Feb. 27, 1951 J. HARRENSTEIN 2,543,164

BUMPER AND SCREEN PLATE COMBINATION FOR ROTARY HAMMER MILLS

Filed June 8, 1948 3 Sheets-Sheet 1

Fig. 1.

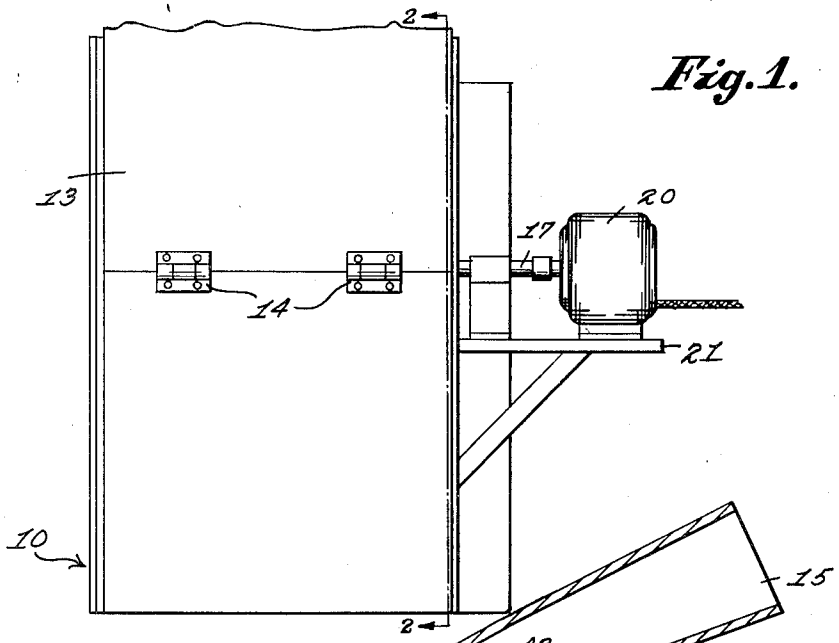
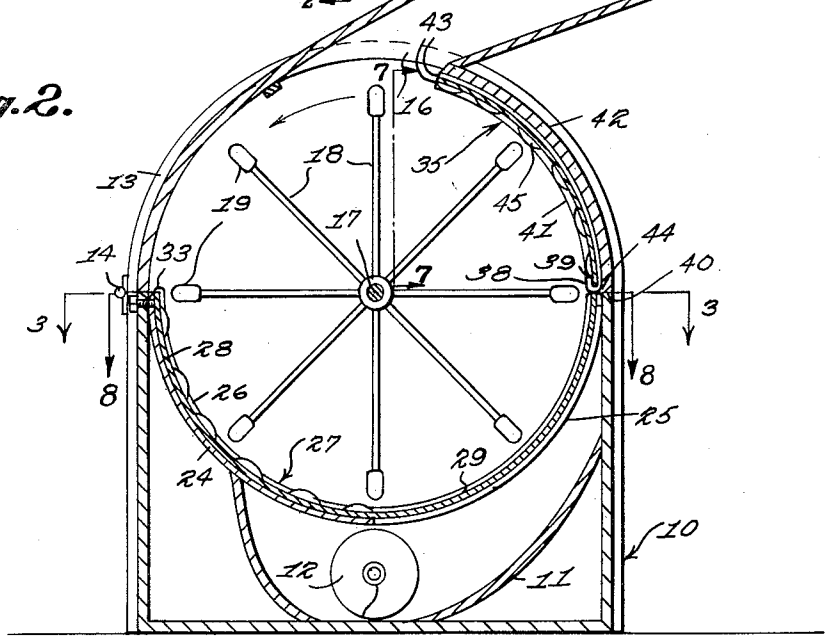


Fig. 2.



INVENTOR.

Jacob Harrenstein

BY

McMorrow, Berman & Davidson

ATTORNEYS

Feb. 27, 1951 J. HARRENSTEIN 2,543,164

BUMPER AND SCREEN PLATE COMBINATION FOR ROTARY HAMMER MILLS

Filed June 8, 1948 3 Sheets-Sheet 2

Fig. 3.

