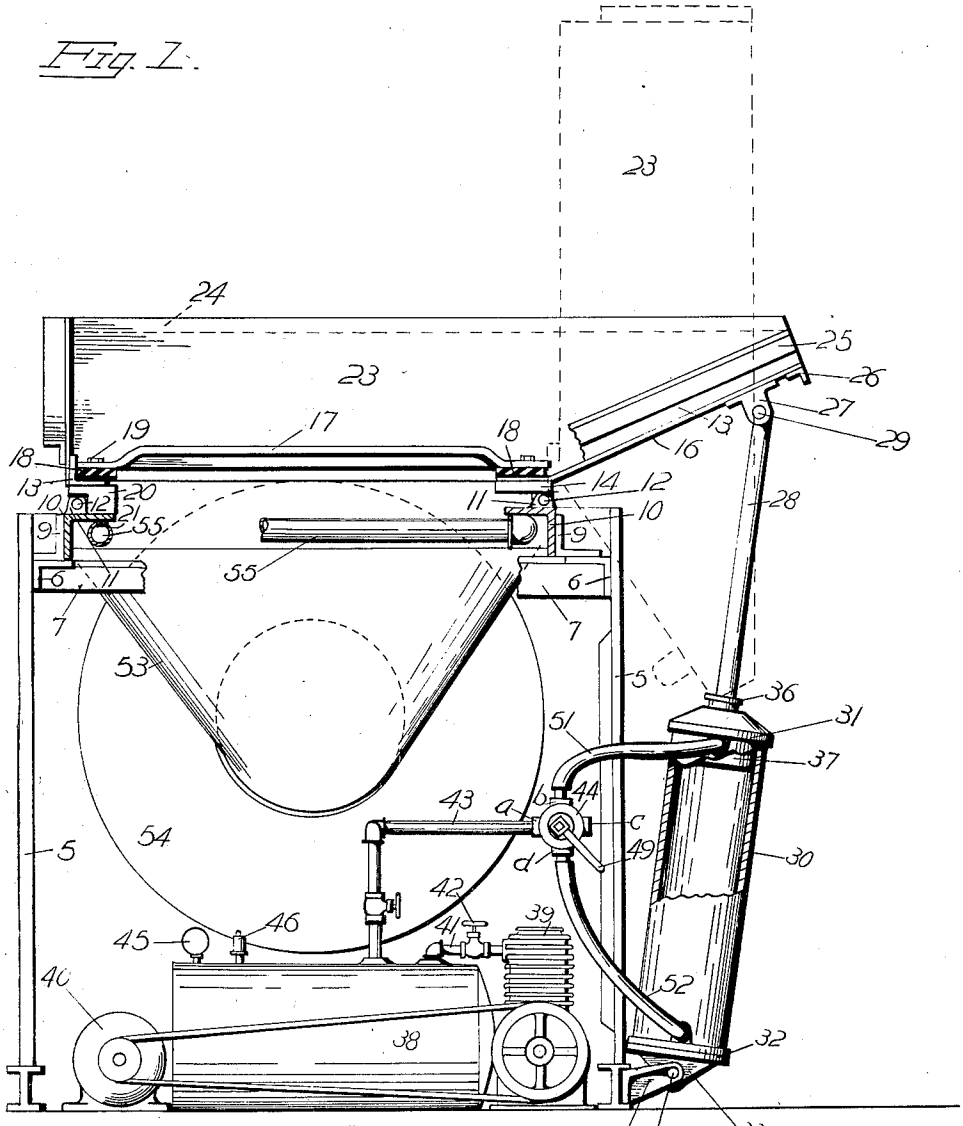
Feb. 8, 1938. C. V. HALLENBECK 2,107,532

DUMPING GRIZZLY

Filed April 30, 1935 2 Sheets-Sheet 1

Fig. 1.



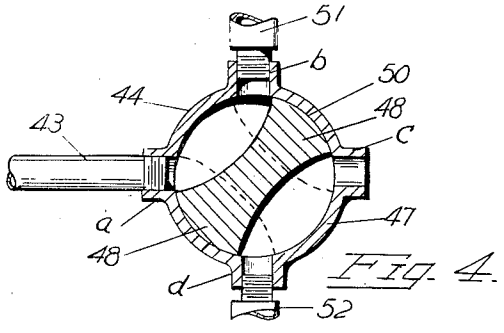


Fig. 4.

