Oct. 7, 1941. H. B. CALKINS 2,258,537

ADJUSTABLE SCREEN FOR HAMMER MILLS

Filed Dec. 26, 1940 2 Sheets-Sheet 1

Fig. 1.

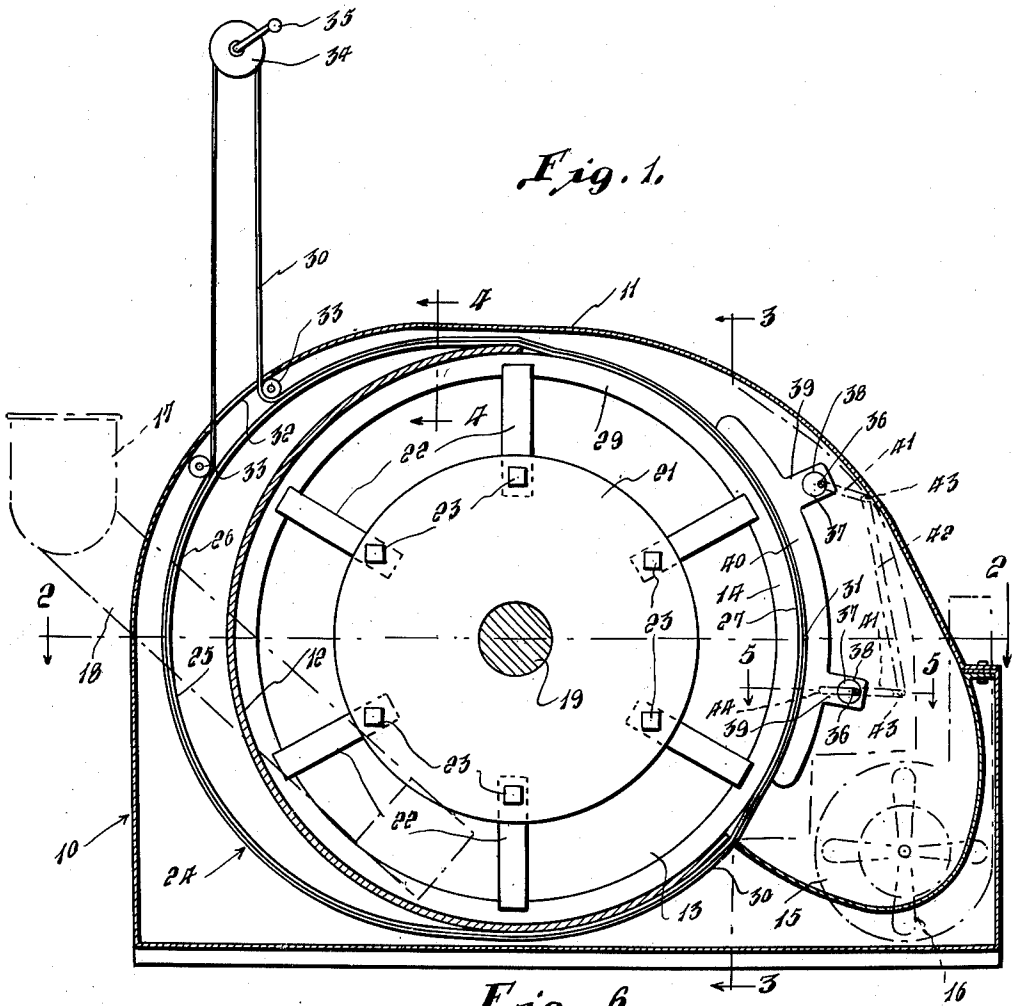
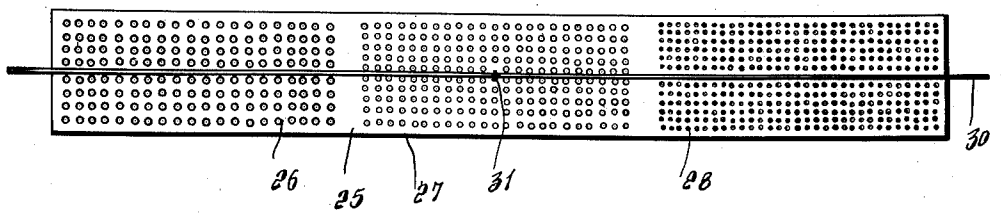


Fig. 6.



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Filed Dec. 26, 1940 2 Sheets-Sheet 2

Fig. 2.

