No. 863,074. PATENTED AUG. 13, 1907.

H. E. LEWIS.

MACHINE FOR FASTENING CROWN STAYS IN BOILERS.

APPLICATION FILED FEB. 23, 1907.

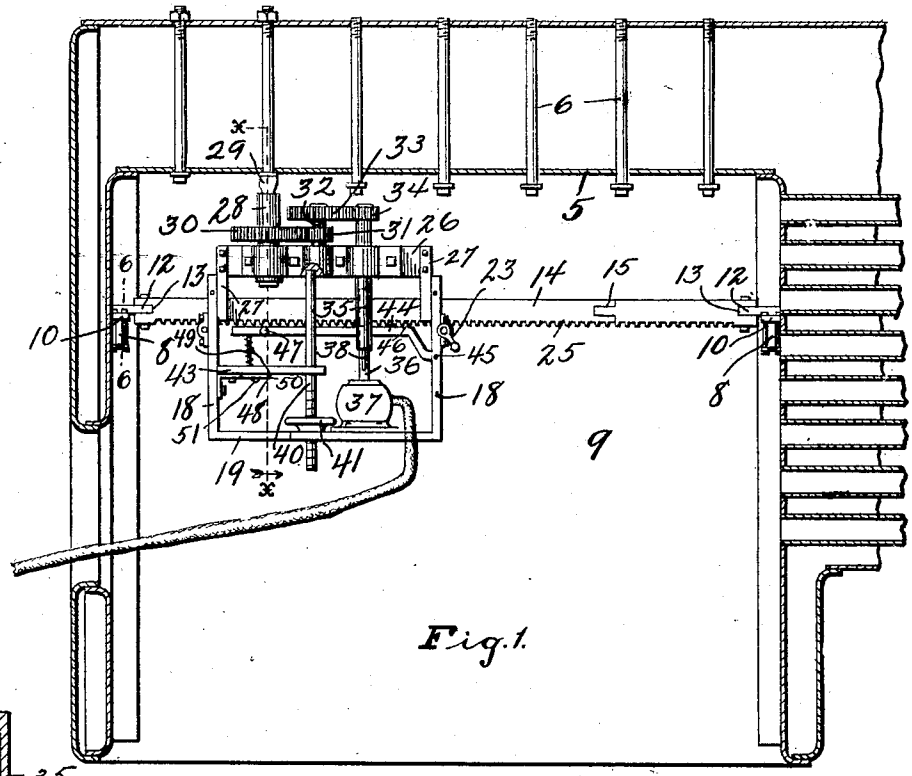


Fig. 1.

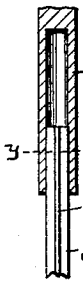


Fig. 4.

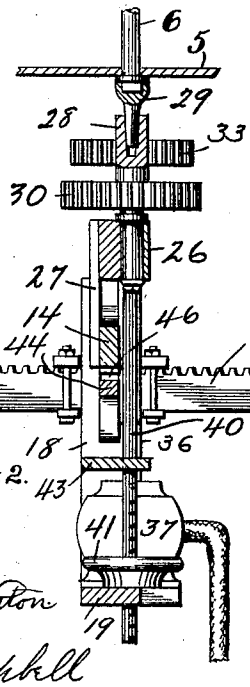


Fig. 2.

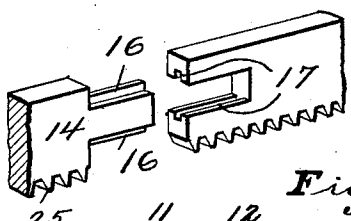


Fig. 3.



Fig. 5.

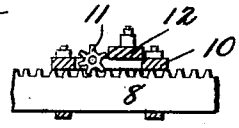


Fig. 6.

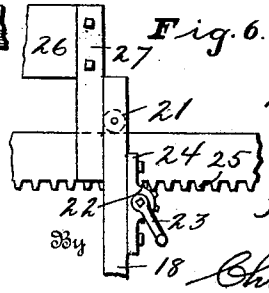


Fig. 7.

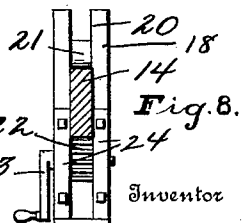


Fig. 8.

Witnesses

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MACHINE FOR FASTENING CROWN-STAYS IN BOILERS.

No. 863,074. Specification of Letters Patent. Patented Aug. 13, 1907.

Application filed February 23, 1907. Serial No. 358,770.

