D. E. ERICKSON.

OIL BURNING APPARATUS.

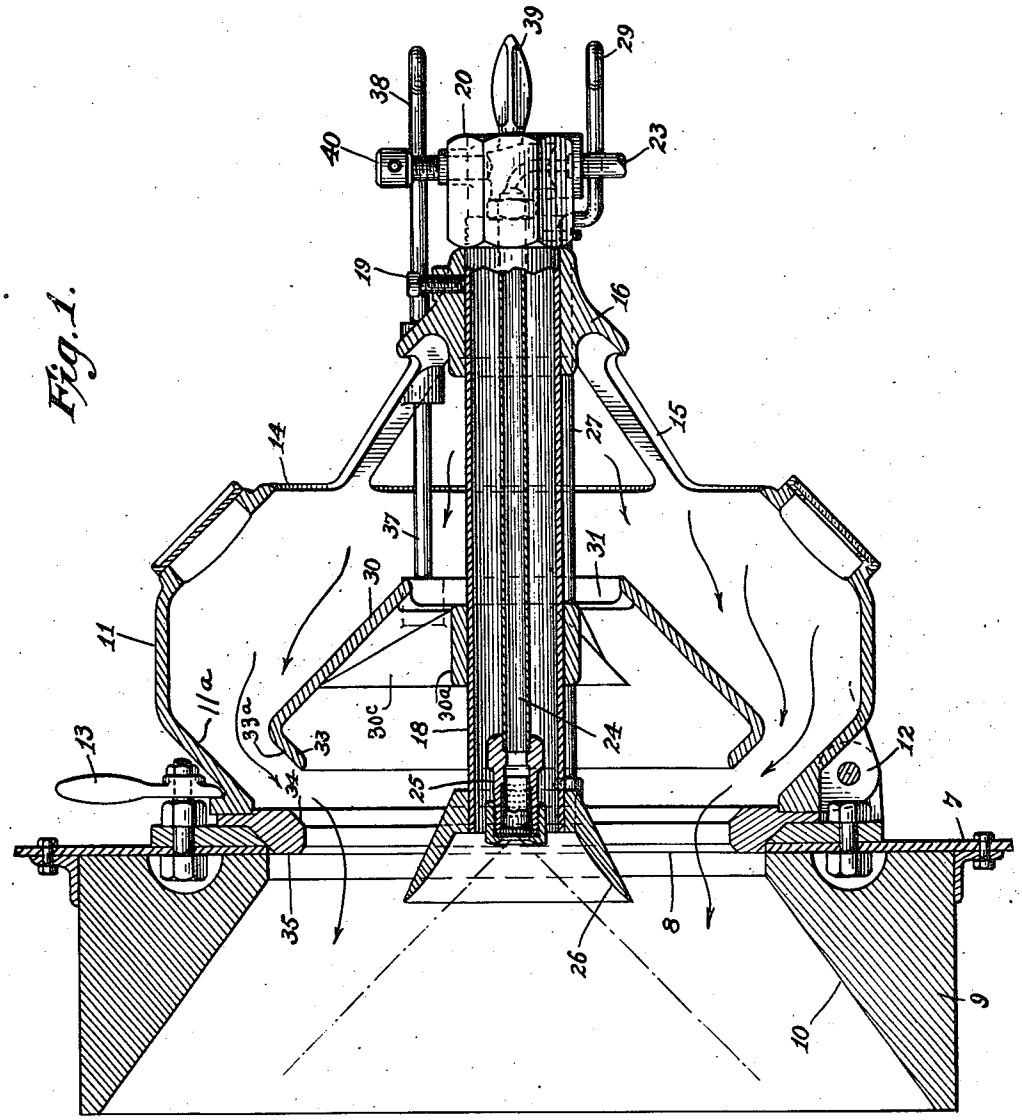
APPLICATION FILED MAY 11, 1920.

1,412,023.

Patented Apr. 4, 1922.

4 SHEETS—SHEET 1.

Fig. 1.



Daniel E. Erickson Inventor

By his Attorney

Royal W. France

D. E. ERICKSON.

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4 SHEETS—SHEET 2.

