P. D. CANHAM.

FURNACE CHARGING APPARATUS.

APPLICATION FILED FEB. 16, 1911.

1,072,571.

Patented Sept. 9, 1913.

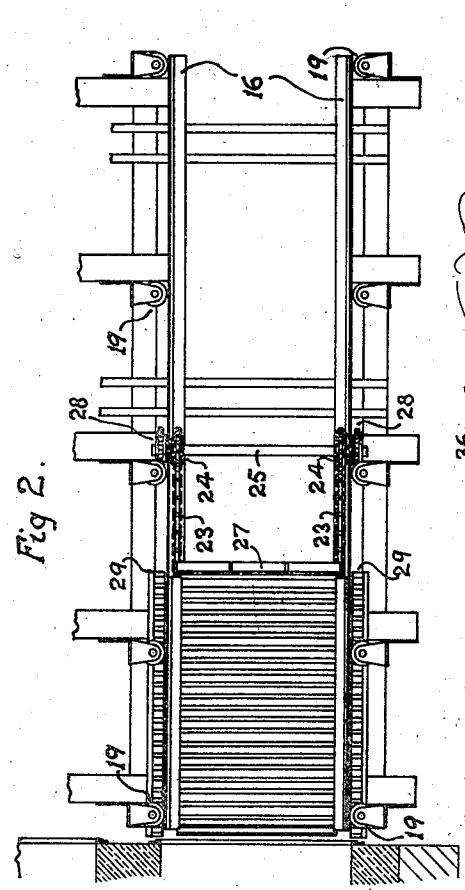


Fig 2.

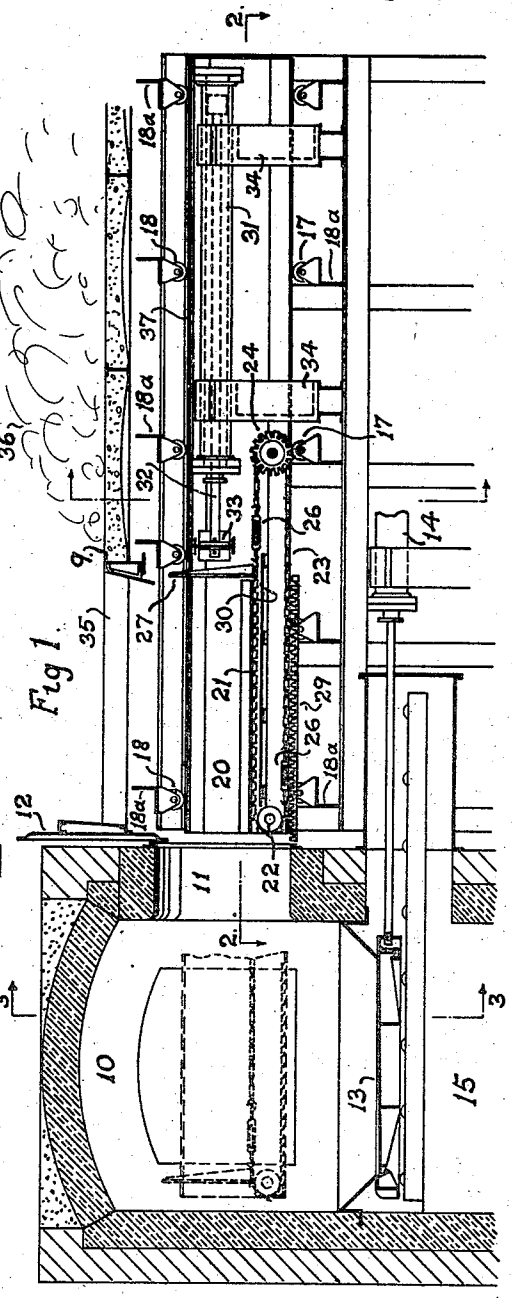


Fig 1.

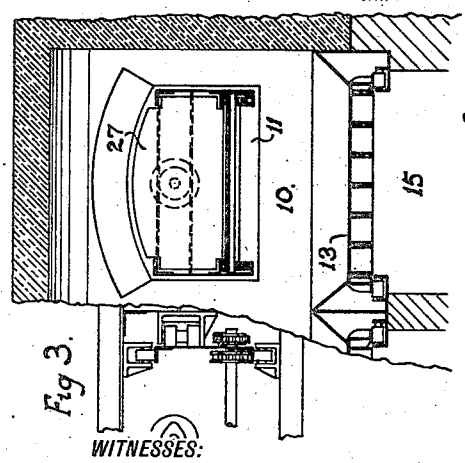


Fig 3.

WITNESSES:

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UNITED STATES PATENT OFFICE.

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FURNACE-CHARGING APPARATUS.

1,072,571. Specification of Letters Patent. Patented Sept. 9, 1913.

Application filed February 16, 1911. Serial No. 609,065.

