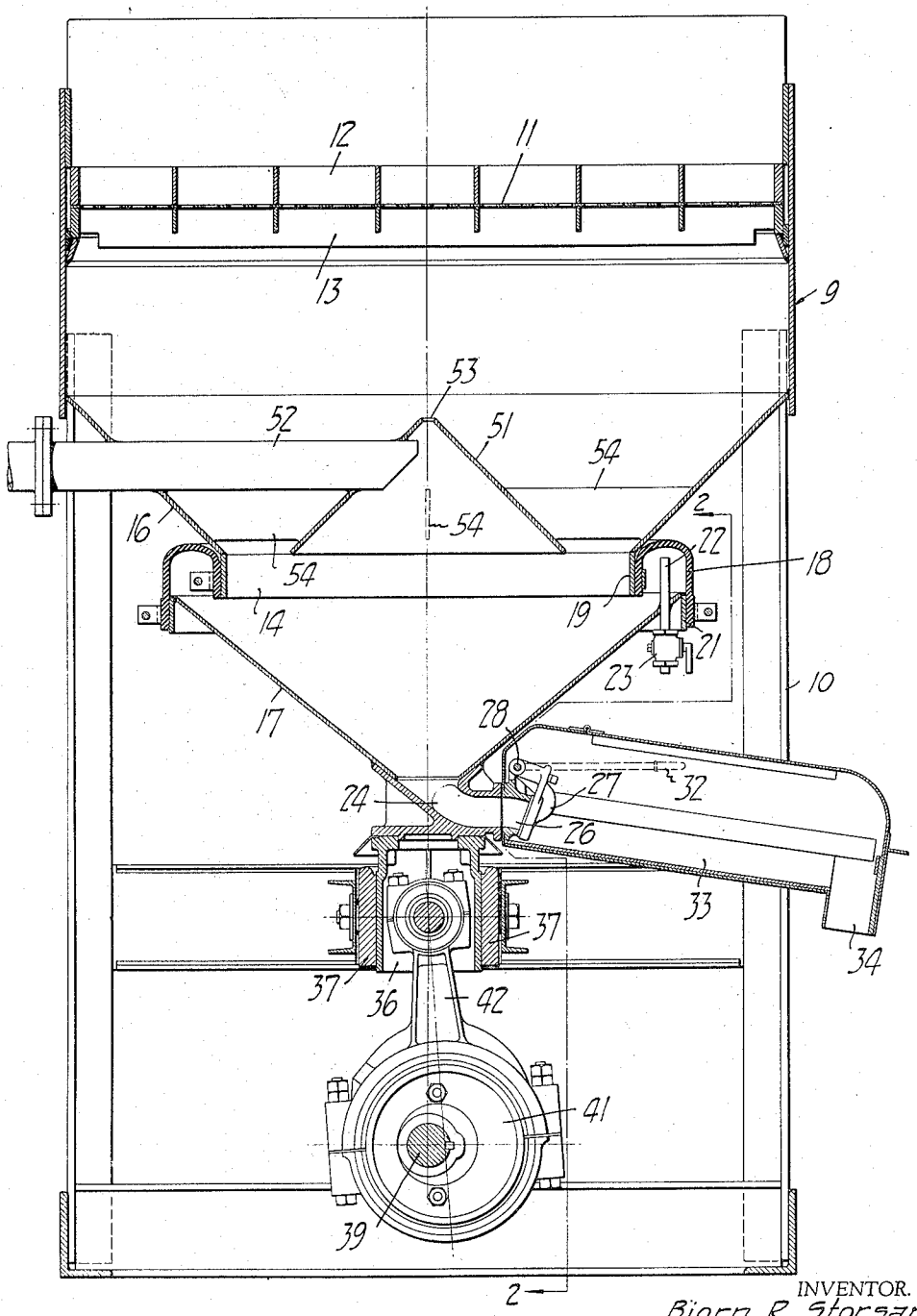
Sept. 13, 1938. B. R. STORSAND 2,129,795

ORE JIG

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FIG. 1



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FIG. 3.

