

Feb. 25, 1930.

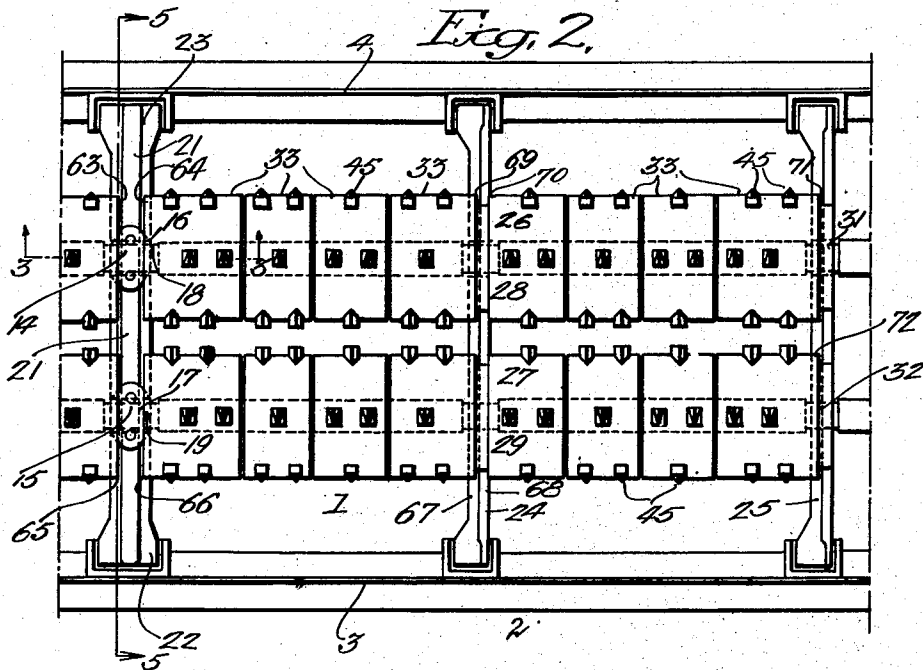
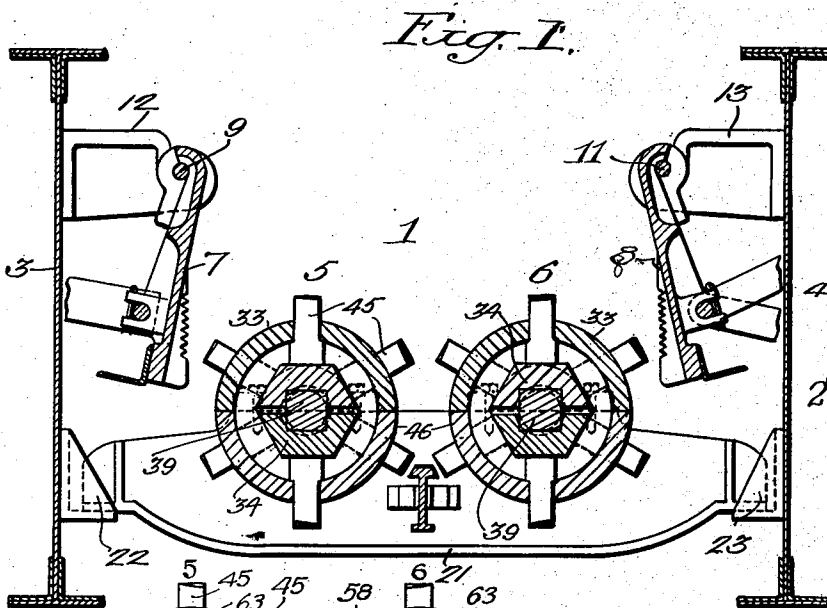
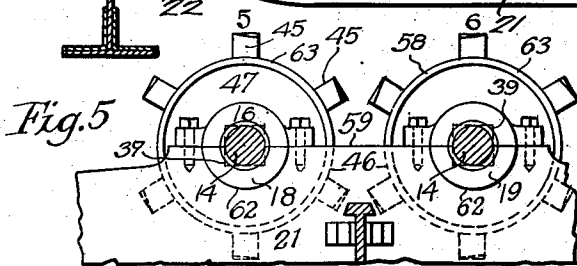
W. I. BOWDEN

