March 21, 1961 H. J. SHELTON, JR 2,975,985

GRINDERS

Filed Feb. 12, 1958

3 Sheets-Sheet 1

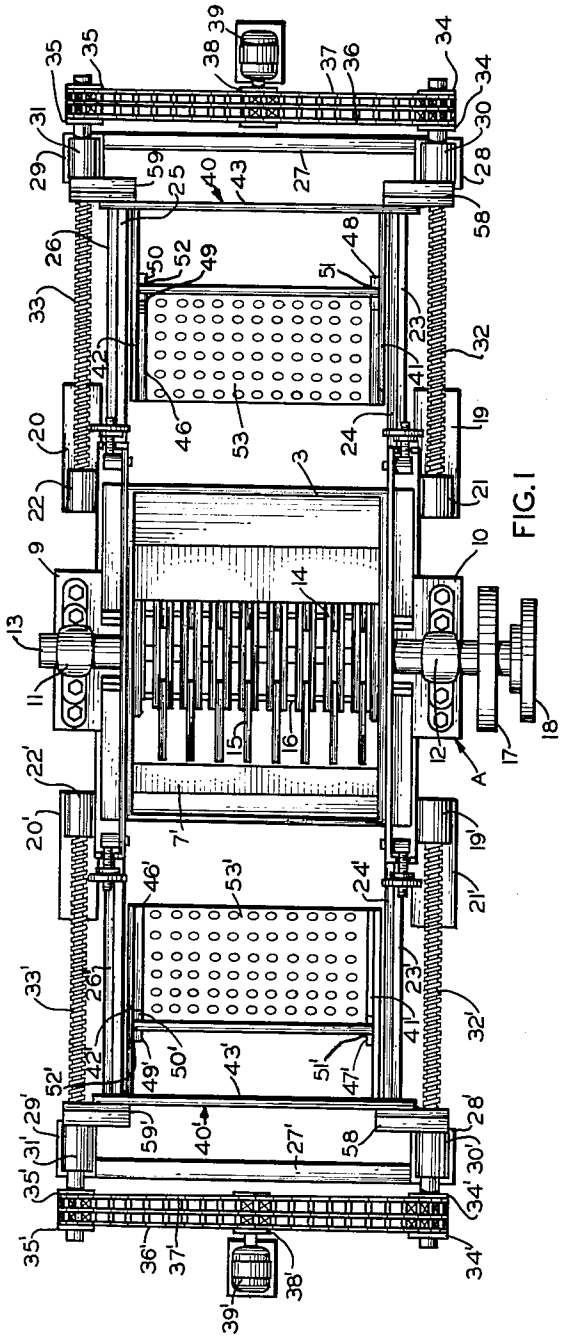


FIG. 1

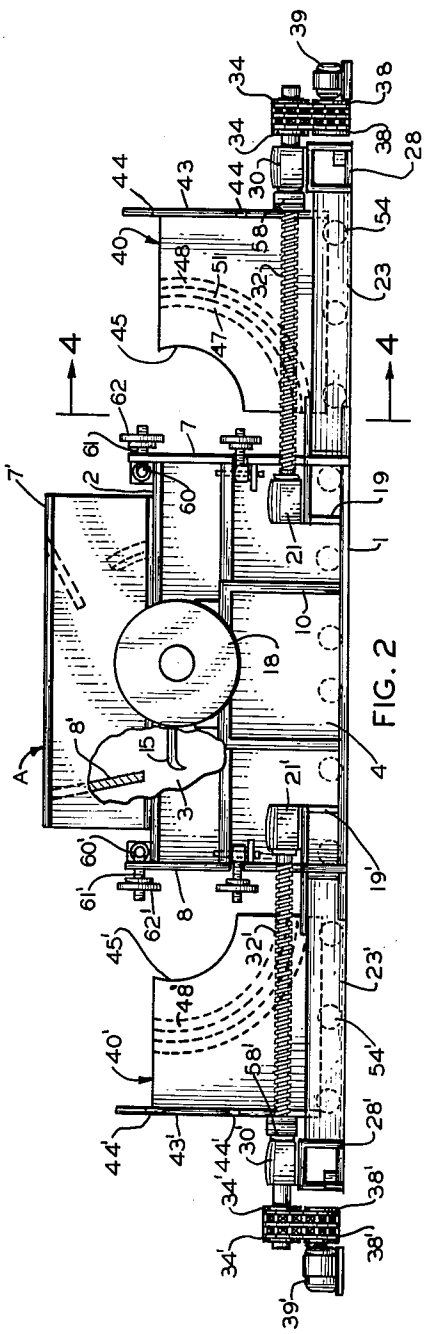


FIG. 2

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3 Sheets-Sheet 2

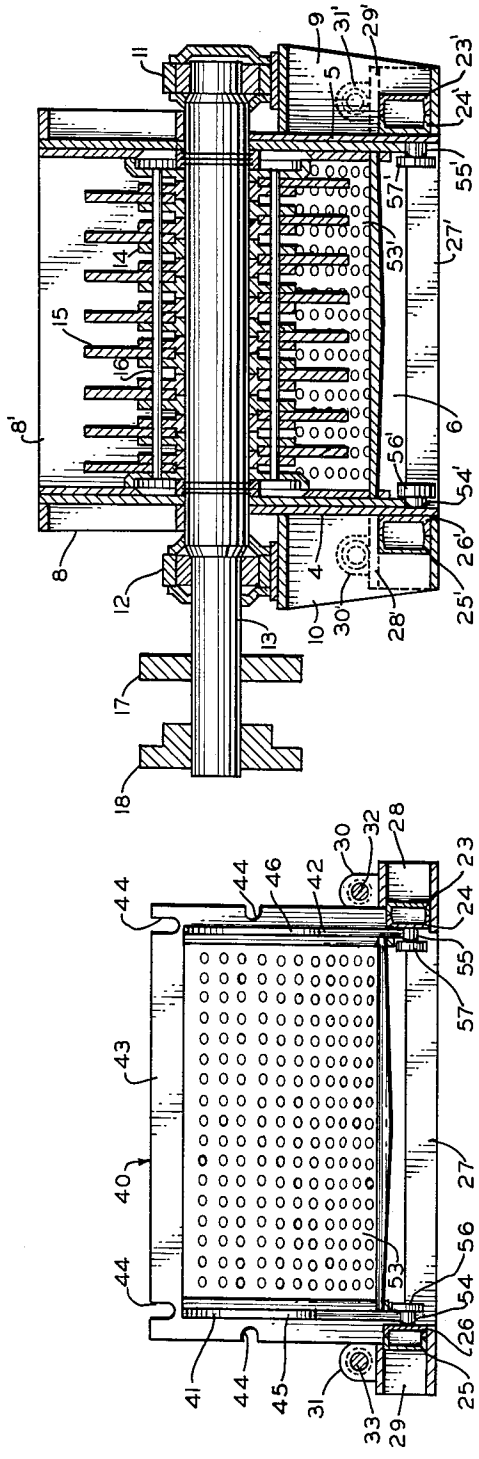


FIG. 5



FIG. 4

