No. 735,287. PATENTED AUG. 4, 1903.

J. B. NEUENDORFF.

OIL BURNER.

APPLICATION FILED JAN. 4, 1902.

NO MODEL.

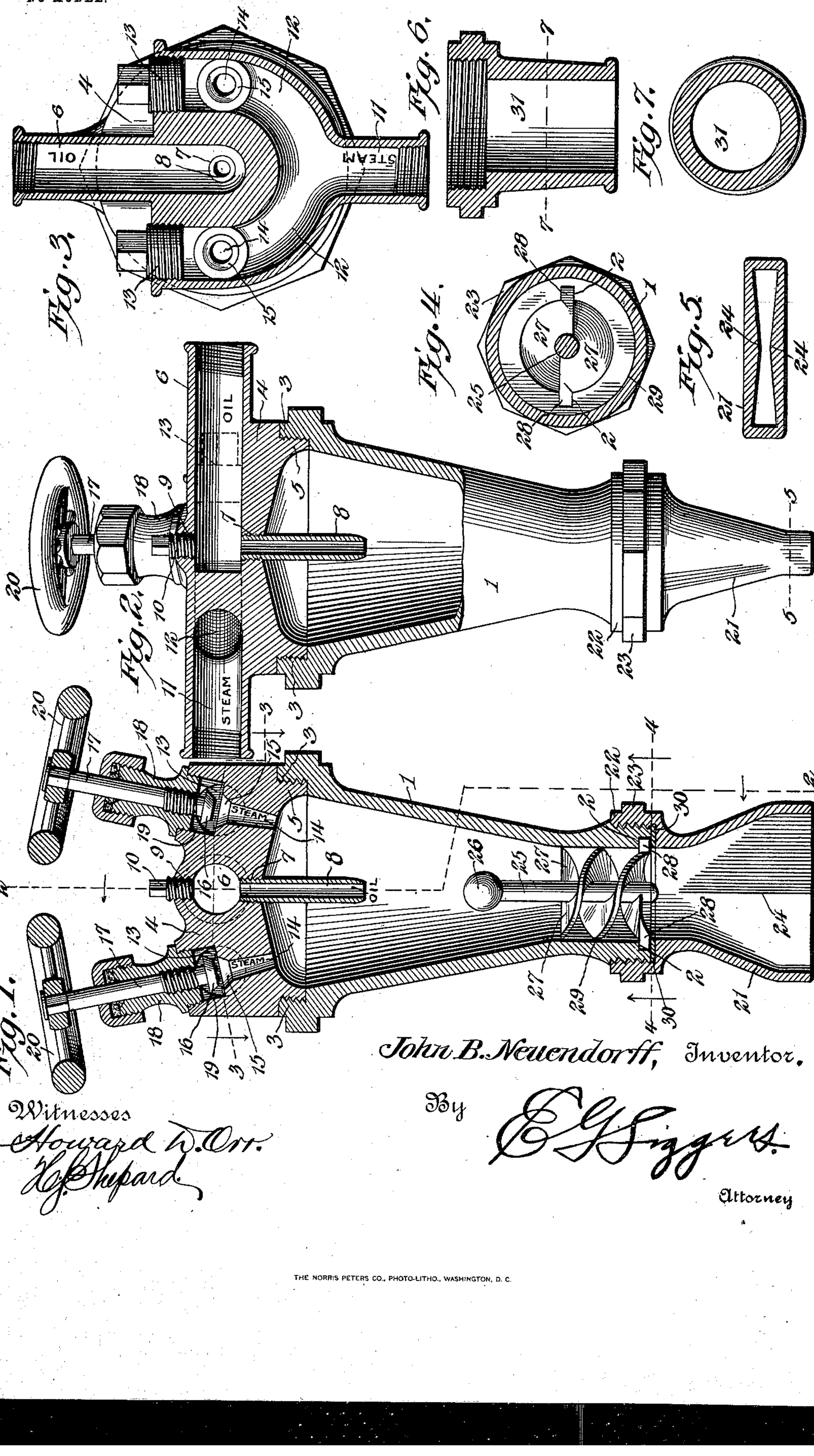

Fig. 1.

Fig. 6.

Fig. 7.

Fig. 4.

Fig. 5.

Witnesses
Howard W. Orr.
H. J. Shepard.

John B. Neuendorff, Inventor.

By E. G. Siggers.

Attorney

No. 735,287. Patented August 4, 1903.

UNITED STATES PATENT OFFICE.

JOHN B. NEUENDORFF, OF SAN ANTONIO, TEXAS.

OIL-BURNER.

