

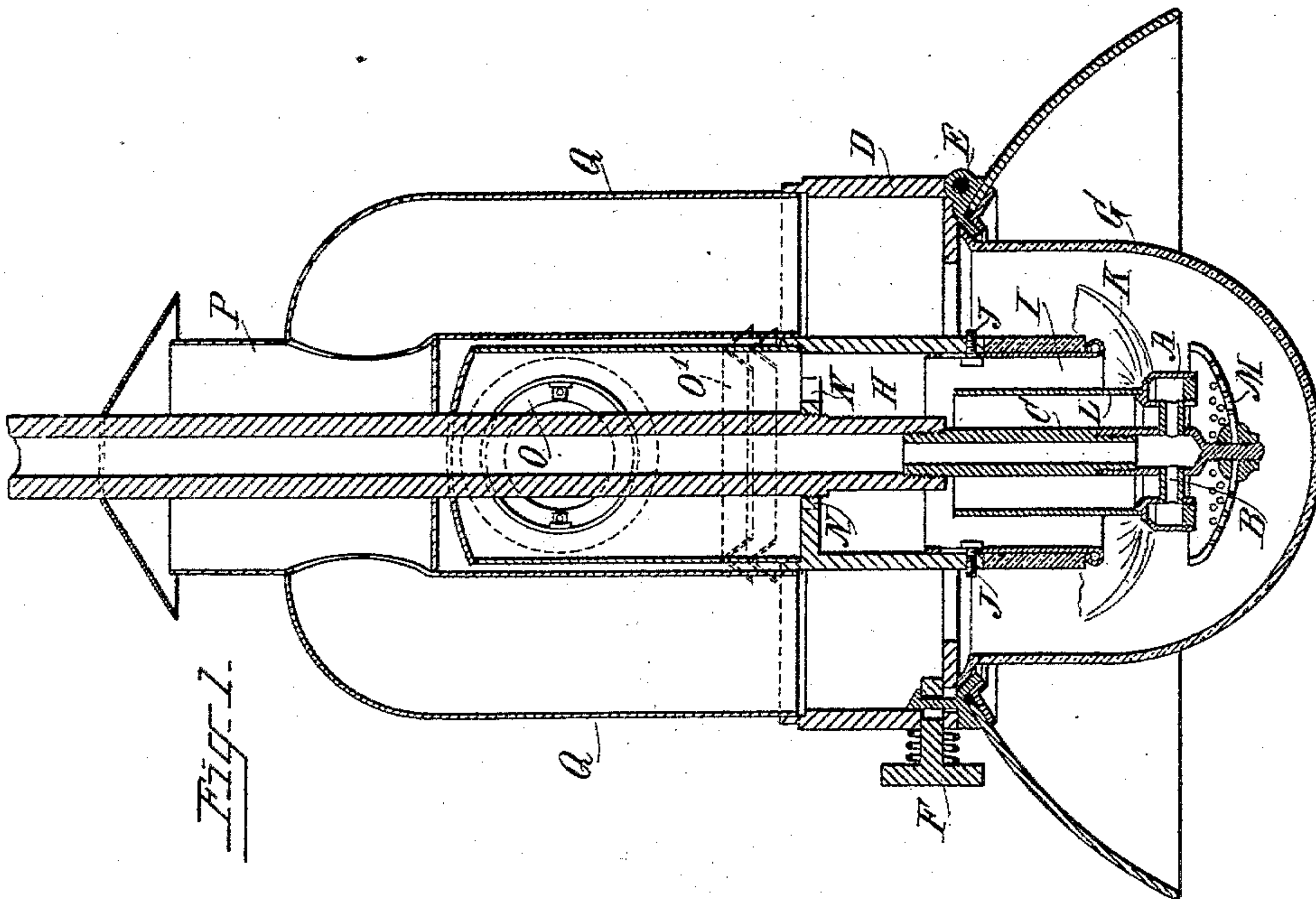
