

April 24, 1928.

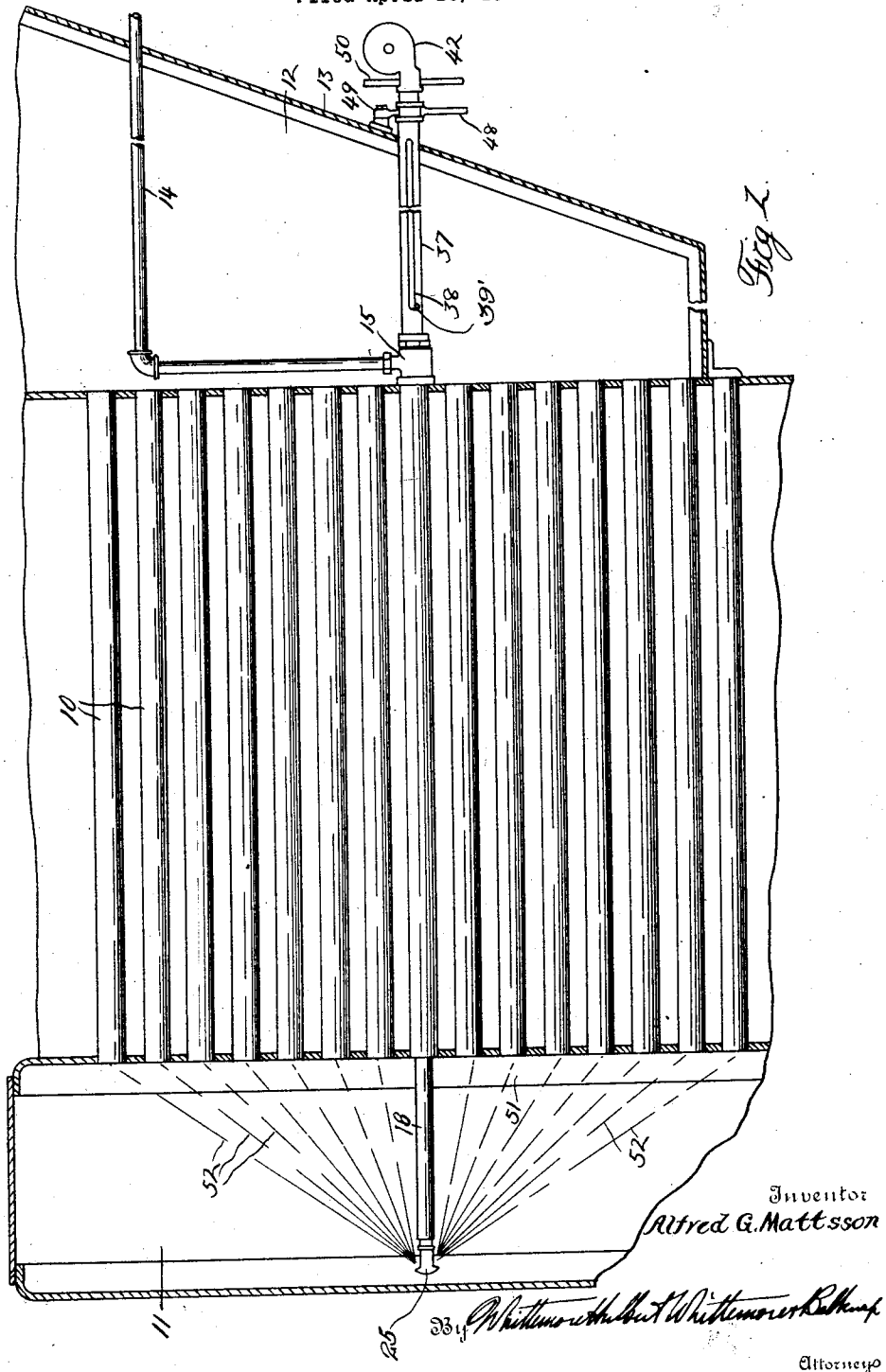
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A. G. MATSSON

