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A. W. FRANCIS.
REGULATOR.

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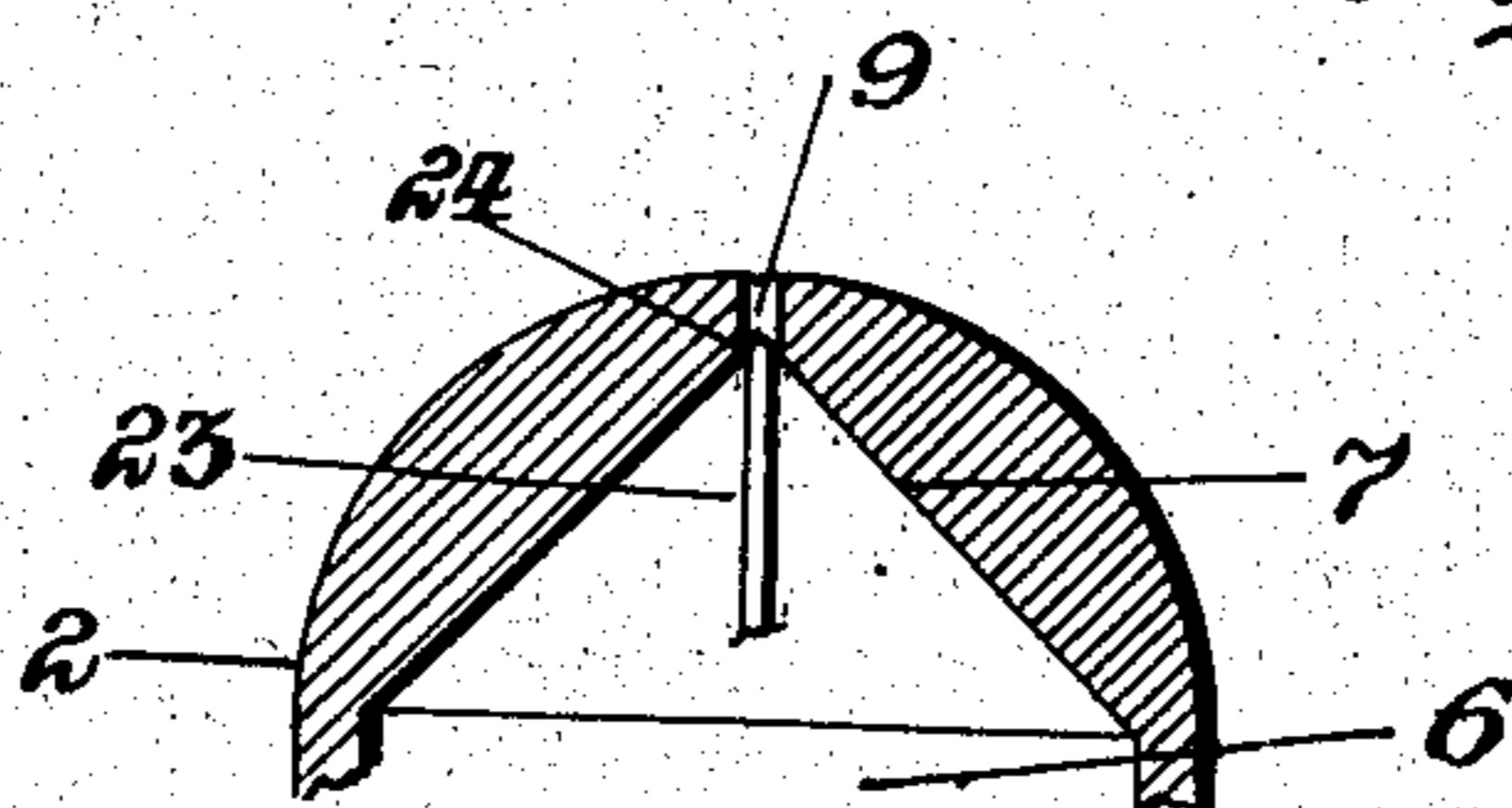
