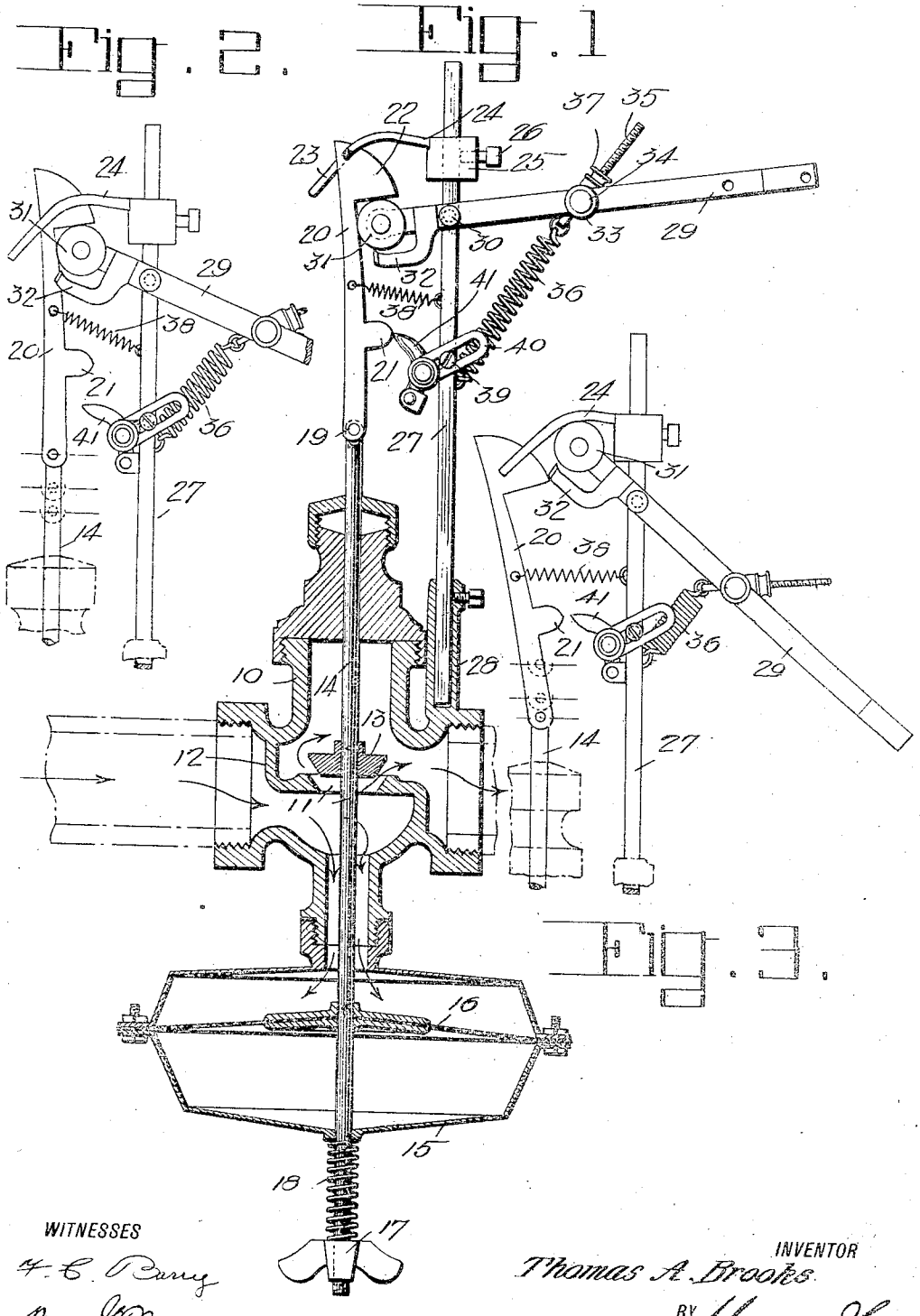


Fig. 3.

WITNESSES

H. C. Carey

Myron L. Deas

INVENTOR

Thomas A. Brooks.

BY Munn & Co.

ATTORNEYS

UNITED STATES PATENT OFFICE.

THOMAS A. BROOKS, OF NEWTON, KANSAS.

SAFETY GAS-VALVE.

1,246,537. Specification of Letters Patent. Patented Nov. 13, 1917.

Application filed June 27, 1917. Serial No. 177,231.

To all whom it may concern:

Be it known that I, THOMAS A. BROOKS, a citizen of the United States, and a resident of Newton, in the county of Harvey and State of Kansas, have invented a certain new and useful Improvement in Safety Gas-Valves, of which the following is a specification.

