

D. L. BREED.
 BOILER CLEANING APPARATUS.
 APPLICATION FILED JUNE 13, 1919.

1,365,149.

Patented Jan. 11, 1921.
 2 SHEETS—SHEET 1.

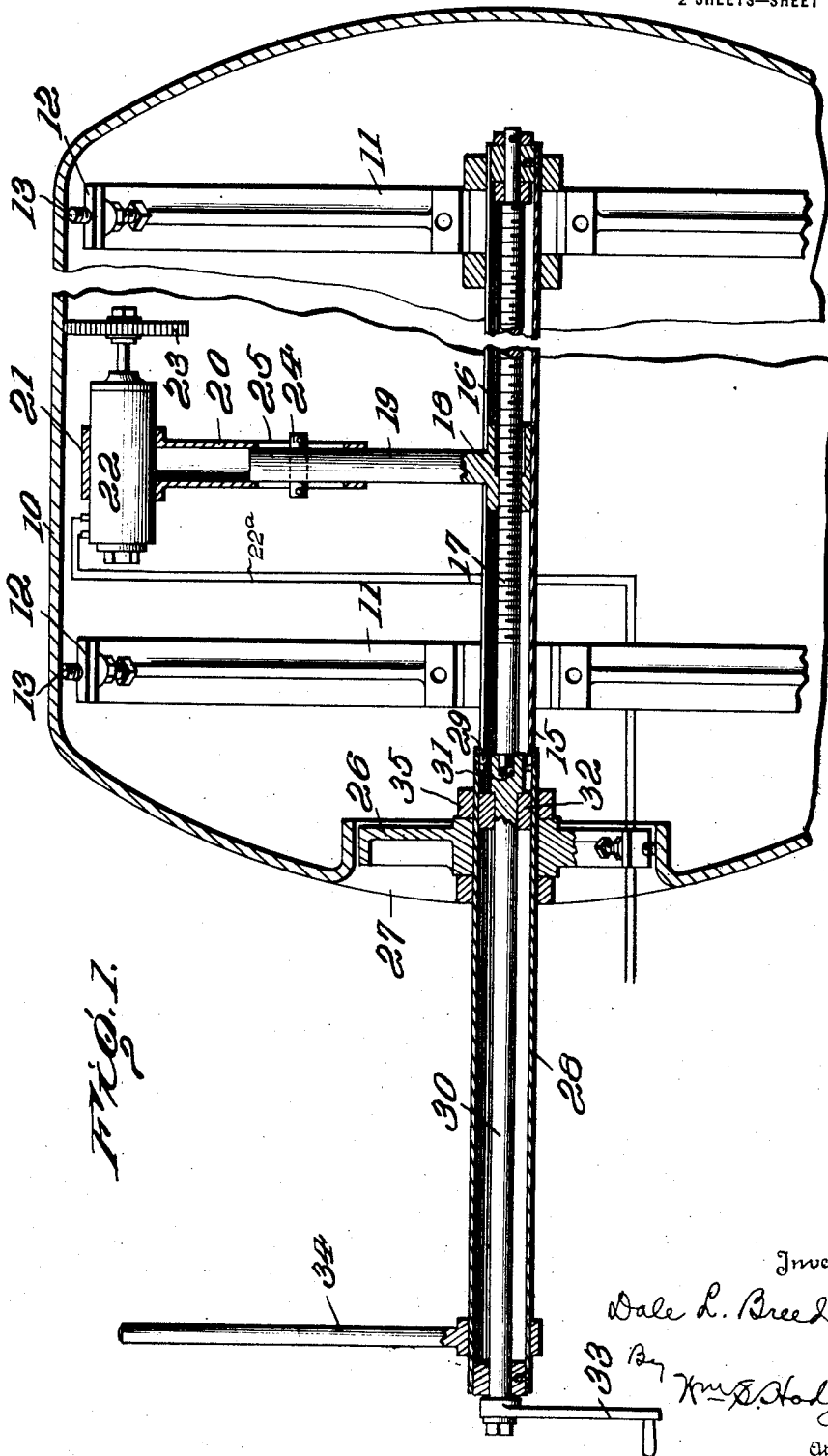


Fig. 1.