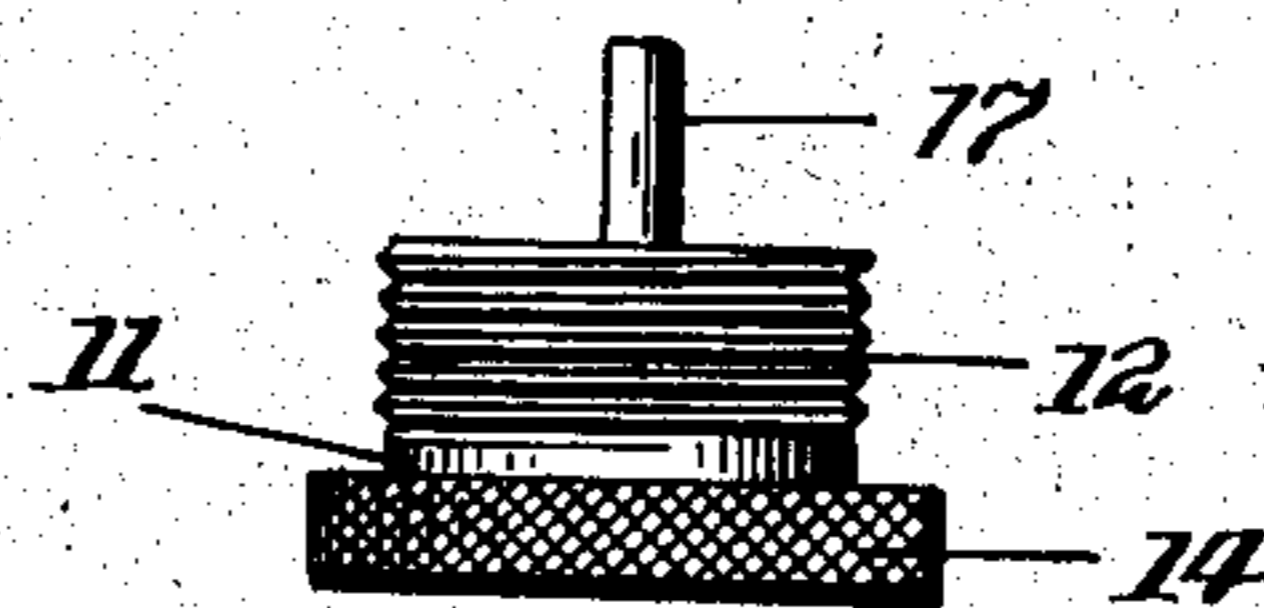
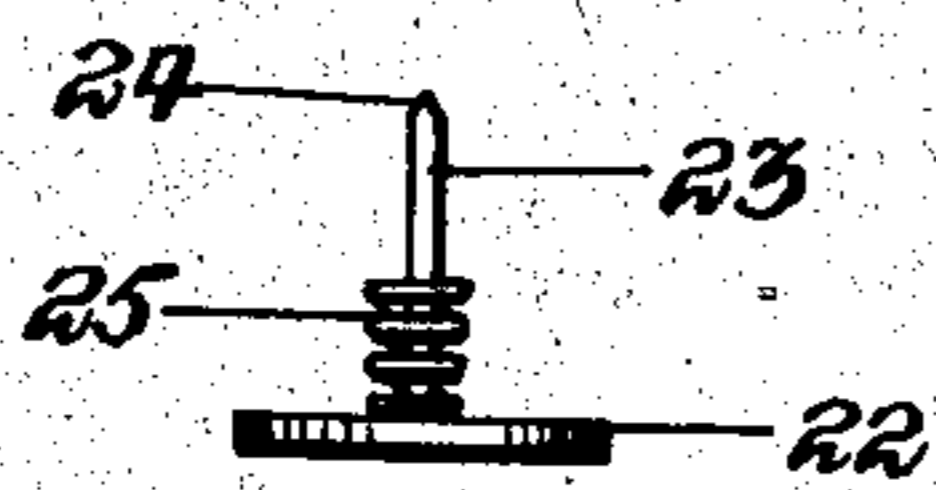
