Feb. 21, 1950 R. P. DARLING 2,498,360

MECHANICAL PAINTBRUSH

Filed May 27, 1948 2 Sheets-Sheet 1

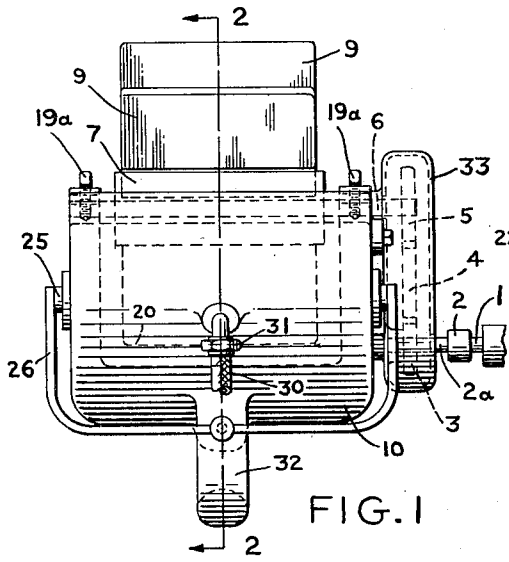

FIG. 1

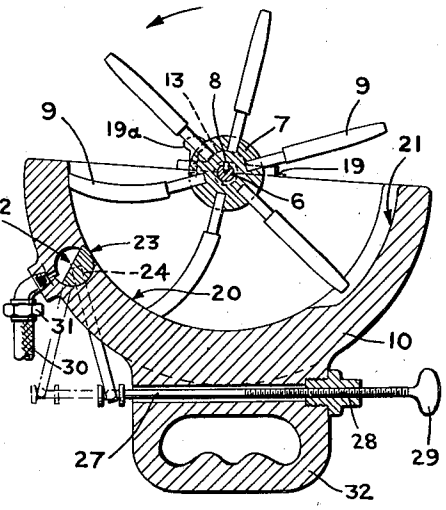

FIG. 2

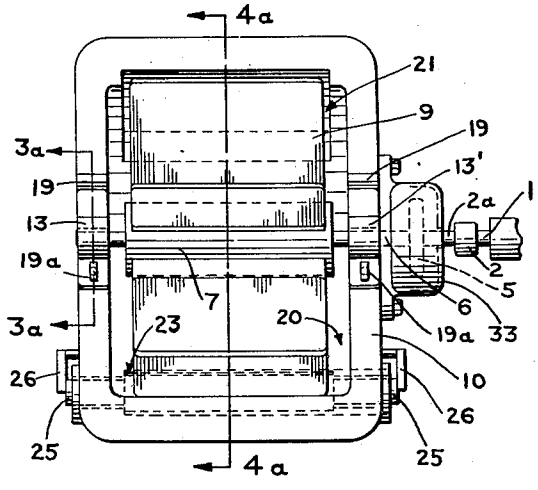

FIG. 3

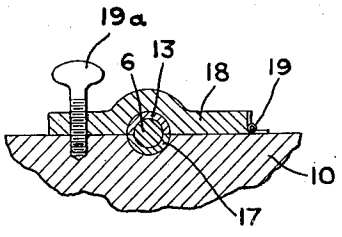

FIG. 3a

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MECHANICAL PAINTBRUSH

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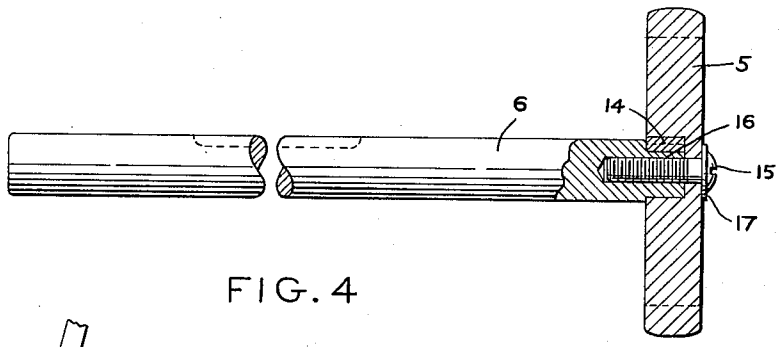