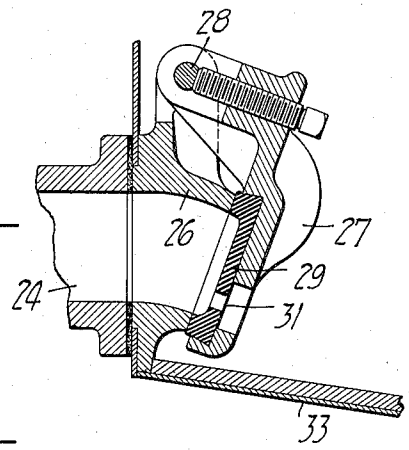
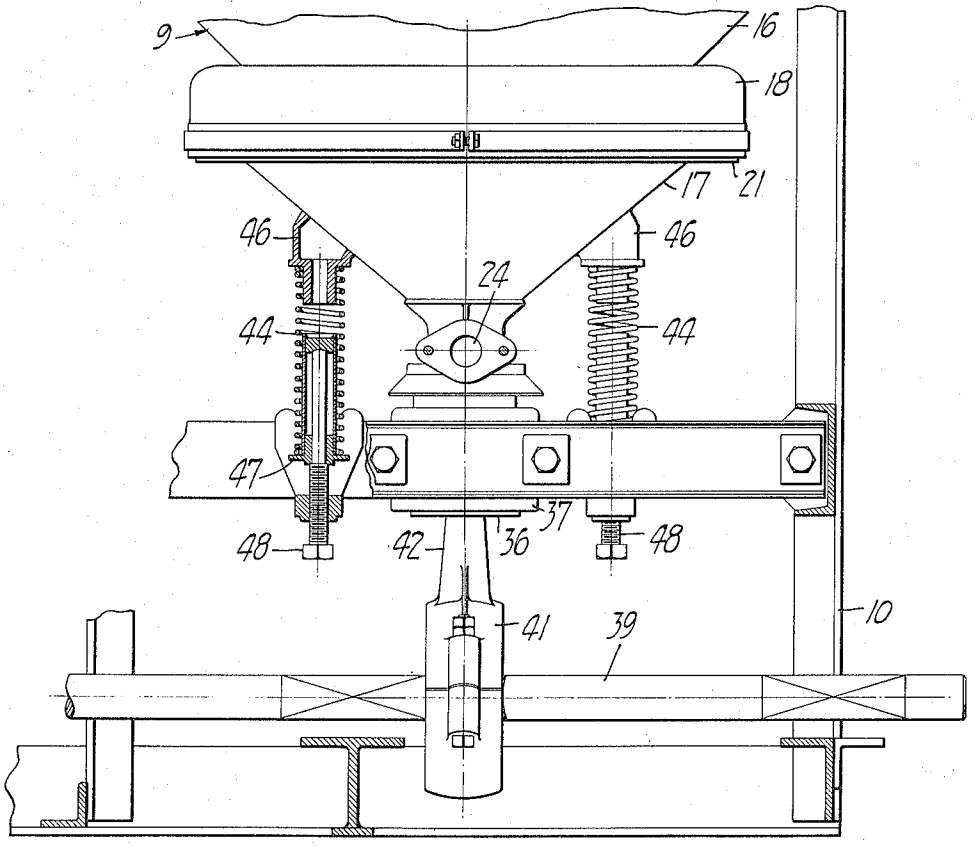


FIG. 2.



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ORE JIG

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Application September 18, 1936, Serial No. 101,452

4 Claims. (Cl. 209—455)

This invention relates generally to ore jigs such as are employed for hydraulic concentrating operations.

It is an object of the invention to provide an ore jig of improved performance, particularly with respect to effectiveness in removing a desired concentrate, power and water consumption in operating upon a given quantity of ore, and capacity for a given size of equipment. The invention as disclosed herein is characterized by positive and energetic hydraulic pulsion and suction through the ore bed, with uniform distribution of such activity. It is also featured by direct and continued downward movement of the separate concentrate to the point of final discharge, and simple and rugged mechanical construction which will afford long useful service.

Referring to the drawings:

Fig. 1 is a side elevational view, in cross-section, illustrating an ore jig incorporating the present invention.

Fig. 2 is a cross-sectional detail, taken along the line 2—2 of Fig. 1.

Fig. 3 is an enlarged cross-sectional detail, illustrating the construction of the discharge orifice, for the hutch spigot.

