June 7, 1955 J. G. BRYANT 2,710,149

SCREEN CHANGER FOR HAMMER MILLS

Filed Feb. 27, 1953 4 Sheets-Sheet 1

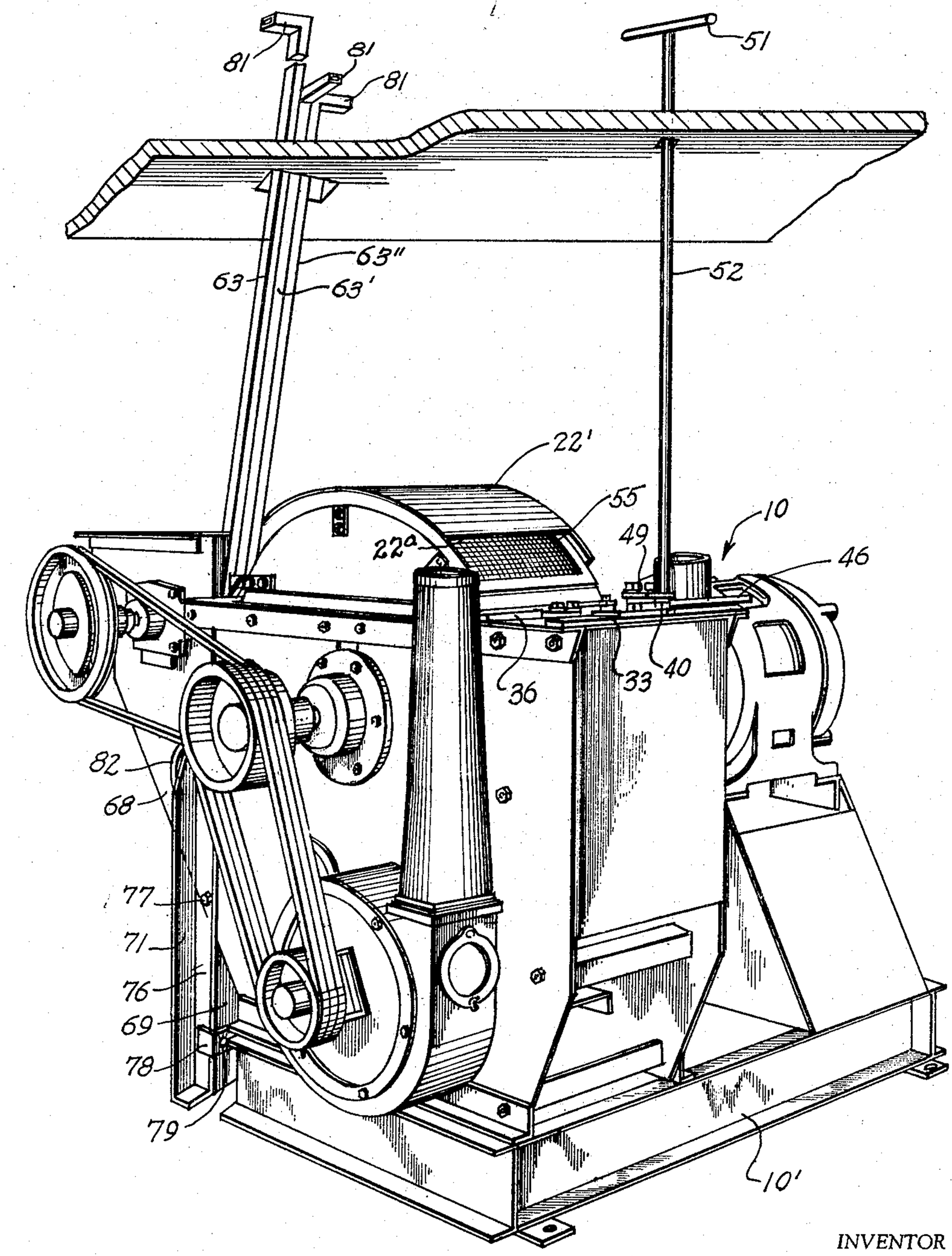

Fig. 1

INVENTOR
James G. Bryant

