

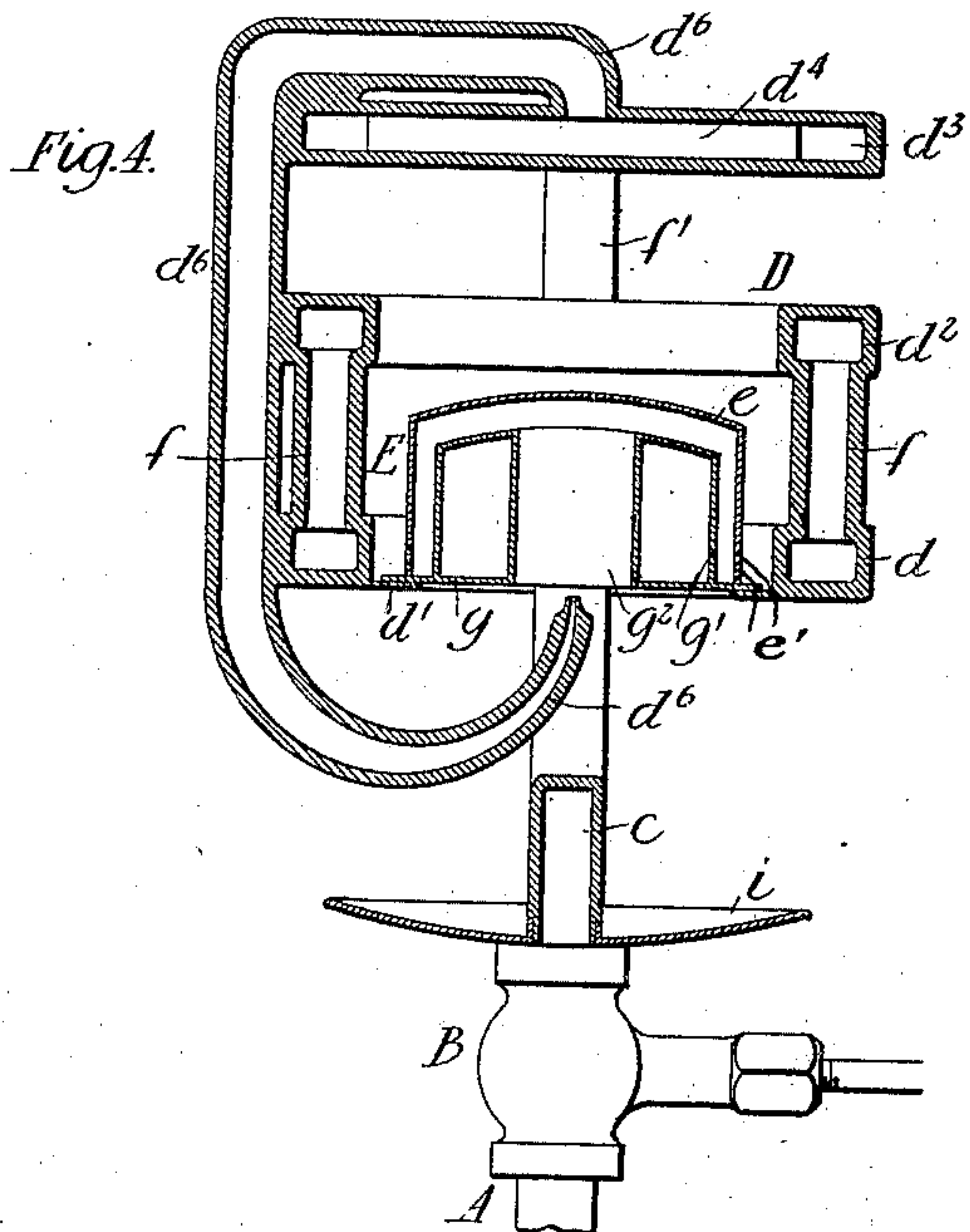
