April 10, 1934. M. W. NELSON 1,954,093

FLEXIBLE SHAFT PAINT MIXING APPARATUS OR DEVICE

Filed Sept. 11, 1931

Fig. 1

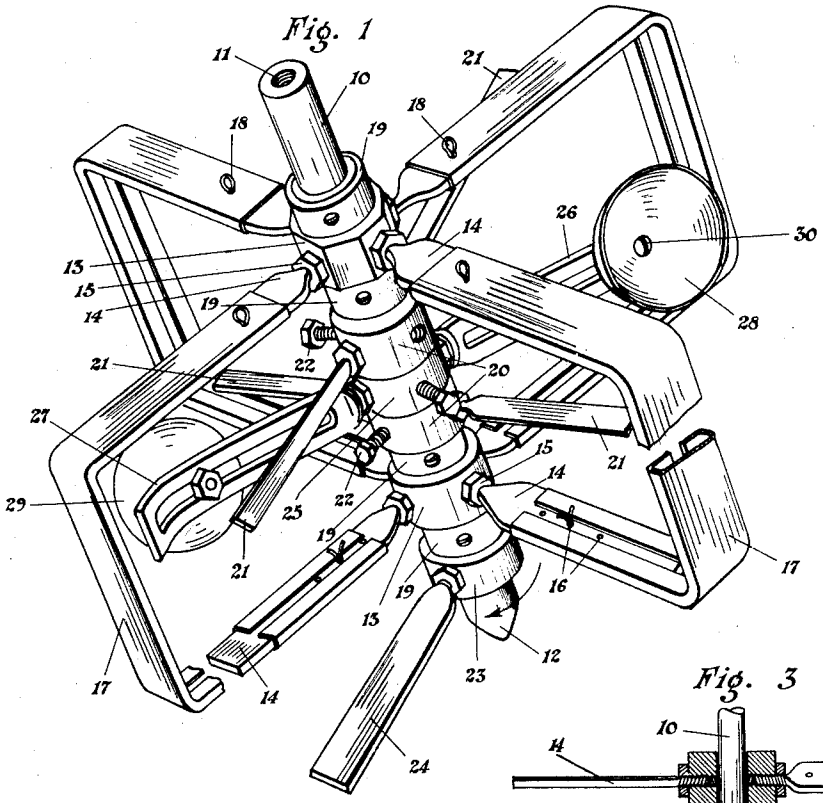


Fig. 3

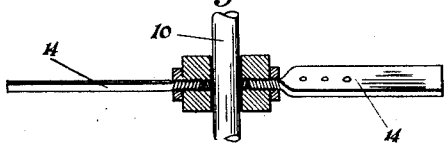
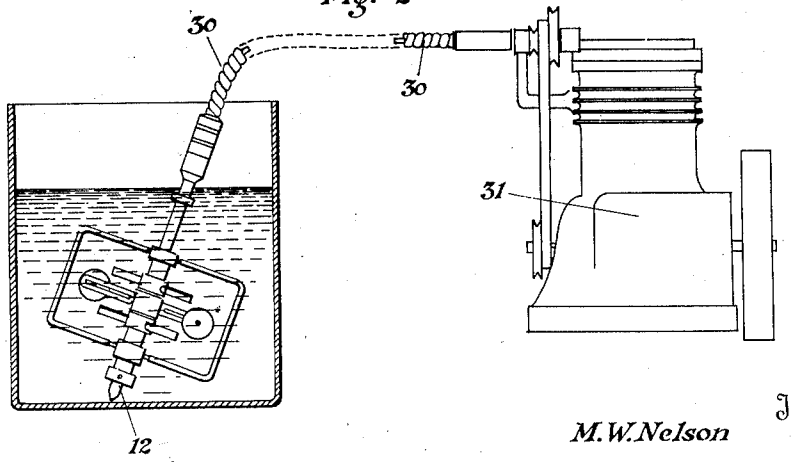


Fig. 2



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FLEXIBLE SHAFT PAINT MIXING APPARATUS OR DEVICE

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6 Claims. (Cl. 259—129)

My invention relates to devices for mixing and stirring paint in the paint containers and its primary object is the provision of a paint mixer which is adapted to be operated mechanically.

Another of my objects is the provision of a paint mixer having adjustable baffle vanes secured to a shaft and operable to either stir and mix the paint or to cut and break up lumpy portions of the paint.

Another of my objects is the provision of a paint mixer having a shaft which is adapted for connection through a flexible shaft with a motor, the flexible shaft enabling the user to position the paint mixer in any desired position in the body of the paint.

Another of my objects is the provision of a paint mixer having a plurality of baffle vanes so arranged that they may be adjusted to counterbalance each other and to direct the streams of paint toward or away from each other as desired.

Another of my objects is the provision of a frame for a paint mixer, the frame including radial arms which are secured together by means of detachable connections such that the arms when free from the connections may be made to serve as supplemental baffle vanes.

It is also my object to provide an adjustment for the arms of the frame such that the arms may be adjusted angularly to supplement the work of the primary baffle vanes.

