

No. 754,103.

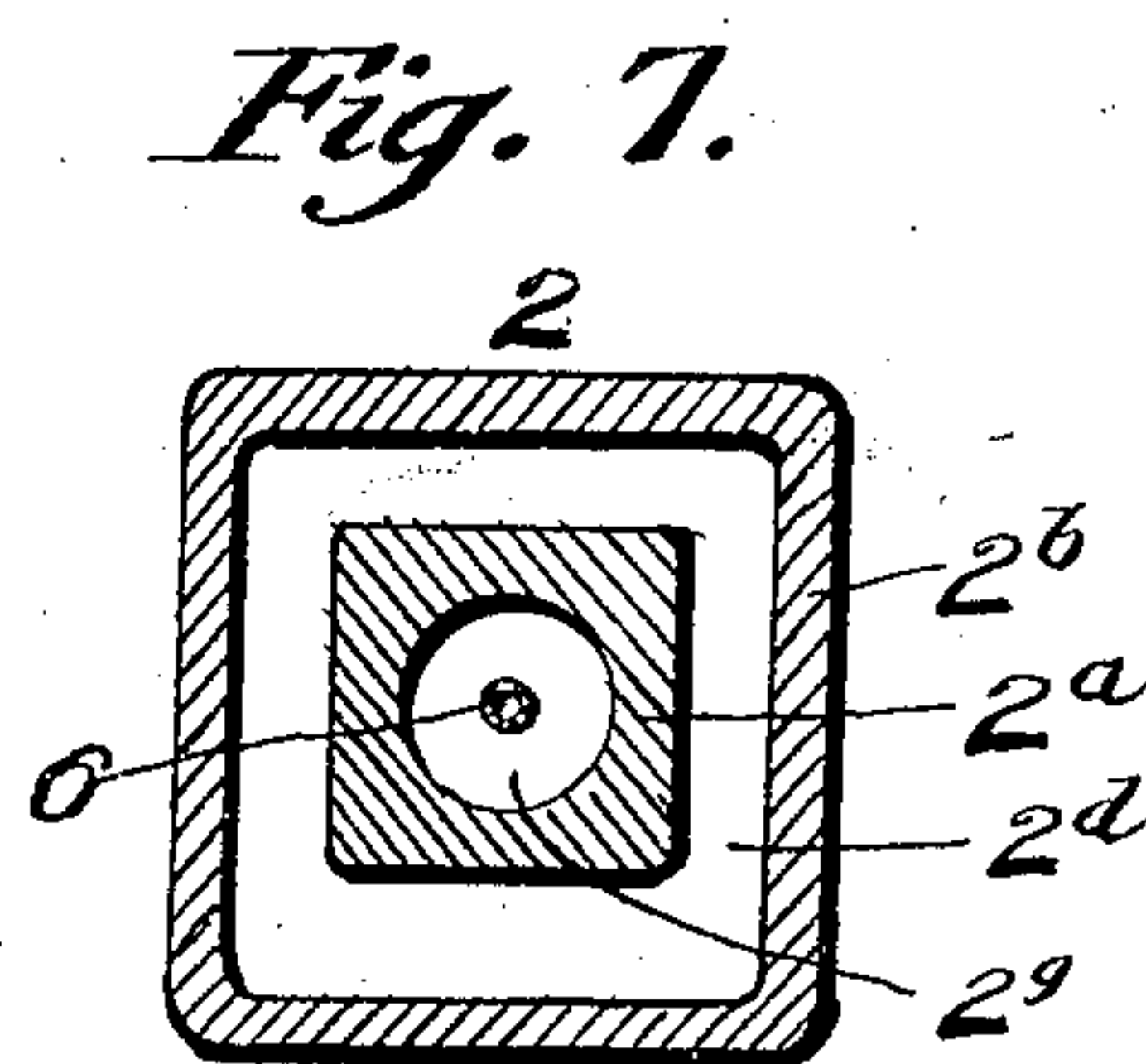
