March 13, 1928. 1,662,237

F. H. DANIELS

ASH DISCHARGE MECHANISM FOR MECHANICAL STOKERS

Filed April 26, 1922

Fig. 1

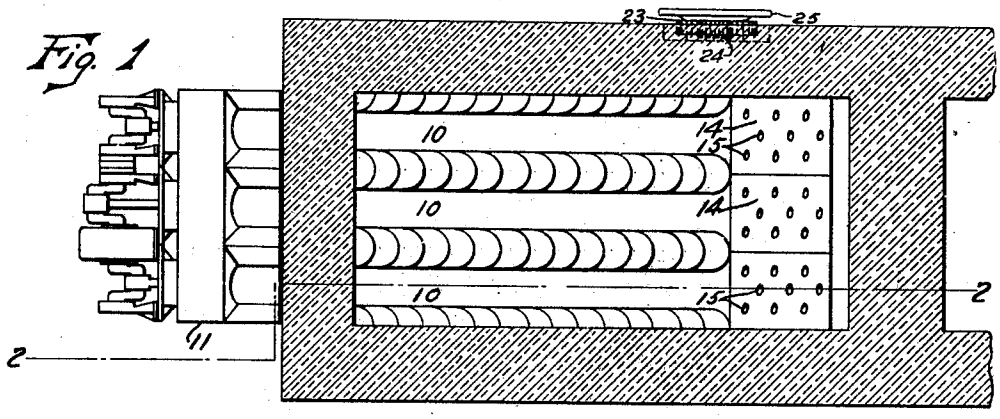



Fig. 4

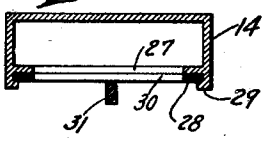
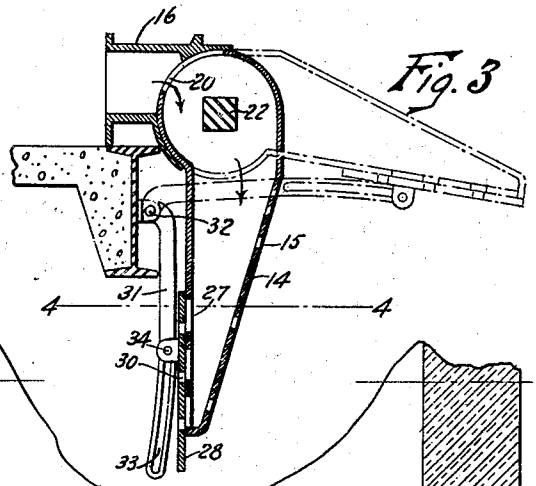



Fig. 3



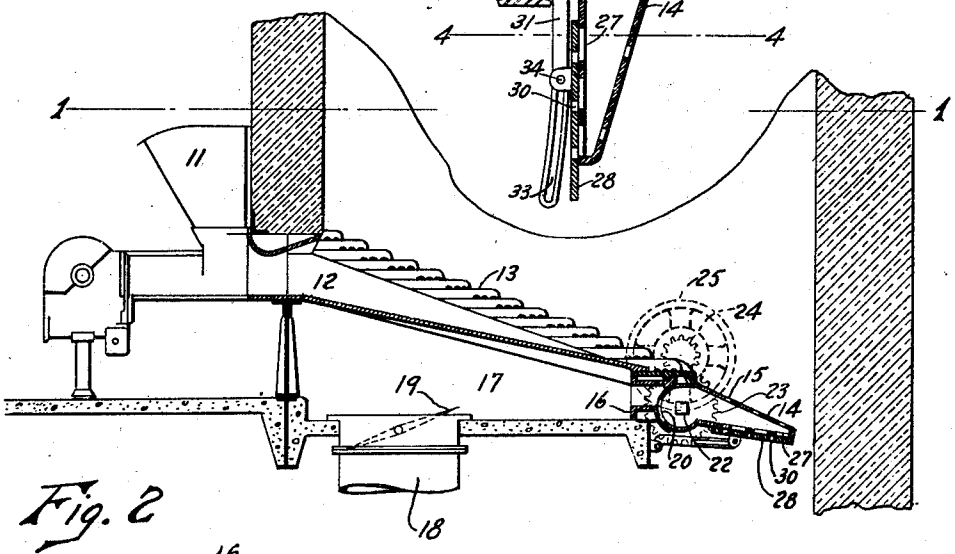
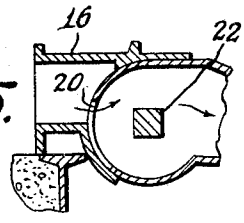




Fig. 2

Fig. 5.