It is also my object to provide such a connection between the arms of the frame and the shaft that the arms may either rotate freely or that the arms may be locked to the shaft to rotate with the shaft.

Another of my objects is the provision of supplemental baffle vanes which carry suction cups, the baffle vanes being adjustable with relation to the baffle vanes.

Having in view these objects and others which will be pointed out in the following description, I will now refer to the drawing, in which

Figure 1 is a view in perspective of my paint mixer.

Figure 2 is a view in side elevation and partly in section of my paint mixer as it appears when in operation.

Figure 3 is a sectional view showing the relation between two of the baffle vanes and the central shaft.

My paint mixer operates on a central shaft 10 having a screw threaded bore 11 and a lower conical extremity 12 which serves as a bearing support when the paint mixer is in the position shown in Figure 2. The shaft 10 normally has its bearing in the hubs 13.

The hubs 13 are each provided with radial apertures extending therethrough, the drawing showing four in number which may be increased or decreased as desired. These apertures are screw threaded for receiving the screw threaded reduced inner ends of the arms 14. These arms are normally in horizontal position as shown in Figure 1, they being held in fixed position by means of the lock nuts 15. Each of these arms is provided with a plurality of apertures 16. The pairs of upper and lower arms 14 may be connected by means of U-shaped channeled members 17 and secured together by means of cotter pins 18 each passing through one of the apertures 16 and through an aperture in the U-shaped member 17. By selecting the most suitable group of apertures 16, the size of the frame may be varied. After the U-shaped members 17 are removed, the arms 14 may be left in horizontal position to act as cutters for the lumps of paint or they may be angularly adjusted by first releasing the lock nuts 15 and then tightening the lock nuts after the arms 14 have been placed at the desired inclination. Normally, the hubs 13 are loose with respect to the shaft 10 but if it is desired to utilize the arms 14 without the U-shaped member 17 and to make the arms 14 serve as baffle vanes the arms 14 are screwed in through the hubs 13 until their inner extremities are in tight contact with the shaft 10.

The hubs 13 are held in place on the shaft 10 by means of collars 19. The collars 19 are each provided with screw threaded bores for receiving set screws which bear against the surface of the shaft 10 to prevent sliding or rotation of the collars on the shaft.

Surrounding the shaft at points within the frame are two collars 20 which serve as supports for the main baffle vanes 21. Each of the collars 20 carries a plurality, preferably two in number, of the baffle vanes 21. These vanes are reduced at their inner ends and they are screw threaded to enter screw threaded bores in the collars 20. They are thus adjustable angularly and their adjustment may be fixed by means of lock nuts bearing against the collars 20. The collars 20 with the baffle vanes 21 are designed to be positively rotated and provision is therefore made for locking them to the shaft 10 by means of set screws 22 passing through suitable screw threaded bores in the collars 20 and bearing tightly against the shaft 10.

It should be noted that these main baffle vanes

21 are arranged in the form of upper and lower pairs which may be adjusted to balance each other. In the preferable method of operation, the lower vanes 21 are adjusted to force a stream of paint in an upward direction while the upper vanes 21 are adjusted to force a stream of paint in a downward direction. The thrust is taken from the cone bearing 12 when the vanes are thus balanced and the paint is prevented from splashing or being hurled out of the container. The main purpose of the adjustment, however, is to direct two streams of paint against each other to thereby bring about a most thorough mixing of the paint.

The collar 23 surrounds the shaft 10 below the frame. It is similar to the collar 20 and it is provided with radial baffle vanes 24 similar in all respects to the baffle vanes 21. It is placed near the bottom of the device so that it will reach the heavier layer of paint at the extreme bottom of the receptacle. The collar 23 is clamped to the shaft 10 by means of a set screw and it may easily be removed from the device when it is not needed.

Between the two collars 20 is another collar 25 which is similar to the collars 20 and 23 and which is similarly held to rotate with the shaft 10. The vanes, however, are replaced by radial arms 26 and 27 which carry the suction cups 28 and 29 respectively. The arm 26 is radial and it is secured to its collar 25 by means of structure similar to that for securing the baffle vanes 21 and 24 to their respective collars. The arm 26 is provided with a longitudinal slot for receiving the pin of a suction cup 28. The pin 30 is screw threaded and carries a nut on its free end thus making it possible to adjust the suction cup 28 lengthwise of the arm 26 and locking it in any desired position on the arm 26. The arm 27 is similar to the arm 26 except that it is curved to provide an additional adjustment for the suction cup 29. The rapid rotation of the shaft 10 with the arms 26 and 27 through the mass of paint creates a partial vacuum in the suction cups 28 and 29 and this deflects the paint currents to cause a still further agitation of the paint. Not only are the suction cups 28 and 29 adjustable toward or away from the center of rotation but they are also adjustable through the connections of the arms 26 and 27 with the collar 25. By removing the suction cups 28 and 29, the arms 26 and 27 may be utilized as supplemental baffle vanes in any desired position of adjustment.

