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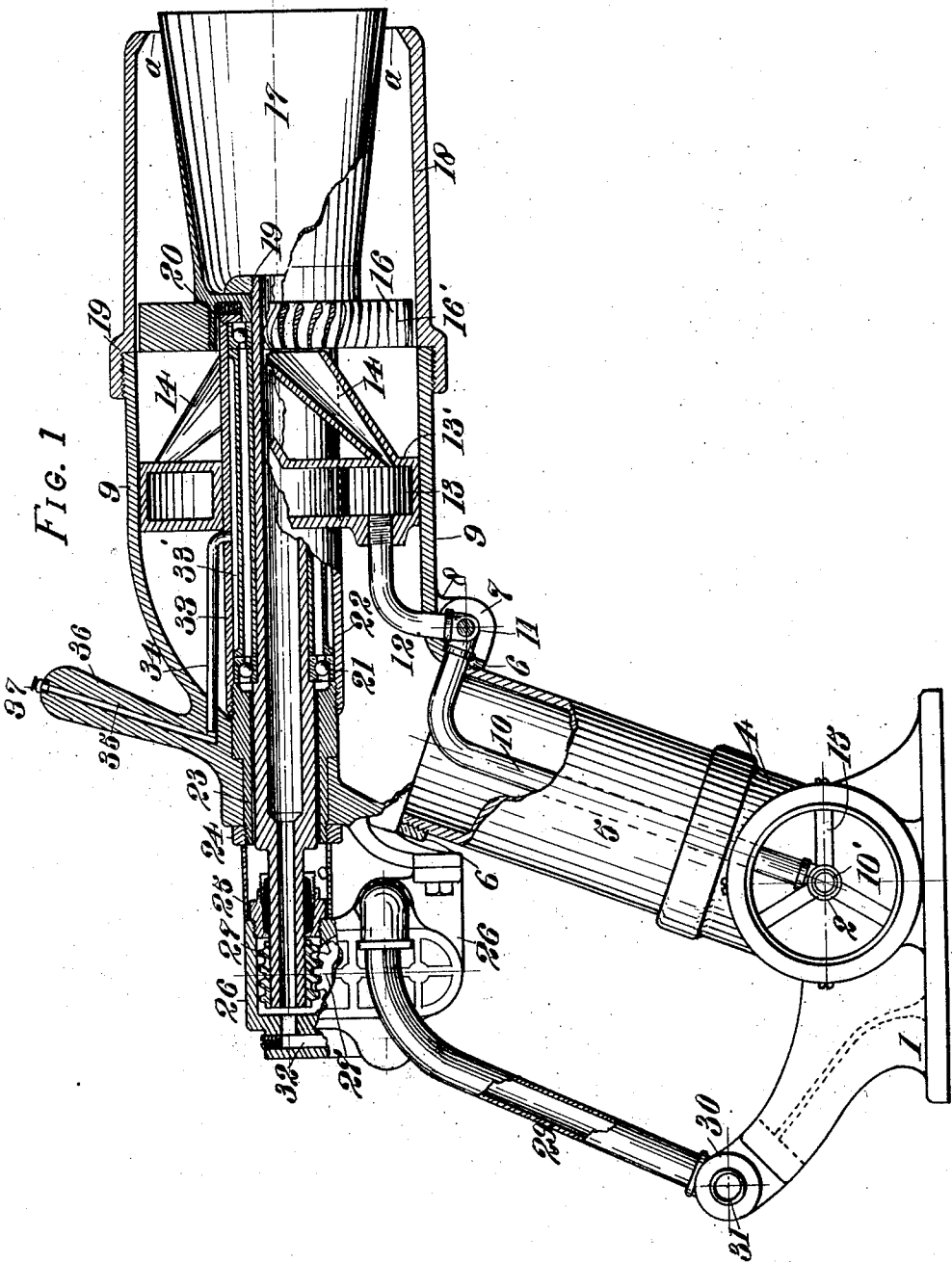
1,476,971

B. W. HURD

OIL BURNER

Filed July 29, 1922

2 Sheets-Sheet 1



INVENTOR.