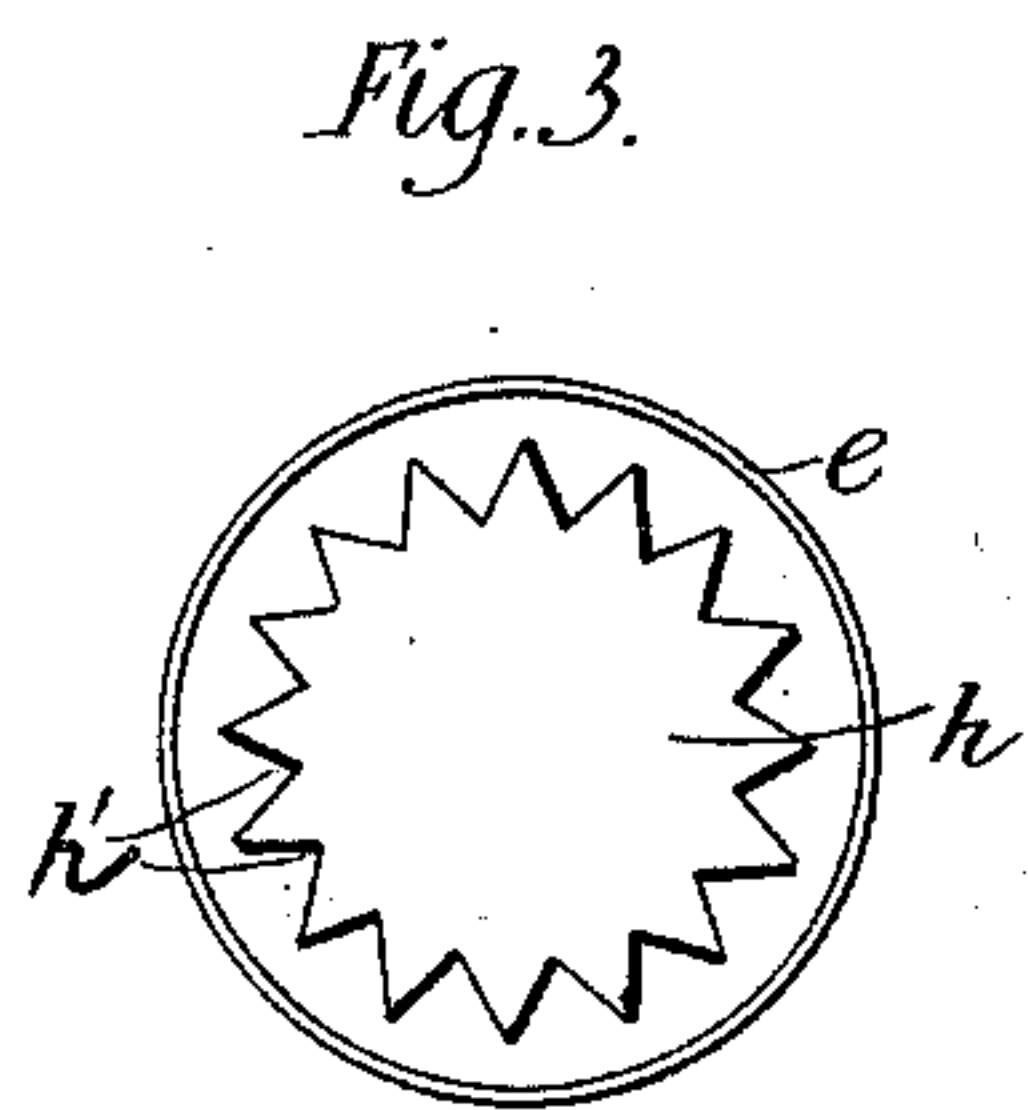
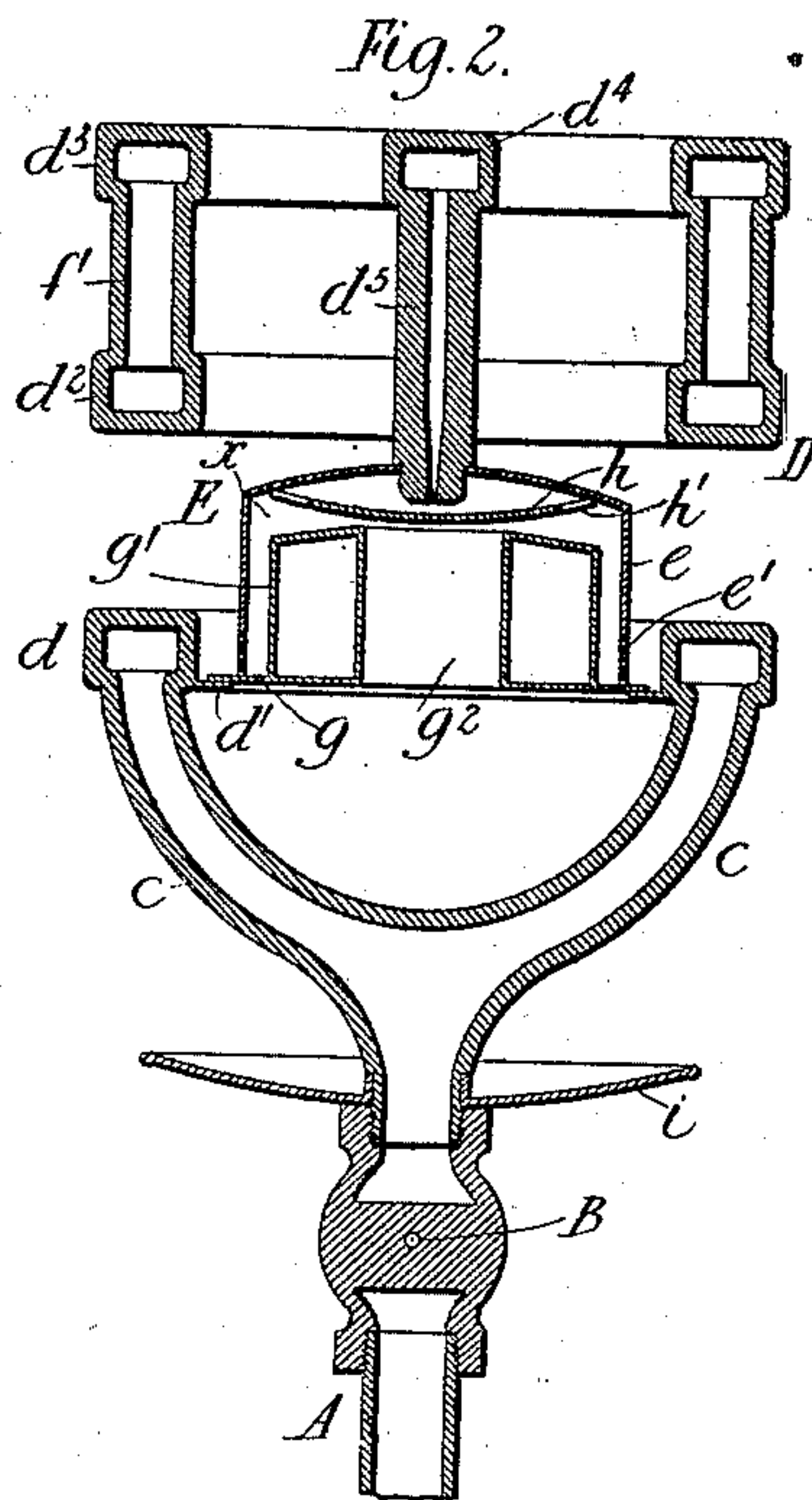
