

June 8, 1943.

L. G. SYMONS

2,321,166

BAR GRIZZLY

Filed June 2, 1939

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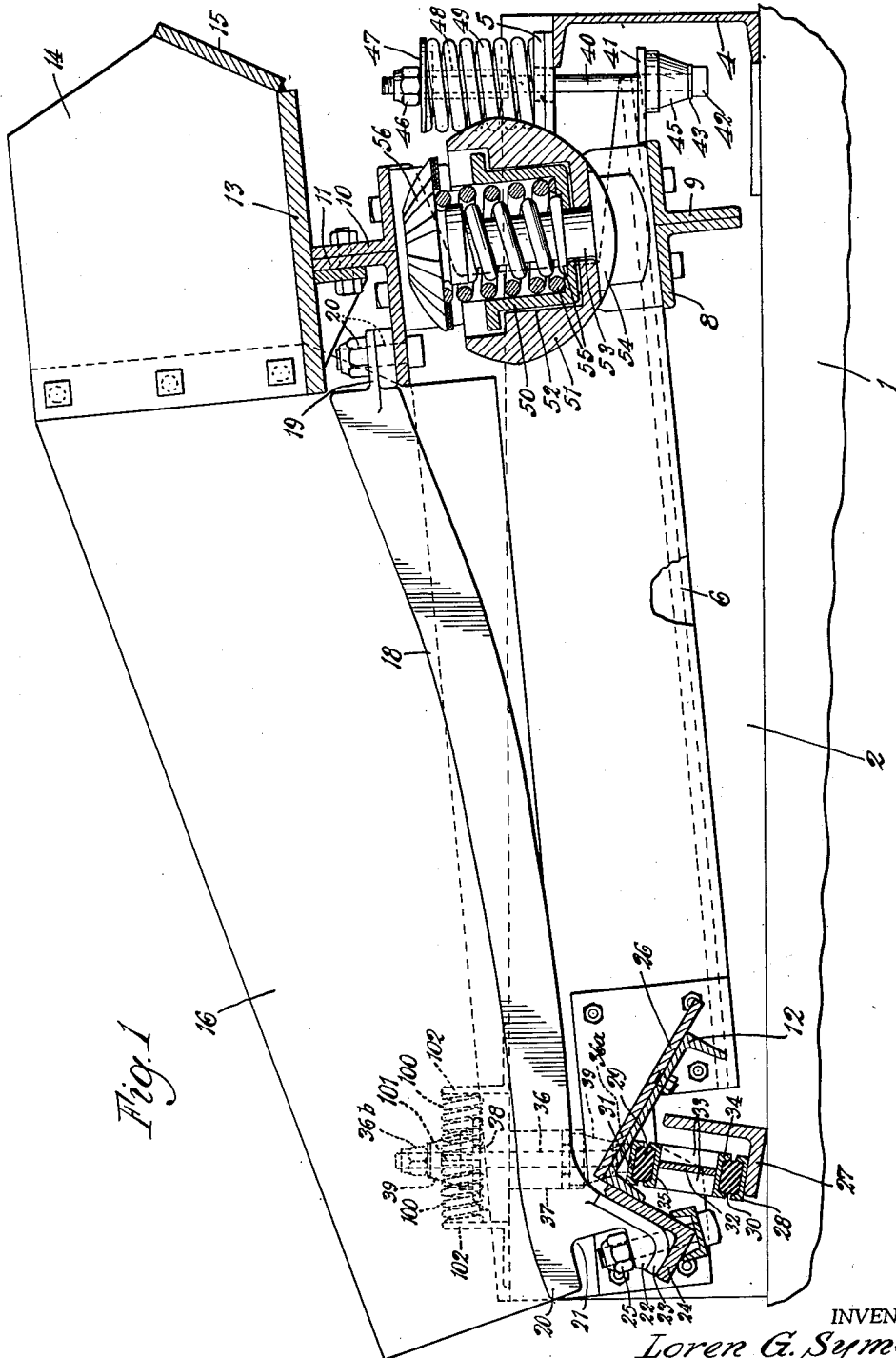