B. W. Hurd
by Arthur T. Johnson
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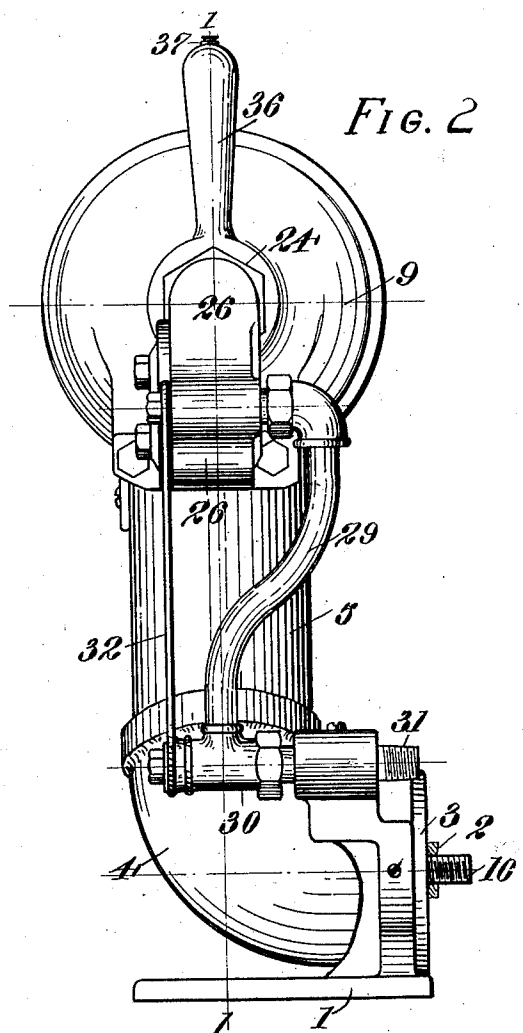
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INVENTOR.

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UNITED STATES PATENT OFFICE.

BENJAMIN W. HURD, OF SAN FRANCISCO, CALIFORNIA.

OIL BURNER.

Application filed July 29, 1922. Serial No. 578,491.

To all whom it may concern:

Be it known that I, BENJAMIN W. HURD, a citizen of the United States, residing at the city and county of San Francisco and State of California, have invented certain new and useful Improvements in Oil Burners, of which the following is a specification.

The herein described invention relates to a burner adapted more particularly for use in connection with marine boilers generally, although the same is equally as well adapted for use in connection with any type of boiler or furnace, such as locomotive boilers, house furnaces, and in fact wherever burners are employed for heating purposes, or for use in connection with boilers for steam generation.

The objects of the invention are to provide a structure for the intermixing or atomization of steam and oil for vaporization and the ejection thereof from the burner as a vapor stream; to provide a burner whereby the pumping action of the oil is performed or carried out by the rotary action of the spray or distributing cup of the apparatus; to provide a burner whereby all of the co-acting working instrumentalities thereof shall be embodied as a single working unit readily attachable or detachable from the steam pressure supply pipe and the oil supply pipe whereby the burner may be removed as an integral structure from the pipe lines; to provide a burner which permits of being moved into and out of the fire-box with a rocking action; to provide a burner having an interiorly arranged steam pressure reservoir provided with nozzles for conveying said fluid as ejecting streams for acting onto vanes of a turbine structure for imparting rotary action to the spray or distributing cup; to provide interconnected working instrumentalities whereby the rotary action of the cup or distributor is transmitted to the means for operating the oil supply pump for the delivery of oil through a longitudinally disposed conduit into the said rotary cup; to provide a burner simple of construction, efficient as to action, economical and durable, and one wherein worn parts may be easily and quickly replaced.

To comprehend the invention, reference should be had to the accompanying sheets of drawings, wherein:—

Figure 1 is a side view in elevation of the burner partly in longitudinal section, illustrating the interior arrangement of the working parts of the burner proper.

Figure 2 is a rear end elevation of the burner.

In the drawings the numeral 1 is used to indicate or designate any suitable form of a supporting base structure on which the burner is supported and mounted for rocking action, there being threaded into the said base a short nipple 2 which is held in place or position by means of a securing nut 3, to the opposite end of the said nipple 2 being secured an elbow 4 adapted for rocking movement. Into the elbow 4 is screwed an upwardly extending pipe or coupling 5, which at its opposite end is screwed into a securing ring 6 provided with ears 7 which in connection with an associated pair of ears 8 attached to and depending from a shell or elbow 9 provide a hinge on which the burner structure proper is permitted to rock back and forth. Through the shell or coupling 5 is extended a steam conduit or pipe 10, which at its lower end is united to and supported by a spider 15 and at its upper end is fastened or attached to a hollow hinge pin 11. The said pipe or conduit 10 communicates with the steam inlet 10' through which steam, air, or other fluid medium is forced under pressure from a suitable source of supply, not shown. From the hollow hinge pin 11 is extended an elbow or connection 12, which may be said to constitute a continuation of the pipe or conduit 12 and which extension 12 at its free or inner end is connected to and communicates with the interior chamber 13 of a receiver or reservoir structure 13', mounted and held within the shell 9. From the receiver or reservoir 13' is outwardly extended a plurality of jet nozzles 14, which discharge the steam, air or fluid medium from the receiver or reservoir 13' and under pressure onto the vanes or blades 16 of a vertically disposed turbine 16' held within the burner nozzle. There is secured to and carried by the turbine 16 an outwardly extended flaring oil atomizing or distributing cup 17, which projects a slight distance beyond the inner face of the burner body. In the present case, the body of the burner is composed of a barrel 18 and the shell or casing 9, to the outer end of which the said barrel 18 is screwed. Through the burner body is extended a longitudinally disposed oil feed shaft 19, which is mounted on ball bearings 20 and 21 for free rotary movement, said ball bearings 20 and 21 being mounted or held within a suitable shell or

