

(No Model.)

2 Sheets—Sheet 1.

C. HAFFCKE.  
BURNER.

No. 541,533.

Patented June 25, 1895.

Fig. 1.

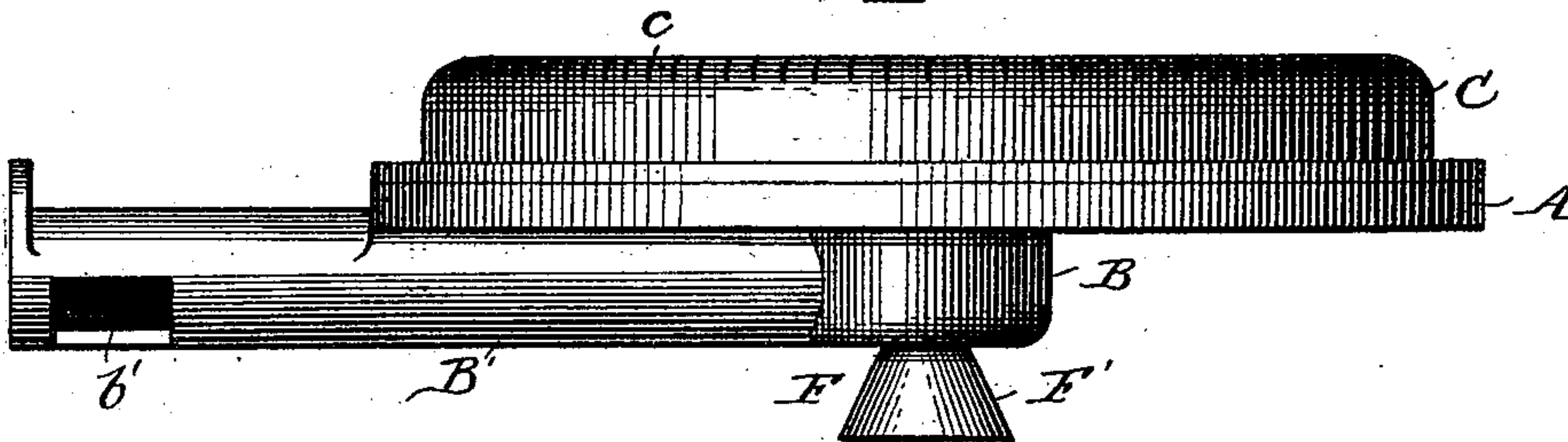


Fig. 2.

