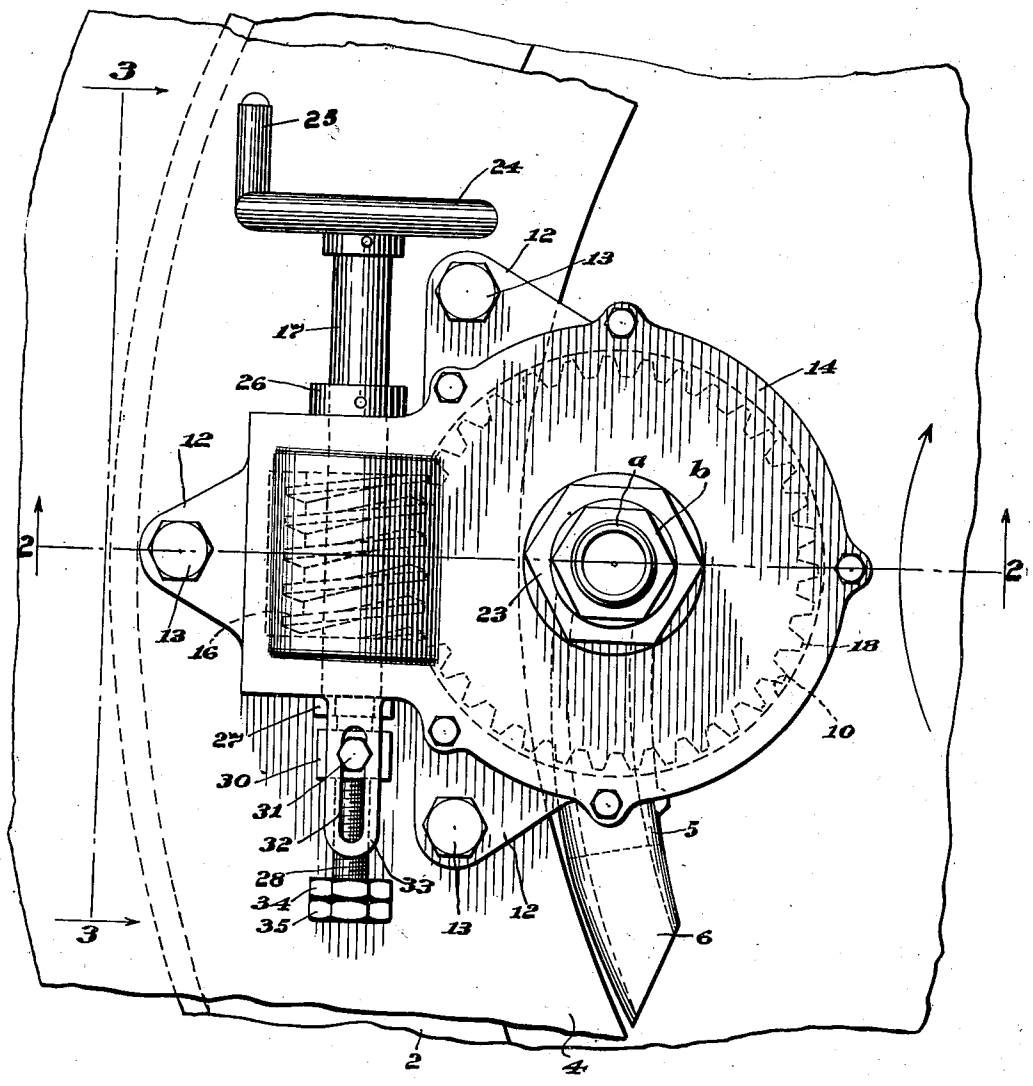
May 20, 1941. J. E. THOLL 2,242,713

SKIMMER FOR CENTRIFUGAL SEPARATORS

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Fig. 