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ORE JIGGER

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Fig. 2.

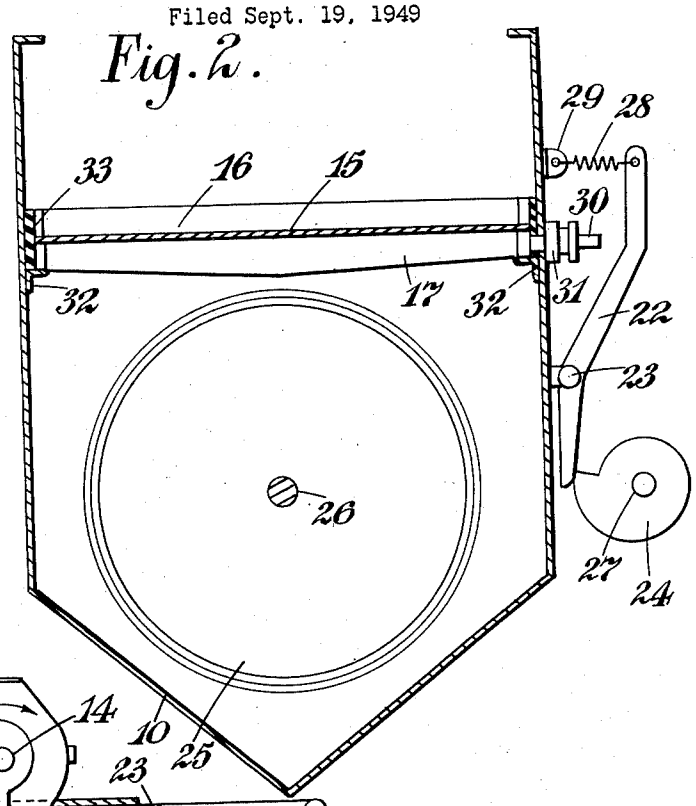
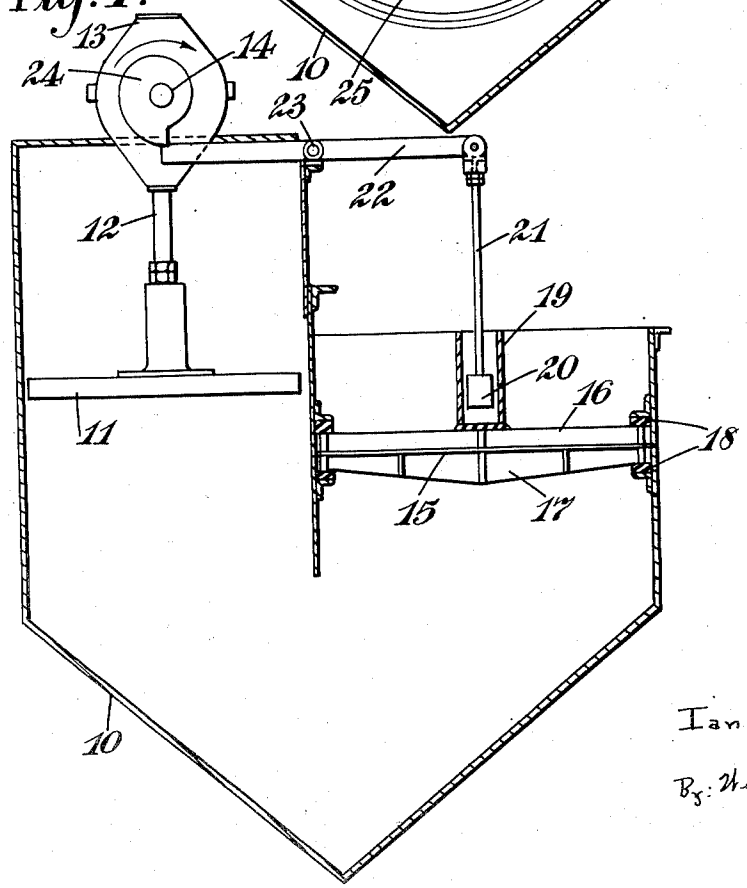


Fig. 1.