BY Christian F. Nielsen

ATTORNEY

June 7, 1955 J. G. BRYANT 2,710,149

SCREEN CHANGER FOR HAMMER MILLS

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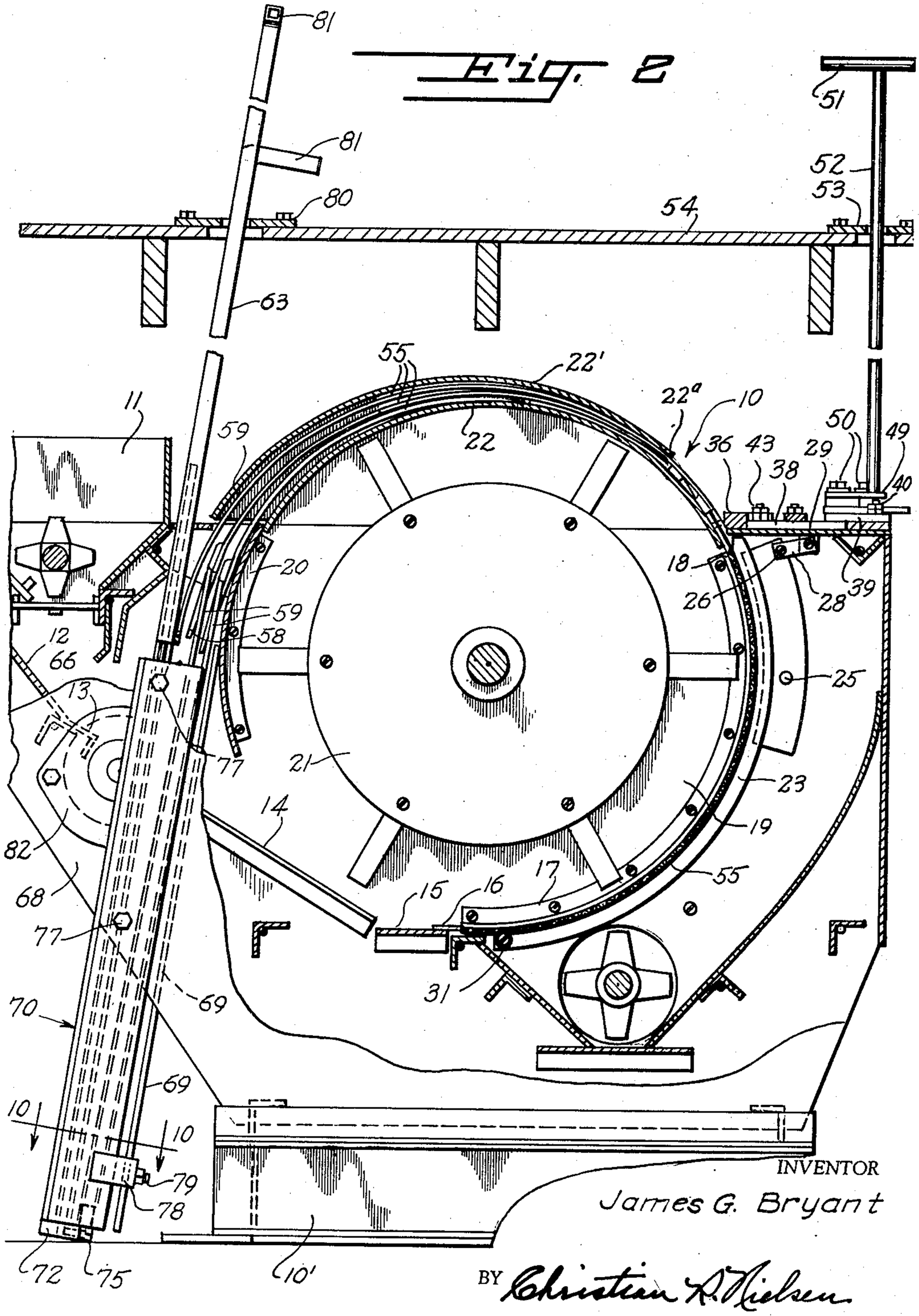
Fig. 2



