

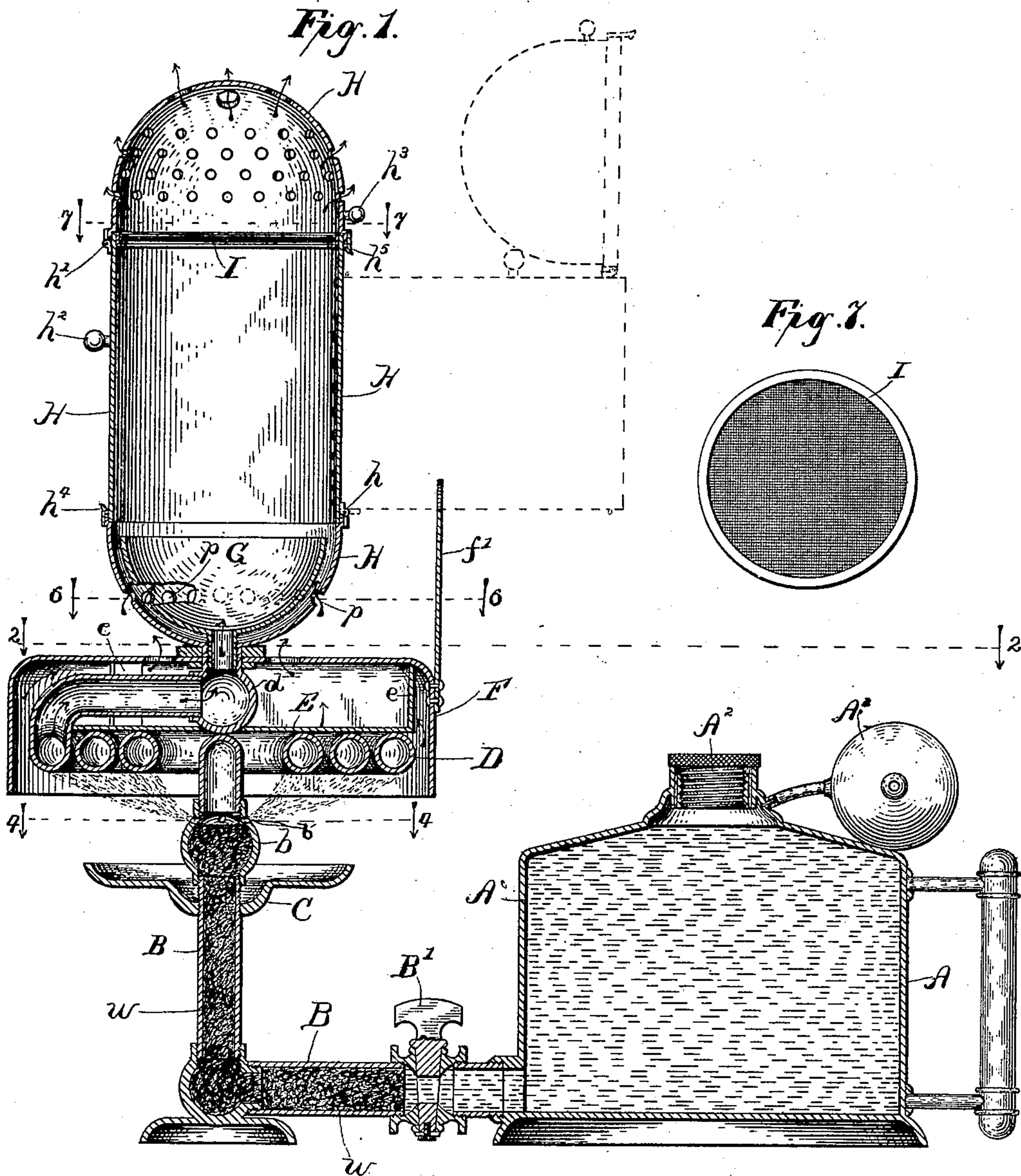
No. 631,870.

Patented Aug. 29, 1899.

J. H. HOLMAN.
FORMALDEHYDE LAMP.
(Application filed Apr. 14, 1898.)

(No Model.)