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Fig. 2.

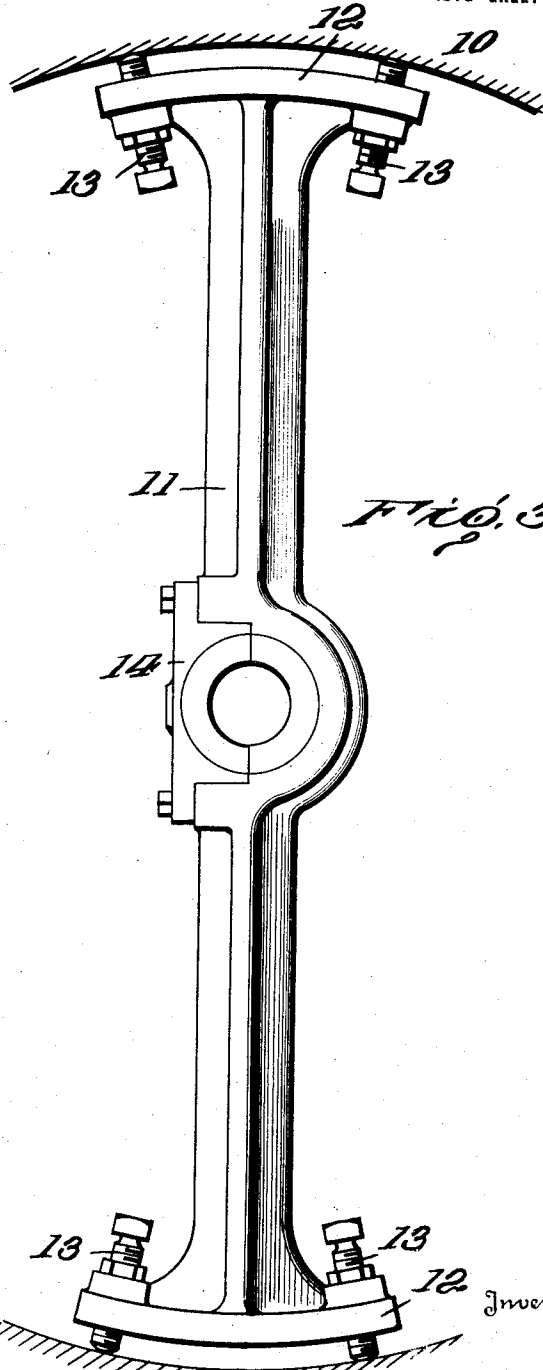
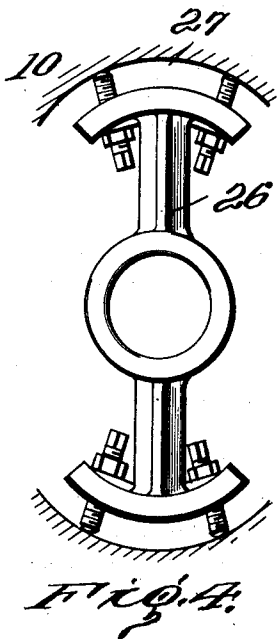
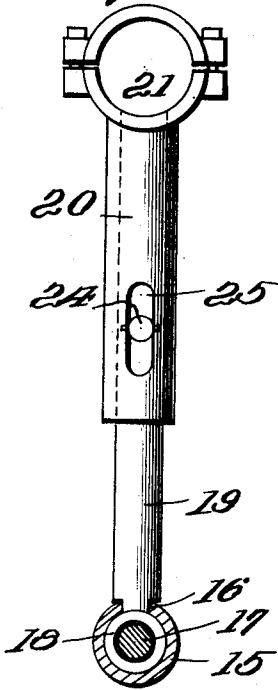


Fig. 3.

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BOILER-CLEANING APPARATUS.

1,365,149.

Specification of Letters Patent.

Patented Jan. 11, 1921.

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To all whom it may concern:

Be it known that I, DALE L. BREED, a citizen of the United States, residing at Ticonderoga, in the county of Essex and State of New York, have invented a new and useful Boiler-Cleaning Apparatus, of which the following is a specification.