INVENTOR

James G. Bryant

BY Christian D. Nielsen

ATTORNEY

June 7, 1955 J. G. BRYANT 2,710,149

SCREEN CHANGER FOR HAMMER MILLS

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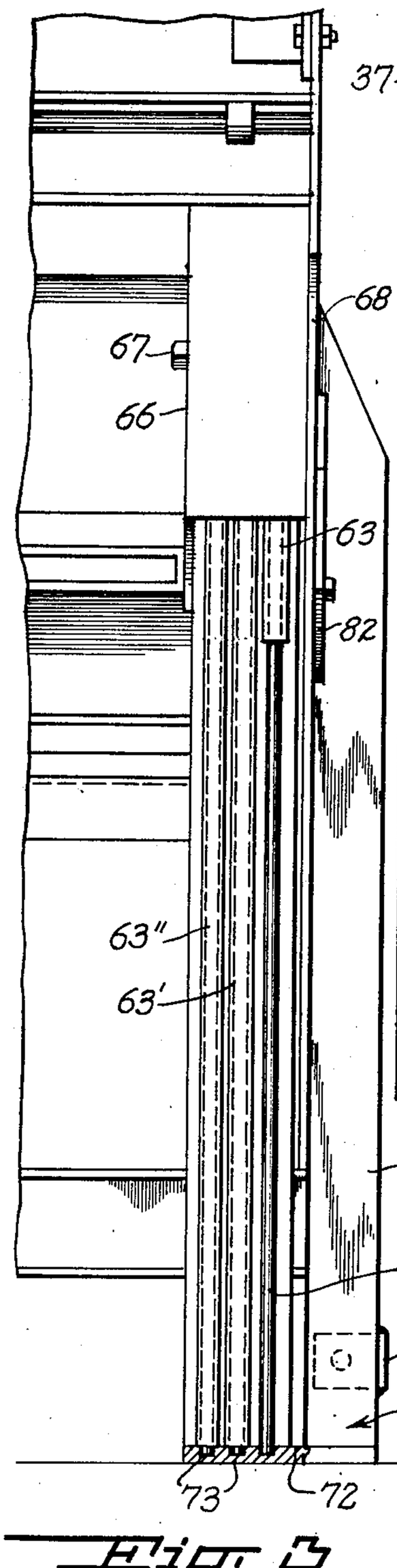