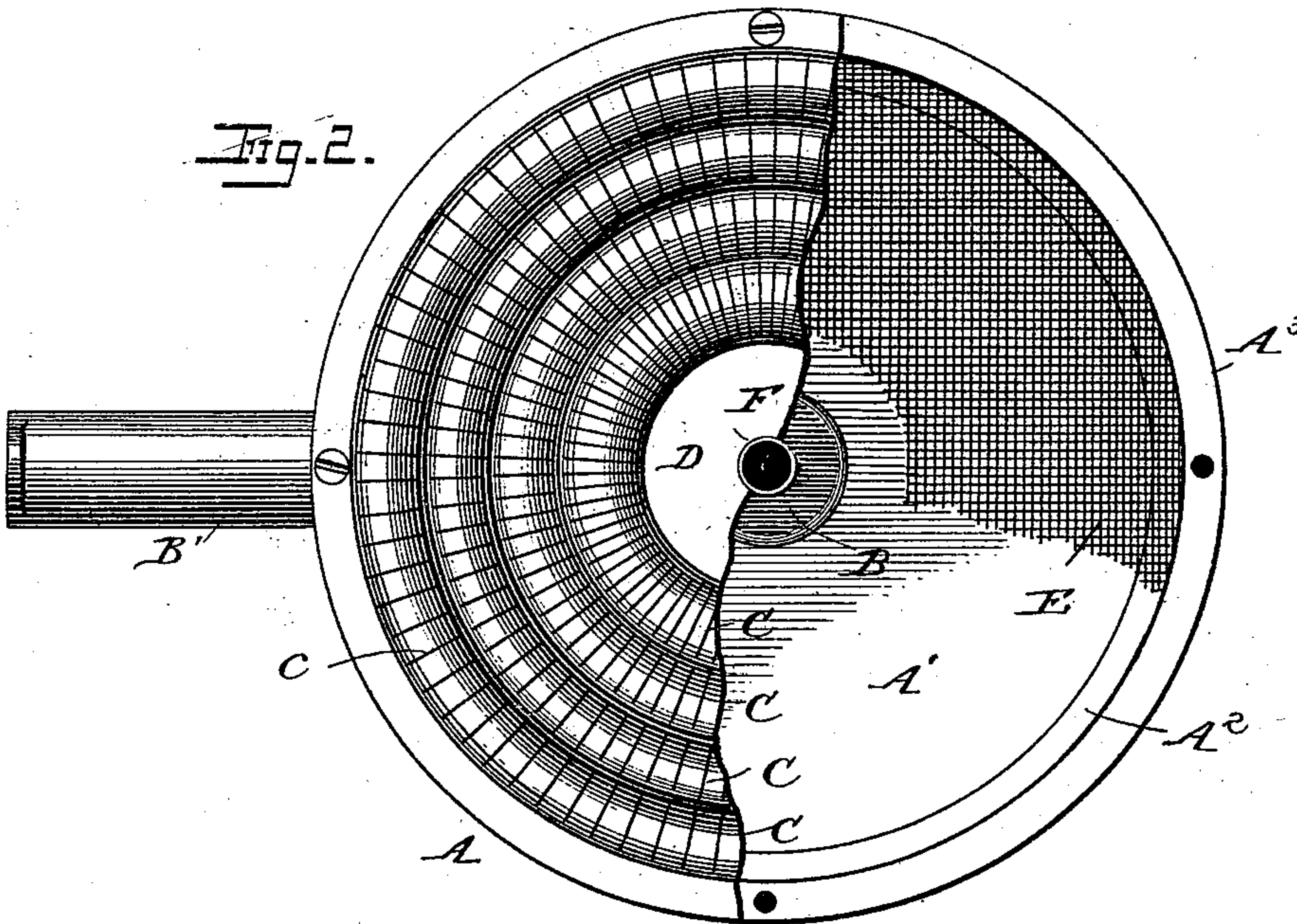


Fig. 3.