2 Sheets—Sheet 1.



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2 Sheets—Sheet 2.

Fig. 2.

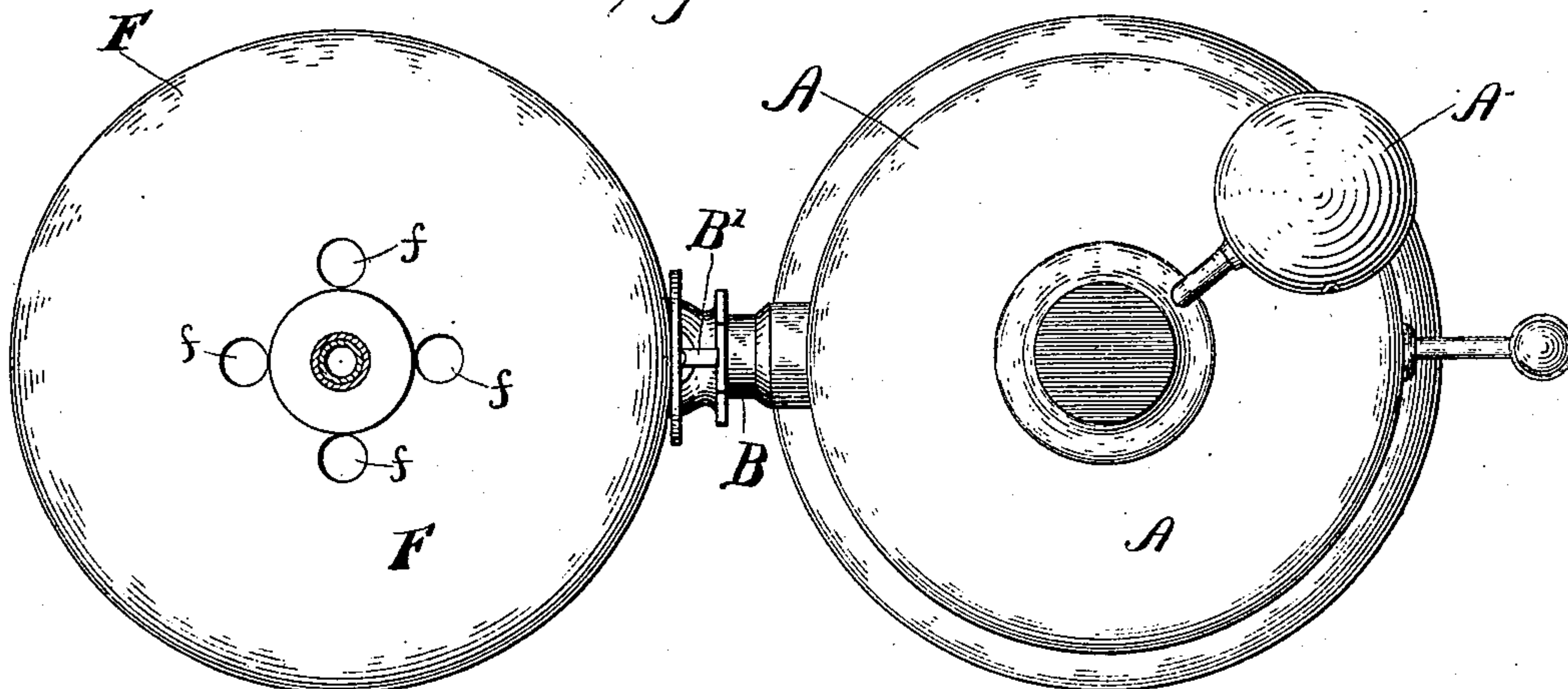


Fig. 3.

