

(No Model.)

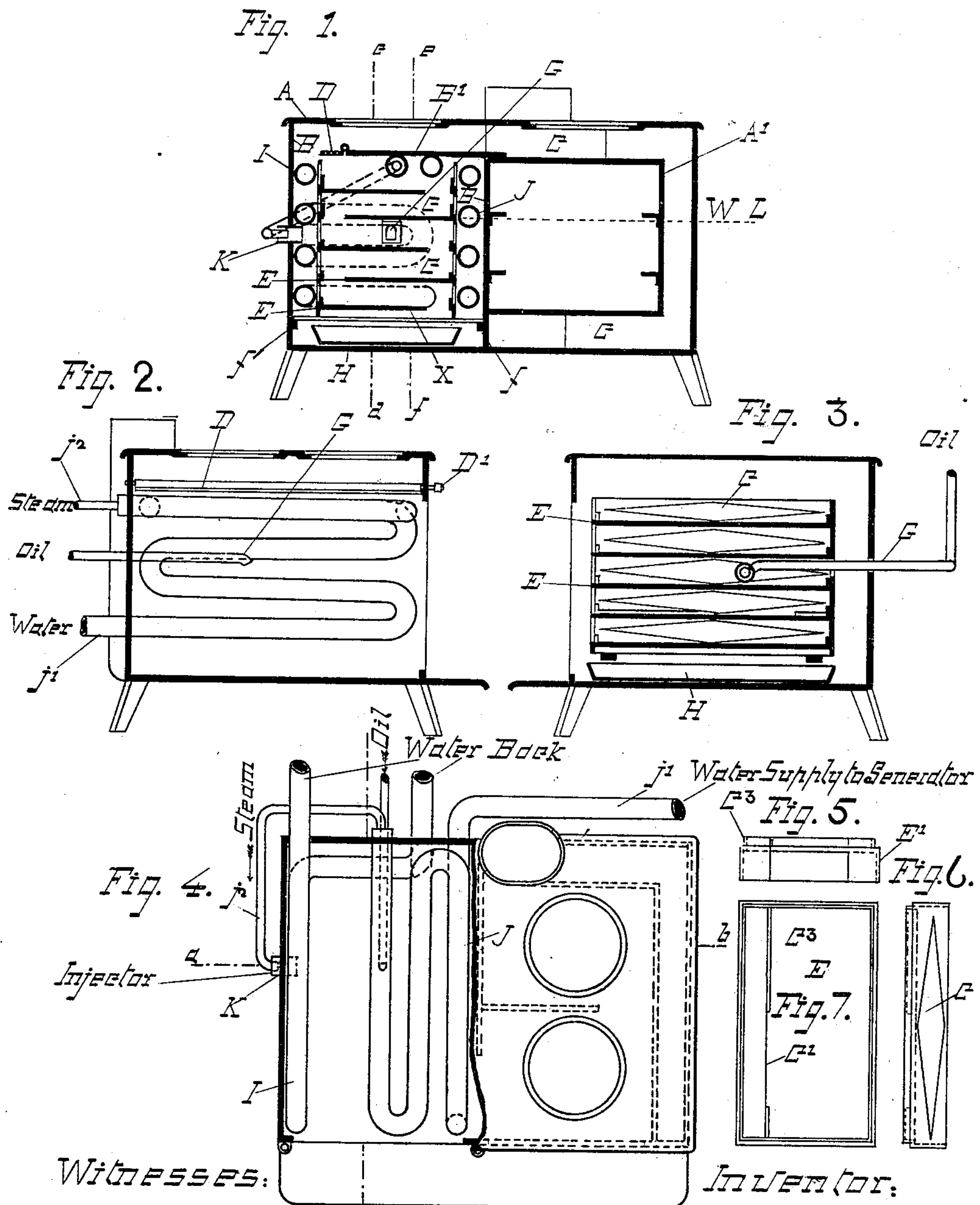
2 Sheets—Sheet 1.

R. E. BURNS.

APPARATUS FOR BURNING FUEL.