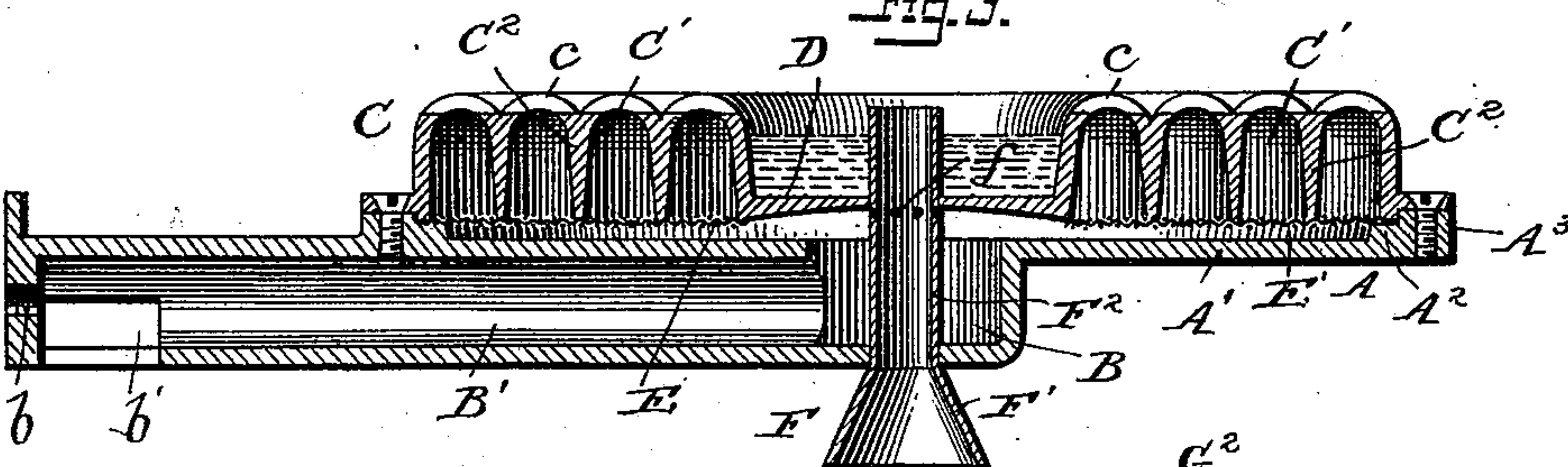