Fig. 3

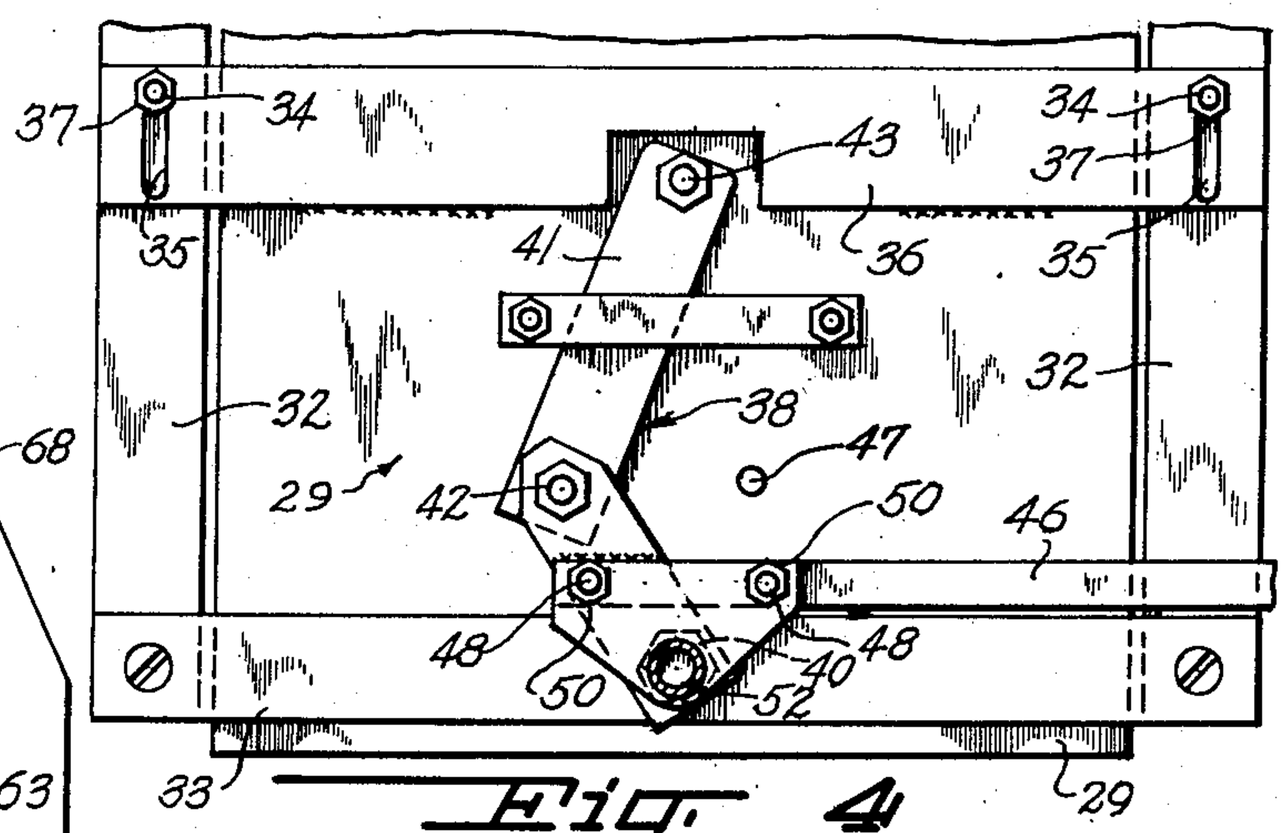

Fig. 4

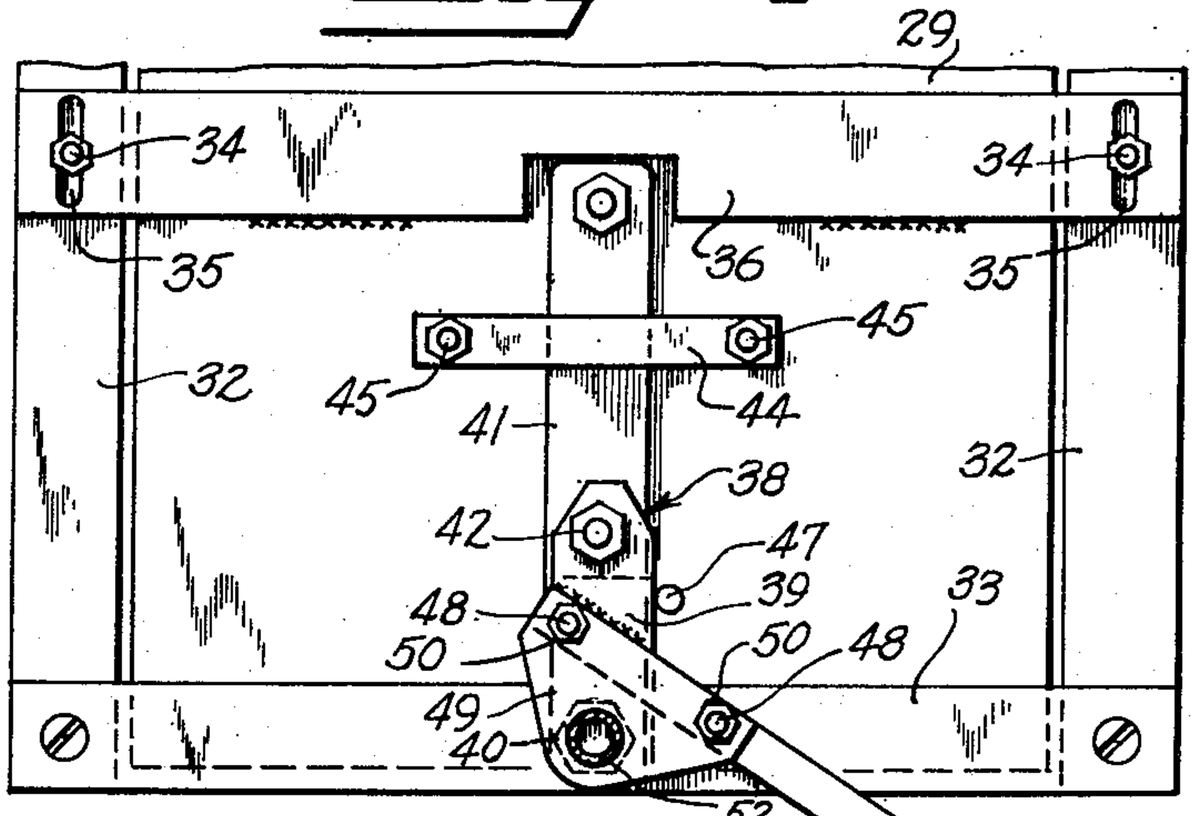

Fig. 5

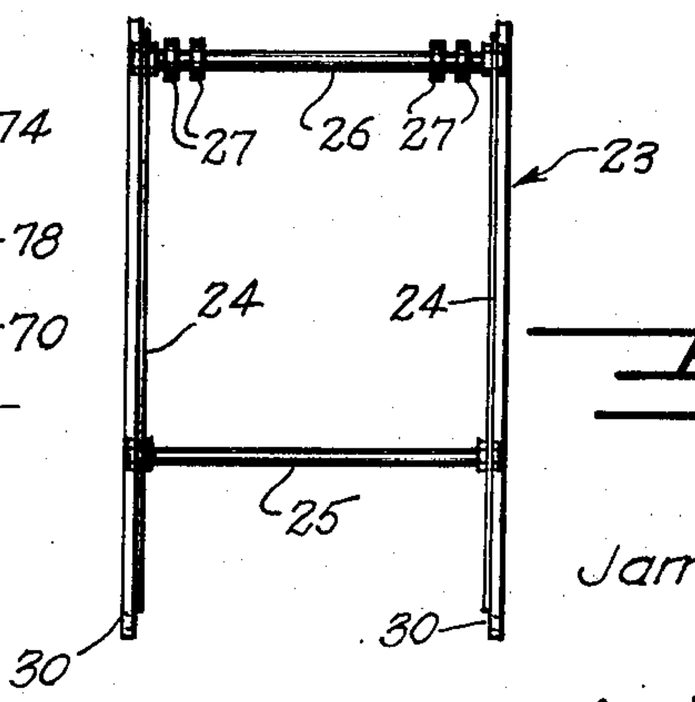

Fig. 6

INVENTOR
James G. Bryant

BY Christian L. Nielsen
ATTORNEY

June 7, 1955 J. G. BRYANT 2,710,149

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Fig. 7

Fig. 8

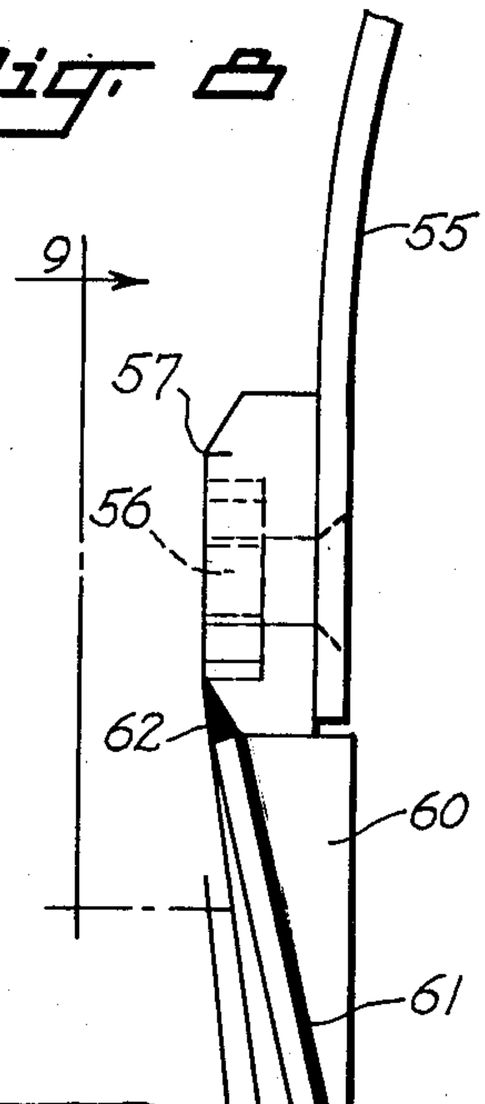

Fig. 9

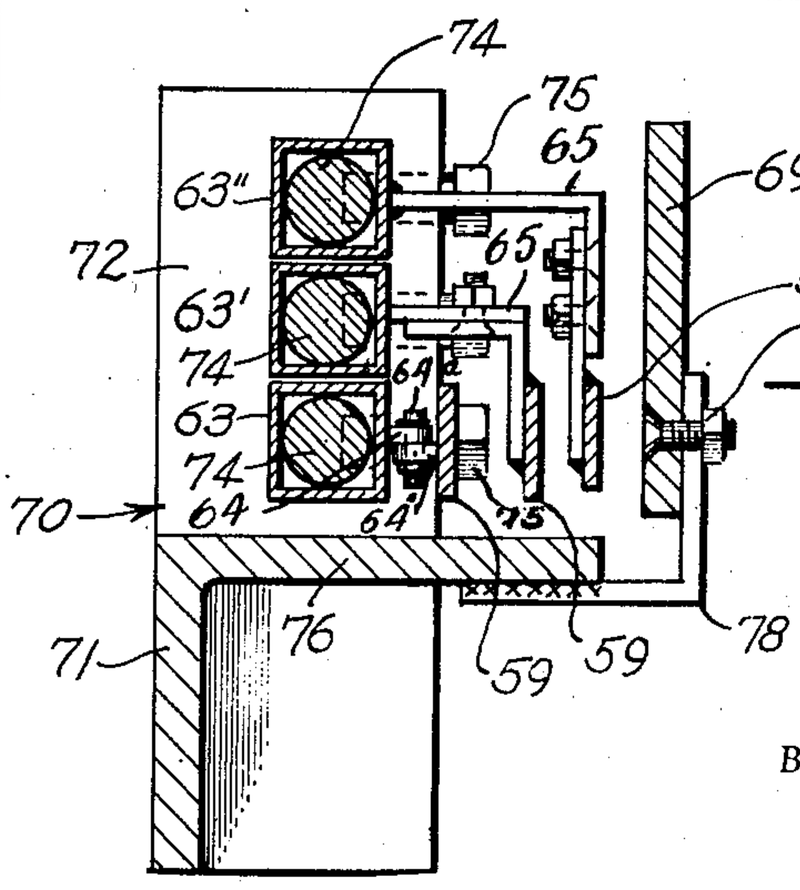

Fig. 10

INVENTOR
James G. Bryant

BY Christian L. Nielsen

ATTORNEY

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SCREEN CHANGER FOR HAMMER MILLS

James G. Bryant, Port Huron, Mich.

Application February 27, 1953, Serial No. 339,319

4 Claims. (Cl. 241—89)

This invention relates to hammer mills and more particularly to a screen changer for such mills and it consists in the constructions, arrangements and combinations herein described and claimed.

It is a customary practice to install hammer mills in the basement of the mill, necessitating a workman going down to the hammer mill to effect a change of one size screen to another, representing a loss of time and labor.

It is therefore the cardinal object of the invention to provide a mechanism which may be operated from the main floor to effect a change in the size of screen positioned before the outlet opening of the mill, as well as to lock the screen in position within the mill, located in the basement.

More specifically, it is an object of the invention to provide a hammer mill wherein a plurality of screens are housed within the hammer mill, selectively movable from a remote point, into operative position before the outlet opening of the mill, and also lock the screen in operative position from said remote point.

