

May 13, 1924.

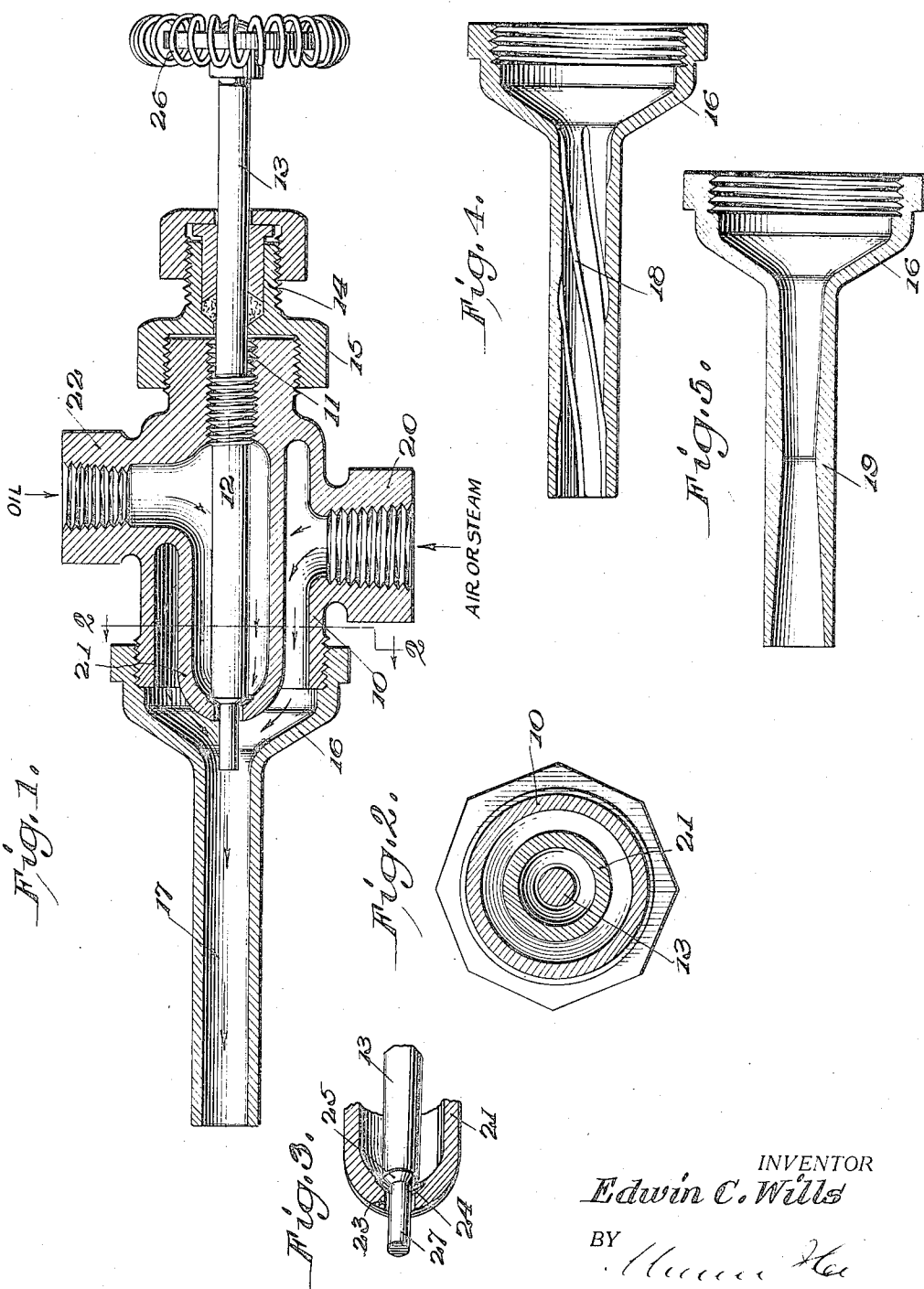
1,493,584

E. C. WILLS

OIL BURNER

Filed June 30, 1923

3 Sheets-Sheet 1



INVENTOR
Edwin C. Wills
BY *Wm. H. H.*
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Fig. 6.