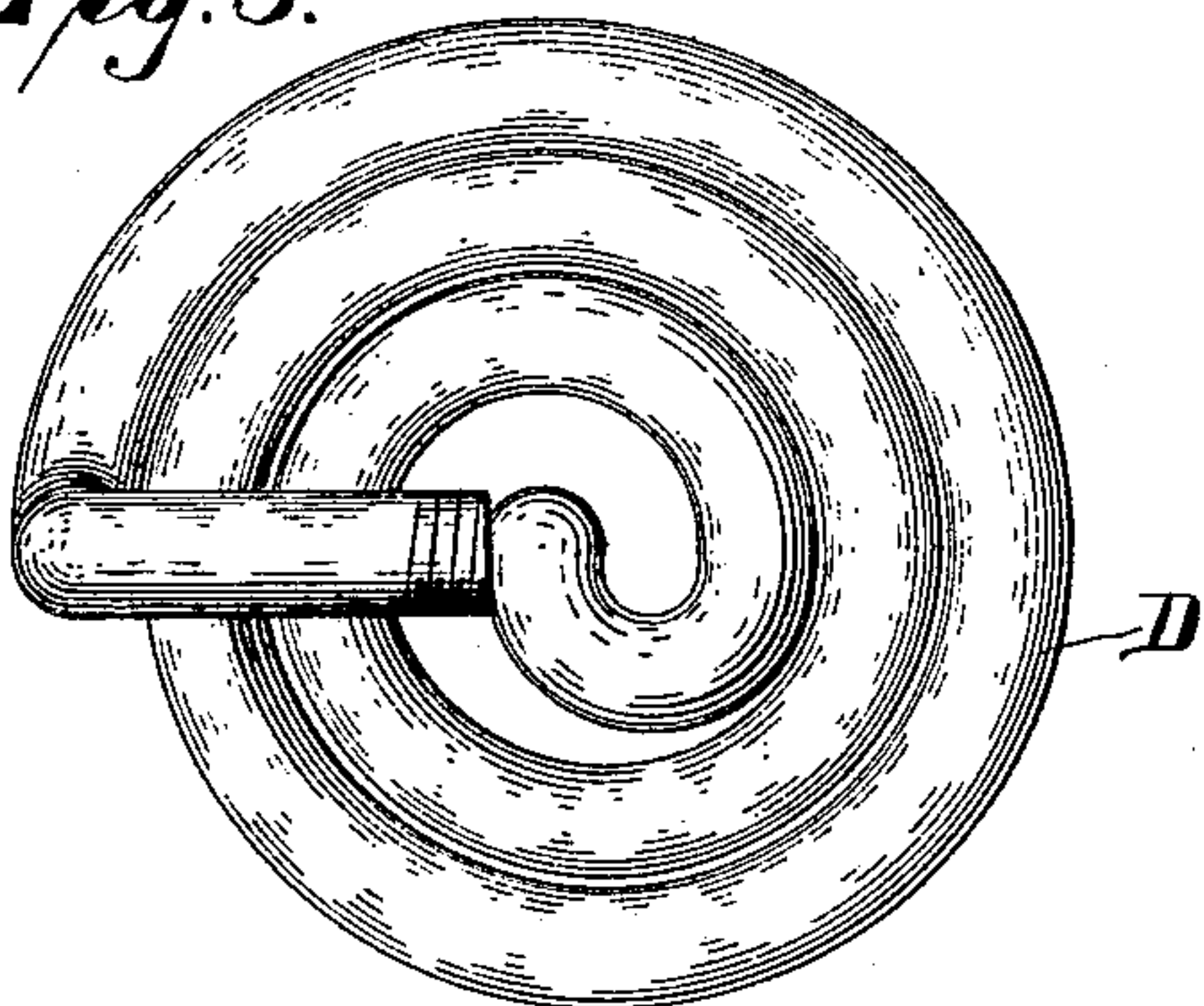


Fig. 4.

