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J. MARTIN

2,124,983

AGITATOR

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FIG. 1.

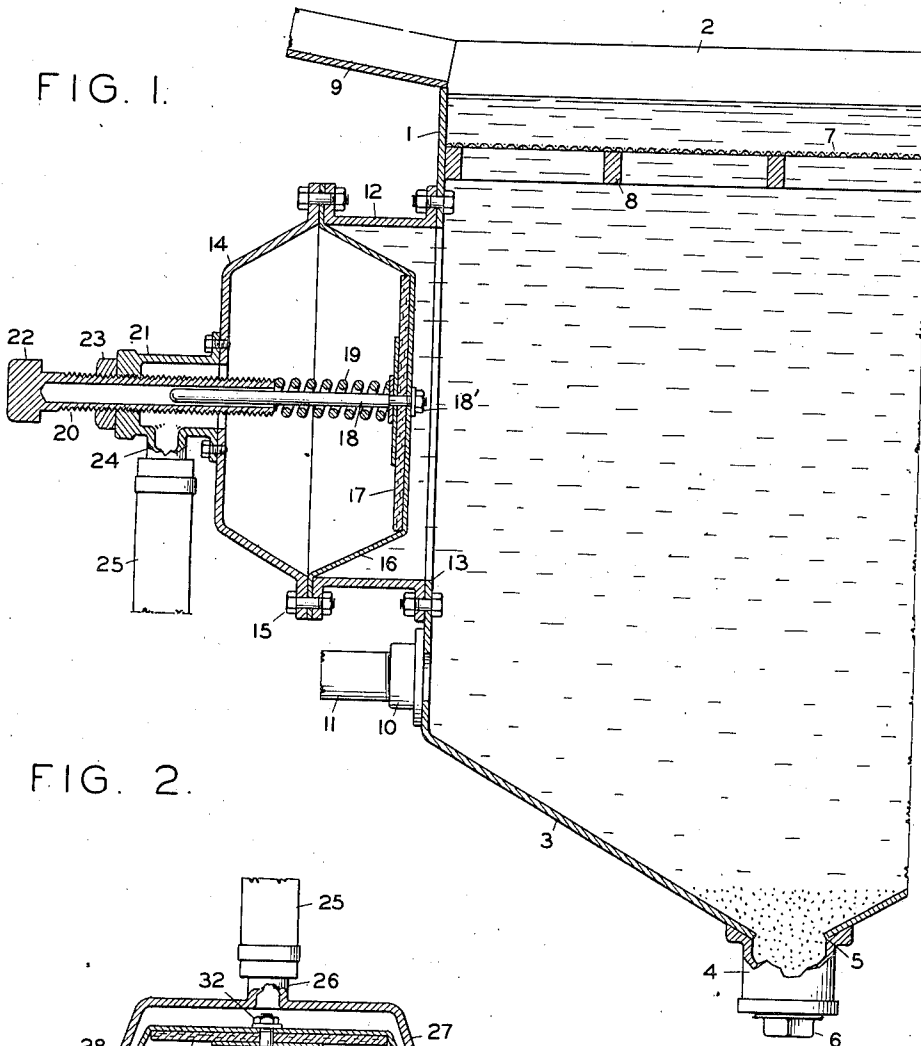
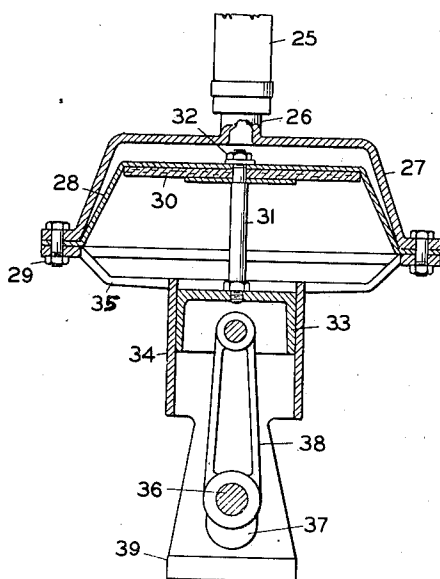


FIG. 2.



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AGITATOR

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1 Claim. (Cl. 259—98)

This invention relates to improvements in agitators and more particularly to agitators for gravitational ore concentrating jigs.

Among the objects of this invention is to provide means for varying the amplitude of the agitation within wide limits to accord with the character of the material being concentrated. The larger the particles and the greater their specific gravity, the more vigorous is the agitation required for efficient concentration. In the case of finely ground materials, too vigorous agitation will impede the descent of the finely divided values.

Another object is to provide micrometric regulating means so that the agitation may be accurately adjusted to the amplitude desired.

Another object is to reduce the external vibrations incidental to the operation of the agitator.

Another object is to provide an agitator simple and inexpensive of construction and reliable in operation.

Other objects and advantages appear as this description progresses.

The present invention is described and illustrated in conjunction with a gravitational ore concentrating jig. It will be obvious to those skilled in the art that the use of the present agitator is not restricted to this use because it is capable of a wide range of applications; for example, the gravitational grading of grain by agitation.

In this specification and the accompanying drawing the invention is disclosed in its preferred form. It is, however, to be understood that it is not limited to this form because it may be embodied in other forms within the purview of the claim following the description.

In the one sheet of drawings:

Fig. 1 is a vertical section diagrammatically illustrating an agitator constructed in accordance with the present invention applied to a conventional gravitational ore concentrating jig.