Fig. 1

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Fig. 2

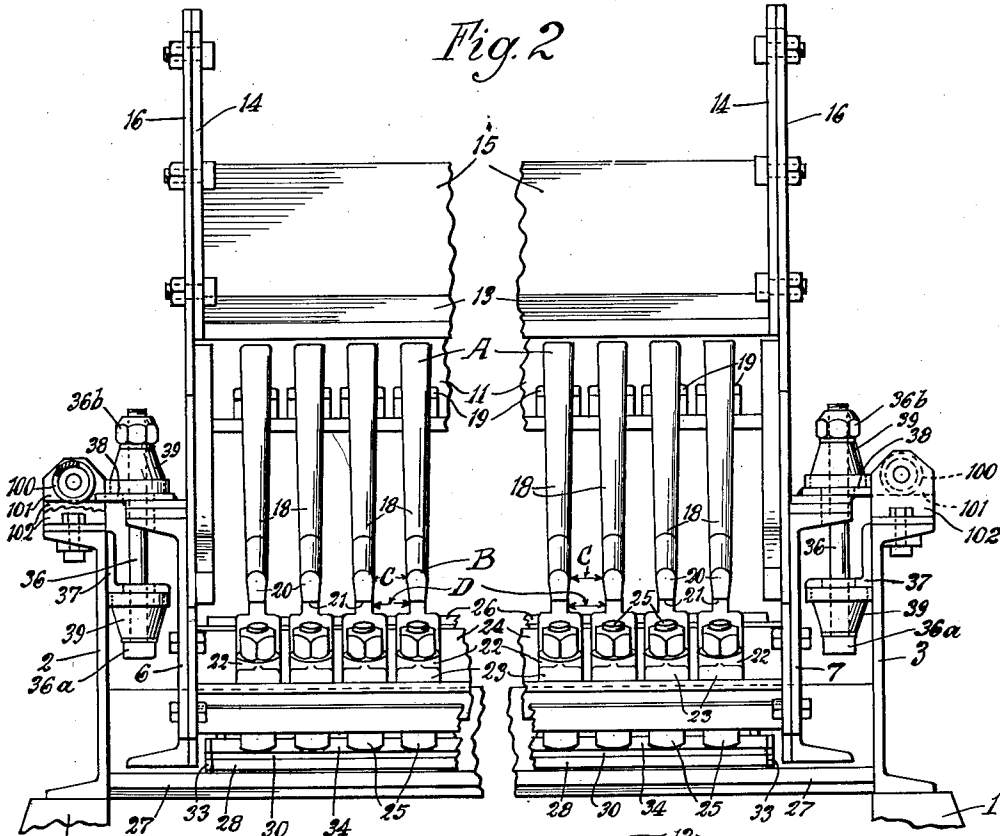


Fig. 5

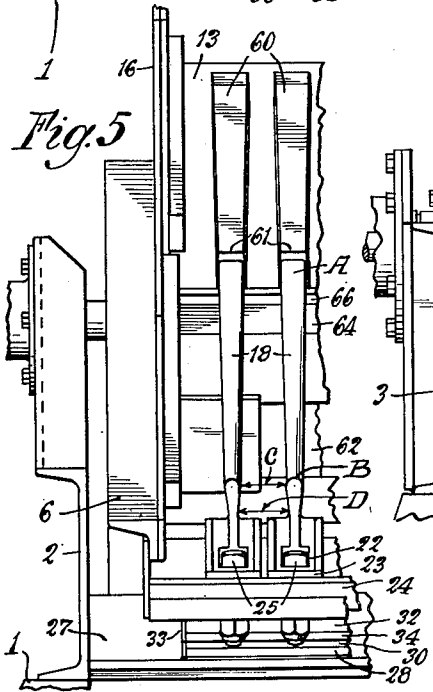
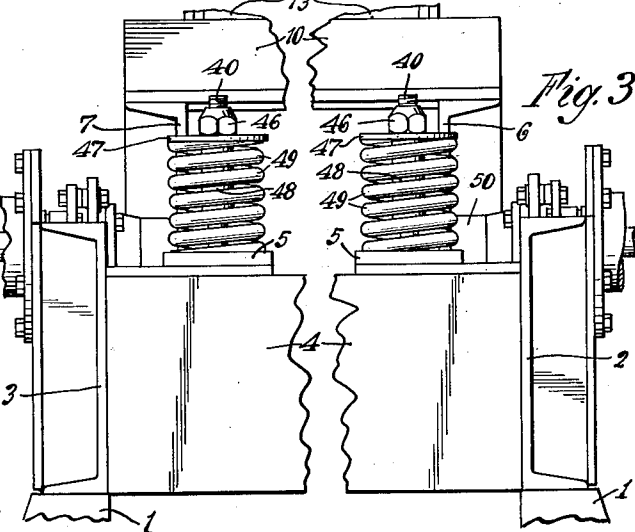