1



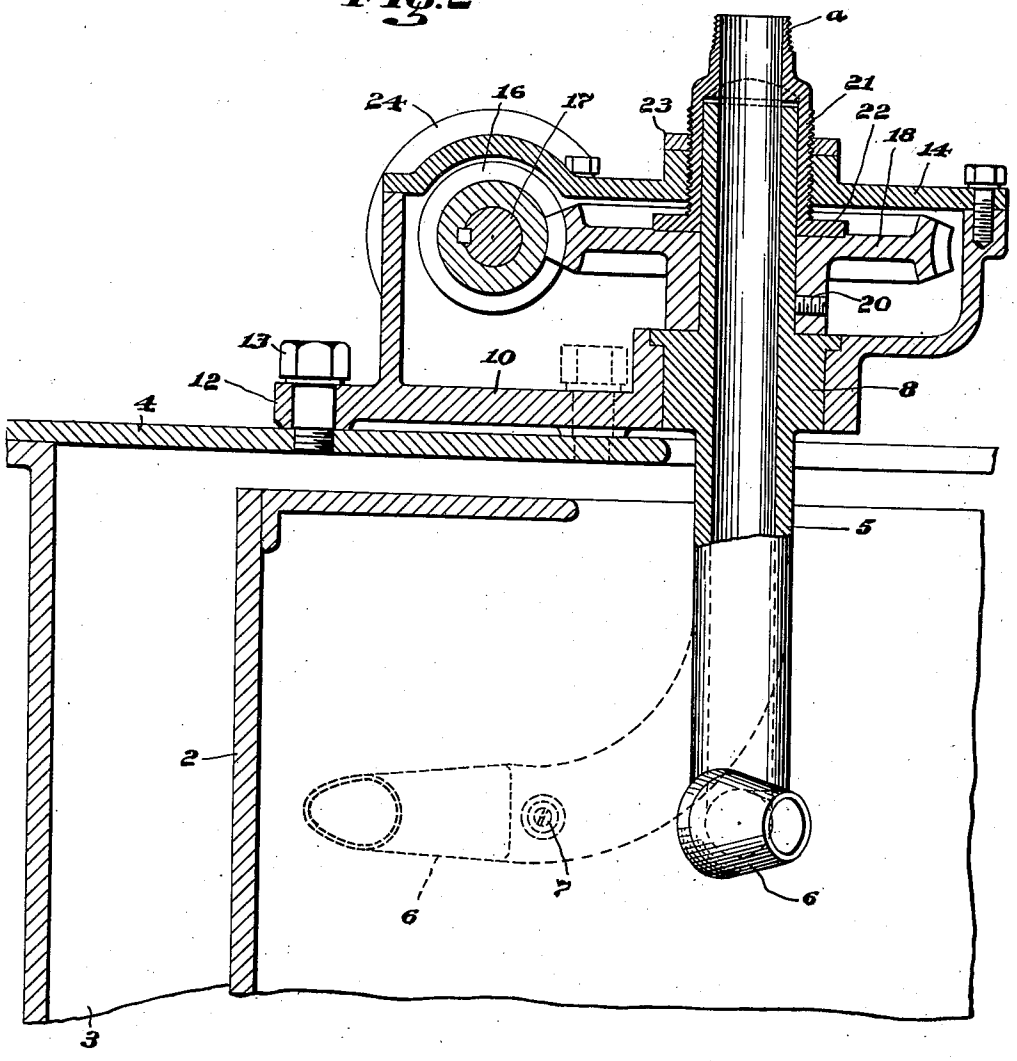
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SKIMMER FOR CENTRIFUGAL SEPARATORS