Fig. 2 is a similar view showing the actuating means for the agitator.

In detail, the construction illustrated in the drawing, referring more particularly to Fig. 1, comprises a conventional ore concentrating jig constructed in the usual manner and consisting of boiler plate or similar material. It has the sides 1 and 2 and the sloping bottom 3. The fitting 4 is welded to the lowest point of the bottom 3 around the opening 5 therein. The threaded plug 6 closes the fitting 4 and is periodically removed for the withdrawal of accumulation of concentrated values.

odically removed for the withdrawal of accumulation of concentrated values.

The horizontally disposed wire screen 7 is supported on the transverse struts 8 near the top of the jig. The mesh of the screen 7 will depend upon the size of the particles of the material being concentrated. A water suspension of the material to be concentrated flows down the chute 9 on to the screen 7 in the jig. Riffles and other refinements common in this art may be provided where desired. The collar 10 welded to the side wall 1 near its lower end has the water supply pipe 11 screwed therein. This enables the introduction of clean water into the jig in accordance with usual procedure.

The structure thus far described is a conventional concentrating jig. The invention is equally adaptable to other types and forms of jigs which are common in this art.

The cylindrical spacer 12 is bolted to the side wall 1 surrounding the opening 13 therein. The chamber 14 is secured to the spacer 12 by the bolts 15. The flexible diaphragm 16 has its margins confined between the abutting flanges of the spacer 12 and the chamber 14. Buckling of the diaphragm 16 is prevented by the disc 17 which is secured to the diaphragm 16 by the stem 18 having the retaining nut 18'. The disc 17 is preferably of stiff leather as indicated. Other material may be employed if desired.

The stem 18 extends laterally from the diaphragm 16 and is encircled by the helical spring 19. The hollow tension regulator 20 is threaded in the fitting 21 which is bolted to the chamber 14. It telescopes over and guides the stem 18 and bears against the spring 19. The spring 19 expanding between the regulator 20 and the disc 17 urges the diaphragm 16 outward from the chamber 14. The outer end of the regulator 20 is provided with the hexagon 22 to receive a suitable wrench for adjustment of the regulator 20 so that the tension of the spring 19 may be varied, for purposes later to be described. The lock nut 23 is arranged to hold the regulator 20 against rotation so as to maintain the adjustment thereof.

The fitting 21 has the nipple 24 having the heavy non-collapsible hose 25 telescoped thereover. The opposite end of this hose 25 has the nipple 26 telescoped therein which projects from the chamber 27. This chamber 27 is closed by the diaphragm 28 which has its margins confined between the marginal flange of the chamber 27 and the ring 29 bolted thereto. The disc 30 prevents buckling of the diaphragm 28 and is

secured thereto by the stem 31 and the nut 32. The lower end of the stem 31 is bolted to the plunger 33 which is slidable within the guide 34 joined to the ring 29 by the spider 35. The plunger 33 is connected to the crank pin 36 of the crank shaft 37 by the pitman 38. The crank shaft 37 is journaled in the standard 39 which supports the guide 4. Suitable means, not shown, are provided for driving the crank shaft 37.

10 The invention operates substantially as follows: The crank shaft 36 is driven at a speed which depends upon the frequency of the agitation desired in the jig. The rotation of the crank shaft reciprocates the plunger 33, which motion is transmitted to the diaphragm 28 by the stem 31. This rhythmically reduces the pressure in the chamber 27. The hose 25 transmits the pulsating pressure through the fitting 21 to the chamber 14. The diaphragm 16 responds to the pulsating pressure reduction in the chamber 14 by contracting against the tension of the spring 19. This sympathetic vibration of the diaphragm 16 agitates and churns the water in the adjoining concentrating jig. The heavier particles settle toward the bottom through the screen 7 while the agitation maintains the lighter particles in suspension. The practical technique of the concentration forms no part of the present invention and is carried out in the well known manner which is described in detail in any standard text book relating to the subject.

30 The amplitude of the agitation desirable depends upon the size of the particles in suspension. Increasing the thrust of the spring 19 by adjustment of the regulator 20 limits the travel of the diaphragm 16 when the pressure in the chamber 14 is reduced by the operation of the diaphragm 28. The tension of the spring 19

can be increased until it approaches the hydrostatic head plus atmospheric pressure on the opposite side of the diaphragm 16. The amplitude of the vibration of the diaphragm will then be negligible. Conversely, the thrust of the spring 19 may be relieved until the diaphragm 16 responds freely to the pressure variation thus providing a maximum vibration amplitude which depends upon the travel of the actuating diaphragm 28 and the relative sizes of the two diaphragms.

It will be obvious to those skilled in the art that, by suitably increasing the dimensions of the actuating diaphragm 28, a plurality of agitators diaphragms such as 16 may be operated therefrom.

It will be noted that, apart from the actuating unit, the operative stresses are confined to the diaphragm 16 and the chamber 14, thus relieving the body of the concentrating jig from destructive strains and excessive vibration.

Having thus described the invention, what is claimed and desired to be secured by Letters Patent is:

An agitator for gravitational ore concentrating jigs comprising a chamber; a diaphragm closing said chamber and in operative relation to the mass to be agitated; means for providing a pulsating pressure in said chamber to reciprocate said diaphragm; a stem attached to said diaphragm and extending across said chamber; a hollow regulating member threaded in said chamber and arranged to telescope over the free end of said stem; and a spring interposed between said regulating member and said diaphragm and encircling said stem.

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