In use, the device is adjusted in accordance with the thickness of the paint and other conditions surrounding the particular work which must be done. The flexible shaft 30 is secured to the shaft 10 in its screw threaded bore 11. This flexible shaft 30 is driven by a motor 31, the motor shown being of the type frequently employed by painters and having an air compressure associated therewith for use in spray painting. The flexible shaft 30 enables the operator to lift the mixing device into or out of the container or to shift it in position within the container. It has all of the advantages of the flexible shaft over the rigid shaft since it gives complete flexibility of the positioning of the paint mixing device.

Attention is called to the great flexibility in operation of my paint mixer. The device is easily assembled or disassembled so that any of the baffle vanes or arms may be removed entirely when the conditions make it desirable to do so. Under certain conditions the suction cups 28 and 29 have an important effect on the mixing of the paint but when those conditions are not present, the suction cups may easily be removed. The cups 28 and 29 are each adjustable so that the effect of the suction cups may be varied at will. The baffle vanes 21 may be adjusted about their longitudinal axes into any desired position. They may be adjusted into their plane of rotation when the paint is lumpy so that their effect will be cut and break up the lumpy masses of paint. When they are inclined in the position shown in Figure 1, they serve as propellers for causing streams of paint to flow toward each other to impinge on each other to thereby increase the mixing effect.

In the usual assemblage of the device, the U-shaped members 17 are in position on the arms 14 while the members 13 serve as hubs for the shaft 10. The members 17 then have no rotation except the rotation which is indirectly imparted to them by the circular flow of paint in the container. This rotation assists in the mixing of the paint. The arms 21, 26, and 27 are shorter than the frame members 17 so that they will move freely within the frame members without coming into contact therewith. The frame members have a very important function in keeping the arms 21, 24, 26, and 27 from striking the sides of the container and thus injuring the container due to their exceedingly rapid movement. By reference to Figure 2, it will readily be seen that the baffle vanes or propellers can not come into contact with the walls of the container regardless of the position of the device in the container.

Having thus described my invention in such full, clear, and exact terms that its construction and operation will be readily understood by others skilled in the art to which it pertains, what I claim as new and desire to secure by Letters Patent of the United States is:

1. A paint mixer including a shaft having a lower conical extremity adapted to function as a bearing against the bottom of a container, a plurality of radial arms projecting from said shaft, said arms being arranged in a plurality of groups at different levels on said shaft, adjustable means for variably spacing said groups of arms from each other, adjustable means for altering the inclination of said arms with respect to their planes of rotation whereby said arms may be positioned either in their planes of rotation to function as cutters for breaking up lumpy masses of paint or inclined to their planes of rotation to function as propellers for establishing flow currents in the paint mass, a plurality of radially positioned U-shaped guard members journaled on said shaft for maintaining said arms out of contact with the wall of the container, and a flexible drive shaft secured to said first named shaft whereby said paint mixer may be placed in any desired position in the container.

2. A paint mixer including a shaft having means at the upper extremity thereof for the attachment of a flexible shaft, a plurality of arms projecting radially from said shaft, slidable means for adjusting said arms to any desired position lengthwise of said shaft, means for adjustably varying the inclination of said arms with respect to their plane of rotation, and U-shaped guard members loosely connected to said shaft, the circular plane of rotation of said arms being within the space enclosed by said guard members.

3. A paint mixer including a shaft having means at the upper extremity thereof for the

attachment of a flexible shaft, a pair of arms projecting radially from said shaft to rotate therewith, suction cups having means for adjustable connection with said arms for varying the radial distance thereof from said shaft, and means for adjustably varying the inclination of said arms with respect to their plane of rotation.

4. A paint mixer including a shaft having means at the upper extremity thereof for the attachment of a flexible shaft, a pair of arms projecting radially from said shaft to rotate therewith, suction cups adjustably secured to said arms, and other arms rotatable with said shaft in planes above and below said first named arms, said last named arms being adjustable for varying the inclination thereof with respect to their planes of rotation.

5. A paint mixer including a rigid shaft having means at the upper extremity thereof for connection with a flexible shaft, a pair of spaced bearing members surrounding said rigid shaft, arms projecting radially from said bearing members, U-shaped members for connecting the arms of one of said bearing members to the arms of the other of said bearing members, and other arms projecting radially from said rigid shaft at points intermediate said bearing members, means for slidably positioning said last named arms on said shaft, and means for varying the inclination of said last named arms with respect to their planes of rotation.

6. A paint mixer including upper and lower bearing members, arms extending radially therefrom, U-shaped guard members for connecting pairs of upper and lower of said arms, said guard members having telescoping relation with said arms, means for latching said guard members and said arms in adjusted position, a shaft having bearings in said bearing members, a plurality of radial arms projecting from said shaft and rotatable therewith, said arms being in groups having different planes of rotation, adjustable means for variably spacing said groups of arms from each other, and adjustable means for varying the inclination of said arms with respect to their planes of rotation.

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