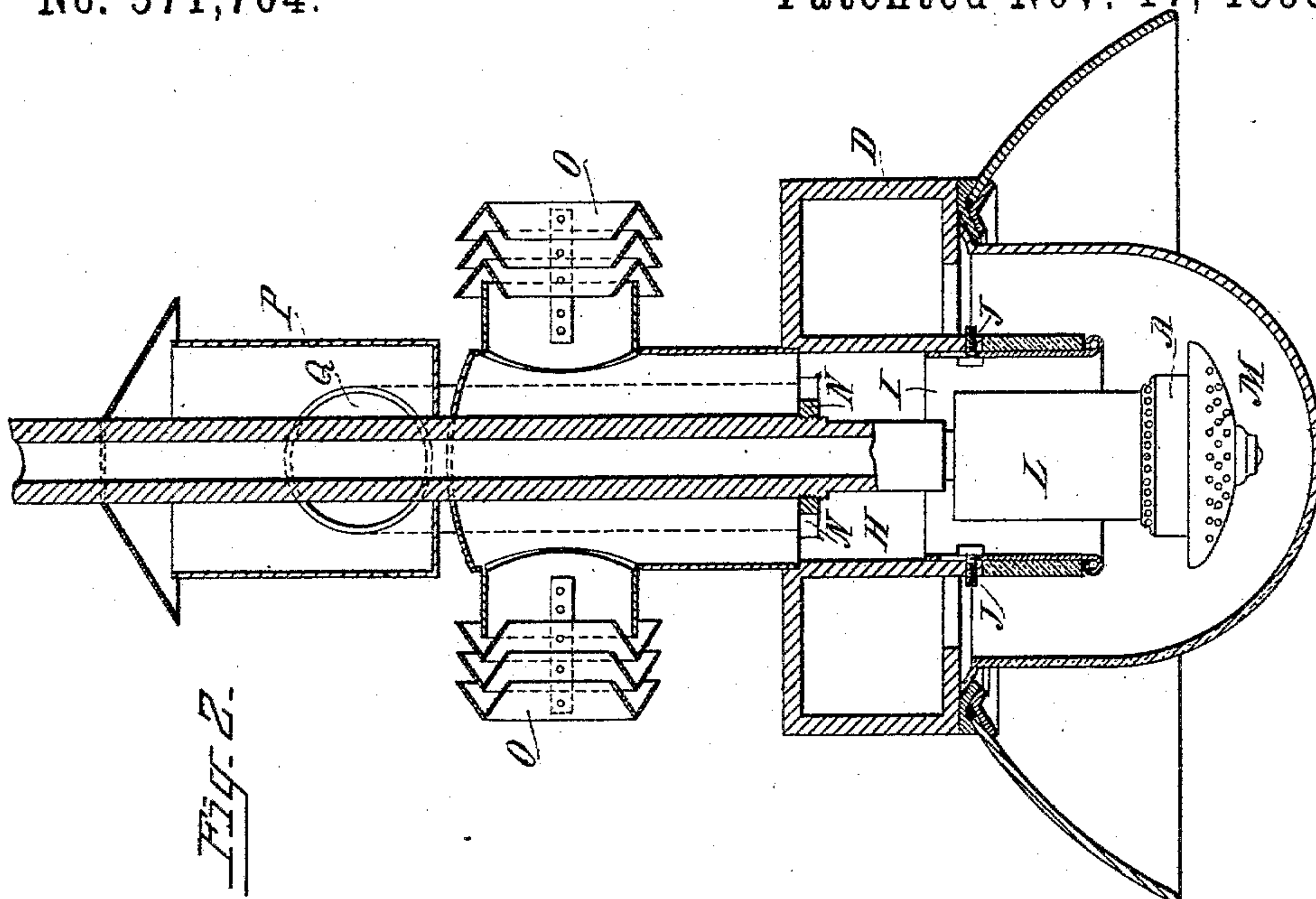
(No Model.)

