May 23, 1933. D. J. MOSSHART 1,910,852

REFUSE DISPOSAL APPARATUS

Filed July 9, 1930 2 Sheets-Sheet 1

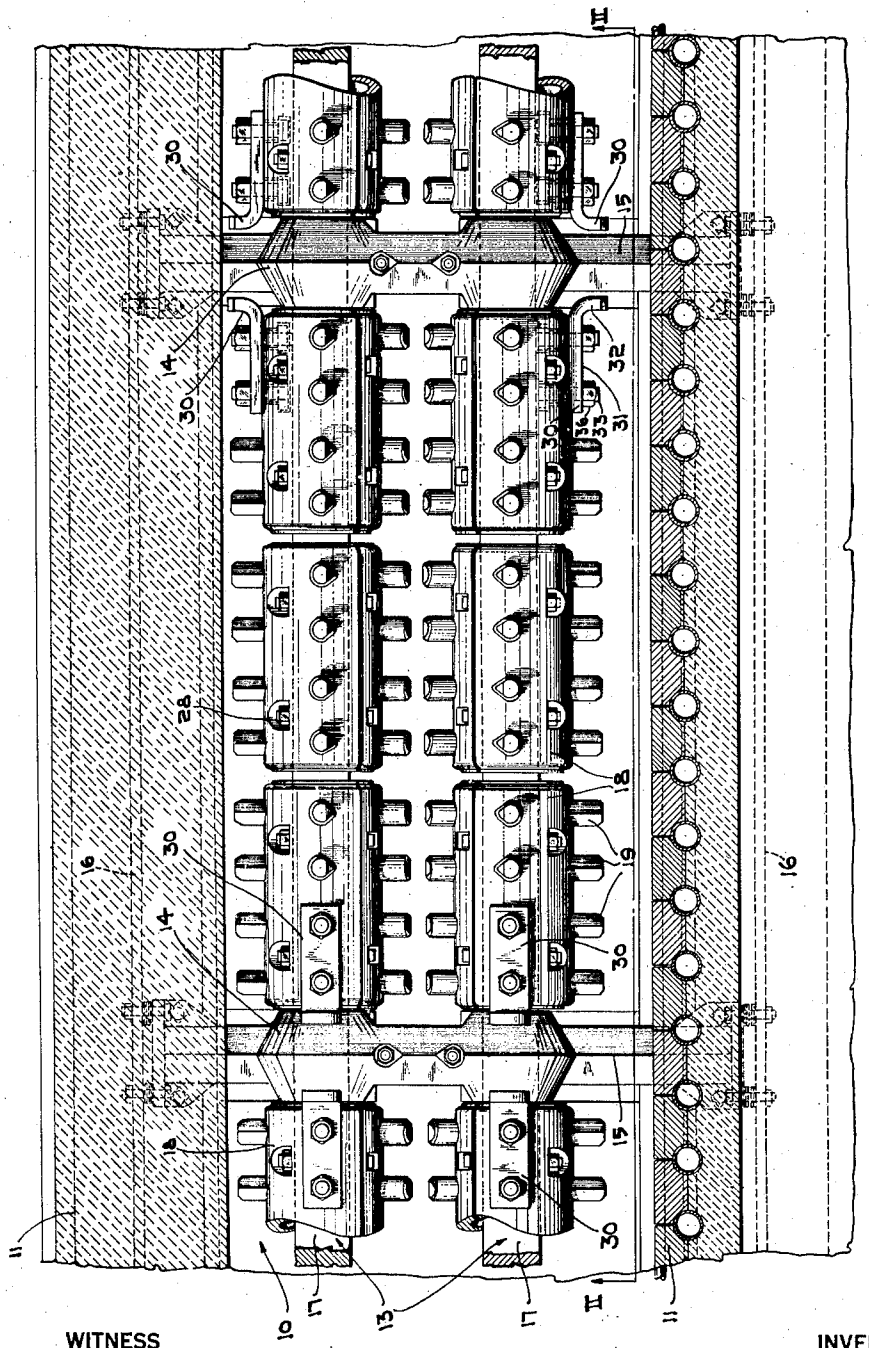


Fig. 1.

WITNESS
C. L. Soars.