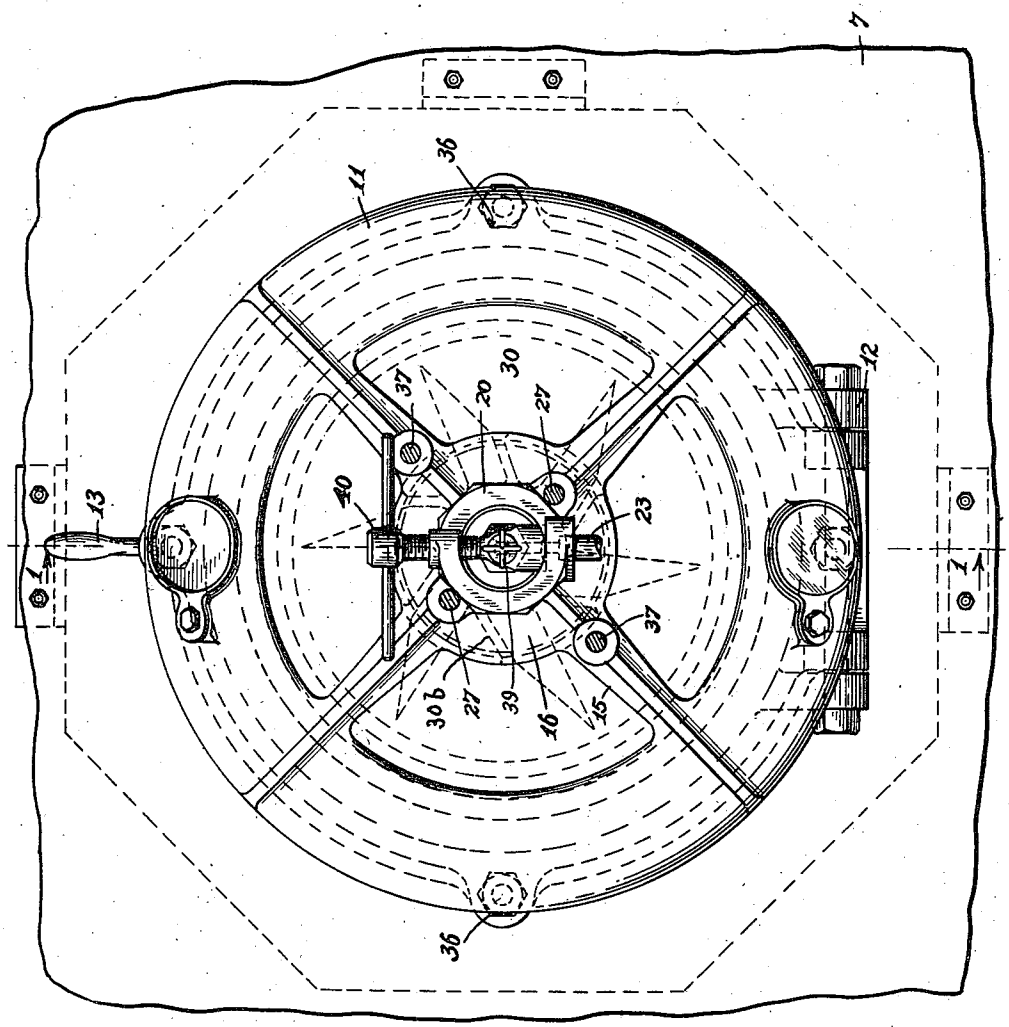


Fig. 2.