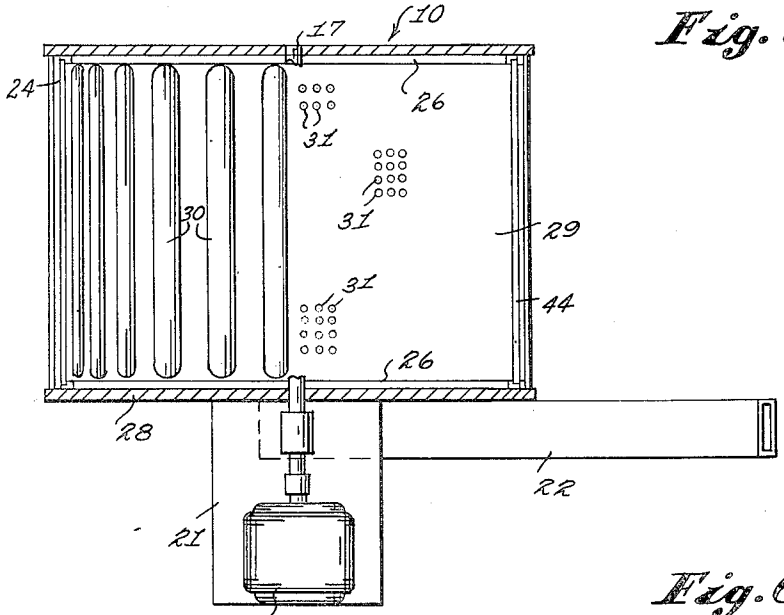


Fig. 6.

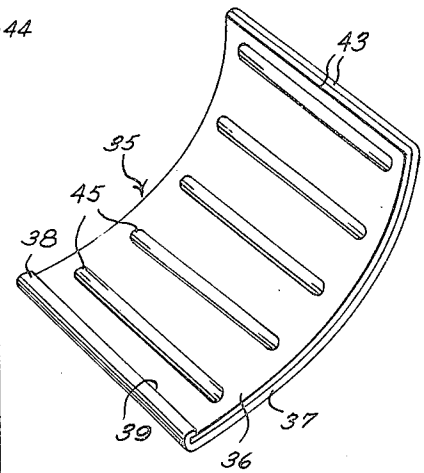


Fig. 4.

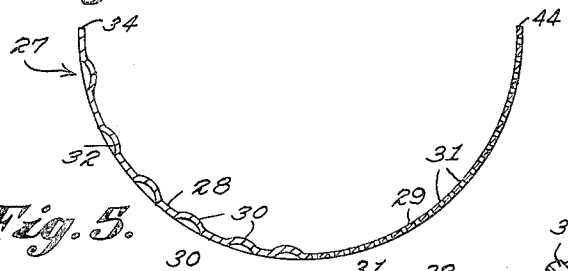
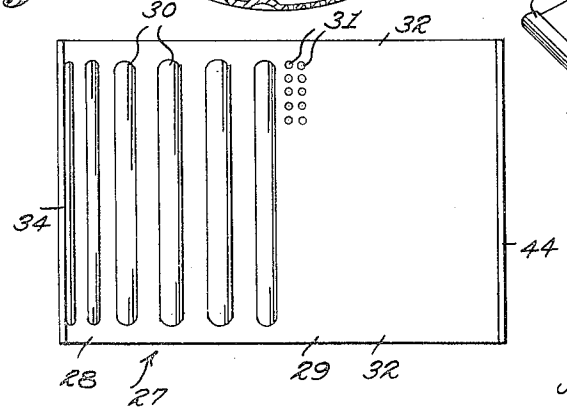


Fig. 5.



INVENTOR.