1,748,828

CRUSHER

Filed Nov. 20, 1926

2 Sheets-Sheet 1



Inventor:
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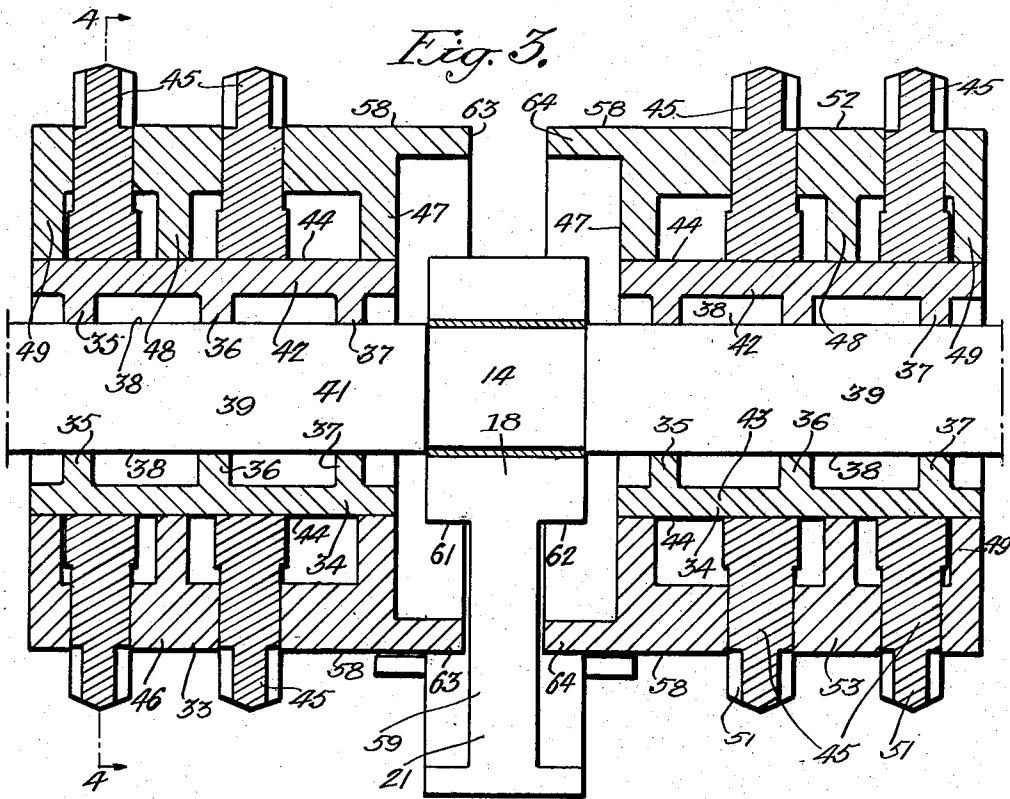
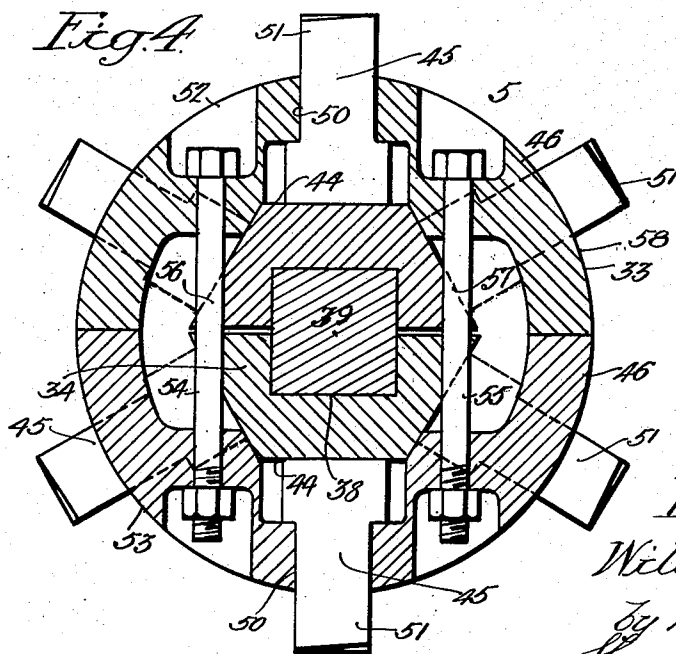
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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CRUSHER

Application filed November 20, 1926. Serial No. 149,784.

My invention relates to crushers, and it has particular relation to rotary crushers applicable, for example, to furnace constructions.

Heretofore, much annoyance and considerable difficulty has been experienced in furnace operation by reason of the arching of clinkers over the crusher rolls and supporting brackets and the consequent interruption in the passage of refuse from the ash pocket. To relieve such condition, it is necessary to shut down the furnace and remove the wedged clinkers by means of the usual fire tools. Consequently, efficiency of the furnace is materially lowered.

An object of my invention, therefore, is to provide means whereby such ash or clinker accumulations may be prevented and a uniform discharge from the ash pocket of the furnace assured.

