

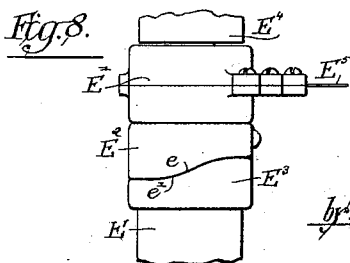
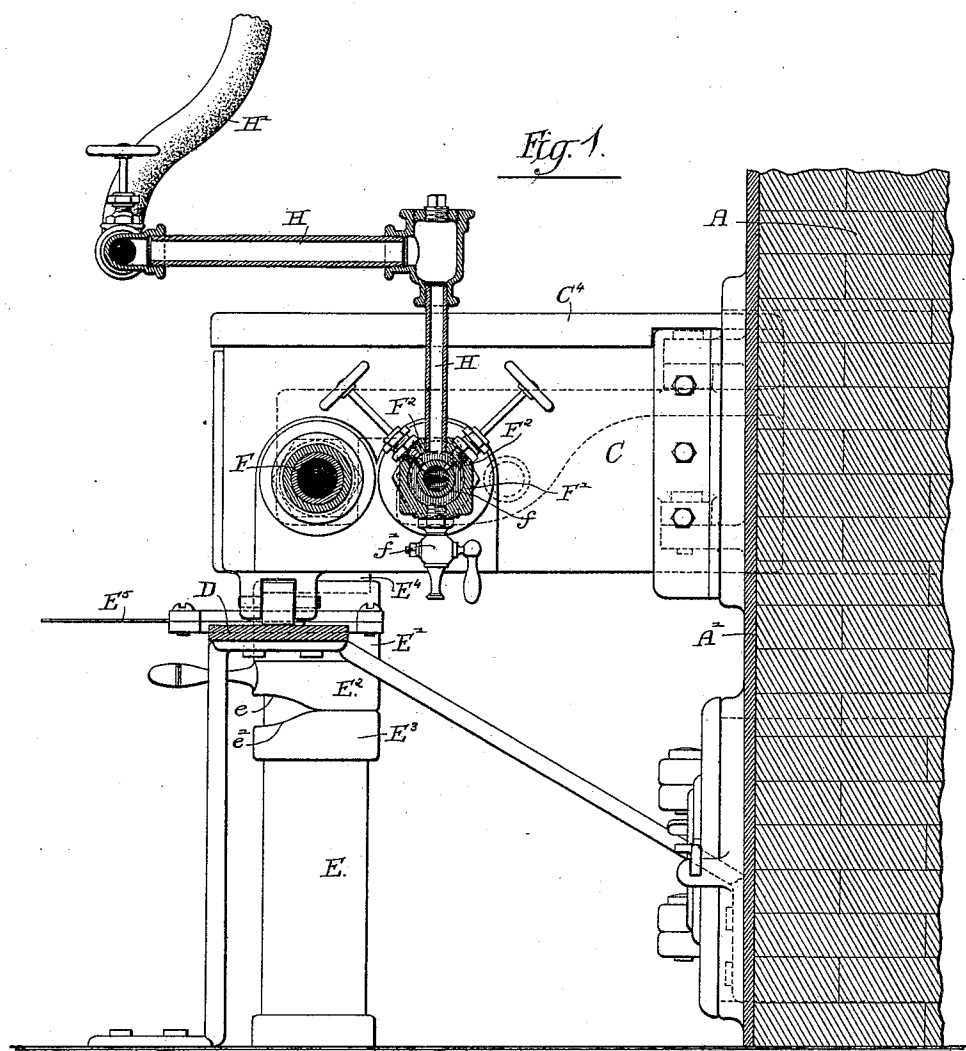
(No Model.)

4 Sheets—Sheet 1.

H. T. RUSSELL.
OIL BURNING DEVICE.

No. 473,165.

Patented Apr. 19, 1892.