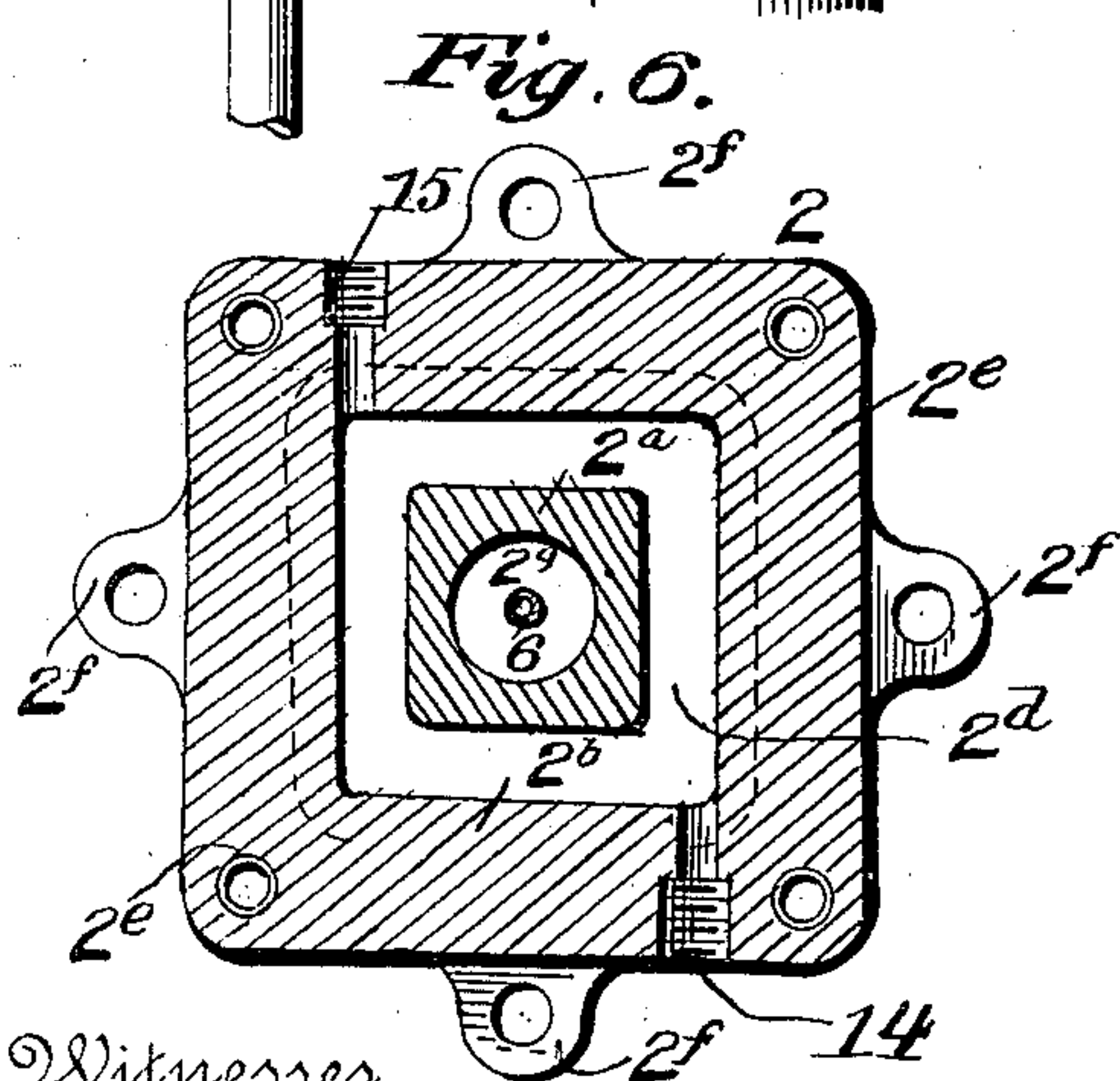