My present invention relates generally to gas cut off valves, and more particularly to a valve of this nature having means whereby to bring the same into action for closing off the gas passage when the pressure of the gas falls below or increases above certain pre-determined limits, my object being the provision of a simple and inexpensive arrangement applicable to the usual type of valve and capable of effective and efficient operation for the purposes described.

In the accompanying drawings illustrating my invention,

Figure 1 is a view partly in elevation and partly in vertical section illustrating my improvements and showing the parts in their position under normal gas pressure;

Fig. 2 is a side view of certain of the parts illustrating the same in position as under decreasing pressure, that is below the normal, and

Fig. 3 is a view similar to Fig. 2, illustrating the parts in position with the valve closed where the pressure has either decreased below or increased above the prescribed limits.

In applying my invention I utilize a valve casing 10 introduced within a gas supply pipe and having the usual internal valve seat 11 formed in its diaphragm 12 for coöperation with the valve member 13, the latter being secured to a point intermediate the ends of a vertically projecting stem 14 projecting above and below the valve casing 10 at its opposite ends and having its lower end journaled through a lower diaphragm casing 15, the diaphragm 16 of which is secured to the valve stem 14 and is subject at all times to the pressure within the casing 10 so that upon an increase of pressure above a predetermined point, the pressure of the gas upon the diaphragm 16 will overcome certain counteracting means to be presently described, and the valve member 13 will be lowered against the seat 11 to cut off the gas flow.

The lower extremity of the rod 14 depending below the diaphragm casing 15 has an adjustable wing nut 17 and a spring 18 coiled therearound between the cut 17 and the lower portion of the casing 15, the function of which spring is to lower the rod 14 and seat the valve 13 upon its seat 11 when the pressure falls below a predetermined point, at which time the spring 18 will be free to act by virtue of the disengagement of the normally counteracting pressures to be presently described.

Above the valve casing 10 the upper end of the rod 14 is pivotally connected at 19 to the lower end of the arm 20 having an intermediate side projection 21, and the upper laterally projecting head 22, the latter projecting between the forks 23 of a guide arm 24.

The guide arm 24 extends from a bracket 25 adjustably mounted and held by a set screw 26 upon the upper portion of a vertically extending supporting bar 27, the lower end of which is adjustably secured within a socket portion 28 of the valve casing 10.

Below the bracket 25 a controlling lever 29 is intermediately pivoted at 30 upon the supporting bar 27, and is provided at one end adjacent the arm 20 with a wheel 31 engageable with the arm and normally beneath the head 22 when the valve 13 is in open operative position, as shown in Fig. 1, with the gas pressure normal. The same end of the lever 29 also has an arm 32 below the wheel 31 which, when the wheel 31 moves upwardly to lift the pivot arm 20 and the valve arm 14, comes into engagement with the pivot arm 20 as seen in Fig. 2, and forces the latter away from the supporting upright 27, so as to shift its head 22 laterally away from the wheel 31.

Between its pivot point 30 and its opposite end the lever 29 has a bearing 33 in which is journaled a transverse pin 34 having an aperture through which a threaded bolt 35 extends, one end of the latter being connected to one end of a main controlling spring 36, the opposite end of which is secured to the supporting upright 27 at a point intermediate the ends of the latter. Above the pin 34 the opposite end of the threaded bolt 35 is engaged by an adjustable nut 37 so that the effective strength of the spring 36 may be adjusted.

Intermediate its ends and at a point above its lateral projection 21, the pivot arm 20 is connected to the supporting upright 27 by a

spring 38 which normally holds the former against the roller 31 and in substantially vertical alinement with the supporting upright.

Below the lever 29 the supporting upright has a fastening screw 39 adjustably engaging the slotted bracket 40 of an intermediately pivoted angular trip member 41 normally below the lateral projection 21, for engagement with the latter upon lowering movement of the valve rod 14 to shift the pivoted arm 20 laterally away from the upright 27 and disengage its head 22 from the roller 31 to the position shown in Fig. 3.

Thus, with the parts in the position shown in Fig. 1, in which normal pressure is present within the valve casing 10, the tension controlling spring 36 acts through the engagement of the lever 29 with the pivoted arm 20 to maintain the valve 13 open, counteracting both the pressure of the spring 18 at the lower end of the valve rod and the effect of the pressure upon the upper surface of the diaphragm 16. Should the pressure decrease the valve rod is moved upwardly by virtue of the spring 36 until the arm 32 of the lever 29 engages the pivot arm 20 and shifts the latter out of engagement with the roller 31 to the position shown in Fig. 3, at which time the pressure of the spring 18 at the lower end of the valve rod operates to lower the valve 13 to closed position.

