April 29, 1947. W. P. GRUENDLER 2,419,773

MOUNTING FOR REMOVABLE SCREENS OF HAMMER MILLS, GRINDERS, AND THE LIKE

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Fig. 2.

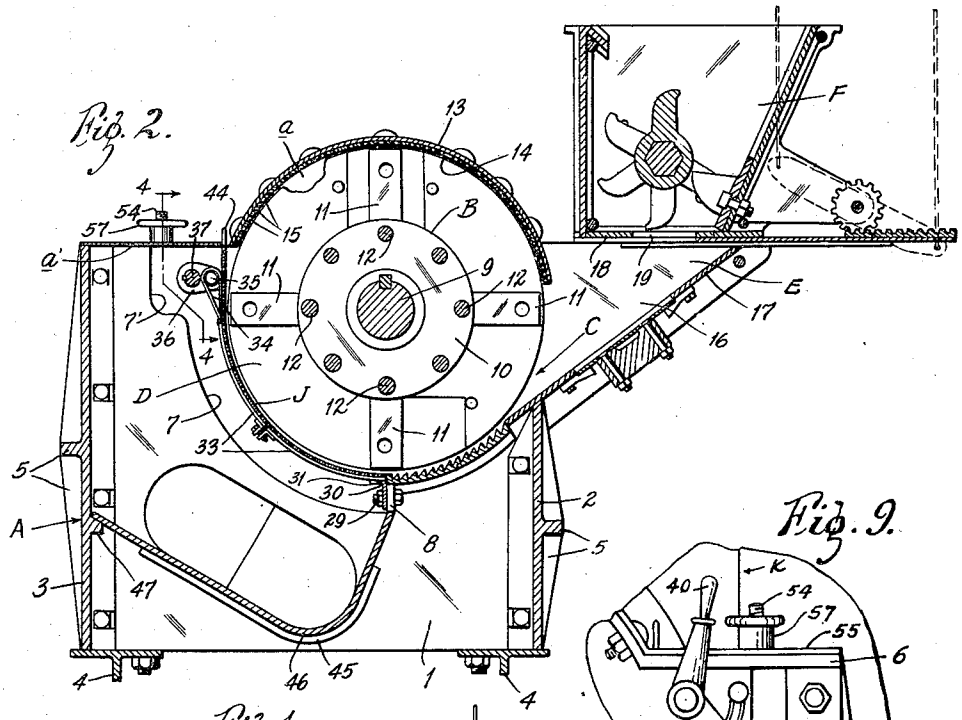


Fig. 9.

Fig. 1.

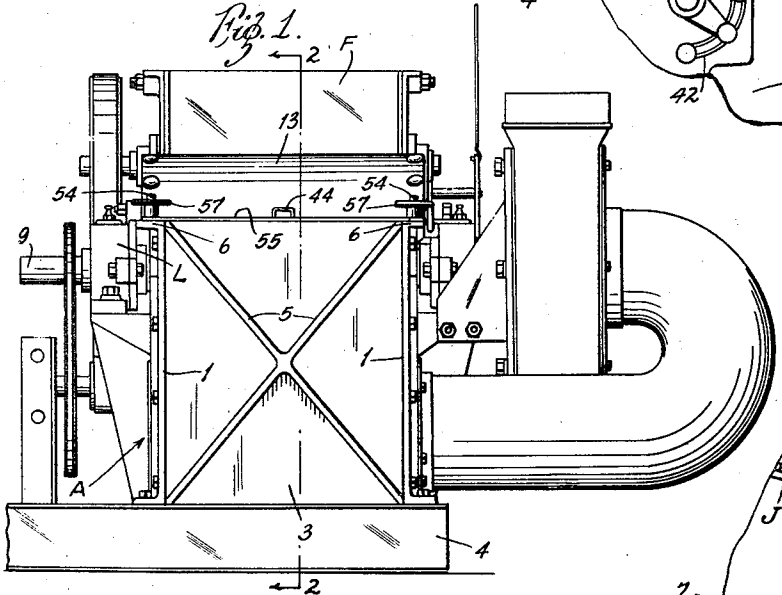


Fig. 3.

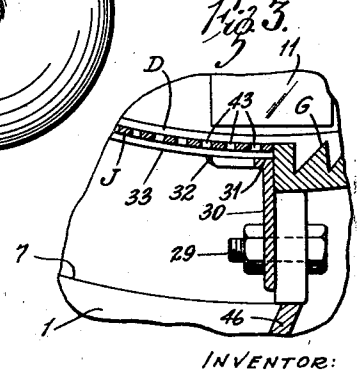
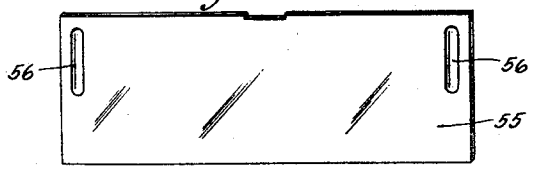


Fig. 6.



