

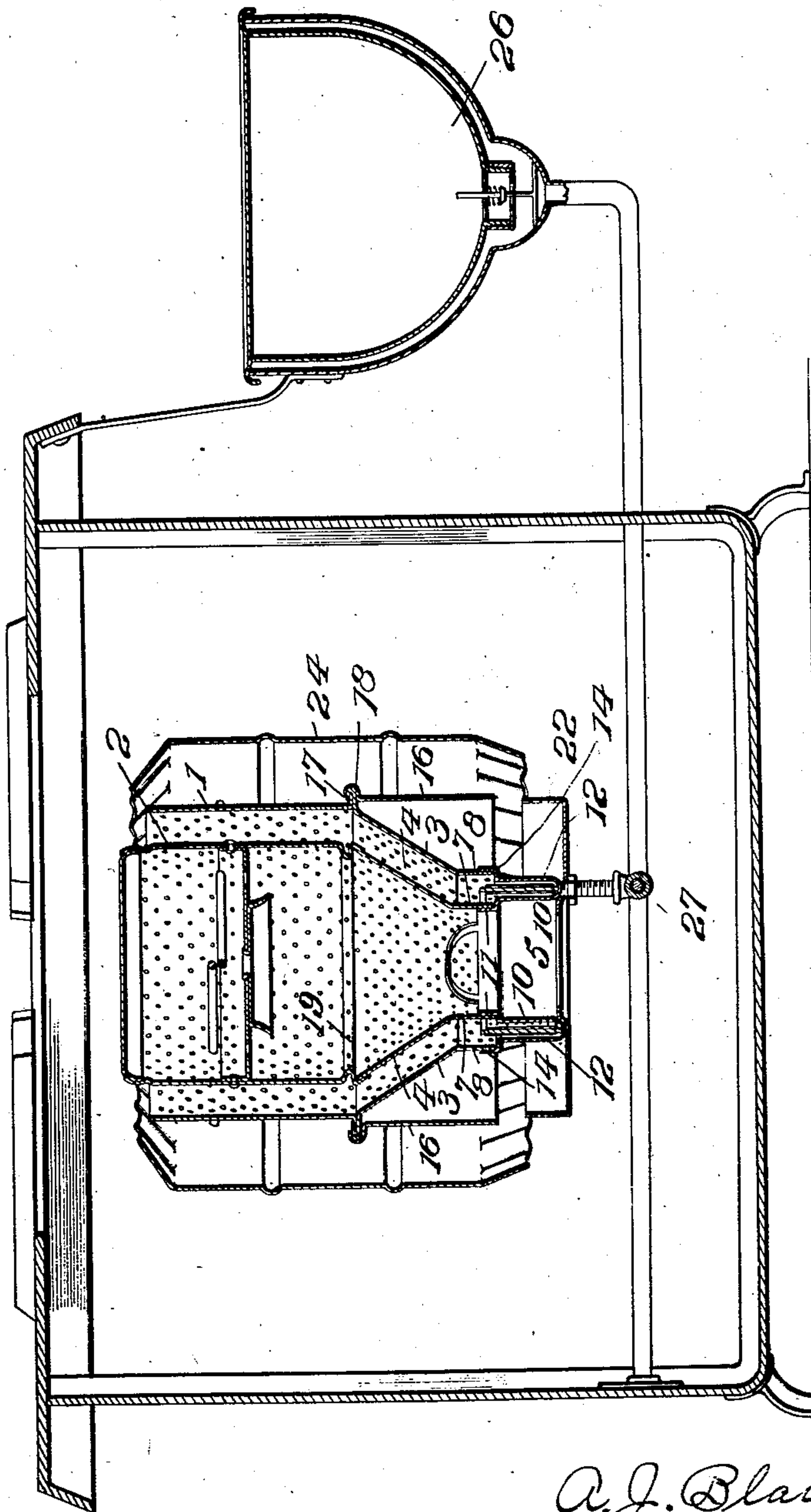
A. J. BLACKFORD.
 BLUE FLAME BURNER.
 APPLICATION FILED DEC. 14, 1905.

915,656.

Patented Mar. 16, 1909.

3 SHEETS—SHEET 1.

Fig. 1.



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3 SHEETS—SHEET 2.

