

C. H. SHEPLER & J. W. SHEARER.
 APPARATUS FOR CLEANING SMOKE TUBES OF BOILERS.
 APPLICATION FILED MAR. 24, 1914.

1,139,911.

Patented May 18, 1915.
 2 SHEETS—SHEET 1.

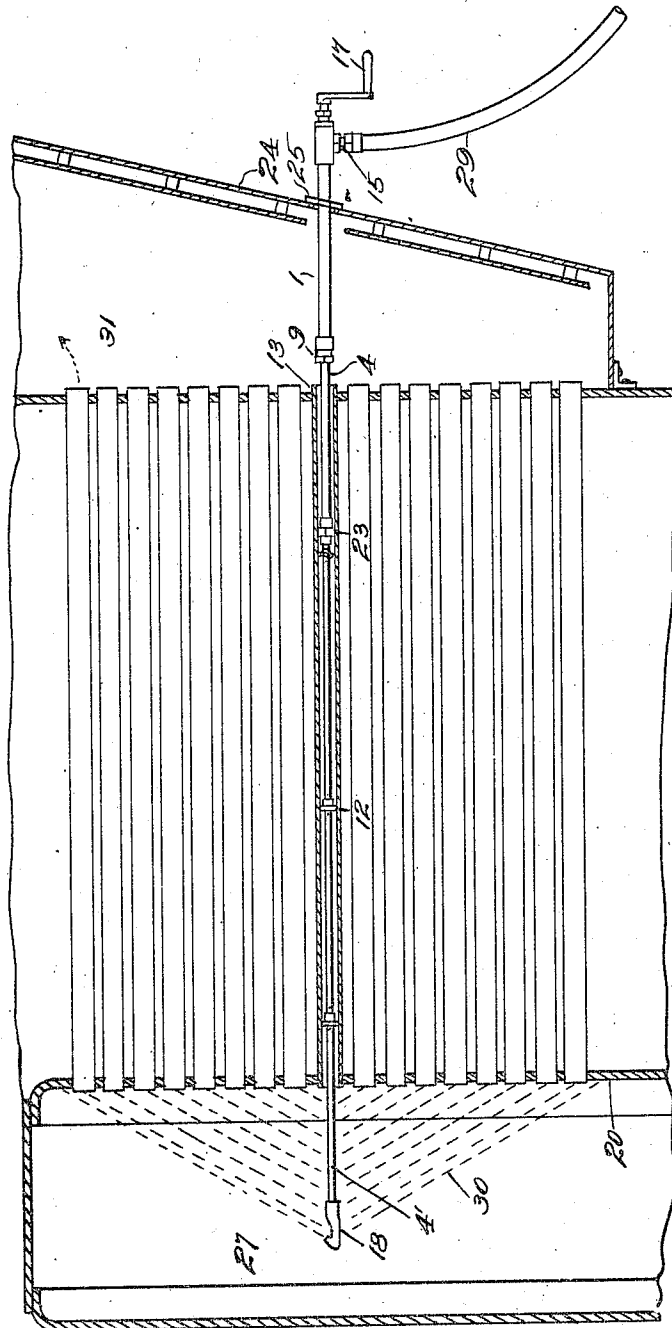


Fig. 1.

WITNESSES:

F. E. Maynard
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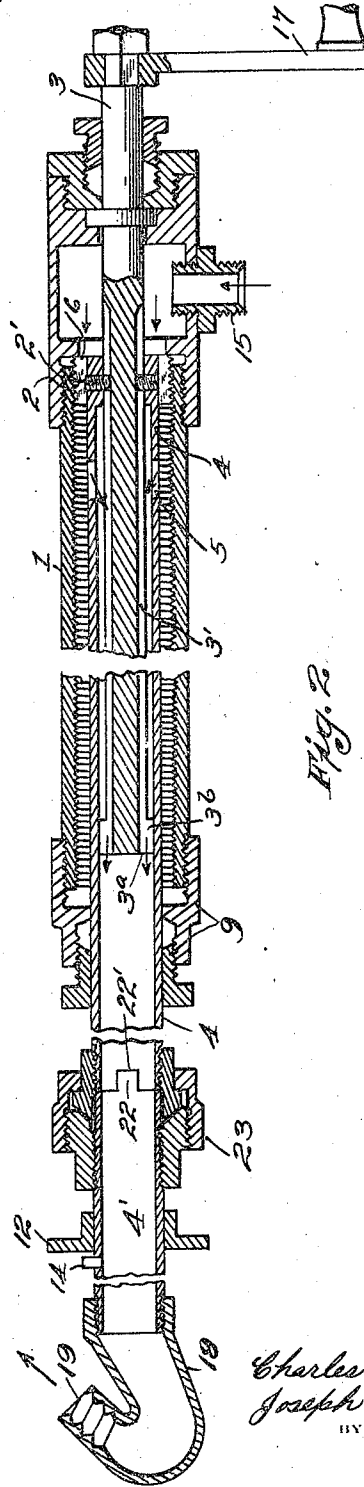
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UNITED STATES PATENT OFFICE.

