

Nov. 20, 1928.

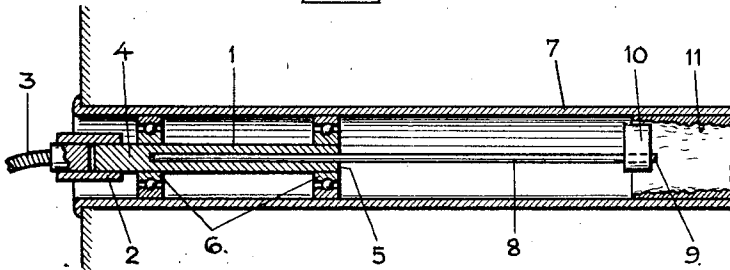
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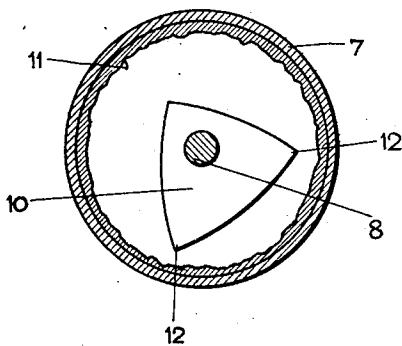
ROTARY RUST OR SCALE CLEANER

Filed April 18, 1927

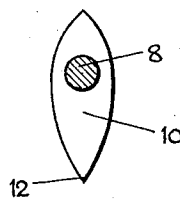
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



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## UNITED STATES PATENT OFFICE.

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## ROTARY RUST OR SCALE CLEANER.

Application filed April 18, 1927, Serial No. 184,744, and in Sweden March 22, 1927.

This invention refers to rotary tools for removing of rust or scale from metal surfaces.

The present invention has for its object to improve tools of this type and for that purpose the tool is built eccentrical and non-counterweighed, the result being that the tool when rotated speedily is brought into a violent shaking movement, which within the narrow space of a water tube boiler pipe causes the blows which are necessary to loosen and remove the scale. To attain such a result the tool consists principally of a chipping member eccentrically suspended at the free end of a long and thin steel shaft of a suitable elasticity and rigidly clamped at the other end. Said thin shaft with the chipping member is in any known manner caused to rotate rapidly about the centre line of the clamped end, and the chipping member is thus caused to strike the uneven surface of the scale which is always more or less present on the surface of the tubes thereby producing such blows which are necessary for the removing of the scale.

In the accompanying drawing two embodiments of the invention are illustrated, in which:—

Figure 1 is a longitudinal section through a portion of a water tube with the tool in operative position,

Figure 2 is a cross section of the water tube on a larger scale with one embodiment of the chipping member, and

Figure 3 a similar view of another embodiment of the chipping member proper.

With reference to the embodiments illustrated in the drawing the rust- or scale-removing tool comprises a thick guiding shaft 1 which by means of a coupling 2 of any known kind is connected with for instance a flexible shaft 3 rotated by an electric motor not shown in the drawing, or in any other suitable way. The guiding shaft 1 which may be of a comparatively short length and a large diameter, is carried at its ends 4, 5 by ball- or roller-bearings 6, the outer race rings of which rest against the interior wall of the tube to be cleaned. In the guiding shaft 1 there is rigidly and centrally clamped a thin steel shaft 8, which is of a comparatively long length and projects from the inner end 5 of the guiding shaft 1. At the free end 9 of the thin shaft 8 a chipping member 10 is eccentrically suspended thereon.

Said chipping member can be variously designed, and the Figures 2 and 3 show only as examples two suitable embodiments, according to which the chipping member is formed with one or more edges 12.

When a tube 7 is to be cleaned inwardly the tool is inserted therein as illustrated in Figure 1, and brought into a speedy rotation by means of the flexible shaft 3. The bearings 6 guide the thick shaft 1 centrally in the tube, while the eccentric arrangement of the chipping member 10 at the free end of the long and thin steel shaft 8 causes said chipping member during its rotation to strike against the uneven coating 11 in the tube. On account of the elasticity of the thin steel shaft 8 the shocks react upon the chipping member and set up and maintain a vibratory or hammering action against the inner tube surface thereby knocking off the scale. During the operation the tool is pushed forward within the tube, and on account of the bearings 6 for the shaft 1 the vibratory movement of the shaft 8 is arrested and the workman suffers but slightly from the violent shocks of the tool.

Though I have shown in the drawing and hereabove referred to the bearings 6 and the thick shaft 1 as means for holding the thin shaft 8 centrally within the tube, so that the clamped end of the shaft 8 is kept in alignment with the flexible shaft 3, I do not want to limit myself exclusively to such means for the same purpose. The essential feature of said centering means is to keep the inner end of the shaft 8 rigidly in alignment with the power transmitting shaft 3, and that can be performed in rather innumerable ways of which the means illustrated are chosen merely as an example. For instance the inner end of the shaft 8 can be held in the hands of the operator.

Having thus particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A rotary rust or scale cleaner for internal cleaning of boiler and like tubes including a rotatable shaft, a chipping member eccentrically mounted at the free end of said shaft, guide means for said shaft located at a substantial distance from the chipping member whereby the axis of the journalled portion of said shaft is held in posi-

tion in the centre of the tube under treatment to prevent displacement across the interior of the tube.

2. A rotary rust or scale cleaner as  
5 claimed in claim 1, characterized therein that said shaft carrying the chipping member is made of small section steel having

elastic properties, the chipping member being immovably clamped to the free end of said shaft.

In testimony whereof I have affixed my  
signature.

KNUT HARALD VILHELM GUSTAFSSON.