To all whom it may concern:

Be it known that I, HARRY E. LEWIS, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Machines for Fastening Crown-Stays in Boilers, of which the following is a specification.

My invention relates to a machine for fastening crown stays in boilers and has for its object the provision of a device of this character which may be moved to any desired position beneath the crown sheet of a boiler and which may then be brought into engagement with the head of a crown stay and is adapted to impart rotation to said stay to screw said stay into position as will be hereinafter described.

Further objects and advantages of the invention will be set forth in the detailed description which now follows.

In the accompanying drawing: Figure 1 is a vertical section of a boiler illustrating this improved machine mounted in the fire box thereof, Fig. 2 is a vertical section upon line x—x of Fig. 1, looking in the direction of the arrow, Fig. 3 is a detail perspective view illustrating a tongue and groove connection between two sections of a rack bar, Fig. 4 is a detail sectional view of a connection between the motor shaft and the gearing, Fig. 5 is a horizontal section upon line y—y of Fig. 4, Fig. 6 is a section upon line 6—6 of Fig. 1, Fig. 7 is a detail view of a pinion which is adapted to impart bodily longitudinal movement to the machine, and, Fig. 8 is a vertical section upon line 8—8 of Fig. 7.

Like numerals designate corresponding parts in all of the figures of the drawing.

Referring to the drawing, the numeral 5 designates the crown sheet of a boiler, and 6 designates the crown stays which are to be screwed into position by the machine which forms the subject matter of the present invention. In carrying out the present invention rack bars 8 are mounted at each end of the fire box 9 of a boiler and carriages 10 are mounted to travel upon said rack bars, said carriages being provided with pinions 11 which mesh with the rack bars. These rack bars may be secured in position temporarily in any desired manner. In practice it will probably be found to be most convenient to bolt them to the end walls of the fire box by bolts, not shown. The pinions 11 permit the carriages 10 to be readily moved from one side of the fire box to the other, said pinions acting in much the same manner that rollers would act in the same positions, but the teeth of these pinions meshing with the teeth of the rack bars 8, create sufficient friction and consequent resistance to the movement of the carriages as to prevent said carriages from being accidentally moved. The result of this is to maintain the rack bar 14 in proper longitudinal alinement. Horizontally disposed blocks 12 rest upon the tops of these carriages and are secured in the bifurcated ends 13 of a longitudinally disposed rack bar 14, said rack bar 14 extending from end to end of the fire box. Since these fire boxes vary in length, it is necessary to provide some means for accommodating these various length fire boxes. In order to accomplish this the rack bar 14 may be made in two sections and connected at 15. As is best illustrated in Fig. 3, this connection is a tongue and groove one, the tongues 16 entering grooves 17 formed in the opposed sections of the rack bar. It will therefore be seen that the rack bar is mounted for bodily movement transversely of the fire box, for when the bar is shoved from side to side, the carriages 10 roll upon the rack bars 8 and carry the rack bar 14 with them.

The stay tightening machine is mounted for bodily longitudinal movement upon the rack bar 14. This machine consists of end members 18 and a bottom member 19. The rack bar 14 passes through slots 20 formed in the end members 18 of the frame of the machine and rollers 21 (see Figs. 7 and 8) which are carried by the end members 18 bear upon the upper surface of the rack bar 14. A pinion 22 to which rotation may be imparted by a handle 23, is journaled in brackets 24 and meshes with the teeth 25 of the rack bar 14. It will therefore be seen that rotation of this handle, will cause the machine frame to travel bodily along the rack bar 14. A bearing block 26 carries depending legs 27 which straddle the rack bar 14. This bearing block is therefore capable of vertical movement with relation to the rack bar and the frame of the machine. Journaled in this bearing member is a spindle 28 which is adapted to receive a wrench 29 (see Fig. 2). A gear wheel 30 which is secured to this spindle, meshes with a small pinion 31 and this small pinion 31 is in turn fast upon a shaft 32. The shaft 32 carries a gear wheel 33 which meshes with a small pinion 34. The pinion 34 is mounted upon a sleeve 35. The shaft 36 of an air motor 37 is provided with a spline 38 which engages a groove 39 formed in the sleeve 35.