This invention is an apparatus for removing scale or incrustation from steam boiler drums or other cylindrical vessels.

Heretofore, when it has been desired to remove scale or other incrustation from the interior of a steam boiler drum or other similar cylindrical vessel, it has been customary to have workmen enter the vessel for the purpose of removing the foreign substances by the use of hand-operated tools, a method which is very costly, slow, dangerous to the health of the workmen, and more or less unsatisfactory. One of the objects of the invention is to overcome the disadvantages of the hand method by providing an apparatus capable of removing the scale or incrustation by mechanical means. A further object is to provide an apparatus of simple and inexpensive construction which may be readily placed into and removed from operative position.

The invention will be hereinafter fully set forth and particularly pointed out in the claims.

In the accompanying drawing:—

Figure 1 is a longitudinal sectional view illustrating a boiler drum in which is positioned a scale-removing apparatus constructed in accordance with the invention. Fig. 2 is a transverse sectional view illustrating the tool support. Fig. 3 is a side view illustrating one of the bridge bearings. Fig. 4 is a similar view illustrating an extension bearing.

Referring to the drawings, 10 designates a portion of a cylindrical casing, which may be steam boiler drum or any other cylindrical vessel, the invention not being limited in this particular. Located at the ends of the casing and within the same, are bearings 11, each provided at its ends with lateral extensions 12 concentric with the wall of the casing 10, and securely retained in position by screws 13 working in said extensions and bearing against said casing wall. Each bearing is also provided with a removable section 14 to permit the cleaner to be inserted into and removed from operative position,

Rotatably mounted in the bridge bearings 11, is a main tubular shaft 15, which is slotted longitudinally, as indicated at 16, and rotatably mounted within the shaft 15 is a feed screw 17. Operatively engaging the screw 17 is a hub 18 located within the shaft 15 and of a shape to travel therethrough, said hub being provided with a radial arm 19 extending through the slot 16. Slidably mounted on the arm 19 is an extension arm 20, provided at its free end with suitable means, such as a bracket 21, for engaging and supporting a motor 22, for driving the abrading member 23, which may be a toothed bur, cutter, or other tool suitable for the work requirements. The motor 22 may be of any desired or suitable type driven by steam, air, electricity, or any other desired power. In the drawing an electric motor is conventionally illustrated, the feed wires 20^a of which are of the usual and well-known flexible type. Said wires lead to the outside of the boiler through the man-hole 27, passing around the bearing 26, to any suitable source of supply and any desired form of control device (not shown). The extension arm 20 is free to slide upon the arm 19, but rotation thereof is prevented in any preferred manner, for instance, by means of a pin 24 engaging complementary slots 25.

Mounted in an extension bearing 26, located in the manhole 27, is an extension tube 28 which is removably interlocked with the shaft 15 in suitable manner, a pin and slot connection 29, being illustrated. It will be noted that the bearing 26 is a substantial duplicate of the bridge bearing 11, but of smaller dimensions. Inside of the extension tube 28 is placed a driving shaft 30, provided with means for engaging the outer end of the feed screw 17, such means, in the form illustrated, consisting of a socket 31 shaped to engage a squared end of the feed screw. Said driving shaft is mounted in suitable bearings 32 within the extension tube, and is provided with a hand crank 33, whereby it may be rotated. The extension tube 28 is provided with an arm 34 by which it also may be rotated.

In practice, when it is desired to clean the interior of a boiler drum or other similar vessel, the bridge bearings 11 are placed in position, and the slotted shaft 15 carrying the feed screw 17, is then placed in position, the arm 19 projecting radially through the slot 16. The extension arm is

then engaged with the arm 19, thereby positioning the motor 22 and abrading member 23 in operative position. The extension bearing 25 is then placed in position in the manhole, and the extension tube 28 and driving shaft 30 brought into engagement with the slotted shaft 15 and the feed screw 17, the collars 35 being adjusted to retain the extension tube in proper position. Power is then applied to the motor 22, and by rotating the shaft 15 through the medium of the arm 34 the abrading member 23 is caused to travel over the area to be cleaned, said member rotating all of the time, and at the same time the feed screw 17 is operated through the medium of the hand crank 33 to cause the member 23 to travel lengthwise of the casing 10. By providing a slidable connection between the arm 19 and extension arm 20, the cutter is permitted to adjust itself to overcome any inaccuracy in the original setting of the shaft 15 and also to conform to any unevenness of the inner surface of casing 10. In this manner, all scale or incrustation may be rapidly and economically removed from the entire inner surface of the drum without it being necessary for the operator to enter the vessel during the cleaning process.