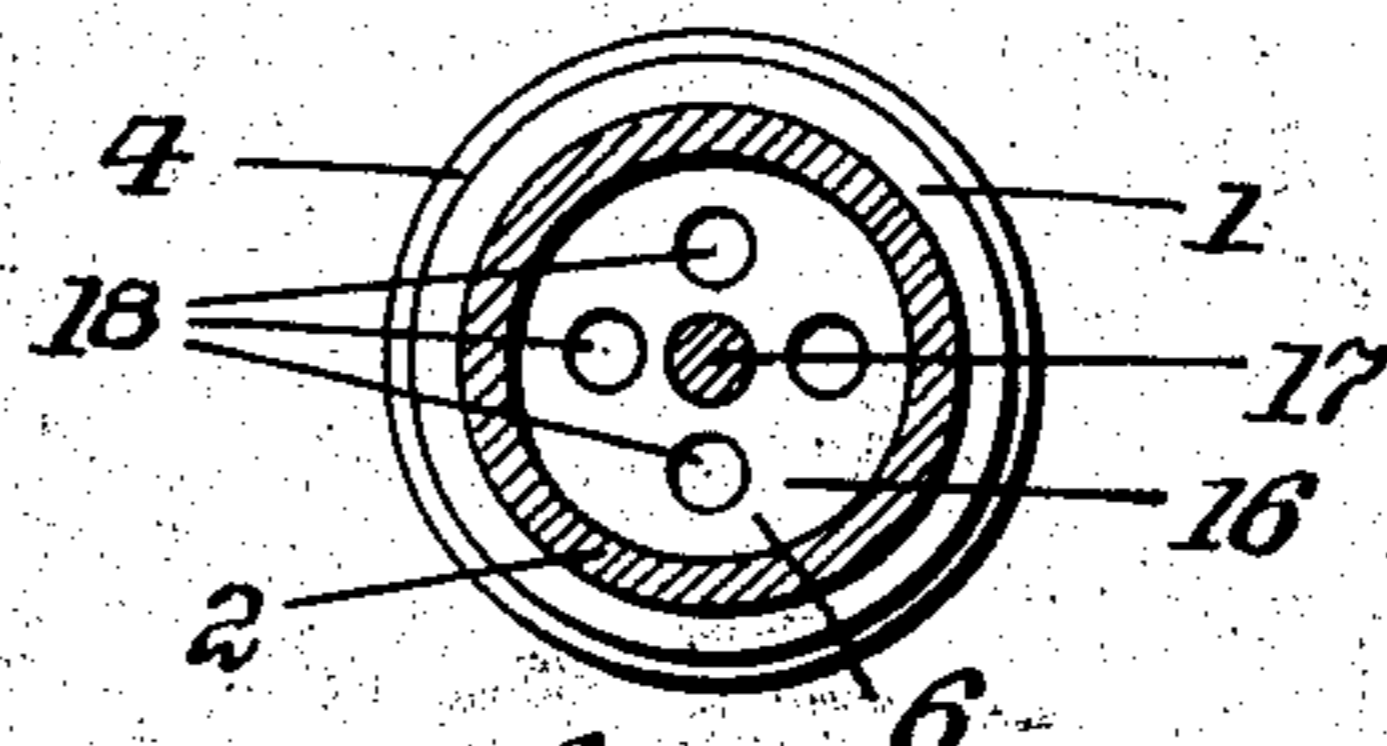
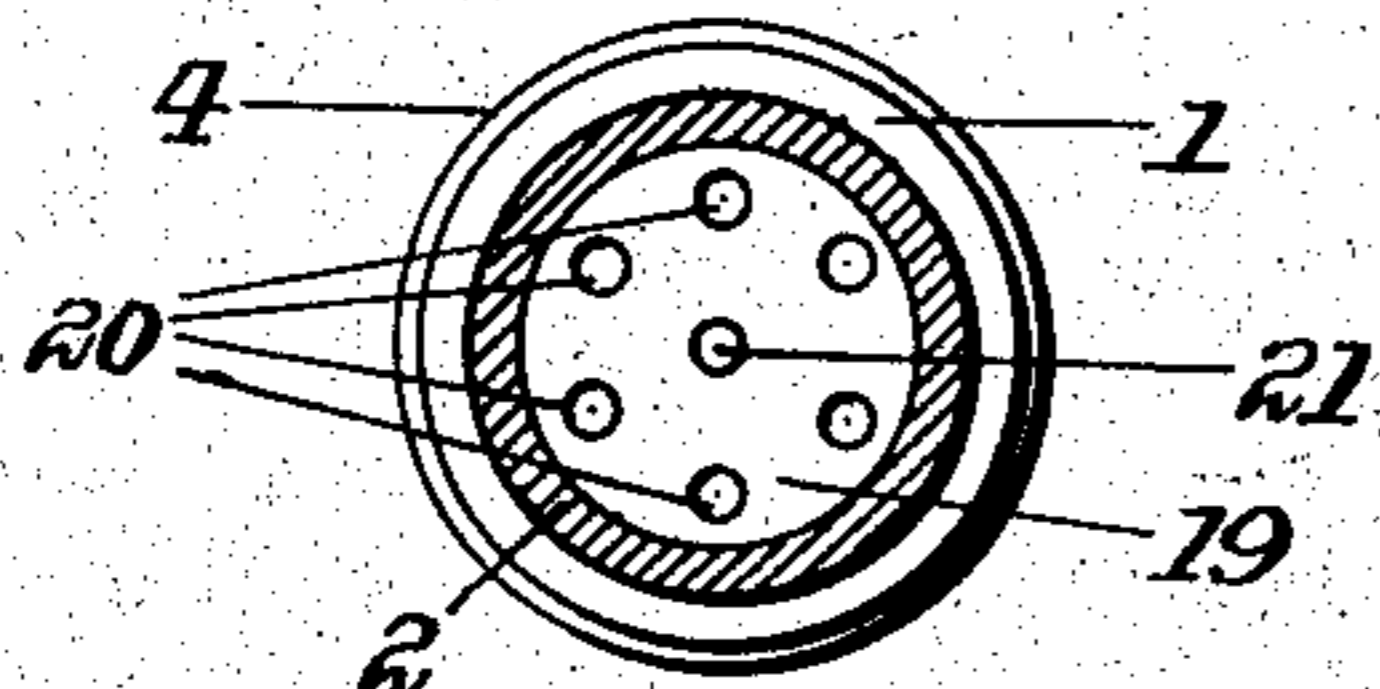
