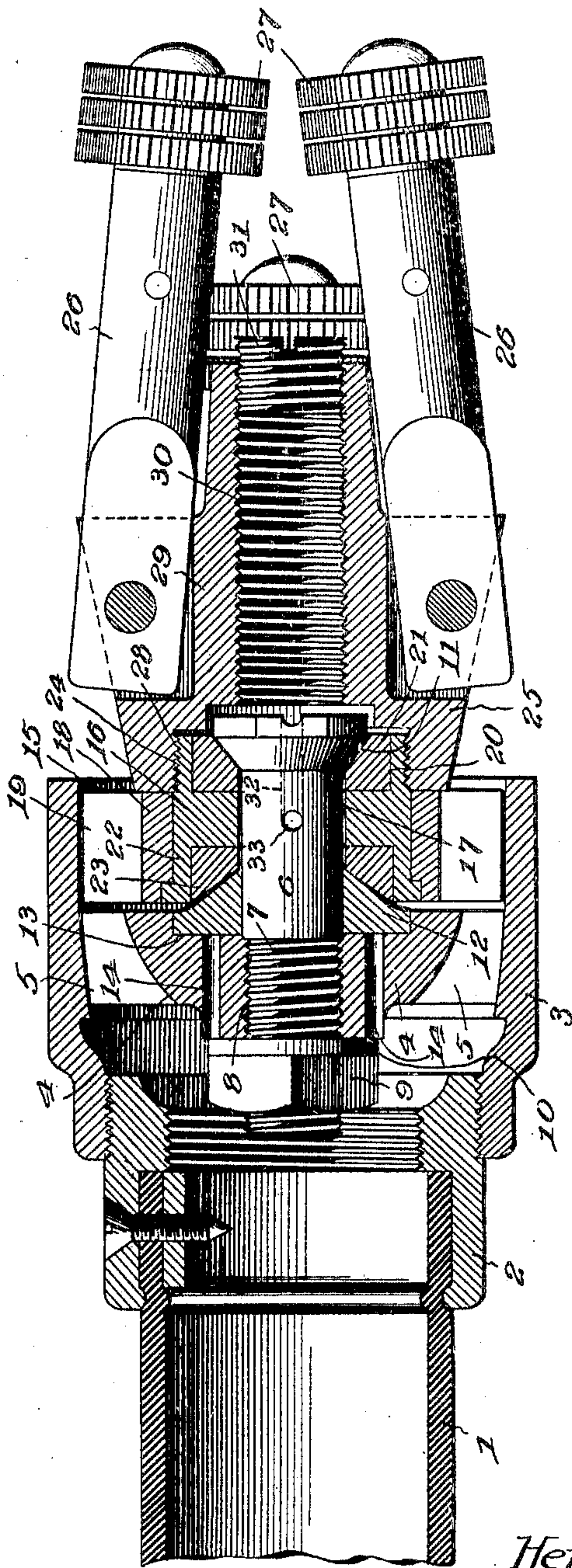


No. 797,649.

PATENTED AUG. 22, 1905.

H. F. WEINLAND.  
BOILER TUBE CLEANER.  
APPLICATION FILED AUG. 6, 1903.



Witnesses

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# UNITED STATES PATENT OFFICE.

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A CORPORATION OF OHIO.

## BOILER-TUBE CLEANER.

No. 797,649.

Specification of Letters Patent.

Patented Aug. 22, 1905.

Application filed August 6, 1903. Serial No. 168,403.

*To all whom it may concern:*

Be it known that I, HENRY F. WEINLAND, a citizen of the United States, residing at Springfield, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Boiler-Tube Cleaners, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to boiler-tube cleaners, and more particularly to that class of cleaners set forth in Letters Patent No. 730,994, granted June 6, 1903, to The Lagonda Manufacturing Company upon an application filed by me. This class of cleaners comprises a rotary water wheel or turbine, a hose for supplying the water, and arms connected to and rotating with the turbine, said arms being free to swing outward under the action of centrifugal force and carrying cutters whereby the scale is removed from the boiler-tubes.

My present invention relates more particularly to the construction and mounting of the turbine or water wheel, and has for its object to provide an improved bearing for the water-wheel, with means for efficiently lubricating the same, whereby ball-bearings set forth in my prior Letters Patent may be dispensed with.

To these ends my present invention consists in certain novel features, which I will now proceed to describe and will then particularly point out in the claims.

In the accompanying drawing I have shown a structure embodying my invention in longitudinal section.

In the said drawing, 1 indicates a hose or flexible water-supply pipe of any suitable construction, and 2 a coupling-sleeve, the connection between the two being preferably that set forth in Letters Patent No. 696,038, granted March 25, 1902, to The Lagonda Manufacturing Company. This coupling-sleeve is externally threaded at its forward end to receive the head 3, which screws thereon or is otherwise suitably connected thereto. This head has a central diaphragm 4, through which are formed water-passages 5, inclined in the manner usual in turbines of this class and forming the fixed or non-rotating portion of the turbine.

6 indicates a bolt or spindle which is inserted into the head 3 from the open front end thereof and which is threaded at its rear end, as indicated at 7. The diaphragm 4 is provided with a threaded aperture 8, into which the bolt 6 screws, and when said bolt is in position its rear end extends beyond the diaphragm and receives a nut 9 and washer 10, by means of which it is locked in position. When in position, the bolt projects forward beyond the diaphragm 5 and head 3 and is provided at its forward end with a conical head 11, which forms one of the bearing-cones. The other bearing-cone is shown at 12 and is removably seated in a recess 13 in the front face of the diaphragm 4. The diaphragm may be provided with apertures 14 for the passage of a pin or other suitable implement for forcing the cone 12 from its seat in case it is desired to remove it. The cones 11 and 12 are preferably of steel or other similar hard metal.

