

J. ZILLIOX.
BOILER TUBE CLEANER.
APPLICATION FILED OCT. 28, 1910.

1,058,932.

Patented Apr. 15, 1913.

2 SHEETS—SHEET 1.

Fig. 1.

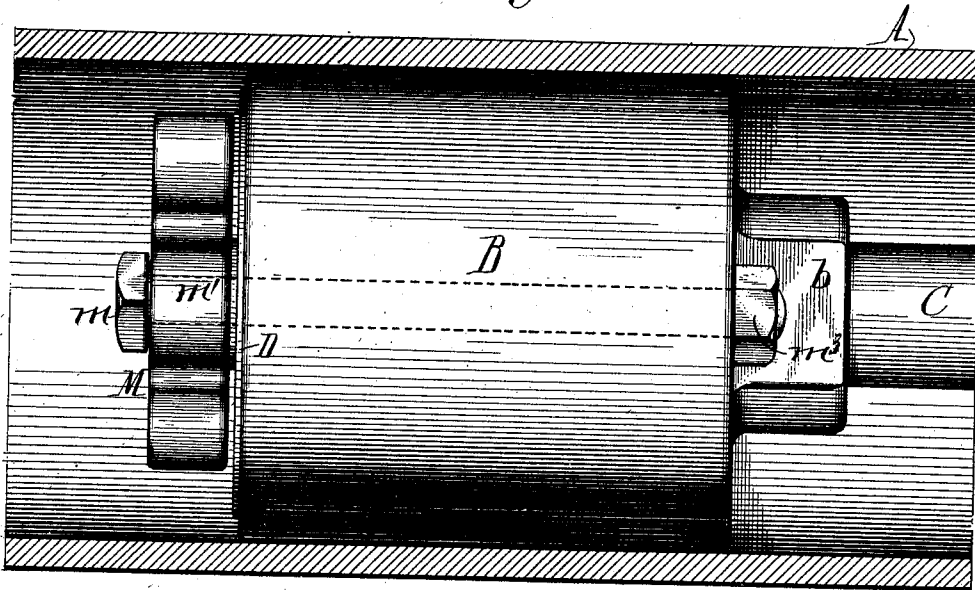
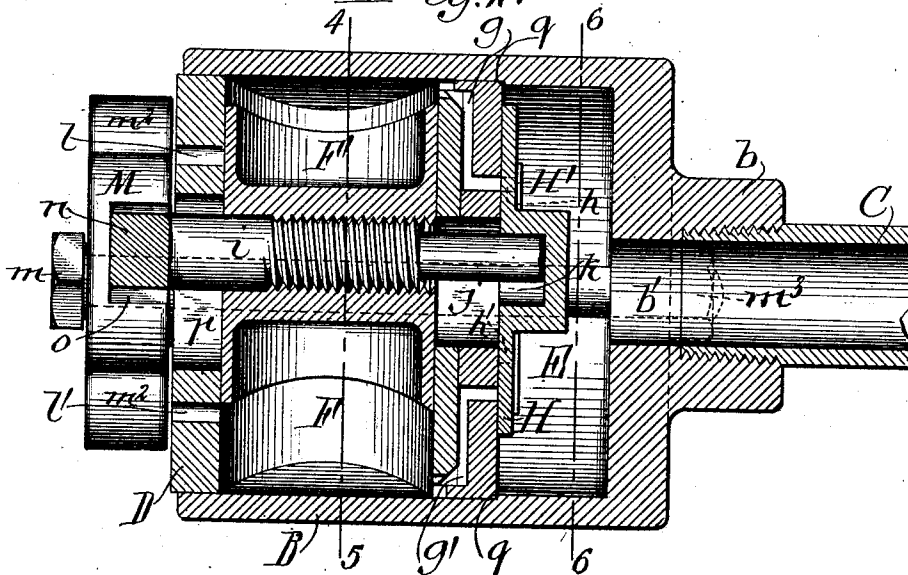


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

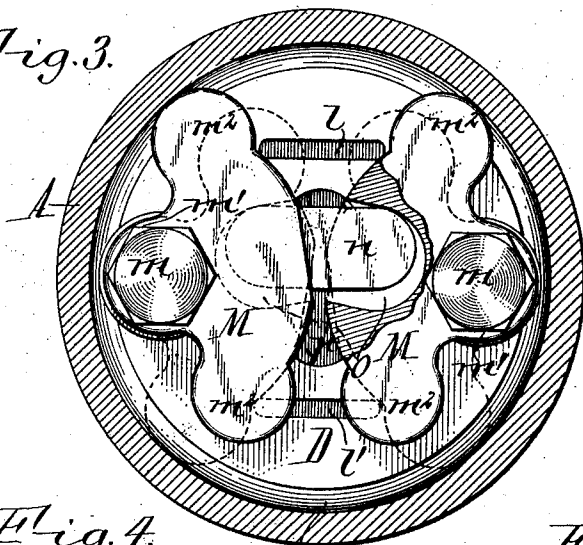


Fig. 4.

