O. G. HALVORSEN.

OILING DEVICE.

APPLICATION FILED JULY 30, 1920.

1,403,684.

Patented Jan. 17, 1922.

2 SHEETS—SHEET 1.

Fig. 2.

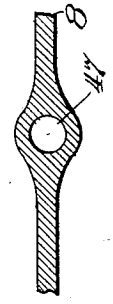


Fig. 1.

Inventor

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2 SHEETS—SHEET 2.

Fig. 3.

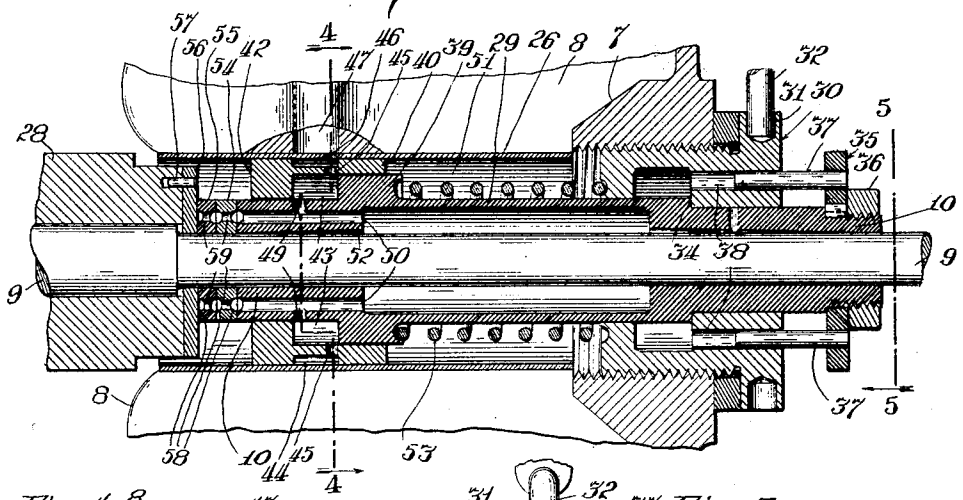


Fig. 4.

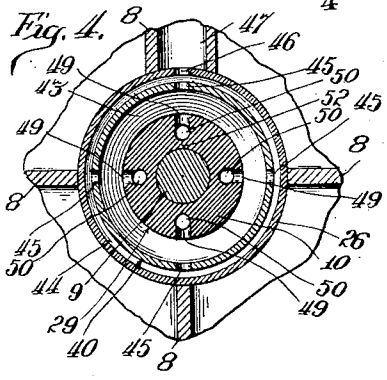


Fig. 5.

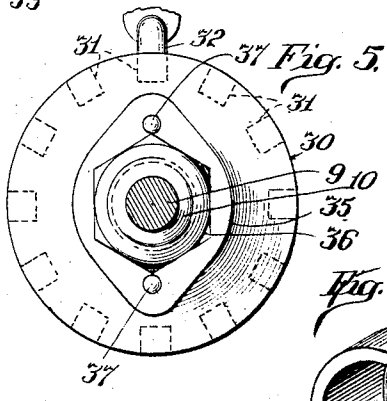


Fig. 8.

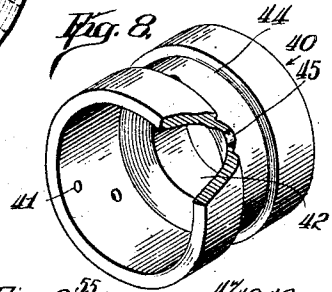


Fig. 6.

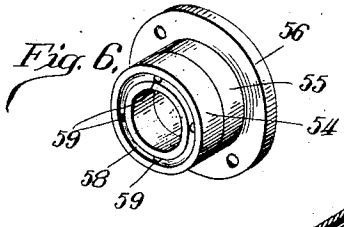


Fig. 7.

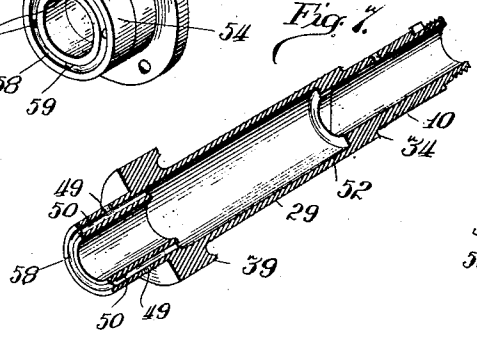
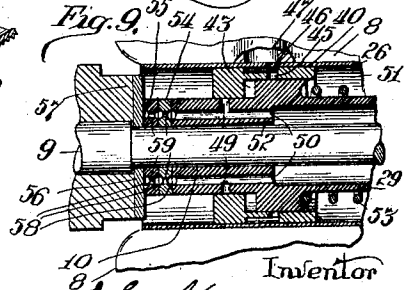


Fig. 9.



