Aug. 4, 1931. W. N. TATRO 1,817,327

APPARATUS FOR INSTALLING SUPERHEATER TUBES IN BOILER FLUES

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Fig. 1.

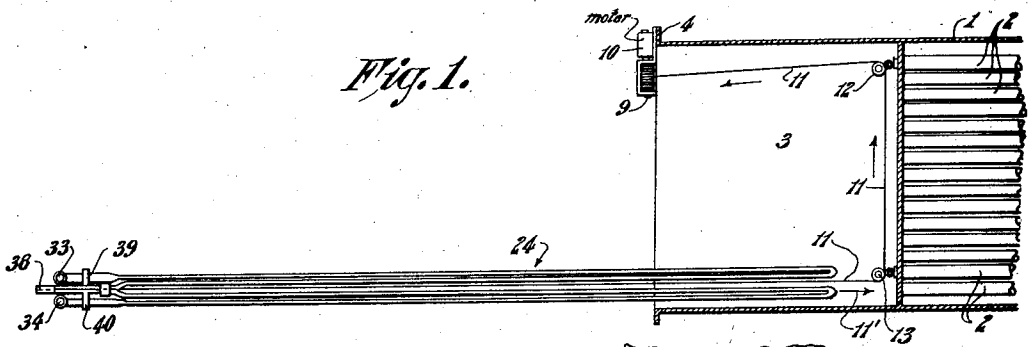


Fig. 2.

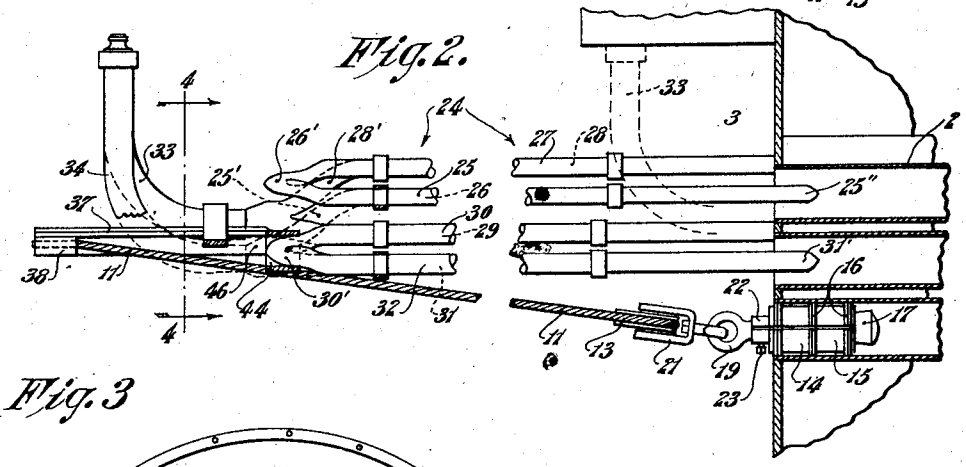


Fig. 3

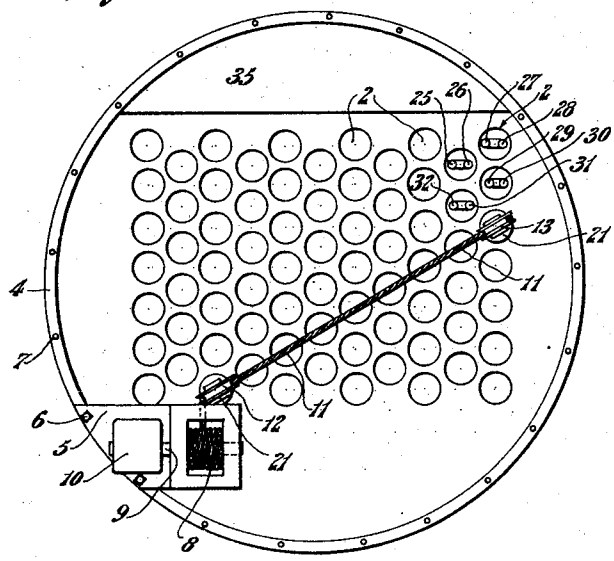
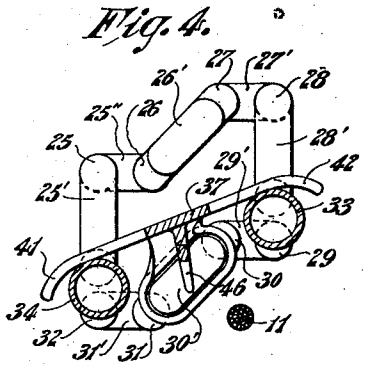