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ORE JIGGER

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4 Claims. (Cl. 209—425)

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This invention concerns improvements in or relating to jigs used for the treatment of mineral ores.

The jig to which the invention is applied is of the well-known type wherein the material containing the ore to be treated is passed over a supporting screen or sieve (hereinafter referred to as screen) and is subjected to a pulsating up-and-down movement thereover by water currents so as to effect a stratification of the material and the passage of the ore particles through the screen to a hutch in the jig. The water currents are produced either by moving water through a stationary screen or, less commonly, by moving the screen in stationary water. The invention is particularly although not exclusively applicable to the fixed-screen construction of jig.

The object of the invention is to provide means for automatically preventing or reducing "blinding" or clogging of the screen plate apertures by particles from the bed of material during the operation of the jig.

In the past it has been the practice of operators to clean the screens by manual means; but as such manual cleaning cannot continuously be applied during the operation of the jig, the screens begin to blind immediately after cleaning, and this blinding becomes progressively worse, so that capacity and efficiency of the jig is reduced.

According to the present invention, in a jig of the above type, there is provided an impact mechanism for automatically imparting during functioning of the jig an intermittent or a continuous series of shock movements to the jig screen so as to obviate or reduce blinding of the screen.

The impact mechanism may include the combination of a stepped rotary driving cam which is rotated continuously, a rocking lever operated by the cam, and a hammer device operated by the cam for imparting the shock movements to the screen. The shock movements may be imparted to the screen in a direction normal to the plane of the screen, or in the same plane or parallel with the screen. In a modification, shock movements may be imparted to the screen in several directions simultaneously.

In one construction, the hammer device comprises a weight guided for movement above or below the screen in a direction normal to the plane of the screen, the hammer being operatively coupled by a connecting rod to one arm of a double-armed rocking lever, whose other arm is operated by the cam.

With another construction the hammer device comprises a striker pin slidably mounted in a

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guide at one side of the screen for movement in the plane of or parallel with the screen, the striker pin being operated by one arm of a double-armed lever in a manner similar to that with the previous construction.

The screen is resiliently supported for shock movement, as in a mounting or mountings of rubber.

Two constructions in accordance with the present invention will now be described by way of example with reference to the accompanying drawings in which:

Figure 1 is a diagrammatic cross-section of one type of jig in which water currents are impelled by a reciprocatory plunger; and

Figure 2 is a cross section of another type of jig in which water currents are impelled by a reciprocatory diaphragm.

Like references are used for similar parts in the two figures.

Referring first to the construction shown in Figure 1, the jig is provided with a shell or box 10 fitted at one side with a plunger 11 mounted for vertical reciprocatory movement. The plunger is coupled by a connecting rod 12 to a driving eccentric 13 mounted on a horizontal shaft 14. At the other side of the jig, a screen 15 is fitted between top and bottom grids 16, 17.

The screen and grid assembly is mounted between upper and lower rubber pads 18, so that the assembly is capable of resilient up-and-down movement. Secured at the centre of the top grid is an upstanding tubular guide 19. A hammer weight 20 is loosely mounted in the guide 19 for up-and-down sliding movement. The weight 20 is carried by the lower end of an upstanding connecting rod 21. At its upper end this connecting rod is coupled to the end of one arm of a double-armed lever 22 which extends substantially horizontally and is mounted for rocking movement about a pivot 23. The other arm of the lever 22 is positioned under a rotary stepped cam 24 which is carried by and rotates with the plunger shaft 14.

In operation, the rotating plunger shaft 14 operates the cam 24 and thereby produces an oscillatory movement of the rocker arm. In consequence, the weight 20 is moved up and down so as to produce a series of intermittent or continuous hammer blows on the top grid 16. This operation produces an oscillatory up-and-down movement of the screen within its resilient mounting 18. Shocks imparted to the screen at a plunger speed of 120 strokes a minute have proved satisfactory.