Inventor

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UNITED STATES PATENT OFFICE.

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OILING DEVICE.

1,403,684. Specification of Letters Patent. Patented Jan. 17, 1922.

Application filed July 30, 1920. Serial No. 400,188.

To all whom it may concern:

Be it known that I, OLE G. HALVORSEN, a citizen of the Kingdom of Norway, residing at Chicago, in the county of Cook, State of Illinois, having invented certain new and useful Improvements in Oiling Devices, do hereby declare that the following is a full, clear, and exact description of the same.

My invention relates to oiling devices for axially moving shafts, whereby the supply of lubricating oil is controlled by the position of the shaft, and it is particularly designed to be employed in a fuel oil burner in which the axial movement of the fan shaft is utilized also to open and close a valve by which the flow of the fuel oil is regulated, so that the flow of both oils is simultaneously controlled. The invention consists in the matters hereinafter disclosed and then pointed out in the appended claims.

In the accompanying drawings which represent a practical embodiment of the various features of my invention in a fuel oil burner, Fig. 1 is a view partly in side elevation and partly in central longitudinal section through the interior of the burner, parts being broken away;

Fig. 2 is a detail sectional view on the line 2—2 of Fig. 1;

Fig. 3 is an enlarged sectional view of certain parts of Fig. 1;

Figs. 4 and 5 are views on the lines 4—4 and 5—5 respectively of Fig. 3;

Fig. 6 is a detail perspective view showing the parts to prevent any torque in the retracting spring and journal sleeve;

Fig. 7 is a detail sectional view of the longitudinally sliding tube;

Fig. 8 is a detail perspective view of the oiling collar, partly broken away, and

Fig. 9 is a detail sectional view showing the parts of the sliding tube and oil collar in position to close the oil passages.

In the drawings, in which like reference numerals indicate the same or corresponding parts in the several views, the numeral 1 represents a burner casing of suitable form, in the present instance being substantially circular in cross-section and composed of three sections connected by bolts through the flanges 2, and having a suitable air inlet 3 and a mixing chamber formed by the outwardly flared portion 4, and a flame outlet 5 leading to a suitable fire pot or combustion chamber.

The air-intake end of the casing above the inlet 3 is formed into a chamber extending across the casing and having its outer wall curved upwardly and inwardly at its central portion as at 6 to a line slightly below the central axis of the casing and approximately in the vertical plane of the inner wall of the inlet, where it carries the shaft-block 7. The interior of the casing is provided with longitudinal air vanes 8 arranged in horizontal and vertical pairs as shown in Fig. 4, and which extend radially from the center to the burner casing and are interrupted at their central portions to provide clearance for the fan propeller in its protracted and retracted positions.

The operating shaft 9 is centrally journaled in the burner-casing in suitable journal-boxes 10 and 11 carried by bearing-blocks 7 and 12, respectively, the former being supported on the wall of the intake end of the casing and the latter on the interior air-vanes near the mixing chamber. The shaft extends beyond the box 11 into and through a fuel oil chamber 13 formed in the stationary hub 14 which is carried on the outer end of the box, this chamber being provided with an oil passage or duct leading through the hub and block to an oil-pipe 15, which is connected with a suitable source of fuel oil supply of either the well-known gravity or force-feed type. The inner end of the box 11 is provided with a stuffing-box closed by a gland 16 to prevent the fuel oil leaking from chamber 13 back along the shaft.

The shaft is connected to a motor 17 by a suitable coupling 18 which permits the shaft to move axially as hereinafter described, and within the chamber 13 the shaft is reduced in diameter to provide a valve 19 which co-operates with a correspondingly shaped valve-seat 20 formed at the inner end of an oil-passage in a partition of the chamber 13, the passage in the partition being of greater diameter or cross-sectional area than the reduced portion of the shaft to ensure the free flow of an adequate supply of fuel oil to the burner-head when the valve is unseated. The outer end of the hub 14 is reduced and provided with a central bore through which the reduced end of the shaft freely passes, and also with suitable radial oil passages through which the oil flows from chamber 13 when the valve is unseated to

oil pipes 21, each of which carries an oil supply header 22 having suitable oil passages and exits. The shaft carries a revolving wheel 23 having beater-heads 24 which sweep over the headers and beat up and atomize the fuel oil when the shaft is rotated

The shaft is enclosed between the blocks 7 and 12 by a housing composed of the front and rear sections 25 and 26, the former being carried by the block 12 and the latter by the block 7, and the sections of the housing are spaced apart at their inner ends to correspond with the interruption of the air vanes to provide space for the travel or movement of the interposed fan propeller 27 along the axial line of the casing. The propeller is pinned to the shaft and has a central hub 28 of the same diameter as the housing but somewhat less in length than the distance between the inner ends of the housing sections to permit the propeller to move longitudinally of the casing, the hub being reduced at each end to make a telescopic fit with the sections of the housing so that the latter are closed in all positions of the propeller.

