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L. H. LARSEN

RAKING ATTACHMENT

Filed Oct. 18, 1926

3 Sheets-Sheet 1

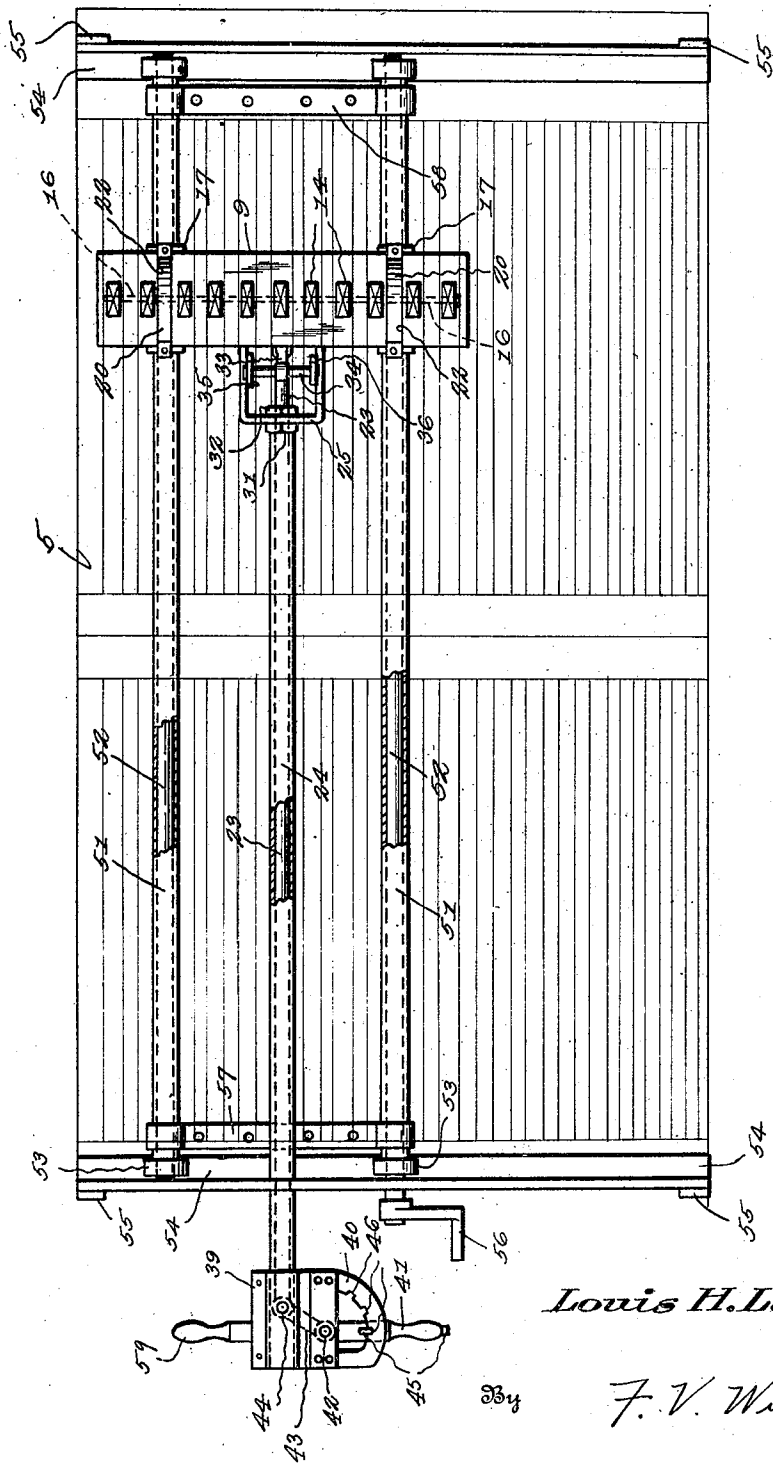


Fig. 1.

Inventor.

Louis H. Larsen.

By

F. V. Winters

Attorney

July 10, 1928.