FIG. 4

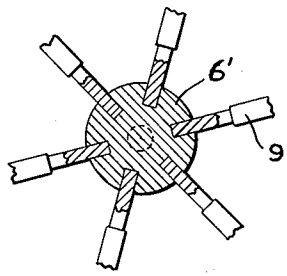

FIG. 4b

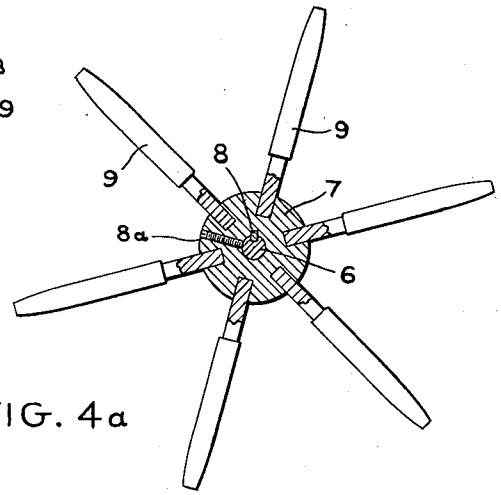

FIG. 4a

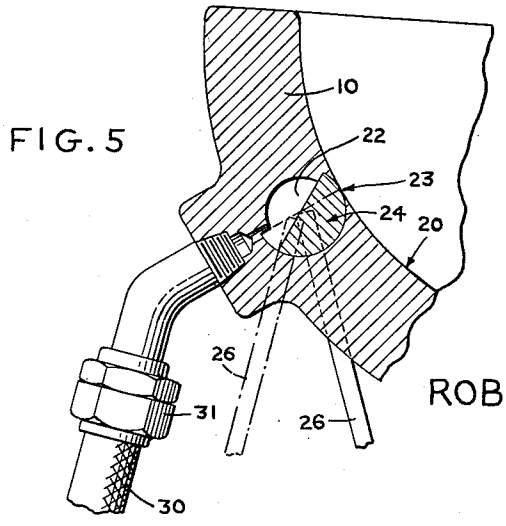

FIG. 5

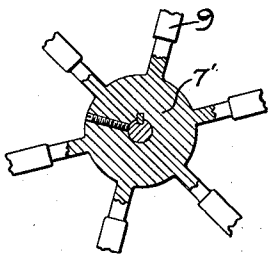

FIG. 4b'

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MECHANICAL PAINTBRUSH

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9 Claims. (Cl. 91—62.5)

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This invention relates to a rotating brush and, in particular, to means for applying paint, coating material or paint removal solvent that would ordinarily have to be applied by a hand brush.

An object of the present invention is to save time and labor where handpainting by means of a brush is required by eliminating hand-dipping the brush into a paint or coating container and dripping of paint or coating material while in the process of using the hand brush.

A further object of this invention is to provide a means for cleaning surfaces prior to painting or coating the surface and for paint removal merely by changing to a paint removing solvent as the coating agent or by changing from a fibrous bristled brush to a metallic bristled brush.

With these and other objects in view as may appear from the accompanying specifications, the invention consists of various features of construction and combination of parts which will be first described in connection with the accompanying drawings, showing a mechanical paint brush of a preferred form embodying the invention, and the features forming the invention will be specifically pointed out in the claims.

In the drawings

Figure 1 is a side elevation of the invention showing the gears, shaft and brush adapter phantomized.

Figure 2 is a cross section taken on line 2—2 of Figure 1.

Figure 3 is a top plan view of the invention.

Figure 3*a* is a cross section taken on line 3*a*—3*a* of Figure 3.