Fig. 3



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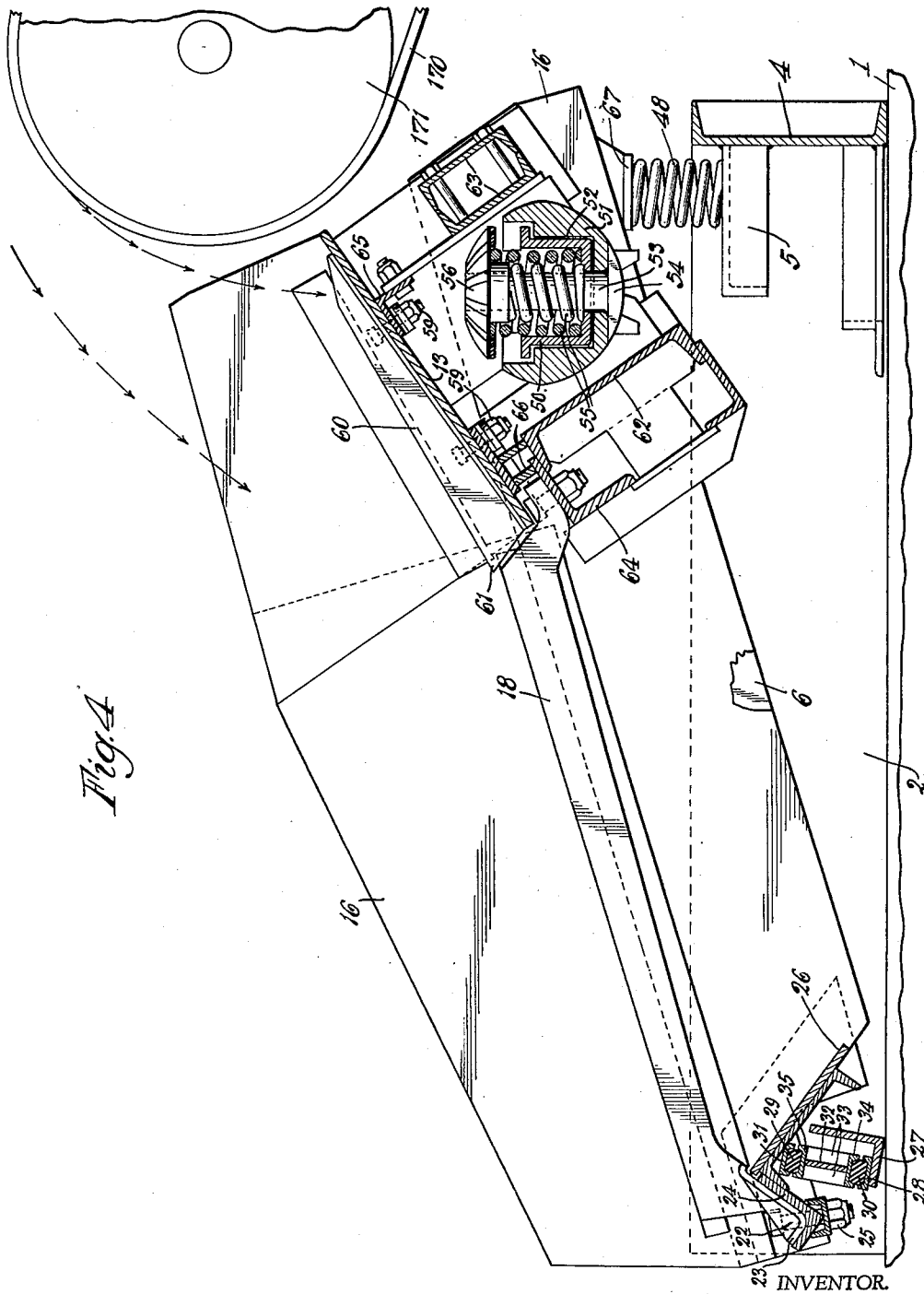
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5 Sheets-Sheet 3