Daniel E. Erickson

Inventor

By his Attorney

Royal W. Prance

D. E. ERICKSON.

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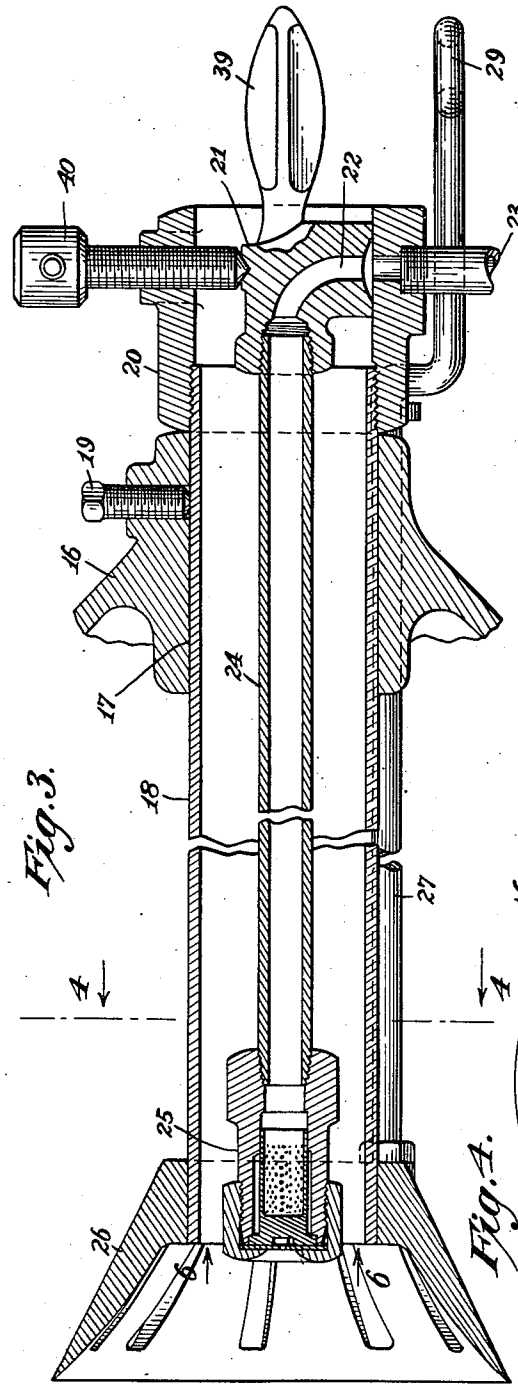


Fig. 3.

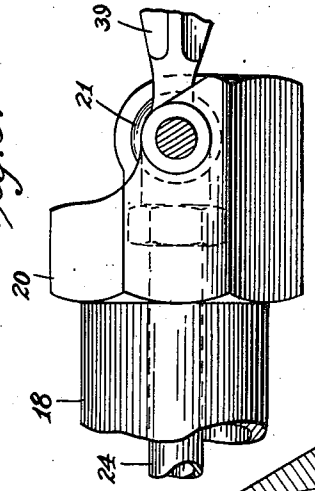


Fig. 5.

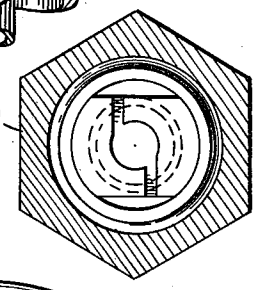


Fig. 6.

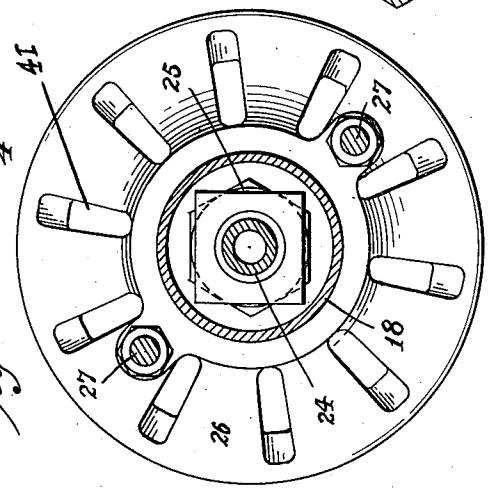


Fig. 4.

Daniel E. Erickson Inventor

By his Attorney

Royal W. Sturgis.

D. E. ERICKSON.

OIL BURNING APPARATUS.

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4 SHEETS—SHEET 4.

Fig. 8.