Witnesses:
Louis M. F. Whitehead.
Wm. J. Fleming.

Inventor:-
Henry T. Russell:-

by: Dayton, Poole & Brown

Attorneys:-

(No Model.)

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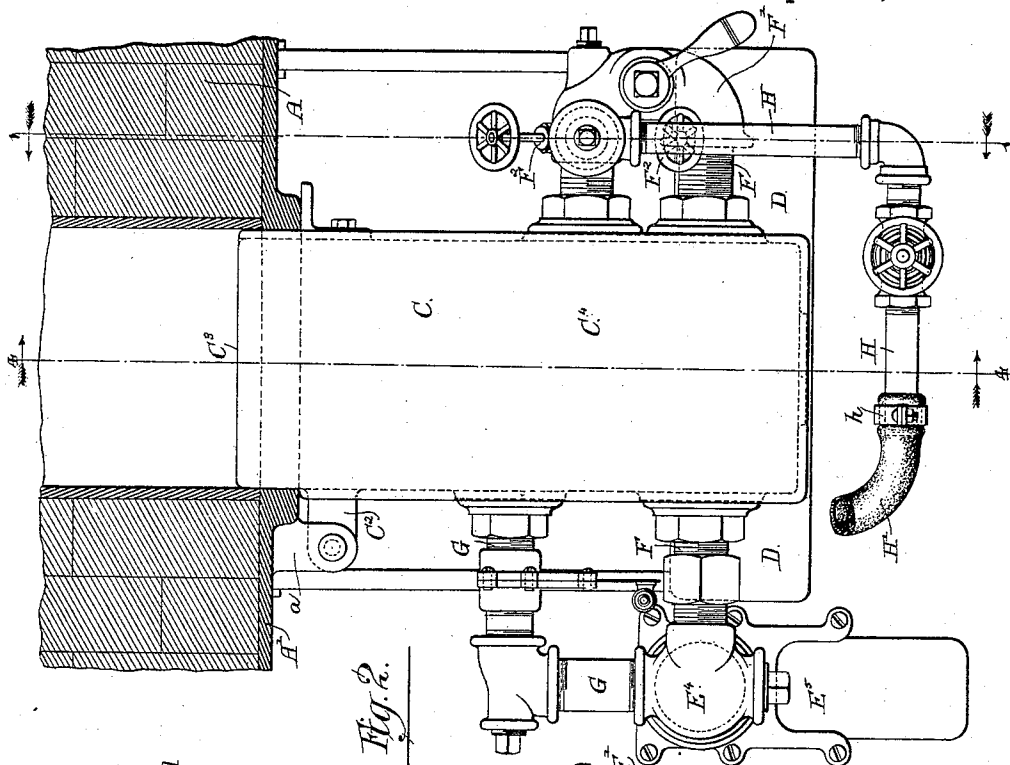


Fig. 2.