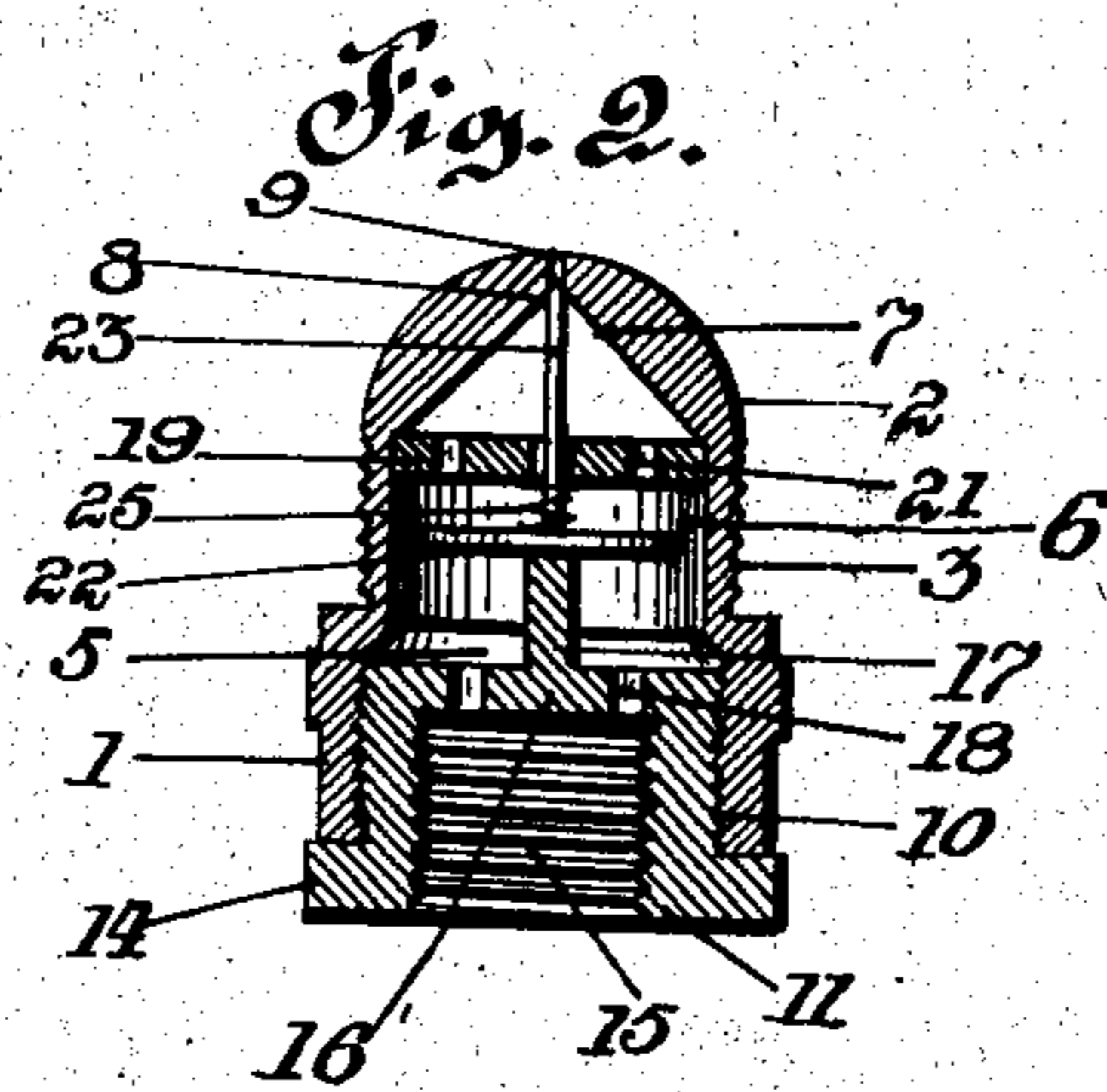
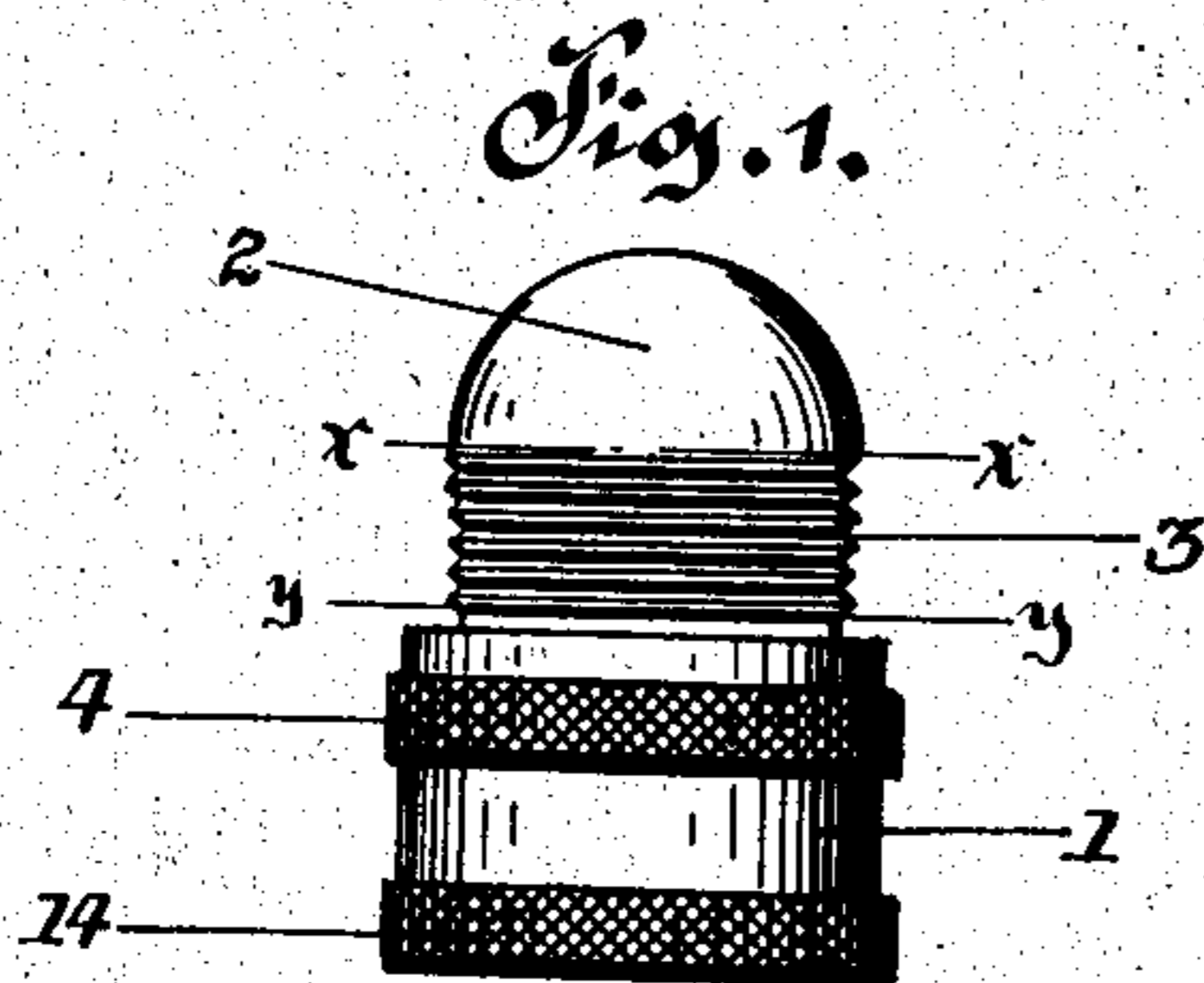


