Nov. 22, 1938. R. M. WILSON ET AL 2,137,432

AGITATOR FOR PAINT DRUMS AND THE LIKE

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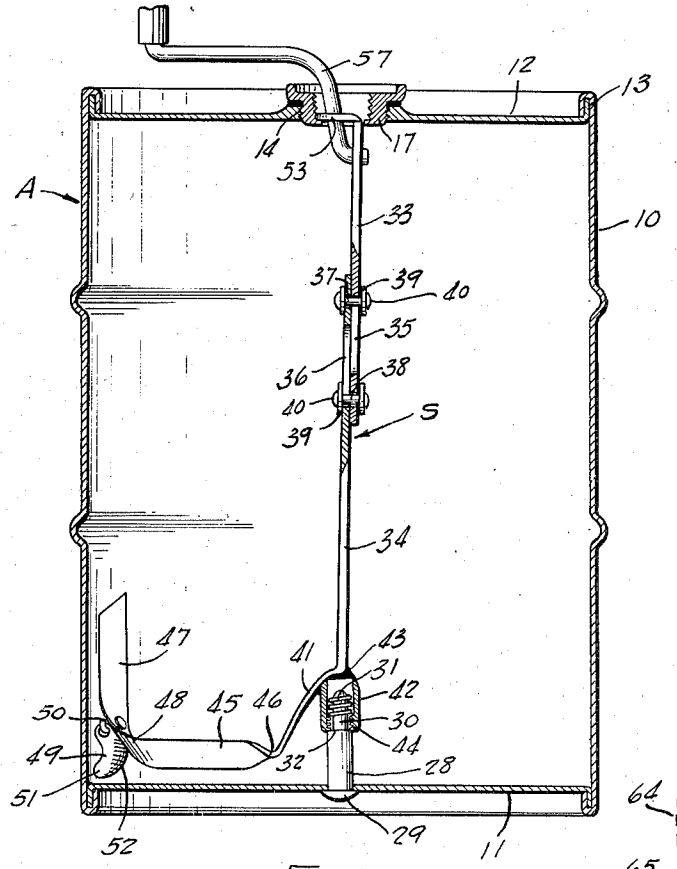

FIG. 1

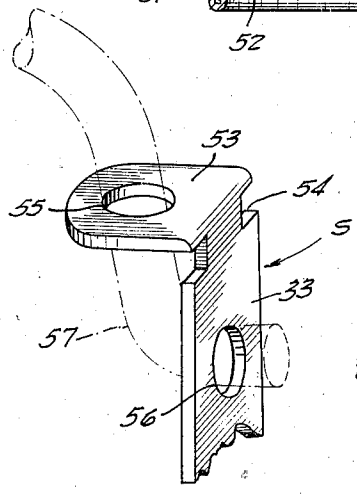

FIG. 2

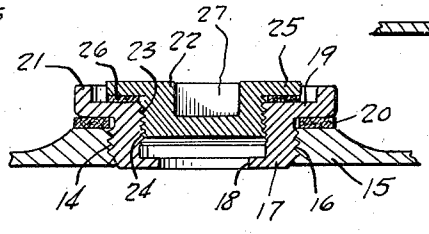

FIG. 3

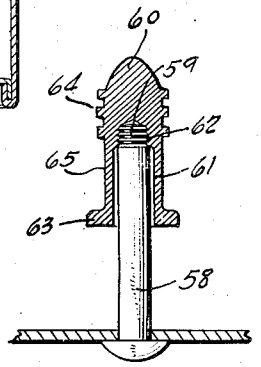

FIG. 4

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AGITATOR FOR PAINT DRUMS AND THE LIKE

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This invention relates to agitating devices such as are employed in conjunction with drums or similar containers which are used in the commercial handling of paint and similar materials, in which the need for stirring or agitating the contents of the drum prior to withdrawal therefrom for use is an important factor.

Ordinarily, drums of the type with which this invention is concerned are of a cylindrical formation, and include top and bottom members in the shape of disks or flat circular plates, and the top is generally provided with a bung hole and a suitable fitting constituting a closure for the same.

Such drums that are suitable for the commercial handling of paint are available to the buying public as such, and conventional practice dictates that these more or less standardized paint drums be used in conjunction with paint products.

With the foregoing conditions in mind, this invention has in view, as its foremost objective, the provision of an agitating device which is designed to be inserted through the bung hole of the drum and therein set up in operative position. In accordance with this invention, such an agitator comprises a central drive shaft which, in its operative position, is coaxial with the drum and substantially coextensive with the axis thereof, and this central drive shaft carries a mixing and stirring arm which extends substantially to the cylindrical side of the drum.

