

No. 753,090.

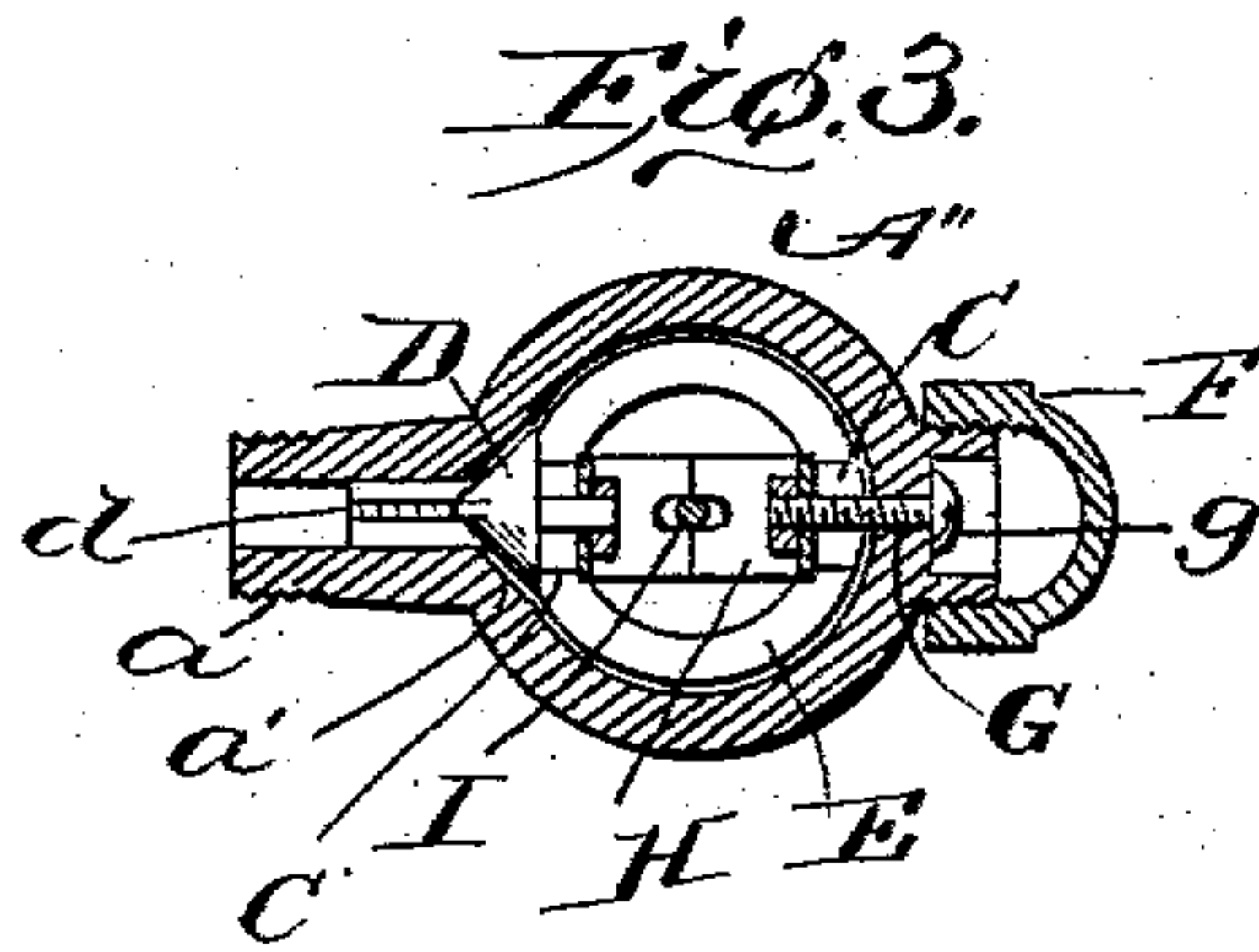