SPECIFICATION forming part of Letters Patent No. 735,287, dated August 4, 1903.

Application filed January 4, 1902. Serial No. 88,455. (No model.)

To all whom it may concern:

Be it known that I, JOHN B. NEUENDORFF, a citizen of the United States, residing at San Antonio, in the county of Bexar and State of Texas, have invented a new and useful Oil-Burner, of which the following is a specification.

This invention relates to oil-burners of the injector type, and is designed to provide an improved burner of this character wherein liquid fuel and steam are introduced and mixed in a novel and effective manner within the mixing-chamber of the burner, so as to produce an intense flame at the mouth of the discharge-nozzle.

Another object is to have the parts of the burner detachably connected, so as to give access to the interior thereof for purposes of cleansing and also to arrange for convenient access to the oil and steam inlet passages for convenience in removing obstructions therefrom.

Another object is to provide a novel form of mixing device which may be conveniently removed whenever desired and also to provide an improved form of discharge-nozzle to produce a fan-shaped flame and to have this nozzle adjustable, so as to vary the angular disposition of the flame, and thereby accommodate the burner to any application thereof.

With these and other objects in view the present invention consists in the combination and arrangement of parts, as will be hereinafter more fully described, shown in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that changes in the form, proportion, size, and minor details may be made within the scope of the claims without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings, Figure 1 is a longitudinal sectional view of an oil-burner constructed and arranged in accordance with the present invention. Fig. 2 is a longitudinal sectional view taken on the line 2 2 of Fig. 1. Fig. 3 is a cross-sectional view taken on the line 3 3 of Fig. 1. Fig. 4 is a cross-sectional view taken on the line 4 4 of Fig. 1. Fig. 5 is a detail cross-sectional view of the burner-tip, taken on the line 5 5 of Fig. 2. Fig. 6 is a detail longitudinal sectional view of a cylindrical burner-tip. Fig. 7 is a detail cross-sectional view taken on the line 7 7 of Fig. 6.

Like characters of reference designate corresponding parts in all the figures of the drawings.

In carrying out the present invention there is provided a nozzle 1, embodying a tapered tubular casing which has its smaller end externally screw-threaded and provided with diametrically opposite notches or seats 2, the opposite larger and rear end of the body being provided with an interiorly-screw-threaded marginal flange 3, which has an angular outer edge to form a wrench-seat.

The rear end of the body or casing is closed by a head or cap 4, which is provided with an externally-screw-threaded reduced cylindrical flange 5, which fits into the interiorly-screw-threaded flange 3 of the casing.

The oil-service pipe 6 pierces the head or cap transversely and terminates just beyond the center of the cap, the outer end of the pipe being projected beyond the casing for convenience in connection with a supply-pipe. At the center of the inner side of the cap or head there is provided a screw-threaded opening 7, which intersects the adjacent side of the oil-inlet 6, and a nipple 8 is fitted into this screw-threaded opening and is of a length to project a suitable distance into the body of the nozzle. It will here be noted that the oil-nipple 8 lies at the longitudinal center of the burner. In the outer end of the cap and at the center thereof there is provided a screw-threaded opening 9, which intersects the oil-passage 6 in alinement with the nipple 8, so as to give access to the latter for cleansing the same, and this opening is normally closed by means of a screw-threaded closure-plug 10, the outer end of which is made polygonal, so as to form a wrench-seat, and normally projected beyond the cap, so that it may be readily removed when desired.

Located diametrically opposite the oil-inlet 6 is a steam-inlet 11, which is provided with a substantially U-shaped branch, the members 12 of which pierce the cap and lie at opposite sides of the oil-inlet. The outer end of each branch member 12 is open and interiorly screw-threaded for the reception of a closure-plug 13, whereby access may be had to the interior of the branch for conven-

ience in cleansing the same. Steam-ports 14 pierce the cap or head and intersect the inner sides of the respective steam-inlet branches 12 in diametric alinement with the oil-nipple 8 and incline inwardly in opposite directions at corresponding angles to the oil-inlet, whereby the range of the ports intersect the range of the oil-nipple at a common point. The ports 14 taper inwardly and are provided at their outer ends with tapered valve-seats 15, which are controlled by valves 16, carried by screw-threaded valve-stems 17, that work in suitable stuffing-boxes 18, which are removably fitted into sockets or recesses 19, formed in the outer face of the head or cap and intersecting the respective steam-inlet branches 12. Each valve-stem is provided with a hand-wheel 20 for convenience in manipulating the valve to open and close the steam-port.