Additional objects, advantages and features of invention will be apparent from the following description considered in conjunction with the accompanying drawings, wherein,

Figure 1 is a perspective view of a hammer mill installed in the basement of a mill and illustrating the relative positions of the operating means for effecting a screen change and for locking said screen in operative position before the outlet opening of the mill.

Figure 2 is a vertical section through the hammer mill.

Figure 3 is an elevation of the hammer mill illustrating the guide and housing means for the operating means to effect movement of the screens.

Figure 4 is a top plan view of the screen locking means in open position.

Figure 5 is a similar view showing the locking means in locked position when securing a screen.

Figure 6 is a plan view of the screen assembly cradle.

Figure 7 is a perspective view of a screen having an operating handle secured thereto.

Figure 8 is a fragmentary side elevation of a screen, operating strap and guide fin.

Figure 9 is a view taken on the line 9—9 of Figure 8, on a reduced scale, and

Figure 10 is a cross section on the line 10—10 of Figure 2.

There is illustrated a well known construction of hammer mill now in general use, indicated by the reference numeral 10. The construction and operation of the mill is well understood by those versed in the art, and only such construction of the mill as actually relate to the screen changer will be particularly described.

Attention is first invited to Figures 1 and 2 of the drawings wherein it will be seen that the hammer mill 10 is suitably mounted upon a base 10'. The mill includes a crusher 11 beneath which there is mounted a

removable door 12, in the path of which there is secured a magnet support 13. An intake plate 14 feeds material to a bottom plate 15 and bottom bar 16. Adjacent the bottom bar 16, a semi-circular screen guide 17 is bolted to respective sides of the mill at the outlet opening, the guides terminating as at 18.

A back plate 20 is bolted between respective side walls of the mill terminating above the intake plate 14 and extending approximately concentric with the rotor 21. A semi-circular cover plate 22 suitably connected between the side walls of the mill extends from the back plate 20 terminating closely adjacent the end 18 of the screen guide 17 and supports the screens while an auxiliary cover 22' mounted thereabove, arranged eccentric to the cover forming a reduced exit 22*a*, forms a passage-way for guiding the screens in the movement toward and away from the outlet opening of the mill.

A screen guide is arranged in spaced concentric relation to the screen guide 17, and as best seen in Figure 6, the guide 23 consists of a pair of flange members 24 held in spaced relation by means of bolts 25 and 26. The bolt 26 includes spaced collars 27 between which respective links 28 are mounted, the links being pivotally connected to a screen locking plate 29. Each of the flange members 24 are formed with an aperture at the lower ends 30 for reception of a bolt 31 for pivotally mounting the screen guide to the sides of the mill.