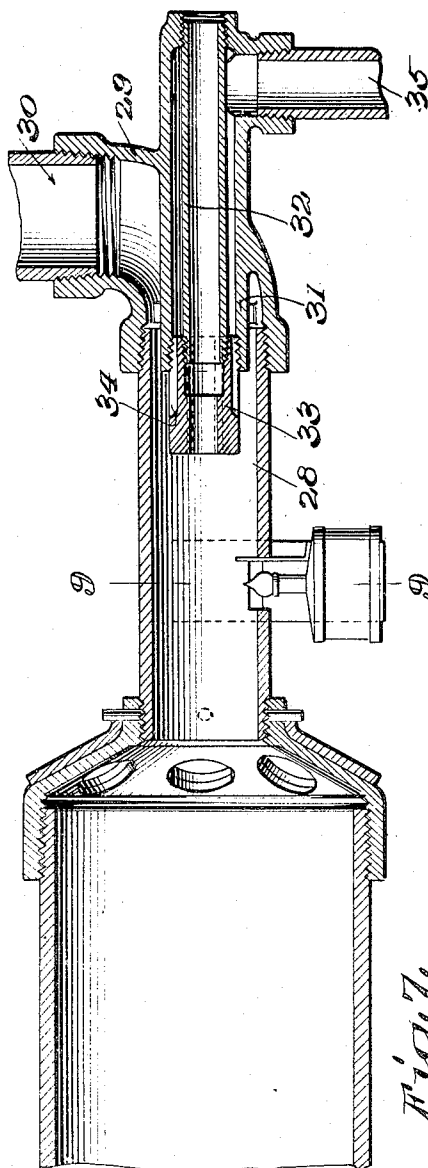


Fig. 8.

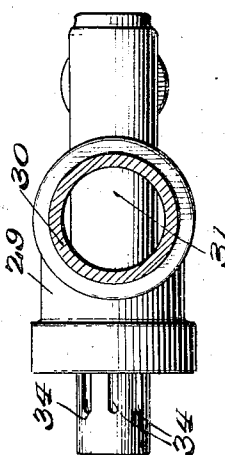


Fig. 9.

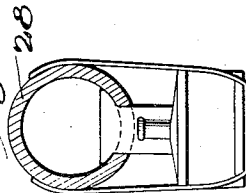
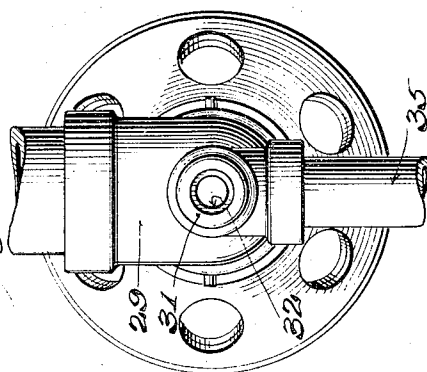


Fig. 7.



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Fig. 10.

