Dec. 29, 1942. W. H. GRINNINGER ET AL 2,306,436

MOTOR SUPPORT

Filed April 13, 1942

Fig. 1.

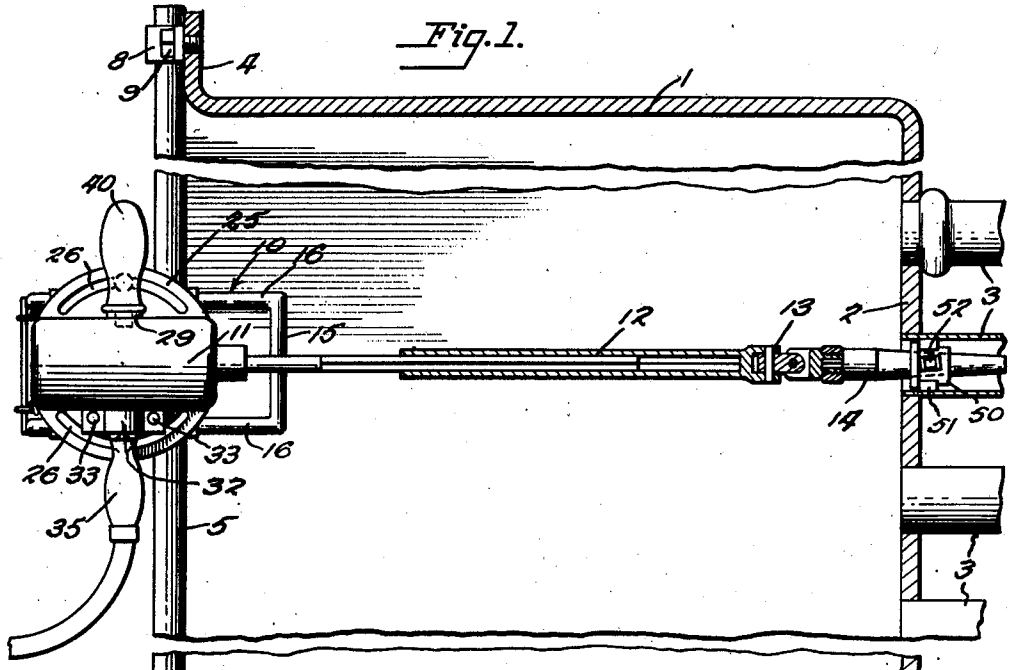


Fig. 2.

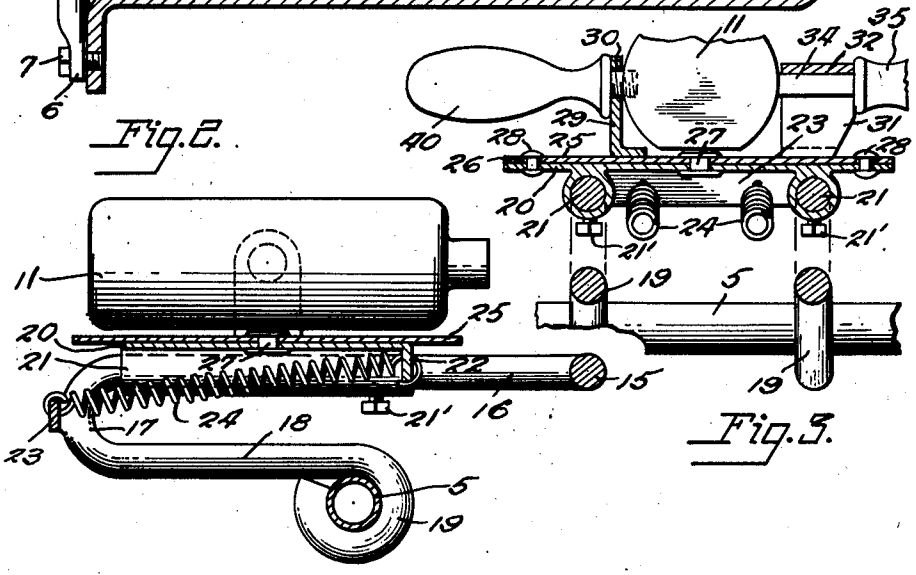


Fig. 3.