As best seen in Figures 2, 4 and 5, the lock plate 29 is slidably mounted between frame members 32 at respective sides of the mill, the frame members being connected at the rear ends thereof by a spring steel bar 33 and at the front end of these frame pieces, bolts 34 are provided extended through respective slots 35 formed in respective ends of a screen lock bar 36. A nut 37 on the bolts maintain the lock bar in sliding relation with the frame members 32.

In order that the screen lock bar may be moved into positive locking engagement with the screens employed in the mill, a linkage 38 is employed consisting of a short link 39 having one end swingably mounted upon a bolt 40 secured in the steel bar 33, the other end of the link 39 overlying a long link 41 and pivoted thereto as at 42. The long link 41 is mounted pivotally upon the lock plate 29 as at 43. A plate 44 is positioned above the long link 41 and secured to the lock plate 29 by bolts 45, the plate 44 serving to guide the movements of the link 41 when the lock plate 29 is moved into open and closed positions with respect to a screen. An elongated handle 46 is welded to the short link 39 for manually opening and closing the screen lock bar and in the closed position of the linkage (see Figure 5) the link 39 will be slightly passed dead center, and the short link 39 will engage a stop pin 47. A pair of threaded studs 48 are integrally formed upon the handle 46, equally spaced upon opposite sides of the pivot 40 of the short link. The studs 48 mount a plate 49 which is secured thereto by nuts 50.

A second operating handle 51 is required for remote control of the screen locking means, and this comprises a rod or tubing 52 secured to and extending at right angles to the plate 49 and of such length as to extend upwardly through a guide plate 53 in the main floor 54 of a building in which the hammer mill is installed.

The construction of the screens are shown in Figures 7, 8 and 9, and as seen in Figure 7, the screen 55 is of semi-spherical contour so that it may be readily moved along the upper surface of the cover plate 22 of the mill for passage between the screen guides 17 and 23, when the screen lock is in open position. The screen 55 is bolted as at 56 to a screen handle 57 which is welded to a tapered guide 58, the latter insuring proper guidance

with respect to other screens in the mill. A flexible steel strap **59** is welded to a tapered fin **60** as at **61** and to the handle **57** indicated at **62**. The fin **60** is located at one side of the handle as shown in Figure 9. If desired an additional strap and fin may be secured upon the opposite side as indicated in dotted lines, in which event an additional guide rod and tube will be required.

Screen elevating tubes **63**, **63'** and **63''** are employed to effect movement of the screens to their respective positions within the mill and as here shown, the lower end of the tube **63** has an apertured ear **64** aligned with an ear **64'** secured to the lower end of the steel strap **59**, the ear **64** having a pin **64***a* forming a hinge joint. Inasmuch as the straps **59** must be maintained in spaced relation so as to avoid interference, the tubes **63'** and **63''** include right angular connector plates **65** welded to respective straps **59**, the plate connected to the tube **63''** being of greater dimensions so as to properly space the strap with respect to the next adjacent strap. The straps **59** are of a length to move the screens to the operative position before the outlet opening and return the screens to inoperative positions and preferably the straps **59** will have a slight curvature which together with the inherent flexibility thereof, the straps will move smoothly over the cover plate **22** and each other.

The tubes **63**, **63'** and **63''** are of square formation as best seen in Figure 10 and spaced closely together so that liability of any rotative movement is avoided. An enclosure or housing **66** is employed bolted as at **67** (see Fig. 3) to the inner face of the wall **68** of the mill and is positioned in the throat of the mill. The housing **66** includes a downwardly extending guide plate **69** inclined at a suitable angle to the vertical axis of the mill and cooperates with a rod support **70** as will be described. The housing **66** is constructed from a non-magnetic material such as brass, so that the magnet in the mill will not be attracted.

As clearly shown in Figures 2, 3 and 10, the rod support **70** is formed from a length of angle iron **71** across the lower end of which there is secured by welding, a base plate **72** projecting beyond the angle iron so as to be positioned within the mill and in alignment with the enclosure **66**. The base plate **72** is formed with three spaced openings **73** in each of which there is positioned a rod **74**, said rods extending upwardly at the same angles as the housing **66** and guide plate **69**, the rods projecting beyond the upper end of the housing and slidably support the tubes **63**, **63'** and **63''**. The rods are secured to the base plate in any approved manner, and in the present instance, set screws **75** are employed threaded in openings formed in the base plate and impinging upon the ends of the rods.