An important object of the present invention is the provision of an agitator of the character above noted, which is so designed and mounted in the drum that it may be withdrawn through the bung hole.

In the carrying out of this thought in a practical embodiment, the manner in which the lower end of the drive shaft is pivotally mounted on the bottom of the drum assumes an important status in that it is essential that this pivotal mounting be disconnectable in order to permit of the withdrawal of the drive shaft and associated stirring blade.

Accordingly, this invention has in view, as a further object, the provision of an agitating device of the character above noted, which includes means for establishing a pivotal connection with the bottom of the drum by proper manipulation of the agitator shaft without requiring the use of any other tools, and which means is also susceptible of being rendered ineffective to break the pivotal connection by further manipulation of the agitator shaft.

This thought takes the form of a pivotal connection which includes a stud upstanding from the bottom of the drum and centrally thereof, and which stud is formed with a reduced cylindrical portion, the upper extremity of which carries threads, the outside diameter of which is greater than the diameter of the said reduced cylindrical portion.

The drive shaft of the agitator is formed on its lower extremity with a sleeve that is provided with interior threads complemental to the threads on the stud. When these threads on the sleeve have been screwed over the threads on the stud and passed therebeyond, they are disposed about the cylindrical portion of the stud to set up the pivotal connection. Unless the agitator blade is raised upwardly so that the threads on the sleeve again engage the threads on the stud, the pivotal connection is maintained, and rotation of the drive shaft provided for in the manner necessary for proper operation of the agitator.

However, when it is desired to remove the agitator the central drive shaft may be raised upwardly to cause engagement of the threads on the sleeve with those of the stud, and upon rotation of the agitator in the proper direction, the sleeve will be unscrewed from the stud.

Inasmuch as there is now available to the buying public more or less standard drums which include studs extending upwardly from the bottoms thereof, and which studs have threaded extremities, which are not particularly adaptable to the above-noted type of connection, this invention has in view, as a more detailed objective, the provision of an adaptor which is designed to fit over the stud on a standard drum and render the same susceptible to having the central drive shaft of an agitator such as contemplated by this invention, rotatably anchored thereto.

Yet another objective of the present invention is the provision of an agitator of the character described which includes a central drive shaft which is adjustable as to its length. In carrying out this idea in a practical embodiment, the central drive shaft is made from two flat bars which are arranged for sliding engagement with each other, and which are provided with suitable pin and slot connections for accommodating this sliding movement, and at the same time maintaining the parts of the drive shaft in proper operative relationship.

Following the principles of this invention, the arm which extends radially outwardly from the central drive shaft, and which constitutes a mix-

ing and stirring blade, has an upturned end which extends along the inner face of the cylindrical side of the drum for a required distance. Such a construction does not readily lend itself to the digging out of the contents of the drum which may be contained in the corner defined by the cylindrical side and bottom of the drum.

Accordingly, this invention has in view as a further object the provision of a cleaning device which is designed to get into this corner of the drum, and which device is characterized as being a member pivotally mounted on the stirring blade, and which is urged by its own weight to cause the extremity thereof to engage with the walls of the drum defining this corner. This cleaning device preferably is in the form of a chime cleaning device that is weighted on one side and formed with a point on the opposite side so that the weighted side is effective to constantly urge the point into the corner.

To the end of providing for a proper operative mounting for the drive shaft of the agitator in the drum, it is necessary that the upper end of the drive shaft be rotatably mounted at the bung hole and at the same time held in position so that it will not fall down into the drum.

This invention, therefore, has in view, as another object, the provision of a connection at this point which involves a direct interlock between the upper end of the drive shaft and the fitting in the bung hole. Such a direct interlock obviates the need for a supplemental fastening means in the form of pins, catches, or other additional parts.

This invention proposes a connection involving the formation of a turned-over projection at the upper extremity of the drive shaft. The drive shaft is notched just beneath this projection, and these notches are designed to receive a flange formed on the fitting in the bung hole. By forming openings in the outwardly extending projection and the drive shaft proper, provision is made for removably and drivably connecting a handle to the drive shaft for stirring purposes.

Other more detailed objects and advantages associated with the carrying out of the above noted objectives in a practical embodiment will in part be apparent and in part be hereinafter stated as the description of the invention proceeds.

The invention, therefore, comprises an agitator for paint drums and the like, which includes a central drive shaft that is adjustable as to length, and which drive shaft has a stirring blade extending outwardly from the lower extremity thereof substantially to the cylindrical side of the drum, and this stirring blade carries a chime cleaning device for cleaning out the lower corner of the drum.