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Fig. 4.

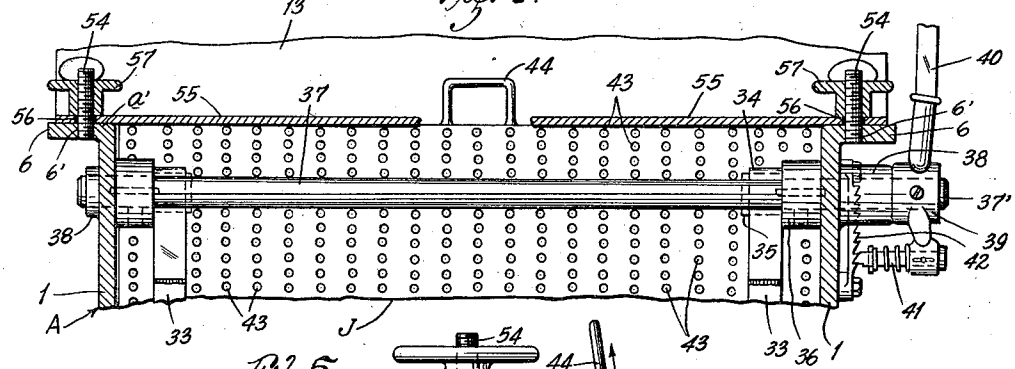


Fig. 5.

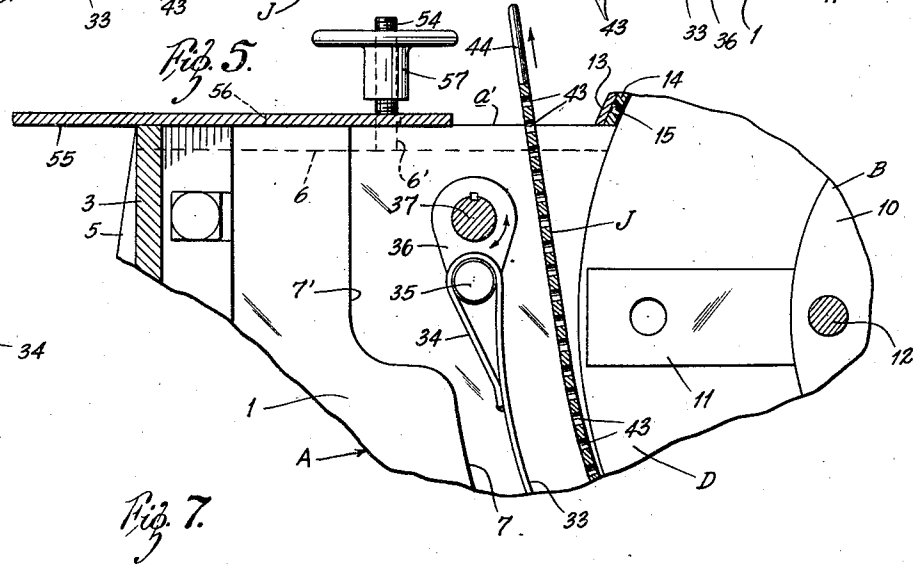


Fig. 7.

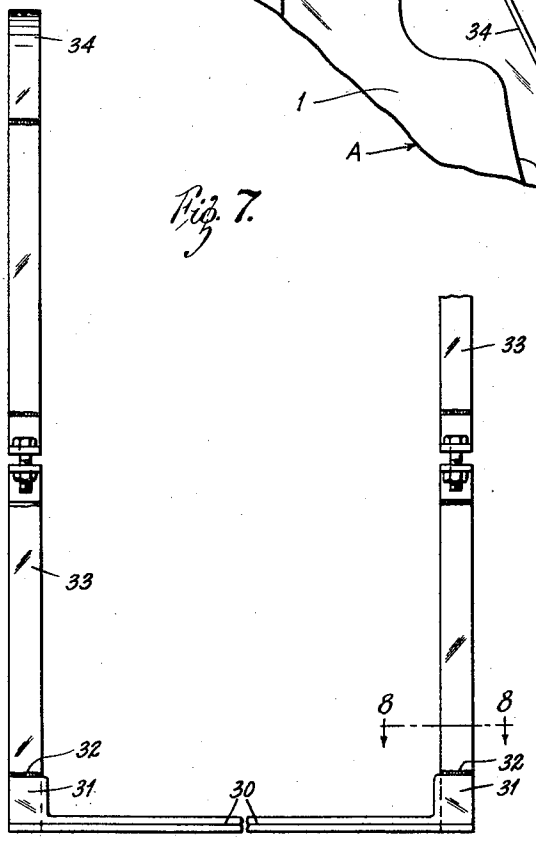
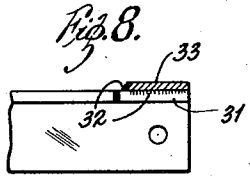