2 Sheets—Sheet 1.

W. R. SWIFT.
REGENERATIVE GAS LAMP.

No. 571,704.

Patented Nov. 17, 1896.



WITNESSES:

Henry T. Hirsch.
Wm. A. Capel.

INVENTOR:

William R. Swift.

W. H. Townsend
ATTORNEY.

(No Model.)

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Fig. 4.

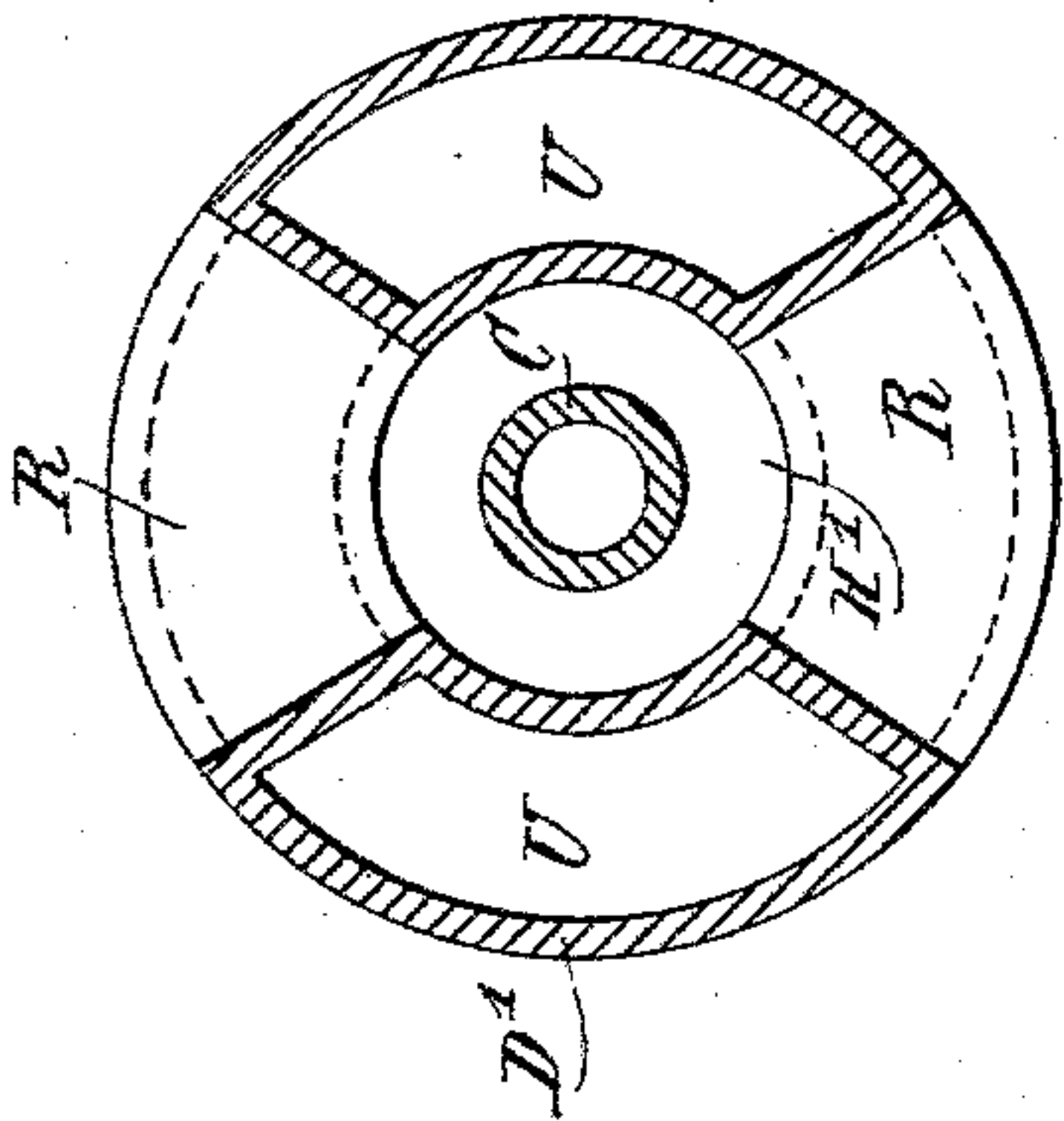


Fig. 5.

