

(No Model.)

A. W. JACKSON & J. SENN.

HYDROCARBON FURNACE.

No. 251,052.

Patented Dec. 20, 1881.

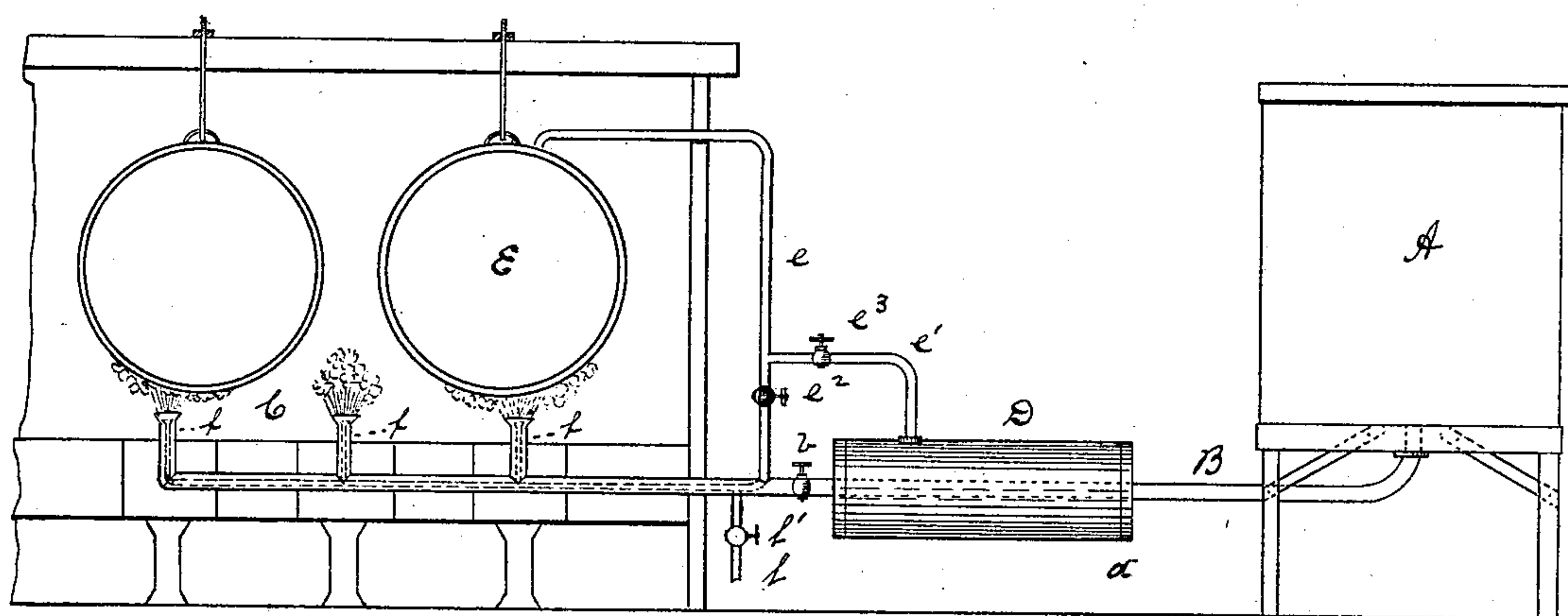


Fig. 1.

