No. 757,876.

PATENTED APR. 19, 1904.

A. J. BLACKFORD.

WICKLESS BLUE FLAME OIL STOVE.

APPLICATION FILED DEC. 6, 1902.

NO MODEL.

3 SHEETS—SHEET 1.

FIG. 1.

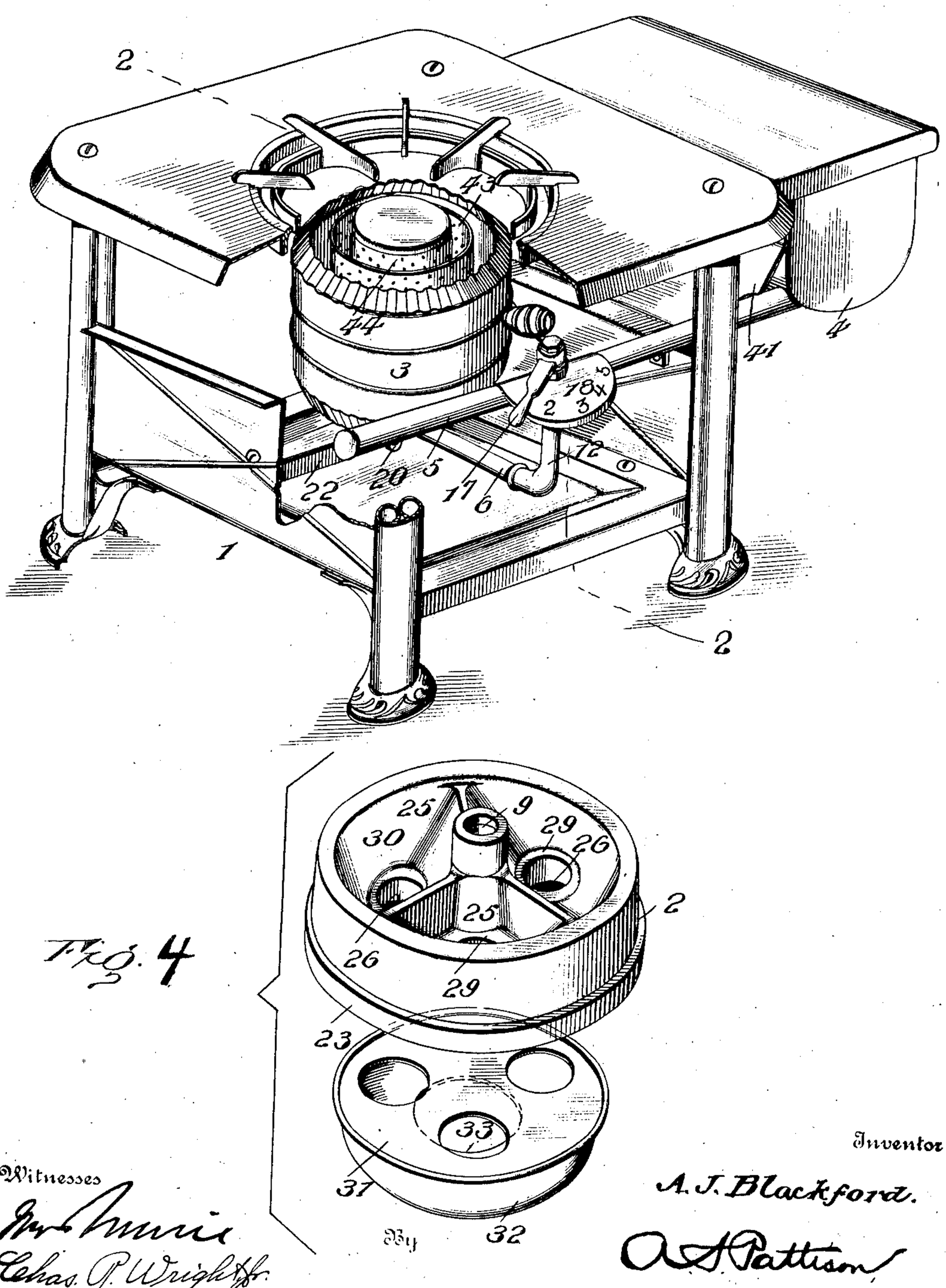

FIG. 4

Witnesses

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NO MODEL. 3 SHEETS—SHEET 2.