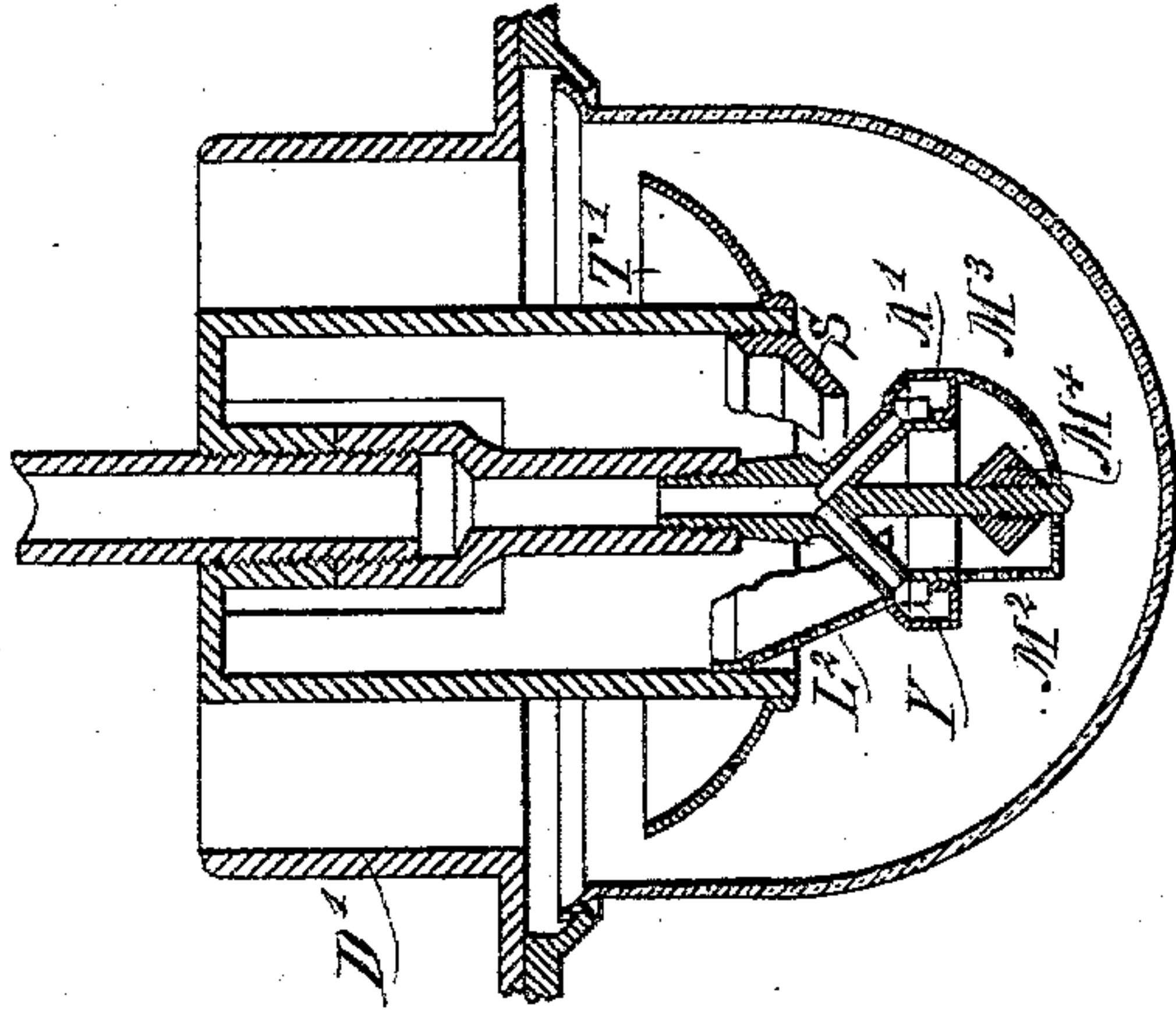
