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J. W. PROSSER

1,611,067

BURNER

Filed August 5, 1922

Fig. 1.

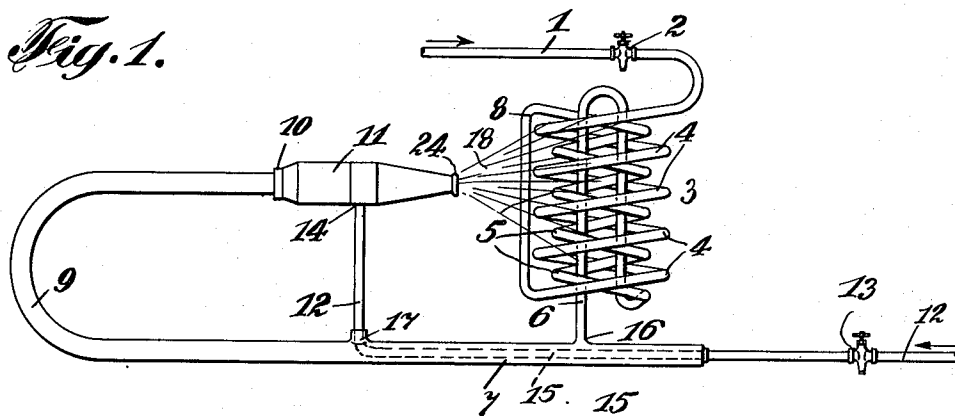


Fig. 2.

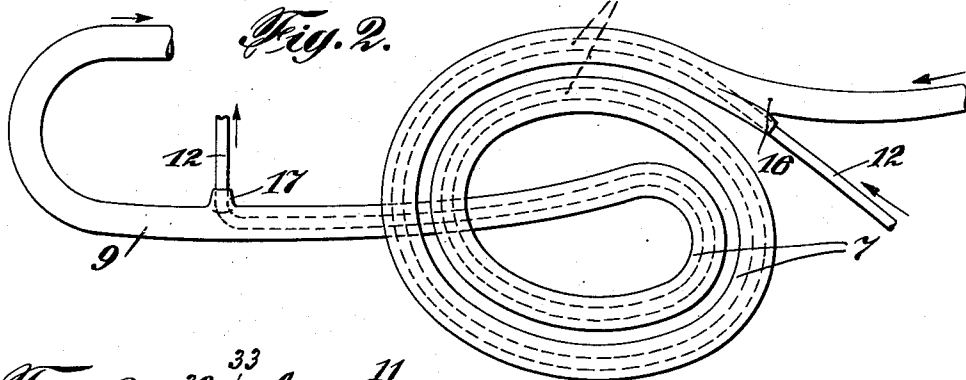


Fig. 3.

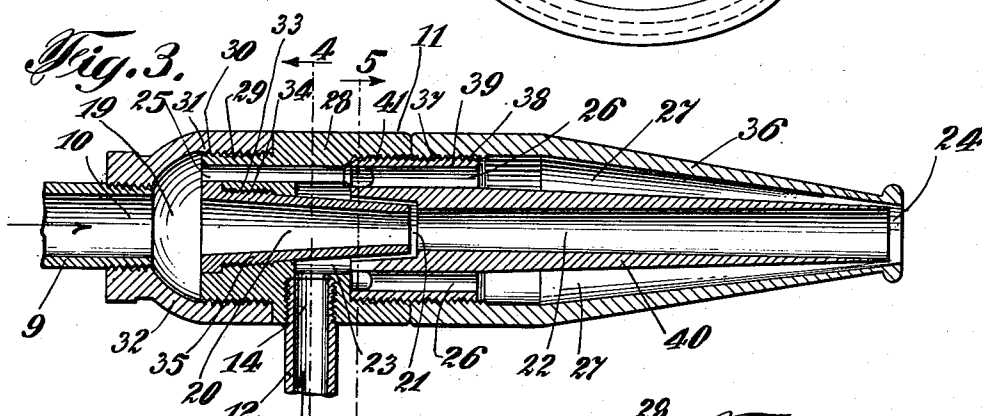


Fig. 5.

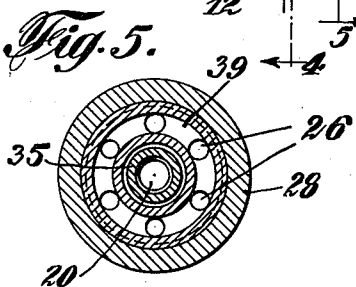
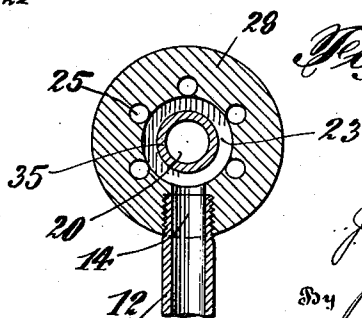


Fig. 4.