Figure 4 is a view showing the shaft partly in cross section.

Figure 4*a* is a cross section taken on line 4*a*—4*a* of Figure 3.

Figure 4*b* is a cross section showing a modified form wherein the brushes are mounted directly on the shaft.

Figure 4*b'* is a cross section showing a modified form wherein the brushes are formed integrally with the brush adapter.

Figure 5 is an enlarged cross section of the valve.

Referring more particularly to the drawings, Figures 1 and 2 show a housing 10, substantially hemi-cylindrical in shape with a hollow interior portion and provided with a single handle member 32, cast as a part of the housing itself. On one side of housing 10 is a gear train 3, 4, and 5, connected to a driving cable 1.

Driving cable 1, with coupling 2 is shown in fragmentary form and may be any conventional

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type purchasable on the open market which is able to transmit the rotary motion from a motor (not shown) of any suitable type, for example, an electric motor.

The end of driving cable 1 shown is connected by coupling 2 to a suitable lateral extension 2*a*, provided on gear 3 for receiving the coupling. Gears 3 and 4 are mounted on housing 10, by anti-frictional bearings and operate so that gear 3 receives a rotational force from the driving cable 1, transmitting it to gear 4, gear 4 in turn engaging and rotating gear 5. Gear 5 is fixedly mounted on the extended portion of shaft 6, and as gear 5 rotates shaft 6 will rotate in the same direction and at the same speed.

Although a gear train is illustrated, it will be observed that other types of rotation transmitting mechanisms can be used. For example, two single V-groove pulleys and a V-belt for connecting them such that one is mounted on the housing and receives the rotational motion similarly to gear 3, transmitting the motion via the V-belt to the second pulley which is fixed to shaft 6, similarly to gear 5. The primary object in each case, however, is to secure a relationship and a ratio of the gears or pulleys to each other so as to rotate shaft 6 in a counter-clockwise direction at a practical speed for operation.

Shaft 6 is carried by housing 10 and is seated on bearings 13 and 13' located on each side of the housing as indicated in Figure 3, and extends past one of the bearing surfaces to receive gear 5 on said extended portion. The extended portion has a threaded bore 16 therein.

Figure 3*a* illustrates a bearing surface which is the same for both bearings by showing the construction of bearing surface 13. The bearing is split so that part of the bearing surface 17 is carried by the housing 10 and part is carried by the locking bar 18. This construction provides a method whereby when gear cover 33 is removed, by operation of the threaded means indicated herein by the thumbscrews 19*a*, shaft 6 may be locked in place or removed with gear 5 affixed thereto.

The locking bar 18, is fixed to housing 10 by a hinge member 19. This offers a simple type of locking device which will secure the shaft 6 to the housing 10 and also furnish a bearing surface offering minimum friction during operation. While this type of locking device is shown, it is understood that other locking devices embodying the same idea may be easily adapted.

Figure 4 shows gear 5 fixed to shaft 6 by a key 14 and a screw member 15 engaging the threaded

bore 16. A lock washer 17 is used under the head of screw 15. By the combination of the key 14, the screw 15 and the lock washer 17, gear 5 will be firmly fixed to shaft 6 and will not be easily separable due to vibration or other causes. While this type of connection is shown, it is understood that other connections embodying the same idea may be easily adapted.

Figure 4a shows a brush adapter 7 with a hollow bore, to fit snugly around shaft 6 and longitudinally fixed to shaft 6 by a key 8 and set screws 8a, annularly spaced along the shaft. The key 8 and the set screws 8a hold the brush adapter 7 firmly in place so that when shaft 6 rotates the brush adapter will rotate with it. Brushes 9, annularly spaced around the brush adapter 7, are fixedly carried by the brush adapter and, therefore, rotate with and are removable as the brush adapter is rotated or removed.