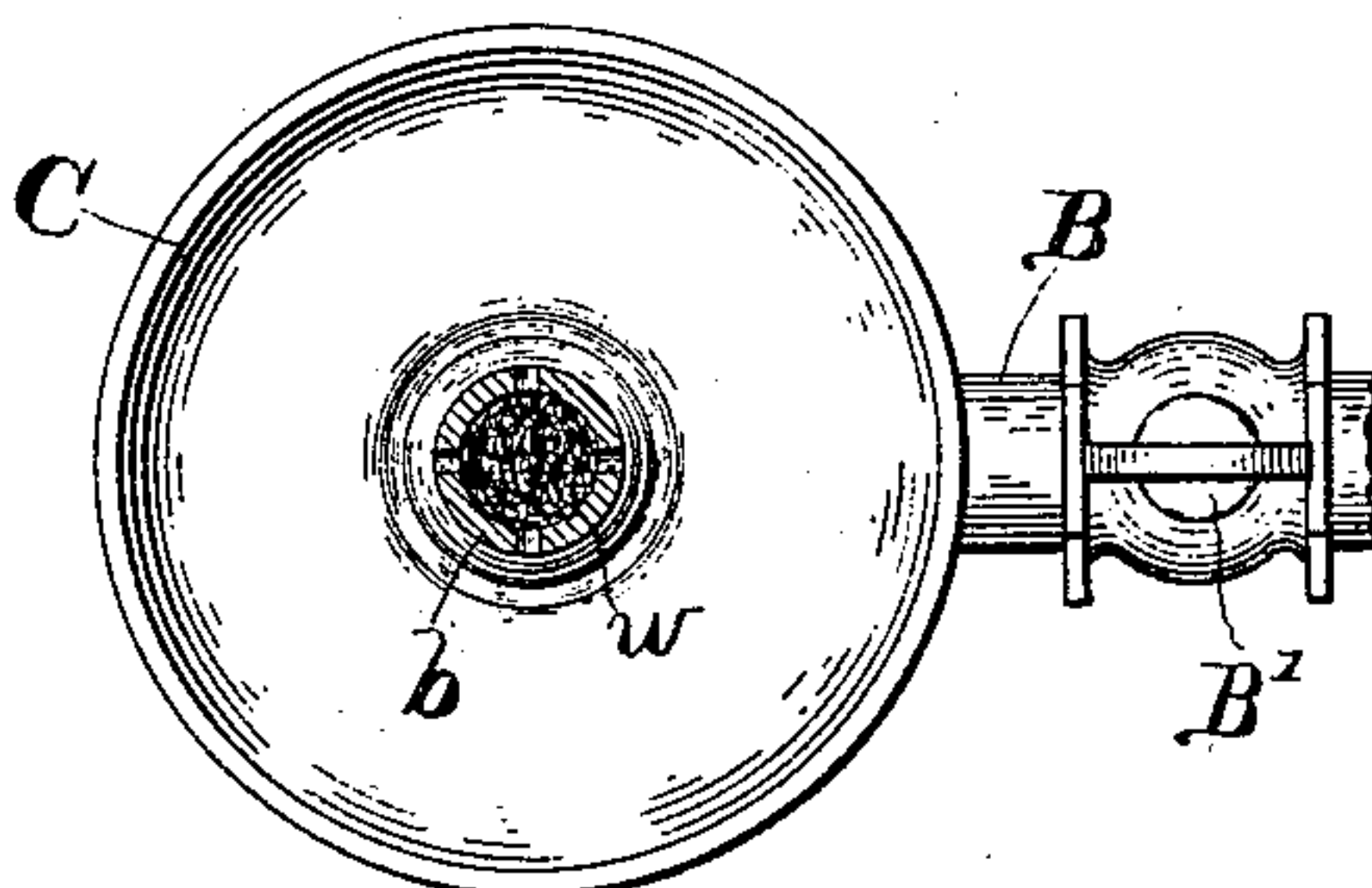


Fig. 5.