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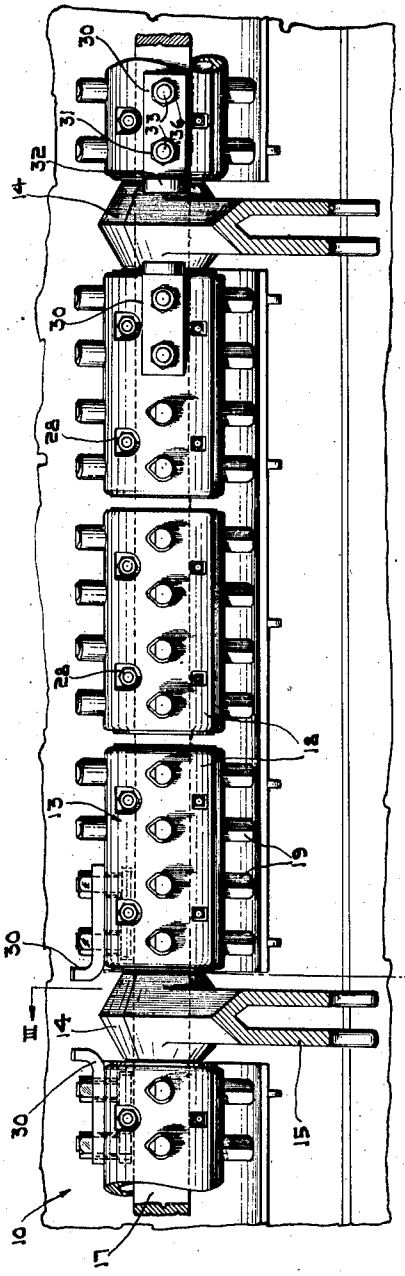


Fig. 2.

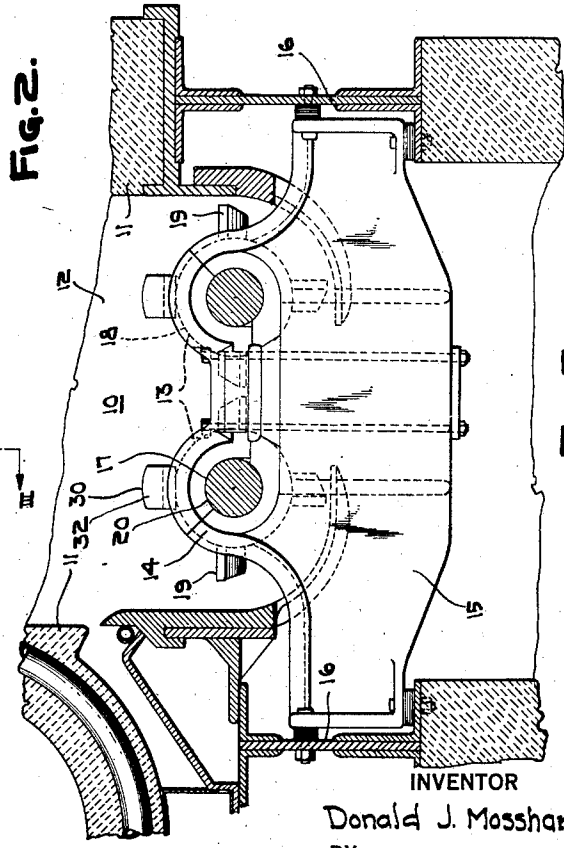


Fig. 3.

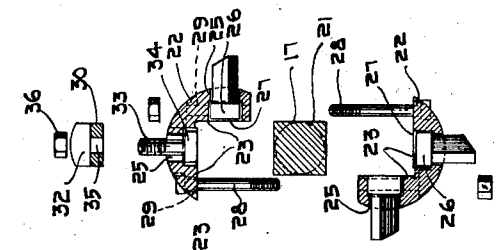


Fig. 5.

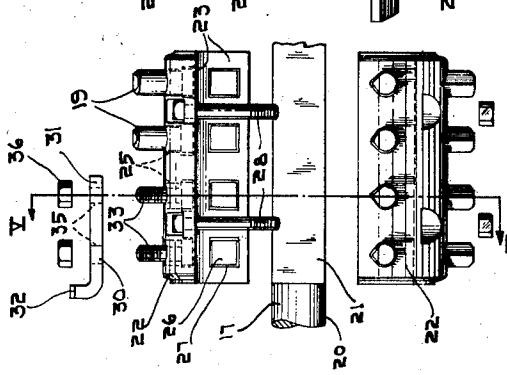


Fig. 4.

WITNESS

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Patented May 23, 1933 1,910,852

UNITED STATES PATENT OFFICE

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REFUSE DISPOSAL APPARATUS

Application filed July 9, 1930. Serial No. 466,825.

My invention relates to refuse disposal apparatus, and more particularly to the grinder or crusher rolls usually disposed within the lower portions of the clinker and ash pits of the conventional furnace.