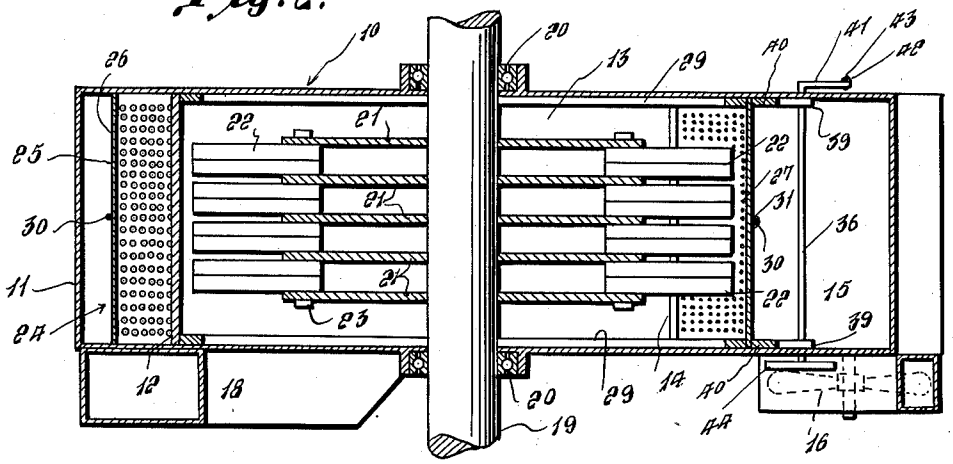


Fig. 3.

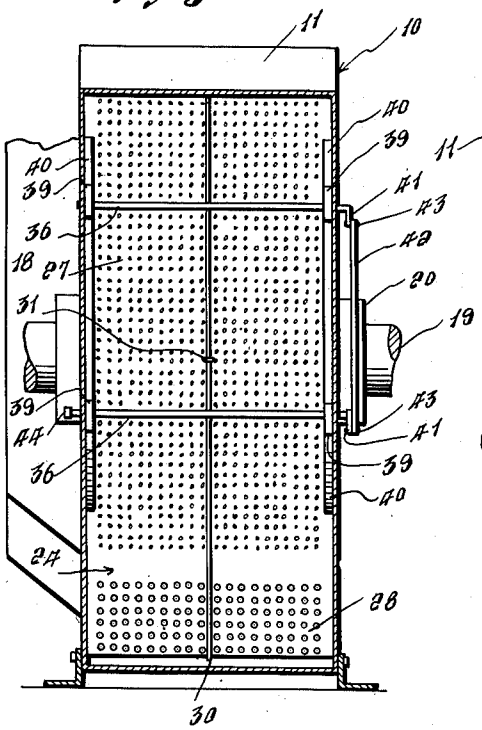


Fig. 4.

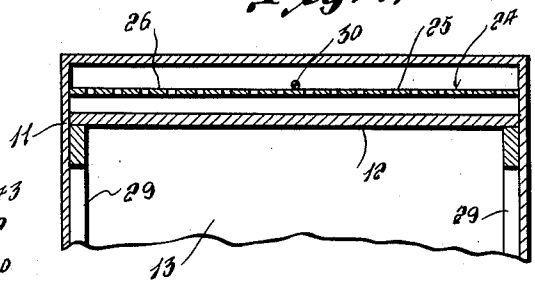
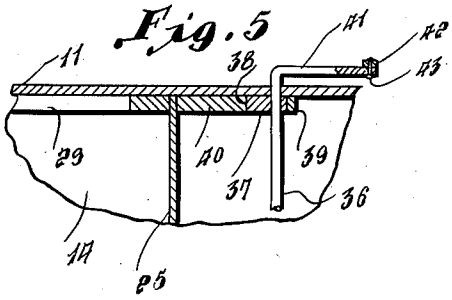


Fig. 5



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ADJUSTABLE SCREEN FOR HAMMER MILLS

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Application December 26, 1940, Serial No. 371,745

9 Claims. (Cl. 83—11)

This invention relates to an improved construction of screen and for an improved means for mounting the screen in a hammer mill to provide for adjustment of the screen to position portions thereof of different mesh over the outlet opening of the grinding chamber of the mill.

The present type of screens for hammer mills are fixedly mounted in the mill so that when it is necessary to employ a screen of a different mesh than that of the screen with which the mill is equipped it is necessary to partly disassemble the mill in order to remove the screen and to replace it with another of a different mesh.