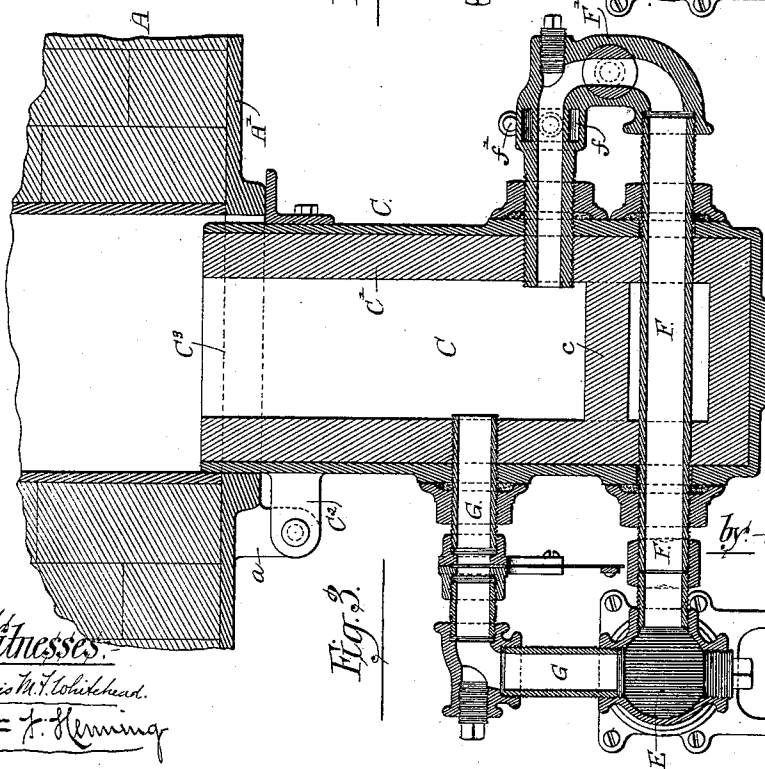


Fig. 3.

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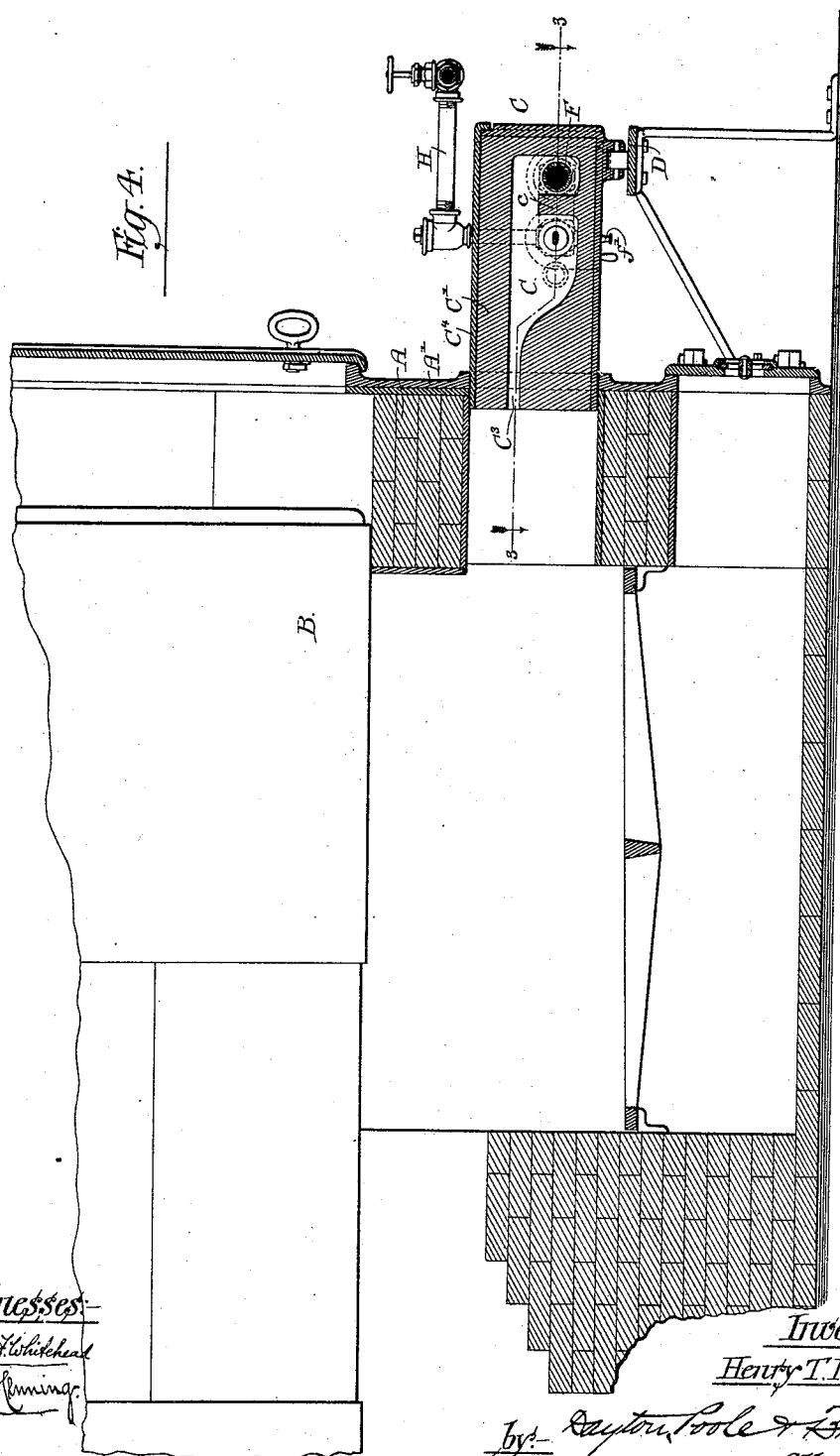
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H. T. RUSSELL.
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No. 473,165.