Jacob Harrenstein

BY

McMorrow, Berman & Davidson

ATTORNEYS

Feb. 27, 1951 J. HARRENSTEIN 2,543,164

BUMPER AND SCREEN PLATE COMBINATION FOR ROTARY HAMMER MILLS

Filed June 8, 1948 3 Sheets-Sheet 3

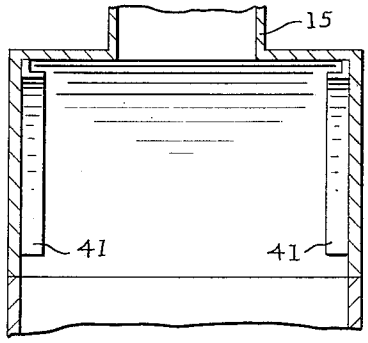
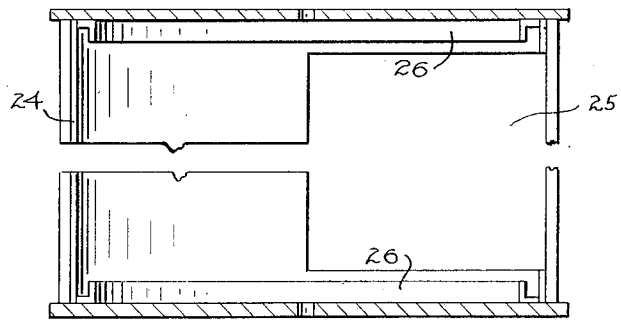


Fig. 7

Fig. 8



INVENTOR.
JACOB HARRENSTEIN
BY
McMorrow, Berman + Davidson
ATTORNEYS

Patented Feb. 27, 1951

2,543,164

UNITED STATES PATENT OFFICE

2,543,164

BUMPER AND SCREEN PLATE COMBINATION FOR ROTARY HAMMER MILLS

Jacob Harrenstein, Forreston, Ill.

Application June 8, 1948, Serial No. 31,707

3 Claims. (Cl. 241—88)

1

My invention relates to rotary hammer mills, and more particularly to a combined bumper and screen plate for use therewith, whereby to achieve a more rapid and more efficient grinding of grain or the like.

An object of my invention is to provide a combined bumper and screen plate for rotary hammer mills.

A further object is to provide a combined bumper and screen plate for rotary hammer mills which includes a screen portion intermediate a pair of bumper portions for agitating grain on both sides of the screen portion.

A further object is to provide a combined bumper and screen plate for rotary hammer mills, together with novel means for mounting the same in a mill.

Other objects and advantages reside in the particular structure of the invention, combination and arrangement of the several parts thereof, and will be readily understood by those skilled in the art upon reference to the attached drawing in connection with the following specification, wherein the invention is shown, described and claimed.

In the drawing:

Figure 1 is a rear elevational view of a rotary hammer mill embodying the invention;

Figure 2 is a transverse vertical sectional view through the mill;

Figure 3 is a horizontal sectional view taken substantially on the plane of the line 3—3 of Figure 2;

Figure 4 is a transverse vertical sectional view through a combined bumper and screen plate according to the invention;

Figure 5 is a plan view thereof;

Figure 6 is a perspective view of a separate bumper plate according to the invention.

Figure 7 is a sectional view taken along the line 7—7 of Figure 2 with the bumper plate removed.

Figure 8 is a sectional view taken along the line 8—8 of Figure 2, with parts broken away and with the combined bumper and screen plate removed.

Referring specifically to the drawing, wherein like reference characters have been used throughout the several views to designate like parts, 10 designates generally a hollow base section for a hammer mill which mounts a discharge trough 11 for ground grain or the like which receives such grindings from the superjacent mill. Ground grain is discharged from the trough 11 by means of a screw conveyor or

2

the like 12. An upper or cover section 13 for the base 10 is hinged thereto by any suitable hinges 14, and mounts an inlet spout 15 through which unground grain is fed to the mill. The side walls of the cover and base sections 10 and 13 have mounted therebetween a shaft 17 mounting a plurality of radially-directed beater arms 18 having hammers 19 formed on the ends thereof. As so far described, the mill according to the invention is conventional and forms no part of my invention.

Any suitable means, such as the motor 20, is utilized to drive the shaft 17, whereby to rotate the beater arms 18 and their associated hammers 19. The motor 20 may be mounted on any suitable bracket 21 outwardly of one side of the mill.