Several brush adapters may be constructed having different types of brushes, so that the operator may choose the particular type of bristle desired. And, it is particularly understood that while brushes are shown, that the brush adapter may have the bristles carried annularly without being in a brush shape.

As explained above, shaft 6 may be easily removed from the housing 10 by releasing the locking bar 18. Thereafter, the brush adapter 7 may be removed from the shaft 6 by backing off the set screws 8a and tapping the adapter to free it from the key 8 and the shaft 6. This construction allows for replacement of a brush adapter having one type of brush by a brush adapter having a different type of brush so that the operator may select the type of brush required for a particular need.

While this type of brush adapter is shown, it is understood that the construction may be modified as shown in Figure 4b', where the brushes 9 are formed integrally with the brush adapter 7' or as illustrated in Figure 4b where brushes 9 are mounted directly into shaft 6' eliminating the use of the brush adapter, in which event replacement of shaft units instead of brush adapters, as shown, would follow.

Shaft 6 is set in housing 10 so that brushes 9 will rotate through the hollow portion of the housing. During the travel inside the housing the brushes contact a portion of inner wall 20, constructed and arranged concentric to the axis of shaft 6, as shown in the cross section, Figure 2.

Inner wall 20 constitutes a surface with two planes or levels adjacent to each other such that for the first two-thirds of the brush travel the inner wall 20 is a sufficient distance from shaft 6 to contact the brush ends. The remainder of the inner wall 20 is on a different plane represented by the offset enlargement 21, which is a sufficient distance from shaft 6, to allow the brush to pass free and unimpeded during the remainder of its travel in the housing.

The contacting portion of the inner wall is provided to give the brushes an opportunity to absorb paint or other coating material during their travel through the housing. The offset enlargement will allow the brushes to straighten out and absorb the picked-up paint or coating material and small quantities of excess paint or coating material which collect due to the bending of the brush ends while moving along the contacting portion of the inner wall. The offset enlargement will prevent the brushes from pushing coating material to the outer edges of the casing where it may collect, dry, and interfere with the operation of the brushes, and also operates to return excess paint or coating material back to the contacting portion of the inner wall, thus doing away with a return mechanism in the event that excess paint is supplied to the brushes.

Housing 10 has a valve chamber 22 which opens onto the contacting portion of inner wall 20, by a longitudinal opening 23, approximately one-third of the distance down the contacting portion of the inner wall. A hemi-cylindrical valve 24 is snugly fitted into the valve chamber 22, rotating on the surface therein.

The width of the longitudinal opening 23 will supply the proper amount of paint or coating material to the brush ends as needed, while the longitudinal construction will supply the paint or coating material evenly along the entire length of each of the brush ends as they pass the slit during their travel through the housing.

A manually controlled lever operates the hemi-cylindrical valve 24 to regulate the width of the longitudinal opening 23, so that the proper amount of coating material will be supplied; the valve being connected to a substantially U-shaped member 26 on either side by longitudinal extensions 25. The middle portion of the U-shaped member is in turn connected to a straight rod member 27. The straight rod member has a threaded portion 28 and a thumb screw 29 so that the width of the longitudinal opening may be regulated and fixed to deliver the supply of paint needed.

While this type of manually operated lever is shown, it is understood that other manually controlled levers embodying the same idea may be easily adapted.

A fragment of conduit 30 is shown in Figures 2 and 5, connected at one end to said valve chamber 22 by a threaded air-tight connection 31. The other end attaches to a reservoir (not shown) of any conventional type for holding paint or other liquid.

The reservoir is operated in conjunction with a compressor (not shown) of any conventional type purchasable on the open market, for forcing fluid into the valve chamber. The compressor may be operated off the electric motor furnishing the rotating force for the brushes.

The housing 10, shown in Figures 1 and 2, shows a single handle member 32 cast into the housing itself. While this type of handle member is shown, it will be understood that the handle member may be a separate member fixed onto the housing by bolts or studs, a dual handle member or a pole member or any combination of single or multiple handles either cast or as separate units subsequently affixed.