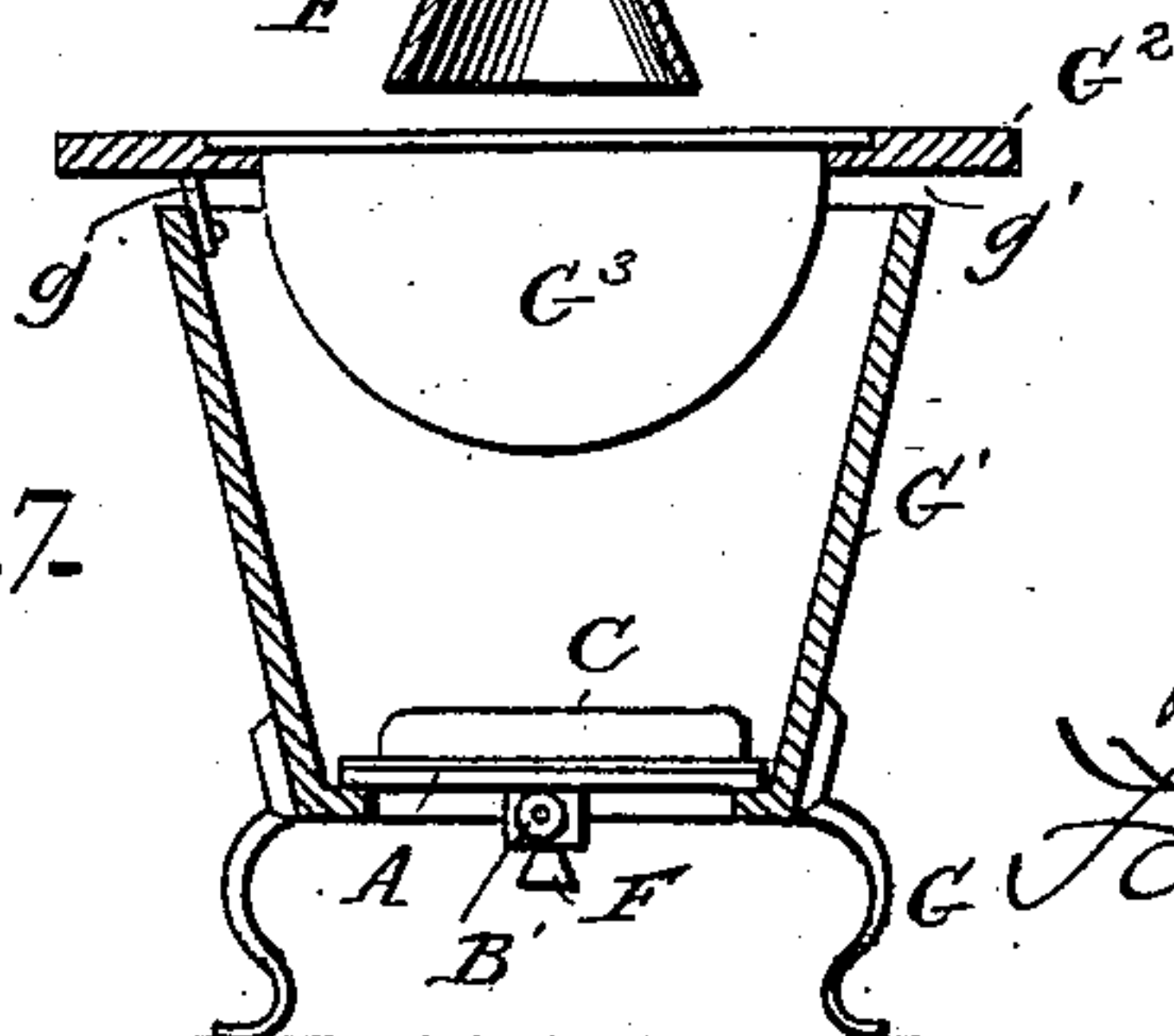