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# UNITED STATES PATENT OFFICE.

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## ASH-DISCHARGE MECHANISM FOR MECHANICAL STOKERS.

Application filed April 26, 1922. Serial No. 556,653.

This invention relates to mechanical stokers having movable ash discharge plates of hollow construction. Such plates are used in certain types of large furnaces in which it is desired to conduct air to the ash or refuse to consume the last remnants of combustible material therein. For this purpose, air openings are formed in the upper surface of the plates and air under pressure is conducted to the hollow interior thereof.

It has been found that more or less ash and refuse will sift through these grate openings so that in time the air passages become clogged and the ash discharge plates are in danger of injury or destruction from overheating.

It is the general object of my invention to make provision in ash discharge members or dumping plates of this general type for the removal or escape of such material from within the plates.

In the preferred form, the apparatus embodying my invention is arranged for automatic operation determined directly by the movement and position of the ash discharge plates.

A further object of my invention is to provide for automatic reduction of air pressure as the plates or members approach their extreme upper limits of travel, while permitting full air pressure in all lower positions.

My invention further relates to arrangements and combinations of parts which will be hereinafter described and more particularly pointed out in the appended claims.

A preferred form of my invention is shown in the drawings in which

Fig. 1 is a diagrammatic sectional plan view of a stoker embodying my improvements, taken along the line 1—1 in Fig. 2;

Fig. 2 is a sectional elevation, taken along the line 2—2 in Fig. 1;

Fig. 3 is an enlarged sectional elevation of one of the ash discharge plates and its associated mechanism;

Fig. 4 is a detail sectional view taken along the line 4—4 in Fig. 3; and

Fig. 5 is a detail view similar to Fig. 3 but showing the grate in raised position.

Referring to the drawings, I have shown parts of an underfeed stoker of a usual type having retorts 10 to which fuel is fed from a hopper 11 by suitable feeding mechanism of any usual type. Side walls 12 separate the retorts 10 and support the tuyère blocks 13 which supply air for the under feed combustion of the fuel. As the fuel reaches the rear end of the retorts, the combustible matter therein is substantially consumed and the ash and refuse is deposited on hollow box-like ash discharge members or dumping plates 14. These plates are provided with air openings 15 in their upper surfaces to which air under pressure is supplied to consume all remaining combustible material in the ash or refuse.

In the drawings, I have shown the plates 14 as mounted for angular movement in brackets or bearings 16 which also constitute air passages from a conduit 17 which receives air from a wind trunk 18 controlled by a damper 19. Each plate 14 is of hollow construction, as shown in Fig. 3, and a wide slot or opening 20 is formed in the bearing portion of each plate positioned to cooperate with the air passage in the bracket 16 when the plate 14 is in lowered or partially raised position. As the plate 14 approaches its extreme upper limit of movement, however, as shown in Fig. 2, the upper edge of the opening 20 partially closes the connection to the air passage in the bracket 16, thus reducing the air supply when the plates are in extreme raised position.

A square shaft 22 extends through the several plates or members 14 and is connected by a gear 23 and pinion 24 to a hand wheel 25 at the outside of the furnace by which the plates may be raised or lowered.

For the purpose of freeing the plates 14 of accumulate ash or refuse, I provide additional openings 27 in the lower face of each plate 14. A slide 28 is movably mounted in guide-ways 29 (Fig. 4) on the lower side of each plate 14 and is provided with slots or openings 30 which in certain positions register with the openings 27.

