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H. F. WEINLAND.

TOOL FOR FACING BOILER TUBE CAPS AND THEIR SEATS.

APPLICATION FILED JULY 13, 1903.

NO MODEL.

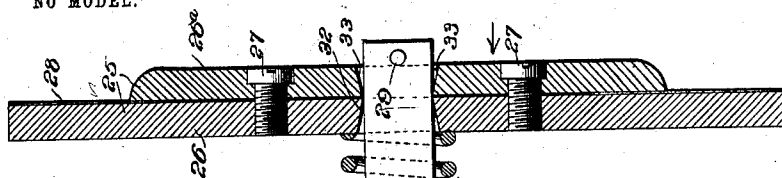


Fig. 1.

Fig. 3.

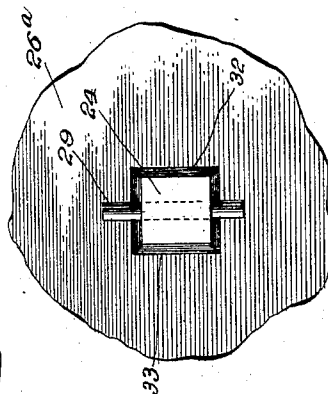
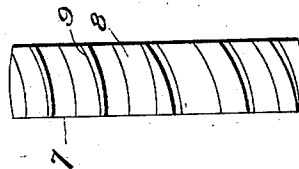


Fig. 2.

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TOOL FOR FACING BOILER-TUBE CAPS AND THEIR SEATS.

SPECIFICATION forming part of Letters Patent No. 752,734, dated February 23, 1904.

Application filed July 13, 1903. Serial No. 165,234. (No model.)

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 Tools for Facing Boiler-Tube Caps and Their Seats, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to tools for facing boiler-tube caps and their seats, said structure being in the nature of a portable grinding-tool driven by fluid-pressure, preferably water-power.

The invention has for its object to provide a simple, efficient, durable, and readily-portable tool comprising an abrasive wheel driven by fluid-pressure at a high rate of speed and adapted to adjust itself automatically to the conditions of use and maintain an effective pressure against all parts of the surface to be cleaned.

To these ends the 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 drawings, Figure 1 is a vertical sectional view of a structure embodying my invention in one form. Fig. 2 is a detail end elevation of the shaft and the central portion of the abrasive wheel, and Fig. 3 is a detail elevation of the motor-wheel detached.

In the said drawings, 1 indicates the body of the tool, consisting of a tube or pipe elbow having a horizontal member 2 and a vertical member 3. The horizontal member is threaded at its rear end, as shown at 4, or otherwise adapted for the attachment thereto of a hose or flexible conduit by means of which water or other fluid under pressure may be supplied to the tool. This horizontal member 2 is also provided with a diaphragm 5, through which I form a plurality of inclined guide-passages 6, through which the motor fluid passes and by which it is directed at a suitable angle against the motor-wheel 7. Said motor-wheel comprises a hub portion 8 and peripheral in-

clined buckets or vanes 9 to receive the impact of the jets of motor fluid issuing from the guide-passages 6. Said motor-wheel 7 is secured on a shaft 10, mounted in suitable bearings in the body 1 with its axis of rotation coincident with the longitudinal axis of the member 2 of said body.

In order to take the thrust due to the pressure of the tool against the work, a ball-bearing is provided for the rear portion of the shaft 10, and to this end the diaphragm 5 is provided with a recess 11 in its front face, in which recess there fits snugly a steel bearing-cup 12, having in its face a groove 13, forming one-half of the raceway of the bearing. The cup 12 fits the recess 11 tightly enough to be held firmly in position when in use, but not so tightly as to prevent its removal in case its renewal is required. The hub 8 of the motor-wheel 7 is provided with a similar recess 14 and bearing-cup 15, having a groove 16, which completes the raceway. This cup is also similarly fitted, so as to be removable. Balls 17, mounted in the raceway thus formed, serve to complete the bearing. In order to take the thrust due to the pressure of the motor fluid against the motor-wheel 7, a similar ball-bearing is provided near the front end of that portion of the shaft 10 within the body 1. To this end the body is provided on its inner face with a recess 18, in which is fitted a removable bearing-cup 19, while the shaft 10 has secured thereon a collar 20, having a recess 21, in which is removably fitted the bearing-cup 22. Balls 23 are mounted in the raceway between the two cups to complete the bearing.

