Jan. 1, 1935. A. SCHLIMBACH 1,986,606

MIXING AND STIRRING DEVICE

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Fig. 1.

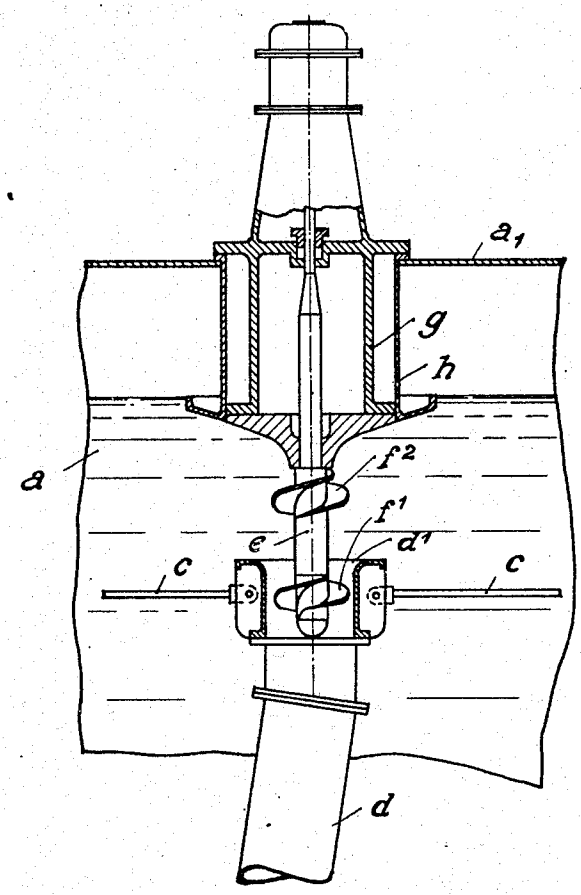
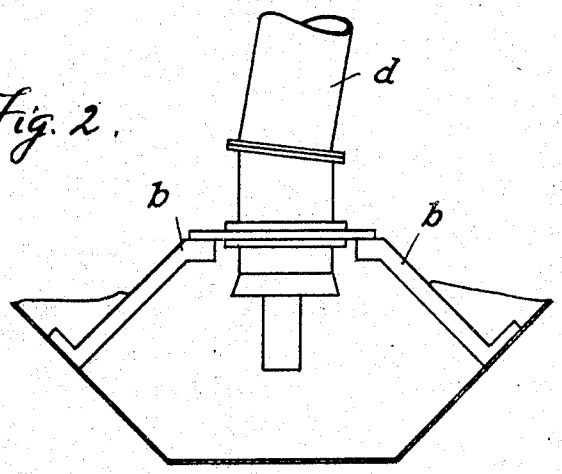


Fig. 2.



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MIXING AND STIRRING DEVICE

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3 Claims. (Cl. 259—9)

My invention relates to a mixing and stirring device of the type in which a conveyor screw is used and which is intended especially for the treatment of rotten mud. It is known that for accelerating the process of rotting in mud or muddy water, it is not only necessary to mix the precipitates continually anew with the water above them and to bring the substances in intimate contact with one another, but it is also necessary to prevent the formation of floating mud, as arises particularly easily in rotten mud because of the many organic substances (fecal substances) present therein.

While with only low depth of the muddy water containing the rotten mud a mixing apparatus having a conveying screw causing the mud to circulate in vertical direction is sufficient, in that, in view of the slight delivery head, such an apparatus is capable of bringing about the strong surface motion requisite for the prevention of the enrichment of the rotten mud with floating mud, this is no longer the case if the depth is comparatively great.

Now, the object of the present invention is to produce an apparatus of the type stated which will prevent very effectively the formation of floating mud and the enrichment of the rotten mud therewith also in the case of great depth of the muddy water, and which is, besides, distinguished by its great simplicity. Its characteristic features are these that a freely suspended shaft is provided with two conveyor screws, of which the upper one rotates freely in the vessel containing the muddy water a little below the upper surface of the same, whereas the lower conveying screw is located in a guide body that forms the outlet end of a vertical or practically vertical riser extending freely upwardly in said water or mud.

This arrangement and combination of parts presents the advantage that the space above the riser through which extend, with the known usual arrangement of said guide body for the lower or circulating conveying screw, the supporting rods, as well as (in the case of the provision of a separate guide member for the conveying screw shaft) the holding members of the guide bearing, remains free for the completely undisturbed action and utilization of the stirring effect of the upper screw.