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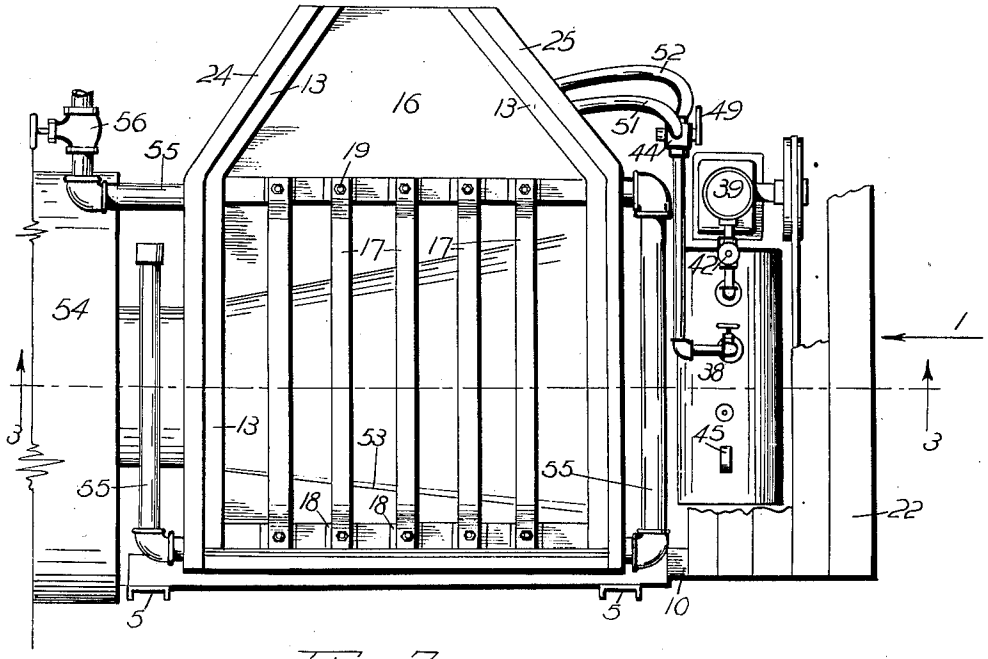

Fig. 2.

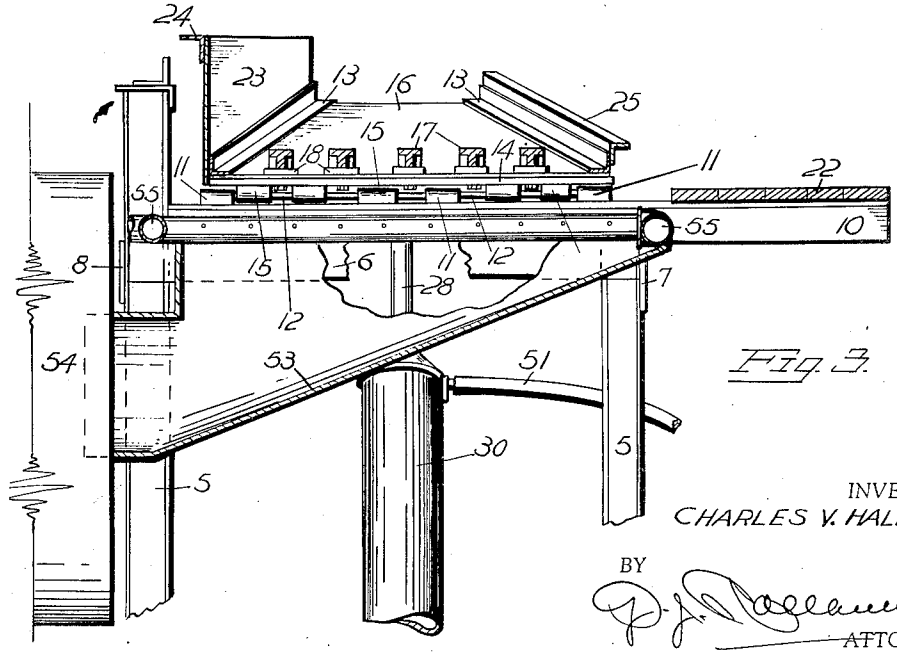

Fig. 3.

