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W. FOWDEN

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SCREEN

Filed March 5, 1928

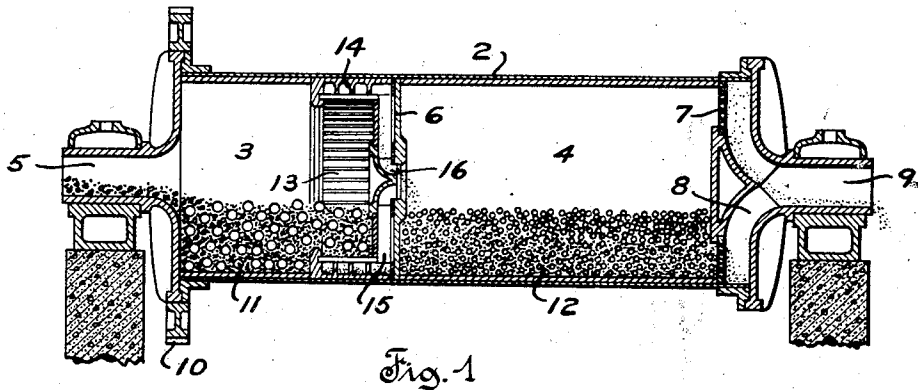


Fig. 1

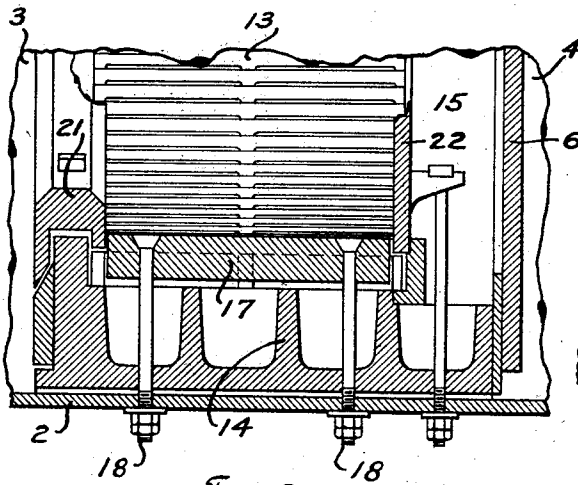


Fig. 2

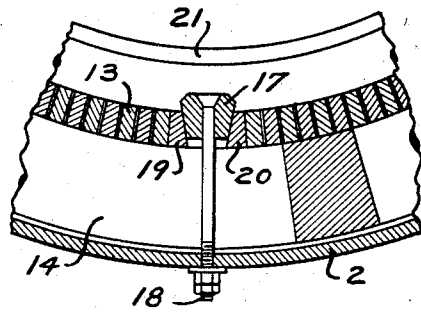


Fig. 3

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SCREEN

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The present invention relates in general to improvements in the art of grading material with the aid of a screen, and relates more specifically to improvements in the construction and operation of screening grids especially adapted for use in connection with rotary comminuting mills or the like.

An object of the invention is to provide an improved screen structure wherein the screening elements may be effectively retained in operating condition. Another object of the invention is to provide an improved grid structure consisting of a series of laterally spaced bars, and means for effectively retaining the bars in position. A further object of the invention is to provide improved means for effectively fastening the bars of a screen in place, and for simultaneously distributing the material being treated, over the screening surface. Still another object of the invention is to provide an improved rotary grid wherein the fastening means for the bars also serves to shower the material being treated over the entire screening surface. A further object of the invention is to provide simple and effective means for fastening and for effecting adjustment of the bars of a grid located within a housing, from the exterior of the housing. These and other objects and advantages of the invention will appear from the following description.

A clear conception of an embodiment of the invention and of the manner in which such devices are manipulable and operable, may be had by referring to the drawing accompanying and forming a part of this specification in which like reference characters designate the same or similar parts in the various views.

Fig. 1 is a central longitudinal section through a combination comminuting mill embodying one of the improved screens.

Fig. 2 is an enlarged fragmentary section

through a portion of the screen, showing the details of construction thereof.

Fig. 3 is an enlarged fragmentary sectional view through the screen, likewise showing details of construction thereof.

The comminuting mill disclosed in Fig. 1 comprises in general a cylindrical shell 2 rotatable about a substantially horizontal axis by means of a gear 10, and having its interior divided into segregated comminuting chambers 3, 4, by means of a partition or division head 6. The shell 2 is rotatably supported by means of feed and discharge end trunnions 5, 9 respectively, the former of which communicates with the inlet end of the coarse grinding chamber 3, and the latter of which is associated with the delivery end of the fine grinding chamber 4. The coarse grinding chamber 3 is provided with a plurality of relatively large freely tumbling comminuting bodies 11, while the fine grinding chamber 4 is similarly provided with a plurality of smaller freely tumbling comminuting bodies 12, the bodies 11, 12 being adapted to tumble and cascade over each other, and to rub and impinge against the material during rotation of the mill.