An actuating arm 31 is mounted to swing about a fixed pivot 32 and is provided with a longitudinally extended slot 33 to receive a cross pin 34 mounted on the slide 28. The parts are so related that movement of the plate 14 to the position shown in full lines in Fig. 3 will push the slide 28 downward so that the openings 27 and 30 are aligned, permitting the ash and refuse to escape therethrough. The discharge of this fine

material is materially assisted by the air pressure within the hollow plate 14.

As the plate 14 is moved upward to the position shown in dotted lines in Fig. 3, the pin 34 engages the opposite end of the slot 33 and the slide 28 is moved inward to cover the openings 27, thus preventing the escape of air under pressure to the ash pit when the plates 14 are in normal or operative position.

I have thus made provision for automatic clearing of the ash discharge members or dumping plates whenever they are swung downward to dump the ash refuse thereon, and this clearing operation is carried out without requiring any attention whatever from the stoker operator.

As previously stated, the air connections are such that air at regular pressure is available in all positions of the plates 14 except their extreme raised positions which they may assume immediately after dumping, when the light load of ashes or refuse on the plates renders heavy air pressure undesirable.

Having thus described my invention and the advantages thereof, I do not wish to be limited to the details herein disclosed otherwise than as set forth in the claims, but what I claim is:—

1. In a stoker, a support, a hollow ash discharge member mounted on said support for movement from an upper ash supporting position to a lower ash discharging position and having openings in its upper and lower faces, means to supply air under pressure to the interior of said member, and means closing the openings in the lower face of said member when the latter is in raised position, said means being movable to uncover said openings when said member is lowered.

2. In a stoker, a support, a hollow ash discharge member mounted on said support for movement from an upper ash supporting position to a lower ash discharging position and having openings in its upper and lower faces, means to supply air under pressure to the interior of said member, a cover normally closing the openings in the lower face, and means to move said cover to uncover said openings in the lower face as said member is lowered to dump the ash and refuse therefrom.

3. In a stoker, a support, a hollow ash discharge member mounted on said support for movement from an upper ash supporting position to a lower ash discharging position and having openings in its upper surface, means to supply air under pressure to the interior of said member, means permitting escape of air through the lower face of said member to eject refuse when said member is in lowered position only and preventing escape of air through the lower face of said member when the latter is in raised position, and means to reduce the air supply as the member approaches its upper limit of movement.

4. In a stoker, a support, a hollow ash discharge member mounted on said support for movement from an upper ash supporting position to a lower ash discharging position and having grate openings in its upper face, means to supply air under pressure to the interior of said member, said member having additional refuse discharge openings, and means to uncover said discharge openings as said member is moved to dumping position, and to cover said discharge openings as said member is returned to operative position.

5. In a stoker, a support, a hollow ash discharge member mounted on said support for movement from an upper ash-supporting position to a lower ash-discharging position and having openings in its upper and lower faces, means to suppy air under pressure to the interior of said member, a slide effective to cover the openings in the lower face of said ash-discharging member when said member is in its raised ash-supporting position and movable to uncover said openings in the lower face of said member when said member is in its lower ash-discharging position, and an arm mounted on a fixed pivot and having a lost motion connection with said slide, whereby reduced covering and uncovering movements are given to said slide as said ash-discharge member approaches its upper and lower limits of travel.

6. In a stoker, a support, a hollow ash discharge member mounted on said support for movement from an upper ash-supporting position to a lower ash-discharging position and having grate openings in its upper face and openings in its lower face, means for supplying air to said member to eject refuse from within said member through the bottom openings, and means preventing such ejection of refuse through the bottom openings when said member is in raised position and permitting such ejection when said member is in lowered position.

7. In a stoker, a support, a hollow ash-discharging member mounted on said support for movement from an upper ash-supporting position to a lower ash-discharging position and having grate openings in its upper face, means for supplying air to said member to eject refuse from within said member when said member is in lowered position, and means for automatically reducing the area of the opening through which air is supplied to said member during the raising of said member to upper operative position.

In testimony whereof I have hereunto affixed my signature.

FRED H. DANIELS.