container 22 concentrically disposed relative to the said shaft 19, said ball bearings being held in position by means of the securing shell or casing 23 which surrounds the inner end portion of the shaft 19 and is held in place by the securing nut 24. The said shaft 19 is secured at its outer end to the distributing cup 17 and revolves therewith.

That portion of the oil feed shaft 19 projected beyond the securing nut 24 extends within a pump casing 26 passing through a stuffing gland 25, and to the extreme inner end portion of the said shaft 19 is secured or attached a worm 27, which worm meshes with a gear 27' of an oil pump held within the pump casing 26. From the pump is downwardly extended an oil feed pipe 29, which at its upper end connects with the suction side of the pump and at its lower end is connected to a suction joint 30, which connects with a suitable oil supply pipe 31. The oil drawn into the pump through the pipe 31, coupling 30 and pipe 29 is ejected from the discharge end of the pump into a chamber or discharge passage 32, and escapes therefrom into the oil pipe or shaft 19, being forced under pumping pressure for discharge into the atomizing cup or distributor 17 for flow thereover and discharge therefrom as in a thin film, from which it is discharged under the centrifugal action of the said cup or distributor 17, and on the discharge therefrom intermixes with the steam, air or fluid medium escaping from the burner through the restricted annular passage *a*, so that the intermixed carbonaceous steam discharging from the burner enters the combustion chamber of the furnace as a vapor or spray.

In order to give stability to the burner structure, and to support the outer end of the burner mounting, there is provided a supporting link 32, Figure 2 of the drawings, which link at its lower end is mounted on the elbow or coupling 30, and at its upper end is secured to the outer face of the pump casing 26, said supporting link serving to prevent undue strain when the burner is swung in or out or toward and from the combustion chamber or fire-box of the furnace.

Surrounding the shaft 19 there is provided a bushing or sleeve 33, which serves to hold the ball bearings 20 and 21 within their raceways and at the same time provide a chamber 33' which receives oil for lubricating purposes from a feed conduit 34 which communicates with a passageway 35 formed through the handle 36, there being secured to said handle for communication with the passage 35 a lubricating cup 37; the lubricating medium therefrom passing through the conduit 34 from the passageway 35 into the passageway 33' makes its escape into the raceways for the ball bearings 20

and 21 for the maintenance of lubrication. The handle 36 is preferably formed integral with the body of the burner, and is adapted for swinging the burner toward and from the firebox of the furnace,

From the foregoing it is believed that the construction and operation of the present burner will be readily understood, the operation being as follows:—

Steam, air, or fluid under suitable pressure is admitted through the inlet 10' into the supply pipe 10 and flows from the extension 12 into the receiver or reservoir 13, and as led from the nozzles 14 expands and impinges at high velocity against the vanes 16 of the turbine 20, imparting high rotative speed to the cup or distributor 17, and inasmuch as the said cup is secured to the longitudinally disposed tubular shaft 19, the rotary motion thereof is transmitted to said shaft or tube 19, causing the rotary motion thereof through the medium of the worm 27 to be transmitted to the pump gear 27' for drawing oil from the oil supply pipe 31, the same passing through the coupling or elbow 30 and upwardly through the pipe 29 into the pump through the suction side thereof, discharging from the pump into the chamber or discharge 32 and flowing therefrom into and through the tube 19 under pumping pressure into the shell or distributor 17, flowing over the wall thereof as a film of oil and discharging from the peripheral edge thereof under the centrifugal action of the said shell or distributor. As discharged from the cup or distributor the oil intermixes with the stream of steam or air escaping from the burner under pressure through its restricted annular discharge way or passage *a*, and is ejected into the furnace as an intermixed atomized stream.