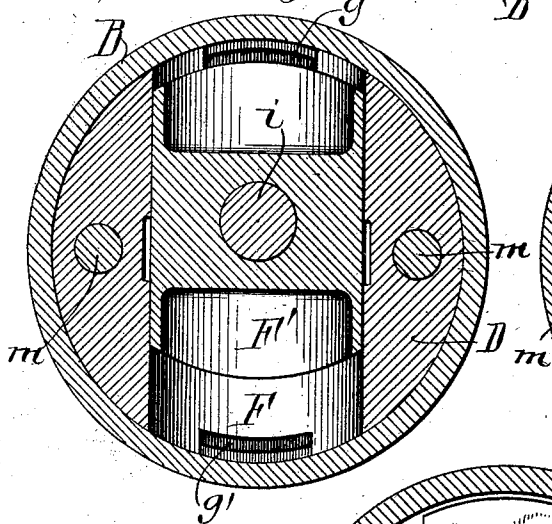


Fig. 5.

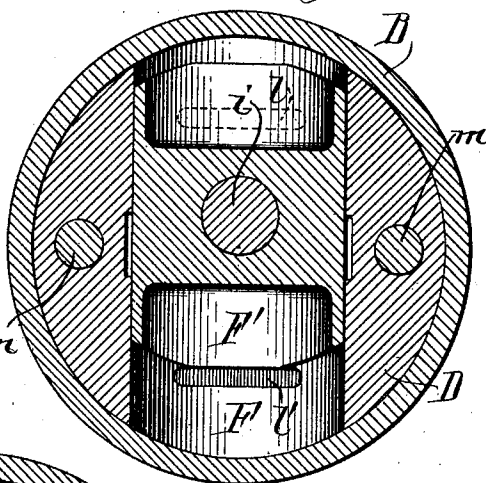
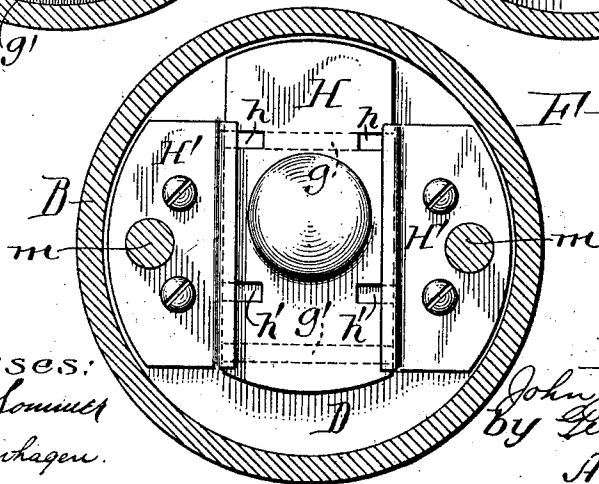


Fig. 6.



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UNITED STATES PATENT OFFICE.

JOHN ZILLIOX, OF BUFFALO, NEW YORK.

BOILER-TUBE CLEANER.

1,058,932.

Specification of Letters Patent.

Patented Apr. 15, 1913.

Application filed October 28, 1910. Serial No. 589,512.

To all whom it may concern:

Be it known that I, JOHN ZILLIOX, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Boiler-Tube Cleaners, of which the following is a specification.

This invention relates to a boiler tube cleaner of the type having a vibratory hammer or scale loosener which acts upon the inner side of the tube for breaking and detaching any scale adhering to its inner or its outer side.

One of the objects of the invention is the production of a cleaner of this class which will detach the scale from all sides of boiler-tubes without the necessity of rotating the tool therein, thus rendering the tool more convenient in use.

A further object is to simplify the construction and reduce the cost of such cleaners, and to increase their cleaning capacity, so that the tubes can be cleaned in correspondingly less time.

In the accompanying drawings consisting of 2 sheets: Figure 1 is a side elevation of the improved cleaner arranged in a boiler tube. Fig. 2 is a longitudinal central section thereof. Fig. 3 is a front elevation of the same, partly in section. Fig. 4 is a cross section on line 4—5, Fig. 2, looking toward the right. Fig. 5 is a section on the same line looking toward the left. Fig. 6 is a cross section on line 6—6, Fig. 2.

Similar letters of reference indicate corresponding parts throughout the several views.

A indicates a boiler-tube.

B indicates the shell or casing of the cleaner which is preferably cylindrical and of the proper size to freely enter a boiler tube. It is provided at its rear end with a head b having a central inlet or connection b^1 for the attachment of a pipe C by which steam or other motive fluid is supplied to the tool. Secured in the shell is a cylindrical head or block D which extends rearwardly from the front end of the shell and terminates short of its head b to leave an inlet or valve chamber E in the rear portion of the shell which receives the motive fluid from the supply pipe C. In the front portion of the head D is formed a transverse piston-chamber F in which a piston F^1 is arranged. Opposite ends of this chamber are connected with the valve-chamber E by