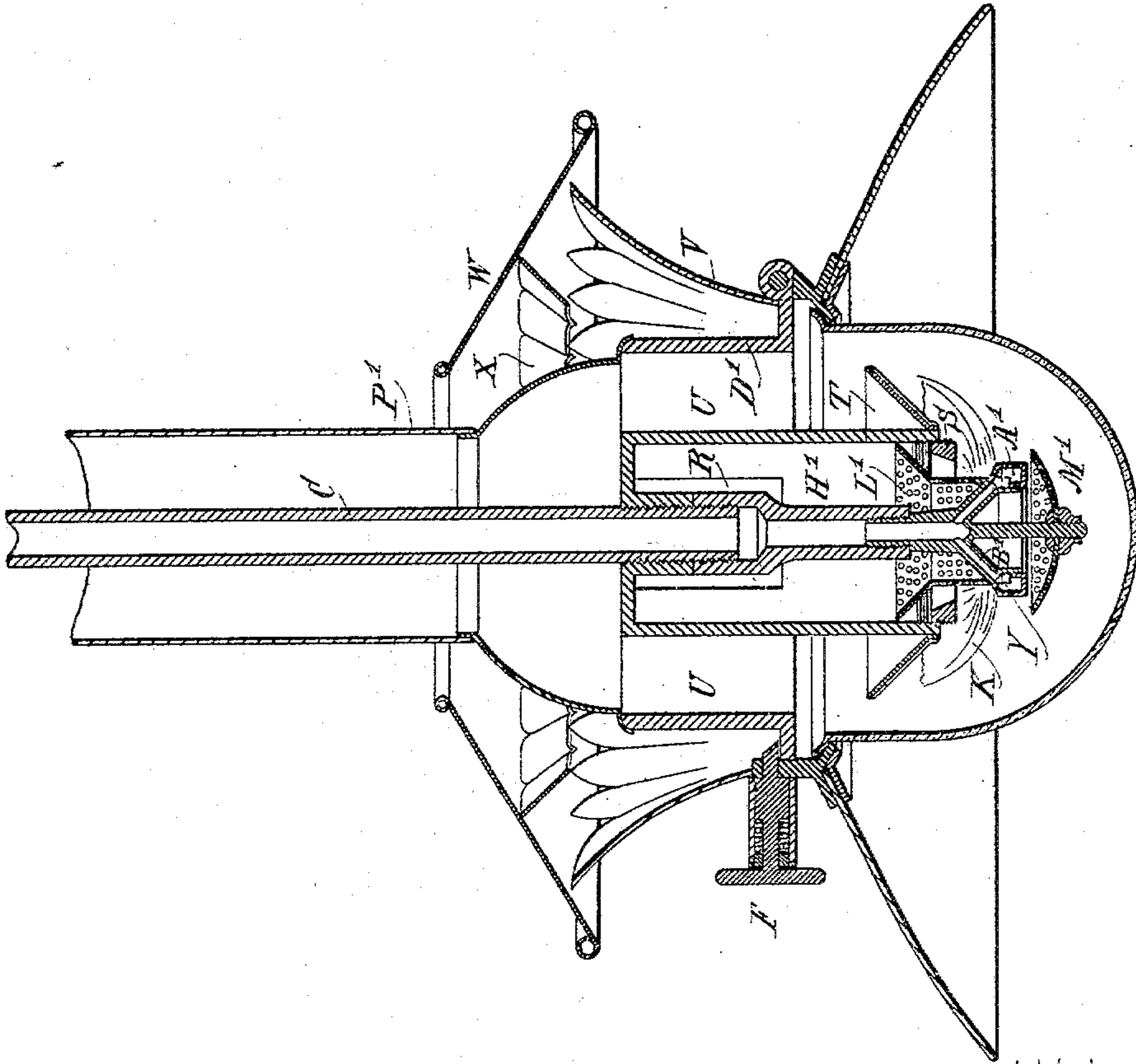