Fig. 8.



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Patented Apr. 29, 1947 2,419,773

UNITED STATES PATENT OFFICE

2,419,773

MOUNTING FOR REMOVABLE SCREENS OF HAMMER MILLS, GRINDERS, AND THE LIKE

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Application October 11, 1943, Serial No. 505,773

3 Claims. (Cl. 241—89)

1

This invention relates generally to crushers, breakers, grinders, and other reducing machines and, more particularly, to a certain new and useful improvement in a mounting for a removable screen of a hammer mill, grinder or the like.

My invention has for its chief objects the provision of a grinding machine for the purposes stated which is uniquely capable of accommodating the disposition for hammer co-operation of interchangeable screens or breaker-plates of different mesh for reducing the feed to a selected degree of fineness.

My invention has for a further object the provision of a mounting for a removable screen of a hammer mill, grinder, or the like which may be readily constructed, which is sturdy and durable, which is economic in operation and maintenance, and which is efficient in the performance of its intended functions.

My invention has for another object the provision of a mounting for a removable screen of the type stated which makes possible the speedy and quick removal of a screen and yet will hold the screen securely and firmly in operative position and prevent undue leakage of chaff and dust into the atmosphere external to the grinder or mill housing.

And with the above and other objects in view, my invention resides in the novel features of form, construction, arrangement, and combination of parts presently described and pointed out in the claims.

In the accompanying drawings (three sheets)—

Figure 1 is a rear end elevational view of the grinder;

Figure 2 is a vertical sectional view of the machine taken approximately along the line 2—2, Figure 1;

Figure 3 is an enlarged fragmental sectional view of the meeting ends of the breaker plate and a cooperable screen and the attached lower end of the screen clamping-frame;

Figure 4 is an enlarged detail sectional view taken approximately on the line 4—4, Figure 2;

Figure 5 is an enlarged fragmental sectional view, illustrating a screen in released position for removal;

Figure 6 is an enlarged plan view of the shiftable cover-plate of the machine;

Figure 7 is an enlarged broken elevational view of the oscillatory screen-clamping frame;

Figure 8 is a detail sectional view taken approximately on the line 8—8, Figure 7; and

Figure 9 is an enlarged detail view showing in

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side elevation the ratchet and quadrant mechanism.

Referring now more in detail and by reference characters to the accompanying drawings, which illustrate a preferred embodiment of my invention, the grinder includes an approximately rectangular frame or housing A comprising suitable side walls 1, 1, a front wall 2, and a rear wall 3, all having preferably the form or contour shown, all suitably flanged and bolted or otherwise fixed rigidly together and to supporting base-forming I-bears 4, 4, and all preferably equipped with reenforcing webs or the like 5.

Along their upper margin, the side walls 1, 1, are partly of arcuate formation as at a, and partly straight, as at a'. Along their straight portion a', the side walls 1, 1, are provided or formed with opposed outwardly presented flanges 6, each formed, for purposes presently appearing, with a threaded opening or seat, as at 6', and, as best seen in Figure 2 and for purposes also presently appearing, the opposite side walls 1, 1, are suitably provided or formed at a proper location within their area with oppositely disposed elongated arcuate recesses or pockets 7, which, throughout their length, open to the respective inner faces of said walls 1, 1, and adjacent their upper end are preferably enlarged, as at 7'. Fixed to and upon, and projecting inwardly from the respective inner faces of, said walls 1, 1, at the base of the recesses 7, are rigid blocks 8.

The frame front wall 2 is reduced in height relatively to the frame side and rear walls 1, 3, as best seen in Figure 2, and extending between, and having a bearing for rotation in the frame side walls 1 in suitably spaced adjacence to the frame front wall 2, as also best seen in Figure 2, is the supporting shaft 9 of the rotor B, which includes a suitable plurality of disks 10 fixed in suitably spaced relation on shaft 9 and hammer-bars 11 pivotally attached at their respective inner ends, as at 12, to and between and adjacent the respective peripheries of the disks 10, as will be well understood, the present grinder, so far as its rotor B is concerned, being of well-known hammer type.