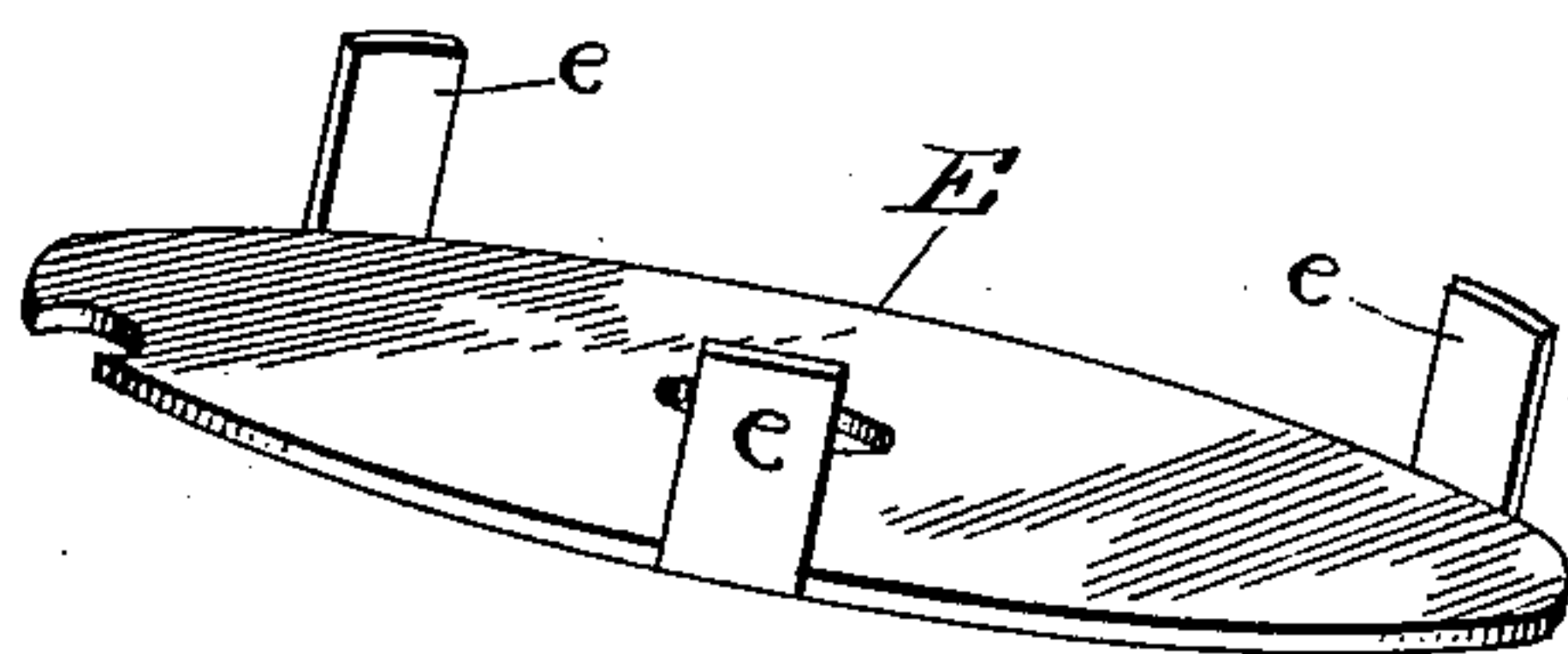
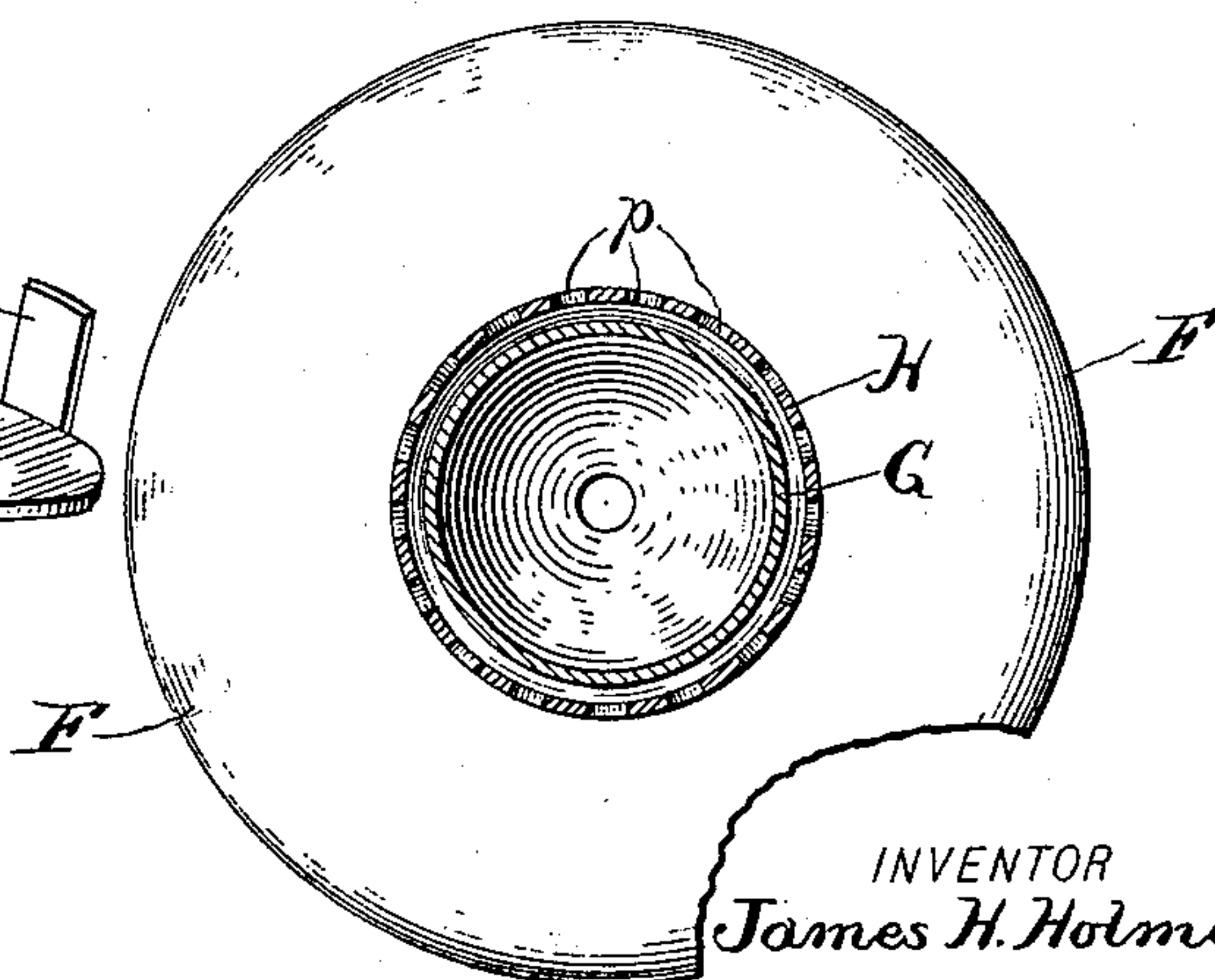


