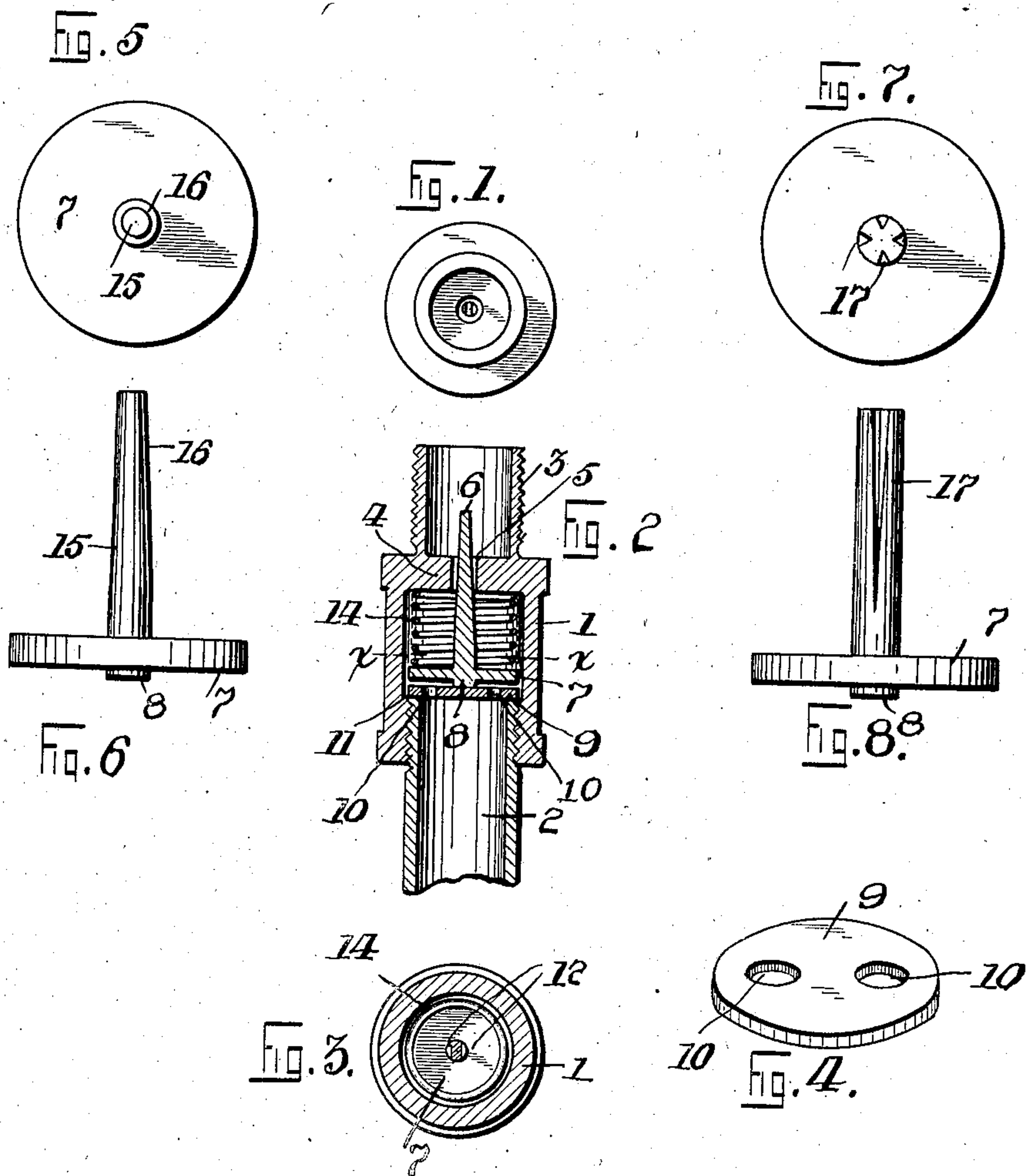


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A. W. FRANCIS.
REGULATOR.

APPLICATION FILED MAY 5, 1904.



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UNITED STATES PATENT OFFICE.

ALBERT W. FRANCIS, OF BEAVERFALLS, PENNSYLVANIA.

REGULATOR.

SPECIFICATION forming part of Letters Patent No. 780,986, dated January 31, 1905.

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To all whom it may concern:

Be it known that I, ALBERT W. FRANCIS, a citizen of the United States of America, residing at Beaverfalls, in the county of Beaver and State of Pennsylvania, have invented certain new and useful Improvements in Regulators, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention has relation to regulators, and more particularly to that class which are adapted to be used in connection with gas-burners, whereby the supply or pressure of gas may be regulated when passing into the burner.

The primary object of my invention is to provide a gas-regulator of the type wherein the regulator is automatically actuated by the pressure of the gas delivered thereto, and aims to construct a regulator of this type that would be extremely simple, having no complicated parts, and therefore being extremely unlikely to become out of order or in non-working condition. To accomplish this, and in providing my improved regulator, I have constructed the same whereby it will be automatically manipulated by the pressure of the gas and at all times a perfect combustion established and a better light obtained.