It is a primary aim of this invention to provide an improved form of screen having portions of different mesh and equipped with means whereby said portions may be selectively positioned over the outlet opening of the grinding chamber without interrupting the operation of the mill.

Still another aim of the invention is to provide operating means for moving the screen disposed exteriorly of the mill and from where it can be conveniently operated for adjusting the screen while the mill is in operation.

Other objects and advantages of the invention will hereinafter become more fully apparent from the following description of the drawings, which illustrate a preferred embodiment thereof, and wherein:

Figure 1 is a longitudinal vertical sectional view of a hammer mill shown equipped with the invention,

Figure 2 is a horizontal sectional view taken substantially along the plane of the line 2—2 of Figure 1,

Figure 3 is a transverse vertical sectional view taken substantially along the plane of the line 3—3 of Figure 1,

Figure 4 is an enlarged transverse vertical sectional view taken substantially along the plane of the line 4—4 of Figure 1,

Figure 5 is an enlarged fragmentary horizontal sectional view taken substantially along the plane of the line 5—5 of Figure 1, and

Figure 6 is a plan view showing the screen as it would appear in an extended position.

Referring more particularly to the drawings, wherein like reference characters designate like or corresponding parts throughout the different views, 10 designates generally a hammer mill including an outer casing 11 within which is disposed an arcuately shaped plate 12 which combines with portions of the side walls of the casing 11 to form a grinding chamber 13. The space between the ends of the plate 12 forms an opening 14 constituting a passage between the grinding chamber 13 and the ground feed chamber 15. The ground feed is adapted to be discharged from the ground feed chamber 15 by means of the blower 16, and the feed to be ground enters the grinding chamber from the hopper 17 through the pipe 18 which opens into chamber 13 through one of the side walls of the casing 11. A shaft 19 extends centrally through the chamber 13 and through the side walls of the casing 11 and is journaled in the bearings 20 carried thereby. A plurality of disks 21 are keyed to the shaft 19 and disposed within the chamber 13 in spaced apart relationship relatively to one another. A plurality of circumferentially spaced rows of hammers 22 are pivotally mounted between the disks 21, adjacent the peripheries thereof, by means of the bolts 23 with the free ends of the hammers 22 extending outwardly therefrom and to adjacent the surface of the plate 12. The shaft 19 is adapted to be rotated by suitable driving means, not shown, for revolving the disks 21 and cause the hammers 22 to assume the positions, shown in Figure 1, by centrifugal force, and the blower 16 is likewise adapted to be actuated by suitable drive means, not shown, for expelling the ground feed from the chamber 15. The parts of the hammer mill 10, which have been previously described, are of conventional construction and have been illustrated in order to better illustrate the application of the improved screen, comprising the invention, and designated generally 24.

The screen arrangement, designated generally 24, comprises a cylindrical screen 25, preferably formed of thin, relatively flexible sheet metal and which is provided with the circumferentially spaced perforated portions 26, 27 and 28 of different mesh or fineness, the portion 26, as illustrated, being relatively coarse, the portion 27 medium, and the portion 28 relatively fine. A ring shaped supporting member 29 is fastened to the inner side of each side wall of the casing 11. The supporting members 29 are disposed in the chamber 13 and engage the inner side of the plate 12 and extend around the sides of the arcuately shaped opening 14. The cylindrical screen 25 is disposed around the chamber 13 and within the casing 11, and the side edges of the exposed portion thereof, which is disposed over the opening 14 for dividing the chamber 13 from the chamber 15, rest on the outer edges of the exposed portions of the supporting rings 29 for holding said aforementioned portion of the screen 25 in a distended position substantially in a continuation of the arc of the plate 12 so that the plate 12 and the portion of the screen 25 which is disposed over the opening 14, will combine to form the cylindrical chamber. The screen 25 is greater in diameter than the plate 12 so that a portion thereof is spaced from the plate 12, but due to the flexibility of

the cylindrical screen 25 it can readily assume this oblong shape.

An endless cable 30 has a portion extending substantially around the cylindrical screen 25 and is fastened at one point at 31 to the screen 25. A portion of the top of the casing 11 is provided with an elongated opening 32 through which the remaining portion of the cable 30 extends. The casing 11 is provided with pulleys 33 adjacent the ends of the opening 32 and over which the cable 30 is trained to prevent it from scraping on the ends of the opening 32. That portion of the cable 30 which is disposed exteriorly of the casing 11 is trained over a pulley 34 to which is connected a crank 35 for turning the pulley for moving the cable 30 to revolve the screen 25 to bring different ones of the portions 26, 27 or 28 into position over the opening 14 to vary the extent to which feed, not shown, must be ground in the chamber 13 before it can be discharged into the chamber 15.