In apparatus of this type, heretofore known to me, it is the general practice to support the rolls at their ends by end bearings disposed in or adjacent to the end walls of the pit, and by intermediate bearings disposed across the pit at intermediate points. The rolls usually comprise one or more shaft sections which are mounted for rotation within the bearings and grinding or crushing sections surrounding the shaft sections between the bearings.

As the grinding elements are at one side of the intermediate bearings, there is no direct action by the crushing sections upon the material occupying the space in and over the bearings. It, therefore, sometimes develops that clinkers will come to rest upon the bearings and cannot be dislodged by the rolls. These clinkers wedge in and build up in these dead spaces and interfere materially with the gravity feed of the refuse to the rolls. In extreme cases, arches of clinker and ash will form from bearing to bearing and entirely prevent the downward movement of the refuse in that section of the pit. In such cases, it becomes necessary to shut down the furnace and remove the clinkers manually.

It has been suggested to construct that portion of the grinding sections which are to be placed adjacent the intermediate bearings, with cylindrical end portions which extend over and surround portions of the bearings, thus reducing the size of the dead spaces over the bearings. In this construction, however, the number and distribution of the grinding teeth are no different than in the construction first described, and, as a result, the clinker and ash over the bearings will still tend to build up and thereby have a detrimental effect upon the efficiency of the apparatus. Furthermore, in grinding rolls of the type last described, the sections adjacent the bearing have to be specially constructed and therefore cost more than the rolls first described.

It is an object of the present invention to provide a simple and effective means for positively moving the ash and clinker from the space over and adjacent the intermediate bearings of grinder rolls.

It is a further object to provide an agitating element which can be readily attached to the conventional type of grinding element without alteration to the latter.

A still further object is to provide an agitator for grinding elements which intermittently contacts with the ash and clinker over and adjacent the intermediate bearings and thereby positively moves such ash and clinker.

These and other objects are effected by my invention, as will be apparent from the following description and claims taken in connection with the accompanying drawings, forming a part of this application, in which:

Fig. 1 is a fragmentary horizontal sectional view through a clinker pit showing the grinder rolls and bearings in plan;

Fig. 2 is a longitudinal vertical sectional view taken on the line II—II of Fig. 1;

Fig. 3 is a transverse vertical sectional view taken on the line III—III of Fig. 2;

Fig. 4 is an exploded view of the portion of the grinder roll in which my improvement is embodied, the parts being shown in elevation; and

Fig. 5 is a sectional view of the parts shown in Fig. 4 the section being taken on the line V—V of Fig. 4.

According to a preferred embodiment of my invention which is shown on the accompanying drawings, I provide refuse disposal apparatus comprising a pair of parallel crusher or grinder rolls supported intermediate their ends by spaced bearings. Each crusher roll comprises the usual shaft portion supported for rotation by the bearings, and a plurality of conventional grinding sections surrounding and secured to the shaft portion. An agitating element in the form of a flat bar having an upturned end, is secured to each grinding section which lies adjacent an intermediate bearing. The upturned end portion extends over the bearings so that, when the roll is rotated, such portion will positively contact with the ash and ref-

use over and adjacent the bearing and impart movement intermittently to such ash and refuse.

Referring now in detail to the construction illustrated in the accompanying drawing, I show at 10 a conventional clinker or ash pit, the purpose of which is to store and grind out the refuse discharged from a furnace. The pit 10 comprises side walls 11 and end walls 12 and a pair of parallel crusher or grinder rolls 13 disposed parallel to the side walls and adjacent the lower portions thereof to provide means for supporting and removing the refuse. Although I have shown two crusher rolls as forming the means for supporting and grinding out the ash from the pit, it is to be noted, however, that my invention is not limited to any particular number of rolls, for it may equally as well be applied to pits having only one roll and also to pits having more than two.

The pair of crusher or grinder rolls are supported intermediate their ends by spaced pairs of journal bearings 14. Each pair of bearings is carried by a suitable bracket 15 which is disposed transversely of the pit and is secured at its ends to suitable steel supporting structure 16.

Each crusher or grinder roll comprises a shaft section 17 and a plurality of two-part grinding sections 18 detachably secured to the shaft section and provided with grinding teeth 19. The grinding sections 18 are disposed in end-to-end relation between the bearings 14. That portion of the shaft section which is adjacent the bearing is turned to provide a journal 20 for fitting the bearing, and that portion of the shaft section which lies between bearings is square in cross-section, as indicated at 21, to aid in securing the grinding sections against rotation with respect to the shaft (see Figs. 4 and 5).

