May 10, 1949. J. H. INGRAHAM ET AL 2,469,557

DRUM AGITATOR

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FIG. 5.

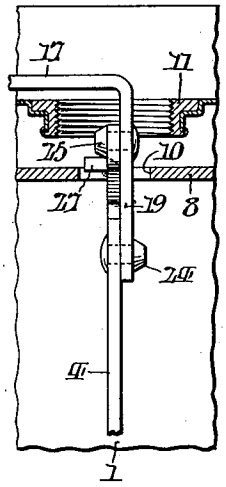


FIG. 1.

FIG. 6.

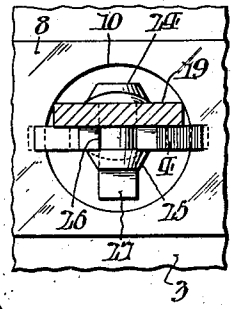


FIG. 4.

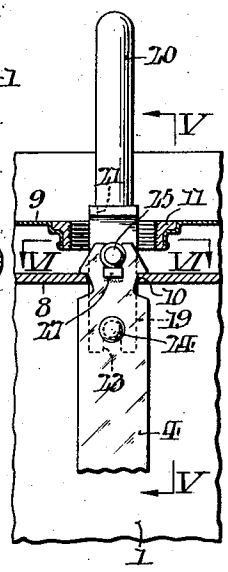


FIG. 2.

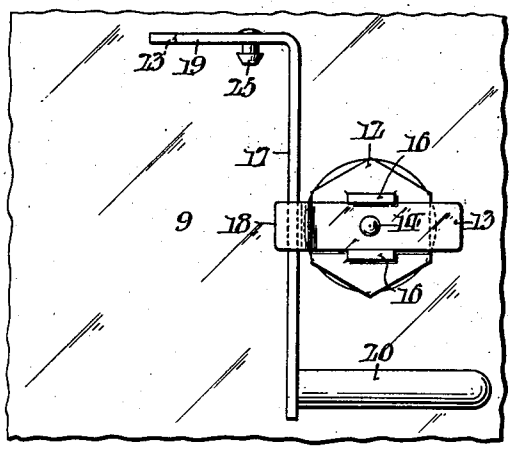
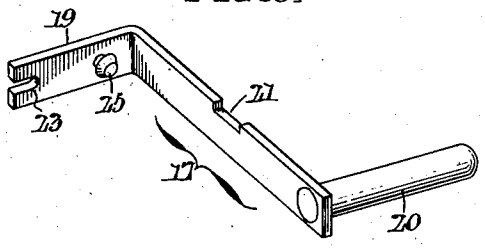


FIG. 3.



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FIG. 7.

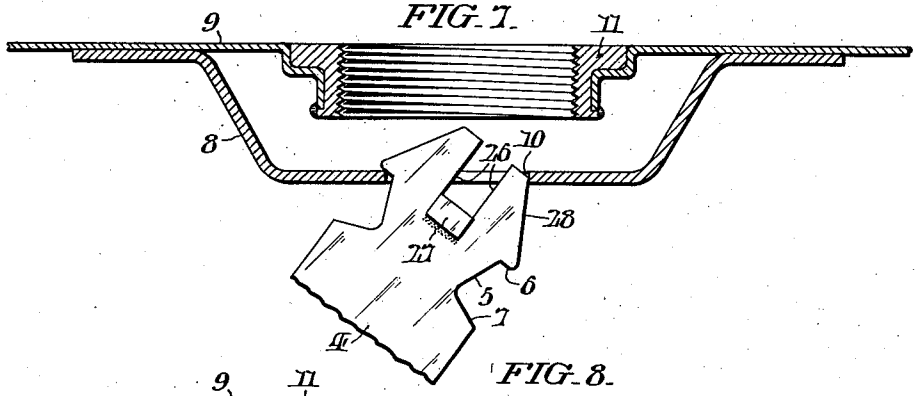


FIG. 8.