No. 326,947.

Patented Sept. 29, 1885.



WITNESSES:

S. A. Owen.

Isaac Thayer.

INVENTOR:

Robt E Burns.
By his Att'y.,

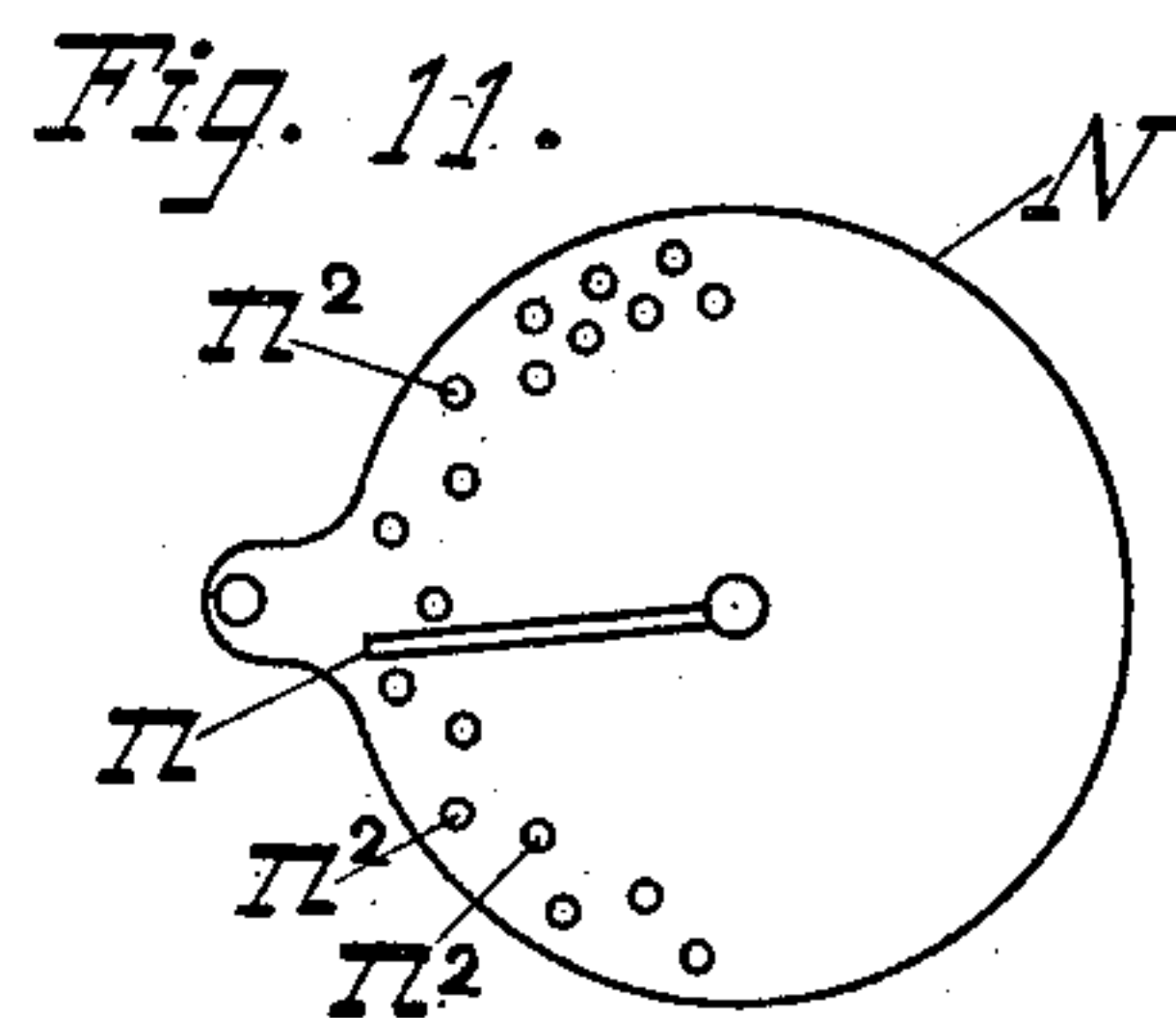