Fig. 4.



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Fig. 5.

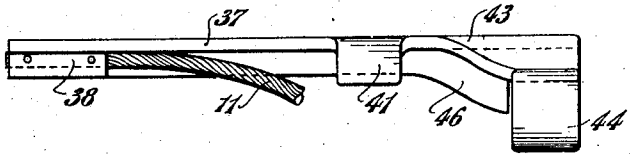


Fig. 6.

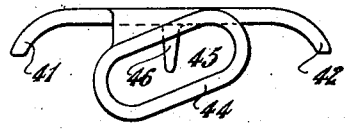


Fig. 7.

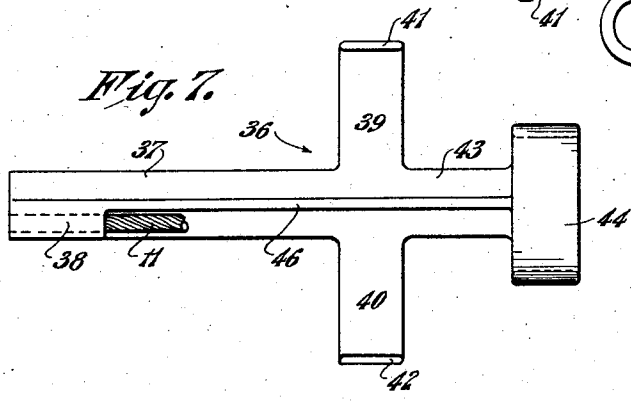
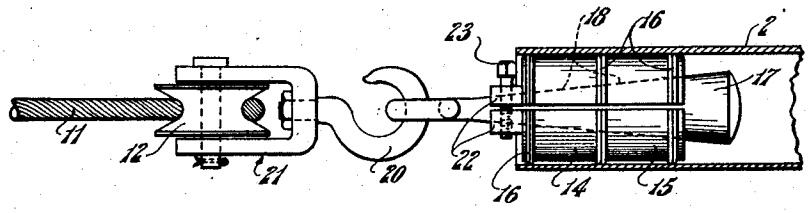


Fig. 8.



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UNITED STATES PATENT OFFICE

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APPARATUS FOR INSTALLING SUPERHEATER TUBES IN BOILER FLUES

Application filed October 13, 1930. Serial No. 488,198.

My invention relates to an improvement in an apparatus for installing superheater tubes in boiler flues, and more particularly in the flues of a locomotive boiler.

An object of my invention is to save a great deal of time and manual labor involved in replacing the superheater tubes in the boiler flues, after they have been removed for cleaning and repairing.

Under present conditions, it has been found that it requires the services of nine men and aproximately three days' time to replace these tubes in a large locomotive boiler having 204 flues. With my apparatus, this same work may be accomplished in about two and one-half hours and with the services of only two employees.

Broadly, my invention comprises an air or other motor which is attached to a winch or drum on which a cable is wound, a plurality of tackle blocks through which the cable passes, means for removably securing the tackle blocks in any one of the boiler flues and a device attached to the free end of the cable for removably attaching the cable to the front end of a holder member which supports the superheater tubes, whereby the superheater tube units which comprise eight of these tubes will be inserted into their respective flues, when the cable is wound on the drum by the motor. By changing the positions of the removable tackle blocks, with reference to the boiler tubes, all of the superheater tube units may be inserted. It should be stated that these superheater tubes, which are located in the boiler tubes, are small tubes through which the moist steam to be dried is passed, before it enters the steam space of the locomotive. These tubes are externally subjected to the hot gases of combustion on their passage through the boiler tubes from the firebox to the smoke box. In practice, there are two of these superheater tubes in each of the boiler tubes. My invention is designed to insert two of these superheater tubes in each of four of the boiler tubes at one operation. These tubes are very heavy to handle by hand, as they are substantially twenty-one feet in length.