As best shown in Figs. 1, 2, and 5, it will be seen that the discharge end of the burner is provided with a burner-tip 21, which is provided with an internally-screw-threaded cylindrical flange 22 to fit the externally-screw-threaded smaller end of the mixing-chamber and has a polygonal external portion 23 to form a wrench-seat for convenience in applying and removing the tip. This tip is flat and tapered outwardly, so as to form a thin slot-like discharge-opening, and thereby produce a fan-shaped flame. In addition to this the inner faces of the tip have their opposite portions inclined inwardly in opposite directions, as best illustrated in Fig. 5, so as to form opposite centrally-disposed longitudinal ribs 24, from which the opposite faces diverge, and thereby tend to spread the fuel and prevent the same from collecting in a small stream at the center of the tip.

In order that the steam and oil may be effectively mixed before entering the burner-tip, there is provided a mixer comprising a stem 25, having its inner end provided with a rounded or convex head in the form of a ball or sphere 26, and upon the opposite end portion of the stem are provided spiral blades or flanges 27, the outer ends of which are provided with outwardly-directed lugs or projections 28, which are snugly fitted in the seats or recesses 2 in the outer end of the mixing-chamber 1 and are held against displacement by the inner end of the burner-tip, which lies against the lugs and is fitted in place after the insertion of the mixer. It will here be noted that the interior of the mixing-chamber is straight or cylindrical at its outer end, as indicated at 29, for a length equal to the length of the flanged portion of the mixer-stem, so that the outer edges of the spiral flanges may fit snugly against this cylindrical portion, and thereby compel the steam and oil to travel in a circuitous path, and thereby become thoroughly mixed before entering the burner-tip.

In practice it is preferable to have the burner assume an upright position, with the tip at its lower end, so that the oil or liquid fuel, which is fed through the nipple 8, may strike squarely against the beveled deflector formed by the ball 26, whereby it is broken up into small particles, which are attacked by the incoming steam-jets, the ranges of which intersect at a point beyond the oil-deflector 26. Hence it is apparent that the oil and steam are thoroughly mixed in passing through the mixer, and thereby enter the burner-tip in the most effective condition for ignition at the outer end of the tip. Furthermore, in view of the transverse wedge shape of the opposite sides of the tip the fuel is effectively spread so as to overcome any tendency to collect in a swirl at the center of the tip, and thereby insure a fan-like distribution of the fuel from the burner-tip.

A very important feature of the present invention resides in the combination and arrangement of the steam-inlets 14, the fuel-inlet, and the mixer. In this connection it will be noted that the spiral flanges of the mixer are two in number and coöperate with the walls of the mixing-chamber to form two separate and distinct passages, which are open at opposite ends, and the steam-inlets, which are two in number, are arranged to discharge toward the inner ends of the passages. The fuel-inlet is located between the steam-inlets, and a centrally-arranged oil-deflector is located at the inner end of the mixer and is interposed between the same and the fuel-inlet.

The tip may be rotatably adjusted, so as to vary the diametric disposition of the flat tip, by inserting one or more washers 30 between the rear end of the tip and the outer end of the mixing-chamber, whereby the disposition of the flame may be adjusted to accommodate the burner to any particular adaptation thereof.

In some instances a fan-shaped flame may not be desired, and therefore it is designed to provide the burner with a cylindrical tip, as indicated at 31 in Figs. 6 and 7 of the drawings, whereby the forms of tips may be interchangeably applied to the burner, so as to adapt the latter to the existing circumstances surrounding the same.

An important feature of the present burner resides in the fact that the spiral mixer is arranged in a cylindrical portion of the mixing-chamber, so that the spiral passage formed thereby is not contracted, thereby to prevent choking of the fuel in the passage, the desired contraction of the discharge-passage being had by contracting the bore of the nozzle, which is fitted to the outer end of the mixing-chamber.

What I claim is—

1. An oil-burner, comprising a mixing-chamber, a burner-tip at one end thereof, a cap or head closing the opposite end of the chamber, a fuel-inlet centrally piercing the cap or head, steam-inlets piercing the cap or head at opposite sides of the fuel-inlet and

inclined within the head to intersect the range of the fuel-inlet, ports for the steam-inlets, valves for the ports, and handled valve-stems projected outwardly through the cap or head.

2. In an oil-burner, the combination with a tubular casing which has a truly cylindrical discharge end, of a mixer fitted into the discharge end of the casing and embodying a central stem and spiral flanges carried thereby with their outer edges snugly fitting the inner walls of the discharge end of the casing and forming open-ended circuitous passages, a fuel-inlet projected through the rear end of the casing and disposed to discharge centrally against the inner end of the mixer, and steam-inlets located at opposite sides of the fuel-inlet and inclined inwardly to discharge their steam-jets toward the inner ends of the circuitous passages of the mixer.