Fig. 7.



Witnesses  
J. G. Hinkel  
J. A. Langriev.

Inventor  
by Charles Haffcke  
Lawrence Freeman  
Attorneys

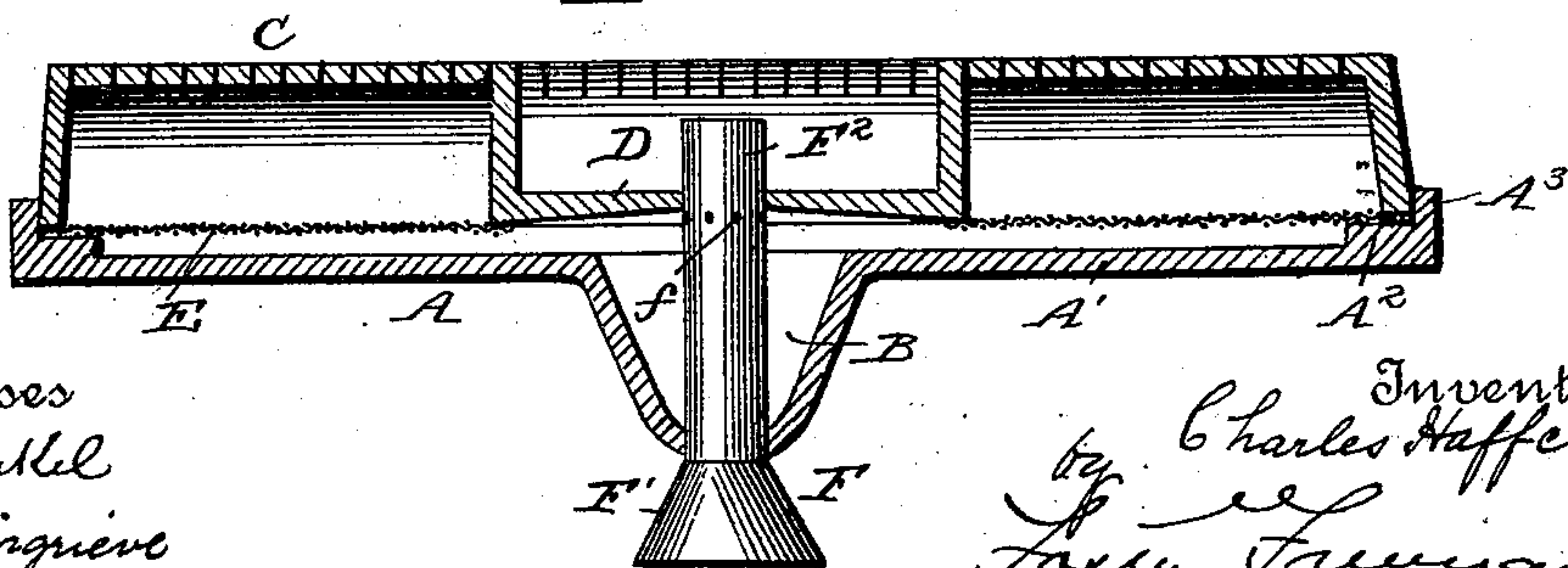