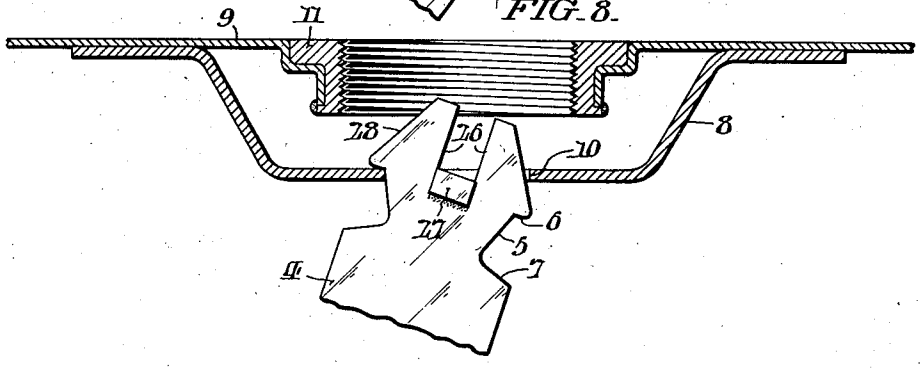


FIG. 9.

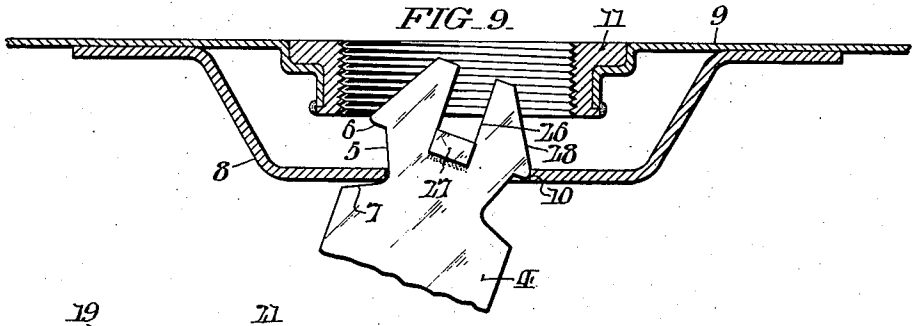
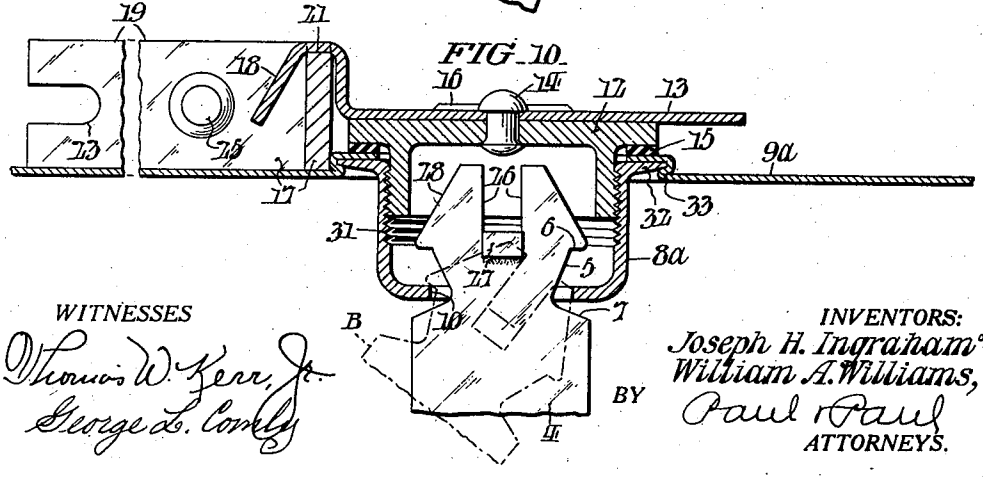


FIG. 10.



WITNESSES

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UNITED STATES PATENT OFFICE

2,469,557

DRUM AGITATOR

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Application February 13, 1947, Serial No. 728,290

3 Claims. (Cl. 259—109)

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This invention relates to agitators such as are used for stirring or mixing paint or similar products shipped in drums or like containers.