The ore jig illustrated in the drawings is of the stationary bed type, and includes the jig tank 9, carried by a suitable supporting frame 10. A screen 11 is shown carried between the upper and lower grids 12 and 13, and serves to support a bed of ore being treated. While the upper portion of the tank 9 may be square or rectangular, the lower tank walls 16 converge to a substantially circular opening 14.

Below the tank opening 14 there is a bottom container 17, which is preferably conical in shape, with its vertical axis generally aligned with the center of opening 14. In order to form a suitable sealed flexible joint between the lower end of the tank 9 and the upper end of the bottom container 17, a flexible diaphragm 18 is employed, made of suitable material such as resilient vulcanized rubber. The lower edge of tank 9 is provided with a cylindrical shaped collar 19, upon which the inner peripheral edge portion of the diaphragm 18 is clamped. The outer peripheral edge portion of the diaphragm 18 is clamped to a similar collar 21, secured to the upper end of bottom container 17. For the purpose of enabling removal of any trapped air from diaphragm 18, a bleed pipe 22 is shown, having its outer end normally closed by valve 23.

Bottom container 17 forms in effect a hutch for the collection of separated fine concentrate, and is provided with the usual hutch discharge opening 24. To properly control the discharge of material through opening 24, means are provided such as illustrated in detail in Fig. 3. Thus attached to the casting which provides opening 24, there is a spigot 26. A gate 27 is adapted to swing down over the mouth of spigot 26, and is pivotally carried by the shaft 28. The inner face of gate 27 is provided with a diaphragm 29 of resilient vulcanized rubber, which not only seats upon the end face of the spigot, but which also provides a discharge orifice 31. Gate 27 can be manually opened or closed, by manipulation of an operating rod 32, which is attached to the shaft 28. Concentrate delivered by spigot 26 is received by the launder 33, which in turn leads to the discharge chute 34.

Mechanism is provided for rapidly reciprocating the bottom container 17 in a vertical direction. Thus a crosshead 36 is shown rigidly secured to the lower end of the bottom container 17, and this crosshead is guided for vertical reciprocation, in the guide member 37. Below the crosshead 36 there is a shaft 39 adapted to be driven by some suitable source of power, and this shaft carries an eccentric 41, which is connected to crosshead 36 through the eccentric arm 42.

Spring counterbalancing means is provided to oppose the downward thrust upon the bottom container 17. Thus a pair of compression springs 44 have their upper ends seated upon the brackets 46, which in turn are mounted upon the under side of container 17. The lower ends of the springs engage thrust washers 47, which are carried by the adjustable rods 48.

From the above description it will be evident that when the ore jig is filled with water, as in normal operation, with a bed of ore on screen 11, reciprocation of the bottom container 17 will cause alternate pulsion and suction of water through the ore bed. As is well known it is such alternate pulsion and suction which causes the desired concentrating action to take place. Without a suitable form of baffle means within the tank 9, and below the screen 11, the desired activity is not distributed uniformly throughout the length and width of the ore bed. The baffle means illustrated in the drawings makes possible distribution of activity whereby all parts of the ore bed are acted upon by hydraulic pulsion and suction, to the same degree of intensity. Briefly, the baffle means disclosed consists of a hollow cone 51. This cone has its axis generally aligned with the axis of the bottom container 17, and the

diameter of its base is somewhat smaller than the diameter of circular opening 14. The interior of this cone is preferably in communication with a pipe 52, by means of which water is supplied to the jig. The upper apex of the cone is preferably provided with a small orifice 53, to avoid the formation of an air pocket, in the event bubbles of air find their way into the cone 51, through the pipe 52. Vertical webs 54 are shown for rigidly connecting the cone 51 to the side walls of the tank.