The drive shaft of the agitator is mounted at its lower end by a pivotal connection which is disengageable, and which may be set up or broken by manipulation of the agitator arms. At the upper extremity the agitator is rotatably mounted and held in position by a connection involving an interlock with the fitting in the bung hole of the mixing drum. This agitator is insertable and removable through the bung hole of the mixing drum.

For a full and more complete understanding of the invention reference may be had to the following description and accompanying drawing, wherein:

Figure 1 is a side view taken as a vertical section through a mixing drum in which an agitating device is operatively mounted, in accordance with the precepts of this invention,

Figure 2 is a fragmentary view in perspective of the upper extremity of the drive shaft,

Figure 3 is a detail showing in section of the bung hole and associated fittings, and

Figure 4 is an enlarged detail view bringing out the manner in which the adaptor may be applied to standard drums having a central stud.

Referring now to the drawing, wherein like reference characters denote corresponding parts, a drum is shown in Figure 1 and referred to generally by the reference character A. This drum comprises a cylindrical wall **10** which carries a bottom **11** and a top **12** in a manner well-known in this art, the bottom **11** and top **12** being connected to the cylindrical wall **10** by an interlocking flange connection, referred to as **13**.

The top **12** is provided with a bung hole designated **14** and the top wall **12** is enlarged about the bung hole **14**, as indicated at **15**, this enlarged portion providing for threads **16** which receive a bung fitting designated **17**. This bung fitting **17** is formed with an inwardly extending flange **18**, for a purpose to be later described, and also with an outwardly extending flange **19** which overlies the thickened portion **15** of the top **12**.

As shown in Figure 3, a gasket **20** may be interposed between the flange **19** and thickened portion **15** of the top **12**. The outer peripheral edge of the flange **19** is upturned, as shown at **21**, to provide a cup-like recess which receives a plug closure **22**. This plug closure **22** is exteriorly threaded at **23** for cooperation with interior threads **24** formed on the fitting **17**, and above the threads **23** the plug closure **22** is formed with an outwardly extending flange **25** that fits over the fitting **17**. A gasket shown at **26** may be interposed between the flange **25** and the fitting **17**. Wrench-engaging means for the plug closure **22** may take the form of a non-circular socket indicated at **27**.

Extending upwardly from the bottom **11** and centrally thereof is a stud **28** which has a headed end shown at **29**, and which may be positively anchored to the bottom **11**, in any preferred manner, as by welding.

The upper extremity of the stud **28** is formed with a reduced cylindrical portion **30**, the outer extremity of which is formed with threads **31**, the outside diameter of which is greater than the diameter of the reduced cylindrical portion **30**. As shown in Figure 1, a shoulder at **32** is formed between the main body portion of the stud **28** and the reduced cylindrical portion **30**.

An agitator, such as proposed by this invention, comprises a central drive shaft referred to generally by the reference character S and which consists of an upper part **33** and a lower part **34**. Referring now to Figure 1, the upper part **33** is shown as provided with a slot **35** while the lower part **34** is formed with a similar slot **36**. A pin **37** is carried by the lower drive shaft part **34** and extends into and through the slot **35** while a similar pin **38** is carried by the upper drive shaft part **33** and extends into and through the slot **36**.

As shown in Figure 1, the pins **37** and **38** may be provided with retaining devices **39** that extend past the sides of the slots **35** and **36** and which are held in position by the headed extremities **40** of the pins **37** and **38**.

It is apparent that the pin and slot connection

just described provides for a sliding relationship of the drive shaft parts 33 and 34 whereby the central drive shaft S is rendered adjustable as to its length.

The lower drive shaft part 34 has a portion 41 offset therefrom adjacent the bottom 11 of the mixing drum to accommodate a connecting sleeve 42 which may be welded to the part 34, as indicated at 43. This sleeve 42 is formed with a section of threads at 44 which are complemental to the threads 31 and which, when passed thereover, engage the shoulder 32 on one side and the lowermost threads 31 on the other, so that they cooperate with the cylindrical portion 30 of the stud 28 to establish a pivotal connection between the lower part of the drive shaft S and the stud 28.

Extending radially outwardly from the offset portion 41 of the lower drive shaft part 34 is an arm 45 which may be connected to the offset portion 41 by a twist indicated at 46. This arm 45 constitutes a stirring and mixing blade and is twisted into a position rendering it most adaptable for this purpose. At the outer extremity the arm 45 is again twisted and bent upwardly to provide an upwardly extending mixing blade 47 that is connected with the arm 45 proper by a twist indicated at 48.