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Fig. 2



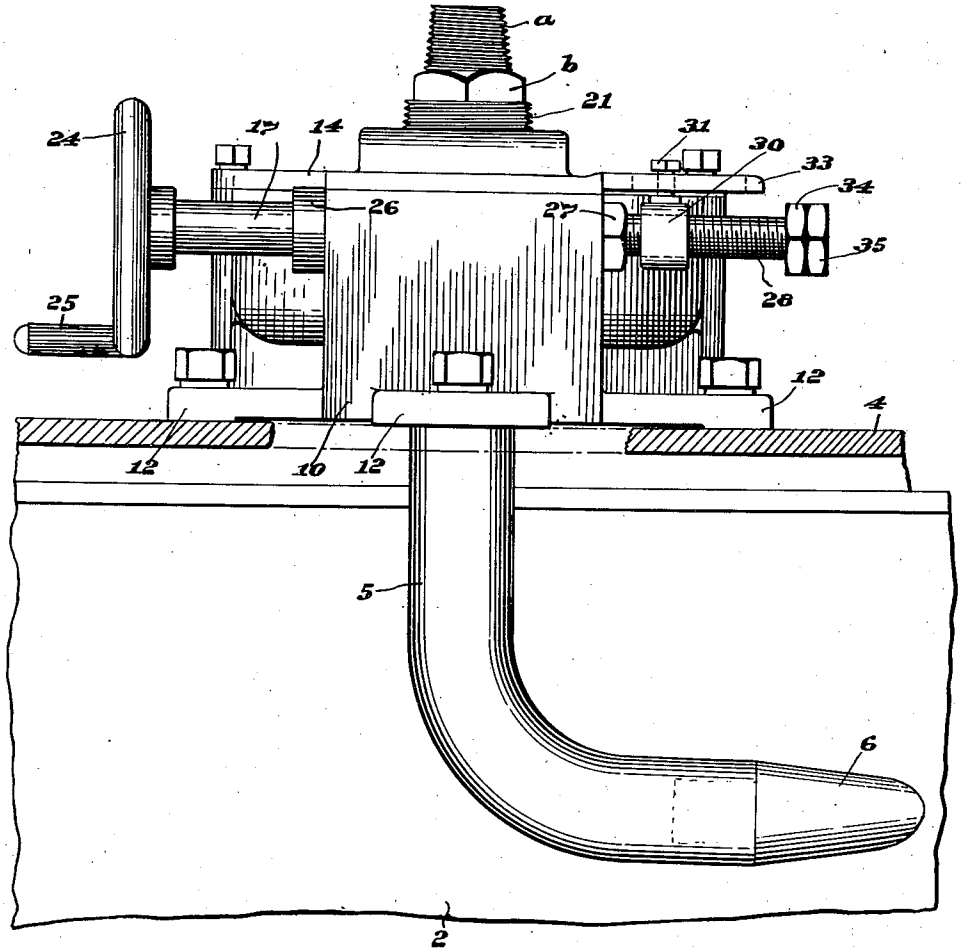
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SKIMMER FOR CENTRIFUGAL SEPARATORS

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Fig. 3



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SKIMMER FOR CENTRIFUGAL SEPARATORS

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Application August 5, 1939, Serial No. 288,533

5 Claims. (Cl. 233—22)

In the use of centrifugal separators for various purposes as, for example, in the treatment of certain sludges in centrifugal baskets of the solid or imperforate wall type, it is necessary to draw off the liquid constituent of the material either continuously or at intervals, as it accumulates. Such an apparatus is commonly referred to as a "skimmer."

Prior devices of this kind with which I am familiar have not proved entirely satisfactory for several reasons, among which may be mentioned particularly leakage in the connections with the centrifugal structure, the fact that the operation of the skimmer depends too much for its control upon the attention and judgment of the workman, and the further fact that such devices have not been adaptable to the variety of conditions encountered in actual practice.

The present invention aims to improve devices of this type with a view to overcoming the objections above mentioned and devising a more satisfactory form of skimmer. It is also an object of this invention to produce a more reliable and rugged construction which can nevertheless be manufactured and installed economically.

The nature of the invention will be readily understood from the following description when read in connection with the accompanying drawings, and the novel features will be particularly pointed out in the appended claims.

In the drawings,

Figure 1 is a plan view showing a skimmer embodying this invention applied to a centrifugal separator; and

Figs. 2 and 3 are vertical, sectional views approximately on the lines 2—2 and 3—3, respectively, of Fig. 1.

Referring first to Figs. 1 and 2, a centrifugal basket is there indicated conventionally at 2 mounted in a casing 3 which includes the usual curb 4, no attempt being made to show exact details of these parts.