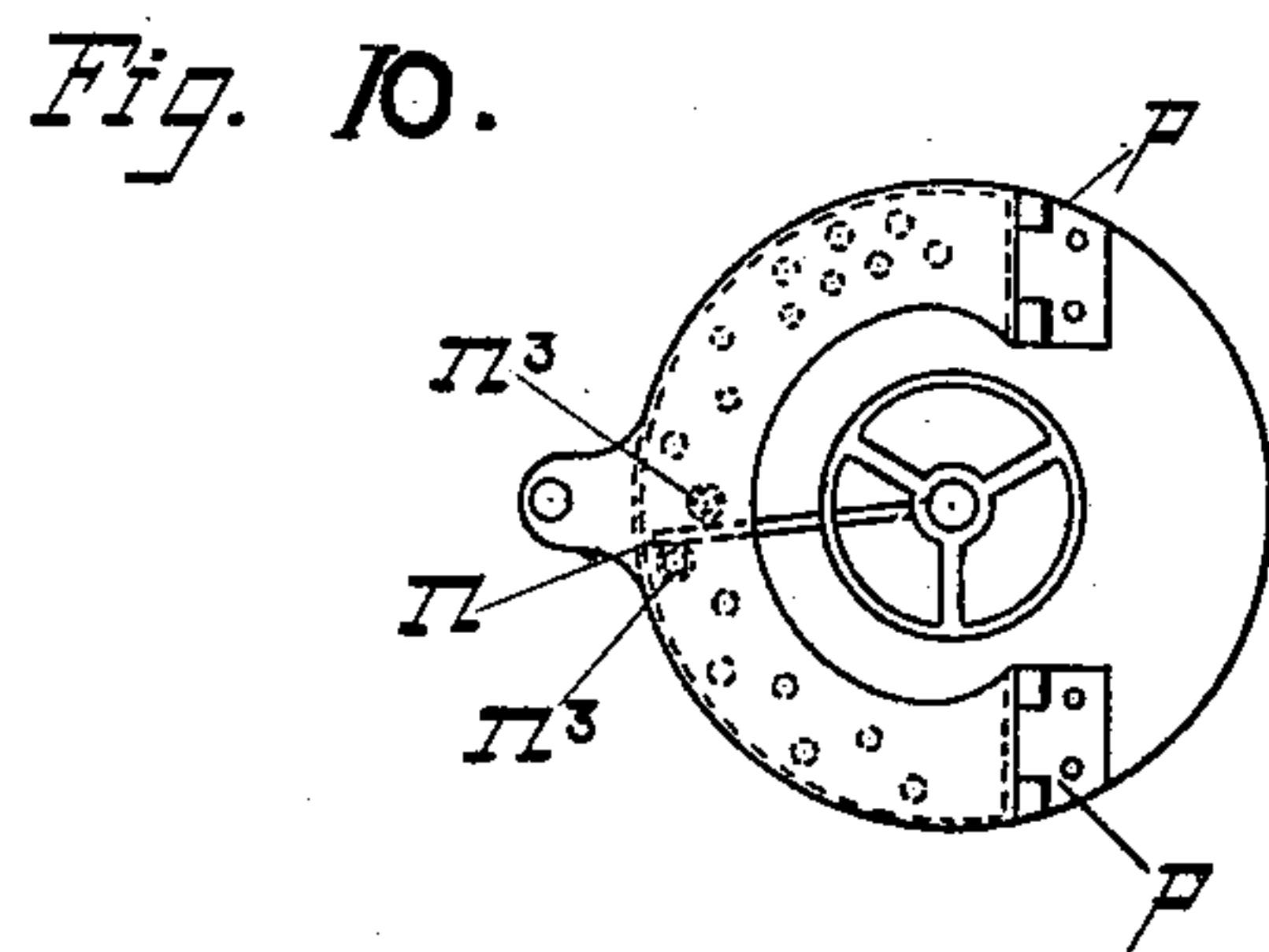
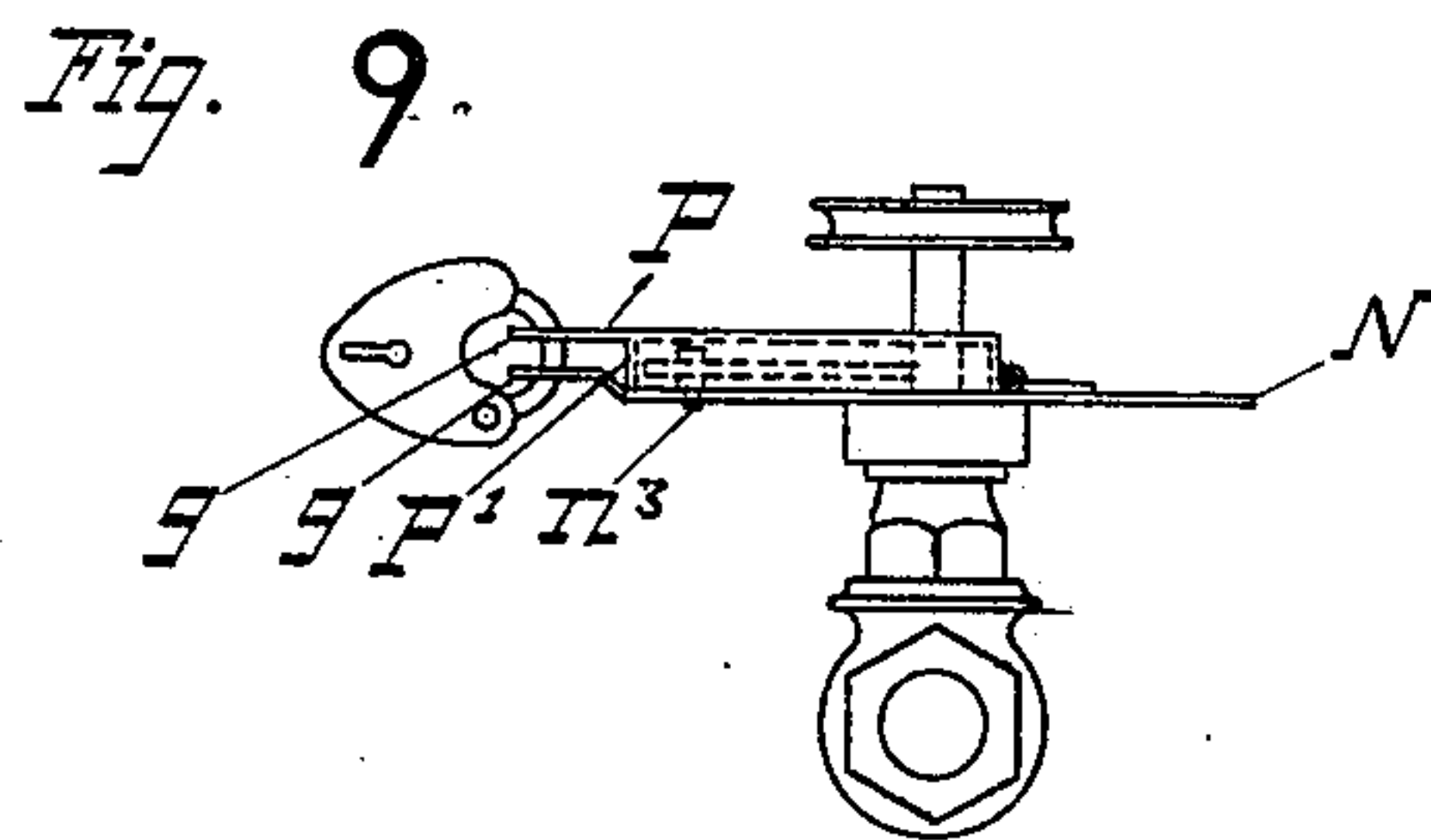