BOILER CLEANER

Filed April 16, 1923

4 Sheets-Sheet 1



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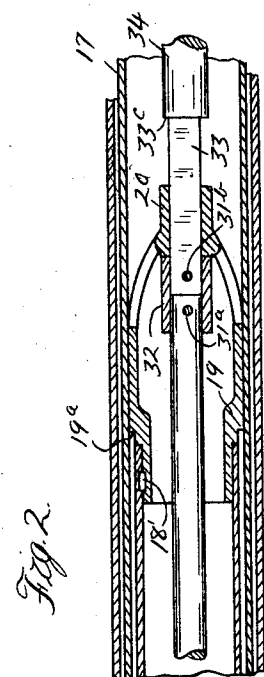
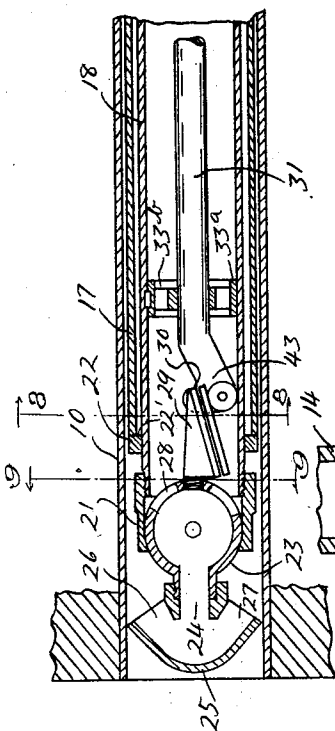
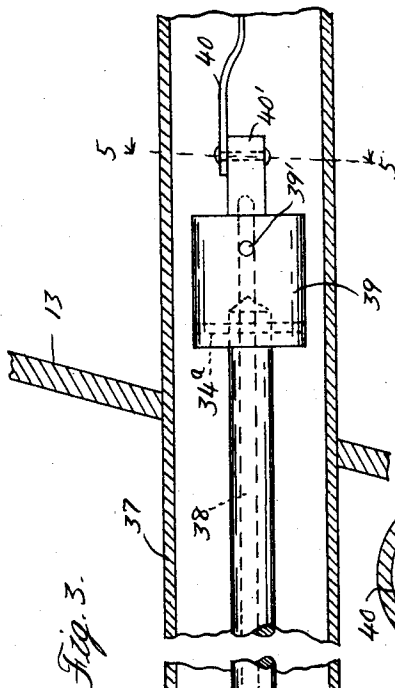
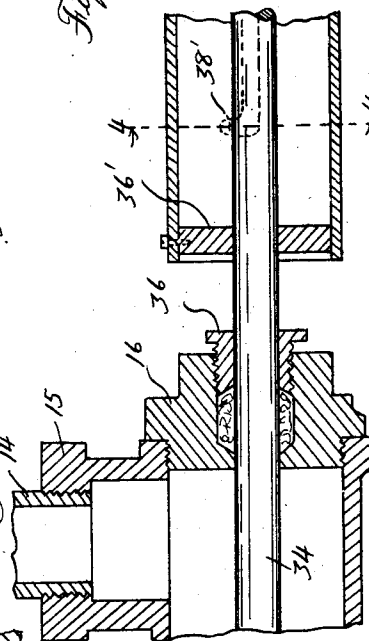
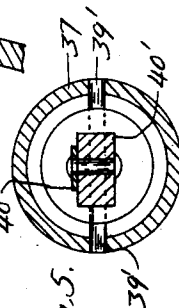
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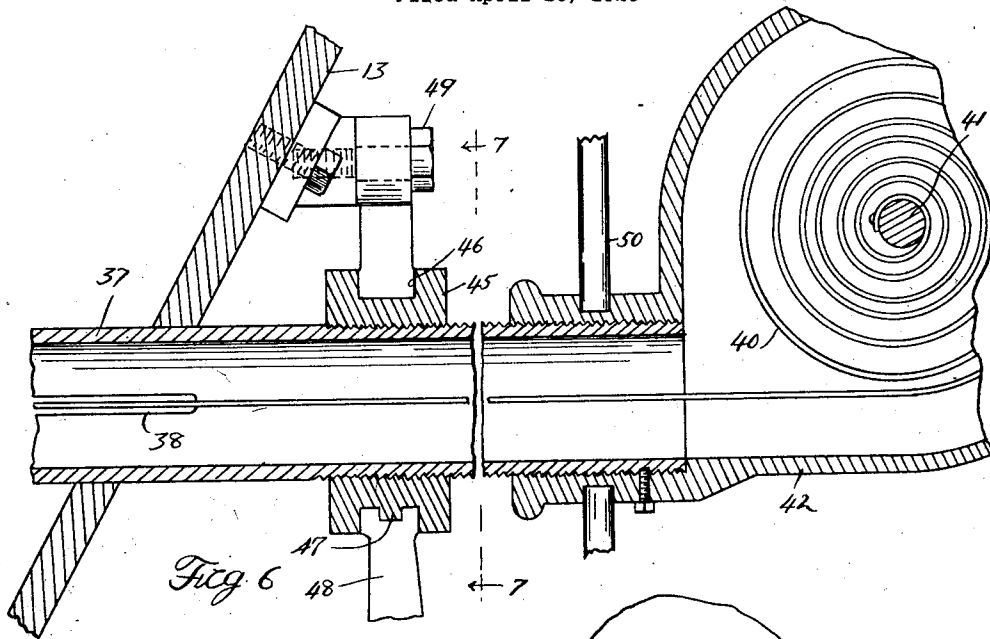


