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TURBINE FOR DRIVING BOILER TUBE CLEANERS.

APPLICATION FILED MAR. 12, 1908.

936,498. Patented Oct. 12, 1909.

Fig. 1.

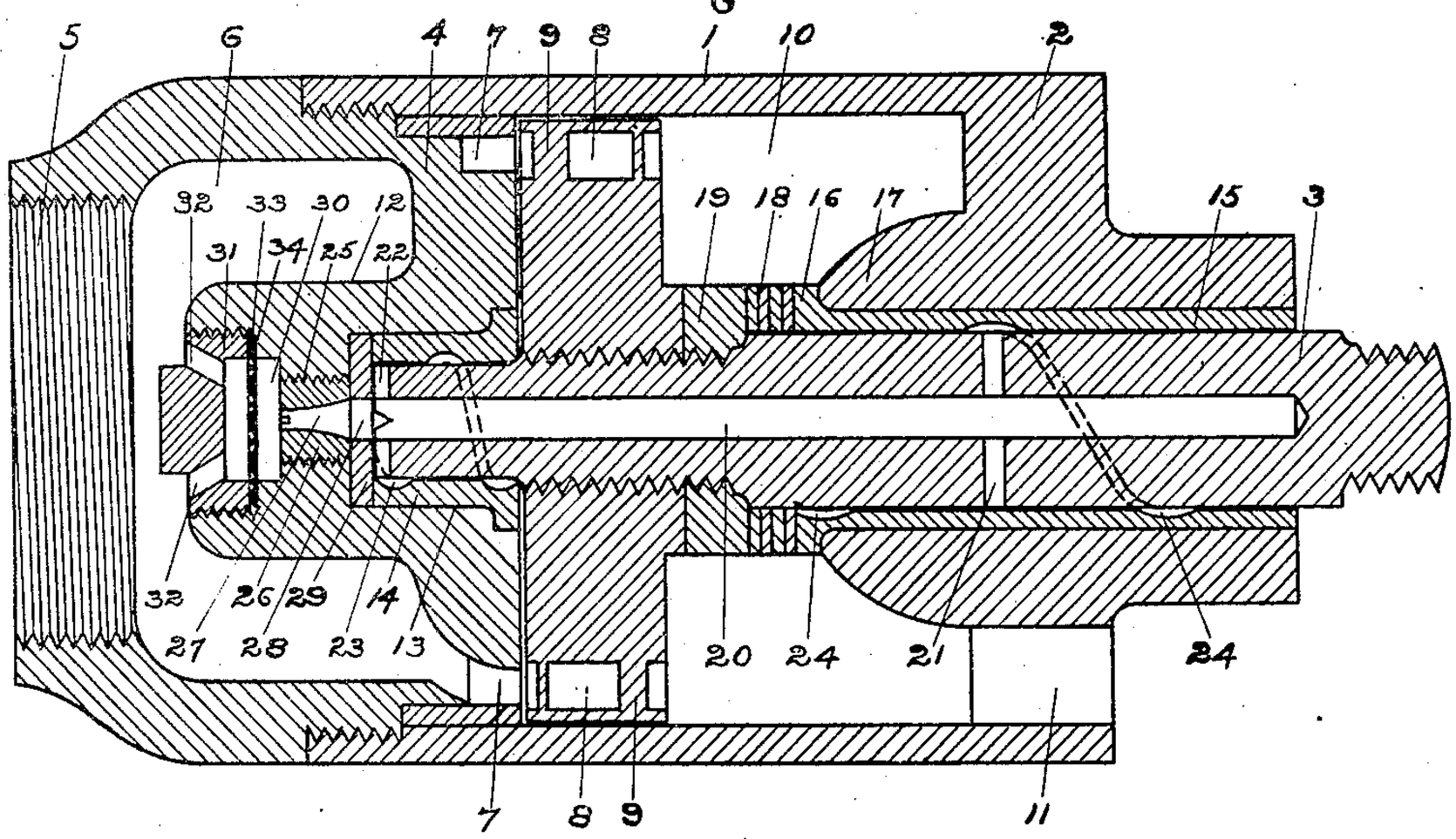


Fig. 2.

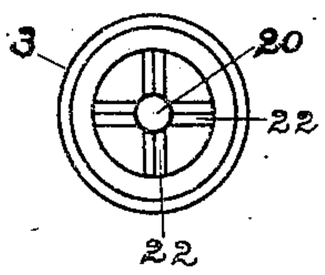


Fig. 3.