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BURNER.

Application filed August 5, 1922. Serial No. 579,831.

This invention relates to burners and more particularly to liquid and gaseous fuel burners using oil and steam.

One of the principal aims of my invention is to provide a burner which produces intense heat. A further object of my invention is to provide a fuel burner which is extremely efficient in operation, durable and simple in construction, and one which may be easily operated and controlled. Another object of my invention is to provide a fuel burner whereby very complete combustion is obtained. A further object of my invention is to provide a mixer or burner head whereby liquid fuel is thoroughly atomized and vaporized and whereby the component parts of the ignitable mixture are efficiently and thoroughly intermixed and discharged, and the discharged mixture, when ignited, produces intense heat and very complete combustion. Another object of my invention is to provide such a burner head or mixer of simple and durable construction, and one which comprises a plurality of component parts removably associated together so that the head may be easily taken apart for cleaning or replacement of one or more of the parts. Other objects of my invention will be in part obvious and in part pointed out hereinafter.

In accordance with my invention, the combustible mixture created by my improved burner consists of a mixture of vaporized fluid fuel and superheated gaseous matter. The burner comprises a suitable retort disposed in front of a burner head or mixer so as to be heated by the flame produced at the burner head, to produce the steam for the head and also, if desired, to vaporize the fluid fuel therefor. In a preferred form, the mixing head is arranged to provide two separate steam jets. One jet is of the siphon type and operates to siphon fluid fuel into the head, to atomize and vaporize the fuel, if liquid, and to intermix the fuel with the steam of this jet. The other steam jet is of the annular, vacuum type and discharges adjacent the discharge opening of the mixer. This jet operates to draw the mixture produced by the first jet to this opening and to intermix there the steam of the vacuum jet with the mixture produced by the first jet to produce the final combustible mixture which is discharged by the head. This final

mixture, when ignited, produces intense heat and its combustion is practically perfect.

In order that a clearer understanding of my invention may be had, attention is hereby directed to the accompanying drawings forming a part of this application and illustrating one possible embodiment of my invention. Referring to the drawings, Fig. 1 shows diagrammatically and in side elevation, a fuel burner embodying my invention; Fig. 2 is a diagrammatic top plan view of the combined steam and fuel coils; Fig. 3 is a vertical section of the mixing head; Fig. 4 is a vertical section of the mixing head, and is taken on the line 4—4 of Fig. 3, and Fig. 5 is a vertical section of the mixing head and is taken on the line 5—5 of Fig. 3. Similar reference characters refer to similar parts throughout the several views of the drawings.

Referring to the drawings, pipe 1 leads from a suitable source of water supply, not shown, through valve 2, which may be of the pressure regulating type, if desired, first into retort 3, wherein the water is converted into steam. Retort 3, as shown, may consist of piping coiled to form an outer helix 4, an inner and reversely wound helix 5, within helix 4, vertical pipe 6 and a spiral plate coil 7 disposed below the helices 4 and 5. The lower end of helix 4 is connected with the upper end of helix 5 by means of pipe 8, and the end of plate coil 7 is connected by pipe 9 to the steam inlet opening 10 of the mixing head 11.

Pipe 12 leads from a suitable source of fluid fuel supply, not shown, through valve 13, to the fuel inlet opening 14 of the mixing head 11.

The fuel may be conducted directly to the head without heating, or, if it is desired to heat the fuel before it reaches the head, the fuel may be conducted through a pipe 15 which enters the plate coil 7 of the retort at 16, and leaves the coil 7 at 17.

Retort 3 is positioned so that the flame of the mixing head will play upon it to vaporize the water and to heat the fuel, the heating of the fuel, however, being accomplished indirectly through the intervention of the pipes of and steam in plate coil 7.

The mixing head 11 is arranged to provide adjacent the steam inlet opening 10, a chamber 19 from which steam flows in a jet

through and from tapered central passage 20, through small chamber 21 into central passage 22. Head 11 also provides an annular chamber 23 in open communication
 5 with fuel inlet opening 14 and with chamber 21 so that as the jet of steam passes through chamber 21 into passage 22 it siphons fuel into the head and to chamber 21, and operates to atomize and vaporize this
 10 fuel and to mix it with the steam of the jet and to impel the mixture into and through passage 22 which leads to the discharge opening 24 of head 11. Head 11 also provides passageways 25 and 26 which direct steam
 15 from chamber 19 into an annular passageway 27 which bypasses and surrounds passage 22 and opens at the discharge opening 24 of head 11. The highly heated steam product is emitted from passage 27 in an
 20 annular jet which tends to draw the mixture in passage 22 to the discharge opening 24 and mixes therewith to produce a combustible mixture emitting from the head 11 in a stream, which, when ignited, produces the
 25 flame 18 of the burner.