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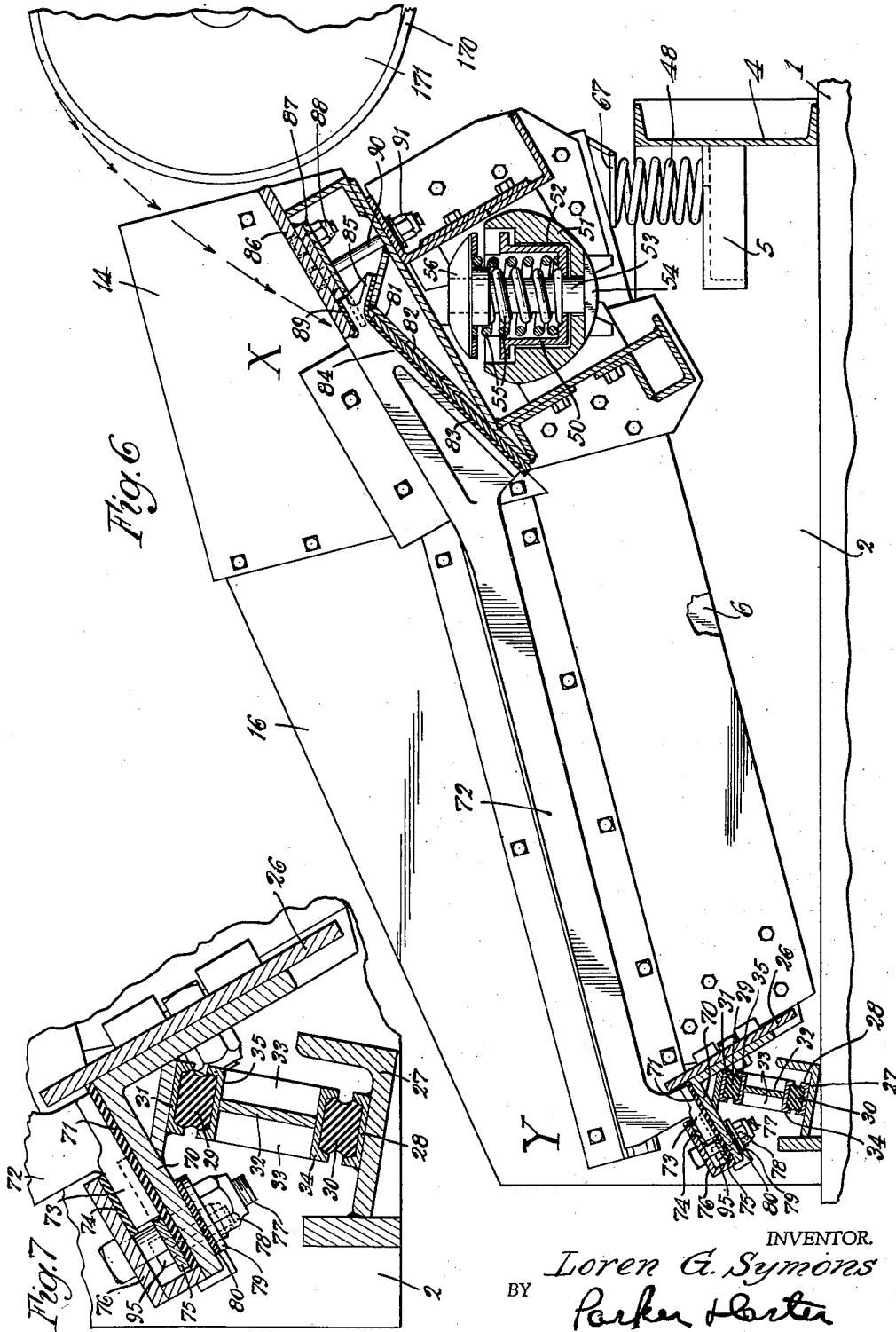
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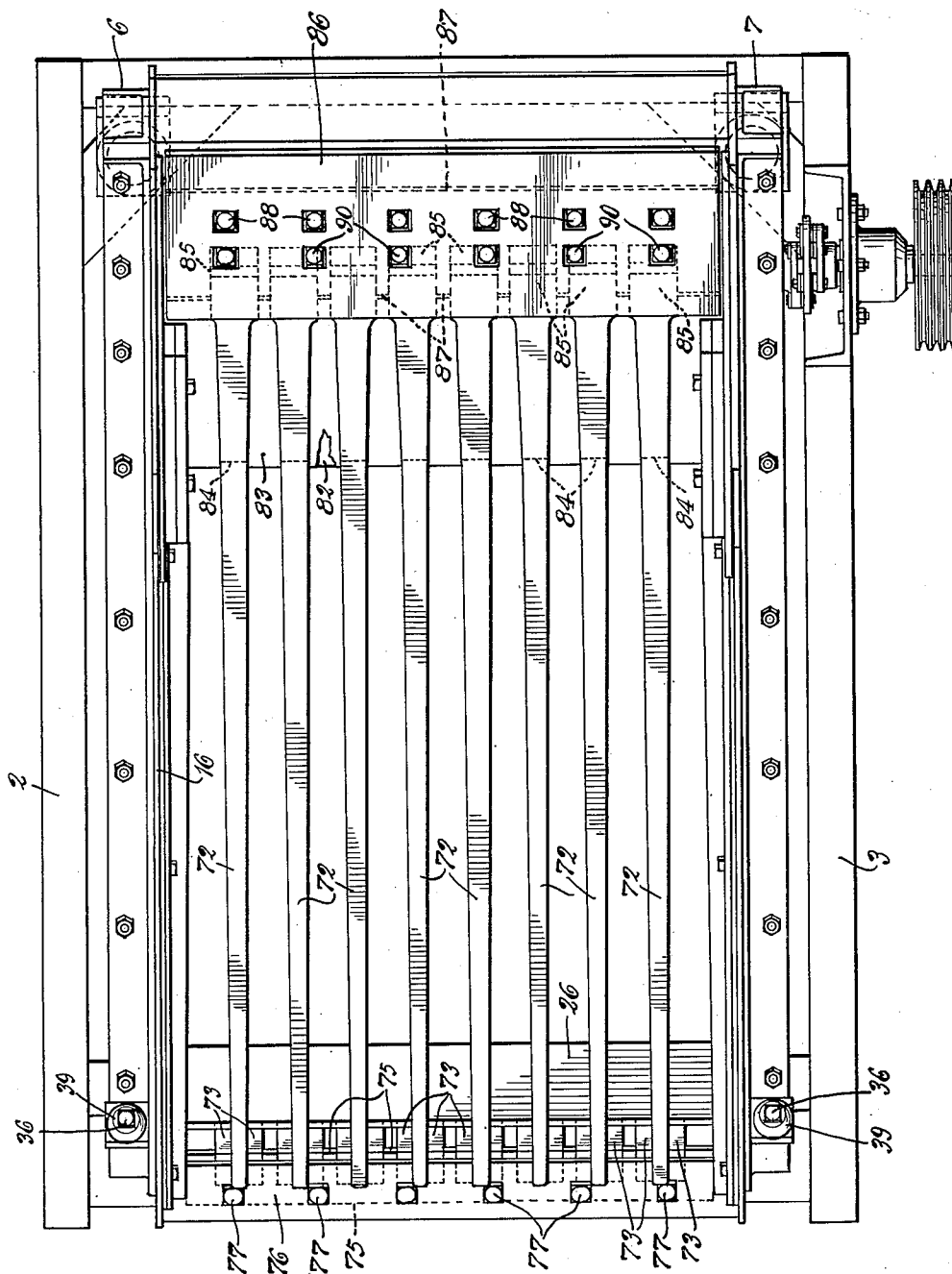
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BAR GRIZZLY