A switch (not shown) may be adapted to fit the handle to remotely control the motor which is furnishing the rotation force.

As a safety protection, a gear cover 33 is mounted on the housing by bolts or studs 30 so that the revolving gears are completely covered except for an opening provided therein for the passage of the coupling 2 for connection with the extension 2 on gear 3.

In operation, the mechanical paint brush is grasped by the handle member 29 and moved manually over the surface to be painted or coated.

In normal operation, hand lever 26 operating valve 24 is regulated to allow a flow of paint or

coating material to pass through the longitudinal slit 23 onto the inner wall 20. Brushes 7, rotating inside the housing pass across the contacting portion of the inner wall 20 where they pick up and distribute the paint or coating material through the bristles until the offset enlargement 21 is reached. The bristles then straighten out absorbing the small excess caused by the bending of the brush ends moving across the contacting portion of the inner wall and pass freely out to coat the surface being painted.

The compressor is utilized to supply a positive pressure for forcing paint or coating material into the valve chamber 22. Thus when valve 24 is regulated this positive pressure helps to supply the proper amount of paint or coating material onto the inner wall.

While operating the brush, an oversupply of paint or coating material may be supplied to the brushes. This will result in excess paint or coating material collecting in the offset enlargement 21. When this occurs the operator must regulate the flow of paint or coating material by means of hand lever 26, either by closing valve 24 completely or partially so as to allow the excess to be used up as it runs back onto the contacting portion of inner wall 20. Thereafter, the supply may be regulated further as it is needed.

The mechanical paint brush may also be used to remove paint, coating material or clean the surface prior to painting or coating the surface by utilizing different paint removing and cleansing solvents and by changing the brush adapter to the type bristle which will be most effective for this purpose.

When a paint removing solvent is used, the solvent is coated over the surface in the same manner as described above. Thereafter, the brushes may be changed from a fiber bristle to metallic bristles, and the surface that has been treated with the solvent may then be cleaned by the action of the metallic bristles either with further paint removing solvent or dry.

It is also possible to avoid the use of paint removing solvent completely where the paint or other coating material is scaly or easily removable by relying on merely the frictional action of the metallic brushes to accomplish the result.

The use of other types of solvents would similarly apply, as, for example, water with a detergent for cleaning dirt off a surface prior to painting or coating the surface or where it is desired to clean the surface but complete removal of paint or coating material is unnecessary. This would not necessitate the changing of the type bristle that is used as described above.

As stated, the mechanical paint brush is manually operated, therefore it would be advisable to construct the housing and other parts of the lightest but strongest materials available, for example, a light cost aluminum or magnesium metal. This will also give long trouble-free operation and allow efficient and easy manipulation.

It will be understood that the inventor is not to be limited to the specific construction or arrangement of parts as shown but, as already illustrated, they may be widely varied within the invention defined by the claims.

What is claimed is:

1. A rotating painting and coating apparatus comprising, a housing having a hollow interior portion, a removable shaft rotatably carried by said housing across the hollow interior portion, means for rotating said shaft, a locking bar pivotally connected to said housing adjacent the ends

of said shaft in a plane perpendicular to the longitudinal axis of the shaft to removably lock the shaft to said housing, a removable brush adapter carried by said shaft, brushes carried by said brush adapter and formed to contact the hollow interior portion of the housing, means for delivering and to control the quantity of coating material delivered to said brushes, and means continuous with said hollow interior portion in said housing to aid absorption of coating material.

2. A rotating painting and coating apparatus as claimed in claim 1 wherein the means continuous with the hollow interior portion to aid absorption of coating material includes, an offset enlargment forming the latter third of the hollow interior portion.