Fig. 6

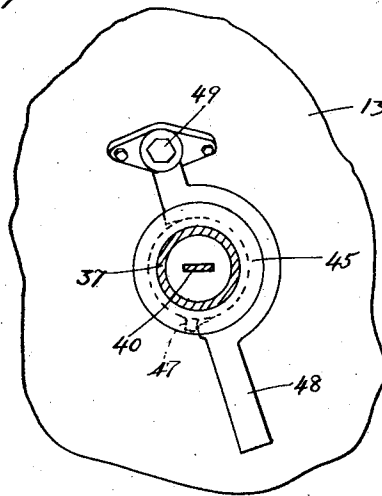


Fig. 7

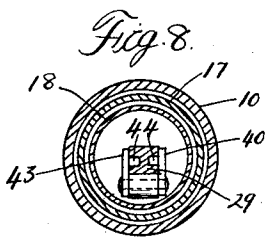


Fig. 8

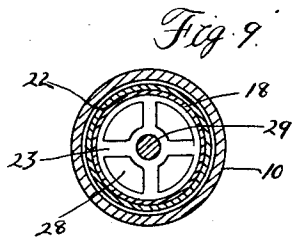


Fig. 9

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BOILER CLEANER

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4 Sheets-Sheet 4

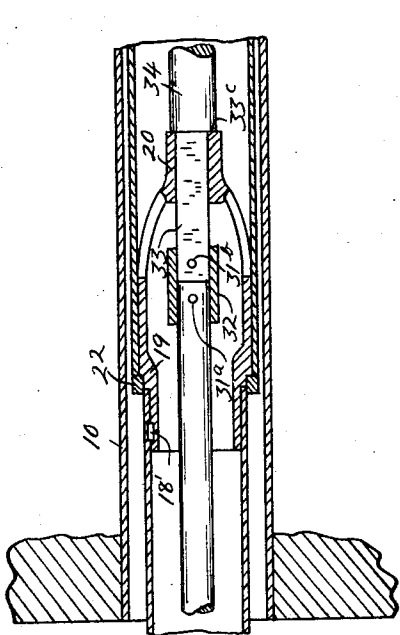


Fig. 10.

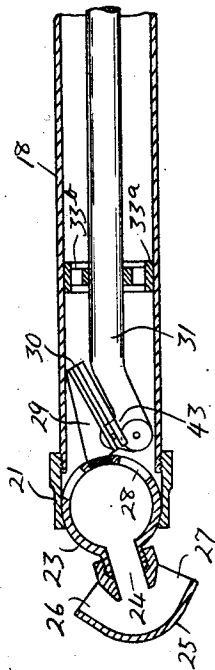
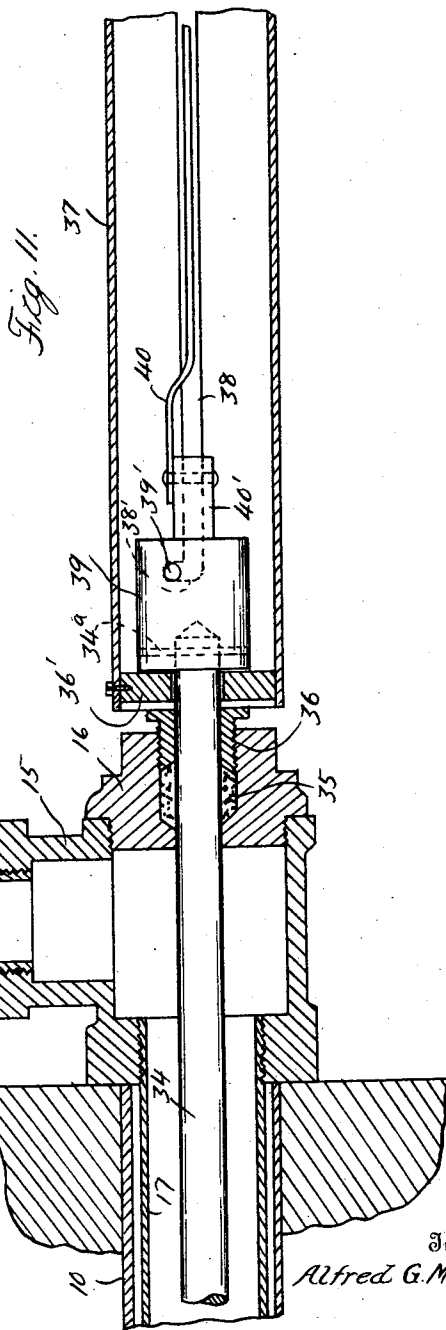