Fig. 6.



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UNITED STATES PATENT OFFICE.

WILLIAM R. SWIFT, OF NEW YORK, N. Y.

REGENERATIVE GAS-LAMP.

SPECIFICATION forming part of Letters Patent No. 571,704, dated November 17, 1896.

Application filed March 12, 1895. Serial No. 541,410. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM R. SWIFT, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented a certain new and useful Improved Regenerative Gas-Lamp, of which the following is a specification.

My invention relates to gas burners or lamps of the class popularly known as "regenerative" gas-lamps, in which the gas on its way to the burner passes through a chamber or in close proximity to tubes or passages through which the products of combustion are allowed to escape. By such construction the gas is heated before reaching the burner.

In my improvement I not only heat the gas as it passes to the burner through what is commonly called the "regenerative" chamber, but I lead all the air fed to the flame through said chamber, so as to heat it. Aside from taking the air from above and directing it downwardly to the flame and feeding it to all sides thereof I provide for giving the globe of the lamp a thorough air-washing below the flame as well as at the sides thereof.

With these objects in view my invention consists in the constructions, arrangement, and combination of the parts entering into the formation of my improved gas-lamp, as hereinafter described, and set forth in the claims.

In the accompanying drawings, which form a part of this specification, I have illustrated my lamp in two forms, one designed for interior use, and particularly for use in street-cars and railway-coaches, and the other for exterior use, as for street-lighting. The construction of each, however, is such that it may be used either indoors or out, with the exception that the form designed for outdoor use is preferably slightly modified when used indoors.

In the drawings, Figure 1 represents in vertical section the form of lamp designed for outdoor use. Fig. 2 also represents a vertical section thereof, taken on a plane at right angles to that of the section in Fig. 1. Fig. 3 represents a vertical medial section of the form of lamp designed for interior use. Fig. 4

represents a horizontal section through the regenerative chamber thereof. Fig. 5 is a diagrammatic representation of various modifications in the deflectors used above and below the burner.

In this lamp I use what may be termed an "upright" burner, that is, a burner from the upper surface of which the jets of gas issue. This burner indicated by A consists of an annular chamber into which open a series of tubes B, preferably three in number, which tubes lead from the lower end of the gas-pipe C and connect the annular chamber thereto. These tubes may extend horizontally from the gas-pipe to the chamber A, as in Fig. 1, or they may be inclined, as shown in Figs. 3 and 5.

I will now describe specifically the construction of the lamp intended for outdoor use. To the gas-pipe is connected what is commonly termed the "regenerative" chamber D, to the lower side of which the shade-support is hinged, as at E, and provided at a point opposite to the hinge with a suitable catch or fastening device, as indicated at F. The shade-support also retains the globe G in place, substantially as indicated. The shade and globe support form no part of my invention in any of the forms illustrated.

The regenerative chamber D has extending through its center an air-passage H, the wall of which is prolonged below said chamber and has attached to it a tube, as I, made vertically adjustable on said wall by means of the screws J, the inner ends of which are headed and passed through slots formed in said tube I. About the lower end of this tube I place a porcelain reflector, as indicated. This tube acts as a deflector for the air descending to the upper surface of the flame, said flame being indicated at K, and by the adjustment of this deflector the shape of the flame may be changed.

Within the tube I and resting upon the chamber A is located a deflecting-tube L, which surrounds the gas-pipe and directs a portion of the air descending in the passage H through the annular burner. Below said burner and supported from a projection on the end of the gas-pipe is a deflector M for

directing the air to the under side of the flame. A special feature of this deflector resides in the perforations through its lower surface by means of which the descending air is permitted to impinge directly upon the lower surface of the globe G, and thereby provide a thorough air-washing of the globe.

I have shown the regenerative chamber connected to the gas-pipe by means of radial arms N, connected to a ring mounted by a screw connection upon said pipe. The connection, however, between the regenerative chamber and said pipe may be formed in any other convenient manner. An upward extension of the passage H is formed by means of a sheet-metal tube having lateral openings near its summit to which are connected wind caps or injectors O, arranged substantially as illustrated. Above this passage and secured to the gas-pipe is the chimney P, into which lead pipes Q from the interior of the regenerative chamber D.