To all whom it may concern:

Be it known that I, PERCY D. CANHAM, a subject of the King of Great Britain, residing at New York, county of Richmond, and State of New York, have invented certain new and useful Improvements in Furnace-Charging Apparatus, of which the following is a full, clear, and exact description.

This invention relates to furnace charging apparatus, more particularly furnaces of the so-called "destructor" type, for consuming garbage, household waste of every description, and like refuse materials.

The chief object of the invention is to provide an improved apparatus for the purpose, simple and compact in construction and positive in action.

A further object is to provide an apparatus by which the fresh charge can be spread evenly over the fire so that all parts of the fresh charge shall be consumed at substantially the same rate.

To these and other ends the invention consists in the novel features of construction and combinations of elements hereinafter described, and more particularly set forth in the claims.

A convenient and efficient embodiment of the invention is illustrated in the accompanying drawings, in which—

Figure 1 is a view in vertical longitudinal section, showing a cell of a destructor furnace and the feeding or charging apparatus therefor. Fig. 2 is a sectional plan view of the charging apparatus, on line 2—2 of Fig. 1. Fig. 3 is a cross-sectional view on line 3—3 of Fig. 1, looking in the direction of the arrows.

One cell of the destructor furnace is shown at 10, provided with a mouth 11, below the stoking floor 9, through which the material to be burned is introduced. The mouth may be closed, after the furnace is charged, by a sliding door 12 capable of being raised and lowered by any suitable means, not shown. The material is burned on a sliding grate 13, which may be withdrawn bodily by a ram 14 to discharge the accumulated clinker into the clinker pit 15, as described in the copending application of Ernest H. Foster, Serial No. 539,103, filed January 20, 1910.

In line with the charging mouth 11 is the charging or feeding apparatus, comprising an elongated longitudinally movable frame 16 of suitable construction, mounted between lower supporting rollers 17 and upper guide rollers 18, journaled in brackets supported by transverse angle irons 18ª, and between lateral guide rollers 19. The sides of this frame at the end next to the furnace are closed by side plates or walls 20, and the bottom between these walls is closed by a plurality of transverse bars or slats flexibly connected together in any convenient manner, not shown, to form a flexible bottom 21. This flexible bottom at the forward end of the frame passes over idle rollers at each side of the frame, one of the rollers being shown at 22. Connected to each end of the bottom are two chains 23, passing over sprockets 24 on a shaft 25 journaled in the sides of the charging frame. In each chain one or more turn buckles 26 are provided, to regulate the tension of the belt formed by the chains and the flexible bottom of the charging receptacle or pen. Mounted on the said bottom at the rear end thereof is an upright plate or back wall 27, extending across the entire width of the charging frame. The frame itself is just narrow enough to pass freely into the furnace mouth. The shaft 25 is also provided with two pinions 28, of the same pitch diameter as the sprockets 24, in position to mesh with a pair of fixed horizontal racks 29, as the charging frame is moved forward.

From the foregoing it will be seen as the charging frame is advanced into the furnace mouth the pinions 28 will engage the racks 29, the latter being of such length as to be engaged by the pinions at the time the forward end of the charging receptacle projects through the mouth 11 into the furnace. As the receptacle or pan continues to advance, the pinions, now in mesh with the racks, are rotated and with them the sprockets 24, causing the flexible bottom of the pan to travel over the rollers 22. The result is that material in the pan is carried to the open forward end thereof and dropped off as the pan advances. Fire already on the grate is thus progressively blanketed by green material, effectually protecting the pan itself from excessive heat. Eventually the pan reaches its extreme forward position, as shown in dotted lines in Fig. 1, in which position the flexible bottom has passed below the idlers 22 and the rear wall 27 is at the front edge of the pan. The frame

is now retracted, during which movement the rotation of the pinions and sprockets is reversed, thereby restoring the parts to their initial positions, shown in full lines in Fig. 1, by the time the frame is fully retracted. The door 12 can then be lowered over the furnace mouth.

Immediately below the charging pan is an imperforate bottom plate 30 mounted on the frame and extending the full width thereof, to support the flexible bottom 21 as it sags under weight and to prevent dripping on to the grate-actuating mechanism or other devices below the pan. Inasmuch as this drip-plate is stationary relatively to the movable bottom of the pan it will be seen that the said plate is scraped clean each time the pan-bottom moves over it.

Any convenient and suitable means may be employed to advance and retract the charging frame, as for example a fluid-pressure ram 31, the piston rod 32 of which is connected to a cross member 33 immediately in rear of the charging pan. The ram may be mounted in suitable supports 34 extending upwardly through the rear portion of the charging frame. In using a ram to actuate the frame, it is particularly advantageous, though of course not absolutely essential to have the discharge of the material from the pan take place during the forward stroke for the reason that in this stroke the full area of the piston head (indicated in dotted lines in Fig. 1) is subjected to the pressure behind it, whereas on the backward or return stroke the effective area of the head is smaller by an amount equal to the cross sectional area of the piston rod. In other words, the heaviest duty is performed while the ram is operating at its greatest efficiency and the lighter duty, of merely retracting the empty frame, is performed during a period when the ram is necessarily working with lower efficiency. In consequence a smaller ram can be used than where the material is discharged on the back stroke.