CHARLES H. SHEPLER AND JOSEPH W. SHEARER, OF SAN FRANCISCO, CALIFORNIA.

APPARATUS FOR CLEANING SMOKE-TUBES OF BOILERS.

1,139,911.

Specification of Letters Patent.

Patented May 18, 1915.

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To all whom it may concern:

Be it known that we, CHARLES H. SHEPLER, a citizen of the United States, and JOSEPH W. SHEARER, a subject of the King of England, residing in the city and county of San Francisco and State of California, have invented new and useful Improvements in Apparatus for Cleaning Smoke-Tubes of Boilers, of which the following is a specification.

This invention has for its object certain improvements in apparatus for cleaning the interior of the smoke tubes or flues of tubular boilers; the cleaning being effected by injecting a jet of steam or other fluid under pressure through the several tubes from the rear, discharging the removed material to the smoke box front.

The present invention is particularly designed for the cleansing of smoke tubes or flues of boilers, or the like, the apparatus being connectible to the front of the boiler and including a rotary and longitudinally movable spray or nozzle member connected by a suitable conductor to a feed head attachable to the front end of the boiler.

A special feature of the present invention is the provision of a means for longitudinally and rotatably moving the spray nozzle, said means comprising a rotary crank which is so mounted and connected to the head of the apparatus, at the front of the boiler, that it will not longitudinally shift and will thus be particularly useful in stoke holes of confining proportions where it would be impractical, if not impossible, to utilize an apparatus attached to the front of the boiler if such apparatus required room for a longitudinal movement toward and from the front of the boiler.

To accomplish these ends, the apparatus consists of a head or main body portion suitably attachable to the front sheet or panel of the boiler adjacent to the smoke box. Within the head portion is turnably and non-shiftably mounted a crank-shaft, upon which is mounted, within the tubular body portion, a conductor, to the outer end of which is joined a discharge pipe carrying a nozzle; the conductor being provided with a threaded part or nut splined to the crank-shaft and engaging the threaded interior of the head or body portion. The crank-shaft being turnably supported in the head of the apparatus against longitudinal movement will, when rotated, turn the conductor,

whereupon its threaded part cooperating with the fixed threaded body will be shifted longitudinally without any longitudinal movement of the crank-shaft.

The invention consists of the parts and the construction and combination of parts as hereinafter more fully described and claimed, having reference to the accompanying drawings, in which—

Figure 1 is a vertical sectional view through a boiler, showing the apparatus as installed for use. Fig. 2 is a central longitudinal sectional view through the apparatus.

In the present embodiment of our invention, the apparatus includes a tubular body member or barrel 1, which may be applied and fixed to some part of the boiler front and secured thereto in a suitable manner when it is desired to clean the tubes. The bore of this barrel 1 is threaded inside to receive a cylindrical nut 2, which latter has its threads outside so that it can be screwed into the threaded bore of the barrel 1 and is capable of being turned in the barrel and during its turning movement moves longitudinally according to the direction of rotation. Through this barrel and in the nut is passed a crank-shaft 3 which is turnably mounted in the outer or head end of the barrel 1 between suitable shoulders; the outer end of the crank-shaft being provided with a crank 17 whereby it may be rotated. The crank-shaft 3 is in the present case mounted within a conductor 4, upon the inner end of which is formed or secured the nut 2. The conductor is provided adjacent to the nut end with ports 5 through which steam entering an inlet or supply connection 15 may find access to the interior of the conductor 4. The nut 2 is provided with longitudinally extending exterior grooves or channels 6, allowing the flow of the steam from the inlet or head end into the barrel 1 and thence through the ports 5 into the conductor 4. The conductor 4 extends beyond the rear end of the barrel 1, which is provided with a suitable packing gland 9, through which the conductor 4 slides when the crank-shaft 3 is turned, and the nut 2 engaging the internal threads of the barrel 1 produces a longitudinal movement of the conductor 4.