Suitably and preferably detachably secured to and upon the upper margin of the arcuate portion a of the frame side walls 1 and concentrically disposed over the rotor B, as further best seen in Figure 2, is an arcuate cover-plate or frame top wall 13, fixed to and upon the inner face of which is a plate 14 of corresponding curvature formed with a multiplicity of preferably circular apertures or openings, as at 15, the inwardly pre-

sented margins of which provide or form cutting edges for co-operation with the hammers 11 in feed reduction in the operation of the machine, as presently more fully appears, the wall 13 and its attached cutter or reducing plate 14 being spaced at their front margin from the top margin of the front wall 2 and thereby providing a mouth, as at C, into the cage D of the rotor B partly formed by the cover-plate 13.

Suitably bolted or otherwise fixed at their inner margin to the frame side walls 1 and cover-plate 13 and presented forwardly from, and forming substantially extensions or continuations of, the walls 1, are side plates 16, 16, of angular outline or contour in side elevation, and bolted or otherwise suitably joined to, and extending between, the side plates 13 at and along their lower beveled margin, is a bottom-plate 17, the plates 16, 17, thus forming what might well be called a chute or neck, as at E, leading to the cage-mouth C.

Suitably mounted and supported upon the upper margin of the chute-forming walls 16, 17, is a hopper F having a bottom wall 18 equipped with an opening 19 for discharging the contents of hopper F into the chute or neck E.

Extending crosswise of the frame A and having its one or downwardly presented leg or flange flatwise abutting and bolted or otherwise attached, as at 29, to the opposed blocks 8 and forming substantially a part of a screen clamping-frame H, is an angle-bar 30 having its other leg presented rearwardly and so disposed relatively to the bar G as to provide a seat or support, as at 31, for the lower end of a removable and interchangeable screen J of suitable curvature for completing the cage D of the rotor B approximately concentrically about the rotor shaft 9.

Welded or otherwise permanently fixed at their lower end, as at 32, to the angle 30 and forming part of the rockable frame H, is a pair of spring steel straps or bands 33 approximately ⅛"–3/16" thick by 1"–1½" wide, depending upon the size of the particular machine, which are movably or shiftably disposed within the respective pockets or recesses 7, as best seen in Figures 2, 4, and 5. Preferably, as indicated best in Figure 7, the flat straps or bands 33 are for length adjustment of two-part structure and at their respective upper end are looped, as at 34, about pins or studs 35 fixed to, and projecting inwardly of the frame A from, cam-members 36 accommodated by the pocket-enlargements 7' and fixed, in turn, to and upon a shift 37 journaled in opposed bearings 38 on, and extending crosswise of the machine between, the frame side walls 1, 1.

At one end, the shaft 37 is extended, as at 37', and fixed thereon is the hub 39 of a bell-crank lever 40 having one arm equipped with a spring-pressed pin or dog 41 for yielding releasable engagement with an arcuate ratchet or quadrant 42 fixed in co-operable location on the adjacent frame side wall 1.

Each particular screen J, it may be here said, is provided preferably throughout its area with apertures or perforations 43 of selected mesh and is of such relative dimensions as to project at its upper margin, when supported at its lower margin on the seat 31, slightly above the plane of the marginal portions *a'* of the frame side walls 1, as indicated in Figure 2, for convenient manual gripping or grasping engagement at a handle 44 provided for the purpose upon its upper margin, as best seen in Figure 4.

It will be evident that, as the lever 40 is swung in one direction, the shaft 37 will be correspondingly rotarily actuated, whereupon the straps 33 and cams 36 will be shifted or rocked into supporting and engaging relation to and with the particular installed or seated screens J and the latter thereby rigidly held in cage-completing relation about the rotor B, and that, when the lever 40 is reversely swung, the cams 36 and straps 33 will be rocked or shifted out of engagement with the installed screen J, whereupon the screen J may, by means of its handle 44, be very easily and conveniently removed for the like installation of a second screen J of likewise selected mesh for delivering from the machine feed or other material ground or reduced to the desired degree of fineness.

Fixed to and upon the inner face of the respective frame side walls 1, are suitable supports 45 for a bottom pan 46, which in transverse section has preferably the form or contour, as best seen in Figure 2, to abut at its forward margin the blocks 8 and to rest at its rear margin on a web 47 provided for the purpose on the frame rear wall 3.

