

Feb. 2, 1932.

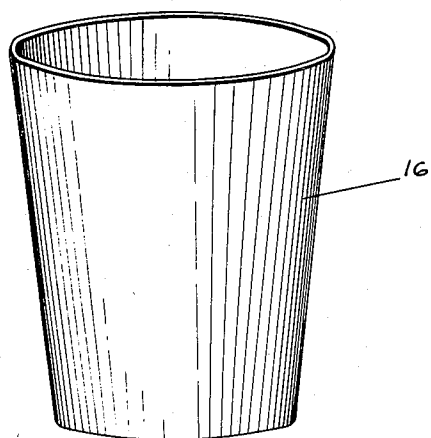
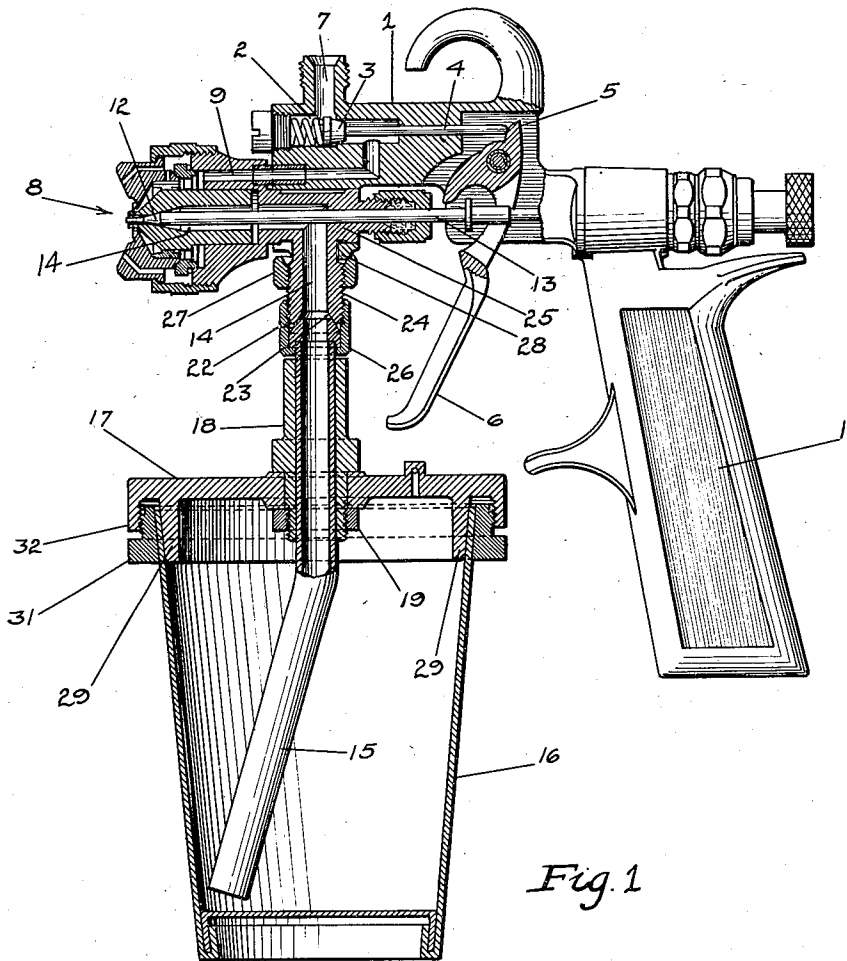
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1,843,269