The angle iron **71** is positioned with a flat flange **76** thereof in contacting engagement with the outside face of the wall **68** of the mill and is secured thereto by bolts **77**.

As best seen in Figures 2 and 10, the guide **69** is spaced inwardly of the flange **76** so that the wall **68** of the mill may be accommodated therebetween and it will also be noted that the lower end of the guide **69** is supported by an angle bracket **78**, one leg of which is welded to the flange **76**, while the other leg is bolted to the guide **69**, as at **79**.

The tubes **63**, **63'** and **63''** are of a length to extend upwardly through a guide plate **80** mounted on the main floor **54** of the building in which the mill is installed, and each has a right angular extension **81** at their upper ends, which function as handles for manipulating the tubes. To avoid interference in elevating and lowering the tubes, the extensions **81** are arranged in angular relation to each other.

The angle iron **71** is also provided with a plate **82** for closing an opening customarily formed in the side wall **68** of the mill.

The operation of the device is as follows, it being assumed that screen **55** has been brought into operative position within the mill by elevating tube **63**, as shown in Figures 1 and 2, with the screen locking mechanism in the closed position as shown in Figure 5. In order to retract the screen, an operator on the floor **54** rotates the handle **51** to move the screen locking linkage **38** to the open position as shown in Figure 4, releasing the lock bar **36** and also moving the screen guide **23** in spaced relation to the screen **55**. The operator then merely exerts a downward pressure upon the tube **63** which exerts a pull on the strap **59** which draws the screen upwardly over the other screens housed beneath the auxiliary cover **22'**. Either of the other two screens may then be moved into operative position before the outlet opening in the mill by merely elevating the required tube **63'** or **63''** as the case may be, which will move the screen into position. The operator then rotates the handle **51** to move the linkage **38** to locked position. In the event that it is desired to release or secure the screen at the mill, the lever **46** may be employed.

While a preferred form of the device has been shown and described, this is by way of illustration only, and I consider as my own all such modifications in construction as fairly fall within the scope of the appended claims.

I claim:

1. A hammer mill having a grinding chamber provided with an outlet opening, a throat and a cover plate, an auxiliary cover plate spaced from said cover plate and forming a passage way, an inclined support fixed to the side of said hammer mill, said support having inclined spaced rods of a length to extend through said throat, a tube member slidably mounted on each rod, said tubes being of a length to extend a substantial distance above said auxiliary cover and having an operating handle, a screen member for each tube disposed in said passage way, each screen having one end of a resilient strap connected thereto, the other end of said strap being secured at a low portion of said tube, the elevation of either of said tubes moving an associated screen into position before said outlet opening, means for locking said screen in position, said means including a handle positioned at a substantial distance above said auxiliary cover for remotely actuating said locking means.

2. A hammer mill having a grinding chamber provided with an outlet opening, a throat and a cover plate, an auxiliary cover plate spaced from said cover plate and forming a passage way, said auxiliary cover plate being eccentrically mounted with respect to the cover plate to provide a reduced exit for said screens, an inclined support fixed to the side of said hammer mill, said support having inclined spaced rods of a length to extend through said throat, a tube member slidably mounted on each rod, said tubes being of a length to extend a substantial distance above said auxiliary cover and having an operating handle, a screen member for each tube disposed in said passage way, each screen member having one end of a resilient strap connected thereto, the other end of said strap being secured to a low portion of said tube, the elevation of either of said tubes moving an associated screen into position before said outlet opening, means for locking said screen in position, said means including a handle positioned at a substantial distance above said auxiliary cover for remotely actuating said locking means.

3. The combination of a building having a basement and a floor thereabove, a hammer mill mounted in the basement, the floor above the basement having a guide plate, said hammer mill having a grinding chamber provided with an outlet opening, a throat and a cover plate, an auxiliary cover plate spaced from said cover plate and forming a passage way, an inclined support fixed to a side of the hammer mill, said support having inclined spaced rods of a length to extend through said throat and outwardly of the mill, a tube member slidably mounted on each rod, said tubes being of a length to

extend upwardly through the guide plate mounted in the floor above the mill and each tube having an operating handle, a screen member for each tube disposed in said passage way in superposed relation, each screen having one end of a resilient strap connected thereto, the other end of said strap being secured to a low portion of respective tubes, the elevation of either of said tubes moving an associated screen into position before said outlet opening, means for locking said screen in position, said means including a handle extended upwardly through a guide plate in the floor above the mill.

4. The structure of claim 3, wherein the means for locking said screen in position includes an auxiliary handle at the mill.

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