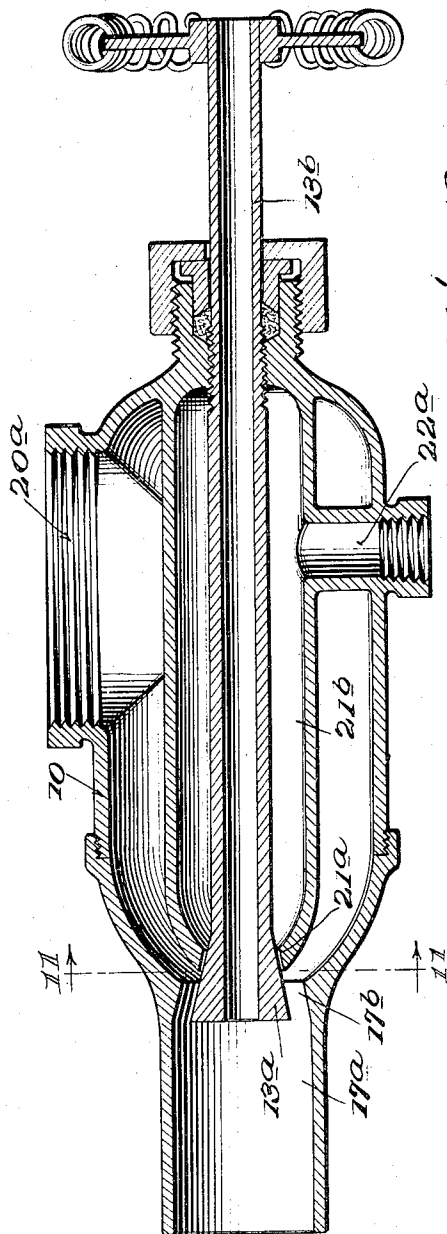


Fig. 13.

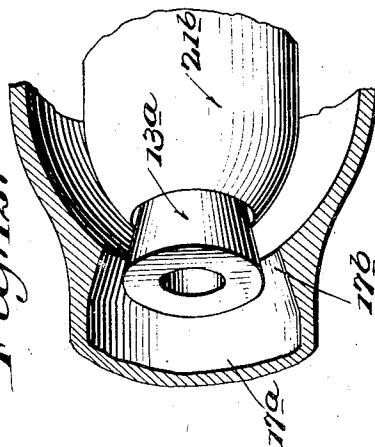
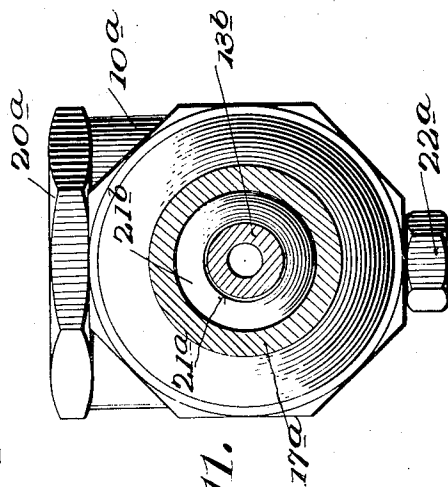


Fig. 11.



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UNITED STATES PATENT OFFICE.

EDWIN COOPER WILLS, OF EAST ORANGE, NEW JERSEY, ASSIGNOR OF ONE-THIRD TO
T. GORDON HOAGLAND, OF ROCKAWAY, NEW JERSEY.

OIL BURNER.

Application filed June 30, 1923. Serial No. 648,724.

To all whom it may concern:

Be it known that I, EDWIN C. WILLS, a citizen of the United States, and a resident of East Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Oil Burners, of which the following is a specification.

My present invention relates generally to oil burners and among its many objects is the provision of a burner in connection with which oil and air or steam are fed under pressure and under control of certain parts whose construction and arrangement is such as to promote thorough vaporization and a breaking up of the oil into a fog with greater efficiency and economy as a result.

A further object is the provision of a burner construction which will admit of readily clearing the burner nozzle of carbon and other collections without disturbing the burner mounting of whatever nature this may be, and without requiring that the burner be taken apart.

A still further object is the provision of a burner having removable interchangeable nozzles by means of which the flame may be delivered as desired dependent upon the requirements in use.