Referring now to Figure 2 a pulsating flow of

water is impelled through the screen 15 by a diaphragm 25 mounted for reciprocatory movement on a horizontal shaft 26 within one of the several cells of the jig shell 10. At one side of the jig shell is a rotary stepped cam 24 fitted on a horizontal shaft 27. This cam lies adjacent the tip of the shorter arm of a double-armed rocking lever 22 carried by a pivot 23. A tension spring 28 connects the end of the other lever arm to a fixed bracket 29 in such manner as to hold the shorter arm resiliently in contact with the cam periphery. In line with the path of movement of the upper lever arm is a striker pin 30 slidably fitted in a guide 31 at the side of the shell. At its inner end the striker pin is positioned to engage the side of the lower screen grid 17.

The screen-and-grid assembly is supported on brackets 32. There is a resilient packing 33 between the assembly and the walls of the shell for permitting a resilient oscillatory movement of the screen within its own plane.

On rocking of the lever, the upper arm imparts blows on the outer end of the striker pin, which in turn imparts hammer blows to the side of the screen-and-grid assembly. As a consequence, this assembly is given oscillatory shock movements in its own plane during operation of the jig.

Among the advantages of the invention are: blinding of the screen apertures is reduced or obviated; cleaning of the screen is effected automatically during operation of the jig, so that the efficienty of the jig remains unimpaired throughout its operation; a saving of time, since the jigs do not require to be taken out of service for cleaning, because cleaning is effected automatically during operation of the jig, saving of manual labour; avoidance of the necessity for skilled supervision of manual cleaning, and the prolonging of the life of the screen plates, because they do not require to be "threshed."

The rigid grid members 16 and 17 together with the screen constitute a frame or unit mounted for bodily movement with respect to the support in the shell 10. In other words the frame or unit as a whole is capable of a motion of translation relatively to the shelf or support. The frame or unit is driven in one direction by the hammer blows and by reason of the fact that the frame or unit is cradled in resilient packing or the like the original movement set up by the blows results in a vibratory motion of the unit incident to the alternate compression and expansion of the packing at opposite sides or ends of the unit. Thus two forces act on the unit and due to its unitary character and its cradling in rubber the screen is vibrated as a whole with all areas of the screen partaking equally of the vibratory motion in contradistinction to vibratory movement locally impressed on a screen that is so anchored as not to be capable of a floating vibratory motion of translation.

This uniform movement of the grid-and-screen unit throughout substantially its entire area will not only prevent clogging of the screen but will also impart to the material being treated a uniform movement throughout the entire mass or body of the material. Such action on the part of the unit will not interfere with the proper stratification of the ore but will supplement and augment the pulsating up-and-down movement of the water currents to effect a quicker, more complete and more uniform stratification of the material being treated.

I claim:

1. In a jig for the treatment of mineral ores of the type wherein the ore is passed over a screen under water and is subjected by water currents to pulsating up-and-down movements to effect stratification of the ore, the provision of a stationary shell, a screen, upper and lower grid members between which the screen is rigidly clamped in a horizontal position within the shell, upper and lower resilient rubber pads carried by the shell between which the screen-and-grid assembly is mounted for oscillatory up-and-down movement as a unit in the shell, and a hammer guided for vertical movement centrally of the screen for imparting blows direct to the grid members to produce vertical oscillatory shock movements to the screen-and-grid assembly.

2. In a jig, a unit comprising a screen and grid members rigidly secured together, a support on which said unit has bodily movement of translation, a resilient cushion on said support and positioned at one side of said unit, a second resilient cushion on said support and positioned at the opposite side of said unit, and hammer means to impart blows to said unit to drive it bodily in one direction against the first resilient cushion, whereby the first cushion will be distorted and will react to drive the unit bodily against the second resilient cushion so that said second cushion will be distorted and will react to drive the unit bodily back against the first cushion to set up in the unit a vibrating motion throughout substantially its entire area.

3. In a jig, a unit comprising a screen and grid members rigidly secured together, a support on which said unit has bodily movement of translation, resilient means comprising portions positioned at opposite sides of said unit, and means to impart blows to said unit to drive it bodily in one direction against one of said portions, each of said portions adapted to be distorted by the impact of said unit thereagainst and to react to oscillate said unit between said portions and to effect shock movements of said unit.

4. Apparatus as claimed in claim 3, wherein the hammer is mounted to direct blows to the side of the frame in a direction substantially within the plane of the screen.

IAN LESLIE PATTERSON.

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