There may be connected to the inner end of the conductor 4, by any suitable coupling device indicated by a union 23, an extension pipe or conductor 4', having at its opposite

and a blower head 18 with a nozzle or spray tip 19 which projects forwardly, that is, toward the tube plate 20, but at an angle oblique to the axis of the conductors 4-4'. The ends of the conductors or pipes 4-4' may be detachably secured together by a union 23. In order to prevent possible disconnection at this union, after the apparatus is inserted in a boiler tube, and during its operation therein, the adjacent and abutted ends of these pipes may be suitably interlocked against relative rotation by means of interengaging surfaces, formed, for instance, by projections 22 on the member 4 entering complementary seats 22' on the adjacent end of the actuating section 4. There may be mounted upon the extension pipe 4' any suitable centering and supporting means; these being shown in the present case as rollers or collars 12 loosely mounted on the pipe so as to permit the free rotation thereof. These collars may be supported against unnecessary longitudinal movement, as to the pipe 4', by engagement with suitable stop pins 14 secured in the latter; the collars 12 being of slightly less diameter than the boiler flues which are shown at 13, Fig. 1, and moving successively into the boiler flue as the apparatus is mounted for use therewith.

The crank-shaft 3 is provided with longitudinal keyways 3', into which project keys or complementary engaging members, here shown as screws 2' mounted in the nut 2 of the actuating conductor 4. As before stated, the nut 2 is longitudinally channeled at 6 for the passage of steam from the inlet 15 to the interior of the barrel 1, from which it flows through the port 5 into the annular space within the conductor 4 surrounding the crank-shaft 3, the opposite end of which is provided with a head or circumferential collar 3" having a sliding fit with the interior of the conductor 4; the head being provided with suitable ports or passageways 3', which may be extensions of the keyways 3', through which steam, or other fluid, under pressure may find admission to the extension conductor 4'.

The operation is as follows: The barrel 1 is suitably fixed to the boiler front in line approximately with the most central smoke tube or the nearest possible to the most center. In connection with a marine boiler a most convenient plan is to cut a hole in the center of the smoke box door 24 large enough to permit the insertion of barrel 1; a flange 25 being secured to the barrel and arranged so as to correspond to the angle of the front of the door. This flange may be suitably secured to the door so that the barrel will be held in fixed position against movement and in line with one of the smoke tubes, as 13, Fig. 1. The pipe or conductor 4', with the blower head 18 at the end, is

passed through the hole in the smoke box door and into the aligned tube 13, so that the nozzle projects a short distance beyond the back end of the smoke tube into the combustion chamber 27. The steam supply pipe 29, which is preferably flexible, is coupled to the inlet connection 15 and the apparatus is then ready for use. Steam or other fluid under pressure is turned on and the operator turns the handle 17, at the end of the boiler, and this in turn revolves the crank-shaft 3, which, through means of the keys or cooperating pins 2' of the nut 2 on the conductor 4, causes the latter to revolve and turn with it the blower head 18, at the rear end, so that a jet of steam is blown toward and into the smoke tubes 13. At the outset, when the nozzle is close to the tube plate 20, the jet of pressure fluid will only enter those smoke tubes nearest to the axis of the pipe 4', but the rotation of the handle 3 not only turns the pipe 4' and its nozzle 3, but through means of the nut 2 of the pipe 4, engaging its complementary threads on the interior of the barrel 1, the nozzle also advances longitudinally and consequently is moved farther away from the tube plate 20. The range of the issuing jet 30 increases so that the steam or other pressure fluid enters in turn those smoke tubes that are farther away from the steam pipe 4', until all of the tubes are individually cleansed by the strong jet of steam from the nozzle, which jet of steam blows the soot through the tubes and outward from the rear into the smoke box 31 at the front of the boiler, which, in case there is a fire in the boiler, will, with the assistance of the natural draft, be carried upward through the stack to the atmosphere. When all of the smoke tubes have been cleaned, the handle 17 may be turned in the opposite direction until the original position of the traveling nut 2 is reached and the steam jet will have been caused to twice traverse the entire range of tubes and the tube plate. After this, the pressure from the supply pipe 29 may be cut off, the apparatus pulled out of the smoke tube, the hole in the smoke box door closed, and the apparatus is then free for use in connection with another boiler.

Having thus described our invention, what we claim and desire to secure by Letters Patent is—

1. The combination in a flue cleaning apparatus, of a tubular body member attachable to a convenient portion of the boiler or other structure, the tubes of which are to be cleansed, said tubular member being internally threaded, a tubular conductor mounted within and having a discharge projecting from the inner end of said body member and having a part operatively engaging said threads, and a crank-shaft turnably sup-

ported against longitudinal movement in said body member and operating to revolve said conductor and cause its longitudinal movement within the internally threaded tubular body member and to move its discharge toward and away from the inner end of the body member.