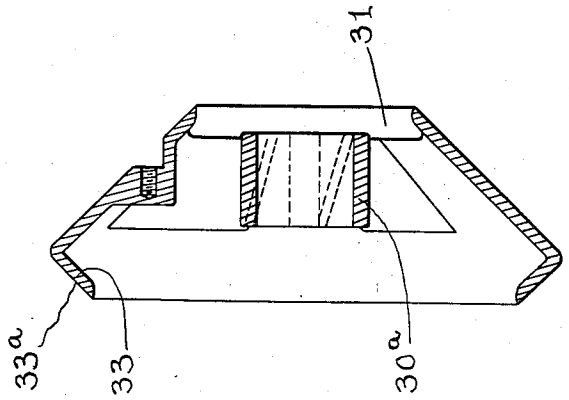
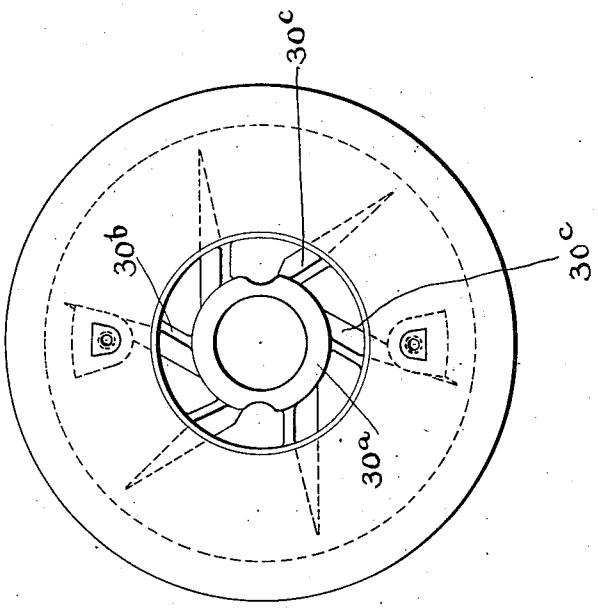


Fig. 7.



Inventor
Daniel E. Erickson
By his Attorney F. W. Barker

UNITED STATES PATENT OFFICE.

DANIEL E. ERICKSON, OF MAMARONECK, NEW YORK, ASSIGNOR TO TODD SHIPYARDS CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

OIL-BURNING APPARATUS.

1,412,023. Specification of Letters Patent. Patented Apr. 4, 1922.

Application filed May 11, 1920. Serial No. 380,605.

To all whom it may concern:

Be it known that I, DANIEL E. ERICKSON, a citizen of the United States, and residing in Mamaroneck, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Oil-Burning Apparatus, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to fuel-oil burning apparatus, and more particularly to improvements in oil-burners especially adapted for steam-boiler furnaces.

It is an object of the invention to provide an efficient and practical oil-burner of the character mentioned.

It is a further object to provide an improved apparatus whereby the fuel-oil is insured thorough volatilization and the combustion is effected with a proper, and regulable volume of air.

Another object is to provide an apparatus for the purpose set forth which is capable of ready adjustment to operate at maximum efficiency under different conditions, and is further capable of convenient assembly and dis-assembly when required.

Broadly, it is the object of the invention to provide an improved oil-burning apparatus having features of structural superiority and functional advantage.

Other objects and advantages will be noted hereinafter in connection with the following description of the accompanying drawings, which illustrate a preferred embodiment of the invention, and wherein

Figure 1 is a central sectional view of the burner apparatus, taken on the line 1—1 of Figure 2.

Fig. 2 is a front view thereof, with certain of the forwardly extending parts cut off and shown in section.

Fig. 3 is an enlarged view of certain of the apparatus illustrated in Figure 2.

Fig. 4 is a section on the line 4—4 of Fig. 3.

Fig. 5 is a fragmentary side elevation of the outer end of the device.

Fig. 6 is a section at the burner tip on line 6—6 of Fig. 3.

Fig. 7 is an end detail view of the deflector, exposing the baffle vanes through the air inlet, and

Fig. 8 is a side sectional elevation of Fig. 7 taken on the line 6—6 thereof.

Referring more particularly to the drawings, there is represented a part of a furnace front 7 having a circular opening 8 and an interior casting 9 secured thereto and affording a conoidal chamber 10 that expands inwardly from the opening 8. The oil-burning apparatus comprises, in general, a unitary assembly applied, and preferably hinged, to the furnace front concentric to the opening 8.