Each grinding section 18 comprises a pair of complementing semi-cylindrical sections 22 formed preferably of cast iron. Each section 22 is provided with flat inner surfaces 23 disposed at right angles to one another for engaging two adjacent sides of the square portion 21 of the shaft. The surfaces 23 of one of each pair of complementing sections 22 engage two adjacent sides of the shaft and the surfaces 23 of the other engage the remaining sides of the shaft.

The grinding teeth 19 are arranged in rows, and the rows are spaced circumferentially about the grinding section 18. The teeth are disposed within openings 25 provided in the sections 18 and are provided at their ends with enlarged square portions 26 which fit within cooperating enlarged square portions 27 of the openings 25. The teeth are held in place by virtue of the engagement of their inner ends with flat sides of the shaft. Each pair of complementing sections 22 is secured in position on the square portion of the shaft by suitable bolts 28 fitting within openings 29 in the sections 22.

The apparatus thus for described is conventional in form and no claim is made to the novelty thereof. In operation, the grinder rolls are preferably rotated toward one another; the refuse is ground and passes out between the rolls.

It will be observed that the cutting teeth on the crushing or grinding section adjacent the bearings 14 are incapable of contacting with the ash and refuse which occupies the spaces over and adjacent to the bearings. In order that the ash and refuse occupying these spaces be moved, I provide a plurality of agitators 30. The grinding sections adjacent to the bearings are each provided with one or more agitators 30, for example, one, which extends over the bearings 14. The agitators move with the rolls and thereby serve to keep in motion the clinker and ash which may occupy the dead space over the bearings.

In Figs. 4 and 5, I have disclosed in detail the agitator 30 and the manner in which it is secured to its grinding section 18. The agitator is in the form of a bar and comprises a body portion 31 which is secured to the grinding section and an upturned end portion 32 which projects outwardly and over the bearing 14 and, when the rolls are rotated, imparts movement intermittently to the ash and clinker. In securing the agitator 30 to a grinding section 18, the two teeth 19 of a row which are adjacent the bearing are omitted, and bolts 33, having square inner ends 34 are inserted. The agitator is provided with spaced openings 35 which receive the bolts 33. Nuts 36 engage the outer ends of the bolts 33 and firmly secure the agitator.

It will therefore be seen that my agitator may be secured to the standard form of grinding roll without alteration. The agitator may be either secured to the grinder rolls when first installed or it may be placed in existing installations without alteration to any of the structure.

While I have shown my invention in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications without departing from the sprit thereof, and I desire, therefore, that only such limitations shall be placed thereupon as are imposed by the prior art or as are specifically set forth in the appended claims.

What I claim is:

1. The combination with a rotary crusher and an intermediate bearing for supporting the crusher; of an agitating element secured to the crusher and having a portion thereof overlying the bearing so as to impart, intermittently, movement to the refuse occupying the space adjacent the bearing.

2. The combination with a rotary crusher including a shaft and a sectional casting sur-

rounding and secured to the shaft and having grinding teeth, and an intermediate bearing adjacent the sectional casting and supporting the shaft for rotation; of an agitating element secured to the casting and having a portion thereof overlying the bearing so as to impart, intermittently, movement to the refuse occupying the space adjacent the bearing.

3. The combination with a rotary crusher and an intermediate bearing for supporting the crusher; of a bar secured to the crusher and having a portion thereof overlying the bearing.

4. The combination with a rotary crusher and an intermediate bearing for supporting the crusher; of a bar secured to the crusher and having a portion thereof overlying the bearing, the end of the bar overlying the bearing having a projection extending outwardly from the bearing.

5. In refuse disposal apparatus, the combination of a plurality of spaced intermediate bearings; a rotary crusher including a shaft supported for rotation by the bearings and crushing elements fixed to the shaft between and at the sides of the bearings; and agitating elements secured to the crushing elements and having portions thereof overlying the bearings for imparting, intermittently, movement to the refuse adjacent the bearings.

6. In refuse disposal apparatus, the combination of a plurality of spaced bearings; a shaft mounted for rotation in the bearings; a plurality of sectional castings surrounding and secured to the shaft between the bearings and arranged in end-to-end relation with respect to one another; tooth members carried by the castings; and an agitating element secured to each end casting and having a portion thereof overlying the adjacent bearing for imparting, intermittently, movement to the refuse occupying the space over and adjacent such bearing.

In testimony whereof, I have hereunto subscribed my name this 26th day of June, 1930.

DONALD J. MOSSHART.