A cleaning device for cleaning the corner between the cylindrical wall 10 and bottom 11 is shown in the form of a chime 49 that is pivotally mounted at 50 to the twisted portion 48 of the stirring and mixing blade. This member 49 has a point 51 which is urged into the corner of the drum by a weighted portion shown at 52 which is effective to constantly keep this point 51 in engagement with the corner of the drum.

The upper end of the drive shaft part 33 is turned over, as indicated at 53, and just beneath this turned-over projection 53 the drive shaft part 33 is notched on either side, as indicated at 54. When the parts are in assembled relation, the notches 54 receive the inturned flange 18 of the fitting 17 in a manner to be later described.

The turned-over projection 53 is provided with an opening 55, while a similar opening 56 is formed on the drive shaft part 33. These openings 55 and 56 are designed to receive an operating handle in the manner shown in dotted lines in Figure 2, and which handle is shown in full ilnes in Figure 1 and designated 57.

Figure 4 develops a construction ordinarily included in the bottom of certain standard drums and which construction involves a standard stud 58 that is threaded at its upper extremity, as shown at 59.

In order to adapt this stud 58 for connection with the lower drive shaft 34 and the sleeve 42 carried thereby, an adaptor is shown at 60, which adaptor is provided with a central bore 61 that terminates in a threaded socket 62 which receives the threads 59 on the stud 58. The lower extremity of the adaptor 60 is provided with an outwardly extending flange 63, while the upper end of this adaptor 60 is exteriorly threaded, as shown at 64. Intermediate the flange 63 and thread 64 is a reduced cylindrical portion 65 which corresponds to the reduced cylindrical portion 30 on the stud 28.

When the threads 44 on the sleeve 42 are threaded over the thread 64, the shoulder 63 and and lowermost thread 64 will serve to maintain the threads 30 in rotative engagement with the cylindrical portion 65, in the manner above described.

The above described agitating device is assembled and used in the following manner. Prior to positioning of the fitting 17 in the bung hole opening 14, the agitating device, as an entirety, is inserted through the bung hole 14 by a proper manipulation thereof. After insertion in the drum, the threads 44 of the sleeve 42 are threaded over the threads 31 until they pass therebeyond and are disposed opposite the reduced cylindrical portion 30 of the stud 28. The pivotal connection at the lower end of the drive shaft is now established, and it is notable that the manipulation necessary for setting up this pivotal connection is readily accommodated by the adjustable length of the drive shaft S.

The fitting 17 is now passed over the turned-over end 53 of the upper drive shaft 33 so that the notches 54 receive the flange 18 after which the fitting 17 is threaded into the thread 16 formed on the enlarged portion 15 of the top 12.

After the drum has been filled by paint or other desired materials, the plug closure 22 is threaded into the threads 24 of the fitting 17, and a wrench may be availed of in connection with the socket 27 to provide a good tight fit at this point.

The drum and its contents are now ready for shipment and commercial handling, during which time the upper extremity of the drive shaft S is positively held in position in the fitting 17, and any possibility of the drive shaft falling into the drum is obviated. When the time comes when it is desired to stir or mix the contents of the drum A prior to use, the plug closure 22 is first removed, after which the handle 57 is positioned in the manner shown in Figures 1 and 2, so that it extends through the openings 55 and 56. This handle 57 may now be availed of as a means for driving the central drive shaft S, which causes a corresponding movement on the part of the mixing blade 45, 47.

During such mixing operations, any upward movement on the part of the drive shaft S is positively inhibited by the interlock with the notches 54 and flange 18. When occasion arises that it is desirable to remove the agitating device from the interior of the drum, as for use with other drums, this may be accomplished by first unthreading the fitting 17, and then passing this fitting over the turned-over end 53 of the drive shaft part 33, during which operation the drive shaft S will be extended as to length, this being provided by the pin and slot sliding connection therein.

Upon upward pull being exerted on the drive shaft S, after the same has been fully extended, the threads 44 on the sleeve 42 will engage the threads 31 on the stud 28, and further rotation of the drive shaft S in a proper direction will cause the sleeve 42 to become unscrewed from the stud 28, whereupon the agitating device may be removed as an entirety through the bung hole 14.

When the standard drum shown in Figure 4 is used, the manner of operation is the same as above described, with the exception that the adaptor 60 is first positioned on the stud 58.