The operation of this lamp is as follows: The gas descends through pipe C and issues from the perforations in the upper surface of the burner A, and the air sustaining the combustion thereof enters through caps O and descends through passage H, nearly to the lower end thereof, where it divides and a portion thereof passes down around the end of deflecting-tube I to the upper surface of the flame, while the other portion descends through tube L and the center of the burner A, thence is in part deflected to the under side of the flame and in part through the perforations of the deflector M to the globe G. These several subdivisions of the current of air then pass through the regenerative chamber D and by way of pipes Q to the chimney P and to the external air. In this way the gas as it descends through the portion of pipe in the chimney P is heated directly by the products of combustion, and as it descends through the air-passage H it may be further heated by the descending air, which receives its heat from the products of combustion as they pass through the regenerative chamber and the tubes Q. By this arrangement both the gas and the air are thoroughly heated as they descend to the burner. For interior use injectors may also be located as at O'. (See dotted lines, Fig. 1.)

Referring now to that form of my lamp shown in Fig. 3, the burner is shown provided with a perforated wall Y in the annular chamber A', into which the gas is directly admitted and through which it is evenly distributed to the outlets of the burner. This is an old and well-known construction and need not be further described. In the deflector M' the imperforate flange shown in Fig. 1 has been omitted. The form of this deflector may be varied in other respects, as described farther on, so long as it retains the essential feature of perforations throughout its lower surface. The deflector is so mounted that it may be

vertically adjustable to vary the direction and amount of air allowed to pass directly to the under side of the flame. In this lamp the regenerative chamber D' is directly connected to the gas-pipe, as in the other form, but is of different shape. The air-passage H' is closed at the top and provided with lateral openings R, the walls of which serve to connect the outer walls of the passage H' with the outer walls of the regenerative chamber. Resting upon the outer walls of the regenerative chamber and surrounding the gas-pipe is the chimney P'. The outer wall of the air-passage H' is extended below the regenerative chamber, as in Fig. 1, and the deflector at the lower end thereof is formed of a ring S, preferably shown beveled on its inner surface, which is vertically adjustable on said wall. This adjustability may be provided for in any suitable manner, but by preference I have shown said ring as screw-threaded and able to turn upon a thread on the interior of said wall.

The adjustability of the deflectors S and I is an essential feature of the lamp, as it provides for regulating the amount of air admitted to the upper surface of the flame in accordance with the constituents of the gas used, as in a low-candle-power gas it is necessary that a greater volume of air be admitted to the upper surface of the flame than in the case of a high-candle-power gas. In this lamp I have shown also a variation in the construction of the deflector L, (here lettered L'.) In this form the deflector is funnel-shaped, as shown, and rests upon the burner, while its flange rests against the wall of the passage H'. This deflector is perforated through the flange and also through its cylindrical portion, although the perforations in the cylindrical portion may be omitted. As a further means of modifying the shape of the flame I mount a deflecting-reflector T upon the lower end of the wall of passage H', as shown. This reflector has its lower surface covered with porcelain or any suitable refractory reflecting material, and aside from serving the purpose of deflecting the air and reflecting the light from the flame outwardly and downwardly it also performs a very desirable function in shutting off from view the dark space formed by the passages U through the regenerative chamber traversed by the products of combustion. The shade and globe support in this lamp are substantially the same as in Fig. 1, though a different form of catch, as F', is shown. None of these features are claimed by me. Upon the flange extending from the regenerative chamber rests a shield, as V, which may be of any ornamental construction, whose upper edge is notched or otherwise formed to provide for the passage of air to the lamp, and upon the upper edge of this shield rests the cap W, whose upper edge is preferably located at a short distance from the chimney C. On the inner surface of the cap W, I attach a deflector X, which I preferably corru-

gate or otherwise form thereon transverse ridges to better provide for directing the air downwardly. By means of the shield, cap, and deflector X, as shown, air is admitted to the lamp in such a manner between the shield, cap, and deflector and between the cap and chimney that the lamp may be used in a strong wind without the flame being seriously affected thereby. In this lamp, as in that shown in Fig. 1, the air and gas both enter from above and the products of combustion have their exit above, thus providing for the necessary heating of the gas and air as they descend to the burner. The deflectors above and below the burner may be further varied from the forms already described, as illustrated in Fig. 5. The ring S may be made in the form indicated at S', and the perforated funnel L' may be made in the form indicated at L². The reflecting-deflector T may be also made of the form indicated at T', while the lower deflector may be of any of the three forms indicated at M², M³, or M⁴. Forms M² M³ are not intended to be adjustable, but to be directly attached to the burner and to the projection at the lower end of the gas-pipe, while the form shown at M⁴ is intended to be adjustable, and consists of a double cone, around which air may be deflected to the flame and also to the bottom of the globe.