The skimmer structure shown comprises a pipe or spout 5, the main body of which is positioned vertically, while its lower end is curved to terminate in a horizontally extending portion. The latter is provided with a tip 6, adjustable relatively to the pipe around a horizontal axis and adapted to be secured in various positions of adjustment by means of a set screw 7. This tip also may be removed and replaced since it is locked in its operative position by said set screw.

At an intermediate point in its height the pipe is provided with an enlarged boss or journal portion 8 of generally cylindrical form but flanged circumferentially at its upper end as shown at 9 and preferably made integral with the pipe. It is mounted in a bore formed for it in a bracket 10 and the flange fits snugly in a socket surrounding the upper end of said bore. The bracket itself thus constitutes the main supporting element for the entire skimmer structure. For this purpose it is provided with three feet 12, Fig. 1, which rest on the curb sheet 4 and are secured thereto by bolts 13. The bracket 10 also cooperates with a cover 14 to form a casing in which the operating mechanism for the skimmer pipe is supported and enclosed. As shown, this mechanism comprises a worm 16 mounted on a worm shaft 17 and meshing with and driving a worm gear 18. The hub of this gear rests on the upper surface of the journal portion 8 of the skimmer pipe and it is secured to the latter by a set screw 20, Fig. 2. The pipe also includes an extension projecting above the enlargement 8 and through the cover 14. Telescoping over the upper part of this extension is a sleeve 21 having a screw threaded engagement with the cover, and the lower end of this sleeve is flanged radially, as shown at 22, Fig. 2, to bear on the hub of the worm gear 16. A lock nut 23 is threaded on the sleeve above the cover so that by adjusting the sleeve in the cover the desired degree of end play of the worm gear can be produced accurately, after which the sleeve can be locked in its adjusted position by turning up the set screw 23. Preferably the sleeve terminates in a threaded nipple *a*, Fig. 3, adapted to take a coupling for connecting a hose or discharge pipe to the skimmer, and the portion of the sleeve immediately below this nipple is made of hexagonal form to take a wrench, as shown at *b* in Figs. 1 and 3.

The worm shaft 17 is equipped with a hand wheel 24, preferably provided with a clamp 25, by means of which the workman can swing the skimmer pipe through the worm and gear connections.

Usually it is desirable to allow the accumulation of solids to build up against the inner wall of the basket to a predetermined thickness before performing the discharging or unloading operation, and in order to facilitate this action, a stop mechanism is provided which is arranged to be operated by the rotation of the worm shaft 17. As shown in Figs. 1 and 3, this shaft is held against axial movement relatively to the casing by means of a thrust collar 26 pinned to the shaft and bearing against the casing and also by a stop nut 27 threaded on an extension of the shaft where it emerges from the opposite side of the

casing. This screw threaded extension 28 also carries a nut 30 which is held against rotation by means of a stud 31 projecting upwardly therefrom through a slot 32 formed in an extension 33 projecting laterally from the cover 14. Consequently, as the shaft 17 is revolved to operate the skimmer, the nut 30 will be moved backward and forward axially of said shaft, its direction of movement depending upon the direction of rotation of the shaft. Inward movement of the nut 30 and stud 31, which occurs during the inward swing of the skimmer toward the axis of the basket, is limited by the inner end of the slot. Outward movement of said nut, however, is adjustably limited by a nut 34 and check nut 35, both threaded on the extension 28. Consequently, these nuts may be adjusted to determine the distance to which the nozzle tip 6 may be made to approach the wall of the basket 2. This adjustment is made such that the desired depth of solids may build up against said wall without being disturbed by the skimmer.

The operation of the skimmer is similar to that of prior devices. As the intake pipe 5 is swung outwardly, its tip sooner or later enters the rapidly revolving body of liquid in the basket. The open end of the tip is directed against the current so that the motion of the liquid body forces a portion of this fluid through the pipe 5 and out through the hose or pipe connections at the upper end of it. This operation continues until the radial liquid depth is so far reduced that further liquid is not forced into the nozzle or tip 6.