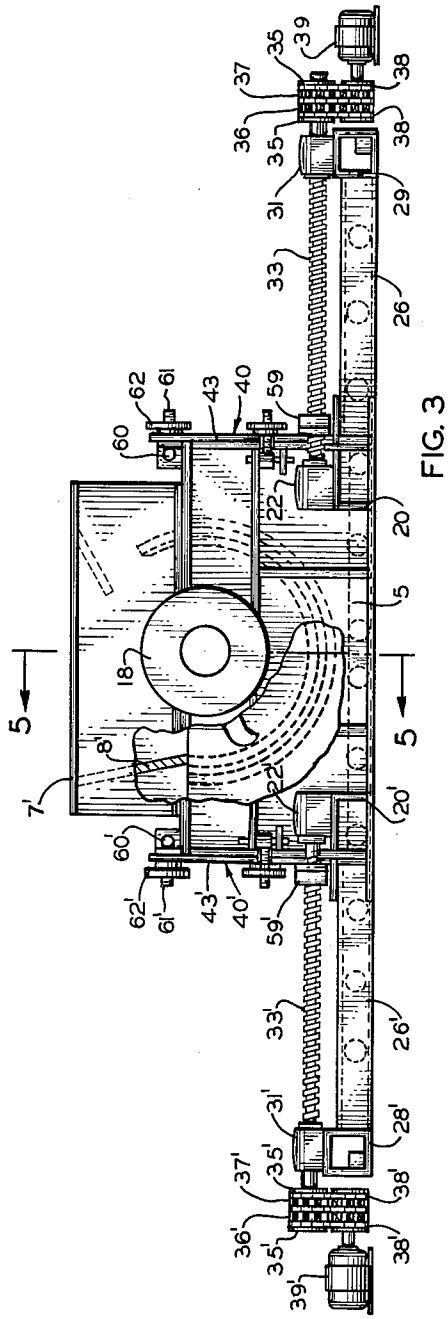


FIG. 3

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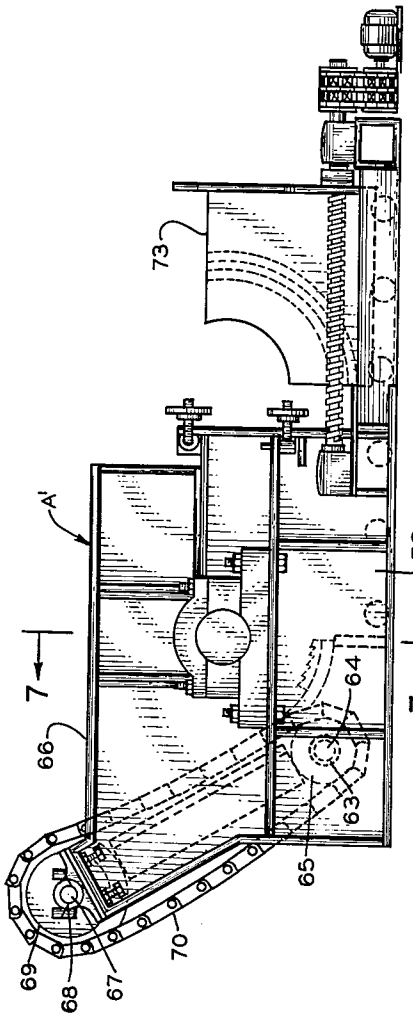



FIG. 6

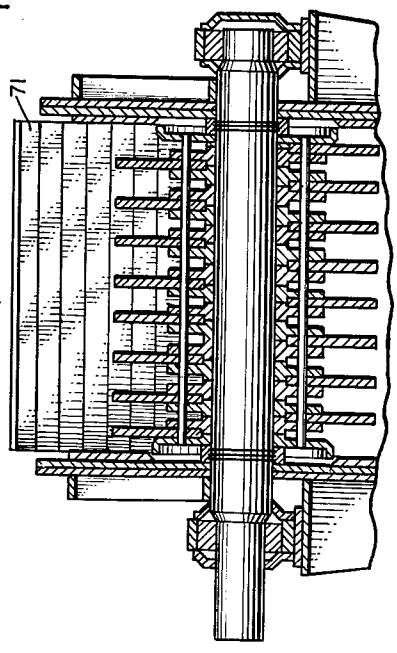



FIG. 7

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United States Patent Office

2,975,985

Patented Mar. 21, 1961



2,975,985

# GRINDERS

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Filed Feb. 12, 1958, Ser. No. 714,851

5 Claims. (Cl. 241—86)

This invention relates in general to grinding and crushing apparatus and, more particularly, to certain new and useful improvements in a mounting for a removable screen of a grinder, crusher or the like.