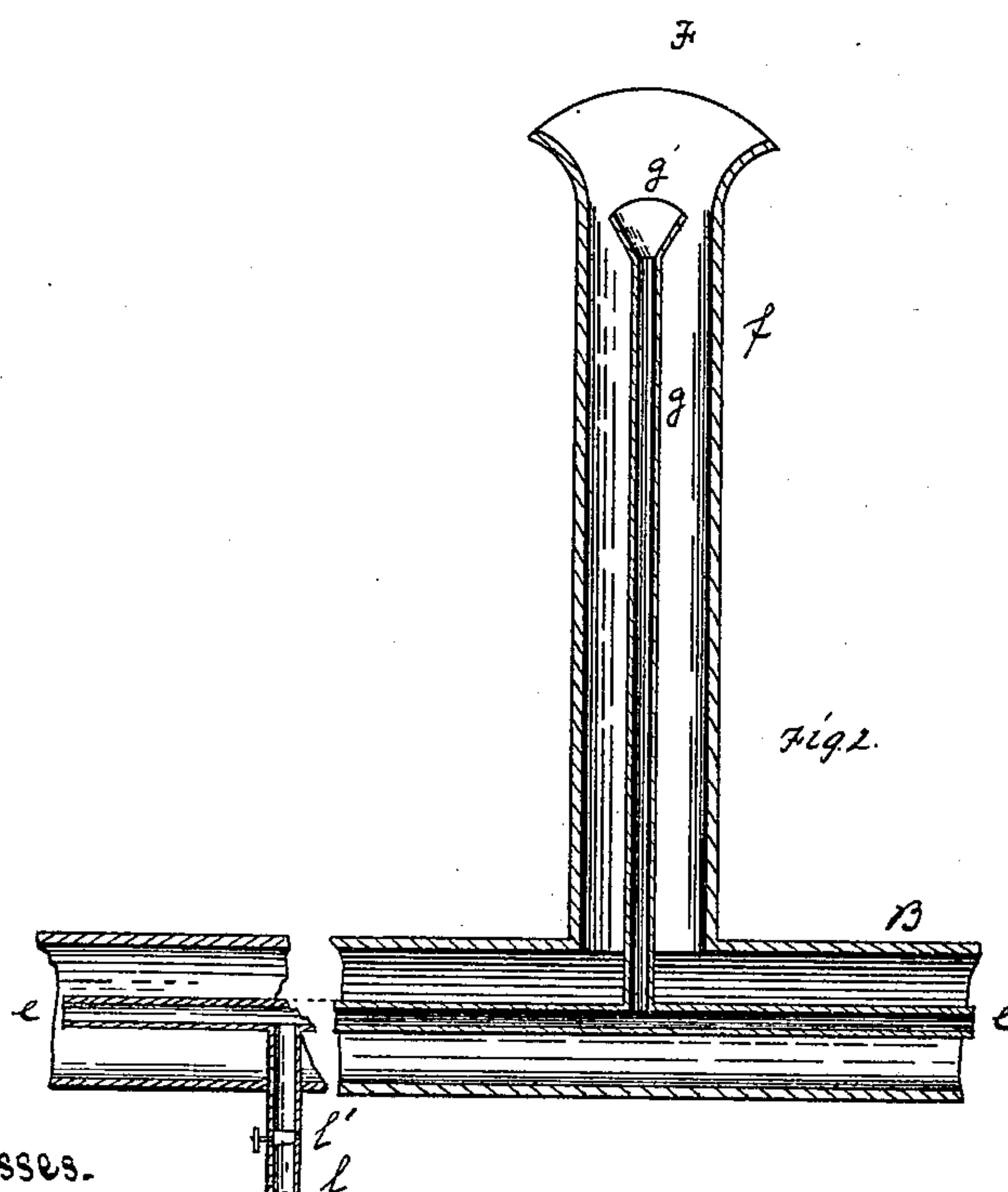


Fig. 2.

Witnesses.
J. W. Baxewell
L. C. Fitter.

Inventors.
Andrew W. Jackson
Jacob Senn
by their attorneys
Bakerwell & Co.

UNITED STATES PATENT OFFICE.

ANDREW W. JACKSON, OF WALKERS, AND JACOB SENN, OF CUYAHOGA FALLS, OHIO.

HYDROCARBON-FURNACE.

SPECIFICATION forming part of Letters Patent No. 251,052, dated December 20, 1881.

Application filed May 23, 1881. (No model.)

To all whom it may concern:

Be it known that we, ANDREW W. JACKSON, of Walkers, in the county of Columbiana, and JACOB SENN, of Cuyahoga Falls, in the county of Summit and State of Ohio, have invented a new and useful Improvement in Hydrocarbon-Furnaces; and we do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is an elevation of our improved apparatus for burning hydrocarbons as adapted to the heating of steam-boilers, and Fig. 2 is a detached view of one of the nozzles or sprayers for spraying and discharging the hydrocarbon.

Our invention relates to an improvement in apparatus for burning hydrocarbons, such as crude petroleum; and it consists, mainly, in the combination, with the steam and oil pipes leading to the furnace, of an auxiliary air-pipe for starting the initial fire before steam is generated in the boilers; and, secondarily, in certain specific combinations and arrangements of the oil-pipe and steam-heating drum, all as will hereinafter more fully appear.

We will now describe our invention, so that others skilled in the art may manufacture and use the same.

In the drawings, A represents the tank or receiver for holding the hydrocarbon. This tank may be constructed of any suitable size and placed at one side of the boilers. From the bottom of this tank a pipe, B, extends under the fire-chamber C.

Around the pipe B, between the tank A and the fire chamber C, is a jacket or cylinder, D, which is provided with a stop-cock, *d*, at the bottom of the same. From the boiler E extends a pipe, *e*, which passes into and along inside of the pipe B to the fire-chamber C. From the pipe *e* extends another pipe, *e'*, which leads into the jacket D. The pipes B, *e*, and *e'* are provided with stop-cocks *b*, *e*², and *e*³.