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DUMPING GRIZZLY

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Application April 30, 1935, Serial No. 19,009

7 Claims. (Cl. 209—260)

This invention relates to improvements in placer mining machines, stone crushing and sorting plants, and the like, and has reference more particularly to an improved grizzly for effecting the first screening operation for removing the larger rocks and other solid material.

In placer mining operations it is necessary to handle large quantities of material, and it is customary to employ steam shovels or dredges of various kinds to raise the material and deliver it to the machines. It is evident that the steam shovels and/or dredges deliver to the machines rocks of large sizes as well as sand and gravel and it is therefore customary to first run the material over a grizzly, provided with properly spaced parallel bars, for the purpose of removing rocks above a given size. Such grizzlies have heretofore been inclined so that the material moves by the action of gravity from the high to the low end. Where inclined grizzlies are used, great trouble and delay is experienced from rocks that get stuck between the bars and prevent the material from flowing; when this occurs, the operator must remove such rocks before the operation can proceed, and this often necessitates a stoppage of the operation.

The inclined grizzly is also very inefficient inasmuch as the large quantity of the material that would pass the bar spacing if the bars were horizontal rides over and goes to waste along with the material which is too large to pass the bar opening.

It is an object of this invention to produce a grizzly of such construction that it is normally flat or horizontal and which is pivoted to tilt about a horizontal axis, for the purpose of effecting a discharge of material therefrom.

It is a further object of this invention to produce a normally horizontal grizzly that can be tilted by the use of compressed air or hydraulic or mechanical means and whose movement can be controlled in both directions so as to effect the operation independently of gravity.

A still further object is to produce a tiltable grizzly operated by pneumatic means and provided with an air storage tank and a compressor of comparatively small capacity.

The above and other objects of this invention which may become apparent as the description proceeds are obtained by means of a construction and an arrangement of parts that will now be described in detail and reference for this purpose will be had to the accompanying drawings in which the invention has been illustrated and in which

Figure 1 is a side elevation looking in the direction of arrow 1 in Figure 2;

Figure 2 is a top plan view;

Figure 3 is a section taken on line 3—3, Figure 2; and

Figure 4 is a section through the four way control valve employed in the operation of the device.

In the drawings, reference numerals 5 designate the vertical corner posts, or supports, of the frame, and of which there are two pair. Numerals 6 designate the horizontal angle irons that connect the pair of supports on each side. Plates 7 and 8 connect corresponding supports of the pairs. From Figure 1 it will be seen that an angle iron 9 is attached to the horizontal flange of angle iron 6 and an angle iron 10 is attached to the vertical flange of angle iron 9. The horizontal flanges of the angle iron 10 are provided with elongated spaced lugs 11 that have openings for the reception of a hinge pin 12 and which form a part of the hinge by means of which the grizzly is attached to the support. The grizzly consists of a frame having three sides formed from an angle iron 13 and the fourth side is formed from a flat bar 14 whose under surface has spaced hinge lugs 15 that fit between the lugs 11 and are perforated for the reception of the hinge pin. A plate 16, which forms the bottom of a discharge chute, has one edge resting on the upper surface of the bar 14. Bars 17, which are preferably formed from T-irons, are supported by the horizontal flange of the angle iron 13 and the upper surface of the bar 14, and have their ends spaced from the supporting surfaces by rubber blocks or cushions 18.

Bars 17 are secured to the frame by bolts 19. Attached to the horizontal flange of the angle iron 10, on the opposite side from the hinge, are blocks 20 that serve as supports for the free end of the grizzly; these blocks are held in place by bolts 21.

The two angle irons 10 extend some distance to the right of the supporting frame (Figure 3) and serve as supports for a plank platform 22. Attached to the vertical flange of angle iron 13, on the inside of the grizzly is a steel plate 23 whose upper edge is reenforced by an angle iron 24. Side 23 extends forwardly and is attached to the vertical flange of the angle iron 13 that projects forwardly for this purpose, and to the horizontal flange on which the plate 16 is attached. The bar 14 is connected between the sides of the angle iron 13 at the point where the discharge chute begins. An angle iron 25 is con-

nected with the vertical flange of the angle iron 13 on the end and the outside of the grizzly, or on the side opposite from the side plate 23. Secured to the under surface of plate 16 directly back of the angle iron 26 is a pair of spaced lugs 27 between which is positioned the end of a piston rod 28 that is attached to the lugs by a pivot pin 29.