Fig. 2

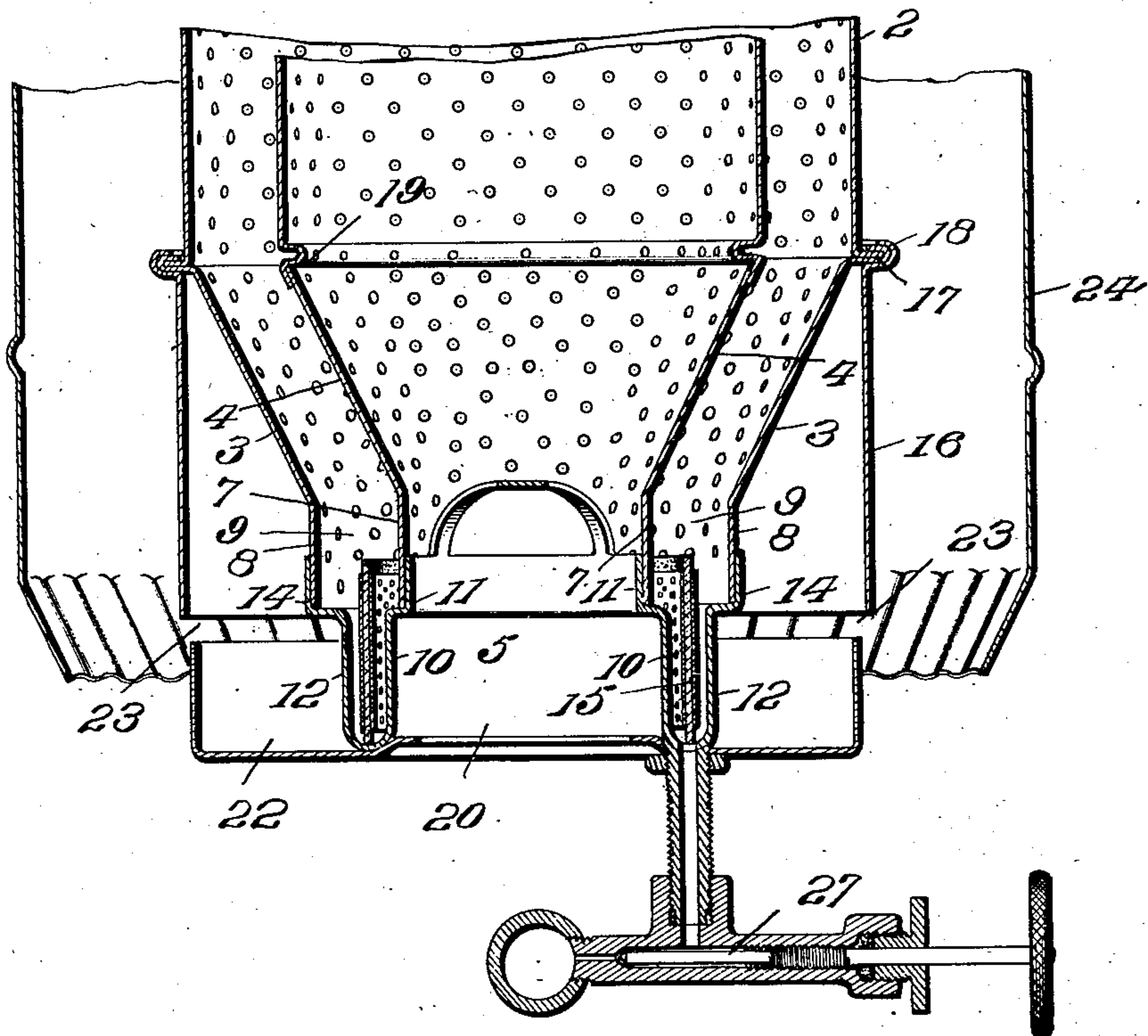