3. An oil-burner, comprising a mixing-chamber, a burner-tip at one end thereof, a cap or head at the other end of the chamber, a central fuel-inlet piercing the cap or head, a steam-inlet having branches lying transversely at opposite sides of the fuel-inlet, steam-ports communicating transversely between the branches and the interior of the chamber, valves for the ports, and handled valve-stems projected transversely through the branches.

4. An oil-burner, comprising a mixing-chamber, a head or cap at one end thereof, a fuel-inlet piercing the cap or head, a steam-inlet extending transversely across the head and having opposite open ends, and a removable closure-plug for one end of the steam-inlet to afford access to the interior thereof.

5. An oil-burner, comprising a mixing-chamber having a head or cap at one end, a central fuel-inlet piercing the cap or head, a steam-inlet having branches extending transversely across the head at opposite sides of the oil-inlet and open at their outer ends, removable closures fitted to the open ends of the branches, and steam-ports extending between the branches and the interior of the chamber.

6. An oil-burner, comprising a mixing-chamber, a cap or head at one end thereof, a transverse fuel-inlet extending across the head and having a lateral branch piercing the same, a transverse steam-inlet located opposite the fuel-inlet and having branches lying at opposite sides of the fuel-inlet and provided with open outer ends, removable closures for the branches, ports communicating transversely between the steam-inlet branches and the interior of the mixing-chamber, valves for the ports, and handled stems for the valves.

7. An oil-burner, comprising a mixing-chamber having a cap or head provided with a central perforation, a removable closure for the outer end of the perforation, a transverse fuel-inlet intersecting the perforation, a transverse steam-inlet located opposite the fuel-inlet and provided with branches lying at opposite sides of the fuel-inlet and having open outer ends, removable closures for the outer ends of the branches, ports communicating between the branches and the interior of the chamber and inclined toward the range of the fuel-inlet, valves for the ports, and handled stems for the valves.

8. An oil-burner, having its mixing-chamber provided with an internally-cylindrical portion, a mixer therein, comprising a stem provided with a ball at its inner end to form a deflector, and a spiral flange extending from a point substantially midway between the ends of the stem to the outer end thereof, the outer edge of the flange snugly fitting the wall of the mixing-chamber, steam and fuel inlets disposed to discharge against the mixer, and a nozzle fitted to the outer end of the mixing-chamber and having a tapered bore.

9. An oil-burner, having a mixing-chamber provided with an internal cylindrical portion, a mixer fitted therein and comprising a stem having an oil-deflector at its inner end, and spiral flanges embracing the stem with their outer edges fitting snugly the internal cylindrical portion of the mixing-chamber, and steam and fuel inlets disposed to discharge against the mixer.

10. An oil-burner, having a mixing-chamber provided in its outer end with sockets or seats, a burner-tip removably fitted to the socketed end of the chamber, and a mixer located within the chamber and having lugs or projections to fit within the sockets or seats.

11. An oil-burner, having a mixing-chamber, a burner-tip removably fitted thereto, and a spiral mixer located within the mixing-chamber and having portions clamped between said chamber and the burner-tip to hold the mixer in position.

12. An oil-burner, having a mixing-chamber which is provided in one end with internal sockets or seats, a burner-tip removably fitted to the socketed end of the chamber, and a mixer embodying a stem, spiral flanges embracing the stem, and outwardly-directed lugs or projections carried by the outer ends of the flanges and fitted in the seats or recesses.

13. In an oil-burner, the combination of a mixing-chamber having its forward end made internally cylindrical and provided with internal edge sockets or seats, a cap or head removably fitted to the other end of the chamber, a transverse fuel-inlet extending across the cap, a nipple piercing centrally the inner side of the cap and in communication with the fuel-inlet, a transverse steam-inlet located opposite the fuel-inlet and having branches lying at opposite sides of the fuel-inlet and provided with open outer ends, removable closures for the open ends of the branches, ports extending between the steam-inlet branches and the interior of the chamber and inclined toward the nipple, valves

for the ports, handled stems for the valves, a mixer-stem having its inner end provided with a deflector, spiral flanges carried by and embracing the stem with their outer edges fitting snugly a cylindrical portion of the mixing-chamber, lugs or projections carried by the outer ends of the flanges and fitted in the sockets or seats of the mixing-chamber, and a removable burner-tip applied to the socketed end of the mixing-chamber and clamping the lugs in the seats.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

JOHN B. NEUENDORFF.

Witnesses:
ANTON ADAM,
S. LEAL, Jr.