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MOTOR SUPPORT

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3 Claims. (Cl. 248—16)

This invention relates to a device for use in connection with the cutting and placing of boiler tubes and more particularly for a motor support in connection with such an operation.

In practice, boiler tubes are found to deteriorate first at or adjacent the points where they are supported by the boiler heads and it, therefore, becomes necessary to cut the tubes just beyond this point of deterioration, remove them from the boiler, weld new portions to bring them to the original length and then after replacing the tubes, to expand them just within the boiler heads so as to secure them in position.

Heretofore this process has been done by an operator, either using hand tools or if using a portable power driven tool holding the motor during the cutting and expanding operations.

The object of the present invention is to provide a convenient support for a motor, the shaft of which is connected by a telescopic portion and universal joint to the tool, the motor support itself being of an improved construction by means of which the motor is freely adjustable and adapted to cooperate particularly with the expanding tool to greatly improve the efficiency of that device.

The invention consists in the novel construction, arrangement and combinations of parts hereinafter more particularly described and claimed.

One sheet of drawings accompanies this specification as part thereof, in which like reference characters indicate like parts throughout.

In the drawing:

Fig. 1 is a horizontal cross section through one end of a boiler showing a portion of the boiler tubes and the present invention applied and ready for use.

Fig. 2 is a medial vertical cross section through the supporting device.

Fig. 3 is a transverse cross section taken on line 3—3 of Figure 2.

In the drawing 1 indicates the boiler head at one end of a boiler, 2 the header plate and 3 the ends of the boiler tubes.

As hereinbefore indicated, the boiler tubes 3 are found to first deteriorate adjacent the points where they are secured in the header plate 2 and to repair the same it is customary to cut the tubes just beyond the worn portion which permits the tube being driven out through the other end of the boiler, the tubes being usually held in position by expanded portions 60 just within each of the boiler headers 2. In making such repairs to boiler tubes it has been heretofore the practice to cut the tubes with a hand cutter tool and after the new portion of tube has been welded on to replace the worn portion and tube replaced to use an expander to again expand the tube in position.

This work has been done through the boiler head by removing the usual cover secured to the boiler flange 4.

In accordance with the present invention, after the boiler cover has been removed a tube 5 is secured horizontally in position and for this purpose the tube 5 is conveniently flattened at one end, as at 6, and provided with a hole through which a bolt 7 can be passed and threaded into one of the holes of the boiler flange 4. To permit the use of the same tube with a variety of boilers, the other end of the tube is preferably secured to the opposite side of the flange by a saddle clip 8 adapted to seat over the end of the tube and be secured to the flange as by a bolt 9.

Slidably positioned on the tube 5 is a motor supporting carriage, which is indicated generally at 10 and formed from a rod of suitable metal 15 bent upon itself to form parallel legs 16—16, which legs are in turn bent upon themselves, as at 17, to extend under and parallel with the legs 16, as at 18, and bent at their ends into eyes 19 adapted to receive the tube 5.

A plate 20 is provided on its lower face with parallel tubular guides 21—21 which are slidably positioned upon the parallel legs 16—16 thus permitting slidable motion of the plate 20 upon those legs. Bolts 21' positioned in holes in the tubular guides 21 permit the securing of plate 20 rigidly with respect to leg 16 when desired. The plate 20 is also provided with a transverse, downwardly directed flange 22 and the bends 17 of legs 16—16 are connected by a transverse member 23. A spiral spring 24 connects the bridging member 23 with the transverse flange 22 thus normally pulling plate 20 towards the rear of the supporting device.