FIG. 2.

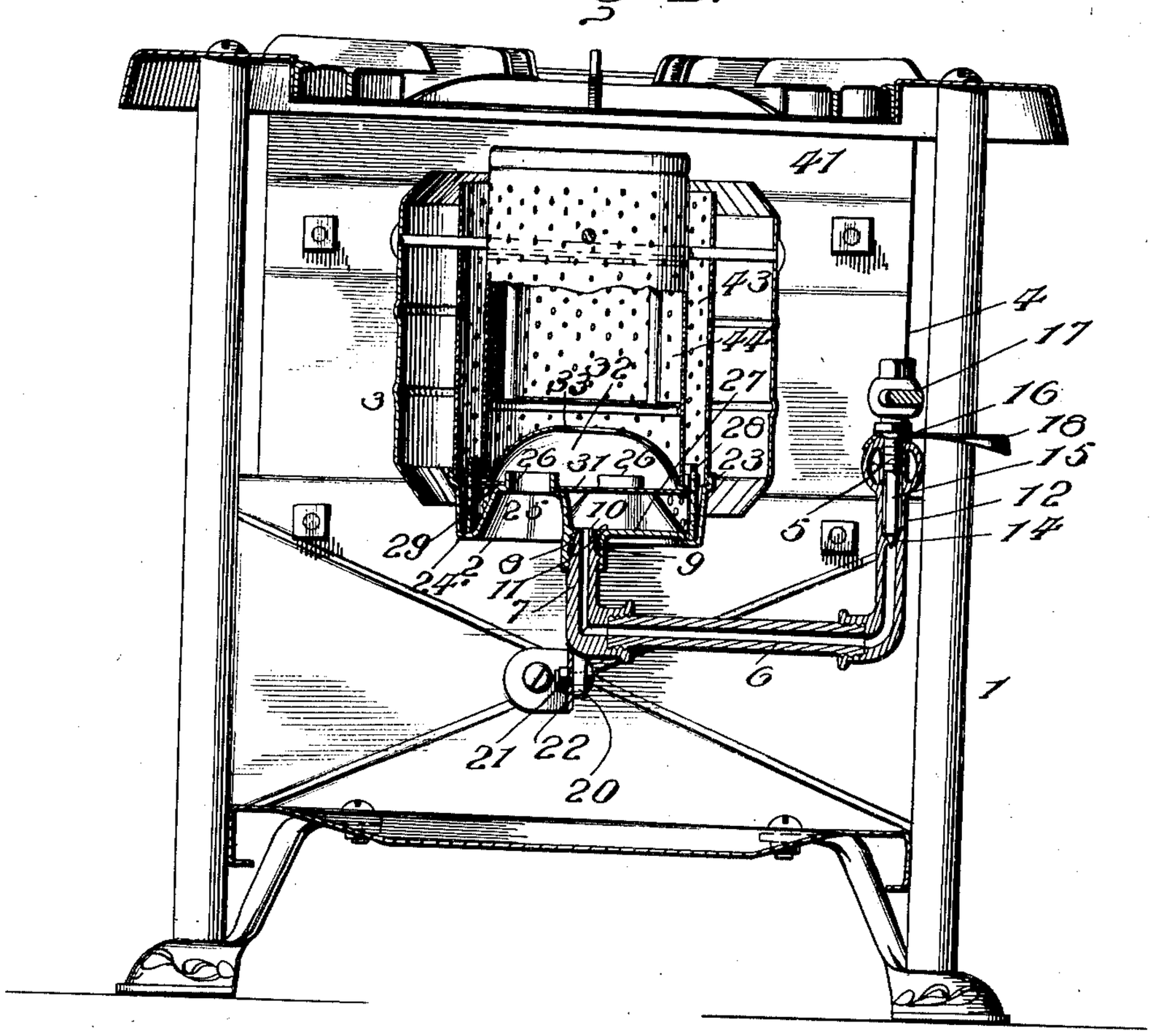
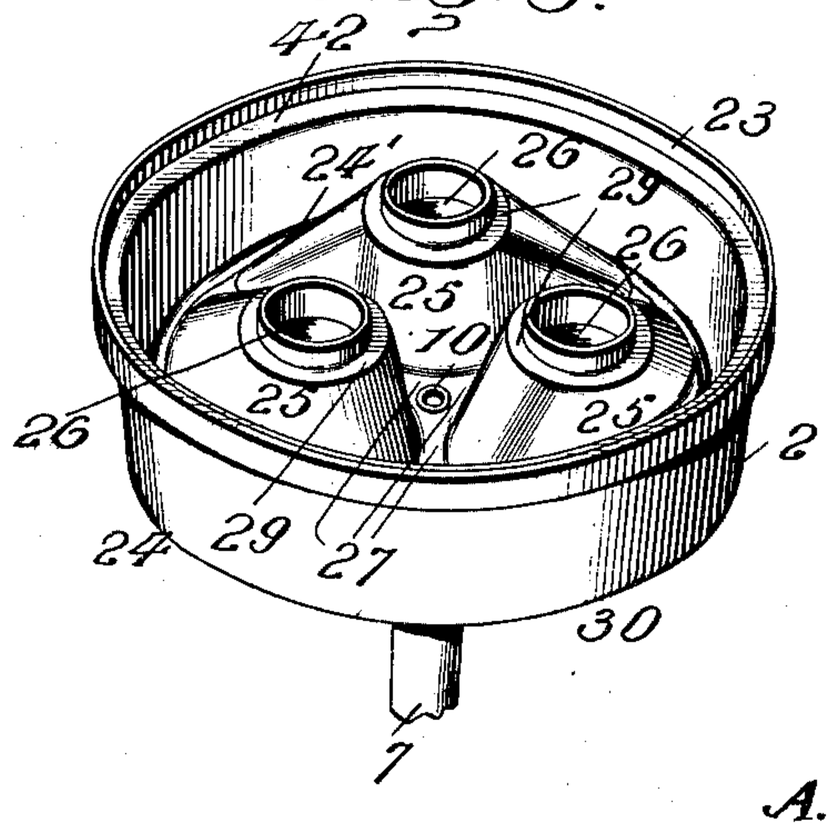