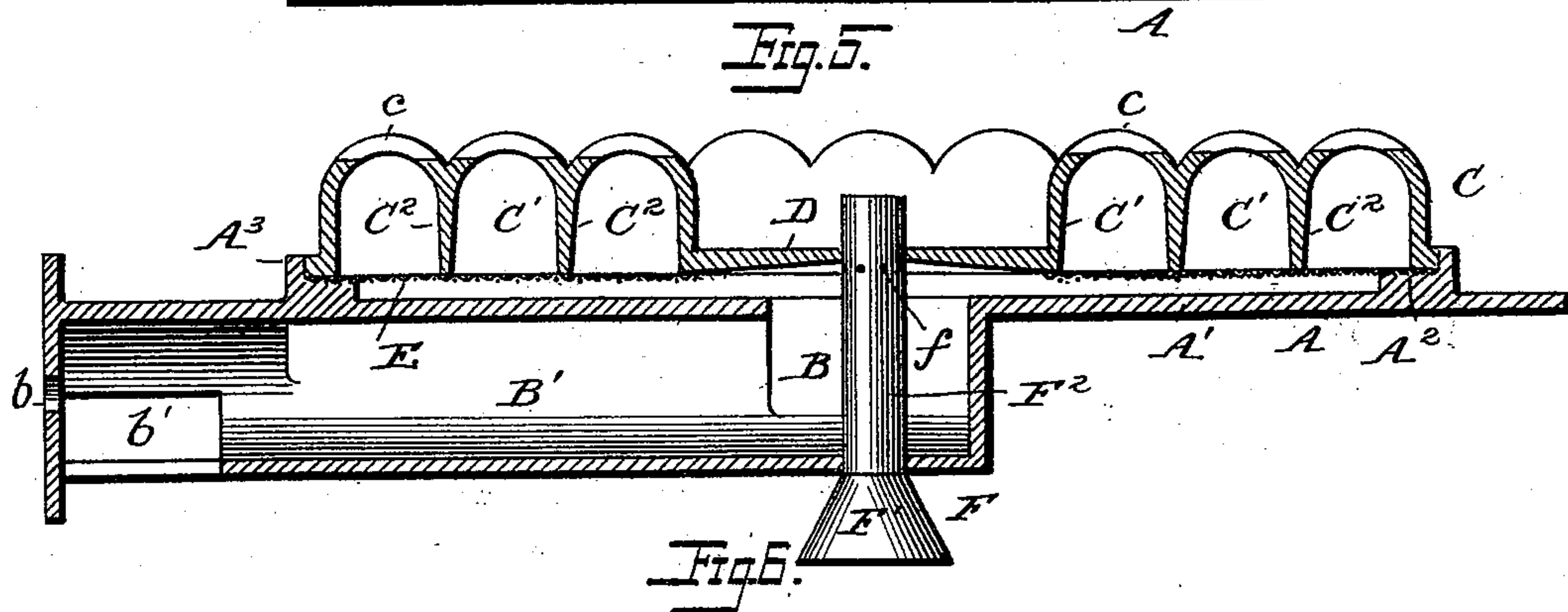
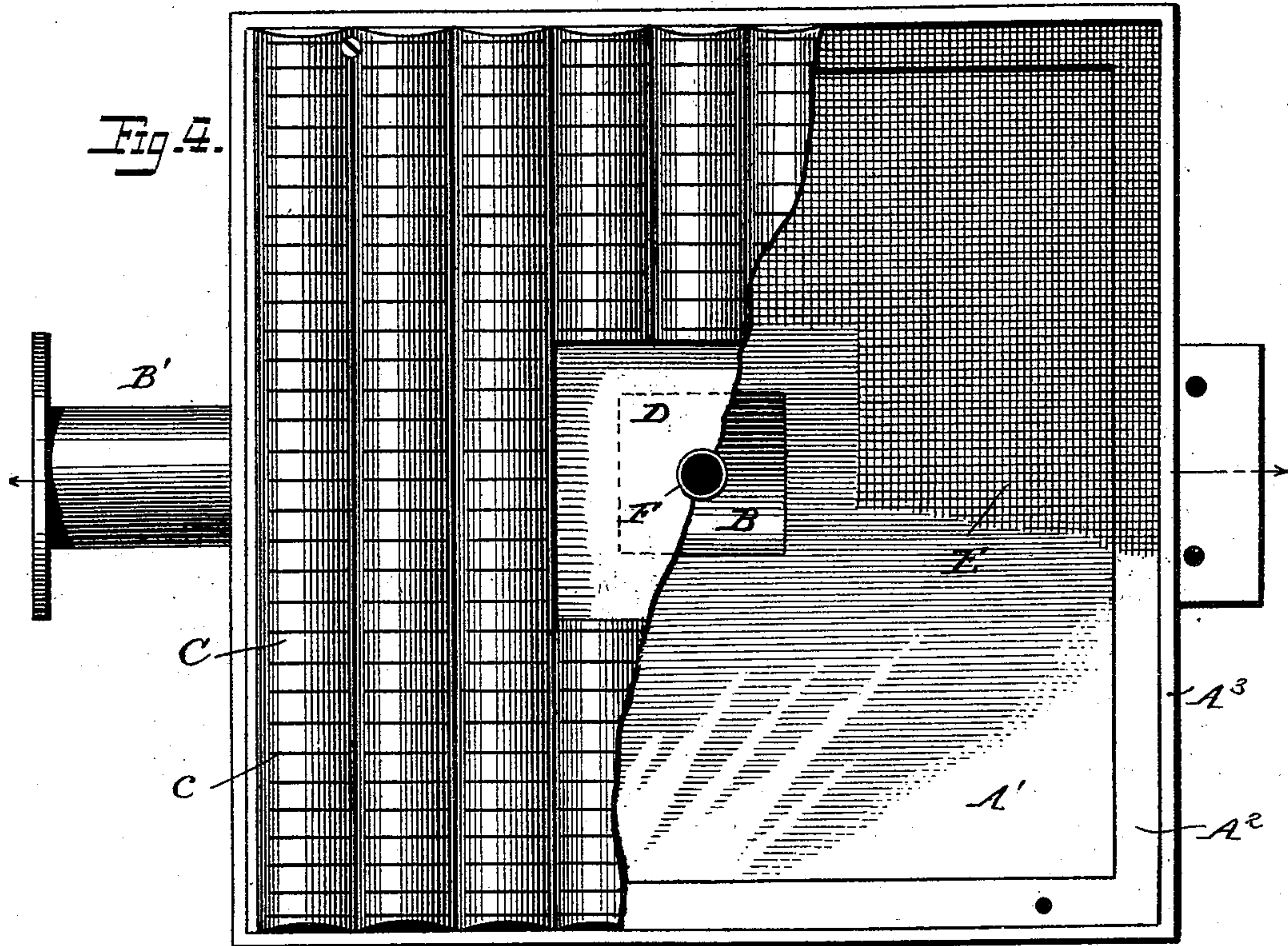
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2 Sheets—Sheet 2.