One of the difficulties encountered with such agitators as heretofore constructed is that internal forces tend to distort the stirrer bar and cause it to become dislodged from the fittings at the top or bottom of the drum by which it is journaled for rotation. In a large drum which has been standing idle for some time the weight of solid pigment clinging to the stirrer bar may exert a considerable force tending to pull the stirrer bar away from the supporting fittings, and as the drum is turned or rolled this force may cause a substantial distortion or flexure of the bar away from the axis of the drum. To meet this difficulty it has been proposed to suspend the top portion of the stirrer bar by means of a removable pin passing through the bar and engaging a fitting adjacent to the bung hole. Such an arrangement has a number of disadvantages including particularly the fact that frequently the pin becomes dislodged, or mislaid, or falls into the drum. For this and other reasons, including the desirability of reducing the number of parts and of eliminating small parts which may be misplaced, it is desirable to form the agitator in such manner that it is journaled at its upper end. For obvious reasons it is also desirable to journal the agitator in such manner that it may be rotated without objectionable oscillation or wear.

The present invention accomplishes this purpose and avoids the above mentioned and other difficulties encountered with older types of agitators by means of a novel formation at the top of the stirrer bar which interlocks with a fitting adjacent to the bung hole in such manner that these elements cannot be engaged or disengaged without swinging one element through a substantial angle with respect to the other element, this angle being greater than the limit of flexure or swinging movement of the bar within the drum so that it is insured that the agitator cannot accidentally become dislodged.

A further object of the invention is to provide an agitator having the advantages indicated above which is permanently incorporated in a drum or like container and which is so constructed that it can be used and reused for a long period of time without the necessity of removal or replacement of parts.

Other objects and advantages characterizing our invention, including those derived from simplicity of construction and economy of manufacture, will become more apparent from the description of a practical embodiment of the invention, as well as a modification thereof, which follows hereinafter, having reference to the accompanying drawings. Of the drawings:

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Fig. 1 represents a vertical section of a drum embodying an agitator of the present invention;

Fig. 2 is an enlarged plan view of a portion of the top head of the drum showing the manner in which the crank handle for the agitator is secured thereto, the view being taken as indicated by the arrows II—II of Fig. 1.

Fig. 3 is an enlarged perspective view of the crank handle employed for rotating the stirrer bar;

Fig. 4 is an enlarged vertical cross sectional view of the portion of the drum in the vicinity of the bung hole with the bung hole cap removed and the crank handle applied to the upper end of the stirrer bar.

Fig. 5 is a similar sectional view showing the interlocking engagement of crank handle and stirrer bar taken as indicated by the arrows V—V of Fig. 4.

Fig. 6 is a horizontal cross section of the same taken as indicated by the arrows VI—VI of Fig. 4.

Figs. 7, 8 and 9 represent enlarged vertical sections through the top of the drum with the bung hole cap removed showing the stirrer bar in three different positions to illustrate the sequence of movements involved in engaging or disengaging the stirrer bar with respect to the fitting within which it is journaled at its upper end; and

Fig. 10 represents an enlarged vertical section similar to that of Figs. 7, 8 and 9 but showing a modification of the invention involving a different type of fitting, and showing the bung hole cap applied to such a fitting.

In Fig. 1 of the drawings a conventional form of drum is shown at 1, and it may be assumed that this drum represents only one of many different forms of containers to which the present invention is applicable. By means of a pivot pin 2 affixed to the bottom head 3 of the drum and passing through an aperture in the stirrer bar 4, the agitator is journaled at its lower end. The stirrer bar may take a variety of different forms but it is desirably made of thin flat stock twisted to a shape that most effectively stirs the contents of the drum, and the general shape thereof forms no part of the present invention.

At its upper end the stirrer bar 4 has an upwardly converging tapered extremity with oppositely disposed notches 5 beneath said extremity which form upper and lower shoulders 6

and 7 for engaging a supporting fitting 8 within which the stirrer bar is journaled at the top of the drum. In Figs. 1 to 9 the fitting 8 is in the form of a bent strap made of thin flat material and having its ends welded or otherwise attached to the underside of the top head 9 of the drum. A circular opening 10 in the supporting fitting 8 is in registry with the threaded bung hole fitting 11 and so spaced beneath it that the upper end of the stirrer bar 4 is accessible within the bung hole when the cap 12 is removed and does not interfere with the cap but is partially housed within it when it is screwed into the threaded bung hole fitting 11.

It will be noted that the distance between the outer limits of the upper shoulders 6 is greater than the diameter of the circular opening 10 in the fitting 11; also that the distance between the outer limits of one upper shoulder 6 and the inner limit of the lower shoulder 7 at the opposite side of the stirrer bar is less than the diameter of the opening 10.