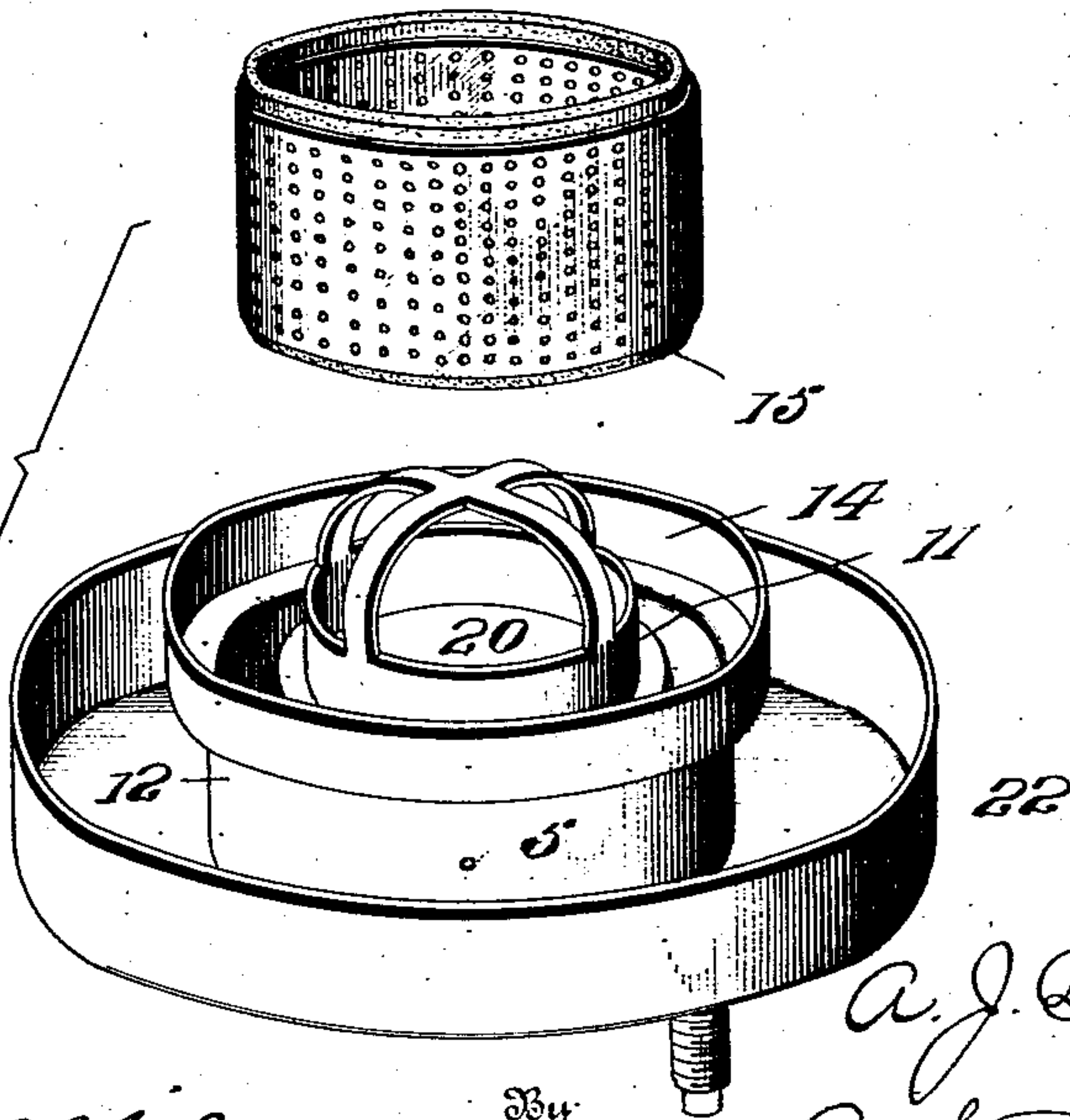