C. HAFFCKE.  
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No. 541,533.

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Witnesses  
J. H. Hummel  
J. A. Fairgrieve

Inventor  
Charles Haffcke  
J. H. Hummel  
Attorneys



# UNITED STATES PATENT OFFICE.

CHARLES HAFFCKE, OF BALTIMORE, MARYLAND.

## BURNER.

SPECIFICATION forming part of Letters Patent No. 541,533, dated June 25, 1895.

Application filed July 7, 1894. Serial No. 516,833. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES HAFFCKE, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Burners, of which the following is a specification.

My invention relates to burners which are adapted for the combustion of mingled hydrocarbon gas and air, and which has for its objects to improve and simplify the construction of such devices and to provide a satisfactory and economic burner, and to these ends my invention consists in the various features of construction substantially as hereinafter set forth.

Referring to the accompanying drawings, Figure 1 is a side view of a burner embodying my invention. Fig. 2 is a plan and part horizontal sectional view of the same. Fig. 3 is a vertical section of the same. Fig. 4 is a plan and part horizontal sectional view of a modified form of burner. Fig. 5 is a longitudinal vertical section of the same. Fig. 6 is a transverse vertical section, and Fig. 7 is a sectional view showing one way of adapting the burner for use.

Heretofore many and various forms of air and gas burners have been suggested, and many attempts have been made to produce a satisfactory and efficient burner, and without attempting to set forth all that has been done by others in this line of invention, it may be well to say that among the requisites for a successful burner are that the burner must be simple and cheap in construction, not liable to get out of order, must be capable of being formed in various shapes and sizes to suit the requirements of any particular case, must be so constructed that the flames shall be of uniform height and size and evenly distributed throughout its face, so that all parts of the burner will furnish the proper supply of heat, that the combustion shall be perfect and complete, without odor, smoke or deposit, and at the same time shall be capable of furnishing a sufficient quantity of heat to accomplish any and all purposes to which it may be applied, and it is with the object of attaining all these results and others which might be enumerated, that my present invention is made.

The burner comprises a base plate A, which

may be of any form, according to the requirements of any particular case, it being shown in Figs. 1, 2 and 3, as being substantially circular, while in Figs. 4, 5 and 6, it is shown as rectangular, and it is preferably made of metal, having a comparatively thin, flat central portion A', with an integral rim or ledge A<sup>2</sup>, and rim A<sup>3</sup>, to which the burner proper may be attached. This base portion is also provided with a central opening B, which may be of any suitable and convenient shape, and connected to the base is a channel or tube B', which serves as a passage-way for the admission of the air and gas supplied to the burner. This passage may be of various shapes and forms, and I have shown a simple and convenient arrangement in which there is an opening b, communicating with an ordinary gas-pipe or tube connected with a source of supply, and below and in close proximity to this opening is a cut-away portion b', which allows the atmospheric air to be drawn into the tube and become mixed with the hydrocarbon gas supplied through the opening b. This opening b' is relatively of considerable size, so as to permit the free passage of a sufficient quantity of air, and I may remark that while many devices have been made heretofore, more or less complex, looking toward the proper mixture of air and gas, I find that a simple opening like that shown, for the passage of the gas, with an enlarged opening in the under side of the tube or channel B' is most effective for this purpose, and produces the best results which I have been able to attain.

Mounted on the base plate A, and secured thereto in any suitable manner, is a top plate C, of metal or other suitable material, having a series of parallel arched chambers C', formed by the flanges or ribs C<sup>2</sup>. In Figs. 1 to 3, these arched chambers are concentric, while in Fig. 4, they are in straight parallel rows. In each case, the arched tops of the chambers are slitted or formed with narrow openings or cuts c, transversely of the chambers, and these cuts form openings or passages for the mixed air and gas, and they are arranged in close proximity to each other, and preferably extend practically through the arched portion of the chambers.

Heretofore, it has generally been common



to provide cylindrical or similarly shaped openings for the passage of the mixed air and gases on the surface of the burners, but I have found from experience that the relatively long and narrow slits or cuts, arranged in close proximity, afford the most satisfactory means for thoroughly burning the mixed air and gas, and this form of slit furnishes a flame which is relatively very wide compared to its thickness, and the air and gases are completely burned, without deposit or smoke, and the flame is spread over a very large area of the burner, although each individual flame is relatively small.

The central portion D of the top plate C, is substantially on a level with the lower portion of the flanges or ribs C<sup>2</sup>, and is concave on its under side, for the purpose of furnishing an abutment against which the air and gas from the channel B', impinge, and which reflects and tends to thoroughly mix the air and gases in their passage to the points of combustion.