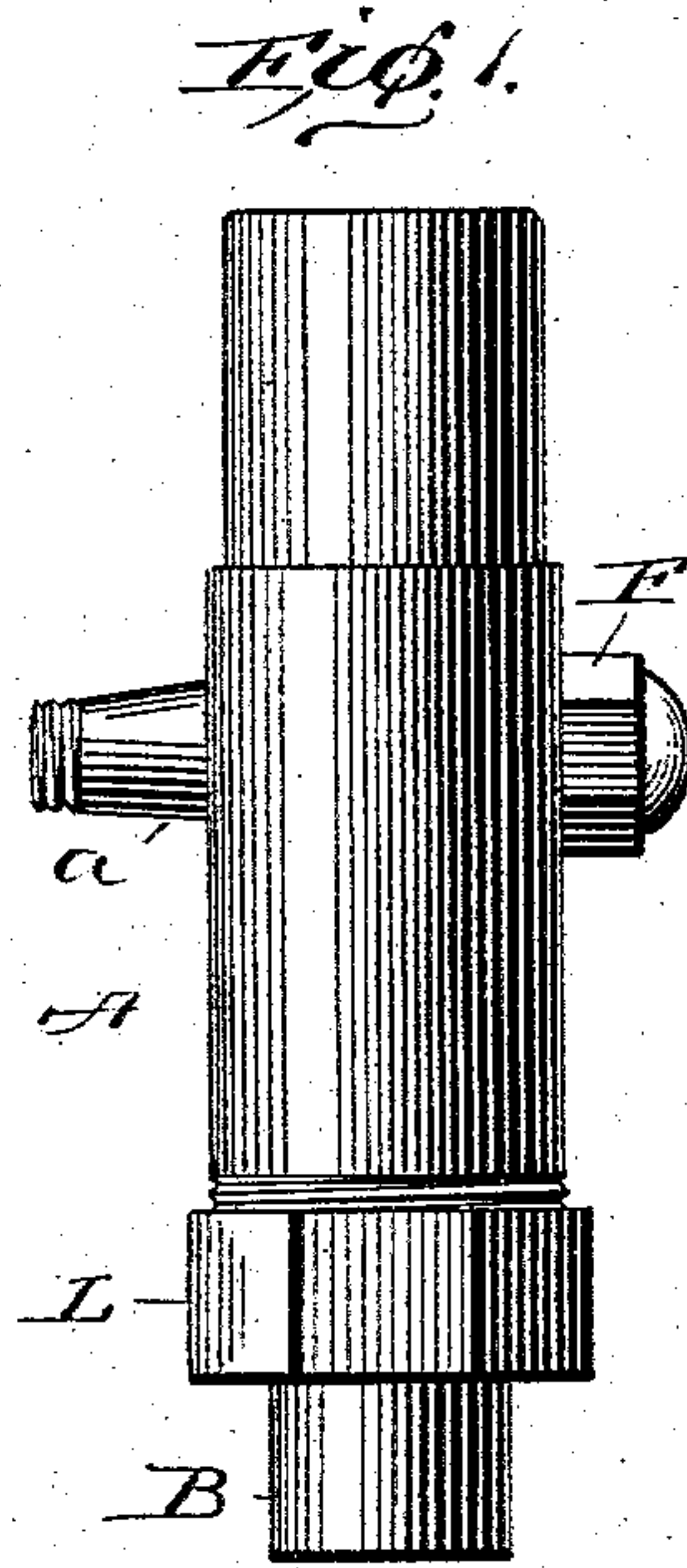