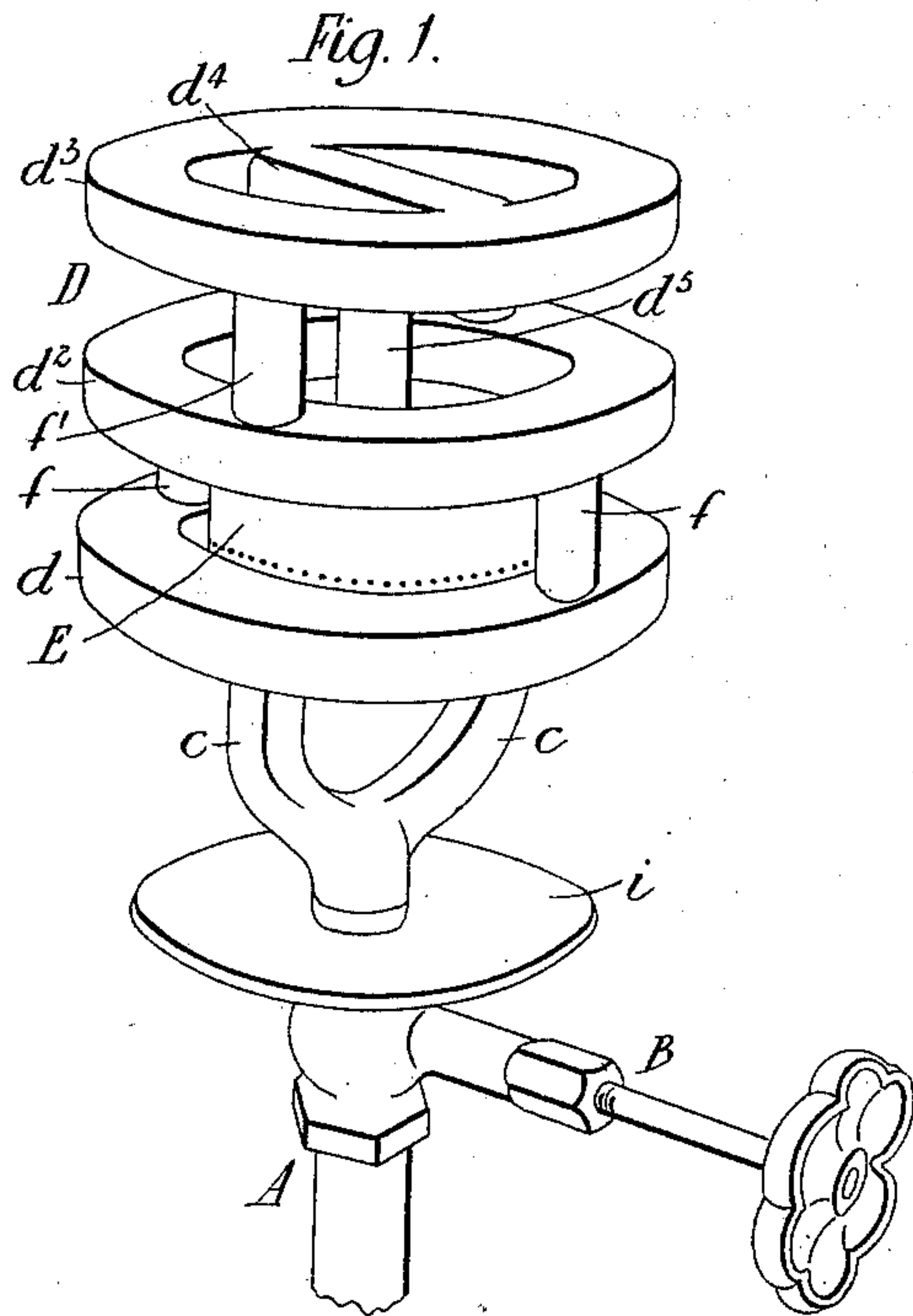
No. 627,176.