FIG. 3.



Witnesses

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NO MODEL. 3 SHEETS—SHEET 3.

Fig. 5.

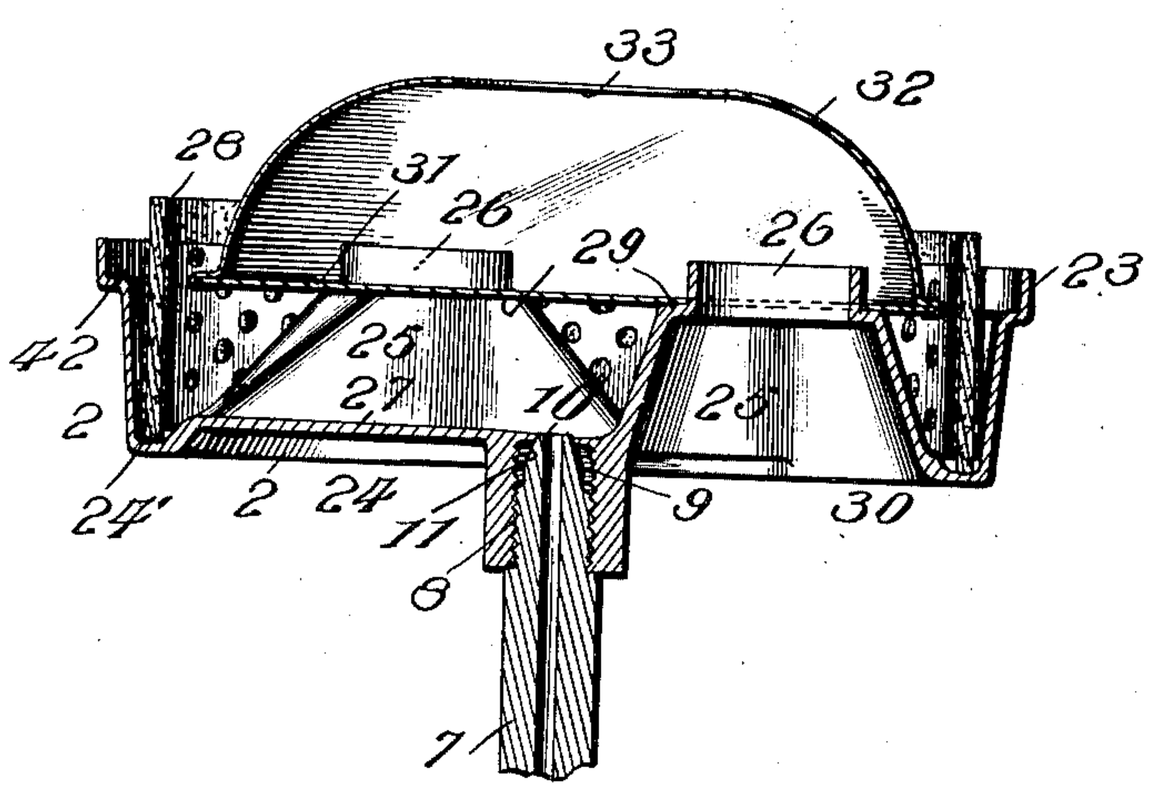
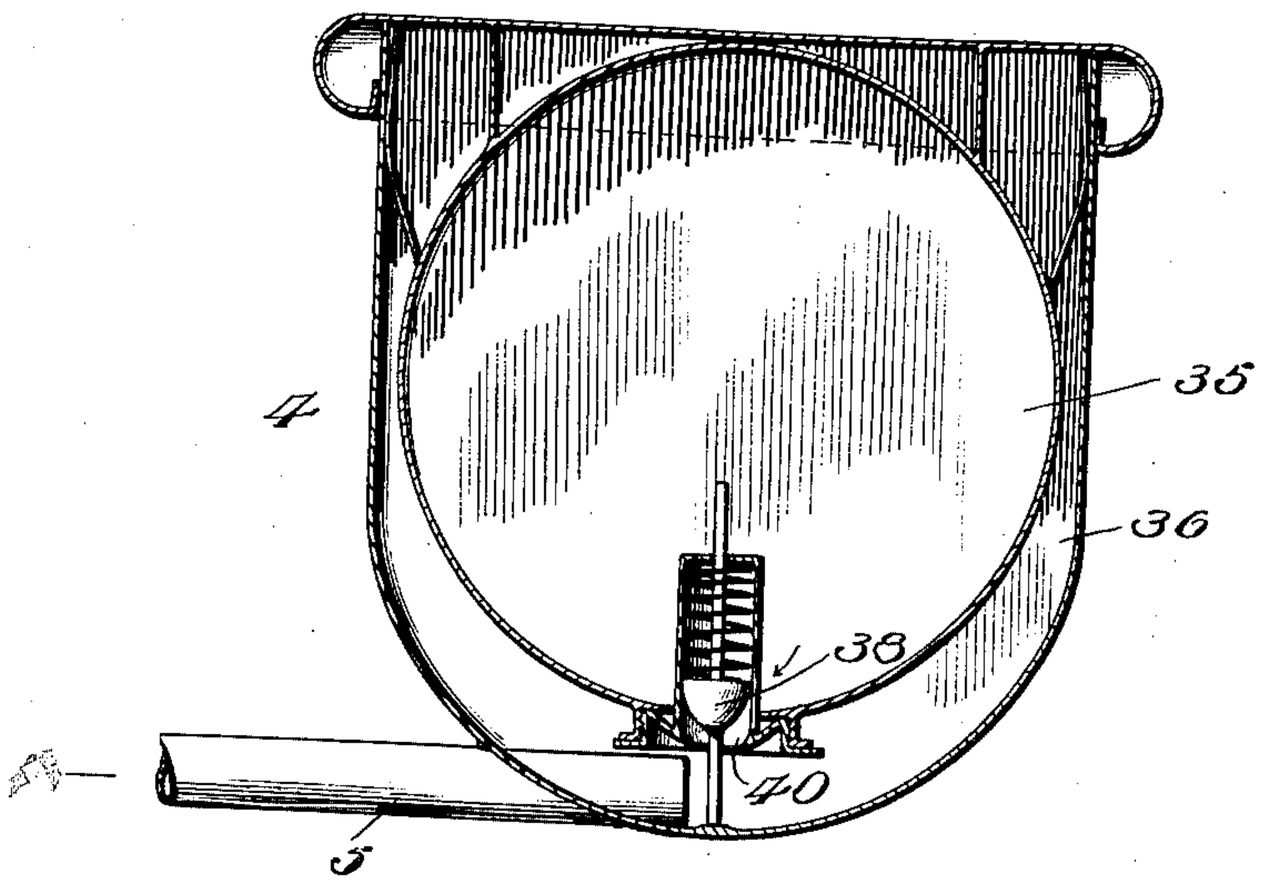