From the pipe B extend the vertical pipes *f f* into the fire-chamber C, and at their ends are the nozzles F F F, which are rose-shaped—that is, flaring—and having perforated disks over their mouths. From the pipe *e* extend

inside of the pipes *f f f* smaller pipes *g g g*, at the ends of which, in the pipes *f*, just below the flare of the nozzles F, are smaller nozzles *g'*, which are similar in form to the nozzles F.

The number of the pipes *f* and *g* may be increased as desired by having branch pipes leading along the boilers from the supply-pipes B and *e*.

l indicates an air-pipe leading from a fan-blower or other suitable means for obtaining an air-blast, and joining the steam-pipe *e* within the oil-pipe B. This pipe is provided with a stop-cock, *l'*, by means of which the air-blast may be cut off when not desired.

Instead of having the nozzles or sprayers discharge directly into the fire-box, they may be placed behind the bridge-wall, and there used either alone or in conjunction with heat arising from the combustion of fuel in the box.

The operation of our improved apparatus is as follows: Steam having been generated by burning the petroleum under the boiler, it being sprayed by means of air being forced by a rotary blower through the pipes *l* and *e*, the stop-cock *l'* in the air-pipe *l* is closed, and the stop-cock *e*³ is opened, which allows steam to pass from the boiler into the jacket D. The stop-cocks *b* and *e*² are then opened, and the steam, passing through the pipes *e* and *g* and through the nozzles *g'*, draws the hydrocarbon from the tank *a* through the pipes B and *f*, and, discharging it through the nozzles F, sprays it under the boiler, where it burns in connection with the steam.

It will be observed that the combination of devices is such that the oil, on its way to the burner, is heated not only by the steam which sprays it into the furnace, but also by steam from an independent branch pipe, so that the oil may be heated when air instead of steam is used to spray the oil into the furnace; and it will also be noticed that when steam is used to force the oil into the furnace the steam and air are mingled in the fire-box, and not before reaching the same, so that condensation is not likely to occur. The hydrocarbon is thoroughly heated before it reaches the nozzles F by the steam in the jacket D and the steam in the pipe *e* inside of the hydrocarbon-supply pipe B.

The supply of hydrocarbon and steam may

be regulated by the stop-cocks b , e^2 , and e^3 , and a portion of air may also be allowed to mingle with the steam, if desired, by properly turning the stop-cock l' of the air-pipe l .

5 The form of hydrocarbon most preferably used with our apparatus is crude petroleum and coal-tar.

Our apparatus may be readily adapted to other heating purposes than that of heating
10 steam-boilers.

The advantages of our invention are the safety resulting from the use of the apparatus described, and also the saving of the fuel or hydrocarbon, as there is little or no waste in
15 the combustion.

We are aware that the combination of a steam-jacketed oil-chamber or oil-conduit, a steam-drum, and a branch steam-pipe leading from the steam-jacket to the steam-drum, for the
20 purpose of heating the oil, is not new, and do not herein broadly claim the same, for the reason that as heretofore arranged the heated oil and steam were mingled before reaching the fire-box, and the gas thus formed was
25 passed through the heating-drum, which was supplied by the branch steam pipe, such an arrangement of the devices having a tendency to permit condensation to take place in the gas-conduit which leads from the mixing-chamber to the fire-box, whereas in our devices the
30 arrangement is such that the steam and oil are

mingled in the fire-box or at the place of ignition, and no condensation will occur.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is— 35

1. The combination of the oil-pipe B , leading from the supply-tank to the furnace, the steam-drum D , inclosing a portion of the oil-pipe, the steam-pipe e , leading directly from
40 the boiler to the furnace and arranged within the oil-pipe after it leaves the steam-drum D , the branch pipe e' , leading to the steam-drum D , the said oil-pipe and steam-pipe e terminating within the fire-box, substantially as and
45 for the purpose specified.

2. The combination of the oil-pipe B , the steam-drum D , arranged on the oil-pipe, the steam-pipe e , arranged within the oil-pipe, the branch steam-pipe e' , connecting the main
50 steam pipe and the steam-drum, and the auxiliary air-pipe l , which joins the steam-pipe within the oil-pipe, the several pipes being provided with valves and relatively arranged substantially as and for the purpose specified. 55

In testimony whereof we have hereunto set our hands.

ANDREW W. JACKSON.
JACOB SENN.

Witnesses:

H. B. NICHOLSON,
D. J. BROOKMAN.