Referring to the drawings:

Fig. 1 is a vertical sectional view of the smoke box end of a locomotive boiler, showing a unit of the superheater tubes about to be inserted.

Fig. 2 is an enlarged detail side elevational view partly in section of a unit about to be installed.

Fig. 3 is an end elevational view of Fig. 1 showing superheater tubes in four of the boiler tubes.

Fig. 4 is an enlarged detail view on the line 4—4 of Fig. 2 showing the eight tubes engaged by the holder members.

Fig. 5 is an enlarged side view of the holder member for a unit.

Fig. 6 is a detail end view of the holder.

Fig. 7 is a plan view of the holder, and

Fig. 8 is an enlarged detail view of one of the expansion members which are inserted in a tube of the boiler.

Referring to the drawings in detail:

1 designates the boiler proper having the usual tubes 2, which terminate in the smoke box space 3. 4 designates the flange portion of the smoke box to which the usual cover, or door plate, (not shown) is secured.

Referring now to the details of my invention, 5 designates a plate or bracket member which is secured to the flange 4 by means of the bolts 6 passing through the openings 7 of the flange 4. 8 indicates a winding drum, or winch, the shaft 9 of which is connected to the air or other motor 10. 11 is a heavy cord or cable which is attached at one of its ends to the winding drum 8, this cable being passed under the two sheave wheels 12 and 13. These wheels are removably retained, with reference as to location, in any of the boiler tubes 2 by means of the split block members 14 and 15, which are formed with the ribs 16 and a tapered opening 18 through the same. 17 is a wedge-shaped member that is inserted in the tapered-shaped opening 18 of the members 14 and 15; the outer end of which wedge is formed with the eyes 19 to receive the swivel hooks 20 of the two snatch blocks 21 that support the sheave wheels 12 and 13, mentioned above. 22 are projections on the split members 14 and 15

for adjustably securing them together with the screw 23. When these blocks are inserted in a boiler tube and the wedge 17 drawn outward, the blocks will be moved outward and the ribs 16 will serve to retain them against removal from the tubes, as readily understood.

One of the units of superheater tubes is indicated, as a whole, by the reference numeral 24, which comprises eight small tubes, two of which are inserted in each of the boiler tubes, as indicated in Fig. 3. This superheater unit does not form any part of my present invention, but is shown here in detail, in order to illustrate how one of them is inserted in four of the tubes of a locomotive boiler. Referring to Figures 2 and 4, 25, 26, 27, 28, 29, 30, 31 and 32 designate the eight superheater tubes of the unit 24. Fig. 3 illustrates two of the superheater tubes in four of the boiler tubes 2, namely, 25 and 26, 27 and 28; 29 and 30; and 31 and 32. Tubes 26 and 27 are connected together with the part 26′; tubes 28 and 29 are connected together with the part 28′; tubes 29 and 30 are connected with the part 29′; tubes 30 and 31 are connected with the part 30′; tubes 31 and 32 are connected with the part 31′; tubes 25 and 32 with the part 25′; and tubes 25 and 26 with the part 25″. The inlet and outlet ends of these tubes are shown connected to the riser tubes, indicated at 33 and 34, which are connected to the dry steam space 35 in the usual manner.

Referring now to what I term the holder for inserting the superheater units 24 into the tubes 2, 36 designates this member, which comprises a substantially flat member of strap iron with the end portion 37 to which the other end of the cable 11 is secured, as shown at 38. 39 and 40 are offset arm portions with upturned ends 41 and 42. Connected to the arms 39 and 40 is the extension 43 having the elliptical-shaped member 44 with the opening 45. 46 is a rib which terminates at the elliptical-shaped member 44.