Fig. 7.

Witnesses:

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UNITED STATES PATENT OFFICE.

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REGULATOR.

No. 815,806.

Specification of Letters Patent.

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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 Beaver Falls, 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 relates to certain new and useful improvements in gas-regulators, and the invention relates more particularly to a novel form of valve adapted to be used in connection with a gas burner or jet.

My invention aims to provide a valve which will be automatically actuated by the pressure of gas passing into the burner or jet. I have devised positive and reliable means for effecting a partial closure of the valve when the gas-pressure increases and means to open the valve when the gas-pressure decreases. To this end I have constructed a novel form of valve in which a spring-actuated plunger is mounted to control the opening of said valve, the elevation of said plunger tending to partially close the gas-outlet of the valve, while the lowering of said plunger opens the outlet in case the gas-pressure is decreased.

In constructing my improved needle-valve I have aimed to provide as few parts as possible, which will provide an inexpensive article of manufacture, at the same time freeing the valve from all danger of being injured by constant use.

The construction entering into my improved valve will be hereinafter more fully described and then specifically pointed out in the claims, and, referring to the drawings accompanying this application, like numerals of reference designate corresponding parts throughout the several views, in which—

Figure 1 is a side elevation of the needle-valve. Fig. 2 is a vertical sectional view. Fig. 3 is a transverse sectional view taken on the line *xx* of Fig. 1. Fig. 4 is a similar view on the line *yy* of Fig. 1. Fig. 5 is an elevation of the plunger and spring used in connection with the needle-valve. Fig. 6 is a side elevation of a member, and Fig. 7 is a fragmentary vertical sectional view of the top of the needle-valve upon an enlarged scale.

To put my invention into practice, I construct my improved needle-valve of a casing

1, which conforms substantially to a nipple. The casing 1 is substantially cylindrical and is provided with a contracted cone-shaped end 2, the periphery of which adjacent to the casing 1 is threaded, as indicated at 3. These threads are provided whereby the casing may be secured in the gas jet or nipple or in the structure in connection with which it is to be used. The casing is also provided with a peripheral knurled collar 4, employed to facilitate the rotation of the casing when being secured in a jet or structure. The casing is provided with a compartment 5, which extends up into the contracted end 2, forming a smaller compartment 6, and the top of this compartment terminates in slanting sides 7, which converge to a common point or apex 8. The top of the contracted end 2 is provided with a vertically-disposed aperture or port 9, communicating with the compartment 6.

The compartment 5 of the casing 1 has its walls screw-threaded, as indicated at 10, to accommodate a member 11. This member in cross-section corresponds to the diameter of the compartment 5 of the casing 1 and is provided with screw-threads 12, whereby it can be secured within said compartment. The member is provided with a peripheral knurled flange 14 near its bottom to facilitate the operation of securing the member within the casing 1. The member 11 is provided with a central screw-threaded opening or recess 15, provided in order that said member and the casing 1 can be secured upon a suitable gas-supply pipe. (Not shown.) The top 16 of the member is provided with a standard or upwardly-extending pin 17, and circumferentially arranged around said standard is a plurality of vertically-disposed openings 18, establishing communication between the screw-threaded recess 15 and the compartment 6. In the compartment 6 of the contracted end 2 I mount a horizontally-disposed partition or plate 19 adjacent to the slanting sides 7 of said compartment. This plate or partition is also provided with a plurality of circumferentially-arranged openings 20, also with a central opening 21. Mounted upon the top of the standard 17 of the member 11 is an annular plate 22, centrally of which is mounted an upwardly-extending pin 23, the upper end of which is substantially cone-shaped or tapers, as indicated at 24. This pin is adapted to extend through