Patented Apr. 19, 1892.



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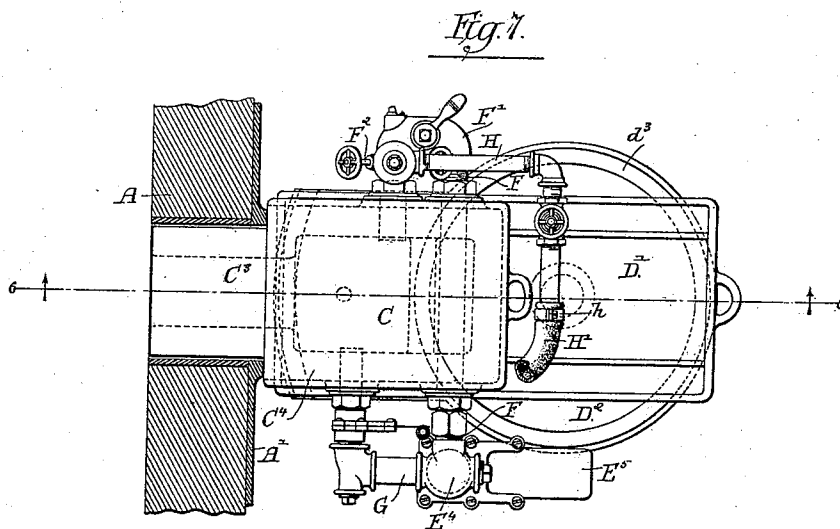
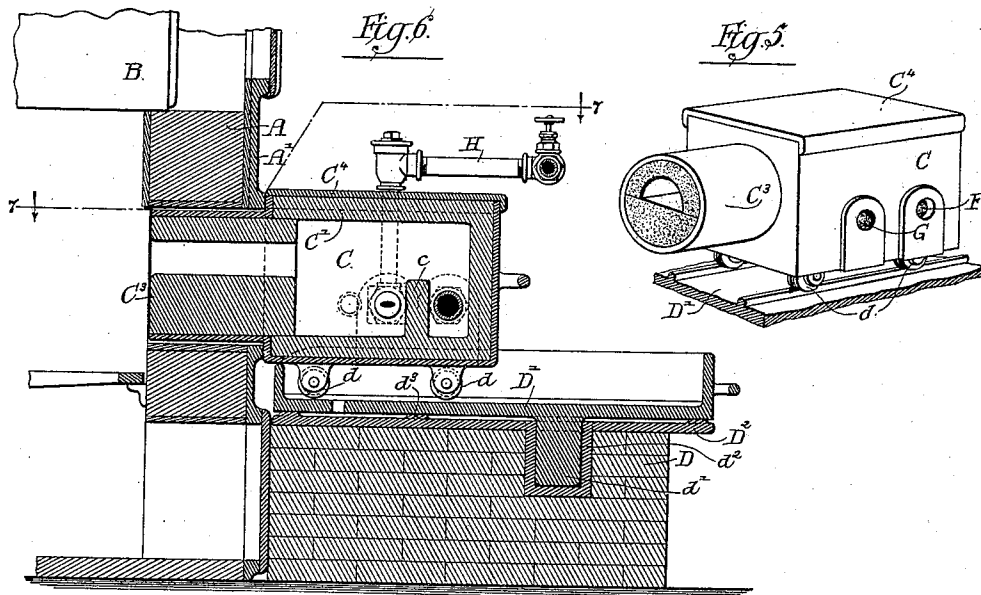
(No Model.)