Fig. 6.



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UNITED STATES PATENT OFFICE.

JAMES H. HOLMAN, OF INDIANAPOLIS, INDIANA.

FORMALDEHYDE-LAMP.

SPECIFICATION forming part of Letters Patent No. 631,870, dated August 29, 1899.

Application filed April 14, 1898. Serial No. 677,606. (No model.)

To all whom it may concern:

Be it known that I, JAMES H. HOLMAN, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Gas-Generators, of which the following is a specification.

The object of my invention is to produce an efficient device, of large capacity in proportion to its size, for generating gases, particularly that variety known as "formaldehyde" gas.

Said invention consists in a certain new and improved construction and arrangement of parts whereby a high order of result is secured, as will be hereinafter more particularly described and claimed.

Referring to the accompanying drawings, which are made a part hereof and on which similar letters of reference indicate similar parts, Figure 1 is a vertical sectional view of an apparatus embodying my present invention; Fig. 2, a horizontal plan view with the generating-chamber removed, as seen from the dotted line 2 2 in Fig. 1; Fig. 3, a view of the superheating device, which is here shown as an ordinary pipe-coil; Fig. 4, a plan view as seen from the dotted line 4 4 in Fig. 1; Fig. 5, a perspective view of the baffle-plate which is situated above the superheating-coil; Fig. 6, a horizontal sectional view as seen from the dotted line 6 6 in Fig. 1, and Fig. 7 a horizontal sectional view as seen from the dotted line 7 7 in Fig. 1.