The base portion 10 of the mill is provided with a floor 24 for the mill which is in the form of a semi-cylinder, the semi-cylinder floor being formed with a discharge opening 25 for the discharge of ground grain or the like into the discharge trough 11. The opening 25 extends inwardly of and is spaced from one of the side and both of the end edges of the semi-cylinder 24 and terminates at a point substantially midway of the semi-cylinder. Each of the end edges of the semi-cylinder is provided with embracing means which face each other, such means taking the form of an inwardly directed flange 26 which is spaced from the adjacent portion of the semi-cylinder 24 and forms therewith a groove. A combined bumper and screen plate 27 conformably shaped to fit within the floor 24 or in the form of a semi-cylinder is insertable between the facing grooves and is pushed inwardly until the plate is completely superposed upon the semi-cylinder 24. The plate 27 comprises an imperforate quarter segment of a cylinder 28 having a plurality of spaced protuberances or rounded bumpers 30 projecting from a face thereof and a perforated or screen quarter segment of a cylinder 29 arranged in side by side relation with respect to imperforate segment 28 and secured thereto. The plate 27 is positioned with respect to the semi-cylinder 24 so that the imperforate segment 28 with its bumpers 30 facing outwardly overlies and abuts the adjacent portion of the cylinder 24 and the screen or perforated segment 29 overlies the discharge opening 25 and abuts the adjacent bounding side and end portions of the semi-cylinder floor 24. It is to be noted that the plate 27 is applied to the semi-cylinder floor 24, after the cover 13 has been raised, by inserting the free end 34 into the grooves at the right

hand side of the mill, Figure 2. The plate 27 is then slid around until the leading edge 34 encounters any suitable stops 33 formed on the flanges 26.

There is no particular need to fasten the plate 27 in place, as will be apparent hereinafter.

Referring now to Figure 2 and to Figure 6, that portion 42 of the cover 13 between the inlet opening 16 and the free edge 40 of the cover 13 is likewise provided with embracing means facing each other, said means embodying inwardly directed flanges 41, Figure 7, which are concentric to the portion 42 and provide therebetween a pair of opposed grooves. A bumper plate 35, Figure 6, which is of the same configuration as the portion 42 or in the form of a segment of a cylinder insertable between the opposed grooves formed by the flanges 41. The bumper plate 35 is preferably of double thickness and comprises a pair of plates 36 and 37 arranged in superposed abutting relation with respect to each other and secured together. As shown in Figure 6 a plate 37 is in the form of a segment of a cylinder and has one of its end edges turned inwardly to form a shoulder 39, the shoulder being spaced from the adjacent portion of the plate to provide a groove. Positioned in superposed abutting relation with respect to the plate 37 and having one end extending into the groove formed by the shoulder 39 and the adjacent portion of the plate 37 is a plate 36. With the cover 13 raised the plate 35 is inserted therein from the end thereof adjacent the free edge 40. This movement is continued until the shoulder 39 of the inwardly turned end edge 38 abuts the ends of the flanges 41 and prevents further movement. At this time the opposite ends 43 of the plates 36 and 37 are substantially flush with the inlet opening 16. It will be noted that when the cover 13 is closed, the double thickness, or rather triple thickness, of the lower end of the bumper plate 35 overlies the ends of the grooves provided by the lower flanges 26 and prevents sliding movement of the lower plate 27 in such grooves. Inasmuch as the stops 33 limit movement of the plate 27 in the opposite direction, the plates 27 and 35 are securely positioned in place without the use of bolts or screws. The bumper plate 35 is likewise provided with a plurality of transversely-extending protuberances or bumpers 45 which are substantially similar to the bumpers 30 of the plate 27. It is apparent, thus, that the trailing edge 44 of the plate 27 not only is prevented from escaping from its groove by engagement with the lower end of the bumper plate 35, but the latter is likewise prevented from escaping from its grooves by its engagement with the trailing edge 44 of the plate 27.