The rotten mud conveyed to the upper screw by the lower one is freely distributed by the upper screw to all sides, without any impediment, whereby the surface of the mud is agitated so strongly that no floating mud can arise or continue to exist.

The circumstance that suspension members for the guide body of the circulating conveying screw are obviated can be utilized for providing in the free space above the outlet body of the riser a device that prevents the escape of gas from the receptacle when the conveying screw shaft and its bearing body are removed from out of the same.

This effect is attained, according to the present invention, by providing for said bearing body (which may be affixed in the cover of the receptacle or below the same) a shell or jacket which extends from the cover downwardly to below the upper surface of the muddy water containing the rotten mud, and which remains at its place when the conveying screw shaft and the bearing body for the same are removed, said shell or jacket acting then as a closure by which the escape of gas through the opening in the cover, when the said shaft with the screw are being removed, is effectively prevented.

The invention is illustrated diagrammatically and by way of example on the accompanying drawing on which the new arrangement and combination of parts mentioned in the introductory part of this specification is shown partly in vertical section and partly in side-view, the upper figure showing the main portion of said arrangement, etc., including the top of the riser, and the lower figure showing the lower end of the riser with some appertaining members.

On the drawing, a denotes the mixing receptacle and d is the riser which is supported by feet b (lower figure) and held in place by upper stays c (upper figure), these latter members being connected with the outlet body d^1 of the riser. In the embodiment shown, the riser has a slight oblique position, but it may as well be completely vertical. The outlet body d^1 surrounds a conveying and circulating screw f^1 which is affixed to a short vertical suspension shaft e on which is mounted a second conveying and distributing screw f^2, this screw being located above said outlet body d^1.

g denotes the bearing body for the shaft e which body extends from the cover a^1 of the receptacle down to below the upper surface of the muddy water and is enclosed in a jacket or shell h which also extends down to below said surface. This jacket or shell is secured to the cover of the receptacle so that it remains in its place when

the body *g* is withdrawn together with the shaft *e* from the cover of the receptacle.

I claim:

1. A device for stirring and mixing a liquid containing substances some of which tend to sink in the liquid and others of which tend to collect and float on the surface of the liquid, said device comprising a relatively deep receptacle to be filled to a level near the top thereof with the liquid, a riser within the receptacle having its lower end open and disposed adjacent to the bottom of the receptacle and having its upper end open and disposed adjacent to the top of the receptacle and below but near the surface of the liquid. a screw propeller within said riser to produce a circulation of the liquid and contained substances from the bottom of the receptacle upwardly through the riser, and means separate from said screw propeller spaced thereabove and disposed near the top of the receptacle above the upper end of the riser and adjacent to and below the surface of the liquid to produce a strong surface flow of the liquid and the substances elevated by the first mentioned means laterally away from the location where the substances are caused to rise near the surface of the liquid by said first mentioned means, thereby to prevent the accumulation of a layer of floating material on the surface of the liquid.

2. A device especially designed for mixing and stirring rotten mud comprising, in combination, a closed receptacle of considerable depth to be substantially filled with the material to be treated, a riser within the receptacle having its lower end open and disposed adjacent to the bottom of the receptacle and having its upper guide-forming end open and disposed adjacent to the top of the receptacle and below but near the surface of the material to be treated, the distance between the surface of the material and the upper end of said riser being considerably less than the distance between the top of said riser and the bottom of the receptacle, a screw propeller within the upper end portion of said riser for effecting an upward circulation of the material through said riser, and a second screw propeller separate from and spaced above said first mentioned screw propeller and above the upper end of said riser and below the surface of the material to intimately mix and distribute the material in a lateral direction thereby preventing the formation of a mud layer on the surface of the material.

3. A mixing and stirring device comprising, in combination, a receptacle for the material to be treated, a cover for the receptacle, a shell extending from the cover downwardly below the surface of the material within the receptacle, a shaft bearing body removably mounted within said shell and coacting with the inside of the wall of said shell, a shaft journaled in said bearing body and extending below said shell, a riser within the receptacle having an open upper end disposed below the lower end of the shell and in alinement therewith, and a pair of screw propellers on said shaft one disposed within the upper end portion of the riser and the other disposed between the upper end of the riser and the lower end of the shell.

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