4 Sheets—Sheet 4.

H. T. RUSSELL.
OIL BURNING DEVICE.

No. 473,165.

Patented Apr. 19, 1892.



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UNITED STATES PATENT OFFICE.

HENRY T. RUSSELL, OF CHICAGO, ILLINOIS.

OIL-BURNING DEVICE.

SPECIFICATION forming part of Letters Patent No. 473,165, dated April 19, 1892.

Application filed February 4, 1889. Serial No. 298,587. (No model.)

To all whom it may concern:

Be it known that I, HENRY T. RUSSELL, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Oil-Burning Devices; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to oil-burning devices for use in connection with steam-boilers and for similar situations.

The invention has for one of its objects to provide a burner which is separate from the furnace proper or fire-space beneath the boiler.

Another object is to provide a construction whereby the burner may be readily moved into and out of place with respect to the boiler-furnace or boiler-setting; and still another object is to provide improvements whereby a better operation of the burner is attained.

To these ends the invention consists in the matters hereinafter set forth, and pointed out in the appended claims.

In the accompanying drawings, Figure 1 is a side view of a burner containing features of my invention made separate from the furnace-setting and mounted movably with respect to the latter, which is shown in vertical section. Certain of the connections for the supply of oil and air are also in this figure shown in section. Fig. 2 is a plan view of the burner shown in Fig. 1, the furnace-setting being made in horizontal section in the plane of the upper surface of the burner. Fig. 3 is a horizontal section of the burner and adjacent furnace-setting in the line 3 3 of Fig. 4, but on the scale of Figs. 1 and 2. Fig. 4 is a central vertical section of a steam-boiler furnace of ordinary construction with my separate burner applied thereto, also seen in section on the line 4 4 of Fig. 2. Fig. 5 is a perspective view of a separate furnace-burner, shown detached and without connections, and illustrating an improved or preferred form of its flame-nozzle, the burner being so mounted on a table that it may be retracted in the direction of the axis of the nozzle. Fig. 6 is a vertical section of the burner

shown in Fig. 5, and also of the furnace-front and of one form of the support upon which the burner is mounted, the section being taken centrally and longitudinally of the burner. Fig. 7 is a plan or top view of the construction shown in Fig. 6, the boiler-setting being shown in horizontal section in the place of the top plate of the burner. Fig. 8 is a view of a section of the air-supply pipe.

A represents the front setting of a boiler-furnace, and B the boiler, the latter being seen only in Figs. 4 and 6.

C is an oil-burner constructed independently of the furnace proper and arranged movably in front of the latter in position to inject its flames into the space beneath the boiler through an opening in the boiler-setting or furnace-front. The burner C consists of a cast-iron box or chamber lined with fire-brick C' and having connections for oil and air which will presently be described.

D is a table or support upon which the burner C rests, said support being in Figs. 1, 2, and 4 shown as sustaining only the outer or rear end of the burner, while the inner end is supported by hinge-lugs C², projecting laterally from the burner-shell near its inner end and resting on similar lugs *a* on the cast boiler-front A'.

In Figs. 5, 6, and 7 the support D is shown as sustaining the burner throughout, there being no hinged connection of the latter with the boiler-front.