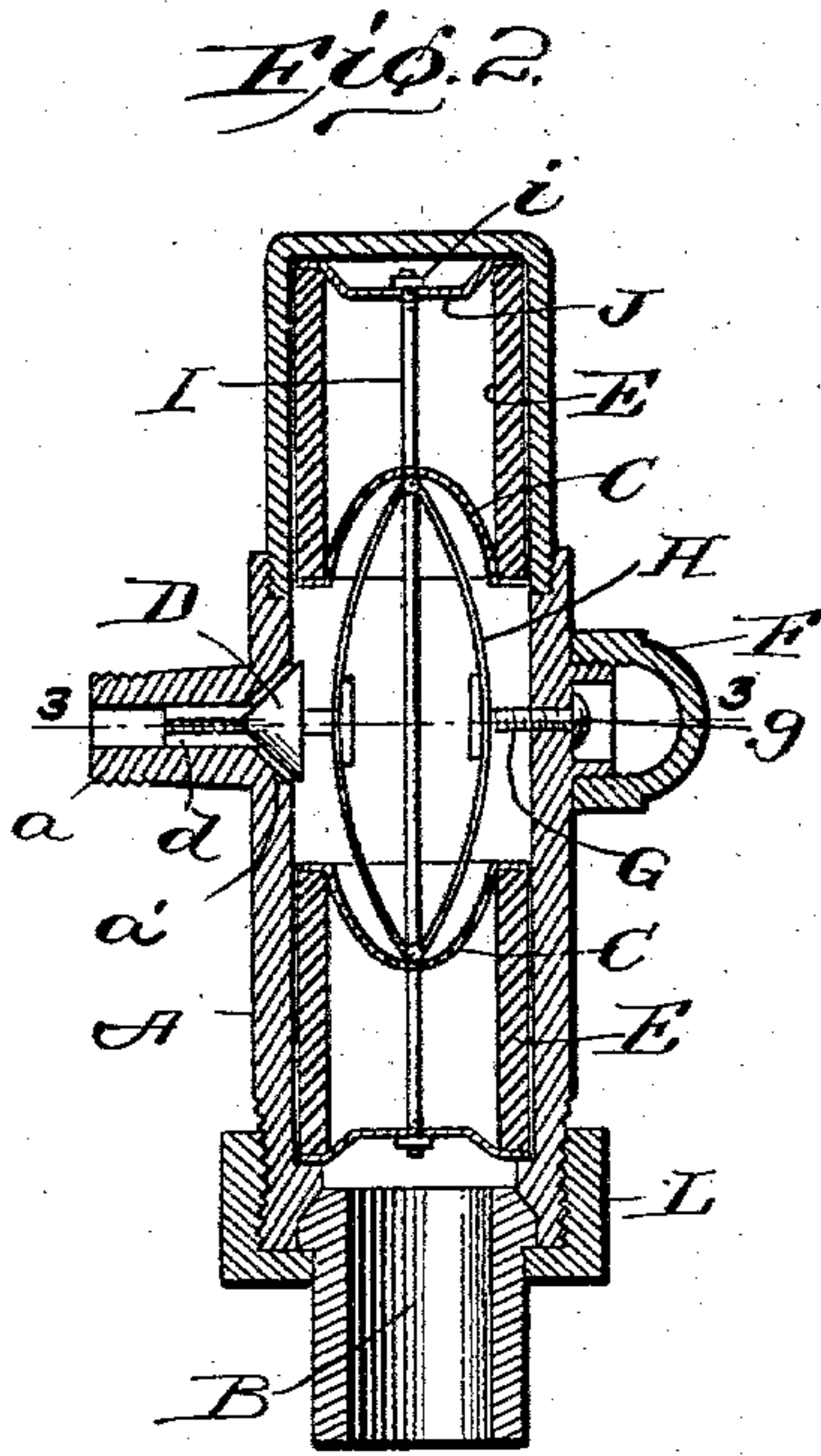
PATENTED FEB. 23, 1904.