Fig. 6



Witnesses

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UNITED STATES PATENT OFFICE.

ATWELL J. BLACKFORD, OF CLEVELAND, OHIO, ASSIGNOR TO THE AMERICAN STOVE COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

WICKLESS BLUE-FLAME OIL-STOVE.

SPECIFICATION forming part of Letters Patent No. 757,876, dated April 19, 1904.

Application filed December 6, 1902. Serial No. 134,108. (No model.)

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 new and useful Improvements in Wickless Blue-Flame Oil-Stoves, of which the following is a specification.

My invention relates to improvements in what have become known in the trade and in the art as "wickless blue-flame oil-stoves," and has for its objects the construction of an improved form of burner trough or cup and an improved manner of conveying and controlling the feeding of the oil thereto.

A further object of my present invention relates to a form of oil-tank especially adapted for use in connection with the wickless blue-flame oil-stove.

Figure 1 is a perspective view of an oil-stove embodying my invention, a part of the top of the stove being broken away. Fig. 2 is a vertical transverse sectional view taken through the oil-feeding valve and on the dotted line 2 2 of Fig. 1. Fig. 3 is an enlarged detached interior perspective view of the trough or cup with the combined cap and air-deflector removed. Fig. 4 is an enlarged detached inverted perspective view of the oil trough or cup. Fig. 5 is an enlarged cross-sectional view of the oil cup or trough with the combined trough-cap and air-deflector in position thereon. Fig. 6 is an enlarged transverse sectional view taken through the oil-tank.

In the accompanying drawings, 1 indicates the frame of the stove; 2, the oil trough or cup; 3, the combustion-section, and 4 the oil tank or reservoir. The oil tank or reservoir 4 is arranged, as here shown, in a horizontal position, and a main feeding-pipe 5 extends in a horizontal position therefrom and extends through the supporting-frame 1. Connecting the main feeding-pipe 5 with the oil cup or trough 2 is an auxiliary feed-pipe 6, which is essentially U-shaped in side elevation. One stem 7 of this U-shaped auxiliary pipe is screw-threaded, as shown at 8, and enters a correspondingly-screw-threaded socket 9 at the center of the oil-trough 2. The upper end 10 of the screw-threaded projection of the auxiliary pipe is made of a shape to make a tight fit with a receiving-seat 11, the end of the pipe 10 and the seat 11 being preferably conical in cross-section. Attention is called to the fact that the upper end 10 of the auxiliary pipe extends up at least even with the bottom of the center of the trough, but preferably slightly thereabove, as shown. The object of this construction is to permit the removal of the trough or cup for cleaning or other purposes without having any oil retained therein to drip therefrom, since all of the oil in the trough will be vaporized, and the oil remaining in the auxiliary pipe will as a consequence remain therein and the trough be removed without any dripping of the oil, as will be readily understood. The opposite leg or stem 12 of the auxiliary pipe is provided with a seat 14 to receive a needle-valve 15. This needle-valve passes through a screw-threaded socket 16, located in the main pipe 3, and has its pointed end 16 adapted to be seated upon its seat for the purpose of closing communication between the tank 4 and the oil cup or trough 2 or to be elevated therefrom for the purpose of establishing communication. The upper end of the said valve is provided with a suitable handle 17, and projecting horizontally from the main feeding-pipe 3 is a dial or index plate 18, provided with indicating numerals or marks, as illustrated.