ports g , g^1 formed in the rear portion of the head D and controlled by a valve H, preferably of the sliding type. This valve moves in suitable guides H^1 . In the construction shown in the drawings, the valve is reciprocated with the piston by a screw-threaded rod or stem i secured in a transverse threaded opening of the piston. This rod projects through a slot j in the rear wall of the piston chamber and into a socket k formed in the front side of the slide-valve H. Ports h , h^1 extending through the valve on opposite sides of its socket, cooperate respectively with the ports g , g^1 in such a manner as to connect the ends of the piston chamber alternately with the valve chamber E. As shown in Fig. 6, and by dotted lines in Fig. 2, the upper ports h of the valve are in register with the corresponding port g of the piston-chamber while the lower ports h^1 and g^1 break register, thus admitting the motive fluid above the piston and driving it downwardly. The slide-valve is thereby shifted in the same direction until its lower ports h^1 come into register with the corresponding ports g^1 of the piston-chamber when the movement of the piston and the valve is reversed. The motive fluid is exhausted through ports l , l^1 extending through the front wall of the piston-chamber near opposite ends of the latter.

M, M indicate a pair of hammers or scale-looseners arranged at the front end of the cleaner. These hammers are arranged to vibrate or oscillate transversely of the implement, and for this purpose are preferably pivoted to the front end of the head D by bolts m arranged lengthwise of the head and passing through perforated ears m^1 formed centrally on the outer sides of the hammers. The hammers face each other and are preferably double-headed or duplex, as shown at m^2 , so that each hammer delivers blows against opposite portions of the boiler-tube, on one side of the axis of the latter. The two duplex hammers thus strike a given circle of the tube at four different points, which are equidistant or nearly so, breaking and detaching any adhering scale on all sides of the tube without the necessity of rotating the cleaner therein, as ordinarily required.

Oscillating motion may be imparted from the piston F^1 to the hammers by any suitable means. In the preferred construction

shown, this is accomplished by a cross-head or knuckle *n* formed on or rigidly secured to the front end of the piston-rod *i* and engaging the walls of sockets or recesses *o* formed in the opposing sides of the hammers, substantially in line with their pivots *m*, as shown in Figs. 2 and 3. The front portion of the piston rod plays in a slot *p* formed in the front wall of the piston chamber lengthwise of the latter. By this construction, the cross-head *n* alternately strikes the upper and lower walls of the hammer-recesses *o*, oscillating the hammers in an obvious manner and causing them to strike the tube at two points at one extremity of their stroke, as shown by full lines in Fig. 3, and at two opposite points at the other extremity of their stroke, as shown by dotted lines in said figure.

By constructing the cleaner in this manner, the blows are distributed around the tube and yet delivered so closely together as to break up and detach all portions of the scale by simply pushing the cleaner through the tube. Rotation of the cleaner in the tube is therefore unnecessary, obviating the labor and inconvenience of this operation.

It will be noted that by the construction shown, the hammers deliver a square blow against the tube, effectually detaching the scale therefrom.

The tool, while simple and inexpensive in construction, has a comparatively large cleaning capacity owing to the use of the two duplex hammers effecting a material saving in the time required to clean the tubes.

The pivot-bolts *m* also serve to removably secure the block or head *D* in the casing *B*, these bolts passing through the head on opposite sides of the piston-chamber and their nuts *m*³ bearing against the rear end of the casing. The latter is provided with an internal shoulder *q* against which the head *D* is clamped by said bolts.

I claim as my invention:

1. A boiler-tube cleaner comprising a casing, a pair of duplex hammers movable transversely to the axis of the casing and arranged to travel laterally beyond the casing—at both ends of their stroke, whereby

the hammers are adapted to strike a boiler-tube at four different points in its circumference, and means for actuating the hammers.

2. A boiler-tube cleaner comprising a casing, a pair of opposing hammers pivoted to oscillate transversely to the axis of the casing, each hammer being provided on opposite sides of its pivot with impact heads adapted to strike opposite portions of a boiler-tube, and means for actuating the hammers.

3. A boiler-tube cleaner having a pair of opposing double-headed hammers movable transversely thereof, and a single actuator engaging both of said hammers.

4. A boiler-tube cleaner having a pair of opposing duplex hammers pivoted to oscillate transversely thereof and provided with recesses in their opposing sides, and an actuating member movable transversely of the cleaner and engaging said recesses.

5. A boiler tube cleaner comprising a casing, a pivot carried by the casing and arranged lengthwise thereof, a hammer mounted on said pivot, a piston movable transversely in the casing, and a rod rigidly secured to the piston, arranged lengthwise of the casing and engaging said hammer for actuating it.

6. A boiler-tube cleaner comprising a casing provided in its rear portion with a fluid inlet chamber and on the front side of said chamber with a transverse piston chamber, opposite ends of the latter being connected with the inlet chamber by ports, a slide-valve in the inlet chamber controlling said ports, a hammer movable transversely of the casing and pivoted to the front end thereof, and an actuating rod rigidly secured to the piston and extending beyond the front and rear sides thereof, the rear end of said rod engaging said valve and its front end engaging said hammer.

Witness my hand this 26th day of October, 1910.

JOHN ZILLIOX.

Witnesses:

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