With the above and other objects in view reference will be had to the accompanying drawings, forming a part of this application, wherein like numerals of reference indicate like parts throughout the several views, in which—

Figure 1 is a top plan view of my improved regulator. Fig. 2 is a vertical sectional view of the same. Fig. 3 is a transverse sectional view taken on the line *xx* of Fig. 2. Fig. 4 is a detail perspective view of the needle-supporting disk used in constructing my improved regulator. Fig. 5 is a top plan view of a modified form of needle-valve. Fig. 6 is a side elevation of the same. Fig. 7 is a top plan view of another modified form of needle-valve, and Fig. 8 is a side elevation of the same.

In the accompanying drawings reference will first be had to Fig. 2, wherein I have shown a vertical sectional view of my improved regulator, all parts being shown in position there-

in, and the reference-numeral 1 designates the nipple of my improved regulator, in which is located the regulating-valve, and the lower end of this nipple is adapted to be secured on the gas-supply pipe 2, while the other end of said nipple is provided with a screw-threaded extension 3, upon which the burner (not shown) is adapted to be secured. The nipple 1 is provided with a central partition 4, having an aperture 5 formed therein, and in said aperture is adapted to operate the needle of the regulator, this needle being provided with an annular rim 7, the lower end of the needle 6 forming a lug 8, which when the needle is in its normal position is adapted to rest upon a disk 9, which, as illustrated in Fig. 4 of the drawings, is provided with two apertures 10 10, and this disk is adapted to rest upon an annular shoulder 11, formed in said nipple, also upon the top of the gas-supply pipe 2 should the same be threaded sufficiently into the nipple. The shank portion of the needle 6 is beveled upon two of its sides, as indicated at 12 12, this beveled portion extending from the end of the needle to within a short distance of the annular rim 7, and interposed between this annular rim and the partition 4 is a spiral spring 14, the tension of said spring being adapted to normally hold the lug 8 in engagement with the disk 9, mounted in the nipple.

In Figs. 5 and 6 I have illustrated a modified form of needle-valve which I may employ in connection with the regulator, and in this construction, the shank portion 15 of the needle may be tapered upon all sides, as indicated at 16, the annular rim 7 and the lug 8 being maintained in this construction. In Figs. 7 and 8 of the drawings another modified form of needle is shown wherein the tapered grooves 17 are formed in the sides of the needle, these grooves being arranged diametrically opposite each other, as illustrated in Fig. 7 of the drawings, and also in this construction the annular rim 7 and the lug 8 are maintained.

The operation of my improved regulator is as follows: When the gas is admitted to the regulator, the same passes through the apertures 10 10 of the annular disk 9 and strikes against the bottom face of the annular rim 7,

from whence it flows around the edge of the same and to the aperture 5, at which point the supply of gas is regulated. To provide means whereby this is accomplished, I have
 5 beveled the sides of the piston, as indicated at 12 12, and upon the pressure of the gas overcoming the tension of the spring 14 the needle 6 will be raised by the gas striking the under face of the annular rim 7 and the nee-
 10 dle will be raised sufficiently to close the opening 5, whereby an equal amount of gas will pass through the same as if the pressure had not been increased, and upon the gas re-
 15 suming its normal pressure the spiral spring 14 will expand and lower the needle to its normal position, whereby the normal pressure of gas will be permitted to flow through the opening 5 of the partition 4.

It is a well-known fact that the pressure of
 20 gas in supply-pipes varies, and this varying of the pressure tends to produce a flickering and unreliable light, and in constructions of burners in which a mantle is employed it often serves to cause the breaking of the mantle,
 25 and thus impairs the effectiveness of the light. This objectionable feature is entirely overcome by the aid of my improved regulator, as by its use the pressure of the gas is constant or normal, any increase of pressure in
 30 the line being compensated for by the regulator partly closing the discharge-orifice to the burner, whereby a constant pressure or quantity of gas is delivered to the burner.

The many advantages of my improved regu-
 35 lator will be apparent from the foregoing description, taken in connection with the operation, and while I have herein shown the preferred form of construction it is observed that either one of the modified forms of nee-
 40 dle may be readily used in place of the preferred form of constructing the needle, and very slight changes may be made without departing from the general spirit and scope of the invention.

Having described my invention, what I 45 claim as new, and desire to secure by Letters Patent, is—

1. In an automatic gas-regulator, a nipple provided on its upper end with an extension and having an interior partition provided with 50 a central opening, a perforated disk mounted within the nipple and free to move vertically therein, means for supporting said disk, a needle resting on the disk, and projecting into the central opening of said partition, and 55 means between the partition and the disk for normally holding the latter stationary.

2. In an automatic gas-regulator a nipple having a threaded extension on its upper end and provided with a partition having a cen- 60 tral opening or discharge-orifice, an interior annular shoulder in said nipple forming a seat, a perforated disk resting normally on said seat and free to move vertically in the nipple, a grooved needle resting on the disk and 65 projecting into the central opening in the partition, an annular flange carried by said needle at a point slightly above its lower end, and a spring interposed between the partition on the said flange, substantially as described. 70

3. In an automatic gas-regulator a nipple having an extension on its upper end, and provided with a partition having a discharge-orifice, a perforated disk supported within the nipple and having free vertical movement 75 therein, a tapered needle supported on the disk and extending into the discharge-orifice of the partition, a flange or rim on said needle at a point slightly above its lower end, and a spring arranged between the partition and 80 said flange or rim, substantially as described.

In testimony whereof I affix my signature in the presence of two witnesses.

ALBERT W. FRANCIS.

Witnesses:

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