The shaft 10 projects beyond the front of the body 1, its projecting portion being indicated by the reference-numeral 24 and being preferably square in cross-section or of some other non-circular form, which will cause the abrasive wheel carried by it to partake of its rotary motion. Said abrasive wheel is mounted on the forward end of the extension 24 of the shaft and is indicated as a whole by the reference-numeral 25. It is preferably composed of two parts—a main portion or body 26 and a clamping-plate 26^a, of less diameter

than the body 26 and connected thereto by clamping-screws 27. The flat front surface of the body portion 26 of the wheel constitutes the working surface and is provided with a facing 28, of emery-cloth or other suitable abrasive, held in place by having its inner edge clamped between plates 26 and 26^a, as shown. The abrasive wheel is free to move longitudinally on the shaft and is held with a yielding pressure against a suitable stop on the forward end of said shaft. To this end the shaft is provided at its forward end, in front of the wheel 25, with a transverse pin 29 to form said stop. A spring 30, coiled around the extension 24 of the shaft, bears at its front end against the back of the wheel, while its rear end bears against a collar 31, secured on the shaft and forming an abutment for said rear end of the spring. Thus when the tool is pressed against the work the abrasive wheel will bear against the surface to be operated upon with a yielding pressure. The tool is used by being held in the hand of the operator, who grasps the body 1 to hold it to the work. Since it is not always possible for the operator to so hold the body of the tool that the axis of rotation of the shaft 10 is at right angles to the surface to be operated upon, I have made provision for enabling the wheel to automatically adjust its working surface to the surface to be cleaned. To this end the wheel is so mounted on the shaft as to permit it to rock or tilt relatively thereto. This is best accomplished by so constructing the eye or central aperture 32 of the wheel that it is enlarged or flaring outwardly from the center in each direction, said eye fitting the extension 24 of the shaft at its central portion, but having a gradually-increasing space between it and its driving part outwardly from said center portion. Of course it will be understood that the general shape of the eye in cross-section is similar to that of the shaft extension on which it is mounted, so that the wheel will rotate along with the shaft. Of course the spring 30 will hold the wheel normally in a plane at right angles to the axis of rotation of the shaft; but if the body of the tool is not held in proper position when the working face of the wheel is brought into contact with the surface to be operated upon the wheel will adjust itself so that its plane of rotation will be parallel with the surface against which it is pressed.

It will be understood that in practice a hose for supplying water or other motive fluid under pressure will be connected to the free end of the member 2 of the body and that said motor fluid after imparting rotary motion at a high speed to the shaft of the tool will be discharged downwardly through the member 3 of the body. This latter member may, if desired, also have a hose or flexible conduit connected with it for carrying off the waste

water or motor fluid; but such provision is not ordinarily necessary.

In order to adjust the bearings of the shaft 10 to take up any wear which may occur, I employ an adjusting-screw 35, which is threaded through the diaphragm 5 from the back thereof and bearing against the back of the cup 12. By means of this screw, which is readily accessible when the body of the tool is disconnected from its supply-pipe, the cup 12 may be moved forward, so as to take up wear and maintain the bearings in proper operative condition.

I do not wish to be understood as limiting myself to the precise details of construction hereinbefore described, and shown in the accompanying drawings, as said details may be obviously 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 tool for facing boiler-tube caps and their seats, comprising a portable motor, a shaft driven by said motor and extending forward therefrom, an abrasive wheel mounted on said shaft extension so as to rotate therewith, and free to rock or tilt relatively thereto, and a spring yieldingly holding said abrasive wheel normally in a plane at right angles to the axis of the shaft, substantially as described.

2. A tool for facing boiler-tube caps and their seats, comprising a portable motor, a shaft driven by said motor and extending forward therefrom, an abrasive wheel mounted to rotate with said shaft extension, movable longitudinally thereof, and free to rock or tilt relatively thereto, and a spring yieldingly holding said abrasive wheel to the work in a plane at right angles to the axis of the shaft, substantially as described.

3. A tool for facing boiler-tube caps and their seats, comprising a portable motor provided with an extended shaft having a terminal abutment, an abrasive wheel mounted on said shaft extension so as to rotate therewith, and free to rock or tilt relatively thereto, and a spring bearing against the rear face of said abrasive wheel to hold it normally against the abutment, substantially as described.

4. A tool for facing boiler-tube caps and their seats, comprising a portable motor having an extended shaft, said extension having an abutment or stop at its front end, an abrasive wheel mounted to rotate with said extension, movable longitudinally thereof, and free to rock or tilt relatively thereto, and a spring carried by said extension and bearing against the rear face of the abrasive wheel to hold it normally against the abutment, substantially as described.

5. A tool for facing boiler-tube caps and their seats, comprising a portable motor, the

shaft whereof has a forward extension square
in cross-section, provided with an abutment
at each end, an abrasive wheel mounted on
said extension and having an eye also square
5 in cross-section and flaring or of increasing
diameter outwardly in both directions, and a
spring mounted on said extension and bearing
at its rear end against the rear abutment, and

at its forward end against the back of the
wheel, substantially as described. 10

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

HENRY F. WEINLAND.

Witnesses:

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