Patented June 20, 1899.

J. CHARLES.  
BURNER FOR HYDROCARBON LIQUIDS.

(Application filed Sept. 6, 1898.)

(No Model.)



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# UNITED STATES PATENT OFFICE.

JAMES CHARLES, OF RICHMOND, INDIANA.

## BURNER FOR HYDROCARBON LIQUIDS.

SPECIFICATION forming part of Letters Patent No. 627,176, dated June 20, 1899.

Application filed September 6, 1898. Serial No. 690,248. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES CHARLES, a citizen of the United States, residing at Richmond, in the county of Wayne and State of Indiana, have invented certain new and useful Improvements in Burners for Hydrocarbon Liquids; and I do 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, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in burners for hydrocarbon liquids, and has for its object the provision of a simple and durable device of this character which is adapted for application to heating and cooking stoves, furnaces, and the like and which is capable of consuming hydrocarbon liquids of low grades, such as coal-oil.

The invention consists generally in providing a generator or retort for the vaporization of the liquid which is heated by contact with the main flame, said generator or retort consisting of a plurality of annular tubes or rings concentric with each other and the burner and intercommunicating, whereby partial vaporization is followed by complete conversion of the liquid into dry vapor, also in providing a burner which in addition to supplying the heat of vaporization is constructed to completely consume the vapor without generating smoke or giving off odors.

The details of construction and operation will now be set forth, and in connection with the description attention is called to the accompanying drawings, in which—

Figure 1 is a perspective view of my improved generator and burner. Fig. 2 is a vertical central sectional view. Fig. 3 is a bottom plan view of the burner-cap, showing the form of deflector. Fig. 4 is a vertical central sectional view of a modified form of generator and burner.

Referring to the said drawings by letter, A denotes the liquid-supply pipe, which is connected with a suitable tank or reservoir placed above the burner to effect a gravity-feed or at or below said burner, in which case it is provided with any suitable pressure means.

At any point in said pipe, but preferably just below the burner, is a needle-valve B. From the supply-pipe A there extends upwardly a Y-pipe connection *c*, which enters the lower annular tube or ring *d* of the generator or retort D at opposite sides, as shown. This ring *d* has at its inner side an annular flange *d'*, which supports the burner E, and in practice the initial vaporization of the liquid takes place in this lower ring. Above the ring *d* is a second annular tube or ring *d*<sup>2</sup>, and these rings are connected by means of tube-sections *f f*, the sections being disposed midway of the points of connection of the lower ring with the Y-pipe branches, whereby the vapor is compelled to fill the ring *d* before it can find its way to the second ring *d*<sup>2</sup>. Above the ring *d*<sup>2</sup> is a top annular tube or ring *d*<sup>3</sup>, and *f' f'* are tube-sections connecting these rings at points midway of the location of the tube-sections *f*. Obviously there may be any number of annular tubes or rings; but I find good results are obtained by the employment of the number shown. Centrally of the top ring *d*<sup>3</sup> is a tube-section *d*<sup>4</sup>, which enters said ring at opposite points midway of the points of connection with the tube-sections *f'*. From the center of this tube-section *d*<sup>4</sup> there depends a tube *d*<sup>5</sup>, which provides the final passage to the burner.