In the burner-case, Figs. 1, 2, and 4, the nozzle or delivery end of the burner intrudes only part way through the setting; but in the latter and better construction it extends the full thickness of the setting, and therefore contains in itself the part which is most subject to destructive effect of the flame passing from the burner to the fire-space of the furnace. Having such longer inward extension or longer nozzle C³, the burner C of said Figs. 5, 6, and 7 in being retracted from the furnace (as will be sometimes necessary or desirable to replace interior parts or to cleanse it) requires or is best made to be drawn directly back from the furnace-front, and to this end it is provided with wheels *d d*, which rest and run on a bed D'. This bed D' is herein shown, and is preferably made, with an upturned flange on its sides or all round to

insure against the displacement of the heavy burner from its position thereon.

To enable the burner to be turned around for inspection or to give access through its nozzle after being retracted, as described, the bed D' is provided with a vertical stud or trunnion d' , which is seated in a corresponding recess or bearing d^2 in the support D , said trunnion d' forming an axis upon which the bed D' may be rotated in its own plane. To further perfect the construction with respect to this rotary movement of the bed D' , the support D has for its top a cast-metal plate D^2 , in which the journal-bearing d^2 is formed and which is desirably widened in its outer part and provided with a circular rib d^3 on this widened portion, as shown clearly in Fig. 7. Thus mounted, the burner, usually weighing one or several hundred pounds, can be manipulated with great ease for the purpose of inspection and repair.

To give convenient access to the interior of the burner-shell for the purpose of removing and replacing the bricks C' , the top plate C^4 of the burner is made detachable or sliding.

The air and oil connections are generally like those described in a preceding application for patent, Serial No. 266,933, filed March 12, 1888—that is to say, E is a vertical wind-pipe rising from a trunk below ground, (as may be here supposed,) through which air is forcibly driven by a suitable fan (not shown) into the burner. The pipe E has two branches F and G which lead to the burner-interior. The former of these F passes first entirely through the burner near its rear or outer end and on the other side takes a return bend and delivers into the burner interior at a point farther forward or toward the burner-mouth. The other branch G leads and discharges into the burner at a point still farther toward the mouth, substantially as shown in Fig. 3.

With the returning part F' of the pipe F is connected an oil-feed pipe H , which delivers in an annular chamber f , surrounding the passage within the pipe F' , and it communicates with the latter through an orifice or orifices controlled by the valve or valves F^2 . From the bottom of this annular chamber leads a pipe or passage controlled by the valve f' . The object of this valve or passage f' is to allow the water contained in the oil fed to the apparatus to be occasionally withdrawn or dripped off, as will of course be done by the contrivance shown, since the water, being heavier than the oil, will settle to the bottom of the chamber f . Air being forcibly driven through the pipe E will be sent into the interior of the burner C through the pipes F , F' , and G . That which is fed through the pipe F F' will be heated in its passage to the burner-interior by reason of the exposure of a portion of the pipe F within the burner-chamber, as shown in Fig. 3. As the heated air passes the orifices through which the oil is supplied to the pipe F' on its way to the interior of the burner, it drives the admitted

oil forward with it and at the same time separates it into small particles or spray. The oil thus enters the burner in a minutely subdivided condition and therefore in the best possible form for immediate vaporization and combustion, while the air which accompanies it and which is injected into the flame by the branch pipe G supplies abundant oxygen to insure the most perfect combustion of the carbon contained in the oil.

To protect that portion of the pipe F which is exposed within the chamber C from being too highly heated, a wall or partial diaphragm c , of fire-brick, is provided in said chamber in front of the exposed portion of the pipe F and between the same and the mouth or delivery end of the prolongation of said pipe, as clearly indicated in Figs. 3, 4, and 6.

By the arrangement of hot-air pipes and of the oil-supply pipe in the manner described a most effective combustion of the oil and oxygen is produced within the burner, the flame of which is driven forcibly forward through the mouth or nozzle C^3 of the burner into the space beneath the boiler.