As shown in Fig. 1, the charging apparatus is located immediately below the stoking floor 9. The latter is provided with an opening 35 above the initial position of the charging pan. The latter can therefore be readily filled by shoveling the material, indicated at 36, through the opening. Back of the charging pan the top of the frame is closed by a plate 37, which, moving forward with the frame, progressively closes the opening in the floor above.

The apparatus herein specifically illustrated is simple and convenient in construction and efficient in operation, and is the form I prefer, but the invention is capable of embodiment in other forms without departure from its proper spirit and scope.

I claim:

1. In a furnace-charging apparatus, in combination, a charging receptacle movable horizontally into and out of the furnace, said receptacle having a horizontal flexible traveling bottom, and means operable as the receptacle moves inward for causing the said bottom to travel horizontally and discharge the contents of the receptacle.

2. In a furnace charging apparatus, in combination, a charging receptacle adapted to be adavanced and retracted into and out of the furnace, and having a flexible traveling bottom, and means operable as the receptacle moves inward for causing the flexible bottom to pass over and under the forward edge of the receptacle, to discharge the contents of the latter.

3. In a furnace charging apparatus, in combination, a charging receptacle having a horizontal flexible traveling bottom, means for advancing and retracting the receptacle into and out of the furnace, and means operable in the advancing movement of the receptacle for causing the bottom of the receptacle to travel longitudinally with respect to the receptacle to discharge the contents thereof.

4. In a furnace charging apparatus, in combination, a charging receptacle having a flexible bottom, supporting means for said bottom at the forward edge of the receptacle, a pinion associated with the receptacle, means connecting the pinion and the bottom whereby rotation of the pinion will cause the bottom to pass forwardly over and rearwardly under the said supporting means, means for advancing and retracting the receptacle and a rack arranged to mesh with and rotate the pinion and said second mentioned means as the receptacle moves into and out of the furnace.

5. In a furnace charging apparatus, in combination, a charging receptacle, a flexible bottom therefor, supporting idlers for the bottom at the forward edge of the receptacle, a pinion associated with the receptacle in rear thereof, means connecting the flexible bottom and the pinion whereby rotation of the pinion will cause the bottom to travel over and under the idlers, means for advancing and retracting the receptacle, and a stationary rack adjacent to the rearward position of the receptacle and adapted to mesh with the pinion to rotate the flexible bottom in opposite directions as the receptacle moves into and out of the furnace.

6. In a furnace charging apparatus, in combination, a movable charging receptacle having a flexible traveling bottom, means for actuating the bottom as the receptacle moves inward, to discharge the contents of the receptacle, and a rear wall for the receptacle, movable with the flexible bottom.

7. In a destructor furnace, in combination,

a charging receptacle movable horizontally into and out of the furnace, said receptacle having a flexible traveling bottom, supporting means adjacent each end of the receptacle over which said flexible bottom is adapted to move, and means operable by the inward movement of the receptacle for causing said bottom to move and discharge the contents of the receptacle.

8. In a furnace charging apparatus, in combination, a movable charging receptacle having a flexible bottom composed of transverse bars or slats, means for causing the bottom to pass over and under the forward edge of the receptacle as the receptacle moves, and an imperforate bottom under the flexible bottom and stationary relatively thereto but movable with the receptacle.

9. The combination with a destructor furnace, of a stoking floor having a charging opening, a charging frame movable longitudinally below the stoking floor, a furnace charging receptacle arranged at the front of the frame and adapted to be filled with refuse through the said charging opening, a closure plate mounted on the frame in rear of the receptacle whereby to close the charging opening in the stoking floor as the receptacle advances, means below said closure plate for actuating the charging frame and receptacle, and mechanism operable by the movement of the receptacle for discharging the contents thereof.

10. In a furnace charging apparatus, in combination, a charging receptacle movable horizontally into and out of the furnace, said receptacle having a horizontal flexible traveling bottom, and means operable by the inward movement of the receptacle, for causing the said bottom to travel longitudinally with respect to said receptacle to discharge the contents thereof.

11. In a furnace charging apparatus, in combination, a charging receptacle having its forward end open and movable horizontally into and out of the furnace, said receptacle having a flexible traveling bottom, and means operable as the receptacle moves inward for causing the said bottom to travel and discharge the contents of the receptacle over the front edge thereof.

12. In a furnace charging apparatus, in combination, a charging receptacle having a traveling bottom, means for advancing and retracting the receptacle into and out of the furnace, means adapted to connect with the traveling bottom after the forward edge of the receptacle is in the furnace to operate the movable bottom for discharging the contents of the receptacle, said means being disconnected from the receptacle at a predetermined point on its return movement whereby the movable bottom is properly positioned in the receptacle for the next charge.

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

PERCY D. CANHAM.

Witnesses:

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N. LAWSON DYER.