March 20, 1928. 1,663,273

I. L. KEMP

BOILER CLEANER

Filed July 21, 1927

Fig. 1

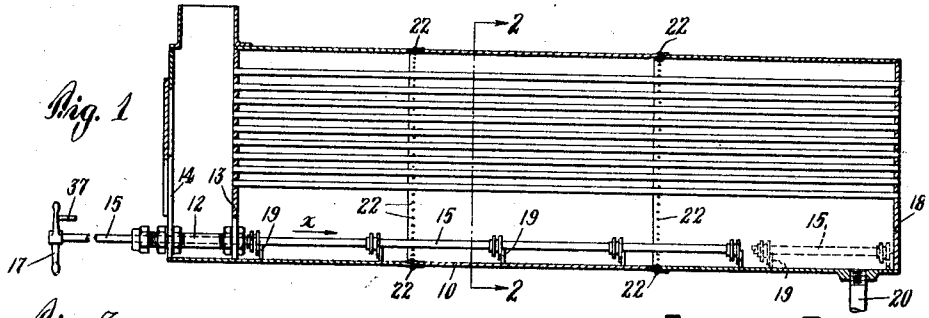


Fig. 3

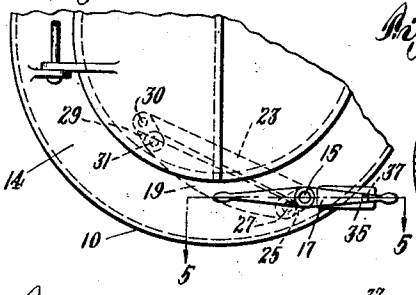
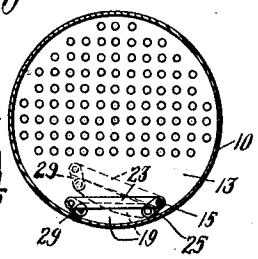


Fig. 2



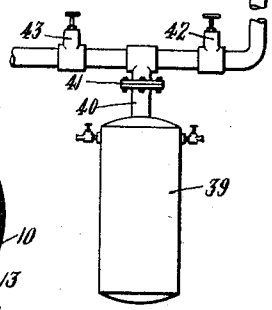


Fig. 4

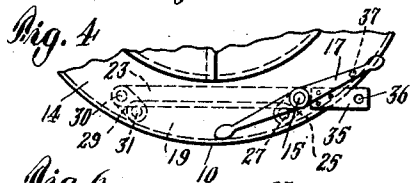


Fig. 7

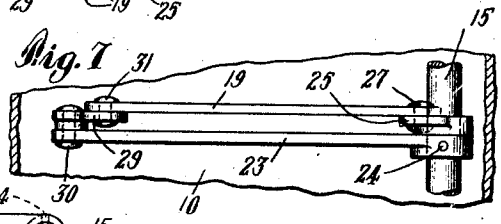


Fig. 6

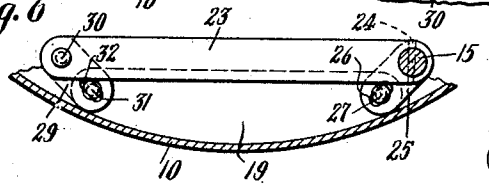


Fig. 8

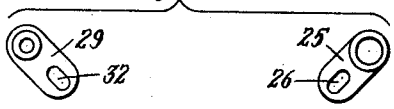


Fig. 5

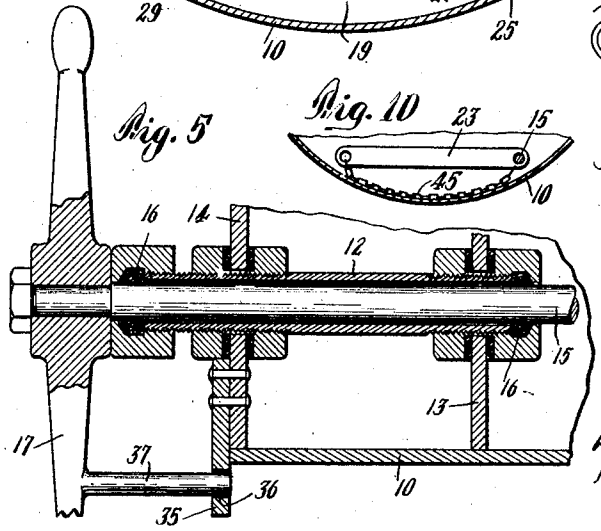
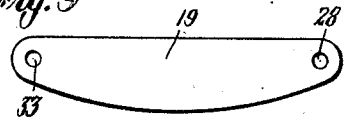


Fig. 10

Fig. 9



Inventor:
Irving L. Kemp.
by Wright Brown Quinby & May
Attys.