The inner stem of the auxiliary pipe 6 is provided with a suitable projection 20, which is clamped by means of a screw or bolt 21 to a transversely-arranged web or bar 22, the said bar thus serving to support the inner end of the auxiliary pipe, and thereby support the oil-trough 2 firmly in its proper position.

The combustion-section 3 is of any desired or improved form, and since this forms no part of my present invention it is unnecessary to explain its construction, since the method of operation of a combustion-section in connection with a blue-flame stove is well understood by those skilled in the art. Especial

attention, however, is called to the construction of the oil-trough. It will be observed that the trough consists of an outer vertically-disposed wall 23 and a bottom 24. The bottom 24 at its outer edge and at the junction of the bottom and the said vertically-disposed wall is provided with an annular or surrounding oil-groove 24'. The bottom is also provided with a plurality of vertically-arranged projections 25, preferably three in number, as herein illustrated, and these projections are preferably of approximately a conical form and are provided with central air passages or perforations 26. Located between these projections and in a plane above the bottom of the aforementioned oil-groove are the oil-passages 27, which have their outer ends extending to the said oil-groove and their inner ends communicating with each other at the center of the bottom of the trough and at the point where the end 10 of the auxiliary pipe extends therethrough. Owing to this construction, the oil is quickly distributed throughout the oil-groove, and consequently the lighting member 28 is quickly saturated therewith for the purposes of lighting in the initial starting of the burner. The upper ends of the projections of the bottom of the trough are provided with projecting flanges 29, which surround the apertures or air-passages, and these projections and flanges form supports and seats for the combined trough-cap and air-deflector 30. This cap and air-deflector comprises or includes a substantially horizontal diaphragm 31, which is provided with a plurality of openings corresponding with the number of projections 25, extending upward from the bottom of the trough, and the wall of these openings interlock with said projection and serve to position the diaphragm or cap properly in respect to the trough. Connected to this diaphragm is a dome-shaped air-deflector 32, which is provided with an air passage-way 33, here shown as situated at the center thereof. The diaphragm and the dome-shaped air-deflector, which constitute the combined cap and air-deflector, are separate from the trough and are loosely placed thereon. These members are preferably formed of sheet metal. The trough proper may be formed either of sheet metal or of cast metal. By having the combined cap and air-deflector separate and loosely placed upon the trough it is readily removable therefrom for the purpose of enabling the ready cleaning of the trough, and the trough is readily removable from the auxiliary pipe for the same or other purposes, as before stated. Also by having the cap and air-deflector formed of a separate piece it does not so readily communicate the heat of the trough to the combustion-section thereabove and serves to keep the lower end of the combustion-section cool and also serves in a certain measure to prevent the accumulation of heat at that point in respect to the trough. A cap and air-deflector of the form here shown and just described is found to be exceedingly effective in the proper distribution of air to the lower end of the combustion-section and exceedingly efficient in keeping the lower end of the combustion-section cool. It provides an even and steady supply and distribution of the air to the interior of the combustion-section and is found to be very effective in producing a steady and even flame at the upper end of the combustion-section, contributing to this result in combination with the combustion-section.

The oil-reservoir is of the student-lamp principle and serves to establish a predetermined level of the oil in the oil-trough, and the construction of the oil-trough here shown is found to produce a normal and uniform flame at different levels of oil. When it is desired to have a low or simmering flame, it can be accomplished through the medium of the oil-valve, and practically the desired height of flame can be regulated also by the oil-valve.