Fig. 3



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3 SHEETS—SHEET 3.

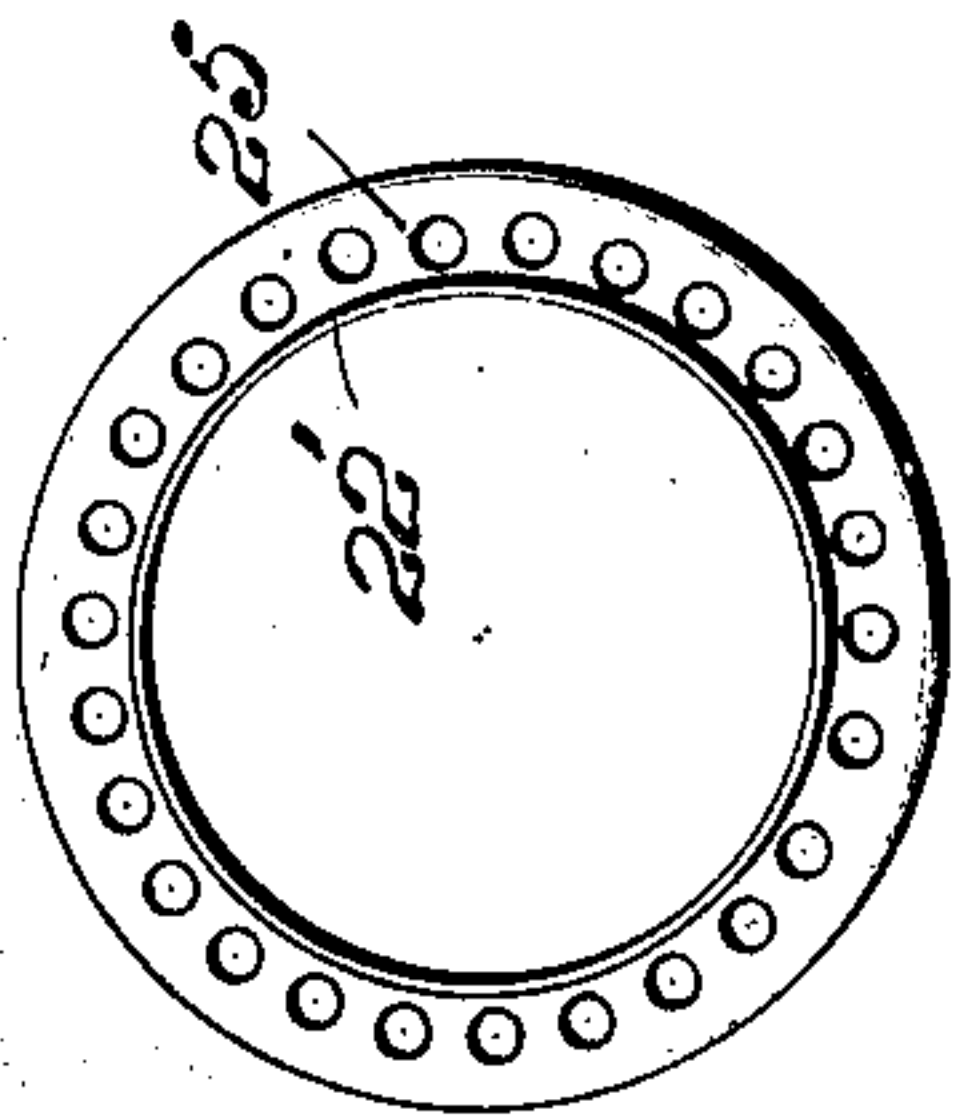


Fig. 5.