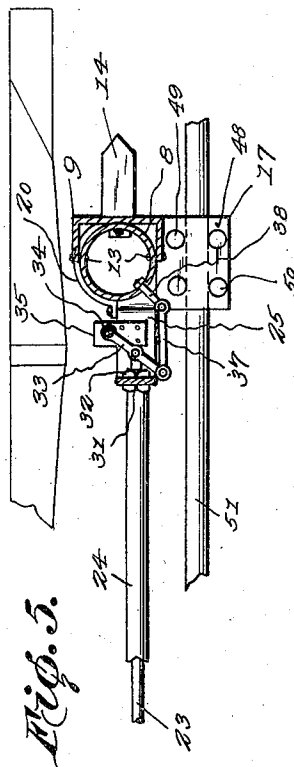
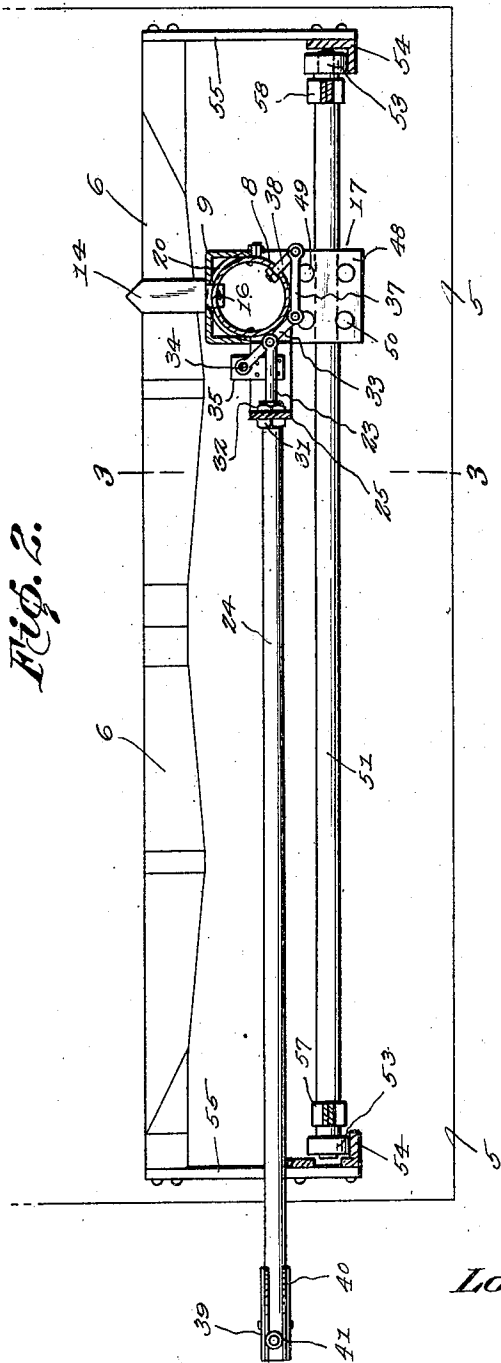
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3 Sheets-Sheet 2



Inventor:

Louis H. Larsen.

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F. V. Winters

Attorney

July 10, 1928.