The journal-box 10 is formed at the ends of a sliding tube 29 which is concentric with the shaft but of larger diameter at its central portion. This tube is carried at its outer end in a plug 30 which is in threaded engagement with the bore of the block 7 so that it may be adjusted therein, the head of the plug being provided with radial holes 31 to receive a locking-pin 32 which is carried by screw-bolts 33 on the casing. The periphery of the tube is reduced near its outer end to provide a shoulder 34 for the plug 30 to limit its sliding axial movement in an outward direction, and at its outer end the tube carries a keyed head 35 which is held thereon by a nut 36 and has rearwardly projecting arms 37 sliding freely in bores 38 in the plug to allow the tube to move axially but prevent it from turning in the plug. The tube is provided near its inner end with an enlarged annular flange 39 that has a sliding fit within the open end of a tubular collar 40 which is pinned as at 41 in the casing 26. The collar 40 is provided at its outer end with an inturned flange 42 that embraces the extended reduced portion of the tube beyond its flange so that an annular oil chamber 43 is provided around the tube within the collar between the flanges 39 and 42. The collar is provided with an outer annular oil groove 44 having passages 45 to the oil chamber 43, and the casing 26 has an oil passage 46 leading into the groove 44 and connected by a supply pipe 47 to a lubricating oil cup 48. The tube 29 is provided with oil passages 49 leading from the chamber 43 to horizontal passages 50 in the inner portion of the journal-box, whereby oil is supplied to the chamber 51 formed by the central portion of the tube. The passages 45 are at the front side of the chamber 43 and the passages 49 are at the rear side of the chamber, so that when the shaft is retracted to open the fuel oil valve 19 the tube 29 is moved to withdraw the flange 39 to open the supply passages 45 and to withdraw the passages 49 from the flange 42 so they are open as shown in Fig. 3, and when the shaft is protracted to close the valve 19 the flange 39 closes the passages 45 and the flange 42 closes the passages 49 as shown in Fig. 9. The journal-box portions 10 of the tube 29 are provided with oil grooves 52 to effectively lubricate the box and shaft.

The expanding spring 53 surrounds the tube 29 and reacts between the plug 30 and flange 39 to move the tube inwardly, and the inner end of the tube transmits its axial movement in that direction to the shaft by means of an interposed torque eliminating bearing composed of a pair of bushing rings 54 and 55. The ring 54 is of steel and the ring 55 is of bronze, and the latter bears against a steel facing disk 56 secured to the propeller hub 28 by pins 57. The rings 54 and 55 and the inner end of the tube 29 are provided with circular oil grooves 58, and the rings are also provided with oil passages 29 to ensure complete lubrication of these parts. The rings transmit the end thrust of the fan propeller to the tube 29 and the counter end thrust of the tube under the stress of spring 53 to the propeller and the shaft, but prevent any torque in the tube and its associated spring 53, so that the spring has only a pushing action. The axial movement of the shaft and tube under the action of the propeller is limited by the plug 30 against which the shoulder 34 of the tube abuts, and its movement under the action of the spring 53 is limited by the expansion thereof and the seating of valve 19 in its seat 20. The tension and force of the spring 53 may be adjusted by turning the plug 30 when the shaft is idle and the shoulder 34 stands away from the plug, the parts 30, 35 and 29 being then rotated together.

When the motor 17 is in operation and shaft 9 is revolved, the propeller retracts the shafts axially toward the intake-end of the casing, overcoming the resistance of the spring 53 and withdrawing the valve 19 from its seat, so that the fuel oil freely passes from the chamber 13 to the atomizing devices by which it is broken up and mixed with the air in the mixing chamber to form the combustible mixture; the propeller also acts as a fan or blower to draw the air for mixture with the atomized oil into the casing through its air-inlet. At the same time the retraction of the shaft causes the tube 29 to take the position shown in Fig. 3, whereby the oil passages 45 and 49 are opened to allow a supply of lubricating oil to pass to the annular groove 44 and the chambers 43 and 51, which are full of oil after their initial filling and

are replenished when these passages are opened by the retraction of the shaft during the combustion of the fuel mixture, which is ignited by any suitable device, such for example as a spark-plug (not shown). When the motor stops and the propeller ceases to revolve, the spring 53 expands and protracts the shaft axially to seat the valve 19 on its seat 20 to stop the passage of the fuel oil to the burner, and at the same time the tube 29 takes the position shown in Fig. 9 to cut off the supply of lubricating oil through the passages 45 and 49. By this means the supplies of fuel oil and lubricating oil are simultaneously opened and closed, and both are shut off when the machine is idle so that there is no escape or leakage of either kind of oil.

