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C. S. DEAN.

AUTOMATIC FEEDER FOR CLEANERS OR SCRAPERS FOR BOILER TUBES OR FLUES.

(Application filed May 29, 1899.)

(No Model.)

Fig. 1.

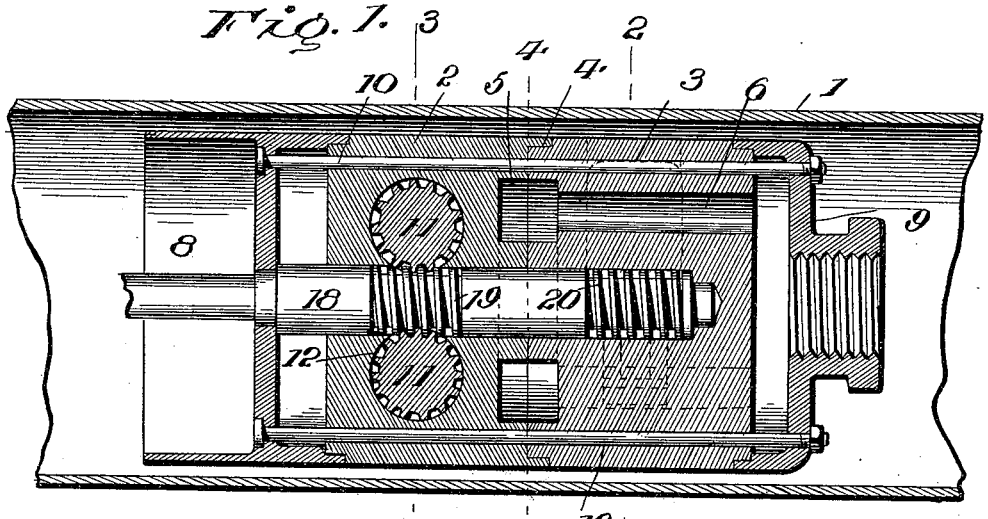


Fig. 2.

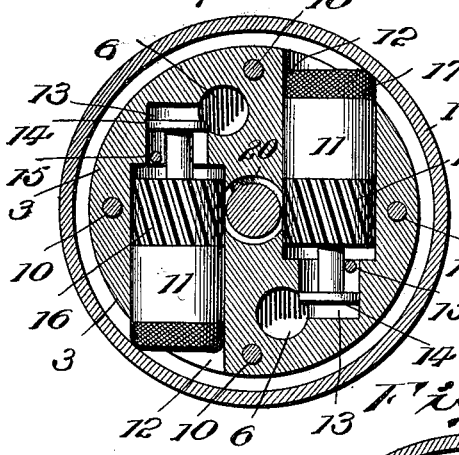


Fig. 3.

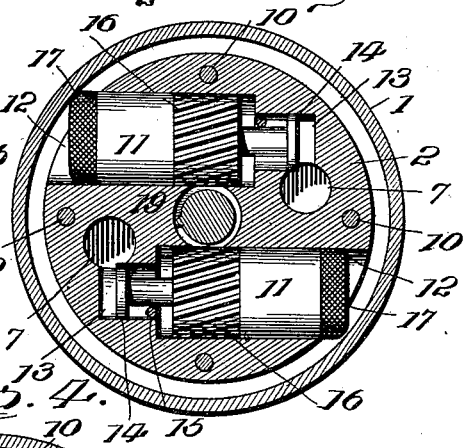
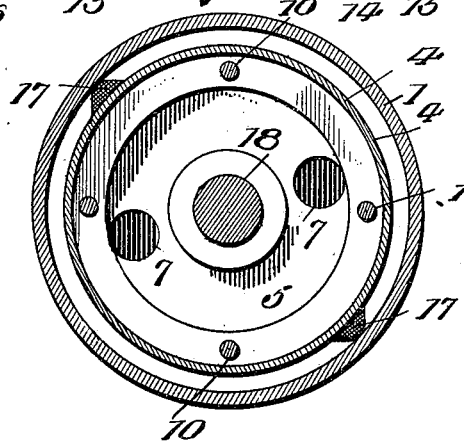


Fig. 4.



Witnesses

Jno. Imrie

Vernon E. Hodges

Inventor

Cyrus S. Dean

by Geo. P. Hamlin

Attorney

UNITED STATES PATENT OFFICE.