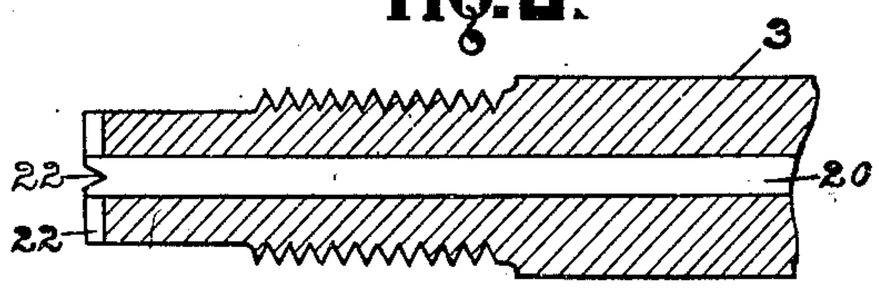


Fig. 4.

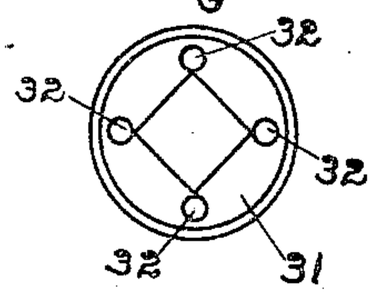


Fig. 5.

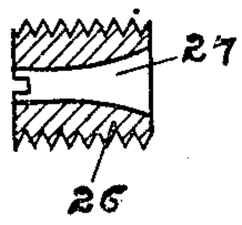
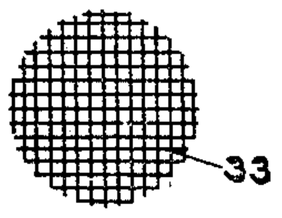


Fig. 6.



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UNITED STATES PATENT OFFICE.

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TURBINE FOR DRIVING BOILER-TUBE CLEANERS.

936,498. Specification of Letters Patent. Patented Oct. 12, 1909.

Application filed March 12, 1903. Serial No. 420,576.

To all whom it may concern:

Be it known that we, HENRY F. WEINLAND, HERMON G. WEINLAND, and GEORGE H. AINGE, citizens of the United States, residing at Springfield, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Turbines for Driving Boiler-Tube Cleaners, of which the following is a specification, reference being had therein to the accompanying drawings.

Our invention relates to a lubricating device for turbines and more particularly for turbines designed for driving boiler tube cleaners and adapted to be carried through the tube with the cleaner.

The object of our invention is to provide improved means for lubricating and reducing the friction in the bearings of the driving shaft by the use of water or other actuating medium, whenever such medium is suitable for the purpose.

With these and other objects in view, our invention consists of the constructions and combinations hereinafter described and set forth in the claims.

In the accompanying drawings, which form a part of this specification, Figure 1 is a longitudinal section of a turbine constructed in accordance with our invention. Fig. 2 is an end view of the driving shaft, looking from the rear end. Fig. 3 is a portion of the shaft in section, showing channels in the rear end of shaft. Fig. 4 is an end view of a plug with inlet ports and recess to form part of the screening chamber. Fig. 5 is a nozzle, and Fig. 6 is a screen.

Like characters represent the same parts in the several views.

In the drawings, 1 represents the casing of a turbine having an exhaust-member 2, which covers the front bearing for a driving-shaft 3. A feed-head 4 is screw-threaded into the rear end of the casing, as shown, and is provided with a screw-threaded inlet 5, to which the supply hose can be attached. The actuating medium to operate the turbine passes through the inlet 5, a chamber 6 and ports 7 to the buckets 8, of the turbine runner 9, and exhausts through a chamber 10 and exhaust ports 11 in a well known manner. The feed-head 4 has a central rearward extension 12, in which we form a recess 13 to carry the rear end of the driving shaft 3, and we preferably provide a removable bushing 14 in said recess to form this bearing; and we likewise preferably provide a removable bushing 15 in the exhaust-head 2 to form the front bearing for the driving shaft. Said bushing has a shoulder 16 that engages a rearward extension 17, of the exhaust-head, and a plurality of disks 18, loosely mounted on the driving-shaft, are interposed between said bushing and a collar 19, screw-threaded on the shaft, forming a thrust-bearing; and the runner 9 is likewise screw-threaded on the shaft in the rear of said collar as shown.

We have shown the driving shaft 3 with a longitudinally-extending conduit 20 therein, opening at its rear end and having transverse openings 21 and 22 to the bearings; the openings 22 being shown as channels cut in the face of the rear end of the shaft, so that the lubricating medium will reach the shaft at its extreme end and will be distributed along the bearing by a spiral groove 23, in the bushing 14; and we further provide like grooves 24 in the bushing 15 in the front bearing.