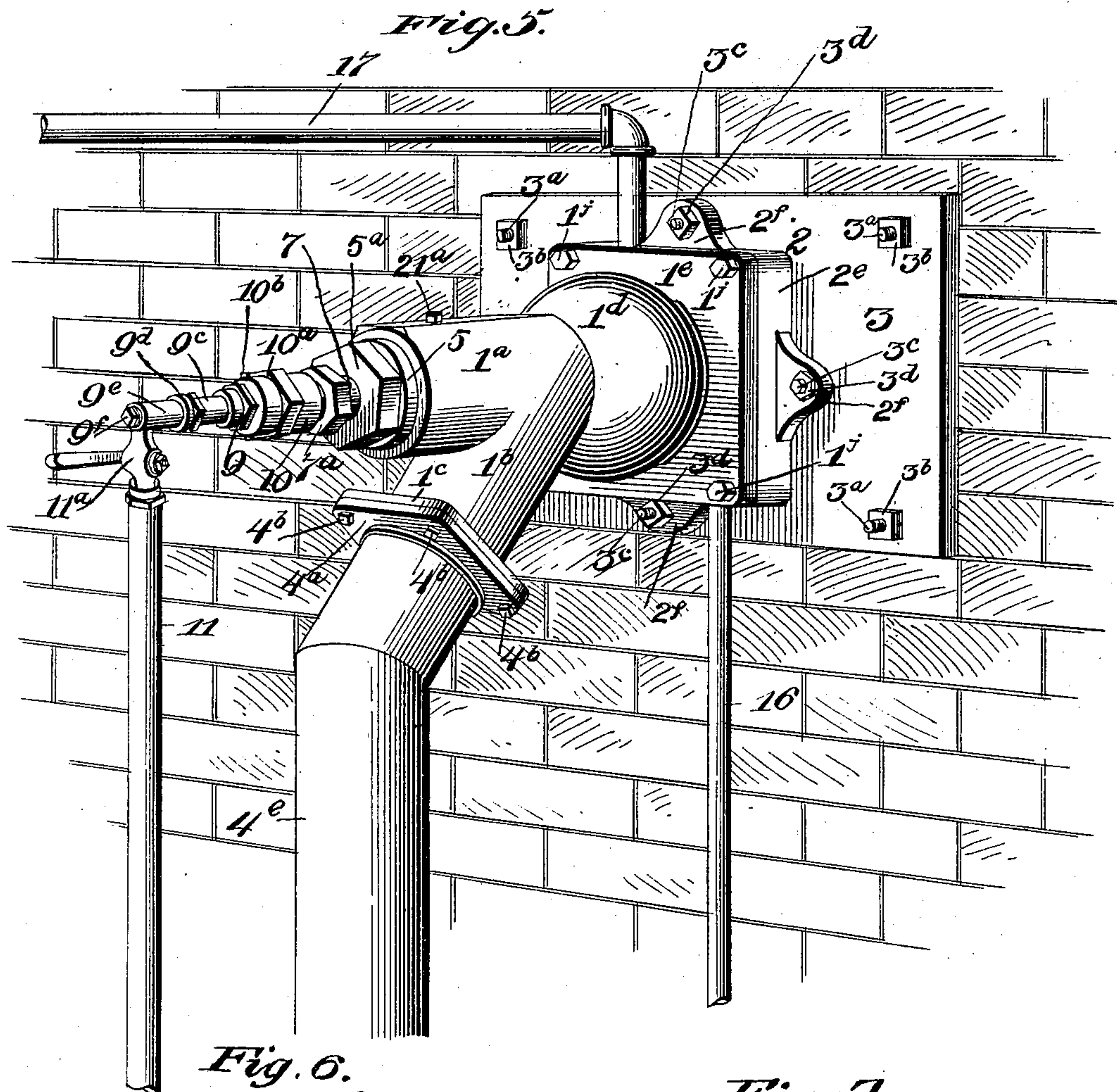
PATENTED MAR. 8, 1904.