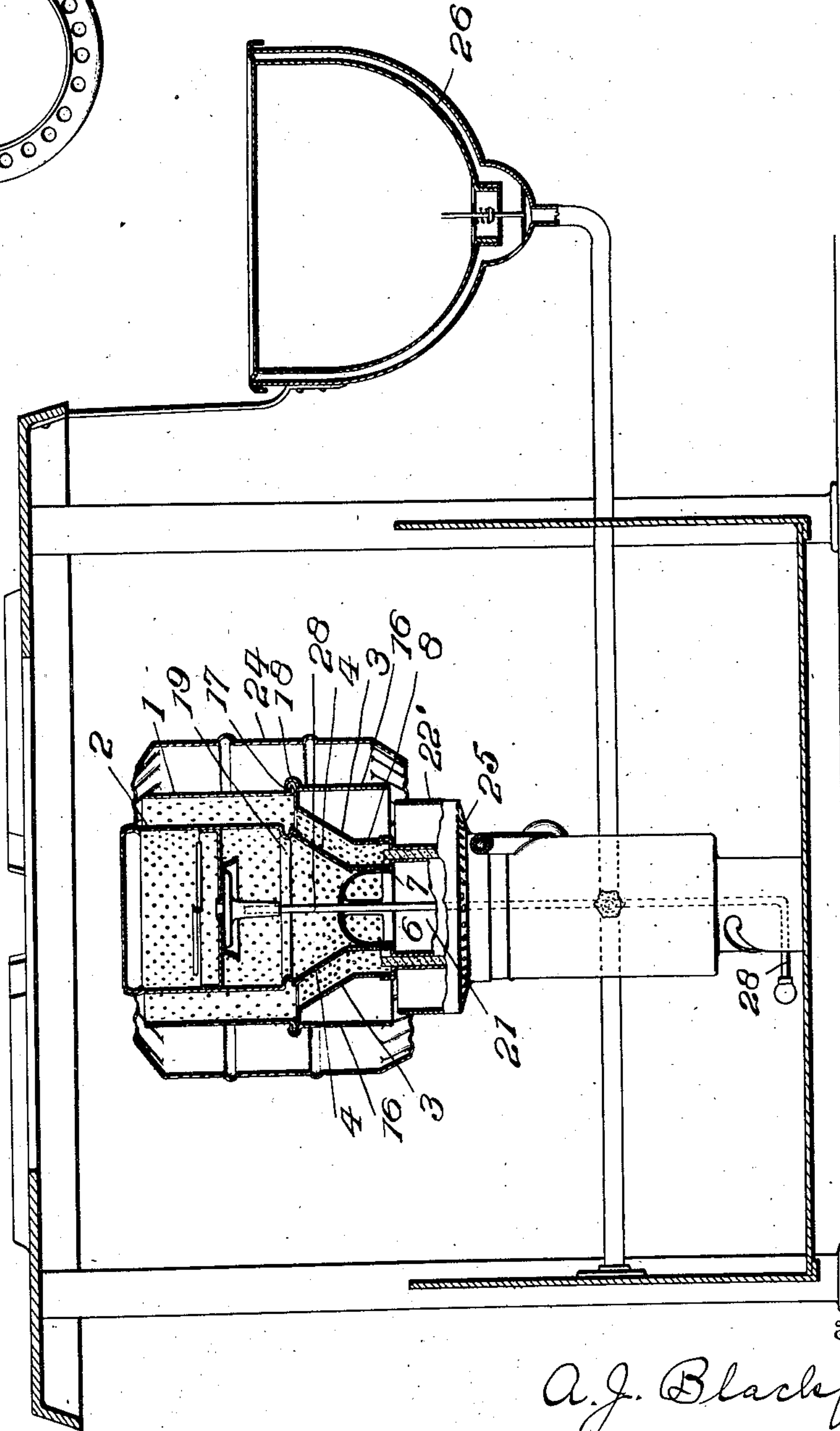


Fig. 4.

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UNITED STATES PATENT OFFICE.

ATWELL J. BLACKFORD, OF CLEVELAND, OHIO, ASSIGNOR TO AMERICAN STOVE COMPANY,
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BLUE-FLAME BURNER.

No. 915,656.

Specification of Letters Patent.

Patented March 16, 1909.

Application filed December 14, 1905. Serial No. 291,801.

To all whom it may concern:

Be it known that I, ATWELL J. BLACKFORD, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Blue-Flame Burners, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to improvements in blue flame burners, and pertains to that class in which kerosene oil is used, and from which the vapors or gases are generated and supplied to a combustion section constructed to produce therefrom a blue flame by the admixture therewith of air within the combustion section.

The primary object of my present invention is to construct a blue flame burner which will produce a blue flame of the usual commercial annular area or size, from a generator which is considerably smaller in annular area or size, whereby certain advantages, to be hereinafter explained, are obtained.

My invention is adapted for either an adjustable wick generator, or a trough generator with a non-adjustable wick, and I have herein shown the present invention as applied to both forms of generators.

In the accompanying drawings, Figure 1, is a vertical, central, longitudinal, sectional view of a complete stove with my improvement applied thereto, and in which the trough and non-adjustable wick form of generator is shown. Fig. 2, is an enlarged sectional view through the trough and non-adjustable wick type of generator combined with the improved form of combustion section. Fig. 3, is an enlarged, detached, perspective view of the trough with the non-adjustable wick shown removed therefrom. Fig. 4, is a sectional view of a complete stove showing the adjustable wick form of generator with the improved combustion section. Fig. 5, is an inverted plan view of the shield located around the upper portion of the wick generator of Fig. 4.