A. MCGONAGLE.

AIR VALVE.

APPLICATION FILED FEB. 26, 1903.

NO MODEL.



Witnesses

J. M. Fowler
Geo. B. Pitts

Inventor

Arthur McGonagle

By

J. S. Barker

his Attorney

UNITED STATES PATENT OFFICE.

ARTHUR MCGONAGLE, OF EAST ORANGE, NEW JERSEY

AIR-VALVE.

SPECIFICATION forming part of Letters Patent No. 753,090, dated February 23, 1904.

Application filed February 26, 1903. Serial No. 145,186. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR MCGONAGLE, a citizen of the United States, residing at East Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Air-Valves, of which the following is a specification.

My invention has for its object to produce an improved air-valve for use in connection with steam-radiators that shall be positive in its actions and of a construction that will permit its being reduced to very small dimensions, thus rendering the device inconspicuous when applied to a radiator.

In the accompanying drawings, wherein I have illustrated the preferred embodiment of my invention, Figure 1 is an elevation of a complete air-valve. Fig. 2 is a vertical section of the same. Fig. 3 is a horizontal sectional view taken on the line 3 3 of Fig. 2.

The operative parts of the valve device are mounted within a casing A, that is provided with a screw-threaded hub or connection *a*, by means of which the valve is connected with a steam-radiator in the ordinary manner. The valve-casing is provided with a vent-aperture, this in the construction of my invention illustrated being through a coupling B, by means of which the valve may be connected with the air-pipe, the latter not being represented, as it forms no part of my present invention. The casing may be constructed of brass or other suitable metal and formed of one or more parts, as convenience of manufacture may dictate. I have represented the lower end of the casing as being left open and adapted to be closed with a cap L screw-threaded thereto. The cap serves in the valve shown also as a union or coupling nut for uniting the union piece B with the casing. Mounted within the casing are two expansion members with which the valve proper is connected. I prefer that these expansion members should be in the form of cylinders E arranged to fit quite closely the interior chamber of the valve-casing and that one of them should be located above the valve-seat *a'* and the other below such valve-seat. These expansion members may be made of any suitable material, though I prefer to employ ebonite for

this purpose, as this material has a high coefficient of expansion. The valve D is connected with a bow-spring H, which in turn is connected with the two expansion members E. I prefer that the spring H should be in the form of a double-bow or an elliptical spring for a purpose which will be presently described, and such spring is conveniently connected with the expansion members E by means of bearing-pieces C of cup shape and arranged to fit in the inner ends of the expansion-cylinders E, as clearly represented in Fig. 2 of the drawings. The opposite ends of a double-bow or elliptical spring rest against the bottoms of the cups or bearing-pieces C. Connected with that leaf of the spring that is opposite to the one with which the valve D is connected is an adjusting-screw G, having screw-threaded bearing in the wall of the casing A and extending through the same, being provided at its outer end with a head *g*, shaped to be manipulated by a screw-driver. The exposed end of the adjusting-screw G is preferably covered by a removable cap F, suitably connected with the casing. For convenience of manipulation and insertion into the valve-casing I prefer to connect the two expansion members E, for which purpose I employ a connecting-rod I, passing axially through the cylinders E and through end plates or bars J at the outer ends of the expansion members. The several parts of the expansion device are held together by the nuts *i* upon the rod I. It will be seen that the connecting-rod and associated parts just referred to operate to hold the expansion members E from separation, and it will also be apparent from the foregoing description and an examination of Fig. 2 that the expansion members will be held apart by the spring H.

I prefer that the valve-operating devices just described shall be held in the casing by means of the valve itself and the adjusting-screw G. The valve may be provided with a projection *d*, arranged to enter the passage in the connecting-hub *a* in order to properly center the valve, it being understood that such projection is grooved to permit free passage of air and steam.

It will be observed that an air-valve such

as described has three expansion members—to wit, the two cylinders E and the spring with which the valve is connected—it being understood that the spring is preferably
 5 formed of some material having a high coefficient of expansion—as, for instance, from brass. The connecting-rod I should be formed of a metal or substance the coefficient of expansion of which is less than that of the ex-
 10 pansion parts E and H—iron or steel, for instance, being suitable for this purpose.

By making the spring I of the form shown and described—that is, of double-bow or elliptical construction—I accomplish two results.
 15 In the first place, I increase the movement imparted to the valve, as the screw G serves as a stationary abutment against which one leaf of the spring bears, preventing its bowing in that direction, so that the entire move-
 20 ment of the spring is communicated to the leaf or part bearing the valve D.