Other changes in the form, construction, and arrangement of the several parts entering into the make-up of my lamp may be made aside from those already specified without departing from the general principle of my invention, which is fully set forth in the appended claims.

What I claim as my invention is—

1. In a regenerative gas-lamp, the upright burner consisting of an annular chamber provided with upwardly-opening outlets for gas, and the downwardly-inclined inlet-tubes opening into said chamber at its upper surface, in combination with a deflecting-cone resting upon the burner between the outlet-openings and inlet-tubes for the purpose of directing the air to the inside and to the outside of the burner, as and for the purpose set forth.

2. In a regenerative gas-lamp, the combination of the gas-pipe, the central air-passage surrounding the same, the upright burner having an annular chamber provided with gas-outlets around its upper surface and connected to the gas-pipe by downwardly-inclined tubes opening into said chamber at its upper surface, and a perforated funnel-form deflecting-cone resting upon said chamber between the outlet-openings and the inlet-tubes and extending to the walls of said air-passage, substantially as and for the purpose set forth.

3. In a regenerative gas-lamp, the combination with the annular burner having perforations in the upper surface thereof, of an

air-passage leading through the regenerative chamber to the burner, a perforated funnel-form deflector arranged about the gas-pipe and resting upon the burner within the line of perforations thereof and against the outer wall of the air-passage thereby directing a portion of the air through the burner to the under side of the flame and a portion of the air against the upwardly-extending flame, an adjustable deflector upon the lower edge of said wall directing the air to the upper side of the flame, and a perforated deflector below the burner provided with an imperforate upturned edge for directing air against the under side of the flame, substantially as set forth.

4. In a regenerative gas-lamp, the combination with the gas-pipe and the burner upon the end thereof, the regenerative chamber surrounding and attached to the gas-pipe and having an air-passage through the center thereof extending nearly to the burner, a perforated funnel-form deflector resting upon the burner for directing the air to the center and outside thereof, and a ring deflector screw-threaded to fit and turn upon screw-threads formed on the interior of the wall of said air-passage thereby rendering it vertically adjustable to vary the direction of the air deflected to the outside of the burner so as to properly present the air to different kinds of gas, substantially as shown and described.

5. In a regenerative gas-lamp, the combination with the shield V, having air-passages at its upper edge and supported on the outer wall of the lamp, of the cap W, mounted on said shield, and a radially-corrugated deflector X, arranged about the interior of said cap, substantially as and for the purpose set forth.

6. In a regenerative gas-lamp, substantially as described, the combination with the downwardly-extending gas-pipe, of the branching tube secured to the lower end thereof, the annular chamber having outlet-perforations along its upper outer edge and supported upon the branches of said tube and to the interior of which they conduct the gas in a manner such that it will strike the walls of said chamber and be diffused throughout it before escaping from the perforations, the air-passage surrounding the gas-pipe and leading downwardly toward the burner, and a deflecting-cone supported upon the burner just within the outlet-perforations and extended upwardly between the gas-pipe and the wall of the air-passage so as to divide the descending current of air and direct a portion through the annular chamber and the remainder to the outside thereof, as and for the purpose set forth.

7. In a regenerative gas-lamp, the combination with an upwardly-extending shield resting upon the frame of the lamp and having suitable air-passages therethrough, of a

cap mounted on said shield and upwardly
inclined toward the chimney of the lamp,
and leaving a space between itself and the
chimney, and a downwardly-inclined corru-
5 gated deflector X, secured at its outer edge
to the interior of said cap, substantially as
shown and described.

Signed at New York, in the county of New
York and State of New York, this 11th day
of March, A. D. 1895.

WILLIAM R. SWIFT.

Witnesses:

WM. H. CAPEL,
D. H. DECKER.