In the accompanying drawings in which I have shown certain forms of my invention,

Figure 1 is a longitudinal section taken centrally through the preferred form of my invention,

Figure 2 is a detail transverse section taken therethrough substantially on line 2—2 of Figure 1,

Figure 3 is a fragmentary section through the delivery end of the oil nozzle,

Figures 4 and 5 are central longitudinal sections through burner nozzles interchangeable with the burner nozzles of Figure 1,

Figure 6 is a central longitudinal section through a modified form of burner,

Figure 7 is an end view thereof,

Figure 8 is a top plan view of Figure 6 with the burner nozzle or pipe removed,

Figure 9 is a cross section taken on line 9—9 of Figure 6,

Figure 10 is a vertical longitudinal section taken centrally through another modified form,

Figure 11 is a cross section taken on line 11—11 of Figure 10, and

Figure 12 is a detail fragmentary perspective view of certain of the parts of Figure 10.

Referring now to these figures and particularly to the preferred form shown in Figures 1 to 5 inclusive my invention proposes a burner including a cylindrical casing 10, through one end of which an axial threaded bore 11 is formed for the intermediate threaded portion 12 of a valve stem 13 whose outer portion extends through a stuffing box 14 formed in connection with a cap 15 threaded upon and around the same end of the casing 10 and detachable therefrom.

The opposite end of the casing 10 is open and externally threaded for the detachable connection of the enlarged inner portion 16 of a burner pipe or nozzle which may be either cylindrical and of one internal diameter throughout with a smooth inner surface as indicated at 17 in Figure 1 or may be cylindrical with internal spiral grooves as at 18 in Figure 4 or provided with a centrally constricted bore with oppositely flaring inner and outer portions as indicated at 19 in Figure 5, the several burner nozzles or pipes being interchangeable by virtue of their cylinder provision for detachable threaded connection with the open end of the casing 10.

At one side intermediate its ends, the casing 10 has an internally threaded nipple 20 for pipe connection with any suitable source of air or steam under pressure whereby such air or steam may be fed into the casing for passage through the open end of the latter around an axially disposed oil nozzle 21 into which oil is fed through an internally threaded nipple 22 at the diametrically opposite side of the casing 10 with respect to the air or steam nipple 20.

At its delivery end, slightly beyond the open end of the casing 10, the oil nozzle

21 has an axial delivery opening 23 and is provided with a valve seat 24 at the inner end of said opening, to receive there-against the valve forming shoulder 25 at the inner forward portion of the valve stem 13, the latter of which is manipulated by a handle 26 at its outer end.

According to this form of my invention the shouldered inner portion of the valve stem 13 has a cylindrical reduced extension 27 which projects through the oil delivery aperture 23 of the oil nozzle and beyond the same so that when the valve stem 13 is turned to slightly unseat valve 25, oil under pressure will be forced through the aperture 23 in the form of a film upon the surface of the extension 27. In this instance the extension 27 has a smooth cylindrical surface so that the oil film extends continuously therearound, the extension forming a solid backing for the film of oil so that the blast of air or steam entering around the oil nozzle will strike the oil film and instantly break the same completely into such fine particles as to promote thorough vaporization and in fact completely fog the oil so that it will burn without loss and promote efficiency as well as economy.

The oil nozzle 21 as well as its oil outlet aperture 23 being axially disposed within the casing 10 it is obvious that the removable valve stem 13 upon removal provides for the passage of a rod or other implement axially through the casing and completely through burner pipe or nozzle so that accumulations of carbon or other matter may be quickly cleared out without disturbing the mounting of the burner as a whole or requiring that it be further taken apart.

Somewhat similar results in so far as the complete vaporization of the oil is concerned, may be secured with the form of my burner shown in Figures 6 to 9 inclusive wherein the burner pipe or nozzle 28 forms a part of the mixing chamber at the open end of the casing 29 to which the air or steam supply pipe 30 is connected, and within which the oil delivery nozzle 31 extends. This nozzle 31 in this instance carries an inner axial tube 32 and is threaded at its inner delivery end for the reception of an extension sleeve 33 having lengthwise grooves 34 in its external surface extending beyond the end of the oil nozzle so that oil from the delivery end of the nozzle 31, which oil is fed to the outer portion of the oil nozzle through an oil feed pipe 35, finds its way into the grooves 34 and finally upon the smooth surface of the latter beyond the ends of the grooves where it is struck by the blast of air entering the burner pipe or nozzle 28. It will be noted that the bore of sleeve 33 aligns with the bore of the inner tube

of the oil delivery nozzle so that any additional air required to support complete combustion can thus be easily drawn into the burner nozzle or pipe.