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5 Sheets-Sheet 5



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2,321,166

BAR GRIZZLY

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Application June 2, 1939, Serial No. 276,985

13 Claims. (Cl. 209—393)

My invention relates to an improvement in bar grizzlies and has for one purpose the provision of a grizzly having improved grizzly bars which are readily removable individually for replacement.

Another purpose is the provision of a grizzly which will have a minimum tendency to choke at the discharge end.

Another purpose is the provision of a grizzly with improved supporting means.

Another purpose is the provision of a bar grizzly in which the supporting means are also adapted to cushion the shock of dropping heavy or large particles of material upon the grizzly.

Other purposes will appear from time to time in the course of the specification and claims.

I illustrate my invention more or less diagrammatically in the accompanying drawings wherein:

Fig. 1 is a longitudinal vertical section;

Fig. 2 is an end elevation of the structure shown in Fig. 1;

Fig. 3 is a detail;

Fig. 4 is a view similar to Fig. 1, of a variant form of the device;

Fig. 5 is a partial end elevation of the structure shown in Fig. 4;

Fig. 6 is a view similar to Fig. 1 through a variant form of my device;

Fig. 7 is an enlarged partial section of the discharge end illustrated in Fig. 6; and

Fig. 8 is a plan view of the structure shown in Fig. 6.

Like parts are indicated by like symbols throughout the specification and drawings.

Referring to the drawings, I generally indicate any suitable surface, foundation or the like. Mounted thereupon is a base member including longitudinally extending outwardly flanged channels 2, 3 and a transverse connecting channel 4. 5 indicates any suitable shelf member or support, mounted on or associated with the channel member 4, the purpose of which will later appear.

Mounted on or in said base I illustrate a movable vibratable grizzly body or frame, which may include generally parallel longitudinally extending outwardly flanged channels 6 and 7. These may be suitably connected and supported for example by transverse angles 8, 9, 10, 11 at the feed end; by the transversely extending channel 12, at the discharge end. Mounted on the upper flanges of angles 10 and 11 I illustrate a feed receiving plate 13, which may form the bottom of the receiving box, having side members 14 and an additional upwardly inclined bottom or end member 15 as shown for example in Figs. 1 and 2.

Additional side plates 16 may be secured to the plates 14 and may extend longitudinally along the grizzly structure throughout all or substantially all of its length. It may be secured in any suitable fashion to the members 6 adjacent the discharge ends thereof. Thus, the members 13, 14 and 15 provide a feed receiving box into which material of mixed sizes, including heavy masses, may be dropped from any suitable conveyor or feeder. This material then passes longitudinally toward the discharge end of the grizzly along the space the sides of which are defined by the side plates 16. The bottom of this space is closed by a plurality of longitudinally extending, individually removable grizzly bars, generally indicated as 18. Each of these bars has a flange 19 at the feed end which may be bolted as by the bolts 20 to the lower flange of the angle 11.

In Fig. 1 the grizzly bar is shown as slightly downwardly curved. In the form of Fig. 4 the bar is shown as substantially straight. The bar is shown as having a longitudinally outwardly extending end portion 20 with a recess 21 therebeneath and a lower portion 22 extending outwardly below said recess, laterally somewhat enlarged and provided with the laterally extending flange 23, adapted to seat in the hollow of an inverted angle member 24, which is mounted on or secured to the end angle 12.

Any suitable means, such as bolts 25, may be employed for securing the baffle bars 18 in position at the discharge end. It will be observed, as in Figs. 2 and 5, that the said bars decrease progressively in width from the point shown at A to the point shown at B, whereby the space between individual bars is increased. It will also be observed that the space laterally separating the bars increases somewhat in width from the top of the bar to the bottom of the bar, the minimum separation being indicated at C and the maximum separation being indicated at D in Figs. 2 and 5.

26 indicates a removable wear plate mounted on the transversely extending frame member or channel 12. It will be observed that the channel and the plate are downwardly and rearwardly inclined, and any concentration and gatherings, or choking of material at that point is prevented.