A sizing screen comprising an annular series of laterally spaced bars 13 which present a substantially cylindrical screening surface to the interior of the chamber 3, is located within the shell 2 directly adjacent to the division head 6. Each of the screen bars 13 is provided with integral laterally extending spacing lugs, and the opposite ends of the bars are retained against inward displacement by means of an annular retainer 21 and a retaining wall 22, the latter of which constitutes a part of the division head 6. The bars 13 are spaced from the interior of the shell 2 by means of a conveyor element having helical ribs 14 formed to urge the material which passes through the screen, toward the division head 6 during rotation of the mill. The grid bars 13 are

urged laterally into firm engagement with each other by means of one or more wedge bars 17 coacting with tapered side bars 19, 20, and formed to project inwardly some distance beyond the screening surface of the grid. Clamping bolts 18 coacting with the bars 17 and penetrating the shell 2, serve to effect adjustment of the wedge bars 17.

The space adjoining the conveyor ribs 14 communicates with a space in the division head 6 having elevating vanes 15 therein. These elevating vanes are adapted to convey the material which has passed through the screen, from the periphery of the rotating mill into the inlet end of the fine grinding chamber 4 through a central feed opening 16. The discharge end of the chamber 4 is provided with a final delivery screen 7, and with a series of elevating vanes 8 formed to deliver the fine material passing through the screen 7 into the discharge trunnion 9 during rotation of the mill.

During normal operation of the mill the shell 2 and the associated elements are being constantly rotated by application of power to the driving gear 10, and untreated material is being delivered into the inlet end of the chamber 3 through the feed trunnion 5 in a well known manner. The material thus introduced is initially reduced during its passage through the coarse grinding chamber 3, by the action of the comminuting bodies 11, and eventually reaches the annular grid adjoining the division head 6. The wedge bars 17 which confine the screen bars 13 against lateral displacement, also serve as lifters by virtue of their inward extension beyond the screening surface, and elevate the charge of material and bodies 11 within the screen during rotation of the mill. The elevated charge is subsequently released and is showered over the screening surface, thereby permitting the fine particles to pass through the screening openings into the space surrounding the conveyor ribs 14. The cascading comminuting bodies 11 upon striking the screen bars 13 also enhance the screening action by vibrating the bars and thus freeing the screening openings of material. The conveyor ribs 14 urge the material which passes through the screen, toward the elevating vanes 15 which deliver the said material into the inlet end of the fine grinding chamber through the opening 16. The initially reduced material thus admitted to the fine grinding chamber 4, is further reduced during its passage through this chamber by the action of the bodies 12 and is eventually delivered from the mill past the screen 7 and through the discharge trunnion 9. In this manner the material is automatically reduced to a fine powder by successive treatment in the chambers 3, 4.

Due to the pounding action of the charge to which the grid bars 13 are repeatedly sub-

jected, these bars tend to work loose. The wedge bars 17 coacting with tapered side bars 19, 20, which in turn coact with the adjacent grid bars 13, serve to take up any such looseness which may develop. These wedge bars are readily manipulable from the exterior of the mill by means of the bolts 18, and besides serving their locking function, also serve as distributors for spreading the material over the screening surface. The bars 13 may be readily removed for renewal by releasing the bolts 18 and the retainer 21, and by subsequently removing the bars 17 and withdrawing the bars 13, 19 and 20 from beneath the wall 20.

It should be understood that it is not desired to limit the invention to the exact details of construction herein shown and described for various modifications within the scope of the claims may occur to persons skilled in the art.

It is claimed and desired to secure by Letters Patent:

1. In combination, an annular rotary screen adapted for internal loading and comprising a series of spaced bars, means providing seatings cooperable locally with the external portions of said bars, and a wedge bar exposed to the interior load on said screen and cooperable with said screen bars to urge the same laterally in contact with each other and against said seatings, said wedge bar extending inwardly beyond the loaded surface of said screen to provide a lifter for the load.

2. In combination, an annular rotary screen adapted for internal loading and comprising a series of laterally spaced parallel bars, means providing seatings cooperable with external end portions of said bars, and a wedge bar exposed to the interior load on said screen and cooperable with two adjacent screen bars to urge all of said screen bars laterally in contact with each other and against said seatings, said wedge bar extending parallel to said screen bars and projecting inwardly beyond the loaded surface of said screen to provide a lifter for the load.

3. In combination, a rotary shell, an annular screen supported by said shell and adapted for internal loading, said screen comprising a series of laterally spaced parallel bars extending longitudinally of the axis of rotation of said shell, means providing seatings cooperable locally with external end and intermediate portions of said bars, and a wedge bar disposed parallel to said screen bars and exposed to the interior load on said screen, said wedge bar being cooperable with said screen bars to urge the same laterally in contact with each other and against said seatings.

4. In combination, a rotary shell, an annular screen secured within said shell and adapted for internal loading, said screen compris-

ing a series of laterally spaced parallel bars extending longitudinally of the axis of rotation of said shell, means providing seatings for external end portions of said bars, and a wedge bar exposed to the interior load on said screen and cooperable with said screen bars to urge the same laterally in contact with each other and against said seatings, said wedge bar extending inwardly beyond the loaded surface of said screen to provide a lifter for the load.

In testimony whereof, the signature of the inventor is affixed hereto.

WM. FOWDEN.

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