the central opening 21 of the partition or plate 19, and surrounding said pin between the plate 22 and the underneath face of the plate or partition 19 is a small coiled or heli-
 5 cal spring 25. This spring is employed to return the valve to its normal position by bearing upon the plate 22 and holding the tapered end 24 of the pin 23 out of the opening or port 9 of the valve. The plate 19 is simply
 10 employed to prevent the spring 25 from interfering with the opening 9, also for preventing a displacement of the spring upon the plate 22, it being observed by referring to Fig. 1 of the drawings that this spring does
 15 not touch the plate 19 in its normal position.

In operation the normal pressure of gas is adapted to pass through the openings 18 into the compartment 6, around the plate 22, through the openings 21 of the plate 19, and
 20 upwardly through the opening 9. The normal pressure of gas partially elevates the plate 22 the smallest fractional part of an inch, and should the pressure for some unforeseen cause be decreased or lowered the plate
 25 22 will recede, permitting a greater area of space to exist in the opening 9 through which the gas may pass. During the operation of the valve, should the gas-pressure increase, the plate 22 will be elevated, moving the rod
 30 23 into the opening 9 to partially close the same, the size of this rod relative to the opening 9 being such as to permit a sufficient quantity of gas to pass therethrough to at all times maintain a light, whether the gas in-
 35 creases or decreases in pressure. The member 11 is simply employed for properly positioning the plate 22 within the valve, and this member is always screwed into the valve-body as far as possible and is only removed
 40 when it is necessary to replace some of the parts contained within the valve.

My improved regulator, which is automatically actuated by fluctuations in the gas-pressure, is particularly adapted for use in
 45 connection with mantles, where it is a well-known fact that if the gas-pressure increases the mantle is broken and cannot again be used. My improved regulator tends to overcome the breakage of mantles by an increase
 50 in the gas-pressure, also prevent the burning gas from being extinguished by an increase of pressure in the gas-supply, consequently preventing the asphyxiation of persons occupying the compartments in which the gas is
 55 burning.

From the construction of my improved valve it will be observed that comparatively few parts are used and that the movable parts of the valve can be readily removed at

any time desired for cleansing purposes. It 60 will of course be understood that in order to insure a perfect operation of the valve the plate supporting the spring and the rod are accurately made in order to obtain a sensi- 65 tive coöperation of these parts with the gas-pressure. It will be evident from the construction of the above valve that I have devised a safety-valve and regulator to be used in connection with gas burners or jets, and I do not care to confine myself to the specific 70 use of the regulator or valve in connection with gas, as it can be readily employed for other purposes, such as air.

It is thought from the foregoing that the construction, operation, and advantages of 75 the herein-described gas-regulator will be apparent without further description, and various changes in the form, proportion, and minor details of construction may be made without departing from the spirit of the in- 80 vention or sacrificing any of the advantages thereof.

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

1. A gas-regulator of the character de- 85 scribed consisting of a casing having a contracted end, said casing having a compartment formed therein, terminating in said contracted end, said end having an opening formed therein, a perforated partition mount- 90 ed in said end, a member adjustably secured in said casing, and having a screw-threaded recess, the end of said member having apertures formed therein, a standard carried by said member and extending upwardly into 95 said compartment, a plate mounted upon said standard, a pin carried by said plate and extending through said partition into the opening of said casing, a spring surrounding said pin between said partition and said 100 plate, substantially as described.

2. A gas-regulator of the character described consisting of a casing having an opening formed therein, said casing having a compartment formed therein, a perforated parti- 105 tion mounted in said compartment, a plate carried within said compartment, a pin carried by said plate and extending upwardly through said partition into said opening, means to normally hold said pin out of said 110 opening, substantially as described.

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

ALBERT W. FRANCIS.

Witnesses:

ROLAND GASKELL,
 EARL R. LEYDA.