Another object of my invention is to provide a rotary crusher, wherein the inactive area between the sections of the crusher on opposite sides of an intermediate bearing is very greatly decreased, so that a maximum working surface may be presented to the clinkers.

A further object of my invention is to provide a crusher construction, characterized by the fact that the clinkers are disintegrated into fine particles so as to present a maximum surface area to the air entering through the crusher pit, whereby the complete utilization of such combustible matter as remains in the ashes at the time of contact with the crusher rolls may be assured.

Other objects and applications of my invention, as well as details of construction and operation, whereby my invention may be practiced, will be apparent more fully hereinafter, when taken in connection with the accompanying drawings, wherein

Fig. 1 is a transverse sectional view of an ash pocket and associated crusher apparatus embodying my invention;

Fig. 2 is a detail, top plan view of the structure of Fig. 1, with the side crusher plates removed;

Fig. 3 is an enlarged vertical sectional view taken on the line 3—3 of Fig. 2;

Figs. 4 and 5 are transverse sectional views

taken on the lines 4—4 and 5—5 of Figs. 3 and 2, respectively.

In the illustrated embodiment of my invention shown in the drawing, an ash pocket 1 of a furnace construction 2 is provided with side walls 3 and 4, and a pair of rotary crusher members 5 and 6 extending longitudinally of the ash pocket 1. The side walls 3 and 4 may include crusher plates 7 and 8 which are mounted on shafts 9 and 11 carried by brackets 12 and 13, respectively. These crusher plates constitute the subject matter of the co-pending application of Clifford E. Harrison, filed July 22, 1925, Serial No. 45,331, and assigned to the American Engineering Company.

The crusher rolls 5 and 6 are provided with central journal portions 14 and 15 of reduced diameter, these portions being respectively supported in bearings 16 and 17 formed in hub portions 18 and 19 of a bracket member 21 extending transversely of the crusher rolls 5 and 6. Opposite ends 22 and 23 of the bracket members 21 may be supported on the side walls 3 and 4 of the ash pocket 1. Should the length of the crusher rolls 5 and 6 be such that additional supporting points are required between the center supporting bracket 21 and the ends of said crusher rolls, auxiliary brackets 24 and 25 may be provided. As shown in Fig. 2, the bracket 24 supports bearings 26 and 27 for journals 28 and 29 of the crusher rolls 5 and 6, respectively, and the bracket 25 is correspondingly provided with bearings 31 and 32.

Inasmuch as the crusher rolls 5 and 6 are similar in construction, the former only will be described in detail. The crusher roll 5 comprises a plurality of working sections 33, there being, say, four sections, between successive supporting brackets. Fig. 3 illustrates in detail the structure of the pair of sections 33, 33, positioned on opposite sides of the center bracket 21, wherein it is noted that each section comprises an inner shell 34 having inwardly extending ribs 35, 36 and 37 formed to abut against the flat sides 38 of a rectangular portion 39 of a shaft 41 extending lengthwise of the crusher roll 5. The

rectangular portion 39 extends between successive journals as, for example, the central journal 14 and the auxiliary journal 26. The inner shell 34 may comprise sections 42 and 43 for convenience in assembly on the square shaft portion 39. The inner shell 34 is also provided with a plurality of axially elongated flat sides 44 which serve to support one or more teeth 45.

The teeth 45 may be secured in position by an outer clamping shell 46 provided with inwardly extending supporting ribs 47, 48 and 49 adapted to engage the several outer sides 44 of the inner shell 34. The teeth 45 extend outwardly from the shell 46 through apertures 50 and terminate in working portions 51. The outer shell 46 preferably comprises sections 52 and 53 which are releasably clamped together on opposite sides by pairs of bolts 54 and 55, respectively. The pairs of bolts 54 and 55 also extend through opposite pairs of recesses 56 and 57 in the inner shell 34, whereby longitudinal movement thereof relative to the outer shell 46 may be substantially prevented and the whole locked securely in position. As illustrated in Fig. 2, the teeth 45 are positioned in staggered relation on the working surfaces 58 of the roll section 33. Certain of the sections 33 may be slightly modified in the arrangement and number of the teeth 45, each section, however, including the inner shell 34 and the outer shell 46 with its working surface or face 58.