A cylinder 30 is provided at opposite ends with cylinder heads 31 and 32, and the latter has a flat projection 33 that is located between the spaced arms of the bracket 34, projecting from the beam and to which it is pivotally attached by a pivot pin 35. The cylinder head 31 has a stuffing box 36 through which the piston rod 28 extends. A piston 37 is located in the cylinder and connected with the inner end of the piston rod. The piston is moved by means of compressed air and for this purpose a storage tank 38 has been provided and located in a suitable position adjacent the machine. The air is compressed by a compressor 39 driven from a motor 40. In the drawings an electric motor has been shown but it is evident that an internal combustion engine can be substituted if desired. The compressor is connected with the tank by a pipe 41 provided with a globe valve 42 and a valve discharge pipe 43 extends to the four way valve 44. The tank is provided with a pressure gauge 45 and a relief valve 46. The piston can, of course, be moved by water or other liquid under pressure, in which case the air compressor unit can be dispensed with and connection from the water mains made directly to pipe 43.

In Figure 4, the construction of valve 44 has been shown and from this it will be seen that it comprises a housing 47 having a cylindrical opening in which is located a rotor or plug 48 that can be turned by means of the handle 49.

The housing is provided with nipples *a*, *b*, *c* and *d*, that are spaced ninety degrees apart. The plug or rotor has its opposite sides cut away so as to leave arcuate surfaces 50 of such angular width that they extend from the opening in one nipple to the opening in the other nipple. When the parts are in the position shown in Figure 4 the nipple *a*, to which pipe 43 is connected, is in communication with nipple *b*, and nipple *c* is in communication with nipple *d*. By turning the plug 48 into the dotted line position, nipple *a* will be connected with nipple *d*, and nipple *b* with nipple *c*, the latter being open to the atmosphere. A tube 51 connects nipple *b* with the interior of the cylinder above the piston and a tube 52 connects the nipple *d* with the interior of the cylinder below the piston. If we assume that the parts are in the position shown in Figure 1 and that the valve is turned to the full line position, shown in Figure 4, compressed air or other fluid under pressure, will be connected with the cylinder above the piston and the tube 52 will be connected with the exhaust nipple *c*, whereupon the piston will move downwardly and tilt the grizzly from full line to dotted line position, thereby effecting a discharge of the contents of the grizzly through the chute. The grizzly can be returned to horizontal or normal position by turning the plug 48 to dotted line position.

The control valve must be properly manipulated to secure the desired speed of operation. Attention is called to the fact that with this construction gravity is not depended on to return the grizzly from tilted to normal or horizontal position, but movement in both directions is effected by the control mechanism that has just been described. Since the grizzly is tilted intermittently only, it is evident that a comparatively small compressor and motor is sufficient to produce the necessary amount of compressed air because the compressor can operate constantly.

In the operation of this machine, the material is elevated, by a steam shovel or drag bucket conveyor, and deposited directly on the grizzly, and the material that is small enough, will drop through the spaces between the bars 17. The larger rocks will remain on the bars and as soon as enough large rocks accumulate on the grizzly to make it necessary to clean it, the operator grasps the handle 49 and manipulates the control valve so as to tilt the grizzly to dumping position and then returns it to normal position. Since the grizzly is entirely stationary when performing its screening operation, there is little likelihood of stones getting caught between the bars, but even if this should occur, it would do no harm as the grizzly is easily tilted to rid it of all accumulations. The function of the rubber blocks 18 is to cushion the shock due to the dumping of a heavy load onto the bars, and to permit a certain degree of lateral movement to the bars so as to facilitate the release of rocks that become wedged between them.

The material that passes through the grizzly passes into the hopper 53 that is located beneath the bars and which conducts the material to the feed opening of a rotary drum, which has been designated by numeral 54. The material that enters the hopper 53 is sprayed with water from a perforated pipe 55, for the purpose of wetting the walls of the hopper and maintaining the material of the proper moisture to facilitate its movement to drum 54 by the action of gravity. The quantity of water delivered to the material by the spray is controlled by a valve 56, shown in Figure 2. The quantity of water used as a spray also controls the speed with which the material is discharged from the hopper.