27 indicates a transversely extending frame member associated with the base structure and extending between and secured to the side members 2, 3. Compressed between the lower flange of the member 27 and the lower side of the member 12 is a vibration permitting support, which includes transversely extending pads of rubber

or other suitable flexible, compressible material indicated at 28, 29. 30, 31 are positioning guiding channels interposed between the pad 28 and the angle 27, and between the pad 29 and the channel 12, respectively. Interposed between the two pads is a radius member, which includes the web 32, supports transverse webs 33, and channels 34, 35 to receive the pads 28 and 29 respectively. The grizzly structure may be supported by gravity upon the said flexible support or linkage, or any suitable means may be employed for preventing an upward movement of the grizzly from its base and for thereby positively constraining it to generally linear or slightly arcuate vibration in relation to the base.

The particular means for positively holding the channel 12 of the grizzly structure down against the angle 27 of the base frame in the construction herein shown includes a pair of bolts 36, positioned at either side of the grizzly structure. Each bolt is threaded through apertures of angle members 37, welded to the channel members 2 and 3 of the base frame respectively, and through brackets 38 secured to the channel members 6 and 7 of the grizzly structure, the apertures of the members 37 and 38 being of sufficient size to permit a certain lateral movement of the bolts 36. Interposed between the head 36a of the bolts and the angles 37, and between the adjustable nuts 36b screw threaded upon the bolts 36 and the brackets 38, are conic pads 39, which may be of rubber or any equivalent compressible flexible material. The rubber pads 39 permit the necessary flexure of the bolts 36 in relation to the angles 37 and brackets 38 through which they pass.

If desired, any suitable means may be employed for tending to return the grizzly structure to approximately neutral position. I illustrate for example coil springs 100 compressed between flanges 101 integral with the brackets 38, and angle members 102 secured to the channels 2 and 3 respectively.

The grizzly structure is supported at the feed end for example by the rod or rods 40, which pass through the shelf 5 and through outwardly extending supports or flanges 41 on the grizzly frame. The rods 40 are headed at the bottom as at 42, and between these heads are any suitable washers 43, and at the bottom of the supports 41 may be compressed rubber washers or supports, as shown at 45. At the upper end of each rod 40 is an adjusting nut 46, a compression member 47, and a spacing sleeve 48. Between the member 47 and the top of the shelf 5 are compressed coil springs 49 whereby the feed end of the grizzly frame is yieldingly supported upon the frame. It will be understood that the rods 40 pass through the suitable apertures in the shelf 5, whereby a substantial longitudinal movement of the grizzly frame is permitted.

In order to impart vibration to the grizzly, I provide any suitable unbalanced rotor member having a body generally indicated as 50. Since the details of the rotor member do not of themselves form part of the present invention, they are not herein shown. It will be understood that any suitable motor not herein shown may be employed to vibrate the member 50. When in the position of rest, the member 50 and its associated structures are in balance. In order to permit them to become unbalanced in response to a predetermined speed of rotation, I provide a member 51 with a recess 52 surrounding the member 50. Limit pins 53 with heads 54 and surrounded by springs 55 tend normally to hold the

parts in the position in which they are shown for example in Fig. 1. In response to a predetermined speed of rotation, however, the member 51 moves centrifugally outwardly, compressing the springs 55.

56 is any suitable adjusting head whereby the adjustment on the springs may be varied to provide a throwout or unbalance at any desired rotational speed. It will be understood that a fixed motor may be employed and that any desired transmission therebetween may be employed, the details of which do not form part of the present invention.

It will be realized that whereas I have described and illustrated a practical and operative device, nevertheless many changes may be made in the size, shape, number and disposition of parts without departing from the spirit of my invention. I therefore wish my description and drawings to be taken as in a broad sense illustrative or diagrammatic, rather than as limiting me to my precise showing.

For example, in Fig. 4 I illustrate a variant structure in which the plate 13 has a substantial downward inclination toward the feed end of the device and has secured thereto, for example by bolts 59, removable bars 60, which are aligned with the individual grizzly bars 18, and even slightly overhang them as at 61. In the form of Fig. 4 the supporting structure for the feed plate 13 is provided by a plurality of transversely extending channels 62 and 63, with connecting angles 64 and 65, and connecting plates 66, whereby in effect a box structure is formed, in which the unbalanced rotor above described is housed. In the form of Fig. 4, also, the coil springs 49 rest directly upon the top of the shelf 5, and a compressing abutment 67 rests directly upon the tops of the springs, it being secured in any suitable fashion to the side plates 6, 7 of the grizzly frame. Any suitable means may be provided for aligning them or holding them in position.

In the form of Figs. 6 to 8 I illustrate a further variation in which the bars are not individually removable but in which they are unitarily gripped at each end and cushioned, permitting ready variation in the spacing between adjacent bars. With reference to the portions of these structures which differ from the form of the other figures, note that at the discharge end an inverted angle 70 extends across the screen frame. Positioned upon one upper surface is a rubber pad 71 adapted to receive the downwardly and outwardly extending flanges 73 of the bars 72.

74 is an upper rubber pad. 75 is a notched spacing strip, the notches being adapted to receive the bar portions 73. In order to change the spacing it is only necessary to supply new notched strips or plates. The notched spacing strip 75 may be secured to the angle 70 by bolts 95.