W. H. THORNLEY.
HYDROCARBON BURNER.

APPLICATION FILED JUNE 26, 1899. RENEWED DEC. 27, 1902.

NO MODEL.

2 SHEETS—SHEET 2.



Witnesses
L. C. Hills.
W. Roberts

Inventor
William H. Thornley

Glascock & Co.
Attorneys

UNITED STATES PATENT OFFICE.

WILLIAM H. THORNLEY, OF READING, PENNSYLVANIA.

HYDROCARBON-BURNER.

SPECIFICATION forming part of Letters Patent No. 754,103, dated March 8, 1904.

Application filed June 26, 1899. Renewed December 27, 1902. Serial No. 136,804. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. THORNLEY, a citizen of the United States, residing at Reading, in the county of Berks and State of Pennsylvania, have invented certain new and useful Improvements in Hydrocarbon-Burners; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to hydrocarbon-burners; and it consists in the novel construction and arrangement of its parts, as herein-
after described and claimed.

The object of my invention is to provide a burner of simple and cheap construction adapted to burn a certain quantity of hydrocarbon and at the same time consume a larger proportion of the combustible elements of air, the burner being so constructed as to properly mix the hydrocarbon and the air and throw the flame in any direction desired. The burner is provided with a water jacket or chamber which constitutes a chill and prevents the burner from being injured by the intense heat created. A pipe is provided having a suitable sprayer which thoroughly breaks up the particles of hydrocarbon, a means being also provided whereby the sprayer may be adjusted lengthwise and rotated, and this governs the intensity and character of the flame. The sprayers are not limited to any particular shape and for special purposes sprayers of particular construction may be provided.

In order that my invention may be fully understood, I will proceed to describe it with reference to the accompanying drawings, in which—

Figure 1 is a longitudinal section of my improved hydrocarbon-burner. Fig. 2 is a side elevation of one form of sprayer. Fig. 3 is an end elevation thereof. Fig. 4 is an end elevation of another form of sprayer. Fig. 5 is a perspective view of the burner, showing it as attached to a furnace-wall. Fig. 6 is a vertical transverse section of the burner-head, taken on the line 6 6, Fig. 1. Fig. 7 is a transverse section of the burner-head, taken on the line 7 7, Fig. 1.

The burner comprises two castings, providing a burner-body 1 and burner-head 2. The burner-body 1 is formed integral with a tubular or hollow horizontal arm 1^a, with a tubular or hollow inclined arm 1^b, having a flange 1^c and merged into the inclined arm 1^a, and with a globular chamber 1^d, having a supporting-flange 1^e and constituting an air-reservoir. The burner-head 2 is formed integral with a rectangular inner shell 2^a, with a rectangular outer shell 2^b, with a flaring or funnel-shaped end 2^c, closing a water jacket or chamber 2^d between the shells 2^a 2^b at their inner end, and with a supporting-flange 2^e, surrounding the shells at their outer end and having ears or lugs 2^f. The inner shell 2^a provides a commingling-chamber 2^g.

3 is a plate secured to a furnace-wall by bolts 3^a and nuts 3^b.

The supporting-flange 1^e of the burner-body 1 has a central opening 1^h, coinciding with the outer end of the commingling-chamber 2^g.

1ⁱ is a washer located between the supporting-flanges 1^e, and 2^e and 1^j are bolts whereby the flanges are fastened together.

The burner is secured to the furnace-plate 3 by means of bolts 3^c, extending through the ears or lugs 2^f of the supporting-flange 2^e of the burner-head 2, fastened by nuts 3^d.

4 is a collar having a flange 4^a, connected to the flange 1^c of the inclined arm 1^b by means of bolts 4^b and nuts 4^c. Between the collar 4 and pendent arm 1^b is located a washer 4^d.