In said drawings the portions marked A represent the reservoir for the fluid from which the gas is to be generated; B, a tube leading therefrom; C, a cup-shaped structure surrounding said tube near the upper end and serving as a combustion-hearth; D, a superheating device, preferably in the form of a coil; E, a baffle-plate situated over said coil; F, an inclosing cap covering said baffle-plate and said superheating-coil; G, a cup-shaped structure connected to the upwardly-extending end of the coil and located within the gas-generating chamber; H, said chamber, and I a disk within said chamber.

The reservoir A is of suitable form and size to contain the fluid from which the gas is to be generated, which for formaldehyde gas is, as is well known, generally wood-al-

cohol. Connected to the upper portion of this reservoir A is an elastic bulb A', by which air-pressure can be applied to the contents of the reservoir, thus forcing them out through the perforations in the tube B upon occasion. The neck of this reservoir is preferably closed by means of a screw cap or plug A².

The tube B preferably leads out from the bottom of the reservoir horizontally for a distance, and thence upwardly to a point substantially level with the top of the fluid in the reservoir A when the latter is filled, and its upper end *b* is preferably swelled or bulb like in form. At its extreme upper end it contains a series of perforations *b'*, through which vapor generated from the fluid may escape, and above said perforations said pipe is connected to the coil D. A cock B' is provided in the horizontal member of the tube B for the purpose of shutting off the flow of fluid when desired. From just beyond said cock a wick *w* leads up to and into the bulb *b* and serves after the ordinary manner of wicks to conduct the fluid from the reservoir to the bulb.

The cup or hearth C surrounds the vertical member of the pipe B and is adapted to receive and contain any overflow of fluid from the perforations in the bulb-like head *b* and also to serve as a combustion-surface upon which the burning fluid may rest, whereby the bulb *b* may be heated and the fluid inside of the same vaporized. After the operation of vaporizing is well begun the flame from the escaping vapor alone is quite sufficient to cause the operation to continue, and the combustion-hearth C is therefore inactive during the greater portion of the time the apparatus is in operation.

The superheating device is preferably in the form of a coil D, which leads vertically from the upper end of the tube B for a short distance and then after making several turns leads inwardly again over the turns to a bulb *d*, connected to the lower end of the generating-chamber H. While this device is shown in the form of an ordinary pipe-coil, it may of course be a cast structure, if desired, and the superheater and baffle-plate may be in such case formed integrally, if desired.

The baffle-plate E is laid upon the upper side of the superheater D and serves to force

the products of combustion outwardly from the center under and around the members of said coil or superheater to the outer sides thereof and thence over said sides to above said baffle-plate, whence it escapes through the perforations in the upper side of the cap F. Stud-like arms *e* extend up from this baffle-plate and rest against the upper side of said cap F and serve to help unite and strengthen the structure.

The cap F is open on the under side and closed on the upper side except that it has a series of perforations *f* in its top near the center through which the products of combustion escape. It is secured to the stem-like lower end of the generating-chamber H, as shown in Fig. 1. A support *f'* for the middle member of the generating-chamber (when the same is turned down) extends upwardly from one side of this cap F.

The part G is cup-like in form and is contained within the lower end of the generating-chamber H and preferably conforms to the shape of said lower end, although somewhat smaller in size, so as to leave a clear space between the two parts. Said part G serves mainly as a distributor of the air and the products of combustion as they enter the gas-generating chamber. It also serves to diffuse the vapor which enters it from below.

The generating-chamber H is preferably, as shown, composed of three parts, the upper and lower ends being semispherical and the central portion cylindrical. The central portion is preferably hinged to the lower portion by a hinge *h'*. When these parts are thrown back on their hinges, they occupy the positions shown by the dotted lines in Fig. 1, the middle or body portion of the gas-generating chamber resting upon the support *f'*, while the upper semispherical end rests against the handle *h²* of the said middle portion. These portions on the opposite sides from the hinges are also preferably provided with spring-catches *h⁴* and *h⁵*.

The disk I is placed within the gas-generating chamber, preferably at the top of the middle portion, and it preferably consists of a gauze of platinum wire, platinum being the best metal for the purpose, as is well known from practical experience. I do not desire to limit myself, however, as to the form, construction, or material of this disk. The intense heat arising from the superheated vapor and from the products of combustion as they arise around and into the gas-generating chamber produces and maintains a very high temperature in said chamber, attached as it is directly to the superheating-coil D, and in all parts connected thereto. The disk I participates in these effects, and when the apparatus is in operation maintains substantially a red heat, which is the most efficient temperature for the purpose.

