C. E. BRAINARD.

ROTARY PULVERIZER.

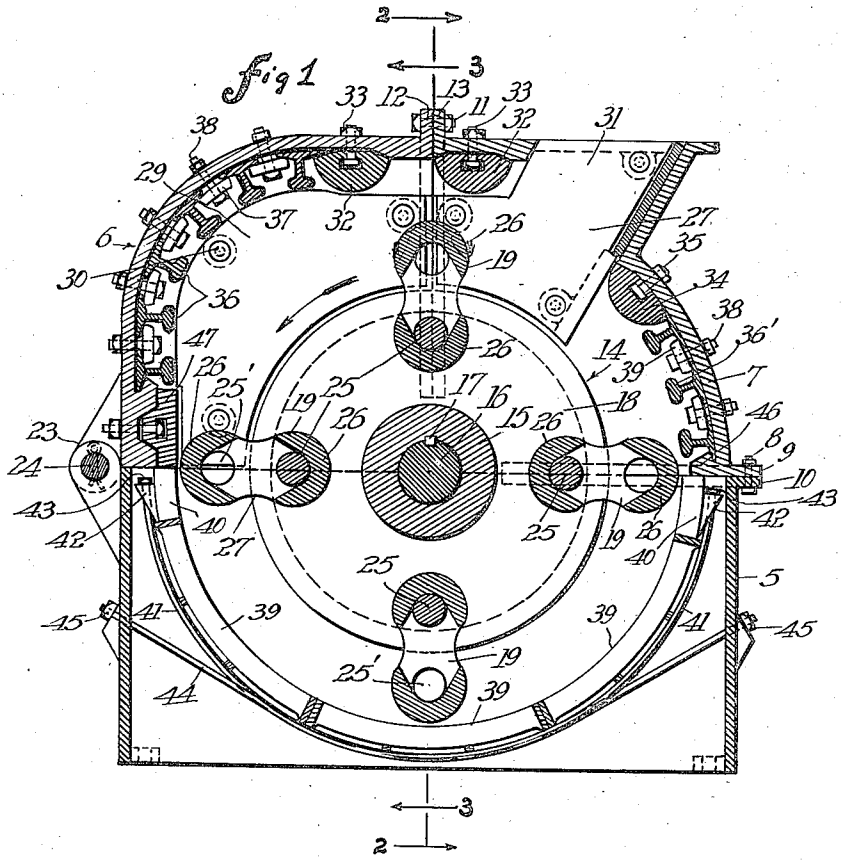
APPLICATION FILED SEPT. 8, 1914.

1,144,102.

Patented June 22, 1915.

3 SHEETS—SHEET 1.

Fig 1



WITNESSES:

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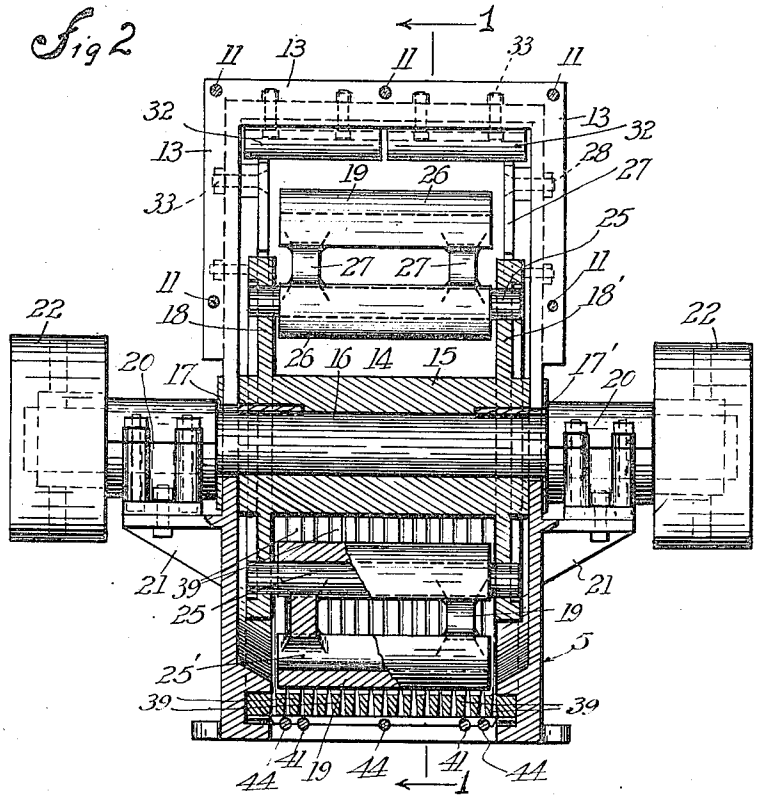
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3 SHEETS—SHEET 2.