4^e is an air-pipe leading from a blower or compressed-air reservoir and connected by the collar 4 with the inclined arm 1^b. This inclined arm 1^b extends at an angle of about forty-five degrees to the axis of the horizontal arm 1^a and provides an air-inlet to the latter.

5 is a plug having a central opening and an angular head 5^a and screw-threaded into the outer end of the horizontal arm 1^a. 6 is a hydrocarbon-pipe loosely mounted in this plug 5 and extending through the horizontal arm 1^a, through the globular chamber 1^d, and through the commingling-chamber 2^g to a position adjacent to the flaring or funnel-shaped end 2^c of the inner shell 2^a of the burner-head 2. Located on and near to the outer end of this pipe 6 is an externally-screw-threaded turn-

collar 7, having a nut 7^a, whereby it may be rotated, and its inner end engaging internal screw-threads in the plug 5. The space between the inner end of the turn-collar 7 and the inner end of the plug 5 constitutes a stuffing-box 8, in which a suitable packing is located. At the outer end of the pipe 6 is located a tap 9, having a reduced part 9^a, provided with an internal screw-thread receiving the screw-threaded outer end of the pipe 6. The reduced part 9^a of the tap 9 is provided with an annular groove 9^b, receiving the inner ends of radial pins or studs 10^b, whereby the tap is connected with an internally-screw-threaded adjustable sleeve 10, which in turn is connected with the outer end of the turn-collar 7. The sleeve 10 has a nut 10^a, providing means whereby it may be rotated.

9^c is an inner pipe-section connected to the tap 9 at its inner end and swiveled by a coupling 9^d at its outer end to an outer pipe-section 9^e. 9^f is a plug closing the outer end of the outer pipe-section 9^e. 11^a is a valve connecting the hydrocarbon-supply pipe 11 with the outer pipe-section 9^e. Thus it will be understood that as the tap is rotated the pipe 6 will be turned, but the turning of the tap 9 will not move the pipe 6 longitudinally. When the sleeve 10 is rotated, its internal screw-thread engages the screw-threaded turn-collar 7 and moves along the latter and turns on instead of with the tap, so that the latter is caused to advance or recede with the sleeve 10, and consequently moves the pipe 6, which is secured to the tap 9 longitudinally in or out, according to the direction in which the sleeve 10 is rotated; but the pipe 6 is not turned except when the tap is rotated within and not with the sleeve 10. Thus by the manipulation of the tap 9 the pipe 6 is rotated, and by the manipulation of the sleeve 10 the pipe 6 is moved lengthwise at the same time or at different times, as circumstances may require.

The tap 9 may be connected with the supply-pipe 11 by any suitable means which will permit of the pipe 6 being rotated by the tap 9. The part of the water-jacket 2^a within the supporting-flange 2^e is provided with an inlet-orifice 14 at the bottom thereof and an outlet-orifice 15 at the top thereof, the inlet 14 being located at the lowest point of the water-jacket and the outlet 15 at the highest point thereof. Thus cold water is introduced into the water-jacket 2^d in the supporting-flange 2^e at the lowest point at one side and is taken off from the water-jacket 2^d in the supporting-flange 2^e at the highest point at the opposite side. 16 is the pipe which conducts the water into the water-jacket 2^d, and 17 is the pipe that conducts the water from the water-jacket 2^d.

The extreme flared inner end 2^c of the burner-head 2 forms the point at which combustion takes place.