In use and operation, as has been indicated, the feed or other material to be reduced or ground, subsequent to preliminary or initial reduction in the hopper F, flows through the outlet 19, in amounts controlled by the operator by means of the adjustably shiftable door 23, into the chute E, through the mouth C and into the cage D, where the feed or other material is further reduced, as will be well understood, by and between co-operative grinding action of the hammers 11 and the bar G and apertured plate 14, the ground feed then passing or flowing through the installed screen J upon the pan 46.

The degree of fineness of the discharging feed is governed by the particular installed screen J. Each machine includes a plurality of such screens, and such screens interchangeably differ one from the other only in the size or mesh of its perforations or apertures 43. Actuation of the lever 40 releases the installed screen J for convenient manual removal, whereupon a substitute screen J may be readily installed and clamped, on reverse actuation of the lever 40, in installed position.

It may be added that the seats 6' of the side wall flanges 6 support upstanding threaded shanks 54, and slidably disposed on such flanges 6, is a supplemental cover-plate 55 having slots 56 for shiftably accommodating the shanks 54. Threaded on the shanks 54, are nuts or the like 57 for engaging the cover-section 55 for removably securing the same either in closure position over the frame A and in abutting relation at its forward margin with the installed screen J, as indicated in Figure 2, or in rearwardly shifted position, as indicated in Figure 5, for permitting convenient removal and installation of respective screens J.

The mounting of the present invention has been found to be exceedingly efficient in the performance of its functions and in accomplishing the objects stated, and it is to be understood that changes and modifications in the form, construction, arrangement, and combination of the several parts of the mounting may be made and substituted for those herein shown and described without departing from the nature and principle of my invention.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A grinding machine comprising, in combination, a housing including side walls having opposed arcuate recesses, a rotor-cage, a support within the housing, the cage including a remov-

able screen normally seated at its lower margin upon said support, and means for removably securing the screen in cage completing relation about the rotor, said means including a pair of yielding bands fixed at an end to said support and disposed for movement in said wall recesses, a shaft mounted for rotatory movement on the housing adjacent the upper margin of said side walls, cam-members fixed on said shaft for movement in said recesses, opposed studs projecting inwardly from said cam-members, said bands having a loop connection at their free end with said studs, and lever-ratchet mechanism mounted on the housing rotarily actuating the shaft and its attached cam-members for shifting the bands into engaging relation with the screen.

2. A grinding machine comprising, in combination, a housing including side walls having opposed arcuate recesses and a top wall having a transversely extending opening, a rotor-cage, a support within the housing, the cage including a removable screen normally seated at its lower margin upon said support and being provided at its upper margin with an upwardly projecting portion extending outwardly through the opening in the top wall, and means for removably securing the screen in cage completing relation about the rotor, said means including a pair of yielding bands fixed at an end to said support and disposed for movement in said wall recesses, a shaft mounted for rotatory movement on the housing adjacent the upper margin of said side walls, cam-members fixed on said shaft for movement in said recesses, opposed studs projecting inwardly from said cam-members, said bands having a loop connection at their free end with said studs, lever-ratchet mechanism mounted on the housing rotarily actuating the shaft and its attached cam-members for shifting the bands into engaging relation with the screen, and closure means operatively mounted on the housing for optional movement into and out of closure-forming position over the opening in said top wall and when closed being positioned for engagement with the upwardly projecting portion of the screen and forcing the latter into engagement with the housing.

3. A grinding machine comprising, in combination, a housing including side walls having opposed arcuate recesses and a top wall having a transversely extending opening, a rotor-cage, a support within the housing, the cage including a removable screen normally seated at its lower margin upon said support and being provided at its upper margin with an upwardly projecting portion extending outwardly through the opening in the top wall, and means for removably securing the screen in cage completing relation about the rotor, said means including a pair of yielding bands fixed at an end to said support and disposed for movement in said wall recesses,

a shaft mounted for rotatory movement on the housing adjacent the upper margin of said side walls, cam-members fixed on said shaft for movement in said recesses, opposed studs projecting inwardly from said cam-members, said bands having a loop connection at their free end with said studs, lever-ratchet mechanism mounted on the housing rotarily actuating the shaft and its attached cam-members for shifting the bands into engaging relation with the screen, a sliding closure plate operatively mounted on the housing for optional movement into and out of closure-forming position over the opening in said top wall and when closed being positioned for engagement with the upwardly projecting portion of the screen and forcing the latter into engagement with the housing, upstanding threaded members mounted adjacent to the closure plate, and nuts mounted on the threaded members for optional engagement with the closure plate whereby to hold said plate in closed position.

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