The mixing head may be constructed by detachably assembling together a plurality of component parts. In a preferred form the head 11 includes an annular central member 28, provided with a rearwardly extending annular boss 29, having exterior threads
 30 engaged by interior threads 31 of a cup-shaped, rear cap member 32. The steam inlet opening 10 is formed at the rear of member 32. Boss 29 of member 28 has interior threads 33 which engage threads 34 of an interior nozzle 35 which extends within the central opening of annular member 28. Nozzle 35 is thus firmly and securely positioned
 35 in place and cooperates with member 28 to provide the annular chamber 23 which is in open communication with the fuel inlet opening 14. An exterior nozzle portion 36 has interior threads 37 adjacent its rear end in engagement with exterior threads 38 provided on a boss 39 formed at the rear end of an interior tube 40. Boss 39 and threads 38 thereon extend rearwardly and engage the interior threads 41 on the forward part of
 40 member 28. Member 28 and boss 39 of member 40 are provided, respectively, with the aligned axial passageways 25 and 26. Nozzle 36 and tube 40 extend to and are open at the discharge opening 24 of head 11 and cooperate to provide the annular steam passage 27 leading thereto.
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The manner in which the steam and fuel flow through the head, become mixed therein, and are emitted as a combustible mixture has been described above, and from the foregoing the operation of the burner will be readily apparent.

The burner may be started in operation in any one of several well known ways, as by
 50 applying a torch to retort 3 until the burner

produces an ignitable mixture. When the burner is operating the flame may be controlled by manipulating water valve 2 and fuel valve 13.

As many changes may be made in the above construction and as many different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

What I claim is:—

1. A burner comprising a central head portion having an exteriorly threaded boss projecting from the rear of the same and an internally threaded socket in the front of the same, an internally threaded cap engaged over said boss and provided with an inlet for superheated steam products, a nozzle entered in the back of said head portion and projecting through the front thereof, said head portion having an open front chamber in the front of the same surrounding the projecting portion of said nozzle, said chamber having a fuel inlet in one side of the same, a mixing tube having an exteriorly threaded boss at the base of the same engaged in the interiorly threaded socket of the head portion, said boss providing a closure to the open front of the fuel chamber and serving to position the bore of the mixing tube in front of and in line with the nozzle, an exteriorly threaded nozzle interiorly threaded at its rear end and engaged over the externally threaded boss of the mixing tube to form an annular chamber about the mixing tube terminating in an annular jet at the mouth of the mixing tube.
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2. A burner comprising a central head portion having an exteriorly threaded boss projecting from the rear of the same and an internally threaded socket in the front of the same, an internally threaded cap engaged over said boss and provided with an inlet for superheated steam products, a nozzle entered in the back of said head portion and projecting through the front thereof, said head portion having an open front chamber in the front of the same surrounding the projecting portion of said nozzle, said chamber having a fuel inlet in one side of the same, a mixing tube having an exteriorly threaded boss at the base of the same engaged in the interiorly threaded socket of the head portion, said boss providing a closure to the open front of the fuel chamber and serving to position the bore of the mixing tube in front of and in line with the nozzle, an exteriorly threaded nozzle interiorly threaded at its rear end and engaged over the externally threaded boss of the mixing tube to form an annular chamber about the mixing tube terminating
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in an annular jet at the mouth of the mixing tube, the central head portion having a passage extending through the rearwardly projecting boss into the socket in the front 5 of the head member and the boss in the mixing tube having a passage therethrough in communication with said first passage.

3. A burner comprising a central head portion having an exteriorly threaded boss 10 projecting from the rear of the same and an internally threaded socket in the front of the same, an internally threaded cap engaged over said boss and provided with an inlet for superheated steam products, a nozzle 15 entered in the back of said head portion and projecting through the front thereof, said head portion having an open front chamber in the front of the same surrounding the projecting portion of said nozzle, 20 said chamber having a fuel inlet in one side of the same, a mixing tube having an ex-

teriorly threaded boss at the base of the same engaged in the interiorly threaded socket of the head portion, said boss providing a closure to the open front of the fuel 25 chamber and serving to position the bore of the mixing tube in front of and in line with the nozzle, an exteriorly threaded nozzle interiorly threaded at its rear end and engaged over the externally threaded boss of 30 the mixing tube to form an annular chamber about the mixing tube terminating in an annular jet at the mouth of the mixing tube, a retort coil supported with its convolutions inclined to the horizontal, water 35 supply connections to one end of said coil and a connection from the other end of the coil to the end cap of the burner head arranged to position the burner with the flame 40 issuing therefrom, directed against the inclined convolutions of the coil.

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