In blue flame stoves heretofore placed upon the market, the generator has been of a diameter or size equal to the diameter of the upper portion of the combustion section, and the concentric combustion tubes are of the same diameter at their lower ends as at their upper ends. To state it in another way, in

stoves now on the market, the generator is of a size in diameter equal to the diameter of the flame which issues from the upper end of the combustion section.

In the trough form of generator, which has been on the market for a number of years, the trough contains a considerable quantity of oil, owing to its diameter, and manufacturers have recognized the consequent inherent result that the flame is not under quick control of the operator, because of the large amount of oil contained in the large trough generator, and in the correspondingly large non-adjustable wick located therein, which contains a large amount of the liquid oil. Therefore, in order to reduce the flame the supply of oil is cut off by a valve, but before any difference in the size of the flame is effected, a considerable portion of the large supply of oil in the trough and in the wick must burn out. In practice, this has been found to require considerable time, and this in turn necessitates that the operator watch the burner for some time, in order to obtain the desired reduced flame. Although this undesirable result has been recognized for several years, so far as I am aware it has not been cured.

The foregoing recognized result I am enabled to overcome by means of my present invention, in which I use a small trough and non-adjustable wick generator, which holds a small amount of oil in both the trough and the wick, so that when the supply is reduced, the effect is almost immediately noticeable upon the flame, while at the same time by the combination with the small trough and non-adjustable wick generator of the lower contracted combustion section I am enabled to expand a small flame at the lower portion of the combustion section into the usual commercial size flame at the upper or heating end of the combustion section, and obtain the same amount of heating qualities.

My present improvement, wherein the above result with the trough and non-adjustable wick generator are produced, has also other advantages which will appear hereinafter.

In the adjustable wick generators heretofore placed on the market, the same size wick generator in proportion to the combustion section has been used, as stated above in respect to the trough generator and its

combustion section. In the adjustable wick generator, the large size wick has made it difficult to provide a wick raiser which would at all times lift the wick correspondingly throughout its circumference when being adjusted, which is desirable in order to produce a uniform and even flame. The large wicks have also been unhandy and difficult for the user to remove and replace properly a new wick. They have been expensive because of the size of the necessarily comparatively long wick tubes of a diameter substantially that of the diameters of the inner and outer straight-wall combustion tubes.

I am enabled by my present invention to overcome the foregoing recognized conditions of the usual blue flame adjustable wick burner, by providing a small adjustable wick generator and combining therewith a combustion section which is adapted to expand a small flame at the lower portion of the combustion section into the usual commercial size flame at the upper or heating end thereof, and to obtain the same degree of heating qualities. Referring now to the construction which enables me to produce this result, I will describe first the improved combustion section which is combined with both forms of generators.

The combustion section comprises an outer perforated tube 1 having a straight upper portion, and an inner perforated concentrically-arranged combustion tube 2 having a correspondingly straight upper portion. The lower portion 3 of the outer tube 1 is contracted or inclined inwardly to a diameter corresponding to the diameter of the outer walls of the two forms of generators and seated thereon. I also contract correspondingly the lower portion 4 of the inner tube 2 to a size corresponding to the diameter of the inner walls of the two forms of generators, and which is seated thereon. The foregoing construction produces an annular combustion chamber with a vertical upper portion, and a truncated-cone-shaped lower portion. The trough and non-adjustable wick generator is indicated by 5, and the adjustable wick generator is indicated by 6. Preferably, the extreme lower ends of the contracted portions of the inner and outer combustion tubes are provided respectively with the straight extensions 7 and 8 which form between them a straight-walled combustion portion 9 which is found to be advantageous in the operation of my improved burner. The inner wall 10 of the trough has its upper portion provided with an L-shaped flange 11 to receive the lower straight portion 7 of the inner combustion tube, and the outer wall 12 of the trough is provided with an annular L-shaped flange 14 to receive the straight portion 8 of the outer combustion tube. By reference to Fig. 4, it will be seen that the inner and outer wick tubes of the adjustable wick

generator 6, are provided with L-shaped flanges corresponding to the L-shaped flanges of the trough, and to receive the straight lower portions of the inner and outer combustion tubes. Placed in the trough is the usual non-adjustable wick 15.

