TOOL FOR INSTALLING HANDBOLE CLOSURES IN BOILERS.

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To all whom it may concern:

Be it known that we, WILLIAM RICHARDSON and JOHN S. FOLAND, citizens of the United States, residing in the city of St. Louis, State of Missouri, have invented a certain new and useful Improvement in Tools for Installing Handhole Closures in Boilers, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a tool for installing a hand hole closure of the kind that is adapted to be seated in a metal sheet by forcing said closure or a portion on same into a hand hole in said sheet with sufficient force or pressure to practically lock the closure in the sheet and produce a tight joint between the closure and the edge of the hand hole in which it is mounted.

The main object of our invention is to provide a tool for the purpose described that materially reduces the time and labor of installing hand hole closures of the general type mentioned.

Another object is to provide an inexpensive tool of the character above referred to which is so constructed that it can be operated from the outside of the structure in which a hand hole closure is being installed. Other objects and desirable features of our invention will be hereinafter pointed out. We have herein illustrated our improved tool used for installing a hand hole closure in the front sheet of the water leg of a water tube boiler, but we wish it to be understood that the tool can be used for installing hand hole closures in various other kinds of structures.

Figure 1 of the drawings is a side elevational view of a hand hole closure installing tool constructed in accordance with our invention.

Figure 2 is an enlarged longitudinal sectional view, taken on the line 2–2 of Figure 1.

Figure 3 is a transverse sectional view, taken on the line 3–3 of Figure 2; and

Figure 4 is a view similar to Figure 2, illustrating another form of our invention.

Referring to the drawings which illustrate two forms of our invention, A designates a hand hole closure that is adapted to be seated in a hand hole formed in the front sheet 1 of the water leg of a water tube boiler, said closure consisting of a hollow cap provided with a slightly tapered portion 2 that is adapted to be inserted in the sheet 1 from the inside of the water leg and then forced forwardly with sufficient pressure so as to securely connect the closure to the sheet and produce a steam and water tight joint between the tapered portion 2 of the closure and the edge of the hand hole in the sheet 1 in which said tapered portion is seated. Our invention consists of a tool that can be operated from a point on the outside of the water leg for seating the hand hole closure A snugly in the hand hole in the front sheet 1 of the water leg.

Briefly stated, our improved tool consists of a member B adapted to be arranged in engagement with the front side of the front sheet 1 of the water leg of the boiler in proximity to a hand hole in said sheet, a member C provided with means for clamping the hand hole closure A to same and means for moving the member C forwardly or to the left, looking at Figure 1, so as to draw the tapered portion 2 of said closure A snugly into the hand hole in the front sheet 1 of the water leg. In the form of our invention shown in Figures 1 to 3 the member B is of substantially yoke form and the member C consists of a solid block of metal of such form and size that it can be introduced into the hollow hand hole closure A, said member C being provided with a plurality of expansible jaws 3 that are adapted to be expanded or forced outwardly into engagement with the tapered portion 2 of the hand hole closure A, so as to clamp the hand hole closure to the member C and force the tapered portion 2 of said closure into the hand hole in the sheet 1 when the member C is moved forwardly, or, in other words, towards the cross piece of the yoke-shaped member B, said jaws 3 being tapered slightly so that when they are expanded they cannot pull out of the small end of the tapered portion 2 of the closure A.

Various means can be used for clamping or connecting the member C of the tool to the hand hole closure A with which the tool is being used and various means can be used for moving the member C forwardly during the operation of seating the hand hole closure. In the form of our invention...
shown in Figures 1 and 2 the means for pulling the member C forwardly consists of a shaft D projecting forwardly from the member C through a hole 4 in the cross piece of the yoke-shaped member B and provided with an externally screw-threaded portion 5 on which a nut 6 is mounted at a point in front of the cross piece of the yoke-shaped member B. The shaft D is preferably utilized to expand the jaws 8 of the member C, one convenient way of accomplishing this result being to provide the shaft D at its inner end with a square portion 7 whose corners are adapted to engage inclined surfaces or cam faces 8 on the inner ends of shanks 9 on the jaws 8 and force said jaws outwardly, as shown in Figure 3, when the shaft D is turned in one direction, each of the shanks 9 being provided with a stop or shoulder 10 against which the co-operating corner of the square portion 7 of the shaft strikes after the jaw has been expanded or forced outwardly into engagement with the tapered portion 2 of the hand hole closure A. At the front end of the shaft D is a square portion 2 to which a wrench can be applied so as to turn said shaft in one direction so as to expand the jaws 8 and in the opposite direction so as to permit said jaws to move inwardly out of engagement with the hand hole closure. The square portion 7 of the shaft D is of greater diameter than the cylindrical portion of said shaft and is arranged in a cylindrical hole in the member C of greater diameter than the hole in the front end of the member C through which the cylindrical portion of the shaft D projects. Accordingly, the front end of the square portion of the shaft D acts as a thrust bearing which engages the member C and moves it forwardly when the shaft D is pulled forwardly by tightening the nut 6, as hereinbefore described. The shaft D is retained in operative position in the member C by means of a collar 12 mounted on said shaft at the front side of the member C and securely connected to said shaft by a set screw 13 or in any other suitable manner.