Thus, it is obvious that the means provided by my invention will effectively operate to close the gas controlling valve when the pressure increases above or decreases below predetermined limits, so as to thereby shut off the gas and obviate danger therefrom.

I claim:

1. A safety gas valve having a vertically projecting stem extending above and below the valve, an arm pivoted at its lower end to the upper end of the said stem and provided with an intermediate projection and an upper head, an upright supporting member extending vertically along the upper portion of the stem and the said arm, and having a yielding connection with the arm to normally hold the latter in operative position, a lever fulcrumed upon the said supporting member and detachably engaging the said head of said arm, a controlling spring adjustably engaging the said lever to actuate the latter, means carried by the said lever to engage and shift the said arm away from the lever adjacent the upper limit of movement of the arm with the valve stem, a pivot member supported by the said upright in the path of downward movement of the said arm with the valve stem, for engagement with the intermediate projection of the arm to shift the latter out of engagement with the lever adjacent the limit of lowering movement of the arm with the valve stem, a pressure controlled diaphragm engaging the lower portion of the valve stem to move the latter downward in opposition to the said lever and to seat the valve in the event of excessive pressure upon disengagement of the arm from the lever adjacent lowermost position of the arm, and means engaging the valve stem to lower the same and close the valve independent of the diaphragm when the arm is disengaged from the lever adjacent the upper limit of movement of the former, upon cessation of pressure.

2. A safety gas valve having a vertically projecting stem extending above and below the valve, an arm pivoted at its lower end to the upper end of said stem and provided with an intermediate projection and an upper head, an upright supporting member extending vertically along the upper portion of the stem to the said arm and having a yielding connection with the arm to normally hold the latter in operative position, a lever fulcrumed upon the said supporting member and detachably engaging the said head of said arm, a controlling spring adjustably engaging the said lever to actuate the latter, means carried by the said lever to engage and shift the said arm away from the lever adjacent the upper limit of movement of the arm with the valve stem, a pivot member supported by the said upright in the path of downward movement of the said arm with the valve stem, for engagement with the intermediate projection of the arm to shift the latter out of engagement with the lever adjacent the limit of lowering movement of the arm with the valve stem, a pressure controlled diaphragm engaging the lower portion of the valve stem to move the latter downward in opposition to the said lever and to seat the valve in the event of excessive pressure upon disengagement of the arm from the lever adjacent lowermost position of the arm, and a spring adjustably engaging the lower extremity of the valve stem to lower the same and close the valve independent of the diaphragm when the arm is disengaged from the lever adjacent the upper limit of movement of the former, upon cessation of pressure.

3. A safety gas valve having a stem, an arm pivoted to the stem, a stationary supporting member extending parallel with the stem and having a guide for the said arm and a yielding connection therewith, a controlling lever mounted in connection with said supporting member and detachably engaging the said arm to normally maintain the valve in open position, adjustable means controlling the said lever, said lever being disengageable from the arm adjacent the limits of operative movement of the latter,

a pressure controlled diaphragm engaging the valve stem to move the latter in opposition to the said lever and close the valve under excessive pressure, and means engaging the valve stem to move the latter and close the valve independent of the said diaphragm after disengagement of the lever upon cessation of pressure.

4. A safety gas valve having a stem, an arm pivoted to the stem, a stationary supporting member, a controlling lever mounted in connection with said supporting member and detachably engaging said arm to normally maintain the valve in open position, means engageable with the said arm to shift the latter out of engagement with the said lever adjacent the limits of operative movement of the arm and the valve stem, a pressure controlled diaphragm engaging the valve stem to move the latter in opposition to the said lever, and a spring engaging the valve stem to elevate the latter independent of the diaphragm and in a similar direction, said diaphragm and said spring operating to close the valve upon disengagement of the arm from the controlling lever.

5. A safety gas valve having a stem, an arm pivoted to the stem, a controlling lever detachably engaging said arm, said lever acting to move the arm with the valve stem in one direction and being disengageable from the arm adjacent the limits of operative movement of the arm with the valve stem, a pressure controlled diaphragm engaging the valve stem to move the latter in opposition to the said lever, and acting to close the valve under excessive pressure, and means engaging the stem to move the latter independent of the diaphragm and acting to close the valve upon cessation of pressure.

THOMAS A. BROOKS.

Witnesses:
W. M. FREELAND,
A. B. BRACKEN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."