Ordinarily, a crusher or pulverizer comprises a series of rotating hammers which pass over a grinder plate, and the co-action of the hammers and the grinder plate pulverize the material which is thereafter discharged through a foraminous screen. For various types of crushing operations, it is often necessary to change the screen, depending upon the material being pulverized, the desired fineness thereof, and the use for which the material is intended. Replacing the screen often involves a complete shut-down of the crusher and partial disassembly thereof. This procedure is quite costly as it often takes several hours to manually disassemble the machine, remove the screen, install the new screen, and, finally, reassemble the machine.

It is, therefore, the primary object of the present invention to provide a grinder wherein the screen may be readily changed without complete shut-down of the machine.

It is also an object of the present invention to provide a grinder of the type stated wherein a power-actuated assembly is utilizing in changing the screen and, therefore, permits the screen to be changed in a minimum amount of time and with little effort.

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—

Figure 1 is a top plan view of a grinder constructed in accordance with and embodying the present invention;

Figure 2 is an end elevational view of the grinder, the housing being partly broken away so as to show the interior thereof;

Figure 3 is an end elevational view partly broken away and in section and showing the screens in operative position within the grinder housing;

Figure 4 is a sectional view taken along line 4—4 of Figure 2;

Figure 5 is a sectional view taken along line 5—5 of Figure 3;

Figure 6 is a side elevational view of a modified form of grinder having traveling breaker plates; and

Figure 7 is a sectional view taken along line 7—7 of Figure 6.

Referring now in more detail and by reference characters to the drawings, which illustrate practical embodiments of the present invention, A designates a grinder comprising a housing 1 having a top wall 2 provided with an opening 3, end walls 4, 5, and a downwardly presented discharge opening 6. Extending around the top wall 2 and end walls 4, 5, are marginal flanges 7, 8, and bolted to the top wall 2 around the opening 3 is a feed hopper 7' having inclined breaker plates 8' mounted therein, and welded to the end walls 4, 5, and extending outwardly



therefrom are bearing support frames 9, 10, having spaced aligned bearings 11, 12, bolted thereto. Journaled in the bearings 11, 12, is a shaft 13 upon which is mounted a plurality of adjacent disks 14, and positioned between the disks 14 and extending radially outwardly thereof are hammers 15, the hammers 15 and disks 14 being drilled for receiving rods 16 by which the hammers are rigidly held in position. The shaft 13 extends outwardly of the bearing 12 for receiving a flywheel 17 and pulley 18, the latter being drivingly connected to a suitable motor or similar source of power (not shown).

Welded or otherwise rigidly secured to the end walls 4, 5, adjacent the marginal flange 7 are journal stands 19, 20, for supporting bearings 21, 22, and secured to the marginal flange 7 and projecting outwardly therefrom are two pairs of channels 23, 24, 25, 26, the outer ends of which are joined by a connecting channel 27. Mounted on the channels 23, 24, 25, 26, are journal stands 28, 29, which support bearings 30, 31, the latter being aligned with the bearings 21, 22, and journaled in the bearings 21, 22, 30, 31, are spaced parallel feed screws 32, 33. Pinned or otherwise rigidly secured to the outer ends of the feed screws 32, 33, are sprockets 34, 35, having drive chains 36, 37, trained therearound, the latter, in turn, being trained around sprockets 38 mounted on the drive shaft of a conventional electric motor 39 of the type capable of rotation in both directions.

Positioned between the feed screws 32, 33, is a screen supporting carriage 40 comprising spaced parallel side plates 41, 42, cross-connected at their rear ends by an end plate 43 having a plurality of notches 44 at the outer edges thereof for purposes presently more fully appearing. At their forward ends, the side plates 41, 42, are provided with circularly shaped margins 45, 46, and spaced inwardly from the margins 45, 46, the side plates 41, 42, are each integrally provided on their inner faces with concentric arcuate ribs 47, 48, 49, 50, which define aligned arcuate keyways 51, 52, the latter snugly receiving a flexible foraminous screen 53.