SPRAYING APPARATUS

Filed March 2, 1929

4 Sheets-Sheet 1



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SPRAYING APPARATUS

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4 Sheets-Sheet 2

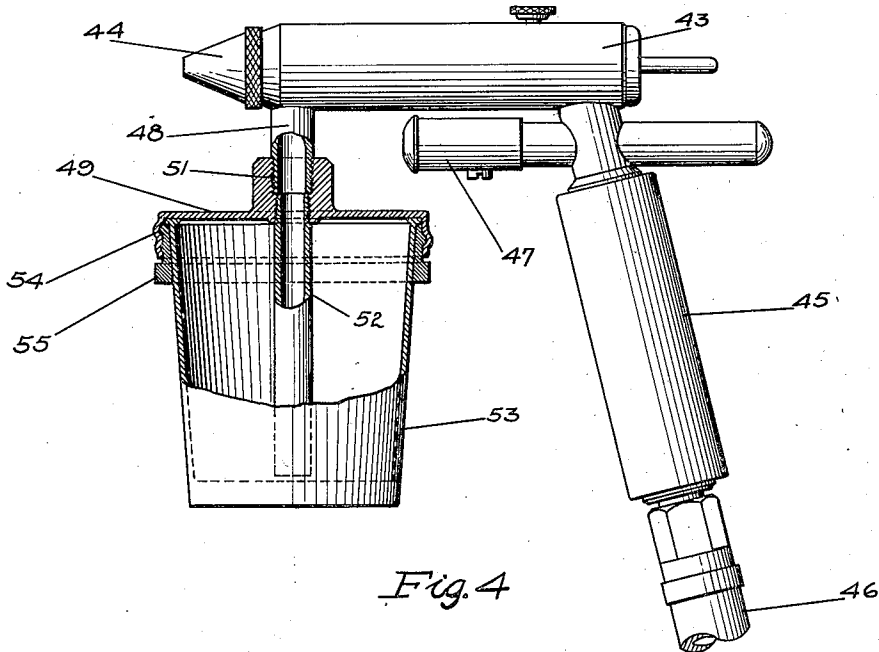


Fig. 4

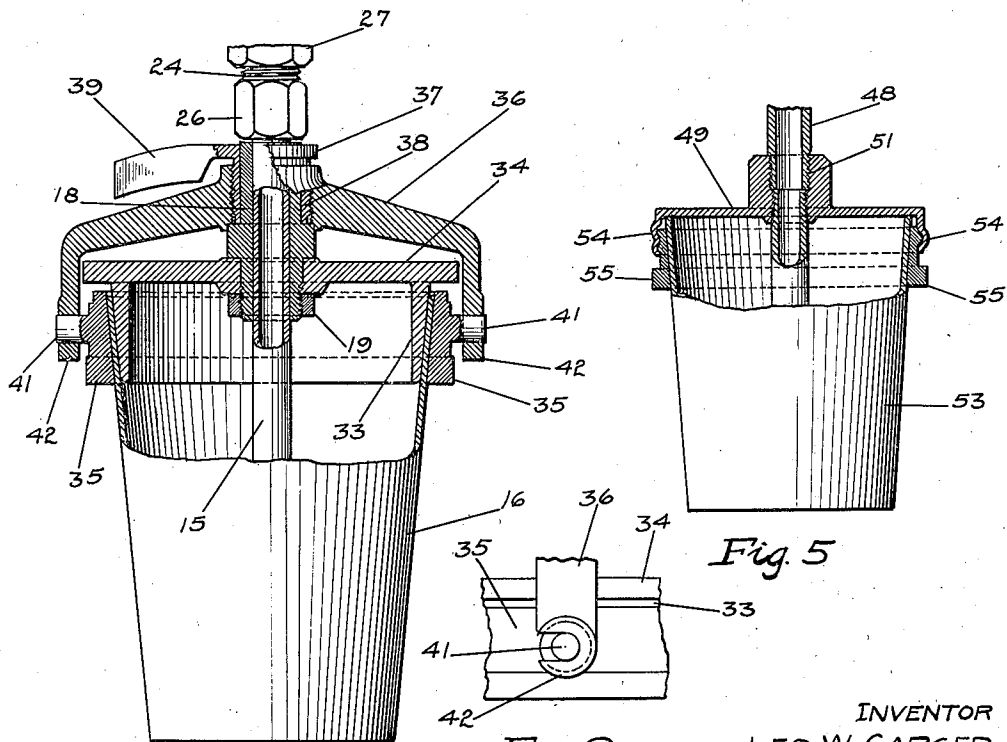


Fig. 3

Fig. 9

Fig. 5

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4 Sheets-Sheet 3

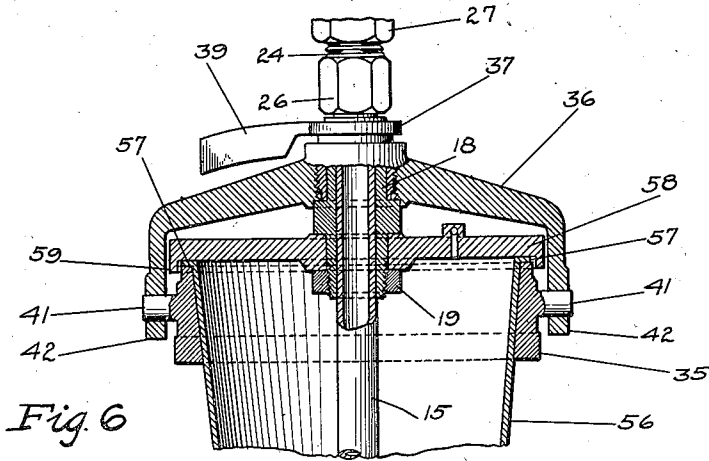


Fig. 6

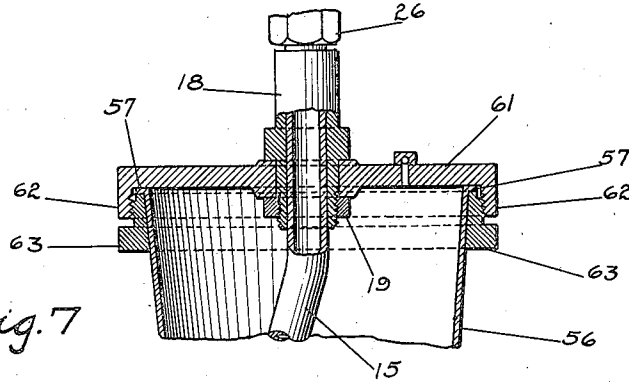


Fig. 7

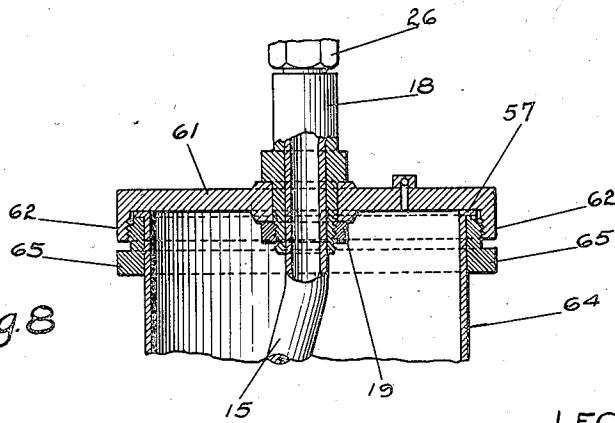