The operation of my invention is as follows: the bracket member 5 is secured to the flange 4; the split members 14 and 15 are then inserted in two of the boiler tubes 2, preferably separated, or spaced, in the positions shown in Fig. 3. The upper set of split members is placed near the four boiler tubes into which the tubes of a superheater unit are to be inserted, as 25 and 26, in one tube; 27 and 28 in another boiler tube and so on. The hooks 20 of two of the snatch blocks 21 are placed in the eyes 19 of the two wedges. The cable 11 is now passed around the two pulleys 12 and its free end secured to the portion 37 of the unit holder member 36. The ends 25″ and 31′ are then placed into four of the boiler tubes, as shown in Fig. 2. The bent end 30′ of two of the tubes of the unit are inserted in the elliptical member 44 of the holder and the rib 46 against the end of these bent tubes, as shown in Fig. 2. Upon the operation of the motor 10, the cable 11 is wound on the drum 8. This operation causes the holder 36 to be moved towards the end of the boiler, as shown in Fig. 1 by the arrow 11′ and carry with it the superheater unit 24. The arms 39 and 40 are placed on upright pipes 33 and 34 and serve to prevent the pipes of the unit from being bent or distorted during the operation.

When other units are to be inserted in other tubes, the members 14 and 15 are removed by loosening the wedge or key 17 and then inserted in other tubes of the boiler and the operation repeated, until all of the units are inserted.

What I claim is:

1. An apparatus for the purpose described, comprising in combination, a motor, a windlass operated by the motor, a cable attached to the windlass, a means insertable in the tubes of a boiler, sheave wheels attachable to the said means and over which the cable passes, a holder member to which the cable is attached whereby, when a superheater unit is placed on the holder, the tubes of the same may be inserted in some of the tubes of the boiler.

2. In combination in an apparatus for inserting superheater units into the tubes of a boiler, said apparatus comprising, a motor and windlass secured to the boiler, sheave wheel supporting devices removably secured in one or more tubes of the boiler, a holder member for supporting the unit, and a cable connected to the windlass and holder and passing over the sheave wheels.

3. In combination, in an apparatus for inserting superheater units into the tubes of a boiler, said apparatus comprising, a motor and windlass secured to the boiler, sheave wheel supporting devices removably secured in one or more tubes of the boiler, a holder member for supporting the unit, and a cable connected to the windlass and holder and passing over the sheave wheels, said devices comprising separable members and means for expanding the same when inserted in the tubes of a boiler.

4. An apparatus for the purpose described having, in combination, a bracket member, a motor and a windlass on the bracket member, means for temporarily supporting a superheater unit, cable means between the unit supporting means and the motor, and pulley means removably mounted in one or more tubes of the boiler.

5. An apparatus for the purpose described having, in combination, a bracket member, a motor and a windlass on the bracket member, means for temporarily supporting a superheater unit, cable means between the unit supporting means and the

motor, and pulley means removably mounted in one or more tubes, said pulley means comprising movable members and means actuated by the cable for frictionally retaining the movable members in a tube.

6. In an apparatus for the purpose described, having, in combination, a motor, a drum connected to the motor, a supporting member for a superheater unit having a portion to receive an end of the unit and arm portions which engage the upright pipes of the unit, sheave wheels removably supported in a plurality of the tubes of a boiler, and a cable connecting the drum and the unit supporting member, the arrangement of the apparatus being such that when the motor is operated the unit will be installed in its respective boiler tubes.

7. An apparatus for installing the tubes of a superheater unit in the tubes of a locomotive or other boiler, a bracket for attachment to the boiler, a drum operated by the motor, a cable connected to the drum, pulley means removably secured in one or more of the tubes of the boiler, and means to which the cable is connected for temporarily supporting the unit when it is being installed in the tubes of the boiler.

8. As an article of manufacture a holder member for a superheater unit comprising a plate member having oppositely located arms, an elliptical-shaped portion at one end and a rib portion terminating adjacent the elliptical-shaped portion, as described.

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