Attention is called to the fact that the two oppositely located angles 10 are provided with hinge lugs 11, so that the grizzly can be pivoted to either, and it is therefore possible to reverse it whenever desired.

The dumping grizzly, whose construction and operation has been described, possesses many advantages over the ordinary inclined grizzly, among which may be mentioned that of size. Since gravity is not depended on to move the material, the grizzly can be positioned horizontally, and consequently can be short. There is no danger of stoppage due to rocks getting wedged between the bars, and since the grizzly can be tilted very quickly and returned to operating position, it can easily be cleaned between each load of a steam shovel or drag bucket, and it can therefore be kept clean at all times.

Owing to the comparatively small size of the grizzly, the size of the machine can be made smaller, and the expense of construction reduced, and at the same time, the machine will be more readily transportable.

As above pointed out, it is possible to omit the motor, the air compressor and the air storage tank where a suitable supply of water under pressure is available. Although air and water are the most suitable fluids for this purpose, any gas or liquid under sufficient pressure can be employed.

The rubber cushion blocks 18 permit the bars to rock slightly and the edges of the bars are therefore permitted a certain amount of lateral movement which facilitates the release of rocks

that could otherwise be removed only with great difficulty.

What I claim and desire to secure by Letters Patent is:

1. A normally horizontal grizzly having spaced bars, walls along one end and side, a spout at the other end thereof upwardly inclined from the normal horizontal position of the grizzly and movable therewith, said grizzly being mounted for pivotal movement to a substantially upright position, and pressure operated means for tilting the grizzly to effect a discharge of material therefrom across the spout.

2. A normally horizontal grizzly having spaced bars, mounted for tilting movement to a substantially upright position, an upwardly extending wall along one end and one side, a spout at the other end thereof, said spout being integral and movable with the grizzly, a pivot located between the grizzly portion and the spout, and pressure operated means, located underneath the spout, for tilting the same to effect a discharge of material through the spout, the grizzly being open at one side to receive material dumped onto the same.

3. A device of the class described comprising in combination, a supporting frame work, a grizzly frame normally horizontal and pivotally connected with the supporting frame, a plurality of spaced bars supported by the grizzly frame, a discharge spout formed integral and movable with the grizzly, the spout being located on the side of the pivot opposite from the bars, and pressure fluid means positioned beneath and connected with the spout, for tilting the frame to effect a discharge of its contents through the spout.

4. A device in accordance with claim 3 in which the grizzly frame has a wall extending along one side.

5. A grizzly comprising a substantially rectangular frame, a plurality of spaced, substantially parallel bars of T-shaped cross section extending across the frame, with the flanged side uppermost, and having their ends flattened and supported on opposite frame members, resilient rubber cushions between the flattened ends of the bars and the frame members on which they rest, to permit a limited movement of the bars toward the frame and a limited rocking movement of the bars for varying the distance between the flanges of adjacent bars, and means for securing the ends of the bars to the frame members.

6. A normally horizontal, tilting grizzly, comprising, a frame having an end bar and two side bars, the free ends of the side bars forming the sides of a discharge spout, a flat bar connecting the side bars at the point where the spout begins, an imperforate plate secured to the ends of the side bars, forming the bottom for the spout, spaced, parallel grizzly bars supported at their ends by the end bar and the flat frame bar, means for securing the grizzly bars to the frame, a support, a hinged connection between the top of the support and the flat frame bar and means located beneath and connected with the support and spout for tilting the grizzly about its pivot to effect a discharge of material over the spout.

7. A normally horizontal tilting grizzly comprising a substantially rectangular frame, a plurality of spaced substantially parallel bars of T-shaped cross-section extending across the frame, with the flanged side uppermost and having their ends flanged and supported on opposite frame members, resilient rubber cushions between the flanged ends of the bars and the frame members on which they rest, to permit a limited movement of the bars toward the frame and a limited rocking movement of the bars for varying the distance between the flanges of adjacent bars and means for securing the ends of the bars to the frame members.

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