3. A rotating painting and coating apparatus comprising, a housing having a hollow portion, a shaft, means for rotatably mounting and locking said shaft on said housing across the hollow interior portion thereof, driving means for rotating said shaft, a brush adapter carried by said shaft for rotation therewith, brushes mounted in said brush adapter to contact the hollow interior portion of the housing, said hollow interior portion having an offset enlargement continuous therewith in the housing to aid absorption of coating material by said brushes, and means for delivering and to control the quantity of coating material delivered to said brushes.

4. A rotating painting and coating apparatus as claimed in claim 3 wherein the means for rotatably mounting and locking said shaft to said housing includes, locking bars pivotally mounted on said housing inwardly of either end of the shaft, and split bearings carried by said housing and each of said locking bars in a plane perpendicular to the longitudinal axis of the shaft and adapted to be opened and closed with said locking bar whereby the said shaft may be removed or locked in position.

5. A rotating painting and coating apparatus comprising, a housing having a hollow interior portion to form an inner wall therein, locking bars pivotally connected to the outer edge of said housing in a plane perpendicular to the longitudinal plane of the housing, split bearings mounted on said housing and having at least one portion thereof carried by each of said locking bars, a rotatable shaft mounted in said bearings across said hollow portion of the housing, means for rotating said shaft, a brush adapter carried by said shaft and rotatable therewith, brushes carried by said brush adapter for contact with said inner wall, means continuous with said inner wall to aid absorption of coating material by said brushes, and a valve means in said housing to open onto said wall to deliver coating material to said brushes.

6. A rotating painting and coating apparatus as claimed in claim 5 wherein the valve means comprises, a valve chamber formed in said housing to receive coating material therein, means for delivering coating material to said valve chamber, a longitudinal opening communicating with said valve chamber and opening onto said inner wall, a hemi-cylindrical valve member movably mounted in said valve chamber to open and close said longitudinal opening, and means to regulate said valve to control the width of said longitudinal opening.

7. A rotating painting and coating apparatus comprising, a housing having a hollow interior portion to form an inner wall therein, locking bars pivotally connected to the outer edge of said

housing in a plane perpendicular to the longitudinal plane of the housing, split bearings mounted on said housing and having at least one portion thereof carried by each of said locking bars, a rotatable shaft removably mounted in said bearings across said hollow portion of the housing, means for rotating said shaft, a brush adapter carried by said shaft and rotatable therewith, brushes carried by said brush adapter for contact with said inner wall, an offset enlargement forming the latter third of the inner wall to aid absorption of coating material therefrom by said brushes, a valve chamber formed in said housing, means for delivering coating material to said valve chamber, a longitudinal opening on said inner wall communicating with said valve chamber to allow coating material to pass thereto, a hemi-cylindrical valve member movably mounted in said valve chamber to open and close said longitudinal opening, and an externally mounted lever to communicate with said hemi-cylindrical valve to control the width of said longitudinal opening to prevent excess coating material from passing to said inner wall.

8. In a rotating painting and coating apparatus, a housing having a hollow interior portion to form an inner wall therein, a removable shaft rotatably carried by said housing across said hollow portion, means for rotating said shaft, a brush adapter fixed to said shaft to rotate therewith, brushes set in said brush adapter, a contacting portion on said inner wall for contact with said brushes, an offset enlargement formed on said inner wall continuously with said contacting portion to aid absorption of coating material, valve means to control delivery of coating material to said contacting portion including, a valve chamber formed in said housing, a longitudinal opening on said contacting portion communicating with said valve chamber, a hemi-cylindrical valve to open and close said longitudinal opening, a manually operated hand lever communicating with said cylindrical valve member to control the width of said longitudinal opening, and means connected to said valve chamber for delivering coating material thereto.

9. In a rotating painting and coating apparatus as claimed in claim 8 which includes, locking bars pivotally mounted on said housing inwardly of either end of the shaft, and split bearings carried by said housing and each of said locking bars in a plane perpendicular to the longitudinal axis of the shaft and adapted to be opened and closed with said locking bar whereby the said shaft may be removed or locked in position.

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