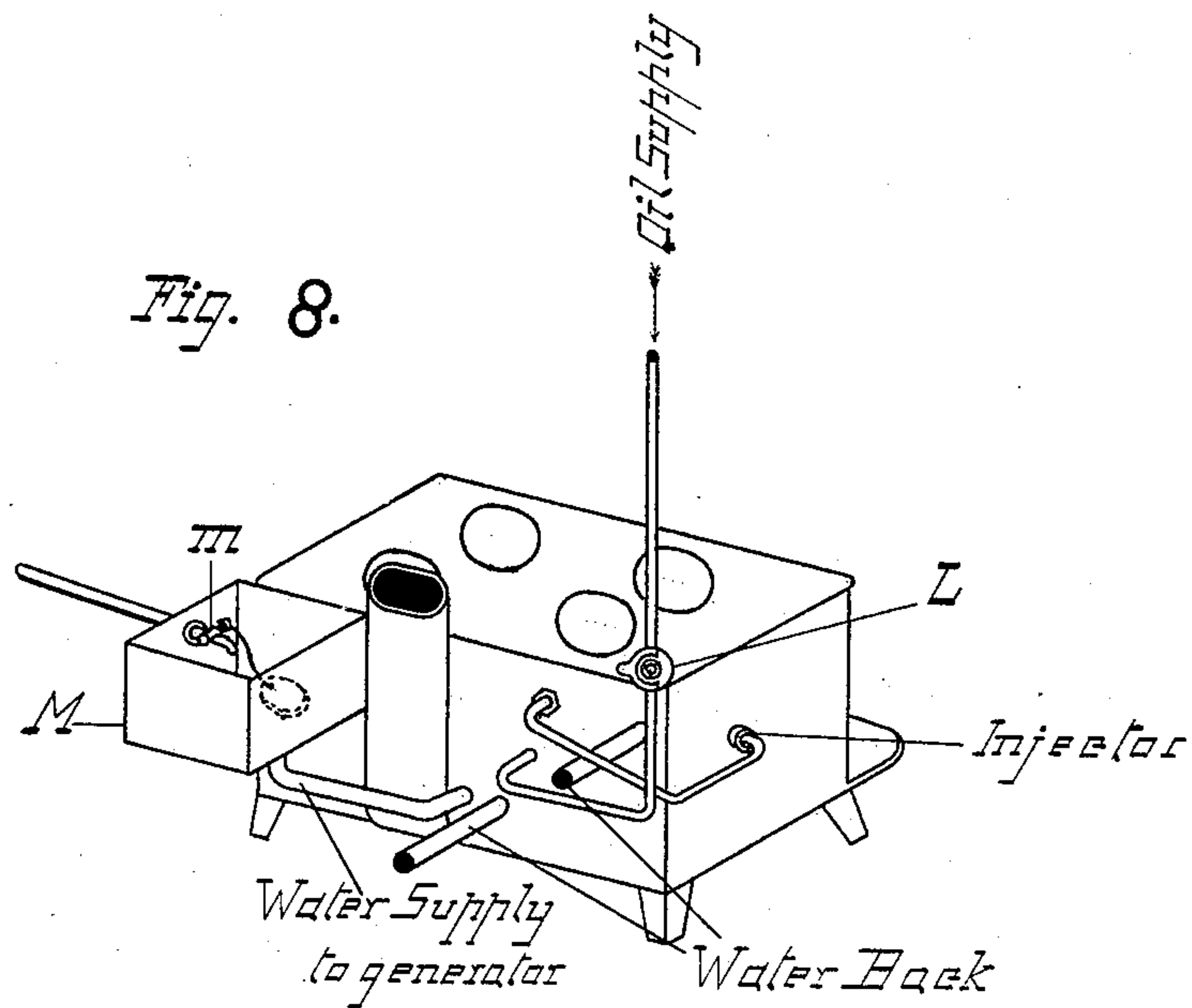
Alphonso Smith