In the rearward extension 12 of the feed-head 4, we further provide an opening 25, in which a nozzle 26 is screw-threaded, the larger end of the nozzle hole 27 opening into the shaft-conduit 20 and channels 22 through a perforation 28 in a hardened plate 29 that is seated in the rear end of the recess 13, to take the end thrust of the driving shaft 3. The opening 25 is enlarged at its rear end to form part of a screening chamber 30, and is still further enlarged and screw-threaded, forming an opening at the rear end of the extension 12 to receive a plug 31 having a plurality of ports 32 opening into the screening chamber 30, the other part of said chamber being formed by a recess in the plug 31. This chamber may be filled with a screening material, but we preferably provide a screen 33, extending through the chamber and held in place between the shoulder 34 in the feed-head 4 and the screw-plug 31. The screw-plug 31 is provided with a square head, as shown, so that it can be readily removed with a wrench, and the nozzle 26 has a slot in its outer end so that with a screw-driver it can be easily removed, or when the feed-head is removed from the casing, the nozzle can be driven inwardly to remove the plate 29 and the bushing 14.

We have shown four of the ports 32 open-

ing through the plug 31 into the chamber 30, and each of these ports is of greater diameter than the small end of the nozzle hole leading from said chamber. This arrangement breaks the strength of the current and avoids clogging of the nozzle hole. In other words, if the nozzle hole were presented directly to the force of the current in the chamber 6, the current or suction in the nozzle hole would be so great that a leaf or other rubbish would cover and be held against the opening of the nozzle and prevent further flow. This situation is relieved by providing the ports 32 of greater capacity opening into the chamber 30 to break the force of the current, and if a leaf or other rubbish covers one of the ports 32, the current will pass through the others. Any rubbish that should pass through the ports will be caught by the screen 33 and can be easily removed by taking out the screw-plug 31.

Having thus described our invention, we claim:

1. In a lubricating device for a turbine such as described, a feed head having a chamber formed therein with ports to the runner of the turbine, a bearing for the rotating shaft of the turbine also formed in said head and a nozzle screw threaded into a recess in said head forming an inlet of gradually increasing diameter to admit the actuating medium to said bearing from said chamber, substantially as described.

2. In a lubricating device for a turbine such as described, a casing having feed and exhaust heads with bearings for the driving shaft, said shaft having a longitudinal conduit therein, with radial openings to the bearing in the exhaust head and channels in the face of the rear end thereof to the bearing in the feed head and an inlet thereto to admit the actuating medium from said chamber, substantially as described.

3. In a lubricating device for a turbine such as described, a feed head having a chamber formed therein with ports to the runner of the turbine, a removable bushing seated in a recess of the head forming a bearing for the turbine shaft and a removable screw threaded nozzle adapted to admit the actuating medium to said bearing and to force the bushing from its seat, substantially as described.

4. In a lubricating device for a turbine such as described, a feed head forming a feed chamber with ports to admit the actuating medium to the runner of the turbine, a bearing for the shaft of the turbine formed in said head and a screening chamber also formed in said head and having openings to admit the actuating medium to said bearing from the feed chamber, substantially as described.

5. In a lubricating device for a turbine such as described, a feed head with a feed chamber having ports to the runner of the turbine, said head also having a bearing for the turbine shaft and a portion extending into said feed chamber forming a screening chamber having an opening to the bearing and a plurality of ports opening from the feed chamber to the screening chamber, each of said ports being of greater capacity than the opening from the screening chamber to the bearing, substantially as described.

6. In a lubricating device for a turbine such as described, a feed head with a feed chamber formed therein with ports to admit the actuating medium to the runner of the turbine, said head also having a bearing for the turbine shaft formed therein and a hollow portion extending into said feed chamber with a removable plug forming a screening chamber having a removable nozzle opening from the screening chamber to the bearing, said plug having a plurality of ports to admit the actuating medium from the feed chamber to the screening chamber, each of said ports being of greater capacity than the nozzle opening, substantially as described.

7. In a lubricating device for a turbine such as described, a turbine runner with a driving shaft rotating therewith having conduits therethrough to the bearings therefor, a casing having feed and exhaust heads forming feed and exhaust chambers with ports for the runner, said heads also having bearings for the shaft on opposite sides of the runner with spiral grooves therein, and the feed head a hollow portion extending into the feed chamber with a removable plug forming a screening chamber having a removable screen therein, a removable nozzle forming an opening from the screening chamber to said conduits, said plug having a plurality of ports from the feed chamber to the screening chamber, each of said ports being of greater capacity than said nozzle opening, substantially as described.

In testimony whereof, we hereunto affix our signatures in the presence of two witnesses.

HENRY F. WEINLAND.
HERMON G. WEINLAND.
GEORGE H. AINGE.

Witnesses:
GROVER F. ILGEN,
CARL CASSEY.