To provide for the bodily movement of the burner C , having air and oil connections, as described, the oil-pipe H is provided with a flexible portion H' , leading from any source of supply or from a rigid pipe connected with such source of supply. This section of flexible pipe H' will usually be made of a kind of rubber especially intended to convey oil and similar destructive fluids and readily found in the market. The section H' of flexible pipe is connected with a rigid pipe H by means of a clamp h , of familiar construction, readily understood from Fig. 2.

To provide a readily-disjointable connection of the burner C with the pipe E , the latter terminates with a lengthwise-sliding section E' , having below it and surrounding the pipe E a rotatable collar E^2 , which is provided with an inclined or cam-shaped edge e . This rests upon a collar E^3 , which is fixed to the pipe E and has its upper edge e' inclined or cam-shaped to correspond with the adjacent edge e of the rotatable collar E^2 . By rotation of the collar E^2 , therefore, the sliding section E' may be readily raised or lowered a suitable distance to engage or disengage the prolongation E^4 of the pipe E , from which the branches F and G immediately proceed. By depressing the section E' , therefore, the pipe E E^4 is effectively severed, and it will offer no obstruction to the bodily movement of the burner C .

In the section E' is located a horizontal slide E^5 , by which the passage through said section may be closed or opened at pleasure, so that the passage of air through the pipe E may be cut off from any particular burner without stopping the fan or other air-forcing device. Of course, when the pipe E is to be disconnected from the burner, this valve or slide E^5 will commonly need to be closed, as indeed it may be occasionally necessary to

close it temporarily when the burner is in connection with the pipe E.

While I have shown and claimed in this application the apparatus as supplying atomized liquid fuel, it will be understood that 5 finely-powdered solid fuel or other similar kinds may be used instead.

I claim as my invention—

1. The combination, with a boiler-furnace 10 provided with an opening or doorway, of an oil-burning apparatus comprising a movably-supported combustion-chamber movable toward and from the furnace and provided with a nozzle adapted to fit within the doorway, 15 and with an exit-aperture for flames opening through said nozzle, a pipe supplying an admixture of atomized fuel and hot air to the said chamber, and a secondary air-pipe supplying air under pressure to said 20 chamber, substantially as described.

2. The combination, with a boiler-furnace provided with an opening or doorway, an elevated horizontal bed with tracks or guides thereupon, of an oil-burning apparatus comprising a combustion-chamber supported on 25 the tracks, movable toward and from the furnace on said tracks, and provided with a nozzle adapted to fit within the doorway and with an exit-aperture for flames opening 30 through said nozzle, a pipe supplying an admixture of atomized fuel and hot air to the said chamber, and a secondary air-pipe supplying air under pressure to said chamber.

3. The combination, with a boiler-furnace,

of a burner comprising a combustion-chamber 35 made separate therefrom and provided with an outlet for flames opening into the said furnace, means movably sustaining the said chamber, whereby the latter may be 40 moved horizontally toward and from the opening of the furnace, an air-duct supplying an admixture of atomized fuel and air to said chamber, said air-duct being provided with an endwise-sliding section E', and a cam-ring 45 surrounding the air-duct and adapted to both turn and move endwise thereon and constructed to act against the said sliding section to move the latter endwise, substantially as described.

4. The combination, with a combustion- 50 chamber, of an air-pipe passing through said chamber adjacent to the end wall of the same and opening at its end into the chamber, and an oil-pipe supplying oil to said air-pipe, the said chamber being provided with a wall or 55 partial partition arranged adjacent to and parallel with the air-pipe located between the end of the said pipe which enters the chamber and the part thereof which passes through 60 the chamber, substantially as described.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

HENRY T. RUSSELL.

Witnesses:

M. E. DAYTON,

TAYLOR E. BROWN.