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UNITED STATES PATENT OFFICE.

IRVING L. KEMP, OF MILTON, MASSACHUSETTS, ASSIGNOR TO OSCAR HUSSA, OF WATERTOWN, MASSACHUSETTS.

BOILER CLEANER.

Application filed July 21, 1927. Serial No. 207,528.

The object of this invention is to provide a horizontal steam boiler with a bottom cleaner manually operable at one end of the boiler and adapted to impart to sediment on the bottom thereof a one-way step-by-step movement to the usual sediment or blow-off outlet, without moving any of the sediment away from the outlet.

Of the accompanying drawings forming a part of this specification,—

Figure 1 is a longitudinal section of a boiler provided with a bottom cleaner, in accordance with the invention.

Figure 2 is a section on line 2—2 of Figure 1.

Figure 3 is a fragmentary end view, showing the cleaner in its inoperative position.

Figure 4 is a view similar to Figure 3, showing the cleaner in its operative position.

Figure 5 is a section on line 5—5 of Figure 3.

Figure 6 is an enlargement of a portion of Figure 2.

Figure 7 is a plan view of the parts shown by Figure 6.

Figure 8 shows separately the links shown by Figures 6 and 7.

Figure 9 shows separately the scraper shown by Figure 7.

Figure 10 is a view similar to Figure 6, showing a modified form of scraper.

The same reference characters indicate the same parts in all of the figures.

In the drawings, 12 designates a combined bearing and guide fixed to the tube sheet 13 and head 14 of a horizontal tubular boiler 10, and communicating with the water space thereof, said guide extending longitudinally of the boiler at one side of the longitudinal center of the bottom portion thereof, 15 designates a cylindrical rod which is movable endwise by a handle 17 fixed to its outer end, and is adapted to turn in the bearing 12, said bearing being provided with packing means indicated at 16, to prevent leakage of water around the rod. The rod is located by the guide at one side of the longitudinal center of the bottom portion of the boiler. The rod 15 is adapted to be reciprocated in the guide, and its length is such that when it is moved outward, as shown by full lines in Figure 1, its inner end is spaced about two feet from the inner head or tube sheet 18 of the boiler, so that the rod and the scrapers 19 hereinafter described, carried by the rod, are adapted to be moved inward, as indicated by dotted lines, a limited distance, the rod and scraper being adapted to have a limited reciprocating movement in the boiler, carrying the scrapers toward and from the usual blow-off outlet 20.

The scrapers 19 are so connected with the rod 15, that when the rod is turned in the bearing 12, the scrapers are swung either upward from the bottom of the boiler, as shown by Figure 3, or downward to bear on the bottom of the boiler, as shown by Figures 1, 4 and 6. When the scrapers bear on the boiler bottom in the starting position shown by full lines in Figure 1, and the rod is moved in the direction of arrow x, the scrapers force sediment toward the outlet 20. When the scrapers reach the position indicated by dotted lines in Figure 1, they may be raised from the bottom by a turning movement of the rod, and thus removed from the deposit of sediment, and then moved back and lowered to again bear on the bottom in their starting position. A one-way step-by-step movement of the sediment to the outlet is thus effected by short movements of the rod, the described operation being repeated until all of the sediment reaches the outlet, there being no backward movement of any part of the sediment away from the outlet. The connection of the scrapers to the rod is preferably such that the scrapers, when moving in contact with the boiler bottom, are adapted to slightly rise and fall independently, so that they may pass over the inner heads of the rivets 22, connecting the plates or sections of the boiler, the preferred connection being as next described.

I fix to the rod 15, by pins 24, or otherwise, the inner ends of arms 23, one for each scraper. The scrapers 19 are formed independently, and their inner ends are loosely connected with the arms 23, by links 25, mounted to turn loosely on the rod 15, and having slots 26, through which studs 27 pass loosely, said studs passing through orifices 28 in the inner ends of the scrapers. Links 29 are pivoted to the outer ends of the arms 23, by studs 30, and are loosely connected with the outer ends of the scrapers by studs 31, passing loosely through slots 32 in the links 29, and through orifices 33 in the outer ends of the scrapers.