While I prefer to use and here show my improved form of trough in connection with means for maintaining a predetermined level of the oil in the trough through the medium of a student-lamp principle, yet I wish it to be understood that this trough may be used in connection with what is known in the art as an "elevated feed," in which event the reservoir will be placed in a plane above the trough and so constructed that the flow of oil to the trough is regulated solely through the medium of a suitable valve. In the instance here shown the feed of the oil is regulated conjointly through the medium of the student-lamp principle and the needle-valve.

In the use of oil-stoves it is found that the heat from the burner causes an expansion of the oil in the reservoir and sometimes causes a "flooding" of the tank. Furthermore, usually in oil-tanks working on the student-lamp principle the oil-receiving tank or portion thereof is of a capacity greater than the capacity of the surrounding or outside tank, which in the case of a leak of the inside or main receiving reservoir there is an overflowing or flooding of the outer reservoir. I overcome these defects by making the inner reservoir 35 of a capacity less than the capacity of the outer reservoir 36, so that in the event of a leak of the inner reservoir the outer reservoir will receive all of the oil from the inner reservoir without overflowing. Furthermore, by making the inner reservoir considerably smaller than the outer reservoir I provide an air-chamber between the inner and outer reservoirs, which very essentially protects the inner reservoir from the heat of the burner and prevents quite effectively the expansion of the liquid in the inner reservoir. This is accomplished in the construction here shown, but which may be varied by forming the outer reservoir practically U-shaped in

cross-section and making the inner reservoir cylindrical. The inner reservoir is provided at a suitable point with the usual valve 38, which is open when it is placed in the outer reservoir. The principle of operation of this valve is so well understood by those skilled in the art and the principle of maintaining a predetermined level of oil in the outer reservoir, and hence a predetermined level of oil in the oil-trough, are so well understood by those skilled in the art that the method of operation need not be explained.

The inner reservoir has connected therewith the top of the outer reservoir, and which, as shown, is essentially flat, whereby when the inner reservoir is removed it can be set upside down upon the said top for the purpose of being filled through the filling-orifice 40, the said filling-orifice containing the aforementioned valve, which is of the usual construction.

For the purpose of further protecting the reservoir from the heat of the burner an apron 41 is located between the reservoir and the burner.

While I here show a single-burner stove, it will be readily understood that the invention is adapted to be used in connection with a stove having a plurality of burners, and in which event the main oil-pipe will extend throughout the length of the supporting-frame, and there will be provided for each burner an auxiliary feed-pipe and a valve, both being the same in construction heretofore described and herein illustrated.

The wall of the trough is provided with a seat 42 for the outer combustion-tube 43, and the combined cap and air-deflector is provided with a projecting flange adapted to receive the lower end of the inner combustion-tube 44. The dome-shaped portion of the combined cap and air-deflector extends upward within the inner combustion-tube, as illustrated. It will be observed that the openings in the diaphragm or cap portion are out of line with the central air-passage of the dome-shaped portion. This arrangement forms an air-chamber at the lower end of the combustion-section, which is adapted to retain or retard the flow of air thereto and serve very materially to cool the lower portion of the combustion-section.

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

1. A blue-flame burner including a trough having a bottom, the bottom provided with a surrounding oil-receiving portion and with upwardly-extending perforated projections, a diaphragm seated upon the projections and provided with corresponding perforations, the said diaphragm forming a seat for the inner perforated tube of the combustion-section.

2. A blue-flame burner including a burner-trough having an outer surrounding wall and a bottom filling the space surrounded by said wall, said bottom provided with vertically-arranged perforated projections and a surrounding oil-channel.

3. A blue-flame burner including a trough having a bottom, the bottom provided with a surrounding oil-receiving portion and with upwardly-extending vertical projections embraced by the surrounding oil-receiving portion, the said projections being substantially conical in longitudinal section, and an oil-feed passing through the bottom and connected with the said surrounding oil-receiving portion.

4. A blue-flame burner including a trough having a bottom, the bottom provided with a surrounding oil-receiving portion, and with upwardly-extending projections, the said projections provided with openings in their upper ends, an oil-feed connected with the surrounding oil-receiving portion and a diaphragm seated upon the said projections and provided with openings corresponding to the openings of the projections, the said diaphragm adapted to form a seat for the lower end of the inner combustion-tube.