Similar results are also obtainable with still another form of construction shown in Figures 10, 11 and 12, along the lines of the construction shown in Figures 1 to 5 inclusive but adapting the invention to a low pressure burner, the burner pipe or nozzle 17^a having a constricted portion 17^b around the flaring adjacent end 13^a of the valve stem 13^b. In this instance the flaring end 13^a not only constitutes a valve a portion of which is to be seated within the conformable valve seat 21^a of the oil nozzle 21^b fed through a nipple 22^a, but the enlargement of the valve stem also presents a smooth external surface and a solid backing for the film of oil fed thereon within the path of air passing through the constricted portion 17^b of the burner pipe or nozzle, the air being fed into the casing 10^a through an enlarged nipple 20^a. This form of the invention is, like the form of Figures 1 to 5 inclusive, adaptable to the interchange of burner pipes or nozzles whereby the flame may be projected therefrom in any desired shape or form. In the last mentioned modification the valve stem 13^b may be hollow whereby like the form of Figures 6 to 9 inclusive such additional air as may be necessary to promote complete combustion may be drawn in through the hollow of the stem.

Thus in so far as the complete vaporization of the oil is concerned as well as the increased efficiency and greater economy due to the foregoing is concerned, the several forms of my invention are similar in their action, the oil spreading in each instance in a film continuously around and upon a smooth surface which presents a solid backing for the film of oil within the path of the air so that the oil is thus completely broken up and vaporized.

I claim:

1. An oil burner including a casing open at one end and having an axial threaded bore in its opposite end and an inlet nipple intermediate its ends, an oil nozzle axially of the casing and extending toward its open end, said nozzle having an oil inlet and being in open communication with the said bore of the casing and also having a constricted forward end and an oil discharge aperture in said constricted end adjacent to the open end of the casing in axial alignment with the said bore, provided with a valve seat around its inner end, a burner nozzle detachably threaded on the open end of the casing and having a reduced portion forwardly beyond the said constricted end of the oil nozzle, and a valve stem having a handle at its outer end and a reduced ex-

tension at its inner end forming an annular shoulder constituting a valve to engage said valve seat said extension projecting into the said reduced portion of the burner nozzle.

5 2. An oil burner including a casing open at one end and having an axial threaded bore in its opposite end and an inlet nipple intermediate its ends, an oil nozzle axially of the casing and extending toward its open
10 end, said nozzle having an oil inlet and being in open communication with the said bore of the casing and also having a constricted forward end and an oil discharge aperture in said end adjacent to the open
15 end of the casing and in axial alinement with the said bore, said aperture being provided with a valve seat around its inner end, a burner nozzle detachably threaded on the
20 open end of the casing, and a valve stem having a handle at its outer end and a reduced cylindrical extension at its inner end forming a forwardly facing annular shoulder at the inner end of said extension constituting a valve to engage said valve seat,

said reduced extension of the valve stem 25 projecting through and beyond the discharge aperture of the oil nozzle and having a smooth cylindrical surface for the purpose described.

3. An oil burner including a casing open 30 at one end, having a fluid inlet, an oil nozzle axially within the casing having a constricted discharge end and an oil discharge aperture at said end adjacent to the open
end of the casing and also having an oil 35 inlet, a bodily removable valve stem extending into the casing and axially through said oil nozzle for cooperation with the oil discharge aperture, and a burner nozzle having
an annularly enlarged portion at one end 40 detachably threaded upon and around the open end of the casing and having a reduced portion beyond the open end of the casing, said valve stem having a reduced extension
at its free end projecting through the said 45 oil discharge aperture and into the said reduced portion of the burner nozzle.

EDWIN COOPER WILLS.