The burner E consists of a cap *e*, of cylindrical form, having an arched top, into which the tube *d*<sup>5</sup> is passed. This cap rests on a plate *g*, supported by the flange *d'* of the lower ring *d*. The plate *g* carries a cylindrical body *g'*, which projects into the cap and is concentric with but out of contact with the latter, whereby is provided an annular mixing-chamber *x*. The plate *g* and body *g'* are apertured centrally at *g*<sup>2</sup> for the admission of air. The lower end of the tube *d*<sup>5</sup> is reduced and its passage contracted in order that the vapor may pass into the burner in the form of a jet. Immediately below the top of the cap and in close proximity to the tube *d*<sup>5</sup> is a spreader-plate *h*, which is concave in cross-section and is serrated at its edges to provide a plurality of openings *h' h'* for the passage of the vapor to the mixing-chamber. In this manner the vapor is caused to fill the chamber *x*, the result being its equal distribution to the plurality of burner-perforations



$e' e'$  in the lower side of the cap, at which ignition takes place.

In the construction illustrated by Fig. 4 is employed in lieu of the tube  $d^5$  a tube  $d^6$ , which passes from the upper side of the tube-section  $d^4$  over the top ring, thence downwardly, and finally by an easy curve its outlet is brought centrally of the aperture  $g^2$ . The vapor entering at the bottom of the burner enables the spreader-plate to be dispensed with, and in lieu of the plate the arched top of the cap receives the jet of vapor and deflects it to the mixing-chamber, after which the operation is as hereinbefore described.

In the operation of my invention I obtain the preliminary heating of the retort by igniting a small quantity of liquid supplied in a cup  $i$ , provided at the lower end of the Y connection, after which the burner-flame is employed for this purpose. The liquid entering the lower ring is partially vaporized and expanded into the ring next above, where practically complete vaporization takes place, though should any moisture remain it will be entirely eliminated after passing through the top ring. From the top ring the dry vapor passes into the burner, is deflected or spread and thoroughly mixed with air, and is then burned at the perforations  $e'$ .

The construction of the generator or retort, as well as that of the burner, renders the invention especially applicable for use with oils of lower grades, such as coal-oil, it being evident that with a retort and burner such as shown and described complete vaporization and complete combustion will take place and all smoke and odor will be prevented. Then by the construction employed only the liquid contained in the generator is vaporized, and there is consequently no danger of the heat from the burner being communicated to the tank or reservoir.

The construction employed is simple, the parts few in number, and there is therefore little liability to disorder, and, moreover, the burner may be cheaply produced.

I claim as my invention—

1. A burner for hydrocarbon liquids com-

prising a burner proper, and a generator or retort surrounding said burner proper and comprised of a plurality of annular tubes or rings connected together at intervals, and a tube leading from the top ring to the burner proper, substantially as described.

2. A burner for hydrocarbon liquids comprising a burner proper, a generator or retort surrounding said burner proper and comprised of a plurality of concentric annular tubes or rings connected together at intervals as described and a Y connection between the lower ring and the supply-pipe, a priming-cup below the rings, and a jet-tube leading from the upper ring to the burner, substantially as described.

3. A burner for hydrocarbon liquids comprising, in combination, a burner proper consisting of a cap having burner-perforations in its lower portion, an apertured body within said cap providing in conjunction with the cap an annular mixing-chamber, a spreader above the said body in proximity to its aperture, a generator or retort surrounding said burner and having tube connection therewith, the tube discharging against the spreader, substantially as described.

4. A burner for hydrocarbon liquids comprising, in combination, a burner proper consisting of a cap having burner-perforations in its lower portion, an apertured body within said cap providing in conjunction with the cap an annular mixing-chamber, a concaved spreader-plate interposed between the top of the cap and the body and having at its edge serrations providing a plurality of passages for the vapor, a generator or retort surrounding the burner proper, and a tube leading from the generator to the burner proper and discharging downwardly upon the spreader-plate, substantially as described.

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

JAMES CHARLES.

Witnesses:

O. B. FULGHAM,  
J. W. NEWMAN.