The lubricating oil supply device may be of any suitable construction, and for practical purposes I use an ordinary cup 48 of the capillary type having a wick in its leg in contact with the oil and dripping the oil into the pipe 47. Any suitable means may be employed to atomize the fuel oil, and to rotate and retract the shaft.

I claim:

1. In a device of the class described, a rotatable and axially movable shaft, a non-rotating journal tube for the shaft axially movable therewith, a stationary oiling collar surrounding the tube and forming an oil chamber therewith, the collar having a port to the chamber and the tube having a port from the chamber to its interior, and means to open and close the ports when the tube moves axially with the shaft.

2. In a device of the class described, a rotatable and axially movable shaft, a non-rotating journal tube for the shaft axially movable therewith and having a circumferential flange, a stationary oiling collar surrounding the flange of the tube and having a flange forming an oil chamber therewith, the collar and tube respectively having offset inlet and outlet ports for the chamber arranged to be opened and closed respectively by the tube flange and collar flange when the tubes moves axially with the shaft.

3. In a device of the class described, a rotatable and axially movable shaft, a non-rotating journal tube for the shaft axially movable therewith and having an interior oil reservoir, a circumferential flange on the tube, a stationary oiling collar surrounding the flange of the tube and having a flange forming an oil chamber therewith, an annular oil groove in the collar, a casing surrounding the collar-groove and having an oil passage thereto, the collar and tube respectively having offset inlet and outlet ports for the chamber arranged to be opened and closed respectively by the tube flange and collar flange when the tube moves axially with the shaft.

4. In a device of the class described, a rotatable and axially movable shaft, a non-rotating journal tube for the shaft axially movable therewith, torque eliminating rings between the tube and shaft, an oiling collar surrounding the tube and forming an oil chamber therewith, the collar having a port to the chamber and the tube having ports from the chamber to the rings, and means to open and close the ports when the tube moves axially with the shaft.

5. In a device of the class described, a rotatable and axially movable shaft, a non-rotating journal tube for the shaft axially movable therewith and having an interior reservoir, torque eliminating rings between the tube and shaft, an oiling collar surrounding the tube and forming an oil chamber therewith, the collar having a port to the chamber and the tube having ports from the chamber to its reservoir and to the rings, and means to open and close the ports when the tube moves axially with the shaft.

6. In a device of the class described, a rotatable and axially movable shaft, a journal tube for the shaft provided with oil ports and having a circumferential flange, a plug surrounding the tube and having means to prevent its rotation, a spring between the plug and flange to move the tube axially in one direction, means to move the tube axially against the force of the spring, and means to open and close the ports in the tube when it moves axially.

7. In a device of the class described, a rotatable and axially movable shaft, a journal tube for the shaft provided with oil ports and longitudinal oil passages and having a circumferential flange, a plug surrounding the tube and having means to prevent its rotation, a spring between the plug and flange to move the tube axially in one direction, means to move the tube axially against the force of the spring, a torque eliminating device between the shaft and tube adjacent the oil passages and means to open and close the ports when the tube moves axially with the shaft.

8. In a device of the class described, a casing, a hub mounted in the casing and having an oil-passage in the axial line of the casing, a rotatable and axially movable shaft having a valve for said oil-passage, a non-rotating journal tube for the shaft axially movable therewith, oil ports in the tube, and means to open and close the oil passages and move the valve when the shaft moves axially.

9. In a device of the class described, a casing having a plurality of oil supply pipes, a hub mounted in the casing and having an oil-passage in the axial line of the casing connected to one of the oil pipes, a rotatable and axially movable shaft having a valve for said oil-passage, a non-rotating journal tube for the shaft axially movable therewith, oil ports in the tube connected with

the other oil supply pipe, and means to open and close the oil ports and move the valve when the shaft moves axially.

10. In a device of the class described, a casing having a plurality of oil supply pipes, a hub mounted in the casing and having an oil-passage in the axial line of the casing, a rotatable and axially movable shaft having a valve for said oil-passage, a non-rotating journal tube for the shaft axially movable therewith, oil ports in the tube connected with the other oil supply pipe, means to open and close the oil ports when the tube moves axially with the shaft, and means to move the shaft axially to open and close the valve.

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

OLE G. HALVORSEN.

Witnesses:
HARRY S. HARNED,
J. MCROBERTS.