Fig 2



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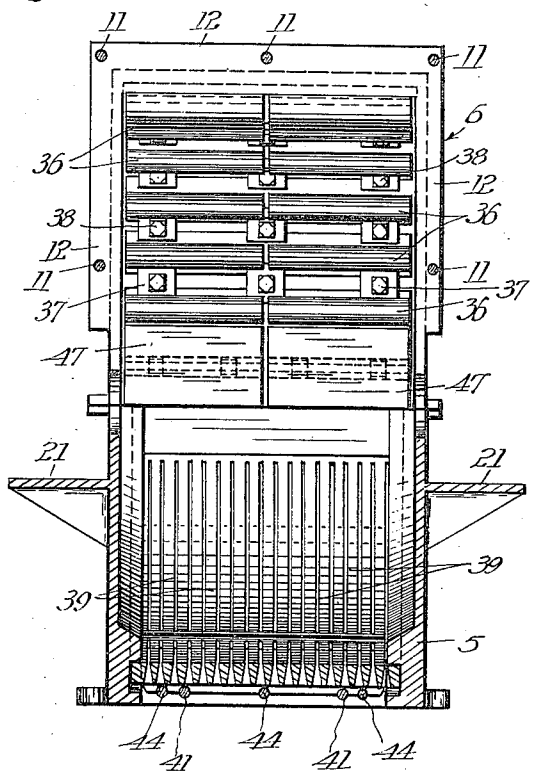
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3 SHEETS—SHEET 3.

Fig 3



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CHARLES E. BRAINARD, OF CHICAGO, ILLINOIS.

ROTARY PULVERIZER.

1,144,102. Specification of Letters Patent. Patented June 22, 1915.

Application filed September 8, 1914. Serial No. 860,636.

To all whom it may concern:

Be it known that I, CHARLES E. BRAINARD, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Rotary Pulverizers, of which the following is a specification.

My invention relates to improvements in rotary pulverizers and has especial reference to machines of this character, of the hammer type.

One of the objects of my invention is to generally improve machines of this character whereby to reduce the cost of their production; to increase their efficiency of operation; to prolong their durability and to render the parts thereof readily accessible and easy to assemble.

One of the specific objects of my invention is to provide a new and improved form of hammer so arranged that a set of such hammers may each be reversed with respect to their pivoted and free ends and with respect to the surface presented to the incoming material, thereby to provide four renewable working or striking surfaces for each hammer.

Other and further objects of my invention will become readily apparent, to persons skilled in the art, from a consideration of the following description when taken in conjunction with the drawings, wherein—

Figure 1 is a central, vertical, transverse section of the machine, taken on line 1—1 of Fig. 2. Fig. 2 is a central axial section taken on line 2—2 of Fig. 1. Fig. 3 is a similar section taken on line 3—3 of Fig. 1.

In all the views the same reference characters are employed to indicate similar parts.

The casing or housing consists of a lower portion 5, an upper rearward portion 6, and an upper forward portion 7. The lower portion is joined to the upper portion by bolts 8—8 taking through flanges 9 and 10 and the two upper portions are joined together in a central vertical plane, by bolts 11 taking through flanges 12 and 13. The upper and lower portions 6 and 7 of the casing are divided on the vertical median axial plane and may be separated from each other, and from the lower portion 5 of the casing, so as to render the rotor 14 accessible. The rotor 14 consists of the central bored hub 15 secured to a shaft 16 by means of keys 17—17′. The hub 14 carries radial flanges, or disks 18—18′, in which are pivoted the hammers 19. Bearings 20 for the shaft 16 are supported upon brackets 21 which are secured to, or are integral parts of the lower portion 5 of the casing. Pulleys 22 are secured to the shaft 16 and are means by which the rotor 14 may be driven.

To avoid the bodily removal of the upper portions 6 and 7 of the casing, either or both may be hinged to the lower portion 5, as by means of a hinge 23, in which the shaft 24 is the pintle.

The disks 18—18′ are bridged by shafts 25 which form pivotal bearings for the hammers 19. Each of the hammers 19 is provided with crescent-shape wearing parts 26 joined near their respective ends by bridge pieces 27—27 and these bridge pieces are perforated for admission of the bearing shaft or pintle 25, so that the hammer 19 may freely swing upon said bearing. As the bridge pieces 27—27 are perforated at each of their ends, as shown in Fig. 1, the hammer 19 may be reversed on the shaft 25, end for end, a hole 25′ being provided in each end of each of the hammers for this purpose. When the rotor 14 is being driven at full speed, in the direction of the arrow, the hammers 19 will, as a result of centrifugal effect be thrown into the positions shown in Fig. 1, where they are thus yieldingly supported in radial planes.

After one of the surfaces 26 of the hammer 19 has been worn by use, the shaft 25 may be removed from the rotor and reinserted in the openings 25′ in the other end of the hammer, thus providing an entirely new and complete surface, thereby doubling the life of the hammer.