A handle carrier 13 is affixed to the cap 12 by a rivet 14. A gasket 15 is desirably interposed between the cap 12 and the threaded bung hole fitting 11. To prevent the handle carrier 13 from turning with relation to the cap 12 raised bosses 16 are formed at the top of the cap at each side of the handle carrier. In addition to its function of securing a crank handle 17 to the top head 9 of the drum in such manner that the crank handle will not become lost or separated from the drum while it is in transit, the handle carrier 13 serves also as a crank element which is of assistance in screwing or unscrewing the bung hole cap 12. To secure the crank handle 17 in place one end of the handle carrier is bent downwardly as indicated at 18.

The crank handle 17 is shown in enlarged detail in Fig. 3. Preferably it consists of a flat bar terminating at one end in a right angle offset leg 19 and having a handle grip 20 attached at the other end. At an intermediate portion the crank handle 17 is indented, as shown at 21, to receive the end of the handle carrier 13 so that it may be firmly secured by the handle carrier at the top head 9 of the drum in the manner illustrated in Fig. 2. When it is desired to apply the crank handle 17 to the stirrer bar 4 in order to stir the contents of the drum, the end portion 18 of the handle carrier 13 is bent upwardly to disengage the crank handle 17 and the bung hole cap 12 is removed. The offset leg 19 of the crank handle is then inserted through the circular opening 10 of fitting 8 to the point where a curved slot 23 formed in the end of the offset leg 19 engages a rivet 24 attached to the stirrer bar 4 as shown in Figs. 4, 5 and 6. At the same time a rivet 25 attached to the crank handle 17 enters a slot 26 formed at the top of the stirrer bar 4 and abuts against a flange 27 formed on the stirrer bar adjacent to the slot 26. The crank handle 17 and stirrer bar 4 are thus interlocked with capacity for being readily detached.

It will be noted that when the stirrer bar 4 is rotated by means of the crank handle 16 it is maintained in a central position within the circular opening 10 of the fitting 8 and is held free of engagement with all parts at the top of the drum excepting the circular edge of the fitting 8 in which it is journaled for rotation. This arrangement permits the stirrer bar 4 to be actuated as often as desired without causing any wear at the bung hole fitting so that the drum may be used for a long period of time and there is no occasion for replacing any of the parts thereof during the life of the drum.

Prior to assembly of the drum heads 3 and 9 the stirrer bar 4 is interlocked with the fitting 8 by an angular movement of the bar or fitting in the plane of the bar. The angular notches 5 are so formed and related to the tapered surfaces 28 at its upper extremity that when these elements are swung relative to each other through a substantial angle, as represented in Fig. 7, the top of the stirrer bar 4 may be entered into the circular opening 10. Further relative angular motion in the plane of the stirrer bar swings these elements through the positions represented in Figs. 8 and 9 until the shoulders 6 above the angular notches 5 pass through the circular opening 10 completing the interlock between the two elements. From Figs. 7, 8 and 9 it will be apparent that the tapered surfaces 28 and the angular notches 5 coact in such manner that the stirrer bar 4 and the supporting fitting within which it is adapted to be journaled can only be assembled or disassembled by a relative angular movement equivalent to or greater than the angle X as represented in Fig. 1. This angle X is sufficiently greater than any possible movement or distortion of the stirrer bar 4 within the drum 1 so that it is impossible for the stirrer bar 4 and its supporting fitting to become disengaged after assembly of the drum.

In Fig. 10 of the drawings there is shown a modification of the invention in which the stirrer bar 4 the handle carrier 13, washer 15 and bung hole cap 12 are identical in construction and mode of assembly to these parts as previously described. In this example of the invention the fitting 8a within which the stirrer bar 4 is journaled is cup-shaped and internally threaded, as indicated at 31, to receive the bung-hole cap 12. An annular flange 32 at the top of the fitting 8a is pressed into engagement with a crimped flange 33 formed in the top head 9a of the drum. The fitting 8a and drum head 9a are firmly secured together, and the agitator assembly, like that previously described, is designed for permanent incorporation in the drum. The stirrer bar 4 is shown in its vertical assembled position and is also represented in broken lines, as indicated at B, in the angular position which it assumes with respect to the top of the drum prior to its engagement with the fitting 8a. The modification thus represented involves a reduction in the number of fittings required at the top of the drum.