Operation of the apparatus described above, can now be briefly reviewed as follows: Assuming that a bed of ore is supplied to the screen 11, and that the tank 9 is filled with water, rotation of shaft 39 causes the bottom container 17 to be reciprocated, thus causing alternate pulsion and suction of water through the ore bed. The cone 51, being disposed directly above the bottom container 17, avoids application of too much pulsion and suction activity upon the central portion of the ore bed, and causes such activity to be uniformly distributed over all parts of the bed. Water can be admitted through pipe 52 through a suitable check valve, whereby it is introduced into the cone 51 on only the suction stroke, or as is well known in the art, it can be introduced continuously, on both the pulsion and suction strokes. In any event water introduced into the cone 51 will not detrimentally affect distribution of activity over the ore bed. The desired fine concentrate finds its way into the bottom container 17, and during normal operation is discharged through the orifice 31. Because this orifice is formed in the resilient rubber diaphragm 29, it does not tend to become clogged by coarser particles. At any time desired the bottom container 17 can be flushed, by swinging open the gate 27. The counterbalancing compression springs minimize the amount of power required and also insure smoother action, with less wear upon the working parts.

My jig operates at relatively high efficiency in effecting removal of a desired concentrate, in addition to affording a relatively high capacity, with economical operation. There is no tendency for concentrate to cling or collect on any parts or surfaces, other than in the bottom container 17 for discharge. For a unit of given capacity a relatively small amount of head room is required for installation and there is a comparatively small difference in elevation between the jig screen or sieve, and the discharge for concentrate. Also for a given capacity there is less dead weight per unit and a smaller amount of water and pulp contained in the jig, as compared to prior types of jigs. In the event the diaphragm 18 becomes worn, it can be readily removed and replaced, without removing the screen or bed, and without occasioning more than a minimum amount of lost time in performing the change. The above characteristics make the present jig particularly desirable for use on hydraulic dredge operations, where a number of such units are carried by the dredge barge.

I claim:

1. In an ore jig, a stationary tank having a substantially circular opening in its lower end, a stationary screen carried within the upper part of the tank, the walls forming the tank being convergent below said screen, a substantially conical shaped bottom container disposed below said opening, a flexible diaphragm serving to form a flexible sealed joint between the lower edge of the tank and the adjacent upper edge of the bottom container, a substantially hollow substantially closed conical shaped baffle disposed above said bottom container and within the tank, the apex of said baffle being uppermost and the face of said baffle being disposed in the region of and centrally of said tank opening, and means for reciprocating said bottom container in a vertical direction.

2. In an ore jig, a stationary tank having an opening in its lower end, a stationary screen carried within the upper part of the tank, the walls forming the tank being convergent below said bed and toward said opening, a substantially conical shaped bottom container disposed below said opening, a flexible annular diaphragm serving to form a flexible sealed joint between the lower edge of the tank and the adjacent upper edge of the bottom container, a hollow and substantially closed conical shaped baffle disposed above said bottom container and within said tank, the apex of said baffle being uppermost and the lower face of said baffle being located generally in the region of and centrally of said tank opening, means for reciprocating said bottom container in a vertical direction, means for withdrawing concentrate from said bottom container, and means for introducing water into the interior of said baffle.

3. In an ore jig, a stationary tank having a circular opening in its lower end, a stationary jig bed carried within the upper part of the tank, the walls forming the tank being convergent below said bed and towards said circular opening, a substantially conical shaped bottom container disposed below said opening, means for reciprocating said bottom container in a vertical direction, and means forming a flexible sealed joint between the lower edge of the tank and the adjacent upper edge of the bottom container, said last means comprising a pair of cylindrical shaped collars secured respectively to the lower end of the tank and the upper end of the bottom container, said collars being concentric, and the collar secured to the tank being of substantially smaller diameter than the collar secured to the bottom container, an annular diaphragm of flexible material having inner and outer peripheral portions respectively engaging said collars, whereby said flexible material in cross section is bent U-shaped, and means enabling the venting of the space within said diaphragm.

4. In an ore jig, a stationary tank having an opening in its lower end, a stationary screen carried within the upper part of the tank, the walls forming the tank being convergent below said bed and towards said opening, a substantially conical shaped bottom container disposed below said opening, a flexible annular diaphragm serving to form a flexible sealed joint between the lower edge of the tank and the adjacent upper edge of the bottom container, a hollow and substantially closed conical shaped baffle disposed above the bottom container and within said tank, the apex of said tank being uppermost and the lower face of said baffle being located generally in the region of and centrally of said tank opening, the apex of the baffle being provided with a small orifice to prevent formation of an air pocket, means for reciprocating said bottom container in a vertical direction, means for withdrawing concentrate from said bottom container, and means for introducing water into the interior of said baffle.

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