As the burner body is formed of detachable sections, the same may be readily separated for permitting access to be had to the interiorly disposed working parts for repair or cleaning purposes.

While I have illustrated and described a preferred embodiment of the invention, it will be readily understood that I do not wish to restrict or limit myself to the details of construction herein shown and described, but on the contrary wish to be understood as claiming the invention as broadly as the state of the art will warrant.

Having thus described my invention what I claim as new and desire to secure by Letters Patent of the United States is:—

1. An oil burner for the described purpose, the same comprising a burner body, a pump casing secured to the outer end thereof, an oil atomizing cup situated within the inner end portion of the burner body, and mounted therein for free rotation, an oil supply shaft extended longitudinally through the burner body and in communication with the said

cup, a receiver for fluid under pressure situated within the burner body, means for admitting fluid under pressure into said receiver, a turbine secured to the distributing cup, nozzles extended from the receiver for directing fluid under pressure from the receiver onto the vanes of the turbines for driving the distributing cup, an oil supply in communication with a pump situated within the pump casing, communication between the oil tube within the burner body and an oil passage formed in the pump casing, and means carried by the oil supply shaft for transmitting its rotary motion for actuating the oil pump.

2. In an oil burner for the described purpose, the combination with a base structure, a burner body mounted thereon, an atomizing cup mounted within the said body for free rotary movement, a turbine mounted on said cup within the burner body, a fluid pressure receiver held within the burner body in rear of the atomizer, means for supplying fluid under pressure to said receiver, nozzles extended from the receiver for ejecting fluid therefrom onto the turbine under pressure, and a pump thrown into action by the rotary movement of the atomizing cup for supplying oil thereto.

3. In an oil burner for the described purpose, the combination with a burner body provided with a restricted annular discharge passage, a shaft rotatably mounted therein, an atomizing cup mounted on one end of said shaft within the said body, fluid actuated pressure means in rear of the cup for imparting high rotative speed to the atomizing cup, a pump, driven from the other end of said shaft and controlled by the rotary action of the said cup for supplying oil within the same, a base structure, and means for normally mounting the burner body thereon.

4. An atomizing oil burner for the described purpose, comprising a burner body provided interiorly with an oil distributing cup mounted for free rotary movement, of a fluid pressure actuated device associated with the said cup and held within the burner body for imparting rotary movement thereto, jet nozzles for supplying a fluid medium under pressure to said actuating device for the driving thereof, and a pump operated by the rotary movement of the atomizing cup for supplying oil thereto for atomization.

5. An atomizing oil burner for the described purpose, comprising a burner body

provided interiorly with an oil distributing cup mounted for free rotary movement, a shaft within said body and mounting said cup at one end, a fluid pressure actuated device associated with the said cup for imparting rotary movement thereto, means for supplying a fluid medium under pressure to said actuating device for the driving thereof and including a receiver and a plurality of discharge nozzles for directing the fluid medium against said pressure actuated device, means actuated from the opposite end of the shaft and thrown into action by the rotary movement of the atomizing cup for supplying oil thereto for atomization, a supporting base structure, and means for mounting the burner body thereon.

6. In an oil atomizing burner for the described purpose, the combination with a burner body, means supporting the body for longitudinally swinging movement, an atomizing cup mounted within the said body for free rotation, a ball bearing for said cup, a pressure driven wheel associated with the atomizing cup for imparting rotation thereto, a plurality of outwardly flaring nozzles directed tangentially toward said wheel for supplying fluid under pressure as jet streams for driving said wheel, and means thrown into action by the rotation of the cup for supplying oil thereto for atomization.

7. In an oil atomizing burner for the described purpose, the combination with a longitudinally disposed burner body provided with a restricted annular discharge outlet, a fluid pressure driven oil atomizing cup mounted within the burner body for free rotation, means controlled by the rotary movement of the said cup for supplying oil thereto for atomization, and means for supporting the burner body for free longitudinally swinging movement.

8. In an oil atomizing burner for the described purpose, the combination with a longitudinally disposed burner body provided with a restricted annular discharge outlet, a fluid pressure driven oil atomizing cup mounted within the burner body for free rotation, means controlled by the rotary movement of the said cup for supplying oil thereto for atomization, and means for supplying fluid under pressure for actuating the oil atomizing cup.

In testimony whereof I have signed my name to this specification.

BENJAMIN W. HURD.