2. In an apparatus for cleaning boiler flues or the like, a tubular body member non-rotatably attachable to a convenient part of the boiler, said body member being internally threaded, a tubular conductor turnably and slidably mounted within said member and having a disconnectible extension insertible into one of the boiler flues, and means for rotating and longitudinally moving said conductor, said means comprising a crank-shaft rotatably and non-shiftably mounted in the body member and operatively engaging the conductor with non-rotative relation, said conductor having a threaded part engaging complementary threads in the tubular body member whereby, when the crank-shaft is rotated, said conductor is caused to shift longitudinally independently of and rotatively with the crank-shaft.

3. The combination in an apparatus for cleaning boiler flues, of a body member attachable to a convenient portion of the boiler, means for supplying a fluid under pressure to said body member, a conductor slidably and rotatively connected to and extending from one end of said body member and carrying a spray nozzle for directing a spray of fluid under pressure obliquely toward the adjacent ends of the boiler flues, an operating shaft held against longitudinal movement and having free rotary movement in said body member and turnably engaging the inner and adjacent end of said conductor, and means for shifting the conductor and therewith the nozzle longitudinally independently of said operating shaft while the latter and the conductor are rotatively operating.

4. Means for sweeping a boiler flue or tube plate with a jet of steam directed at an oblique angle to said plate, comprising a conductor having a nozzle at one end for directing the jet obliquely, said conductor being insertible and supported in one of the flues, and non-slidable means for revolving said conductor to move the jet of steam in a circle and for longitudinally moving the nozzle from and toward said flue or tube plate to increase or decrease the diameter of the circle.

5. Means for sweeping a boiler flue or tube plate with a jet of steam directed at an oblique angle to said plate, comprising a conductor having a nozzle at one end for directing the jet obliquely, said conductor being insertible and supported in one of the flues, and means for revolving said conduc-

tor to move the jet of steam in a circle and for moving the nozzle from and toward said flue or tube plate to increase or decrease the diameter of the circle, said last named means including threads on the inner end of the conductor, a stationary part engaged by said threads, and a crank-shaft operative rotatively upon said threaded part and being held against longitudinal movement.

6. A tube cleaner including an interiorly threaded barrel, a member engaged with the threads of said barrel and having channels which extend through the ends thereof, a conductor connected to said member and being spaced from the barrel to form a steam passage in connection therewith, said conductor having ports which lead to the interior thereof, a shaft extending through said member and within the conductor and having longitudinal key-ways, projections on said member extending into said key-ways, a discharge nozzle on the conductor, means to hold said shaft against longitudinal movement and to allow rotation thereof, and means to rotate the shaft.

7. In a tube cleaner, a steam conductor having a discharge nozzle at one end thereof and non-slidable means to both rotate said conductor and to simultaneously move same longitudinally of the tube.

8. In a tube cleaner, a steam conductor, having a discharge nozzle at one end thereof, a non-slidable rotatable driver, and means between the driver and the conductor whereby rotation of the driver will effect simultaneous longitudinal and rotatable movement of the conductor during non-longitudinal movement of the driver.

9. In a tube cleaner, a barrel having a steam receiving chamber, a nozzled conductor spaced from the barrel to form a steam passage therewith, said conductor having a port whereby steam from the chamber may enter said port from said passage to enter the conductor, a shaft in the conductor, means to allow rotation of the shaft but to hold same against longitudinal movement, and means whereby rotation of the shaft will effect combined rotary and longitudinal movement of the conductor.

10. A flue cleaner including a relatively stationary body insertible in one of the flues, a conductor in the body, means between the body and conductor whereby rotation of the latter will simultaneously rotate and move the conductor longitudinally of the body, a non-slidable rotatable element which extends within the conductor, and means whereby said element in its rotation effects rotation of the conductor, and permits the latter to slide relative thereto.

11. A flue cleaner including a body insertible through one of the flues, a conductor having a nozzle which discharges angularly therefrom and beyond the rear end of the

flue, and a non-shut-ble rotatable means for both rotating and simultaneously moving the nozzle toward and away from the flue whereby to enable increase and decrease of the range of the jet and the direction of rotation thereof as well.

In testimony whereof we have hereunto

set our hands in the presence of two subscribing witnesses.

CHARLES H. SHEPLER.
JOSEPH W. SHEARER.

Witnesses:

JOHN B. WHEELER,
LESTER S. MELSTED.