The described connection permits the rais-

ing and lowering of the scrapers by turning movements of the rod, and a sufficient independent edgewise movement of the scrapers to enable them to pass over rivet heads.

To support the scrapers raised above the boiler bottom when they are not in use, I provide the boiler and the rod with complemental detent members, whereby the rod may be releasably confined in position to hold the scrapers raised, said members in this instance, including an ear 35, fixed to the boiler head 14, and provided with an orifice 36, and a stud 37, fixed to the rod handle 17, and adapted to enter the orifice, as best shown by Figure 5. The arrangement is such that when the stud enters the orifice, the scrapers are held raised, as indicated by Figure 3, and when the stud is removed from the orifice, the scrapers are permitted to bear on the boiler bottom, as indicated by Figure 4.

To facilitate the movement of sediment through the outlet 20, I connect with said outlet a vacuum chamber 39, from which air may be exhausted by any suitable means, the chamber being provided with an inlet 40, detachably connected at 41 with a branch of the outlet 20. Shut-off valves 42 and 43 are provided in the outlet 20 at opposite sides of said branch. When the boiler is to be cleaned, the valve 43 is closed, the valve 42 is opened, and vacuum is created in the tank 39, and maintained during the cleaning operation. The removed sediment is drawn by suction into the tank, which may be removed and emptied after the operation.

Each scraper may be a short length 45 of chain attached at its ends to an arm 23 and depending therefrom in the form of a festoon which bears on the bottom of the boiler as shown by Fig. 10 when the arm 23 is lowered and is raised from the bottom when the arm is swung upward.

The rod 15 and the arms 23 constitute a scraper carrier, and the arms 25 and 29 and studs 27 and 30, constitute a suitable embodiment of means connecting the scrapers 19 with the carrier.

When each scraper is a chain 45, as shown by Figure 10, the arms 25 and 29 may be omitted, and the terminal links of the chain constitute the means for connecting the scraper with the carrier.

I claim:

1. A steam boiler having a longitudinally extending guide at its forward end communicating with the water space of the boiler, and a bottom cleaner comprising a rod longitudinally movable and adapted to turn in said guide, a plurality of arms fixed to the rod and projecting laterally therefrom, a plurality of scrapers, and links loosely connecting the scrapers with the rod and arms, and permitting independent edgewise movements of the scrapers.

2. A steam boiler having a longitudinally extending guide at its forward end communicating with the water space of the boiler, and a bottom cleaner comprising a rod longitudinally movable and adapted to turn in said guide, and a plurality of bottom scrapers connected with and projecting laterally from the rod, the scrapers bearing normally on the bottom of the boiler and being movable sidewise by an endwise movement of the rod to scrape the bottom, and edgewise from and toward the bottom by turning movements of the rod, so that the cleaner is operable to impart a step-by-step one-way movement to sediment on the boiler bottom, the boiler being provided with a suction chamber connected with the sediment outlet and adapted to facilitate the one-way movement of the sediment.

3. A steam boiler having a longitudinally extending guide at its forward end communicating with the water space, and located at one side of the longitudinal center of the bottom portion of the boiler, adjacent said bottom portion, and a bottom cleaner comprising a scraper carrier, composed of a rod longitudinally movable and adapted to turn in said guide, and located thereby above said bottom portion, at said one side of the longitudinal center thereof, and a plurality of arms fixed to the rod and extending therefrom across the longitudinal center of the bottom portion, the arms being vertically oscillatable edgewise and movable sidewise by the rod, a plurality of scrapers, and means connecting the scrapers with the carrier, said connecting means and carrier locating the scrapers so that they are spaced apart and extend across the longitudinal center of the bottom portion, the scrapers conforming from end to end to said bottom portion, the arrangement being such that edgewise and sidewise movements may be imparted by the carrier to the scrapers to impart a one-way step-by-step movement to sediment on the bottom portion.

4. A steam boiler as specified by claim 6, the means connecting the scrapers with the carrier being adapted to permit independent edgewise movements of the scrapers.

In testimony whereof I have affixed my signature.

IRVING L. KEMP.