Thus, it is apparent that I have provided novel means for securing the plates in place without the use of bolts, screws or the like. At the same time, by providing the particular plates of the invention, the grain fed to the mill through the spout 15 and inlet opening 16 is agitated or held back by the bumpers 30 and 45, so that the hammers 19 have a better chance to hit the grain. That is to say, the grain bounces off of the bumpers and is thrown into the path of the hammers 19 to insure better pulverization of the grain. When the grain is sufficiently pulverized, it escapes into the discharge trough 11 through the perforations 31 in the screen section 29 of the plate 27.

While I have shown and described what is now thought to be a preferred embodiment of the

invention, it is to be understood that the same is susceptible of other forms and expressions. Consequently, I do not limit myself to the precise structure shown and described hereinabove except as hereinafter claimed.

I claim:

1. In a rotary hammer mill including a semi-cylinder floor, said floor being provided with a discharge opening extending inwardly of and spaced from one side and both end edges of and terminating at a point substantially midway of said semi-cylinder floor for the discharge of grain therethrough, embracing means engaging each of the end edges of said semi-cylinder floor and facing each other, and a combined bumper and screen plate conformably shaped to fit within said semi-cylinder floor insertable between the facing embracing means and superposed upon said floor, said plate embodying a pair of segments arranged in side by side relation and secured together, one of said segments being provided with a perforated screen and the other of said segments being imperforate and having one face provided with a plurality of spaced protuberances projecting therefrom, the screen segment overlying said discharge opening with the imperforate segment overlying the adjacent portion of said floor.

2. In a rotary hammer mill including a semi-cylinder floor, said floor being provided with a discharge opening extending inwardly of and spaced from one side and both end edges of and terminating at a point substantially midway of said semi-cylinder floor for the discharge of grain therethrough, an inwardly directed flange engaging each of the end edges of said semi-cylinder floor and spaced from the adjacent portions thereof to thereby form a groove, the grooves facing each other, and a combined bumper and screen plate comformably shaped to fit within said semi-cylinder floor insertable between the facing grooves and superposed upon said floor, said plate embodying a pair of segments arranged in side by side relation and secured together, one of said segments being provided with a perforated screen and the other of said segments being imperforate and having one face provided with a plurality of spaced protuberances projecting therefrom, the screen segment overlying said discharge opening with the imperforate segment overlying the adjacent portion of said floor.

3. In a rotary hammer mill including a semi-cylinder floor, a semi-cylinder cover superposed upon said floor and connected to the latter along one of its side edges for opening and closing movement with respect thereto, said cover being subdivided into two portions with one portion having embracing means engaging each of the end edges and facing each other, said floor being provided with a discharge opening extending inwardly of and spaced from one side and both end edges of and terminating at a point substantially midway of said semi-cylinder floor for the discharge of grain therethrough, embracing means engaging each of the end edges of said semi-cylinder floor and facing each other, a combined bumper and screen plate conformably shaped to fit within said semi-cylinder floor insertable between the facing embracing means and superposed upon said floor, said plate embodying a pair of segments arranged in side by side relation and secured together, one of said segments being provided with a perforated screen and the other of said segments being

imperforate and having one face provided with a plurality of spaced protuberances projecting therefrom, the screen segment overlying said discharge opening with the imperforate segment overlying the adjacent portion of said floor, and a bumper plate comformably shaped to fit within said portion of said cover insertable between the facing embracing means and in abutting relation with respect to said portion of said cover, said bumper plate having a plurality of spaced protuberances projecting from a face thereof and facing the protuberances on the imperforate segment of said combined bumper and screen plate.

JACOB HARRENSTEIN.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
978,034	Kinsey	Dec. 6, 1910
991,477	Buchanan	May 9, 1911
1,354,855	Simpson	Oct. 5, 1920
1,420,354	Williams	June 20, 1922
1,606,692	Brooks	Nov. 9, 1926
2,066,621	Gray	Jan. 5, 1937
2,215,226	Meyer	Sept. 17, 1940
2,385,767	Wagner	Sept. 25, 1945