76 indicates any suitable upper clamping member, and bolts 77 pass through the said upper clamping member and through the plates 75 and through the flange of the angle 70. 78 are any suitable nuts operating against washers 79 and additional rubber pads 80.

At the feed end of the device I provide an inverted V-shaped support 81, upon which is positioned a supporting plate 82, over which extends a rubber pad 83. The feed end of each bar is provided with an inverted V-shaped surface opposed to the rubber pad, as at 84, 85. 86 is a transversely extending plate or support, to the lower face of which is applied a notched spacing bar or strip 87, which may be held in position as

by the bolts 88. It will be understood, of course, that the two spacing strips at the end will be changed at the same time when a variation in lateral spacing of the bars is desired.

The support 86 is in effect a clamping member and is drawn downwardly against the upper rubber pad 89, and thus against the bars, by any suitable bolts 90, with their nuts 91. The plate 86 also serves as a feed receiving plate, the upper surface of which may be aligned with the adjacent upper surfaces of the individual bars.

It will be observed that the grizzly has an effective screening length extending from X to Y, and renewing the bars renews their entire wearing surface. The clamping bolts clamp the bars firmly, without, however, passing through any of the bars.

The inverted V structure of the under side of the bars, as at 84, 85, at the feed end, taken in connection with the flat end portion 73 at the discharge end, takes care of irregularities in bar length that are bound to occur in cast manganese bars. Rubber strips or pads above and below the feed and discharge ends of the bars make it unnecessary to machine them accurately.

The use and operation of my invention are as follows:

I provide a bar grizzly which is highly robust and adapted to take mixed material, including large pieces and boulders. The material may be deposited or dropped upon the grizzly from any suitable conveyor, generally indicated for example as including an endless belt 170 passing around any suitable pulley 171. The material discharged from this conveyor, which is shown in Fig. 4 by arrows and will be understood as included in Fig. 1, drops upon the plate 13 or upon the bars 60. If large boulders are dropped from any substantial height, it will be understood that a substantial impact results, which impact is cushioned by the employment of the springs 49 as supporting means beneath the feed end of the grizzly. The particles then are delivered downwardly and outwardly along the bars 18, the smaller particles falling through the spaces between the bars, and the larger particles passing outwardly over the feed end.

In response to rotation of the unbalanced member above described, a substantial vibration will be imparted to the grizzly frame. This vibration will be slightly arcuate or in effect linear at the discharge end of the grizzly, owing to the action of the linkage below described, which includes the flexible compressible members 29 and 30. At the discharge end there will be practically no vertical component to this vibration. At the feed end, on the other hand, the vibration will be generally orbital and violent and with a substantial vertical component. Thus, at the feed end, where the fine particles are being initially separated from the coarse, the orbital or separating vibration will be effective. As the material flows along the bars, however, the fines are increasingly separated out, and a conveying linear vibration is effective at the discharge end to carry the oversize rapidly across the discharge end.

There is a minimum tendency of the material to choke between the bars both because of the separation between adjacent bars, including longitudinally along the length of the bars, as from A to B, and because it increases downwardly between the bars as from C to D. The material which drops from between the bars is readily cleared from the grizzly, and the inclined plate 26 conveys away the fines which pass through the

bars, and there is no pocket or gathering place in which material can accumulate beneath the bars. In effect, the employment of the grizzly structure above described eliminates the present task, generally necessary in current bar grizzlies, of having an operator with a crow bar or the like cleaning out the space between the grizzly bars to prevent choking.

I find it highly advantageous to employ an unbalanced vibrator floated on the feed end in connection with the rocking action at the discharge end.

In the form of Figs. 1 to 5 the bars are individually removable. In the form of Figs. 6 and 7, however, the bars, while being laterally adjustable, are not so readily individually removable, since it is necessary to release the gang securing means, for example to remove bars or to change the spacing between bars.

I claim:

1. In a bar grizzly, a base, a frame movably mounted on said base, means for vibrating said frame, said frame including a transversely extending member adjacent the feed end, an upwardly concave transversely extending member adjacent the discharge end, and a plurality of generally parallel longitudinally extending grizzly bars, each end of each said bar engaging one of said transversely extending members, each said bar, at its discharge end, being provided with a downward extension conforming to the concavity of said last mentioned transversely extending member.

2. In a bar grizzly deck, a plurality of longitudinally extending bars, transversely extending supports for the ends of said bars, the support adjacent one end of the bars having a transversely extending bar engaging convexity, the surface of the support for the opposite end of the bars being generally plane, the bars including under portions conforming to said convex and said plane supports, and means for clamping the bars thereagainst.

3. As a new article of manufacture, an individual grizzly bar separately insertable and removable from a grizzly including a generally rectilinear bar member of greater height than thickness, the thickness of said bar member decreasing progressively from the feed to the discharge end of the bar and from the top to the bottom of the bar, and an attaching portion extending downwardly from the discharge end of said bar member, said bar member including an individual end portion extending outwardly above said attaching portion, said bar being provided at its feed end with an attaching lug located substantially below the top of the bar, said attaching lug having a generally concave downward face, a portion of said face being located endwise beyond that part of the top of the bar member which receives the material to be separated.