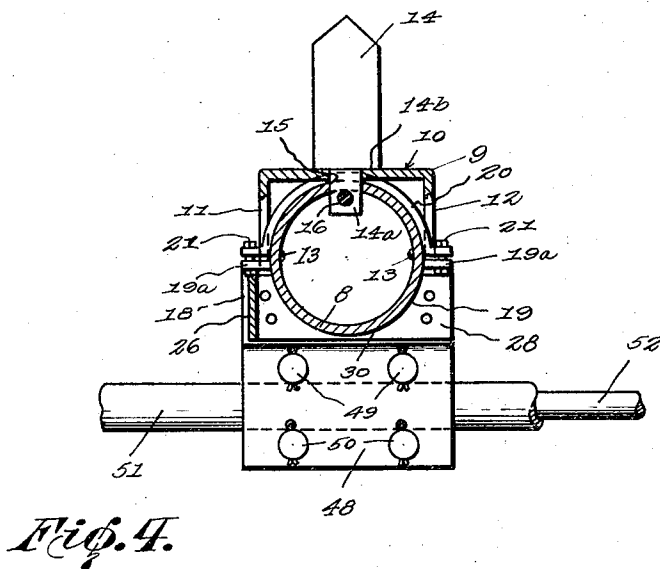
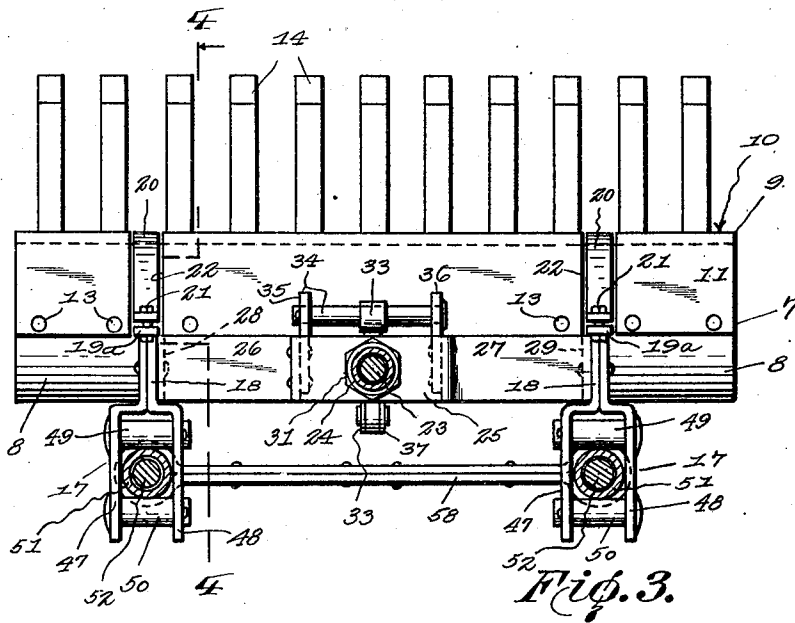
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L. H. LARSEN

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3 Sheets-Sheet 3



Inventor.

Louis H. Larsen.

By

F. V. Winters

Attorney.

UNITED STATES PATENT OFFICE.

LOUIS H. LARSEN, OF ENGLEWOOD, NEW JERSEY.

RAKING ATTACHMENT.

Application filed October 18, 1926. Serial No. 142,274.

My invention relates to improvements in raking attachments, adapted for use in connection with stoves, furnaces and boilers, or the like.

5 Though my improved device is capable of use in conjunction with heating or power plant apparatus having a relatively small grate area, its greatest degree of utility becomes apparent when operated in the fire chambers of boilers having considerable extent of grate area.

The objects of the invention, therefore, may be classified as follows:

15 First:—To provide means for attaching the device in close workable proximity to a grate in the fire-box of a boiler.

20 Second:—To provide means for reciprocating a plurality of rake teeth between and beyond the upper level of the interstices in a grate.

Third:—To provide means for rocking or oscillating said rake teeth to a point below the lower level of said interstices.

25 Fourth:—To provide means for transporting or shifting the rake-teeth carrying means to other sections of the grate for effecting the second object aforesaid.

30 Fifth:—To provide an attachment, in toto, which may be readily secured to any of the well-known furnaces or boilers without the necessity of altering the same to any appreciable extent.

35 Other features and objects of the invention, and my unique assemblage of the parts into a unitary structure, will become apparent as the description proceeds, and in order that the same may be better understood, reference is had to the accompanying drawings forming a part of this specification, and wherein like characters of reference denote similar parts throughout the several views.

In said drawings:

45 Figure 1 is a plan view of my improved raking attachment, the grate directly above the same being shown diagrammatically in light lines.

50 Fig. 2 is a central longitudinal section of the same, illustrating the usual fire-chamber and its grate in outline and also the means for supporting said raking attachment from a grate.

Fig. 3 is a vertical sectional view taken substantially on line 3—3 of Fig. 2.

55 Fig. 4 is a similar sectional view taken on the irregular line 4—4 of Fig. 3; and

Fig. 5 is a fragmentary view of a portion of Fig. 2 to illustrate the raking teeth in their proper position during the transverse movement of the device under the grate.

60 Those skilled in the art to which this invention appertains will at once recognize the familiar parts of a boiler, furnace, or the like, said parts, in the drawings, being illustrated somewhat diagrammatically, but at the same time sufficiently in detail to illustrate the use of my improvement in connection therewith. Accordingly, let 5 denote generally the fire-chamber of a boiler, furnace, or the like, and 6 a conventional grate, having the usual end portions for mounting within a fire-chamber and central joining sections; the interstices in said grate in this particular instance running longitudinally thereof, and according to best practice the front of the boiler, or the like, may be considered as the point from which certain operative parts of my attachment are positioned, as will presently become apparent.