Pinned or otherwise rotatably mounted on the inside of the end walls 4, 5, and channels 24, 26, are aligned track-forming rollers 54, 55, each provided with enlarged annular flanges 56, 57, which are spaced from the end walls 4, 5, and channels 24, 26, by a distance approximately the same as the thickness of the side plates 41, 42. At their lower ends, the side plates 41, 42, are slidably mounted on the rollers 54, 55. Welded to and extending laterally outwardly of the end plate 43 are opposed tapped bosses 58, 59, for threaded engagement with the feed screws 32, 33. Rockably secured to the end walls 4, 5, adjacent the marginal flange 7 by means of pins 60 is a plurality of bolts 61 having capstans 62 threaded thereon, the bolts 61 being sized for removable disposition within the notches 44.

Similarly secured to the end walls 4, 5, adjacent the marginal flange 8 are journal stands 19', 20', which rigidly support bearings 21', 22'. Mounted on the marginal flange 8 and projecting outwardly therefrom are two pairs of channels 23', 24', 25', 26', which are similar to and aligned, respectively, with the channels 23, 24, 25, 26 and are joined at their outer ends by a cross connected channel 27'. On the outer ends of the channels 23', 24', 25', 26' are journal stands 28', 29' for supporting bearings 30', 31' which are aligned with the bearings 21', 22' and rotatably mounted on the bearings 21', 22', 30', 31' are spaced parallel feed screws 32', 33', the outer ends of which are provided with sprockets 34', 35', having drive chains 36', 37' operatively trained therearound. The drive chains 36', 37' are also trained around sprockets 38' mounted on the drive shaft of an electric motor 39' capable of being rotated in both directions.

Operatively positioned between the feed screws 32', 33'

is a screen supporting carriage 40', similar to the screen carriage 40 previously described, and comprising parallel side plates 41', 42', and an end plate 43' joining the plates 41', 42' and provided with a plurality of notches 44'. The screen supporting carriage 40' is similarly provided with circularly shaped margins 45', 46' and arcuate ribs 47', 48', 49', 50' which define keyways 51', 52' for receiving a foraminous screen 53'. Rotatably mounted on the end walls 4, 5 and channels 24', 26' are aligned track-forming rollers 54', 55' each provided with annular flanges 56', 57', and the side plates 41', 42' are slidably mounted on the rollers 54', 55' in the same manner as the side plates 41, 42 are mounted on the rollers 54', 55'. Extending laterally outwardly of the end plates 42', 43' are tapped bosses 58', 59' for engagement with the feed screws 32', 33', and, secured to the end walls 4, 5 adjacent marginal flange 8 by means of pins 60' is a plurality of bolts 61' provided with capstans 62'.

In use, the carriages 40, 40', are initially in the position shown in Figures 1 and 2, at which time the foraminous screens 53, 53', may be fitted within the keyways 51, 52, 51', 52'. The motors 39, 39', are then turned on so as to rotate the feed screws 32, 33, 32', 33' and shift the carriages 40, 40' along the rollers 54, 55 toward the housing 1 until the end plates 43, 43' abut the marginal flanges 7, 8 and, in effect, form side walls for the housing 1. The side plates 41, 42 will then be in their operative positions within the housing 1 as shown in Figures 5 and 6, and will be in edgewise abutting relationship. Similarly the ends of the screens 53, 53' will endwise abut each other and form a semicircular screen assembly above the discharge opening 6. The bolts 61, 61' may be rocked into the notches 44, 44', and the capstans 62, 62' tightened against the side plates 41, 42, 41', 42' so as to hold them snugly against the marginal flanges 7, 8. When it is desired to change the screens 53, 53', the capstans 62, 62' are loosened and the bolts 61, 61' swung out of the notches 44, 44', whereupon, the motors 39, 39' can be reversely rotated, thereby withdrawing the carriages 40, 40', together with the screens 53, 53', from within the housing 1 to the position shown in Figures 1 and 2. The screens 53, 53' can then be easily slipped out of the keyways 51, 52 and another set of screens inserted therein.