For the purpose of insuring the passage of the proper amount of air through the perforations in the contracted or inclined portion 3 of the outer combustion tube, I extend an apron or shield 16 therearound which forms an air-pocket to catch the air and cause it to pass through the openings in the inclined portion, instead of gliding upward thereby, as it would otherwise have a tendency to do. This shield has its upper end bent over the connecting joint 17, as shown at 18. Attention is also directed to the fact that the upper straight portions of the inner and outer combustion tubes are formed of separate pieces of sheet metal from the lower contracted portion thereof, thus forming the upper and lower sections, and that these upper and lower sections of the said inner and outer tubes are suitably connected. As just stated, the joint 17 serves to connect the sections of the outer tube, while the joint 19 serves to connect the sections of the inner combustion tube.

As clearly shown, both the trough and the adjustable wick generators are annular in form, which provides in the trough generator a central air passage 20, and in the adjustable wick generator, a central air passage 21, which provide for a supply of air to the interior of the inner combustion tube. In the trough generator form, I surround the trough with a dish or cup-shaped member 22 which has its vertical portion stopping at a point below the lower edge of the shield 16 to provide an air passage 23 to the shield between it and the contracted portion of the outer combustion tube. In this way a limited amount of air is permitted to pass to the space inclosed by the shield, and the amount is readily regulated in the construction of the burner to the quantity necessary for proper operation. Furthermore, the surrounding cup 22 serves to retain the radiated heat to a considerable extent around the trough, thus increasing its generating power to supply the necessary amount of vapor or gases for the larger portion of the combustion section under all conditions in the burner. I find this feature desirable, though not absolutely necessary to the operation of my improved burner. In both the types of burners, the combustion sections are surrounded with the usual drum or air shield 24 for the purpose of protecting the combustion section from air drafts.

Referring now to the adjustable wick form of generator, it will be observed that this is also provided with the cup-shaped shield or member 22' which also serves to regulate the

quantity of air passing within the space surrounded by the shield 16. The cup-shaped member 22' in the adjustable wick generator, however, has its bottom portion provided with a plurality of air openings 25, which is for the purpose of preventing the outer wick tube from becoming so hot as to char the wick lying thereagainst.

I have here shown in connection with each form of burner, the well-known form of supply-tank 26, whereby the level of the oil in the adjustable wick-generator is maintained always at a predetermined point, and whereby the oil in the trough generator is maintained therein at a predetermined point when the valve 27 is "wide open". I desire it to be understood, however, that other forms of oil supply tanks and oil supplies may be used with each form of generator, without departing from my present invention.

In the adjustable wick generator, there is preferably provided the well-known elevating device 28 which is adapted to engage the combustion section and lift it away from the generator when the burner is not in use, to prevent the capillation of oil thereon.

Having thus described this invention, what is claimed and desired to be secured by Letters Patent, is:—

1. A blue flame oil burner comprising an annular generator having a central air-passage-way, in combination with an annular combustion section consisting of perforated parallel tubes spaced apart, the upper portion of the combustion section larger in diameter than said generator, and having a

truncated cone-shaped lower portion, the lower extremity of the latter of a diameter to fit the upper end of the generator, and form a center air passage registering with the central air passage-way of the generator.

2. A blue flame oil burner comprising an annular generator having a central air-passage-way, in combination with an annular combustion section consisting of perforated parallel tubes spaced apart, the upper portion of the combustion section larger in diameter than said generator and having a truncated cone-shaped lower portion, the lower extremity of the latter of a diameter to fit the upper end of the generator and form a center air passage registering with the central air passage-way of the generator, and an annular air shield extending down from the large upper portion of the combustion section and surrounding said lower truncated cone-shaped portion.

3. In a blue flame burner, the combination with concentric perforated combustion tubes spaced apart to form between them a flame space, said tubes having upper vertical parallel portions, relatively smaller vertical parallel perforated lower portions, and intermediate inwardly-extending parallel portions connecting the said upper and lower portions, and a generator fitting said lower portions.

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

ATWELL J. BLACKFORD.

Witnesses:

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