65 At this time it may be well to point out that in some plants the only practical method of keeping a fire in workable condition is by the use of a hand rake, hoe, hook, or the like, and obviously the use of implements of this sort renders firing more or less inefficient and laborious. It is my aim to dispense with the use of these inefficient implements by installing my attachment within a boiler without the exercise of any special skill or material change in the structural arrangement thereof.

70 Referring now in particular to the accompanying drawings, I have designated the teeth-carrying means of my device with the numeral 7, said means embodying a tubular member 8 carrying a plate 9 to present a flattened top surface 10 and lateral legs 11 and 12, which extend to point in close proximity to the horizontal axis of said tubular member 8 where they are bolted, or otherwise fastened, thereto. Figure 4 clearly shows this construction.

75 The raking teeth of my device, denoted by the numeral 14 are mounted on the flat top portion 10 of said plate 9, the latter, as well as the tubular member 8, being suitably apertured, as at 13, for the reception of the reduced portion 14^a of said teeth 14, thus presenting a shoulder 14^b to abut the top surface of said plate 9 to prevent displacement of said teeth, said teeth having their

reduced portions 14^a apertured to receive a transverse rod 16 abutting the inner periphery of the tubular member 8, thus firmly anchoring said teeth in position. The use of

5 a rod 16 permits the removal and replacement of an individual tooth by the simple expedient of withdrawing the same longitudinally of the tubular member.

As shown in Fig. 2 of the drawings, the 10 teeth 14 are adapted to fit within the interstices of a grate and project a slight distance above the upper face thereof, and while in this position it is my intention to reciprocate said teeth in a direction corresponding 15 to the length of said interstices. Further it is my object to rock or oscillate said teeth 14 to a point below the lower surface of the grate in order to shift the device to other operative positions thereunder.

20 To these ends, said teeth-carrying means 7 is rotatably mounted in brackets 17, preferably two, and similar in construction, each being constructed from two pieces of flat material presenting a portion 18 having a 25 substantially semicircular recess to rotatably engage the tubular member 8 of the teeth-carrying means 7, as indicated at 19, Fig. 4. Said portion 18 is also provided with lateral flanges 19^a to which is bolted clamps 30, as shown at 21. It should be understood that said recess 19 and said clamps 20 loosely engage the tubular member 8 to permit the rotation thereof therebetween, and in order to effect the engagement of said clamps 20 35 with said tubular member I have slotted the plate 9 and its legs 11 and 12, as indicated at 22, so that substantially said plate 9 is arranged in three parts, as clearly shown in Fig. 3.

40 The means for rocking said teeth is composite in nature and comprises a longitudinal shaft 23, housed in a length of tubing 24, the inner end of the latter being secured to a bracket 25, which is U-shaped in plan and 45 presenting lateral flanges 26 and 27, having their ends bent at right angles and suitably apertured for securing to the portions 18 of said brackets 17. Figures 3 and 4 should be consulted to understand this construction, 50 the right angle bends 28 and 29 of Fig. 3 being shown in dotted lines, while in Fig. 4, the section line 4—4 of Fig. 3 cuts the lateral flange 26 and shows the right angle bend 28 secured to the portion 18 of bracket 17. Like 55 unto the portion 18, said right angle bends 28 and 29 are each provided with semi-circular recesses 30 to fit around the lower portion of the tubular member 8.

Said bracket 25 is apertured to receive 60 said tubing 24 which latter is preferably screw-threaded to receive the clamping nuts 31 and 32, while the shaft 23 emerges from the end of said tubing 24 for pivotal connection with a rock arm 33 having one end 65 hingedly connected to a pin 34, journalled

in ears 35 and 36, the other end being connected to a link 37, pivoted to a stud 38 fixed in said tubular member 8.

The other end of said tubing 24 is positioned exteriorly of the front of the fire 70 chamber and carries a clamping plate 39 and quadrant 40, the former pivotally supporting a manually-operated lever 41, as at 42, having its inner arm 43 pivotally connected to said shaft 23, as clearly shown in Fig. 1. 75

From the foregoing it is apparent when the lever 41 is moved toward the front of the boiler, said shaft 23 is reciprocated in the opposite direction and through the medium of the linkage 33—37 oscillates said 80 teeth-carrying means 7 and retracts the teeth 14 to the position indicated in Fig. 5, and through the medium of the well-known locking-means 45 carried by the lever 41, said teeth-carrying means may be secured in 85 any position dependent on the location of notches 46 in said quadrant 40.