Having thus explained the nature of the invention and described an operative manner of constructing and using the same, although without attempting to set forth all of the forms in which it may be made or all of the forms of its use, what is claimed is:—

1. A boiler cleaning apparatus of the character described comprising a rotatable shaft, an abrading member carried by said shaft and mounted to travel in an orbit around the latter, means for causing the abrading member to travel in a line parallel with said shaft, and means for imparting rotations to said abrading member independently of the rotations of said shaft.

2. A boiler cleaning apparatus of the character described comprising a rotatable shaft, supporting means therefor, a rotatable abrading member spaced radially from and movable with said shaft during rotation of the shaft, means for imparting independent rotation to said abrading member simultaneously with the rotations of said shaft, and means for feeding the abrading member longitudinally of the shaft.

3. A boiler cleaning apparatus of the character described comprising a rotatable shaft, an arm extending radially from said shaft and rotatable therewith, an abrasive member adjustably supported by said arm, means for feeding said abrasive member longitudinally of said shaft, and means for actuating said abrasive member independently of the rotation of said shaft.

4. A boiler cleaning apparatus of the character described comprising a rotatable

shaft, an arm extending radially from said shaft an extension arm adjustably engaging the first mentioned arm, abrading mechanism carried by said extension arm, means for moving said radial arm longitudinally of the shaft, and means for actuating said abrading mechanism independently of the rotation of said shaft.

5. A boiler cleaning apparatus of the character described comprising a rotatable hollow shaft, a feed screw mounted therein, an abrading member rotatable with said shaft and having a member engaging said feed screw, and means for actuating said abrading member independently of the rotations of said shaft.

6. A boiler cleaning apparatus of the character described comprising a rotatable hollow shaft, means for supporting the same, a feed screw mounted within said shaft, a radial arm projecting from said shaft and engaging said feed screw, an abrading device carried by said arm, and means for actuating said abrading member independently of the rotations of said shaft.

7. A boiler cleaning apparatus of the character described comprising a rotatable hollow shaft, means for supporting the same, a feed screw within the shaft, a radial arm projecting from the shaft and engaging said feed screw, an extension arm adjustably engaging said radial arm, an abrading device carried by said extension arm, and means for actuating said abrading member.

8. A boiler cleaning apparatus of the character described comprising a rotatable hollow shaft, means for supporting the same, a feed screw within said shaft, an abrading member, means carried by said shaft and engaging said feed screw for supporting said abrading member, an extension tube removably engaging said hollow shaft, and a driving shaft removably engaging said feed screw.

9. A boiler cleaning apparatus of the character described comprising a rotatable hollow shaft, means for supporting the same, a feed screw within the shaft, an abrading member, means carried by said shaft and engaging said feed screw for supporting said abrading member, means for independently rotating said shaft and said screw, and means for actuating said abrasive member independently of the rotations of said shaft.

10. A boiler cleaning apparatus of the character described comprising a rotatable hollow shaft, means for supporting the same, a feed screw within the shaft, an abrading member, means carried by said shaft and engaging said feed screw for supporting said abrading member, an extension bearing, an extension tube mounted in said bearing and removably engaging said hollow shaft, a driving shaft rotatably mounted within said

extension tube and removably engaging said feed screw, and means whereby said extension tube and said driving shaft may be independently rotated.

- 5 11. A boiler cleaning apparatus of the character described comprising a hollow shaft having a longitudinal slot therein, adjustable supports for said shaft, a rotatable

threaded shaft supported within said hollow shaft and having an arm mounted to travel 10 thereon and extending through said slot, and a motor operated cleaning tool supported by said arm.

In testimony whereof I have hereunto set my hand.

DALE L. BREED.