The head 3 is provided in front of the diaphragm 4 with a recess 15, in which the water-wheel is located.

16 indicates the hub or body of the water-wheel, which consists of a sleeve having a bore or opening 17 therein of greater diameter than the body of the bolt or spindle 6. Upon this hub is secured, in any suitable manner, an annulus 18, having on its periphery the inclined blades or vanes 19 of the water-wheel. In the front face of the hub 16 there is formed a recess 20, in which is removably seated a bearing-cup 21, shaped to receive the conical head 11 of the bolt or spindle 6. In the rear face of the hub 16 there is formed a recess 22, in which is removably seated a bearing-cup 23, which is fitted to receive the cone 12. The bearing-cups 21 and 23 are preferably of brass or some other similar bearing metal and are readily removed to permit renewal. The bearing may be adjusted in an obvious manner by rotating the bolt 6 to tighten or loosen it, said bolt being secured after adjustment by the nut 9 and washer 10. It will be noted in this connection that the bolt is threaded into the diaphragm 4, so that it is positively held from motion in either direction when the nut 9 is tightened up.

The hub 16 is preferably of steel or other durable metal and extends forward beyond



the face of the water-wheel, its forwardly-extending portion being provided with an external screw-thread, as indicated at 24. The cutter-head is indicated at 25, and it carries the usual centrifugally-acting pivoted arms 26 and cutters 27. Said cutter-head is provided in its rear end with a threaded recess 28, by means of which it is screwed onto the projecting end of the hub of the water-wheel, so that it closes the bearing-space at the front end thereof. Said cutter is also provided with a central forward extension 29, having formed in it a longitudinal opening 30, which extends from the extreme front end of said extension to the recess in the rear end of the cutter-head. This opening 30 forms a lubricant-reservoir to receive the lubricant for the bearing, which is preferably in the form of a grease. Said opening 30 is threaded internally to receive a screw-plug 31, which fits said opening, and it may be advanced along the same by rotating it, so as to force the lubricant into the bearing of the water-wheel. In this way a positive or force feed of the lubricant is obtained. The bolt 6 is provided with a longitudinal lubricant-passage 32, extending from the front end of the bolt, which communicates with the reservoir 30, to a point about midway of the water-wheel. Here a passage 33 is formed at right angles to the passage 32, connecting with the said passage and extending to the periphery or outer surface of the bolt 6, where it communicates with the space 17. The lubricant may thus be forced from the reservoir, through the bolt, into the space within the water-wheel, and thence distributed equally to the bearings at each end thereof.

The screw-plug 31 not only serves as a means for positively feeding the lubricant to the bearings, but also has another important function. In devices of this character, operating with water under a relatively high pressure, it has been found by practical experience that the water will enter the bearings and where there is a passage through the cutter bearing-head which is open and unobstructed a part of the water will flow through the bearings and through said passage, carrying off the lubricant and rendering it impossible to properly lubricate the bearings. The screw-plug in my present construction closes the passage through the head and prevents the flow of water through the same, thereby preventing the lubricant being carried off in the manner just described, since there is no passage through the bearings by which the water can pass.

In practice I have found that while the ball-bearing construction shown in my prior Letters Patent hereinbefore referred to is a satisfactory and efficient one as a rule it is expensive and if it starts to deteriorate its destruction is frequently rapid and complete.

A plain bearing such as herein set forth does not present this disadvantage, and by the provision for satisfactory lubrication which is herein described I have found that the bearing is fully as satisfactory as a ball-bearing and at the same time more durable.

I do not wish to be understood as limiting myself strictly to the precise details of construction hereinbefore described, and shown in the accompanying drawings, as these details may obviously be modified without departing from the principle of my invention.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A boiler-tube cleaner of the character described, comprising a main head having a transverse diaphragm provided with water-passages, said head having a recess in its forward end in front of said diaphragm, and said diaphragm having a bearing-cone on its front face, a removable, normally non-rotating spindle mounted in said diaphragm and projecting forward therefrom, its front end being provided with a reverse bearing-cone, said spindle being also provided with a lubricant-passage extending from its forward end to its lateral surface between the bearing-cones, a turbine-wheel mounted to rotate in the recess in the head and provided with removable bearing-cups in its opposite faces to receive and fit the bearing-cones, the bore of said hub being of greater diameter than the inclosed body of the spindle, and a cutter-head secured to the front end of the turbine-wheel so as to inclose the front bearing and front end of the spindle, said cutter-head being provided with a lubricant-chamber, and means for positively forcing the lubricant from said chamber through the lubricant-passage of the spindle to the space between the spindle and wheel and to the bearings, substantially as described.

2. A boiler-tube cleaner of the character described, comprising a main head having a transverse diaphragm provided with water-passages, said head having a recess in its forward end in front of said diaphragm, and said diaphragm having a bearing-cone on its front face, a removable, normally non-rotating spindle mounted in said diaphragm and projecting forward therefrom, its front end being provided with a reverse bearing-cone, said spindle being also provided with a lubricant-passage extending from its forward end to its lateral surface between the bearing-cones, a turbine-wheel mounted to rotate in the recess in the head and provided with removable bearing-cups in its opposite faces to receive and fit the bearing-cones, the bore of said hub being of greater diameter than the inclosed body of the spindle, and a cutter-head secured to the front end of the tur-

bine-wheel so as to inclose the front bearing and front end of the spindle, said cutter-head being provided with a threaded lubricant-chamber, and a screw-plug to fit said threaded chamber and serving to force the lubricant from said chamber to the bearings of the wheel, substantially as described.

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

HENRY F. WEINLAND.

Witnesses:

IRVINE MILLER,  
GERTRUDE YOUNG.