While a preferred specific embodiment of the invention is herein set forth, it is to be understood that we are not to be limited to the exact constructions illustrated and described, because various modifications of these details may be provided in putting this invention into practice, within the purview of the appended claims.

We claim:—

1. In combination with a drum having a cylindrical wall, a bottom, and a stud upstanding from the bottom and located centrally thereof, said stud being formed with a reduced portion intermediate the ends thereof, the upper extremity of said stud being threaded, an agitator in the drum including a central drive shaft which carries at its lower end a threaded sleeve, the threads on said sleeve being disposed about the reduced portion of the stud when the parts are in assembled position.

2. An adaptor for drums including a central stud upstanding from the bottom thereof and having a threaded extremity, which adaptor is designed to constitute a means for pivotally mounting an agitator on the stud, said adaptor having a threaded socket for receiving the threaded extremity of the stud and being formed with a reduced portion intermediate the extremities thereof.

3. An adaptor for drums including a central stud upstanding from the bottom thereof and having a threaded extremity, which adaptor is designed to constitute a means for pivotally mounting an agitator on the stud, said adaptor having a threaded socket for receiving the threaded extremity of the stud and being formed with a reduced portion intermediate the extremities thereof, said reduced portion being defined by a shoulder at the lower end of the adaptor and threads at the upper end, said threads having an outside diameter larger than the diameter of the reduced portion.

4. In combination, a drum having a top formed with a bung hole therein, an agitator in the drum having a central drive shaft formed with a turned-over end, said drive shaft being notched on each side below said turned-over end, a fitting threaded in the bung hole and formed with an inturned flange, said flange being received in said notches, and a plug closure for said fitting.

5. In combination, a drum having a top formed with a bung hole, an agitator in the drum having a turned-over end, there being holes formed in the turned-over end and in the agitator, said holes constituting a means for removably and drivably connecting a handle to the agitator, and a fitting threaded in the bung hole and interlocked with the turned-over end of the agitator.

6. An agitator of the character described comprising a central drive shaft having a mixing blade extending therefrom, the upper extremity of said agitator being turned over to provide a projection extending at right angles to the main drive shaft, and having openings formed in said projection and in the drive shaft proper which are designed to receive a handle to set up a driving connection therewith.

7. An agitator of the character described comprising a central drive shaft consisting of two parts in sliding engagement with each other, said sliding engagement being provided for by a pin and slot connection between said two parts, a mixing blade outstanding from the lower end of the drive shaft and formed with a turned-up end, means at the lower end of the drive shaft for pivotally mounting the same in a drum, and means at the upper end of the drive shaft for rotatably mounting the same in a drum and consisting of a turned-over extremity, said drive shaft being notched below said turned-over extremity.

8. The combination with a closed drum having a bung hole in the top, an agitator in said drum consisting of a stirrer blade pivotally mounted on the bottom of the drum, said blade extending radially and outwardly from the pivot and terminating in an upward disposed mixing blade having a free end disposed adjacent the wall of the drum, and an upwardly extending drive shaft on the other end of the stirrer blade coacting with means associated with the bung hole for rotating the same.

9. The combination with a closed drum having a bung hole in the top, an agitator in said drum formed of flat bar material consisting of a stirrer blade pivotally mounted on the bottom of the drum, said blade extending radially and outwardly from the pivot and terminating in an upwardly disposed mixing blade having a free end disposed adjacent the wall of the drum, the blade portion of the agitator being twisted from a point adjacent the pivot to lie in a vertical plane, and an upwardly extending drive portion on the other end of the stirrer blade coacting with means associated with the bung hole for rotating the same.

10. The combination with a closed drum having a bung hole in the top, an agitator in said drum formed of flat bar material consisting of a stirrer blade pivotally mounted on the bottom of the drum, said blade extending radially and outwardly from the pivot and terminating in an upwardly disposed mixing blade having a free end disposed adjacent the wall of the drum, an upwardly extending drive portion on the other end of the stirrer blade coacting with means associated with the bung hole for rotating the same, and the stirrer and mixing blade being arranged in a substantially vertical plane.

11. The combination with a closed drum having a bung hole in the top, an agitator in said drum consisting of a stirrer blade pivotally mounted on the bottom of the drum, said blade extending radially and outwardly from the pivot and terminating in an upwardly disposed mixing blade having a free end disposed adjacent the wall of the drum, and an upwardly extending drive shaft consisting of two slidably engaged parts longitudinally adjustable to permit adjustment of the length of the drive shaft for different sized drums, the lower part of the drive shaft being connected with the inner end of the stirrer blade and the upper part coacting with means associated with the bung hole for rotating the shaft.

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