With either example of the invention shown in the accompanying drawings the stirrer bar 4 is journaled in such manner that it does not interfere with any normal use of the drums; the crank handle may be readily applied to the stirrer bar to rotate the same, such rotation being accomplished without objectionable oscillation and without injury to the threads at the bung hole; and the agitator assembly is so incorporated and interlocked with the drum heads that it can withstand a considerable flexure without danger of disengagement. Furthermore, all parts of the agitator are secured in such manner that none of them may become dislodged or separated.

While we have described and illustrated in considerable detail a preferred embodiment of our invention and a modification thereof it will be apparent that various changes may be made in the form of the parts as thus described and illustrated and that certain features of the in-

vention may be used to advantage without use of other features, all without departing from the spirit of the invention as defined in the annexed claims.

This application is a continuation in part of our abandoned application, Serial No. 545,074 filed July 15, 1944 for patent for An agitator bar assembly.

Having thus described our invention, we claim:

1. A drum having a fitting affixed to a head thereof, said fitting having a circular opening adjacent to a bung hole in said head, and a stirrer bar permanently incorporated in said drum and having an end portion journaled in said fitting at said circular opening, said stirrer bar having an upwardly converging tapered extremity with oppositely disposed notches beneath said tapered extremity forming upper and lower shoulders for engaging said fitting above and below said opening to confine the bar to limited axial movement, the distance between the outer limits of the opposite upper shoulders being greater than the diameter of said opening, and the distance between the outer limit of one upper shoulder and the inner limit of the opposite lower shoulder being less than the diameter of said opening, and the depth and configuration of the notches and the configuration of the tapered extremity being such that prior to assembly of the drum heads the bar can only be engaged centrally within said fitting by relative swinging movement of the bar through an angle with respect to said fitting which is larger than the relative angular movement permitted between the bar and fitting after assembly of the drum and the head carrying said fitting.

2. A drum having a fitting affixed to a head thereof, said fitting having a circular opening adjacent to a bung hole in said head, and a stirrer bar permanently incorporated in said drum and having an end portion journaled in said fitting at said circular opening, said stirrer bar having an upwardly converging tapered extremity and being recessed between the converging surfaces to receive a crank element, and having oppositely disposed notches beneath said tapered extremity forming upper and lower shoulders for engaging said fitting above and below said opening to confine the bar to limited axial movement, the distance between the outer limits of the opposite upper shoulders being greater than the diameter of said opening, and the distance between the outer limit of one upper shoulder and the inner limit of the opposite lower shoulder being less than the diameter of said opening, and the depth and configuration of the notches and the configuration of the tapered extremity being such that prior to assembly of the drum heads the bar can only be engaged centrally within said fitting by relative swinging movement of the bar through an angle with respect to said fitting which is larger than the relative angular movement permitted between the bar and fitting after assembly of the drum and the head carrying said fitting.

3. A drum having a fitting affixed to a head thereof, said fitting having a circular opening adjacent to a bung hole in said head, and a flat stirrer bar permanently incorporated in said drum and having an end portion journaled in said fitting at said circular opening, said stirrer bar having an upwardly converging tapered extremity and being recessed between the converging surfaces to receive a crank element, and having oppositely disposed notches beneath said tapered extremity forming upper and lower shoulders for engaging said fitting above and below said opening to confine the bar to limited axial movement, and said stirrer bar being otherwise free of engagement with said fitting, the distance between the outer limits of the opposite upper shoulders being greater than the diameter of said opening, and the distance between the outer limit of one upper shoulder and the inner limit of the opposite lower shoulder being less than the diameter of said opening, and the depth and configuration of the notches and the configuration of the tapered extremity being such that prior to assembly of the drum heads the bar can only be engaged centrally within said fitting by relative swinging movement of the bar in the plane of the bar through an angle with respect to said fitting which is larger than the relative angular movement permitted between the bar and fitting after assembly of the drum and the head carrying said fitting.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,621,277	Richman	Mar. 15, 1927
2,137,432	Wilson et al.	Nov. 22, 1938