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UNITED STATES PATENT OFFICE.

ROBERT E. BURNS, OF SAN FRANCISCO, CALIFORNIA.

APPARATUS FOR BURNING FUEL.

SPECIFICATION forming part of Letters Patent No. 326,947, dated September 29, 1885.

Application filed December 16, 1884. (No model.)

To all whom it may concern:

Be it known that I, ROBERT E. BURNS, of the city and county of San Francisco, State of California, have invented a certain new and
5 useful Improvement in Apparatus for Burning Oils, Gas, Coal, Wood, and other Fuels, of which the following is a full, clear, and exact description.

My invention relates to improvements in
10 burning oil for fuel in heating and in cooking stoves; and it consists in a novel construction of furnace or fire-box, in the combination therewith of means for feeding and for regulating the feed of oil, and the supply of oxy-
15 gen and hydrogen in the form of air and steam, and in an improved regulator for controlling the feed and of preventing change in the supply except by the proper person.

In the following description hereinafter set
20 forth, and the accompanying drawings that relate to it, I shall proceed to explain the said improvements as applied and combined for the production of a range or cooking-stove; but for heating purposes alone it will
25 be understood that the oven and parts necessary for cooking purposes are omitted.

Referring to the drawings, Figure 1 is a longitudinal section on the line *a b*, Fig. 4, extending through the front of the stove,
30 showing the fire-box, steam, gas, and air generator, a water-heater, and the necessary spaces and passages for conducting the heat products around the oven. Fig. 2 is an end view taken from the left-hand side of Fig. 1,
35 and with outer shell or body removed. This view shows the steam, gas, and air generator coil, and the oil-supply pipe, but not the deflecting-plates of the fire-box. Fig. 3 is a cross-section through *e f*, Fig. 1. Fig. 4 is a
40 top view, with that portion of the shell or body over the fire-box broken away. Figs. 5, 6, and 7 show details of the deflecting plates or surfaces of the fire-box in end view, plan, and side view. Fig. 8 is a view in perspective of
45 such a stove with an automatically-regulating water-supply for the generator. Fig. 9 is a view on a larger scale of the oil-regulating valve; Figs. 10 and 11, views of the setting and locking device.

50 A represents the outer shell or plates of the stove-body, and A' the oven.

B B are the walls of the fire-box, and B' its top plate.

C C are the spaces and passages for the heated gases around the oven and underneath
55 the top plate of the stove.

D is a hinged damper operated from the outside by means of a suitable handle, D', to regulate the outlet of the heat from the fire-box space into the passages outside. This
60 damper is formed of a perforated plate, and it extends the full length of the fire-box, as seen in Fig. 2.

E E are a number of plates that divide the fire-box space into a circuitous passage, or a
65 continuous flue that returns upon itself from side to side from the bottom to the top of the fire-box. These plates run from front to back the full depth of the fire-space, and in their position form a series of flat shelves over
70 which the oil is caused to flow or drip from one to the other by introducing it through a feed-pipe, G, that is carried into the fire-space from a suitable tank or reservoir outside. These surfaces are constructed of a flat plate,
75 F, with a deep rim or ledge, E', all around, of sufficient height to produce the required space between one surface, E, and the heat when these trays or pans are placed one on top of another. Parts of the rims are cut away, as at *c' c'*, to
80 reduce the weight. The space C' within the rim of each plate is the opening for the oil to descend and the heat and flames to ascend in the passage of these products upward to the outlet into the surrounding space. The sup-
85 ports *f f* for these trays project from the sides of the stove and the oven-plates, and are placed above the bottom plate at sufficient height to let in a drip-pan, H, underneath the lowest deflector-surface, X.

90 The trays E are somewhat narrower than the fire-space, so as to give room outside of the walls or partitions formed by the rims, one upon another, for the coils I J.

The coil I is the ordinary hot-water coil, 95 which is connected with a water-supply outside the stove at one end, and at the other end leads into the boiler or hot-water reservoir.