As illustrated, a casing member 11 is employed as the external supporting member of the burner and is connected to the furnace at its entrance by hinging at 12 so that it may be swung to expose the opening 8 or to close the same and be latched by pivoted element 13. Casing 11 is approximately cylindrical and has an open outer end 14 save for spider arms 15 which join the same with a materially smaller circular extremity 16 having a central bore 17 therethrough. The inward portion of casing 11 has the centering interior surface 11ª for directing the flow of air centrally toward the furnace entrance. The casing end 16 constitutes the support for a tube 18 extending through bore 17 and projecting inwardly to about the plane of the opening 8 in the furnace front. Tube 18 in turn is held by a set-screw 19 and its outer end is threaded to receive a hollow nut 20 which releasably holds a block 21 with a conduit 22 connecting the fuel supply pipe 23 and the discharge pipe 24. The latter is supported by block 21 and, extending axially within tube 18, is provided with a terminal burner tip 25. The burner tip is of character to effect volatilization of the oil, supplied preferably preheated and under pressure.

At the inner end of tube 18, there is also provided a surrounding flared element 26 which is longitudinally positionable and functions as an air deflector and flame cone. This element, in the construction shown, has attached thereto a pair of rods 27 extending parallel to the tube 18 and outward through casing extremity 16 to terminate in

handles 29 by which, and independently of other parts, the position of the element 26 may be adjusted along tube 18.

Also surrounding the burner tube is a second, and larger, conoidal element 30 having a central opening 31, at its smaller end, and having an inturned flange 33 at its larger end to co-act with the front surface 34 of an annulus 35, that is secured to the furnace front by bolts 36, said element 30 being movable along the tube 18 as by a second pair of rods 37 which protrude outwardly and terminate in handles 38, whereby element 30 is capable of independent adjustment to control the volume and force of the draft of incoming air, whereby the character of the combustible mixture may be governed.

The conoidal element 30, which, it will be noted, opposes its base or larger extent to the furnace opening 8, thereby constitutes a chamber for pre-heating the air supply that enters at the orifice 31. The flange 33, which is in the form of an annular inturned lip, presents its outer surface 33^a in opposition to the outer surface portion 34 of annulus 35, at a centering angle, said surfaces 33^a and 34 being in substantially concentric parallelism, to thereby accord a centering or conoidal formation to the volume of air flowing into the furnace from casing 11. It will of course be appreciated that the volume of air thus introduced, as well as its speed of travel, are regulable by the transverse extent of the passage between surfaces 33^a and 34, said extent being adjustable through the axial movement of member 30.

The conoidal member 30 is slidably mounted on tube 18 by a collar 30^a, which connects with member 30 by radial or spider arms 30^b. Also carried by collar 30^a is a series of radial, angularly disposed vanes 30^c, that extend transversely between the opening 31 in member 30 and the furnace opening, thus serving the twofold purpose of causing air that passes to the furnace through opening 31 to have a whirling motion, and also comprising a baffle which prevents the direct radiation of furnace heat out through opening 31. In effect heat is by this means conserved within member 30, which thus becomes a preheating chamber for the air supply that enters through opening 31, thereby enhancing its combustion supporting efficiency. The air deflecting element 26 which surrounds the burner tip may be provided with openings, here shown in the form of slots 41, to permit some of the preheated air from member 30 to enter within the conoidal chamber of element 26, to thus aid in the support of combustion near the flame genesis, where the burner tip is supplied with air by supply entering through tube 18.

The technical effect achieved in improved combustion by thus intermingling the air supplies in the region of flame generation is important, and, I believe, new with me in the art.

Block 21 has a handle 39 and may be conveniently mounted by a screw 40 so that the block and pipe 24 and burner tip 25 can be withdrawn readily and as a unit when desired for any purpose.

In operation oil is projected into the combustion chamber through the burner tip 25 and in a finely divided state forming a combustible mixture with air which enters through tube 18, through casing 11, around and through conoidal member 30, and through the slots in member 26. The adjustment of said member 30, and the independent adjustment of the member 26, as described, enables a regulation and fine control of the course of incoming air and thereby the relative proportions of air and oil in the combustible mixture as well as the shape and length, to an extent, of the burning flame. When the conoidal member 30 is withdrawn its full length from the furnace it closes the air intake to casing 11, and constitutes a door shutting off the passage of air to the furnace.

It will thus be observed that the apparatus as described attains, among others, the objects and advantages before noted. It is to be understood, however, that the invention is capable of modification without departing from the intended scope of the following claims.