The function of the screw G is to permit the adjustment of the valve toward or from its seat to insure the proper working of the valve.

25 It is evident that my invention may be modified without departing from the principles of its construction and operation. Thus one of the expansion members E might be dispensed with and still an efficient and operative device
 30 would be produced, though I prefer to employ the two expansion members, as shown, as it increases the range of movement, and hence the effectiveness of the valve. Like-
 35 wise a bow or curved spring having but a single leaf might be employed, though I prefer to use a double-bow or elliptical spring, such as shown.

By employing a plurality of expansion parts or members such as shown and arranging them
 40 in the manner described and illustrated—that is, an expansion member, such as E, combined with an expansion-spring that is in turn connected with a valve—or by employing two expansion members in connection with such
 45 a spring I am enabled to impart to the valve such range of movement as is necessary to produce an effective and positively-acting air-valve by means that may be arranged within
 50 a valve embodying my invention may be made small and inconspicuous—a very desirable and practical feature.

I employ the term “expansion” in this specification and the following claims in a relative
 55 sense, applying it to parts of the apparatus that are formed of material whose coefficient of expansion under the influence of heat is relatively high as compared with that of the casing in which the parts of the valve are
 60 mounted.

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

1. In an air-valve device, the combination of
 65 a valve, an expansion-spring to which the

valve is connected, an expansion-abutment against which one end of the said expansion-spring bears, and a casing in which these parts are mounted, substantially as set forth.

2. In an air-valve device, the combination of
 70 a pair of expansion abutment members, an expansion-spring arranged between and having its ends resting against the said expansion abutment members, a valve connected with
 75 the spring between its ends, and a casing in which the said parts are mounted, substantially as set forth.

3. In an air-valve, the combination of a casing, a pair of independent expansion mem-
 80 bers situated therein, a valve independent of the said expansion members, and a flexible connection between the valve and the said expansion members arranged to be bent by the combined expansion thereof and thereby seat
 85 the valve, substantially as set forth.

4. In an air-valve the combination of a casing, a pair of separated expansion members, a bow-spring situated between said expansion
 90 members, and a valve operated by the said spring, substantially as set forth.

5. In an air-valve the combination of a casing, an expansion member, a double-bow
 95 spring connected at one end with the said expansion member; a valve connected with one leaf of the said spring, and a stationary abutment against which the other leaf of the spring rests, substantially as set forth.

6. In an air-valve the combination of a casing, an expansion member, a double-bow
 100 spring connected at one end with the said expansion member, a valve connected with one leaf of the said spring and an adjusting-screw connected with the other leaf of the spring, substantially as set forth.

7. In an air-valve the combination of a casing, a double-bow spring, a valve connected
 105 with a leaf of the spring near its middle portion, an adjusting-screw connected with the other leaf of the spring near its middle portion, and expansible supports for the ends of
 110 the spring, arranged to approach each other as they expand, substantially as set forth.

8. In an air-valve the combination of a casing, a pair of cylindrical expansion members
 115 E, a double-bow spring arranged between and connected with the said expansion members, and a valve connected with the said spring, substantially as set forth.

9. In an air-valve the combination of a casing, an expansion member of cylindrical shape,
 120 a cup-shaped support fitting into one end of the said cylindrical expansion member, a spring having one end resting in the said cup, and a valve connected with the spring, substantially as set forth.
 125

10. In an air-valve, the combination of a casing, independent expansion members therein
 130 arranged in line with each other, connecting means between the said expansion members, of a material whose coefficient of expansion is

less than that of the expansion members and
having connections with the latter at their
ends which are most remote from each other,
and a valve operated by the expansion mem-
5 bers and connected with the ends thereof that
are closest together, substantially as set forth.
In testimony whereof I have signed my name

to this specification in the presence of two sub-
scribing witnesses.

ARTHUR McGONAGLE.

Witnesses:

RALPH STARRETT,
W. A. STARRETT.