A second plate 25 is rotatably mounted on plate 20, being pivotally secured thereto as by a central rivet 27. The plate 25 is provided with oppositely disposed arcuate slots 26—26 and the two plates 20 and 25 are further secured by rivets 28 extending through said arcuate slots of plate 25 and secured to plate 20 thereby affording limited rotary motion of plate 25 with respect to plate 20. On plate 25 is an upwardly extending flange 29 provided with a hole 30 through which a handle 40 of motor 11 can be passed. A bracket 31 spaced from flange 29 is adapted to support the power supply tube 34 of motor 11, the latter being clamped in position, as by a saddle strap

32 and bolts 33. The drawing herein illustrates a compressed air motor but obviously the invention is not restricted to any particular type of motor. As illustrated, the tube 34 supplies compressed air to motor 11 and the supply of the compressed air is controlled by a rotary hand-grasp valve 35.

The shaft of the motor is provided with a telescopic extension 12 which carries a universal joint 13 which can be connected to a suitable tool as desired, the drawing herein illustrating an expander tool for expanding the boiler tubes.

These tube expanders are well known in the art and are illustrated in many patents, such as No. 1,467,238, and are generally characterized as comprising a conical spindle carrying a head 50 provided with circumferentially spaced rollers 51 and other feed rollers 52, the latter having their axes angularly disposed with respect to the axis of the spindle. By reason of the construction and arrangement of the rollers on these devices, their rotation in one direction causes the expander rollers to move outwardly within the tube and thus expand the adjacent portion of the tube while their rotation in the opposite direction forces the rollers inwardly and thus permits the withdrawal of the tool from the expanded tube.

From a consideration of the motor carriage as hereinbefore described and by reference to Fig. 1 it will be apparent that with the motor mounted as described on this carriage, it will be freely slidable transversely of the boiler head on rod 5 and also rotatable on rod 5. Further, the motor will be rotatable in a horizontal axis by reason of the rotation of plate 25 on plate 20 so that with the carriage once mounted on the boiler head, the operator can apply the tool to any of the many boiler tubes and if necessary to all of the boiler tubes in succession without changing the mounting of the motor.

When the tube expander is being used it will be noted that for the greater part of the tubes the improved motor carriage will functionally cooperate with the tube expander to automatically withdraw the tool from the tube. With all of the tubes except that which may be in direct alignment with the shafts of both the motor and the tool, it will be found that when the tool 14 is positioned parallel with the axis of the tube it will be angularly disposed to the axis of the motor shaft so that any motion of the tool on the line of its own axis will effectively lock the telescopic joint 12 by reason of side friction so that the forcing of the expander tool 14 inwardly to expand the rollers will draw the plate 20 forwardly against the tension of spiral springs 24. Conversely, when the rotation of expander tool 14 is reversed to permit the withdrawal of the expander rollers, the springs 24 will force the carriage plate 20 back and thus automatically withdraw the expander tool from the tube. In the case of a tube directly in alignment with the axes of both the motor shaft and tool 14, there will, of course, be no such automatic withdrawal of the expander tool because in that angular position the telescopic joint will prevent tensioning of springs 24.

Various modifications will suggest themselves to those skilled in the art but within the scope of the present invention as claimed.

Having described our invention, we claim:

1. A motor support for boiler tube tools, comprising a supporting rod, a frame device slidable and rotatable on the rod, a plate slidable on the frame, a second plate rotatable on the first plate, and means carried by the second plate for securing a motor thereon.

2. A motor support for boiler tube tools, comprising a supporting rod, a frame device slidable and rotatable on the rod, a plate slidable on the frame, spring means arranged to retract the plate to one end of the frame, a second plate rotatably mounted on the first plate, and means carried by the second plate for securing a motor thereon.

3. A motor support for boiler tube tools, comprising a supporting rod, a frame consisting of a rod bent upon itself into U shape having the legs bent back in parallel relationship and formed into eyes adapted to receive the supporting rod, the legs of said frame connected by a transverse bridge member, a plate slidable on the legs of the frame member, spring means connecting the slidable plate with the transverse bridge member, a second plate rotatably mounted on the slidable plate and means carried by the rotatable plate for mounting a motor thereon.

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