The operation of this invention may be described as follows: At first a slight pressure upon the bulb A' causes the fluid to overflow

slightly into the cup or hearth C. The overflow is then lighted, which heats the bulb *b* and vaporizes the fluid. A portion of the vapor escapes through the perforations *b'* at the upper side of said bulb and forms a fuel, the flame from which impinges against the coil D, as shown in Fig. 1. The greater portion of the vapor, however, passes through said coil, and is thus superheated by the burning of the escaping portion. This after being so superheated passes into the cup-like part G, and thence into the gas-generating chamber, where it strikes the disk I. At first in order to get the required heat on said disk I prefer to throw back the upper section of the generating-chamber and light the vapor as it comes through the fine perforations of said disk. After the burning has continued for a few moments I close the top of the generating-chamber, which has the effect to extinguish the flame at this point, and then the generation of the gas proceeds with great rapidity, and said gas escapes into the room or sterilizing-chamber in which the apparatus is placed. The products of combustion from that portion of the vapor which escapes through the orifices in the bulb *b* after passing up around the coil and up through the orifices *f* in the cap F also enters (along with a certain amount of atmospheric air) the perforations *p* in the lower section of the generating-chamber H. The mixture of atmospheric air with the highly-heated vapor and the thorough mingling therewith which occurs in this chamber, especially when they come in contact with the disk I, produce the formaldehyde gas in large quantities.

As will be observed, in my apparatus a portion of the vapor constitutes the fuel by which the other portion of the vapor is superheated, that portion which is not used as a fuel passing through the coil D (in which it is superheated by the heat produced by the combustion of the other portion) and passing thence into the generating-chamber, where it becomes mixed with atmospheric air and so forms the gas.

Having thus fully described my said invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a formaldehyde-gas generator, the combination, of the fluid-reservoir, a tube leading therefrom and upwardly and formed with perforations in its sides near its top through which a portion of the gas may escape and burn under the superheating-coil, a combustion-hearth just below said perforations, said superheating-coil connected with the top of said tube just above said perforations, and a generating-chamber connected to the top of said coil, and formed with perforations in its lower side for the ingress of gas and air from below, all substantially as set forth.

2. The combination, in a formaldehyde-gas generator, of the fluid-reservoir, the tube leading out and upwardly therefrom, the gas-burner formed around near the top of said

tube, the superheating-coil connected therewith just above said burner, the inverted cup-shaped cap F covering said coil and formed with apertures near the center of its top, the generating-chamber connected with the top of said coil above said cap, and formed with apertures in its under side to permit the ingress of air and the gas from beneath said cap, all substantially as set forth.

10 3. In a formaldehyde-gas generator, the combination, of the fluid-reservoir, the tube leading therefrom and upwardly, the superheating apparatus on its upper end, the generating-chamber on the top of said superheating
15 apparatus, and the diffusing device G in the bottom of said chamber with a free space between them, substantially as set forth.

20 4. The combination, in a formaldehyde-gas generating apparatus, of a reservoir for the fluid from which the gas is to be made, a tube leading from said reservoir, a superheating device attached to the upper end of said tube,

a baffle-plate above said superheating device, a cap inclosing said device and baffle-plate, a gas-generating chamber attached to the upper end of said superheating device, and a combustion-hearth below said superheating device. 25

5. The combination, in a formaldehyde-gas generating apparatus, with the fluid-reservoir, and a heating apparatus, of a gas-generating chamber containing within its lower end a cup-shaped structure opening upwardly, and a disk extending across the same near the upper end said disk containing metallic gauze. 35

In witness whereof I have hereunto set my hand and seal, at Indianapolis, Indiana, this 12th day of April, A. D. 1898.

JAMES H. HOLMAN. [L. S.]

Witnesses:

CHESTER BRADFORD,
JAMES A. WALSH.