Fig. 11.

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UNITED STATES PATENT OFFICE.

ALFRED G. MATTSOON, OF DETROIT, MICHIGAN, ASSIGNOR TO DIAMOND POWER SPECIALTY CORPORATION, OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN.

BOILER CLEANER.

Application filed April 16, 1923. Serial No. 632,388.

My invention relates to new and useful improvements in a boiler cleaner and particularly that class of boiler cleaners in which a cleaning fluid is used for removing the soot and ash from the tubes by discharging the cleaning fluid into or against them or in proximity therewith.

An object of the invention is a provision in a boiler cleaner having a discharge nozzle resting within one of the tubes of a boiler of means for automatically projecting said nozzle beyond the ends of the tube during operation and withdrawing the same into the tube after the completion of the operation.

Another object is the provision in a boiler cleaner having a fluid conductor inserted into a tube of a boiler and adapted to be projected therefrom of a nozzle constructed to discharge the cleaning fluid forwardly of the boiler and of means for altering the direction of discharge of said nozzle.

Another object is the provision in a boiler cleaner of the class set forth of a rockable nozzle adapted to discharge cleaning fluid forwardly of the fluid conductor of the blower.

Another object is the provision in a boiler cleaner of the class set forth of means for effecting the oscillation or rocking of the discharge nozzle so as to effect an increase in the area covered by said nozzle.

Other objects will appear hereinafter.

The invention consists in the combinations and arrangements of parts hereinafter described and claimed.

The invention will be best understood by reference to the accompanying drawings which form a part of this specification and in which:

Figure 1 is a side elevational view of a marine boiler with the parts removed showing the invention installed and in operation;

Figure 2 is a fragmentary sectional view of the discharge nozzle and parts associated therewith showing the nozzle in its retracted position;

Figure 3 is a central sectional view showing the rod for operating the nozzle in its retracted position.

Figure 4 is a sectional view taken on substantially line 4—4 of Figure 3;

Figure 5 is a sectional view taken on substantially line 5—5 of Figure 3;

Figure 6 is a central vertical sectional

view showing the connection with the smoke box of the boiler;

Figure 7 is a sectional view taken on substantially line 7—7 of Figure 6;

Figure 8 is a sectional view taken on substantially line 8—8 of Figure 2;

Figure 9 is a sectional view taken on substantially line 9—9 of Figure 2.

Figure 10 is a view corresponding to Figure 2 showing the parts in projected position, the discharge nozzle being inclined;

Figure 11 is a view corresponding to Figure 3 showing the parts in projected position corresponding to that shown in Figure 10.

This invention is designed primarily for use with fire tube boilers of the marine type and particularly with that class of boilers in which there is no space for operating a blower from the side of the boiler or in which it is impracticable to insert a blower unit into the interior of the boiler from the side thereof. The customary method of installing a blower unit in a boiler of this type is by inserting the blower unit through one of the tubes of the boiler.

In the drawings I have shown the invention applied to a marine boiler although the use of the invention is not necessarily limited to this class of boiler as will be readily apparent to anyone skilled in the art. The boiler comprises fire tubes 10 which communicate at one end with a combustion chamber 11 and at the other with a smoke box 12 provided with a closure 13.