In accordance with my invention, the clinkers in the ash pocket may be prevented from lodging on or adhering to the central bracket 21 and causing the arching of the refuse over the crusher rolls 5 and 6 by so forming each of the rolls 5, 6 as well as the bracket 21 that the hub portions 18 and 19 thereof are at least partially enclosed. Referring to Fig. 3, which is a vertical longitudinal sectional view of the crusher roll 5, it is seen that the hub 18 constitutes an integral extension of a vertically positioned web portion 59 of the bracket 21. The web portion 59 is of reduced thickness as compared with the hub 18, forming oppositely extending shoulders 61 and 62. The outer shells 46, 46 of the pair of sections 33, 33 positioned on opposite sides of the hub 18 are provided with projecting flanges 63 and 64 which overlie at least a portion of the hub 18 and completely encircle the journal portion 14. Thus, the hub or bracket portion 18 is at least partially enclosed, whereby clinkers and refuse in the ash pocket 1 may be substantially prevented from lodging on said bracket portion and causing the disadvantages aforementioned.

The projections 63 and 64 are preferably positioned in the outer working surfaces 58, 58 of the sections 33, 33, whereby the available working surface presented to the clinkers may be increased. Such increase in surface assures the disintegration of the clinkers into

fine particles, so that a maximum surface area is presented to the air passing through the ash pocket 1. Hence, the complete utilization of such combustible matter as remains in the clinkers at the time of contact with the rolls 5 and 6 is assured. The hub portion 19 of the central bracket 21 is similarly enclosed by overhanging flange portions 65 and 66 which tend to prevent clinkers from lodging on this portion of the central bracket 21.

The auxiliary supporting bracket 24 is shown as an angle rather than as an I-beam, as in the case of the central bracket 21, and it comprises a base flange 67 and an upright flange 68. The bearings 26 and 27 constitute extensions of the flange 68. The bearing 26 may be at least partially enclosed by means of flanges 69 and 70 extending from the adjacent section 33, 33, as in the case of the bearing 14. The bearing 27 for the roll 6 is similarly enclosed, whereby the tendency for the bearing 27 and the adjacent portions of the auxiliary bracket 24 to serve as shelves for the clinkers may be decreased. The bearing portions 31 and 32 of the next succeeding auxiliary bracket 25 may also be at least partially enclosed by overhanging flanges 71 and 72, respectively.

Under conditions of operation, the lodging of the clinkers on the several intermediate supporting bearings and adjacent bracket portions for the crusher rolls 5 and 6 is substantially prevented by the several projecting flanges which cause the partial enclosing of these parts. As a consequence, the furnace 2 may be continuously operated for long periods of time with a minimum attention to the crusher rolls 5 and 6.

Although, I have shown only one embodiment of my invention, it is apparent that various changes and modifications may be made in the several constructional details illustrated, without departing from the spirit of my invention. I desire, therefore, that only such limitations shall be imposed thereon as are indicated in the appended claims or as are demanded by the prior art.

I claim:

1. In combination, a crusher member, a bearing for said member, and means extending from said crusher member so as to enclose at least partially said bearing.

2. In a furnace, a crusher member, and means affording said member a bearing intermediate the ends thereof, said crusher member having a portion at least partially overlying said bearing.

3. In combination, a crusher member, and means affording said member an intermediate bearing, portions of said member on opposite sides of said bearing being extended so as to overlie said bearing.

4. The combination with a roll having spaced working surfaces, of an intermediate bearing for said roll, portions of said roll on

opposite sides of said bearing being extended in substantially the plane of said working surfaces to overlie said bearing, whereby the working surfaces of said roll may be increased and the tendency for material to lodge on said bearing decreased.

5 5. A crusher roll having spaced sections, and a bearing for said roll interposed between said sections, at least one of said sections having a projecting edge portion overlying said bearing, so that the space intermediate said sections through which clinkers may pass to said bearing is decreased.

10 6. In combination, an ash pocket, a roll therefor provided with a portion of reduced diameter, a bracket having a bearing for said roll portion, and means extending from said roll for at least partially enclosing said bearing.

20 7. A pair of elongated crusher rolls having portions of reduced diameter, bearings for said portions, and a supporting member for said bearings, said rolls being formed to enclose said bearings to a desired extent.

25 8. In a furnace, the combination with a crusher roll, of a supporting bracket having a bearing portion in engagement with said roll, the latter having a portion positioned to overlie said bracket, so that said bearing may be protected to a desired extent.

30 9. A rotary crusher member having a journal portion and also a shell portion, said shell portion being extended to overlie said journal portion, whereby the latter may be at least partially enclosed.

35 10. An elongated member having a pair of spaced working sections and an interconnecting journal portion, said sections having projecting flanges positioned to embrace said journal portion.

40 11. A crusher roll comprising a shaft, a shell defining an outer working surface, a supporting bracket having a hub portion constituting a supporting bearing for said shaft, and a flange portion extending from said shell so as to overlie said bracket.

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