The hammer may also be reversed so as to present either of its four surfaces to the work. A hammer may become more worn near its inner end (there being two hammers as shown on each shaft 25) than on its outer end, therefore their ends may be made to exchange places with reference to the casing.

A lining 27 is provided for the forward, upper portion of the casing, held in place by means of bolts 28 and a similar lining 29 is provided for the rear portion of the casing, held by similar bolts 30. A feed opening 31

is provided for admission of the material to be pulverized within the casing, or housing. Removable anvils 32, preferably of cast material, are held in the casing by bolts 33. Two such anvils are shown in the portion of the casing which the material approaches when sent into the opening 31 and another similar anvil 34, held in place by bolts 35 is shown at the rear of the opening 31. These anvils, of which there are two in each transverse plane may also be reversed with reference to their presented sides and ends to the work, to accomplish the same result as by similarly reversing the hammers. Other bumpers or anvils 36 consisting, preferably, of short lengths of railroad rails are held in the curved portion 6 of the casing, by means of cleats 37 and bolts 38. These anvils are to protect the outer walls of the casing and have frequently to be reversed as above and renewed as a result of wear and therefore the cleats and bolts afford a very convenient means for removing and replacing them and for holding them in place.

A semi-circular screen, or grating consisting of segments 39—39 and terminal blocks 40—40 which serve as a screen through which the comminuted material may pass is secured in place in the lower portion 5 of the casing. The bolts 41 pass through ears 42 projecting from the terminal blocks 40 and are tightened and held firm therein by nuts 43, whereby the segments 39 are held in circular position. Other bolts 44 pass under the semi-circular structure and are secured to the sides of the casing 5 by nuts 45. There are preferably three such bolts 44 which serve for holding the grating as a whole in elevated position against abutments provided in the casing.

The operation of the device is similar to that of pulverizers and crushers of this general type in which the material in unbroken form is passed through the feed opening 31, is struck by the hammers 19 and driven against the anvils 32 by which impact it is broken and from which it rebounds in many pieces which are struck by another hammer and thereby driven against the anvils 36, and again broken and thereafter the pieces are struck and the impact under various occasions serving to fracture the material each time it is struck by the hammer. The material finally finds its way between the anvil 47 and the hammers 19, where it is further broken and crushed into smaller portions, after which it passes below and is received upon the nearest portion of the grating 39 and finally falls through the grating out of the machine. Any material that may be left within the machine too large to fall through the grating is again projected by the hammers 19 against the anvils 36′ that are secured in the casing section 7 by bolts 38 and cleats 39, and against the anvils 34. Material that is broken by striking these parts either falls below or is again driven through the casing in the same direction as when coming initially into the opening 31.

It is of course manifest that other bars of iron than the sections of railroad iron 36—36′ may be used for the purpose of providing renewal anvils for the casing of the machine, but such material is cheap, serves the purpose well and provides pockets between adjacent irons in which to contain material, more or less pulverized, as a cushion to prevent impact against the casing walls 6, 7. The presented faces or heads of the rails serve to receive the impact of the projected material. This statement of economy is especially true when the rails 36—36′ have seen service for the purpose for which they were initially constructed and are no longer fit for such service.

While I have herein shown a single embodiment of my invention for the purpose of clear disclosure I have no desire or intention of limiting the claims to the specific structure shown, realizing that considerable change in arrangement and distribution of parts may be effected within the scope of the appended claims.

Having described my invention, what I claim with a view and desire to secure by Letters Patent of the United States is:—

1. A double face hammer for a pulverizer rotor, comprising two parallel spaced apart striking bars of concavo-convex cross section, said bars being positioned with their concaved surfaces facing each other, and bridge pieces connecting said bars, said pieces being provided with perforations near each striking bar for making pivotal connection with the rotor.

2. A double faced, double sided hammer for a pulverizer rotor, comprising two parallel striking bars and bridge pieces, said pieces provided with perforations near each striking bar for making pivotal connection with the rotor, substantially as and for the purpose set forth.

3. A rotary pulverizer, comprising a casing; a rotor, comprising a hub and terminal flanges, said flanges provided with registering perforations at circumferential intervals, near their periphery; a double faced double sided hammer, provided with two parallel striking bars and bridge pieces, said pieces provided with perforations near each striking bar and a shaft taking through said perforations whereby to pivot either end of each said hammer to said rotor.

4. A double face hammer for a pulverizer rotor, comprising two parallel spaced apart striking bars of concavo-convex cross section, said bars being positioned with their concaved surfaces facing each other, bridge pieces connecting said bars, said bridge

pieces being provided with perforations near each striking bar, the outer edges of the perforations registering with the concaved faces of the striking bars and a shaft connectible at its end with said rotor and adapted to pass through either set of perforations substantially as and for the purpose set forth.

In testimony whereof I hereunto set my hand in the presence of two subscribing witnesses.

CHARLES E. BRAINARD.

In the presence of—
FORÉE BAIN,
MARY F. ALLEN.