The boiler cleaner is adapted to be inserted through one of the fire tubes of the boiler, preferably a centrally located one. Leading into the smoke box of the boiler is a delivery pipe 14 which communicates with a T 15 which is provided at its outer end with a plug 16 and has threaded into its opposite end a pipe 17 which is positioned within one of the tubes 10 of the boiler. Positioned within the pipe 17 adjacent to the combustion chamber 11 is a pipe 18 which is secured by a key 18' to a spider 19 having a hub 20 through which passes rod 33, said rod 33 being formed square in cross section at the point the same passes through the hub 20. The spider 19 has a shoulder or abutment 19^a adapted to limit the forward movement of the nozzle 25 as will presently be apparent. Mounted upon the pipe 17 at the free end thereof is a ring 22 providing a bear-

ing for the pipe 18 and also presenting an annular shoulder or abutment 22' engageable by the shoulder 19^a in the projected position of the blower as illustrated in Figure 10. Threaded upon the pipe 18 at its free end is a bearing member 21 in which is pivotally mounted a hollow ball 23 so as to form a sort of ball and socket joint. The member 23 provided with an elongated neck 24 threaded upon which is a deflecting nozzle 25 provided with openings 26 and 27 which serve to direct fluid delivered therefrom forwardly of the boiler and at an angle to the axis of the boiler tube 10. The member 23 is provided with openings 28 through which steam passing through the pipe 17 may find an entrance. Threaded into the member 23 at its forward end is an operating arm 29 which is provided at opposite sides with grooves 30 in which engage pins 44 (see Fig. 8) which project inwardly from arms 43 which are mounted upon a rod 31 which is securely fastened by a pin 31^a to a coupling 32, said coupling 32 being also securely fastened by a pin 31^b to the rod 33. 33^a indicates a spider guide carried by pipe 18 for the rod 31, the guide having openings 33^b for the passage of cleaning fluid. Said rod 33 may be made integral with or merely fastened to a rod 34 which projects through a stuffing box 35 formed in the plug 16. 33^c is a shoulder adapted to contact with hub 20. A suitable gland 36 is provided which serves to maintain the packing in the stuffing box 35 in compact condition. The outer end of the rod 34 is fastened to a thimble 39 and keyed therein. The member 39 is provided with a pair of studs 39' projecting therefrom on opposite sides of member 39. Said studs 39' are adapted to engage in slots 38 formed in the pipe or operating member 37, said pipe 37 being adapted to project through and beyond the closure 13 of the smoke box of the boiler. Each slot 38 is of a length corresponding to the distance travelled by the nozzle when the latter is projected from the position shown in Figure 2 to that shown in Figures 1 and 10. Each slot 38 terminates in an offset 38'. Securely fastened to a projection 40' formed on the member 39 is a spring 40 which extends through the pipe 37 and into a housing 42, one end of said spring being securely fastened to a shaft 41 which is rigidly positioned in a housing 42. Said spring 40 is composed of a flat spring metal and coiled as shown in Fig. 6 the operation and arrangement of the same being in the manner of a clock spring. 36' indicates a guide carried by the pipe 37 and provided with a central opening for slidably receiving the rod 34. Threaded upon a threaded portion of the pipe 37 exterior of the smoke box is a nut 45 being provided with a peripheral groove 46 in

which is adapted to engage the arcuate portion of a lever 48 which is pivotally mounted by means of a bolt 49 upon the closure of the smoke box. The member 45 is provided with a shoulder 47 which is adapted to engage the member 48 upon the rotation of the pipe 37 and thereby prevent the rotation of the nut 45 so as to effect longitudinal movement of the pipe 37 and rod 34 after the blower has been projected by the cleaning fluid. Securely fastened to the housing 42 are handles 50 by which the housing and the pipe 37 may be caused to rotate about the center of the pipe as an axis. In operation with the parts retracted in inoperative position as shown in Figures 2 and 3, cleaning fluid is introduced into the pipe 14 and flows through pipes 17 and 18 against the nozzle 25, thereby exerting a force on the same rearwardly of the boiler. Such force causes rearward projection of nozzle 25 carrying with it the pipe 18 and spider 19 which acts against the coupling 32 to also project the rods 31 and 34, all of which parts are moved against the resistance of spring 40. Projection of the parts is limited by engagement of shoulder 19^a with abutment 22', at which time the parts will be in the projected position ready for rotation of the housing 42 to advance the pipe 37 to rock the nozzle 25 into the positions shown in Figure 10. In the projected position the pins 39' will be at the rear of slot 38 ready to be engaged by the offset portions 38' upon rotation of the housing 42.