When the teeth are in the position shown in Fig. 5, the device may be bodily shifted 90 beneath the grate for operation at several positions thereunder, and I term this movement "transverse" as distinguished from the longitudinal reciprocatory movement resorted to during the actual manipulation 95 of the device as a rake.

Returning now to the description of the brackets 17, it will be observed on inspection of Fig. 3, that the portion 18 is bent at right angles below the bottom of the tubular member 8 to define spaced legs 100 47 and 48, each being apertured to receive a pair of parallel disposed pins 49 and 50, between which is mounted tubular rails 51, one on either side of the device, each carrying a rotatable shaft 52 therein. Each of 105 said shafts 52 carries a wheel at its extremities, as indicated at 53, which operate on a track 54 supported by arms 55 depending from the edges of said grate 6. One of said shafts 52 extends beyond the front of the boiler and is here provided with a crank 56, 110 for rotating said shaft. It will also be noted that I prefer to positively assure the parallel disposition of said rails 51 and their contained shafts 52, through the medium 115 of spacer members 57 and 58, positioned adjacent the ends of said rails, as clearly shown in Fig. 1.

The foregoing description covers the essential elements of my invention, so let us 120 proceed to the manipulation of the device, keeping in mind that same is susceptible of a varied series of operations, to wit: an operation to bring the teeth into placement 125 between the interstices of a grate; an operation to reciprocate the teeth longitudinally therebetween; a similar operation to oscillate the teeth from between said interstices and finally an operation to shift the device transversely of the grate, each there- 130

of moving in their proper sequential order.

Let us assume the device is in the position shown in Fig. 2, the teeth having been oscillated to this position from that shown in Fig. 5. The locking means in the lever 41 secures the teeth in this upright position and it is only necessary to grasp the handle 59 and lever 41 and reciprocate the device on the rails 51, said rails sliding between pins 49 and 50 as aforesaid. This operation is continued between the grate cutting clinkers and allowing the air to get to the fire. When a clinker is thus cut, it falls through the grate openings or interstices leaving a clean fire.

The area of the workable portion of my device sometimes being smaller than the grate area, it obviously is necessary to shift the same to another portion of the grate. To effect this shift, the lever 41 is moved inwardly toward the front of the boiler thus retracting the shaft 23 and through the medium of the linkage 33—37 aforesaid oscillates the teeth to the position indicated in Fig. 5. Sufficient clearance being afforded beneath the grate, the crank 56 is turned communicating motion to the wheels 53 through the medium of shafts 52 and thus the device travels transversely on the tracks 54. By preference I may roughen the upper surfaces of the tracks to assure positive traction, but this is immaterial to the invention. The lever 41 may now be drawn back to elevate the teeth to workable position and the reciprocation thereof is effected as aforesaid.

The device is indeed featured by the fact that parts mostly likely to wear are readily replaced without tearing down the structure as a whole. For instance, a tooth may be

readily removed by retracting the rod 16 and inserting another tooth in its place. This is but one of the many examples of the utility of my device. Positive locking of the teeth in vertical position is assured since the linkage 33—37 (see Fig. 2) fits snugly against the tubular member 8 thus acting as a brake, and preventing the turning thereof.

Having thus described the preferred embodiment of my invention, it is of course apparent that several modifications and changes may be resorted to without departing from the spirit of the invention as defined in the appended claims.

I claim:

1. In a raking attachment, a rockable member presenting a flattened top portion having a plurality of apertures arranged therein, a plurality of teeth mounted in said rockable member, each of said teeth presenting a reduced portion defining a shoulder to abut the flattened top surface of said rockable member, and a rod removably securing said teeth to said member.

2. In a raking attachment, a rockable tubular member, an inverted U-shaped member carried by said tubular member and having a plurality of apertures arranged in its flattened top portion, a plurality of teeth mounted in said U-shaped member, each of said teeth presenting a reduced portion insertible within said apertures and presenting a reduced portion defining a shoulder to abut the flattened top surface of said U-shaped member and a rod removably securing said teeth to said member.

In testimony whereof I affix my signature.

LOUIS H. LARSEN.