CYRUS S. DEAN, OF FORT ERIE, CANADA, ASSIGNOR OF ONE-HALF TO CHARLES O. RANO, OF BUFFALO, NEW YORK.

AUTOMATIC FEEDER FOR CLEANERS OR SCRAPERS FOR BOILER TUBES OR FLUES.

SPECIFICATION forming part of Letters Patent No. 645,894, dated March 20, 1900.

Application filed May 29, 1899. Serial No. 718,688. (No model.)

To all whom it may concern:

Be it known that I, CYRUS S. DEAN, a subject of the Queen of Great Britain, residing at Fort Erie, county of Welland, Province of Ontario, Dominion of Canada, have invented certain new and useful Improvements in Automatic Feeders for Cleaners or Scrapers for Boiler Tubes or Flues, of which the following is a specification.

My invention relates to automatic feeders for propelling cleaners or scrapers through boiler tubes or flues.

The object of the present invention is the provision of an improved feeder for use in connection with scrapers or cleaners having propelling devices of novel construction adapted for operation by steam or air pressure in such manner that they will be held in strong active contact with the tube or flue by the steam or air pressure while they are being operated thereby, thus insuring the automatic feeding of the device through the tube or flue while the scrapers or cleaners are operating thereon and obviating the necessity of feeding by hand, as usually done heretofore.

Having the foregoing object in view, the invention comprehends improved propelling devices adapted for operation by a suitable steam or air motor and mounted and arranged in such manner that the air or steam pressure acts on them and holds them in contact with the tube or flue as long as it is supplied to the driving-motor.

The invention consists, further, in certain improved features and novel combinations of parts, fully described hereinafter and particularly recited in the appended claims.

In the accompanying drawings, Figure 1 is a longitudinal section of the invention shown in a tube or flue, certain parts being in dotted lines and in full lines; Fig. 2, a cross-section with the propelling or feeding devices in full lines, taken on line 2 2 of Fig. 1; Fig. 3, a view similar to Fig. 2, taken on line 3 3; and Fig. 4, a sectional end view.

The invention is shown in a section of boiler tube or flue 1. The body or casing of the device is composed of two cylindrical sections 2 and 3, fitted together by a lap-joint 4 and having steam or air chambers 5, which match each other. Extending through the section 3 are two steam or air ports 6, arranged in diametrical relation and opening into the chambers 5, and the section 3 is also provided with similar ports 7, extending therethrough.

At the outer end of section 2 is a cylindrical casing 8 for any suitable self-contained steam or air motor employed to operate the propelling or feeding devices, as well as the cleaners or scrapers, (not shown,) while at the outer end of section 3 is a head or cap 9, having a pipe-coupling to which the steam or air pipe can be connected. Bolts 10, running through the sections 2 and 3 and the casing 8 and head 9, hold them firmly together.

Each section of the body carries two propellers or feeders arranged parallel, with their axes coinciding with chords or lines of less length than the diameter of the body or casing and adapted to operate on the opposite sides of the tube or flue. One pair of propellers or feeders are, however, arranged at right angles to the other pair, and consequently active contact is had with four parts of the tube or flue at the same time.

The propellers or feeders have a cylindrical body 11, snugly fitting but easily slidable in a chamber 12, which opens through the exterior of the body at one end and is blind at its inner end, where it is continued in a small pressure-chamber 13, which is in communication with the port 6 or 7. The cylinder 11 has a reduced stem, provided with a piston 14, adapted for movement in the pressure-chamber, a pin 15 being provided to prevent the feeder from dropping out when the device is being carried about from place to place. The inner end of the cylindrical body of the feeder is provided with a worm-wheel 16, and the outer end, which is adapted to operate on the tube or flue, is rounded and ridged or toothed, as shown at 17.

The numeral 18 designates a driving-shaft adapted for operation by the motor or engine employed, which is journaled in the casing 8 and the sections of the body and has its inner end suitably stepped in the section 3. This shaft has two similar worms 19 and 20, the former of which meshes with the worm-wheels of the feeders in section 2 and the latter with

those contained in section 3. The cleaners or scrapers (not shown) are carried on the outer end of shaft 18, so as to be in advance of the propelling mechanism.