The operator then grasps the handles 50 and rotates the housing 42 carrying with it the pipe 37. Rotation of pipe 37 causes engagement of the pins 39' with the offset portion 38' whereby, as the pipe 37 is advanced by reason of the nut 45, the member 39 will also be advanced carrying with its rods 34 and 31. During advancement of the rod 31 it will be understood that cleaning fluid is being discharged from the openings 26 and 27 forwardly of the boiler to direct the jets of cleaning fluid into the tubes 10.

Advancement of pipe 37 and rod 31 causes pins 44 to rock the nozzle 25 by reason of the inclined grooves 20 engaged by the pins. Simultaneously the square portion 33 of the rod 31 causes rotation of spider 19, pipe 18 and hence nozzle 25. Thus, the nozzle 25 will be caused to discharge forwardly against the tubes two jets of cleaning fluid, each of which will trace a spiral, one increasing outwardly and the other approaching the center. Thus, all of the tubes are effectively reached and within a short time. The limit of the rocking movement of the nozzle may be determined by engagement of the shoulder 33^c with the hub 20 of spider 19. By reversing the rotation of handles 50 the nozzle will be rocked back to its initial position. The supply of cleaning fluid may

then be cut off and the spring 40 will act to retract the parts to the original position within the boiler tube as shown in Figures 2 and 3.

5 What I claim as my invention is:

1. A boiler cleaner comprising a fluid conductor, a nozzle normally lying in a tube of a boiler and communicating with said fluid conductor, said nozzle being adapted to project into the combustion chamber of the boiler; a housing exterior of said boiler and a spring mounted in said housing for withdrawing said nozzle into said tube, and means effective upon rotation of the housing for rocking the nozzle when the nozzle is in its said projected position.

2. A boiler cleaner comprising a fluid conductor adapted to be positioned within a tube of a boiler, a nozzle normally housed within said tube and slidable longitudinally of the conductor to project the nozzle into operative position, said nozzle provided with a pair of openings adapted to direct jets of cleaning fluid in a direction opposite to the direction of projecting, means for simultaneously rotating and tilting the nozzle while the nozzle is substantially stationary longitudinally relatively with the boiler and in its said projected position, whereby the angularity of the nozzle openings is varied to discharge fluid jets describing spirals respectively, one of which approaches the axis of the said boiler tube and the other spiral recedes therefrom.

3. A boiler cleaner comprising a source of cleaning fluid, a nozzle, a supply pipe for supplying said cleaning fluid to said nozzle, said nozzle provided with a plurality of discharge openings, and means for moving the nozzle whereby the angularity of the nozzle openings is varied to discharge fluid jets which describe spirals respectively, one of said spirals approaching the axis of the boiler tube and the other receding therefrom.

4. In a boiler cleaner, a nozzle and means for simultaneously rotating and rocking said nozzle, said means including an operating

member, means for rotating the operating member, means for transmitting the rotative movement of the operating member to the said nozzle, means compelling longitudinal movement of the operating member during its rotation and means for converting the longitudinal movement of the operating member incident to the rotation of the same into a rocking movement of said nozzle.

5. In a boiler cleaner, a nozzle and means for simultaneously rotating and rocking said nozzle, said means including an operating member, means for rotating the operating member, means for transmitting the rotative movement of the operating member to the said nozzle, means compelling longitudinal movement of the operating member during its rotation and means for converting the longitudinal movement of the operating member incident to the rotation of the same into a rocking movement of said nozzle, said last mentioned means including a grooved operating arm carried by the nozzle and pins movable longitudinally with the said operating member and engageable in the grooves of the said operating arm.

6. In a boiler cleaner, a fluid conductor having a supply inlet, a nozzle rockably mounted in and projecting substantially axially from the discharge end of said conductor and having an outlet arranged to discharge a stream of cleaning fluid toward said inlet, means for rotating said conductor and nozzle, and means for rocking said nozzle with respect to said conductor.

7. In a boiler cleaner, a fluid conductor having a supply inlet, a nozzle rockably mounted in and projecting substantially axially from the discharge end of said conductor and having outlets arranged to discharge divergent streams of cleaning fluid along opposite sides of said conductor and toward said inlet, means for rotating said conductor and nozzle, and means for rocking said nozzle with respect to said conductor.

In testimony whereof I affix my signature.

ALFRED G. MATSSON.