5. A blue-flame burner including a trough having a bottom, the bottom provided with a surrounding oil-receiving portion and with upwardly-extending projections, the projections provided with openings in their upper ends, and also provided with surrounding shoulders, a diaphragm provided with perforations corresponding with the openings in the projections and seated thereupon and held in position by the said shoulders or flanges.

6. A blue-flame burner including a trough having a bottom, the bottom having a surrounding oil-receiving portion and upwardly-extending projections, the projections having openings in their upper ends, a diaphragm seated upon the projections and having openings corresponding with the openings in the projections, the projections having members interlocking with the diaphragm to position and hold the diaphragm in place, the diaphragm adapted to form a seat for the lower end of the inner combustion-section.

7. A blue-flame burner including a trough having a bottom, the bottom provided with a surrounding oil-receiving portion and with upwardly-extending projections, the projections having openings in their upper ends, the projections provided with flanges surrounding the said openings, a diaphragm seated upon the projections and having openings embracing the said flanges, the diaphragm adapted to form a seat for the lower end of the inner combustion-section.

8. A blue-flame burner including a trough having an outer surrounding wall and a bottom filling the space surrounded by said wall; said bottom provided with a plurality of vertically-arranged perforated projections, an oil-channel surrounding said perforations, an

oil-feed extending through said bottom and arranged centrally between said projections, and oil-feeding channels radiating from said oil-feed and extending between said projections to said oil-channel.

9. A blue-flame burner including a trough having a bottom, the bottom having a surrounding oil receiving portion, a feed extending through the bottom, an oil-feeding channel connecting the oil-feed with the surrounding oil-receiving portion, and a diaphragm supported within the trough at a point above its bottom and adapted to receive the lower end of the inner combustion-section.

10. A blue-flame burner including a trough having a bottom, a surrounding oil-receiving portion, an oil-feed passing through the bottom and operatively connected with the oil-surrounding portion, and a combined diaphragm and air-deflector supported from the bottom of the trough and in a plane above the said oil-receiving portion.

11. A blue-flame burner including a trough having a bottom, a surrounding oil-receiving portion, a combined cap and air-deflector comprising a lower diaphragm and an upper diaphragm, the lower and upper diaphragms having openings out of line with each other, the said diaphragms being supported in a plane above the said oil-receiving portion.

12. A blue-flame burner including a trough having a bottom, the bottom having a surrounding oil-receiving portion and a combined cap and air-deflector located within the trough and consisting of a diaphragm with a projecting portion adapted to receive the lower end of the inner combustion-tube, and with an upper inwardly-extending portion extending within the lower end of the inner combustion-tube, the said diaphragm and upper portion having openings.

13. An oil-burner including a trough, in combination with a combined cap and air-deflector located within the trough, the said air-deflector consisting of a diaphragm and a dome-shaped portion, the diaphragm and dome-shaped portion having air-passages.

14. A blue-flame burner including a trough having an oil-receiving portion, in combination with a combined cap and air-deflector consisting of a substantially horizontal diaphragm and a dome-shaped portion, the diaphragm and dome-shaped portion having air-passages.

15. A blue-flame burner including a trough having an oil-receiving portion, in combination with a combined cap and air-deflector consisting of a lower diaphragm and an upper dome-shaped portion, the diaphragm and dome-shaped portion having air-passages, the said combined cap and air-deflector having a laterally-extending flange adapted to receive the lower end of the inner combustion-section.

16. An oil-stove comprising a framework having a web-portion extending through substantially the center thereof, an oil-trough, a main feed-pipe, a reservoir connected therewith, the main feed-pipe extending through the framework, an auxiliary pipe connecting the main feed-pipe with the burner, one end of the auxiliary pipe being supported by the said web, the said auxiliary pipe having a vertical portion connected with the main feed-pipe, and a vertically-arranged valve extending through the main feed-pipe and regulating the flow of oil therefrom to the said auxiliary pipe.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

ATWELL J. BLACKFORD.

Witnesses:
E. A. SCHNEIDER,
HUGH J. MCBRIDE.