The operation is as follows: The steam or air entering the head 9 passes through the ports and chambers and finally reaches the engine or motor, which puts the driving-shaft in rotation, thereby revolving all the propellers or feeders. The steam or air while passing through the ports acts on the pistons of all of the feeders with sufficient pressure to force them outwardly and hold them in strong contact with the interior of the tube or flue while they are rotating. As the roughened ends of the feeders touch the tube at only one point of their periphery, their rotation brings different portions of their peripheries successively in contact with the tube or flue surface, resulting in the automatic propulsion of the device through the tube or flue. When the steam or air supply is cut off, the feeders slide easily inward, so that there is no interference when placing the device in position or sliding it from place to place in the tube or flue.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an automatic feeder for cleaners for tubes or flues, the combination with a body or casing adapted for movement through the tube or flue, of a feeder or propeller carried by the casing and movable relatively thereof toward and away from the interior surface of the flue, means for projecting said feeder out from the body by fluid-pressure and maintaining it in contact with the flue-surface thereby and means for rotating the propeller.

2. In an automatic feeder for cleaners for tubes or flues, the combination with a body or casing having a chamber and adapted for movement through the tube or flue, of a feeder or propeller slidable in the chamber, means for rotating the propeller, and means for applying fluid-pressure to said feeder or propeller to project it for engagement with the tube.

3. In an automatic feeder for cleaners for tubes or flues, the combination with a body or casing having a fluid-pressure chamber, of a slidable feeder or propeller having a piston movable in said chamber, and means for rotating the feeder.

4. In an automatic feeder for cleaners for tubes or flues, the combination with a body or casing having a cylinder-opening through its side and continued in a pressure-chamber at its inner end, of a feeder or propeller slidable in the main chamber and having a reduced stem provided with a piston slidable in the pressure-chamber, means for rotating the feeder, and a limit stop or pin interposed between the piston and the body of the feeder.

5. In an automatic feeder for cleaners for tubes or flues, the combination with a body, of a rotatable feeder or propeller carried thereby which is slidably mounted so as to be adapted for projection or retraction, and means for rotating said feeder and for projecting it.

6. In an automatic feeder for cleaners for tubes or flues, the combination with a body, of a rotatable feeder or propeller carried thereby which is slidably mounted so as to be adapted for projection or retraction, and means whereby said feeder is simultaneously rotated and projected by fluid-pressure.

7. In an automatic feeder for cleaners for tubes or flues, the combination with a body or casing, of a rotatable feeder or propeller having a worm-wheel, and a power-driven shaft having a worm meshing with said worm-wheel.

8. In an automatic feeder for cleaners for tubes or flues, the combination with a body or casing, of a rotatable feeder or propeller having a worm-wheel and carried thereby which is slidably mounted for projection or retraction, a power-driven shaft having a worm meshing with said worm-wheel, and means for projecting said feeder or propeller.

9. In an automatic feeder for cleaners for tubes or flues, the combination with a body or casing, of a rotatable feeder or propeller positioned with its axis coinciding with a chord or line of less length than the diameter of the body or casing, whereby only one portion of the propelling-surface of the feeder is maintained in contact with the tube or flue.

10. In an automatic feeder for cleaners for tubes or flues, the combination with a body or casing, of a rotatable feeder or propeller having its outer end rounded and constituting the propelling or feeding portion thereof, said feeder being positioned with its axis coinciding with a chord or line of less length than the diameter of the body or casing, whereby only one portion of the rounded end of said feeder contacts with the tube or flue.

11. In an automatic feeder for cleaners for tubes or flues, the combination with a body, of rotatable feeders or propellers arranged in pairs or sets and carried thereby, with the members of one pair disposed at an angle to those of another pair, and means for operating all the feeders or propellers.

12. In an automatic feeder for cleaners for tubes or flues, the combination with a body, of rotatable feeders or propellers arranged in sets or pairs with their ends projecting on opposite sides of the body, and the members of one set or pair being disposed at an angle to those of the other pair, and means for operating all the feeders or propellers.

13. In an automatic feeder for cleaners for tubes or flues, the combination with a body, of rotatable feeders or propellers arranged in sets or pairs and each having a worm-wheel, and a power-driven shaft having a worm for each set or pair which meshes with their worm-wheels.

14. In an automatic feeder for cleaners for

tubes or flues, the combination with a body composed of sections placed end to end and having steam or air chambers in their adjacent faces, and ports running through them which communicate with said chambers, of means for connecting to a source of fluid-supply at one end of the body, means for connecting to a motor at the other end of the body, and feeders or propellers carried by the different sections of the body and operated by the supplied fluid-pressure.

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

CYRUS S. DEAN.

Witnesses:
A. M. ARMSTRONG,
CHAS. CANNON.