A rod 40 is adapted to elevate the bearing block 26, a hand wheel 41 being threaded upon this rod and bearing against the bottom member 19 of the machine frame. When this hand wheel is turned, it either elevates the bearing block 26 or permits said bearing block to descend as the case may be. The rod 40 passes through a plate 43 which extends from one of the end members 18 of the frame. A lever 44 is pivoted at 45 to one of the end walls of the frame. This lever carries a tooth 46 which is adapted to engage with the teeth of the rack bar 14. At its free end this lever is provided with the knob 47 to permit this lever to be readily thrown down to withdraw the tooth 46 from engagement with the bar 14. A spring 48 encircles a rod 49 which is carried by the free end of the lever 44 and passes through the plate 43, this spring normally holding the free end of the lever elevated and holding the

tooth 46 into engagement with the rack bar 14. A latch 50 is pivoted at 51 on the underside of the plate in such manner that this latch may be swung beneath the lower end of the rod 49 when desired, to prevent the downward movement of said rod and consequently to prevent the downward movement of the lever 44.

From the foregoing description, it will be seen that the carriages 10 and the rack bars 8 provide means for moving the machine bodily from side to side of the fire box of the boiler and beneath the crown sheet, while the mounting of the machine upon the rack bar 14 permits the machine to move bodily from end to end of the fire box. The wrench 29 may therefore be brought into engagement with any one of the large number of stay bolts which pass through the crown sheet.

The operation of the device is as follows: With the parts in the position illustrated in Fig. 1, air is supplied to the motor 37 and said motor in turn imparts motion to the wrench 29 through the sleeve 25, pinion 34, gear wheel 33, shaft 32, pinion 31, gear wheel 30 and spindle 28. After the said bolt has been screwed into position, the hand wheel is turned to permit the bearing block 26 to descend to bring the wrench out of engagement with the head of that particular stay and the latch 50 is then moved into such position that the lever 44 may be depressed to bring the tooth 46 out of engagement with the teeth of the rack bar 14. The handle 23 may then be turned to cause the machine to travel to such a point as to bring the wrench 29 beneath the next stay. The hand wheel 41 is then turned to elevate the bearing block 26 to bring the wrench into engagement with the next stay, after which the current is again supplied to the motor to cause the machine to screw this stay into position. The sliding connection between the motor shaft 29 and the sleeve 35, permitting this vertical movement of the bearing block with relation to the rest of the machine, while still maintaining the connection between the sleeve 35 and the motor shaft 36.

From the foregoing description, it will be seen that simple and efficient means are herein provided for accomplishing the objects of the invention, but while the elements shown and described are well adapted to serve the purposes for which they are intended, it is to be understood that the invention is not limited to the precise construction set forth, but includes within its purview such changes as may be made within the scope of the appended claims.

What I claim, is:

1. In a device of the character described, the combination with a rotative member adapted to engage the heads of crown stays, of means for inparting rotation to said member, a frame upon which said member is mounted, and means for imparting bodily movement to said frame longitudinally of the fire box of a boiler.

2. In a device of the character described, the combination with a rotative member adapted to engage the heads of crown stays, of means for imparting rotation to said member, a frame upon which said member is mounted, and means for imparting bodily movement to said frame longitudinally and transversely of the fire box of a boiler.

3. In a device of the character described, the combination with a rack bar, of a frame mounted to travel upon said rack bar, a bearing block adapted for vertical movement with relation to said frame, a motor carried by the frame, gearing carried by the rack bar, and a sliding connection between said motor and said gearing.

4. In a device of the character described, the combination with a rack bar, of a frame mounted to travel upon said rack bar, a bearing block adapted for vertical movement with relation to said frame, a motor carried by the frame, gearing carried by the rack bar, a sliding connection between said motor and said gearing, and means for locking said frame against movement with relation to said rack bar.

5. In a device of the character described, the combination with a rack bar, of a frame mounted to travel upon said rack bar, a bearing block adapted for vertical movement with relation to said frame, a motor carried by the frame, gearing carried by the rack bar, a sliding connection between said motor and said gearing, and a pinion carried by the frame and meshing with said rack bar.

6. In a device of the character described, the combination with a rack bar, of a frame mounted to travel upon said rack bar, a pinion carried by said frame and meshing with said rack bar, a locking mechanism adapted to lock said frame against movement with relation to the rack bar, a motor carried by the frame, a bearing block adapted for vertical movement with relation to said frame, gearing carried by said bearing bar, a sliding connection between the gearing and the motor, and a member adapted to engage and impart movement to stays, which is driven by said gearing.

In testimony whereof I affix my signature in presence of two witnesses.

HARRY E. LEWIS.

Witnesses:
A. L. PHELPS,
F. G. CAMPBELL.