One great difficulty in this class of burners heretofore has been in properly distributing the air and gas through all its parts, so that its surface will be provided with uniform quantities of the air or gas, and so that the flames will be evenly distributed over all parts, and in order to accomplish this purpose, I make use of a distributor E, in the form of a wire netting of a comparatively fine mesh, which extends under the chambers C', and in the present instance being confined between the ledge A<sup>2</sup> of the base piece and the outer flange C<sup>2</sup>, of the top piece, leaving a chamber E' between the base piece and the distributor. With this arrangement, I find that the gas and air after being thoroughly mixed by impinging against the concave surface of the abutment D, will be evenly distributed throughout the chambers C', supplying a proper amount of air and gas, so that there will be a uniform flame at all portions of the upper surface of the burner.

Sometimes it is desired to concentrate the heat at the central portion of the burner, and for this purpose I provide an additional passage for the air in the form of what may be termed a blow-pipe F, preferably having a flanged or extended base F', and a cylindrical or body portion F<sup>2</sup>, passing up through the channel B', and the abutment D, and having an opening at the top, practically on a level with the openings or slits in the chambers. A series of small openings or perforations f, are arranged in this blow-pipe, just below the abutment D, to permit the mixed air and gas to pass into the blow-pipe, while the atmospheric air in relatively large quantities passes up through the pipe and a very intense and large flame is produced at its upper end, producing an intense heat at this part of the burner.

One well-known objection to the use of this class of burners is that they apparently absorb the moisture from the atmosphere, rendering it disagreeable, if not unhealthy, and in order to prevent this action, and as a matter of fact supply moisture to the surrounding atmosphere, I place a quantity of water in the depressed portion surrounding the blow-pipe, and the heat of the burner transforms this water into steam or vapor, which is given out to the surrounding air, tending rather to moisten it than to absorb the moisture from the air.

While my improved burner may be used for many and various purposes in the arts, and may be applied to various forms of stoves, ranges, heaters, or used open, without any inclosing portion, I have shown in Fig. 7, one way of using the burner in connection with what I have termed a smelter, and this comprises a base portion G, mounted on suitable legs, and having an opening to receive the burner, with a side inclosure G', preferably fitting the outline of the burner, so as to prevent air passing around the outside of the burner, and supported on this side portion is an annular or ring-like plate G<sup>2</sup>, receiving a kettle or similar receptacle G<sup>3</sup>, which extends down within the casing in proper proximity to the burner. The annular rim is supported on adjustable pins or supports g, so as to leave an opening g' above the top of the side portion, and beneath the annular, ring-like portion through which the products of combustion may pass. With this arrangement, I am enabled to produce an intense heat in the kettle G, sufficient to cook candy and other materials requiring a comparatively intense heat, and I find this one of the many useful and successful applications of the burner.

From what is set forth above, it is unnecessary to describe in detail the operation of the device, as it will be seen that the hydrocarbon, or other gas, coming in through the passage b, under more or less pressure, draws a sufficient quantity of atmospheric air through the passage b', into the channel B', and as it approaches the abutment D, the further mixture of the air and gases is attained, and an even distribution of the mixed air and gases is caused by the wire netting extended over the chamber E', and the chambers C' are filled with the moisture which passes through the narrow and elongated slits or openings c, and are there ignited, furnishing an even and intense flame, and allowing of complete and perfect combustion of the mixed air and gases. A portion of the gases flows into the blow-pipe when used, and this causes a rapid flow of air through the blow-pipe, producing an enlarged and intense flame at the top thereof.

It will be seen that the device is exceedingly simple of construction, can be readily made of any shape desired, and of relatively large size, and the whole comprises a most efficient and practical burner.

What I claim is—

A gas burner comprising a base plate having a central opening, an air and gas channel leading thereto, a top plate provided with



parallel chambers having slits in their upper portion, a depressed central portion, and a blow-pipe extending through said depressed portion and through the opening in the base  
5 plate and having perforations in the sides thereof, substantially as described.

In testimony whereof I have signed my

name to this specification in the presence of two subscribing witnesses.

CHARLES HAFFCKE.

Witnesses:

W. N. WAMSLEY,

WM. H. JONES.