It is also possible to provide a modified form of grinder A', as shown in Figures 6 and 7, which is similar to the grinder A previously described, except that the housing 1 is provided internally thereof at its lower end with bearings 63, which rotatably support a shaft 64 and having a drive sprocket 65 mounted thereon. Adjacent the mouth of the hopper 66 and at one end thereof the grinder A' is provided with bearings 67 which rotatably support a shaft 68 provided with sprocket 69. Trained around the sprockets 65, 69 are chains 70, the links of which support breaker plates 71. The shaft 68 is driven by a suitable motor (not shown) so as to cause the breaker plates to travel with the chains 70. The housing 1' is provided with a discharge opening 72 at the lower right-hand portion thereof, reference being made to Figure 6, and a screen supporting carriage 73, similar to the carriage 40, is removably positioned within the housing 1' in the same manner as in the grinder A, previously described.

It should be understood that changes and modifications in the form, construction, arrangement, and combination of the several parts of the power-driven extension ladder 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 grinder comprising a fixed housing open on two opposite sides thereof, grinding means rotatably mounted in said housing, a pair of screen supporting carriages, one each on opposite sides of the housing and adapted for closurewise disposition across the open sides when the carriages are within the housing, each carriage having a foraminous screen removably mounted therein, mounting means extending outwardly from said two opposite sides of the housing, roller means on said mounting means for shiftably supporting the carriages, and driving means operatively connected to the carriages for shifting said carriages and screens along the roller means into and out of said housing.

2. A grinder comprising a fixed housing open on two opposite sides thereof, grinding means rotatably mounted in said housing, a pair of screen supporting carriages, one each on opposite sides of the housing and adapted for closurewise disposition across the open sides when the carriages are within the housing, each carriage having a foraminous screen removably mounted therein, mounting means interposed between each carriage and the housing for shiftably supporting the carriages, and driving means operatively connected to the carriages for shifting said carriages and screens along their respective mounting means into and out of said housing, said screens being adapted to contact edgewise when in operative position within the housing so that one screen forms substantially a continuation of the other, said driving means being adapted for causing the independent shifting of the carriages in diverging and converging directions.

3. A grinder comprising a fixed housing open on one side thereof, grinding means rotatably mounted in said housing, a screen supporting carriage comprising a pair of spaced parallel side plates joined together by an end plate, aligned arcuate slots formed in said side plates, a foraminous screen removably mounted in the arcuate slots, track-forming rollers interposed between the carriage and housing and adapted to support said side plates, feed screw means rotatably mounted in said housing and threadedly connected to said carriage, and power operated means for rotating said feed screw means and thereby shift the carriage and screen along the rollers into and out of said housing, said end plate extending closurewise across said open side when the carriage is within the housing.

4. A grinder comprising a fixed housing open on one side thereof, grinding means rotatably mounted in said housing, a screen supporting carriage comprising a pair of spaced parallel side plates joined together by an end plate, aligned arcuate slots formed in said side plates, a foraminous screen removably mounted in the arcuate slots, track-forming rollers interposed between the carriage and housing and adapted to support said side plates, feed screw means rotatably mounted on said housing and threadedly connected to said carriage, power operated means for rotating said feed screw means and thereby shift the carriage and screen along the rollers into and out of said housing, said end plate being adapted to extend across and close the open side of said housing when the carriage is operatively positioned within the housing, and means for securing said end plate to the housing when in contact therewith.

5. A grinder comprising a housing open on one side thereof, grinding means rotatably mounted in said housing, a pair of spaced parallel channel members extending outwardly from said open side, rollers rotatably mounted on said channel members and also within said housing, a screen-supporting carriage having a pair of spaced parallel plates joined together by an end plate, said parallel plates being shiftably supported on said rollers, aligned arcuate slots formed in said parallel plates, feed screw means rotatably mounted on said housing and threadedly connected to said carriage, power operated means for rotating said feed screw means and thereby shift the carriage and screen along the rollers into and out of said housing, said end plate being adapted to extend across and close the open side of said housing when the carriage is operatively positioned within the housing, and means for securing said end plate to the housing when in contact therewith.

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