It will be seen from an inspection of Fig. 1 that this skimmer structure includes one joint only through which leakage is possible, namely, that between the sleeve 21 and the extension of the skimmer pipe 5 telescoped inside of it. This telescoped section is made relatively long, and the matter of making it liquid tight involves very simple and inexpensive machine operations. Accordingly, this difficulty is readily eliminated. The sleeve 21 also holds the boss or journal portion 8 of the intake pipe 5 firmly in its seat and this joint between the parts 8 and 10 also may readily be made liquid tight so that the casing can be packed with lubricant without danger of its leaking into the basket.

It will also be appreciated that the invention provides an exceptionally sturdy construction, not liable to get out of order, capable of giving a long period of service with a minimum of care, which can be manufactured and installed economically, and which is adaptable to a wide range of machines.

While I have herein shown and described a preferred embodiment of my invention, it will be understood that the invention is not limited to embodiment in the precise form shown.

Having thus described my invention, what I desire to claim as new is:

1. A skimmer for centrifugal separators having a centrifugal basket and a curb, said skimmer comprising a discharge pipe adapted to extend into the centrifugal basket, a bracket adapted to be mounted on the curb portion of the separator, said pipe including an upright portion extending through said bracket and having a journal portion rotatably mounted in the bracket and forming a liquid tight joint therewith, a cover cooperating with said bracket to form a casing, a sleeve screw threaded through said cover and having a telescoping connection with said pipe, and means in said casing operable to swing said pipe about the axis of that portion of the pipe extending through the casing, said means including a member secured to the pipe between said sleeve and said journal portion.

2. A skimmer for centrifugal separators having a centrifugal basket and a curb, said skimmer comprising a discharge pipe adapted to extend into the centrifugal basket, a bracket adapted to be mounted on the curb portion of the separator, said pipe including an upright portion extending through said bracket and having a journal portion rotatably mounted in the bracket and forming a liquid tight joint therewith, a cover cooperating with said bracket to form a casing, means in said casing operable to swing said pipe about its own axis, said means including a member seated on the journal portion of said pipe, and a sleeve screw threaded through said cover and surrounding the pipe and bearing on said member to hold the latter firmly against said journal portion of the pipe.

3. A skimmer for centrifugal separators having a centrifugal basket and a curb, said skimmer comprising a discharge pipe adapted to extend into the centrifugal basket, a bracket adapted to be mounted on the separator structure, means supporting said pipe on said bracket for movement about an axis through a portion of the pipe, a worm mounted on said bracket, a worm wheel meshing with said worm and through which said pipe extends, a shaft for said worm, said shaft having a screw threaded portion, a nut mounted on and in threaded engagement with said portion to be traversed thereby, and means adjustable on the screw threaded portion to limit the extent of such traversing movement.

4. A skimmer for centrifugal separators having a centrifugal basket and a curb, said skimmer comprising a discharge pipe adapted to extend into the centrifugal basket, a casing adapted to be mounted on the separator structure, said pipe passing through the walls of said casing, a sleeve having a substantially liquid tight telescoping connection with said pipe, said sleeve being threaded into the wall of said casing, and means operable to swing said pipe around its own axis.

5. A skimmer for centrifugal separators having a centrifugal basket and a curb, said skimmer comprising a discharge pipe adapted to extend into the centrifugal basket, a bracket adapted to be mounted on the curb portion of the machine, said pipe including an upright portion extending through said bracket and having a journal portion rotatably mounted in the bracket, said journal portion including a circumferential flange and said bracket having a seat surrounding the bore in which said journal portion is mounted, said flange fitting snugly in said seat, said bracket being recessed to form part of a casing, a cover fitting over said recess to close it, a worm wheel secured fast to said pipe immediately above the journal portion thereof, a worm mounted in said casing and meshing with said worm wheel to drive it, a sleeve extending through said cover and having a screw-threaded connection therewith and also having a liquid tight connection with said pipe, and means for locking said sleeve in an adjusted relationship to said cover, said sleeve cooperating with said pipe to hold the flanged journal portion thereof firmly in its seat in said bracket.

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