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

1. In an oil burning furnace, in combination, a hollow casing comprising a furnace front with central oil supply means, said casing having outward air intake means and inward means of delivery to the furnace, a hollow conoidal air deflector within said casing whose larger portion is directed inwardly and whose smaller portion is provided with an air inlet, and baffle means within said deflector to prevent the direct radiation of furnace heat, thereby according the deflector interior the character of a pre-heating zone.

2. In an oil burning furnace, in combination, a hollow casing comprising a furnace front, with central oil supply means, said casing having outward air intake means and inward means of delivery to the furnace, a hollow conoidal air deflector within said casing whose larger portion is directed inwardly and whose smaller portion is provided with an air inlet, baffle means within said deflector to prevent the direct radiation of furnace heat, thereby according the deflector interior the character of a pre-heating zone, and means of axial adjustment for said deflector.

3. In an oil burning furnace having an annulus at its entrance, in combination, a

hollow casing comprising a furnace front, with central oil supply means, said casing having outward air intake means and inward means of delivery to the furnace, a hollow, conoidal air deflector within said casing whose larger portion is directed inwardly, and an angularly inturned flange about said deflector at its larger portion, to co-act with said annulus in centeringly directing the flow of air into the furnace.

4. In an oil burning furnace having an annulus at its entrance, in combination, a hollow casing comprising a furnace front, with central oil supply means, said casing having outward air intake means and inward means of delivery to the furnace, a hollow, conoidal air deflector within said casing whose larger portion is directed inwardly, an angularly inturned flange about said deflector at its larger portion, to co-act with said annulus in centeringly directing the flow of air into the furnace, and means of axial adjustment for said deflector.

5. The combination, with an oil burning furnace having a circular entrance, of a hollow casing connecting with said entrance, said casing having outward air inlet means, and an inward, centeringly angled interior surface, an oil pipe axially penetrating said casing, said pipe having a burner tip, and a conoidal air deflector supported within said casing with its larger portion directed toward the furnace entrance, said larger portion having an exterior, inwardly angled surface to co-act with the angled surface of said casing in directing the flow of air from said casing toward the furnace entrance.

6. The combination, with an oil burning furnace having a circular entrance, of an annulus at said entrance having an inwardly constricted forward surface, a hollow casing connecting with said annulus, said casing having outward air inlet means and an inward, centeringly angled interior surface, an oil pipe axially penetrating said casing, said pipe having a burner tip, and a conoidal air deflector supported within said casing with its larger portion directed toward the furnace entrance, said larger portion having an exterior, inwardly angled surface to co-act with the constricted surface of said annulus in directing the flow of air from said casing into the furnace.

7. Oil burning apparatus including, in combination, main air supply means, an oil supply pipe having a terminal nozzle, a tube surrounding said pipe, and a conoidal member at the delivery end of said tube, surrounding said nozzle, said tube serving to conduct air contactingly past the nozzle, and said conoidal member having openings for the passage of air from the main supply into the region of flame generation.

8. Oil burning apparatus including, in combination, main air supply means, an oil supply pipe having a terminal nozzle, a tube surrounding said pipe, a conoidal member at the delivery end of said tube, surrounding said nozzle, said tube serving to conduct air contactingly past the nozzle, and said conoidal member having openings for the passage of air from the main supply into the region of flame generation, and means of longitudinal adjustment for said conoidal member.

9. In oil burning apparatus, in combination, an annulus comprising a furnace entrance, a substantially cylindrical casing having rearward air intake means, an oil pipe supported axially through said casing and having a terminal burner tip; a conoidal air deflector surrounding said pipe in spaced relation therewith, to provide a concentric air inlet, the diameter of said deflector exceeding the diameter of said annulus, and radial, inclined vanes disposed in said casing to prevent direct heat radiation through said air inlet and thus maintain a heated zone within said deflector.

10. In oil burning apparatus, in combination, a substantially cylindrical casing; an oil pipe supported axially therethrough and having a burner tip at its inner end; a conoidal air deflector surrounding said pipe and having its larger portion directed rearwardly, said deflector being adjustable longitudinally with respect to said casing and said burner tip; and a second conoidal element surrounding said pipe adjacent to said burner tip and adjustable longitudinally with respect thereto and to said deflector.

In witness whereof, I affix my signature in the presence of two witnesses.

DANIEL E. ERICKSON.

Witnesses:
SARA B. MAPES,
MARION A. POTTER.