The pipe 6 extends well into the commingling-chamber 2^f of the inner shell 2^a and is provided at its inner end with the radial outlets 18 for the hydrocarbon, the outlets 18 being located just in rear of a sprayer 19. As heretofore stated, the sprayer 19 may be of any desired shape. It is, however, made preferably approximately frusto-conical and has formed on its periphery a number of grooves 20. The said grooves may extend straight, as shown in Figs. 2 and 3, or they may be spirally inclined, as shown in Figs. 1 and 4. The sprayer as shown in Fig. 4 is circular, and will therefore throw an approximately circular flame, while the sprayer as shown in Figs. 2 and 3 is approximately elliptical and is so manipulated as to throw a flame of greater intensity from two of its sides than from the other two of its sides. The burner-body 1 is further provided with a steam-inlet 21, which, as shown in Figs. 1 and 5, is closed by a suitable plug 21^a.

The operation of the burner is as follows: By opening the valve 11^a in the supply-pipe 11 the hydrocarbon enters into the pipe 6 and passes out of the said pipe 6 at the radial outlets 18. At the same time air under pressure is admitted into the horizontal arm 1^a through the pendent arm 1^b and into the globular chamber 1^d, the said air passing along the commingling-chamber 2^f blows the hydrocarbon against the sides of the commingling-chamber 2^f and against the sprayer 19. By applying a light at the inner end 2^c of the burner-head 2 the commingling gas and air are ignited. The air as it is blown through the grooves 20 of the sprayer 19 is finely divided and mixed with the hydrocarbon. Then by adjusting the pipe 6 as above described the intensity and the character of the flame may be governed. Should it be found necessary or desirable to introduce live steam with the air, a steam-pipe can be connected with the steam-inlet 21.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. A hydrocarbon - burner comprising a burner-body, a burner-head, a hollow plug secured in the outer end of the burner-body, a screw-threaded collar secured in the plug, an adjustable sleeve secured to the collar, a hydrocarbon-pipe extending through the sleeve supported in the plug and extending through the burner-body and into the burner-head, a tap secured to the outer end of the hydrocarbon-pipe, and means whereby the tap is connected with the sleeve so as to rotate therein or to be adjusted therewith.

2. A hydrocarbon - burner comprising a burner-body, a burner-head, a hollow plug secured in the outer end of the burner-body, a screw-threaded turn-collar secured at one end in the plug, an adjustable sleeve secured to the other end of the turn-collar, a hydrocarbon-

pipe extending through the sleeve, supported in the plug and extending through the burner-body and into the burner-head, a tap secured to the outer end of the hydrocarbon-pipe, and
5 pin-and-groove connection between the sleeve and the tap.

3. A hydrocarbon - burner comprising a burner-body formed with a hollow horizontal arm, with a hollow inclined arm and with a
10 chamber having a supporting-flange and providing an air - reservoir, the burner - head formed with an inner shell providing a comingling-chamber, and an outer shell providing a water-jacket between the shells, a
15 supporting-flange on the burner - head into which the water-jacket extends, having an inlet and an outlet, and a hydrocarbon-pipe supported in the horizontal arm.

4. A hydrocarbon - burner comprising a
20 burner-body formed with a hollow horizontal arm, with a hollow inclined arm, and with a chamber having a supporting-flange and providing an air - reservoir, the burner - head formed with an inner shell providing a comingling-chamber, and an outer shell providing
25 a water-jacket around the inner shell, a

supporting - flange on the burner-head into which the water - jacket extends, having an inlet at the bottom and an outlet at the top, and a hydrocarbon-pipe supported in the horizontal arm. 30

5. A hydrocarbon - burner comprising a burner-body formed with a hollow horizontal arm, with a hollow inclined arm, and with a
35 chamber having a supporting-flange and providing an air - reservoir, the burner - head formed with an inner shell providing a comingling-chamber and with an outer shell providing a water-jacket around the inner shell, a supporting-flange on the burner-head into
40 which the water-jacket extends, having an inlet at the bottom and an outlet at the top, a hydrocarbon-pipe supported in the burner-body and extending into the burner-head, and means for adjusting the hydrocarbon-pipe. 45

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

WILLIAM H. THORNLEY.

Witnesses:

A. E. GLANOCK,
BERTHA L. DANA.