In using the tool the closure A is slipped into the hand hole in the front sheet 1 of the water leg from the inside of said water leg. The member C of the tool is then inserted in the closure A, thus causing the yoke-shaped member B to be arranged in engagement with the front side of the sheet 1. At this time the jaws 8 of the member C are retracted and the collar 12 on the shaft D is spaced away from the cross piece of the yoke-shaped member B, as shown in Figure 1. The shaft D is then turned in such a direction that the corner portions of the square part 7 on the rear end of said shaft will engage the cam faces or inclined surfaces 8 on the shanks of the jaws 8 and move said jaws outwardly into snug engagement with the tapered portion 2 of the hand hole closure A, each of the jaws 8 being accurately guided in a guideway in the member C, as shown more clearly in Figure 2. After the hand hole closure has been connected to the member C by expanding the jaws of said member, the nut 6 on the shaft D is turned to the right, so as to pull the shaft D and the member C forwardly, the operation of tightening the nut 6 or screwing said nut to the right being continued until the tapered portion 2 of the closure A has been forced into the hand hole in the sheet 1 tightly enough to practically lock the closure A to the front sheet of the water leg and produce a steam-and-water tight joint between said closure and the hand hole in which it is seated. After the hand hole closure has been seated the nut 6 is loosened and the shaft D is rotated slightly in the opposite direction, so as to disengage the corner portions of the square part 7 on said shaft from the shanks on the jaws 8, and thus permit said jaws to move inwardly out of engagement with the tapered portion 2 of the closure. Thereafter, the member C of the tool can be withdrawn from the closure A.

As previously stated, various means can be used for expanding the jaws of the tool so as to connect the jaw carrying member to the hand hole closure with which the tool is being used. Therefore, in Figure 4 of the drawings we have illustrated another form of our invention, wherein the shaft D' of the tool is provided at its inner end with a tapered or wedge-shaped part 7' having flat, inclined faces that bear against inclined surfaces 8' on the inner ends of the shanks 9' of the jaws 3' in the member C', the shaft D' being provided forwardly through the cross piece of a yoke-shaped member B'. When the jaw carrying member C' of the tool is first introduced into the hand hole closure A, as shown in Figure 4, the jaws 3' are retracted. To expand said jaws the shaft D' is pulled forwardly or moved to the left, looking at Figure 4, so as to cause the wedge-shaped part 7' on said shaft to move the jaws outwardly into engagement with the tapered portion 2 of the hand hole closure. Thereafter, the nut 6 is tightened so as to move the jaw carrying member C' to the left, and thus draw the hand hole closure snugly into the front sheet of the water leg. The shaft D' is prevented from rotating relatively to the jaw carrying member C' by means of a pin or screw 12' on said member whose inner end projects into an elongated slot in the shaft D', and if desired, a nut 13' can be mounted on the screw-threaded portion 5 of said shaft immediately in front of the jaw carrying member C', so as to cause the shaft D' to be
moved in a direction to expand the jaws when the nut 13 is tightened or turned to the right. The tool is preferably provided with a spring ring 14 that surrounds the jaws 3, as shown in Figure 4, so as to prevent said jaws from dropping out of the jaw carrying member C' when the tool is not in use.

While we prefer to use a nut and screw for drawing the jaw carrying member of the tool forwardly, during the operation of forcing the hand hole closure into the hand hole with which it co-operates, we wish it to be understood that various other means can be used for this purpose without departing from the spirit of our invention.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is:

A tool for the purpose described, comprising a substantially yoke-shaped member, a jaw carrying member, radially-disposed jaws in said jaw carrying member, a shaft projecting rearwardly through the cross piece of said yoke-shaped member and provided with a tapered or inclined part that forces said jaws outwardly when said shaft is moved longitudinally, means for preventing said shaft from rotating with relation to said jaw carrying member, and means for preventing the jaws from dropping out of said jaw carrying member when the tool is not in use.

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