A pair of shafts 36 extend through the chamber 15 and are journaled, adjacent their ends, in the side walls of the casing 11. An eccentric 37 is keyed to adjacent each end of each of the shafts 36 and on the inner sides of the side walls of the casing 11. Eccentrics 37 are mounted in openings 38 in ears 39 which project from the outer edges of arcuately shaped clamping members 40 for mounting the members 40 on the inner sides of the side walls of the casing 11 and on the outer sides of and substantially concentric with portions of the supporting rings 29. The shafts 36, as best seen in Figure 5, are provided at corresponding ends thereof with crank arms 41 the free ends of which are connected by a link 42 which is pivotally connected at its ends by the fastenings 43 to the free ends of the arms 41. The opposite end of one of the shafts 36 is provided with a lever or handle 44 by means of which the shafts 36 may be turned in unison for revolving the eccentrics 37 for moving the clamping members 40 toward and away from the supporting rings 29. When the clamping members 40 are in their projected positions, as seen in Figures 1, 2 and 5, portions of the side edges of the screen 25 will be clamped between the members 40 and portions of the rings 29 for preventing the screen 25 from moving relatively to the opening 14.

From the foregoing it will be obvious that while the grinding mill 10 is in operation for grinding feed, that the lever 44 may be turned to turn the shafts 36 for retracting the clamping members 40 to permit the pulleys 34 to be turned by the crank 35 for moving the cable 30 to thereby revolve the screen 25 to move any one of the portions 26, 27 or 28 out of position over the opening 14 and to move either of the other of said portions into position over the opening 14, after which the shafts 36 will be again revolved by the lever 44 to project the clamping members 40 for clamping the screen 25 in its newly adjusted position. It will be obvious that this operation may be accomplished at any time without interrupting the operation of the grinding mill 10, thus providing means whereby feed may be ground to different fineness in the mill 10 without stopping the mill to change the screen.

Various modifications and changes are contemplated and may obviously be resorted to as only a preferred embodiment of the invention has been disclosed.

I claim as my invention:

1. A hammer mill provided with a flexible, cylindrical screen adapted to surround a grinding chamber, said chamber having an outlet opening, said screen having circumferentially spaced portions of different mesh, and means connected to said screen for rotating the screen within the hammer mill for positioning various portions thereof over the outlet opening of the grinding chamber.

2. A device as in claim 1, comprising fixed supporting members arranged for engaging the portion of the screen disposed over said outlet opening for holding said portion in an extended position.

3. A device as in claim 1, comprising means for releasably clamping the screen for holding it in adjusted positions relatively to the outlet opening.

4. A screen attachment for hammer mills comprising a flexible screen cylinder adapted to surround a grinding chamber, said chamber having an outlet opening, said screen cylinder having circumferentially spaced perforated portions of different mesh, and means attached to said screen cylinder and projecting from the hammer mill for rotating the screen for selectively positioning the different perforated portions thereof over the outlet opening of the grinding chamber of the mill.

5. A device as in claim 4, said means comprising an endless cable attached at one point to said screen and extending substantially thereabout and having a portion projecting from the hammer mill, said portion being adapted to be actuated for rotating the screen.

6. A device as in claim 4, said means comprising an endless cable disposed substantially around said screen cylinder and having a portion projecting therefrom, and a pulley over which said portion is trained and which is adapted to be rotated for rotating said screen.

7. A device as in claim 4, comprising ring shaped supporting members disposed in the grinding chamber of the mill and arranged for engaging the edges of a portion of the screen cylinder that is disposed over the outlet opening of the grinding chamber, for holding said portion in a distended position.

8. A device as in claim 4, comprising a clamping member for engaging and clamping the screen cylinder in adjusted positions.

9. A device as in claim 4 in combination with ring shaped supporting members disposed in the grinding chamber of the mill and arranged for engaging the edges of a portion of the screen cylinder that is disposed over the outlet opening of the grinding chamber, for holding said portion in a distended position, arcuately shaped clamping members disposed adjacent to portions of said supporting rings for clamping portions of the edges of said screen cylinder therebetween, and eccentric means for mounting said clamping members, said eccentric means being rotatable for moving the clamping members toward and away from said last mentioned portions of the supporting rings.

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