4. As a new article of manufacture, a generally rectilinear grizzly bar, including a single bar portion decreasing in width progressively from the feed to the discharge end of the bar and from the top to the bottom of the bar, and an individual support-engaging pad at each end of the bar, such pads being of greater width than the bar, the pad for the feed end of the bar having a plurality of lower generally plane bearing surfaces intersecting each other, and downwardly inclined from said intersection in relation to the top of the feed end of the bar.

5. As a new article of manufacture, a generally rectilinear grizzly bar, including a single bar

portion decreasing in width progressively from the feed to the discharge end of the bar and from the top to the bottom of the bar, and an individual support-engaging pad at each end of the bar, such pads being of greater width than the bar, one of said pads having a downwardly convex surface adapted to engage a transversely extending concave support.

6. In a bar grizzly, a base, a frame movably mounted on said base, means for vibrating said frame, a plurality of longitudinally extending generally parallel grizzly bars mounted on said frame, transversely extending supports on said frame adapted to engage overlying portions of said bars at the opposite ends of the bars, and an adjusting comb plate removably mounted on one of said supports and including portions interpenetrating with engaging portions of said bars each said bar having an end extension penetrating an edge aperture of said comb plate, the edge apertures of said comb plate extending entirely through said plate.

7. In a bar grizzly, a base, a frame movably mounted on said base, means for vibrating said frame, a plurality of longitudinally extending generally parallel grizzly bars mounted on said frame, transversely extending supports on said frame adapted to engage overlying portions of said bars at the opposite ends of the bars, an adjusting comb plate removably mounted on one of said supports and including portions interpenetrating with engaging portions of said bars each said bar having an end extension penetrating an edge aperture of said comb plate, the edge apertures of said comb plate extending entirely through said plate, and unitary means for holding said bars and adjusting comb plate fixed in relation to said frame.

8. As a new article of manufacture, a separately removable grizzly bar including a single bar member decreasing progressively in thickness from the feed to the discharge end of the bar, separate individual pads integral with said bar and located at the feed and the discharge ends thereof, said pads being of greater width than the bar, the pad at the feed end of the bar having a transversely extending downwardly concave face located substantially below the material engaging portion of the bar at the free end.

9. As a new article of manufacture, a separately removable grizzly bar including a single bar member decreasing progressively in thickness from the feed to the discharge end of the bar, separate individual pads integral with said bar and located at the feed and the discharge ends thereof, said pads being of greater width than the bar, the pad at the feed end of the bar having a transversely extending downwardly concave face located substantially below the material engaging portion of the bar at the feed end, said concave face including two intersecting, generally plane portions at an angle to each other and both downwardly inclined from their intersection, their intersection being at a level substantially below the material engaging top portion of the feed end of the bar.

10. As a new article of manufacture, a separately removable grizzly bar including a single

bar member decreasing progressively in thickness from the feed to the discharge end of the bar, separate individual pads integral with said bar and located at the feed and the discharge ends thereof, said pads being of greater width than the bar, the pad at the feed end of the bar having a transversely extending downwardly concave face located substantially below the material engaging portion of the bar at the feed end, the pad at the discharge end of the bar having a generally plane bottom downwardly inclined in relation to the top of the discharge end of the bar.

11. As a new article of manufacture, a solid grizzly bar including a solid bar member decreasing progressively in thickness from the feed end to the discharge end of the bar, separate individual pads integral with said bar at the feed and discharge ends thereof, said pads being of greater width than the bar, the pad at the feed end of the bar having a downwardly concave face, and an endwise projection at the feed end of the bar adapted to interpenetrate with a securing comb plate.

12. As a new article of manufacture, an individual grizzly bar separately insertable in and removable from a grizzly, said bar including a body of solid cast metal which is of greater height than thickness substantially from end to end of the material engaging portion of the bar, an attaching portion extending downwardly from the discharge end of the bar and including a laterally extending web and an attaching portion extending downwardly from the feed end of the bar and including an attaching web, said webs being at all points separated from the upper material engaging surface of the bar by a substantial thickness of solid metal, each of said webs having lower faces substantially inclined in relation to the upper face of the adjacent portion of the bar, one of said webs including two portions downwardly inclined in opposite directions longitudinally of the bar.

13. As a new article of manufacture, an individual grizzly bar separately insertable in and removable from a grizzly, said bar including a body of solid cast metal which is of greater height than thickness substantially from end to end of the material engaging portion of the bar, an attaching portion extending downwardly from the discharge end of the bar and including a laterally extending web and an attaching portion extending downwardly from the feed end of the bar and including an attaching web, said webs being at all points separated from the upper material engaging surface of the bar by a substantial thickness of solid metal, each of said webs having lower faces substantially inclined in relation to the upper face of the adjacent portion of the bar, the web at the feed end of the bar including two portions downwardly inclined in opposite directions longitudinally of the bar and converging at their upper ends whereby to form a concavity adapted for locking interpenetration with the grizzly with which the bar is used.

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