The other coil, J, is a steam-generator, and consists of a coil connected with a water-sup-
100 ply at one end, *j'*, and terminating in a steam, gas, and air conducting pipe, *j''*, at the other

end, through which a jet of steam is carried into the fire-space. This end j^2 is inserted into the side of the stove through a tube, K, of larger diameter, both ends of which are open, the one to the atmosphere outside the stove and the other to the fire-space, the difference in diameter between the steam-pipe and the tube giving an inlet through which the air is drawn in and injected into the fire-space, with and by the action of the steam-jet. This supply of steam and air is regulated by the size of the injector and also by the degree of heat within the fire-box, for the supply of steam and air increasing with the rise in temperature the steam or air pressure will be raised accordingly. These oil, steam, and air supplies may be increased in number for a large fire box or space, but for an ordinary size stove or range the injector and a single oil-feeding tube on the same line, or in the same part of the continuous flue, will be found sufficient.

By connecting the hot-water coil to a supply-tank, M, having a feed-pipe with lever-cock m , I keep the water-line in the generator always at the same height.

On the outside of the oil-feed pipe, at some convenient point between the oil-tank and the fire-box, I place a regulating-valve, L, in the pipe for opening and closing the pipe, as well as for regulating the supply of oil to the fire. With this valve is combined a regulating and also a locking device by which the valve when set by the proper person can be kept in such position as long as desired, and cannot be moved or tampered with in any manner to effect the feed. This prevents the feed from being changed by any one except the proper person, and thus enables accidents to be avoided. Figs. 9, 10, and 11 show the construction of this device, and Fig. 8 the position of the valve.

On the stem of the valve is fixed a projecting arm or rod, n , to turn with it, and beneath this arm the body of the valve supports a stationary disk or plate, N, having a number of holes, n^2 , in rows concentric with the circle described by the end of the arm n . These holes receive the movable, pins n^3 , which, being set in place the one behind the other in front of the end of the arm at any point in the circle, will serve as stops to determine the position of the arm and consequently to hold the valve.

Upon the stationary plate N is fixed, by hinge $p p$, a movable covering-plate, P, having a rim, P' , around the outer edge, of suitable depth to shut in the stops n^3 when closed down over the top of them. This hinged part and the stationary plate below have each a loop or ear, $g g$, with an aperture to receive

the bow of a padlock by which the cap P is locked down over the stop-pins. No movement of the valve in either direction can take place while the stop-pins are in place and the cap P locked down.

By leaving out the back stop, the valve could be turned off to put out the fire, but no increase of feed could be made while the valve was locked. This regulator is of especial advantage in situations where the apparatus is left to the care of servants or exposed to danger of being tampered with by children.

In the construction of the deflectors E given in Figs. 5, 6, and 7, it will be noticed that each tray or rimmed plate has a shoulder or ledge, c^3 , around the top edge to receive the rim of the next tray, and they are thus placed upon one another and held in position without fastening. This enables any one or more of the plates to be removed for cleaning, or to be replaced by a new one when repairs are needed.

When I desire to use wood, coal, or other analogous material, I remove the lower return-flues and place the said fuel in the space thus provided, and it can then be burned in combination with the steam and air from the injector.

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

1. The fire box or space formed of the separate trays or pans with rims or ledges adapted to be placed upon one another, with spaces C' for the oil to descend and the heat and flame to ascend, substantially as and for the purpose set forth.

2. In a stove for burning oils, the combination, with the oil-feeding pipe, of the regulating-valve provided with an outwardly-extending arm, n , a fixed plate, N, provided with a series of holes, n^2 , and pins n^3 , for inserting in the holes n^2 and holding the rod n between them at any position, as set forth.

3. In a stove for burning oils, the combination, with the oil-feeding pipe and valve having the outward-extending arm n , of the fixed plate N, having the holes n^2 and pins n^3 for inserting therein to hold the arm n in any position, the locking-plate P, hinged to plate N, as described, and the ears for receiving the lock, substantially as set forth.

In witness whereof I have hereunto set my hand and seal on the 14th day of November, 1884.

R. E. BURNS. [L. S.]

Witnesses:

R. H. MORTON,
O. B. FENNER.