Fig. 8

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4 Sheets-Sheet 4

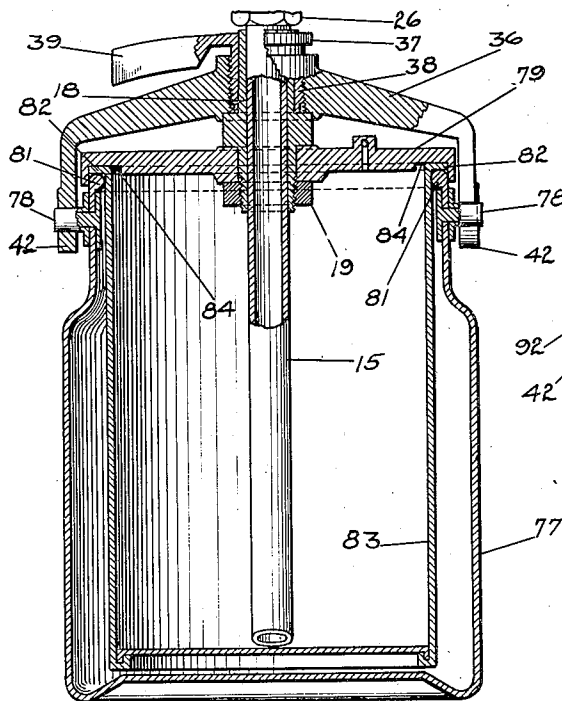


Fig. 13

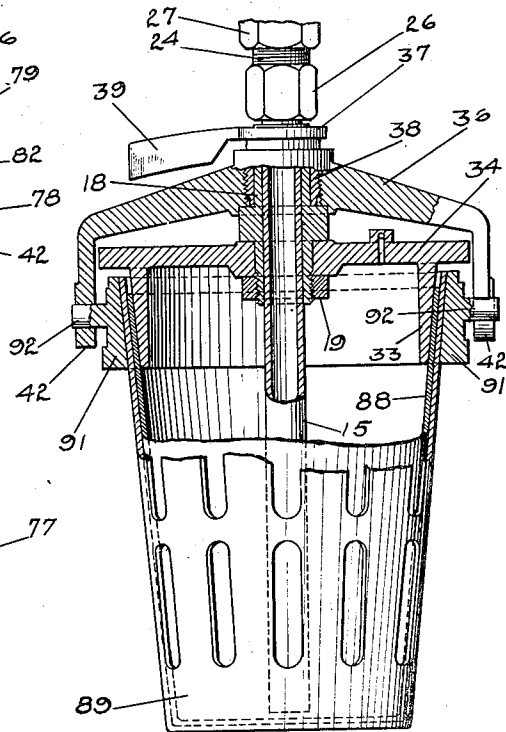


Fig. 15

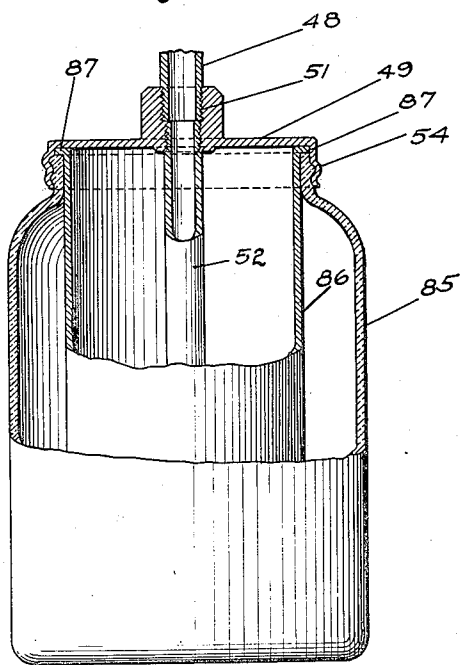


Fig. 14

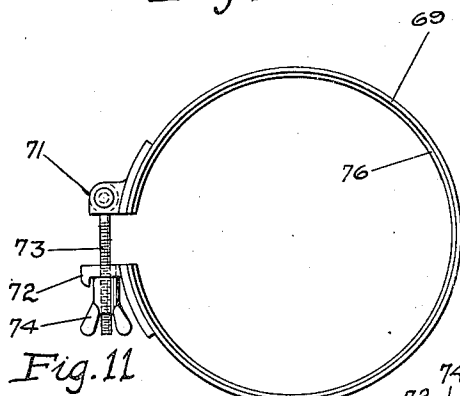


Fig. 11

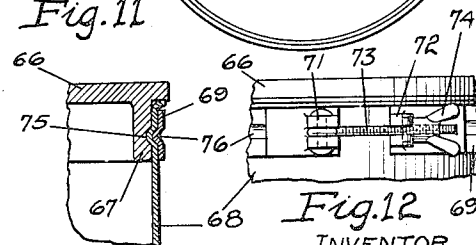


Fig. 12

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UNITED STATES PATENT OFFICE

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SPRAYING APPARATUS

Application filed March 2, 1929. Serial No. 344,001.

My invention relates to improvements in liquid spraying apparatus or air brushes, adapted for spraying lacquers, paints, oils, varnishes, and other liquid materials. Such material as lacquer, because of its viscousness and quick-drying qualities, has been found difficult to uniformly apply with a hair brush, especially when coating a large surface, resulting from the inherent tendency of the lacquer to set quickly. It is therefore desirable to apply lacquer with an air brush, as this method is much quicker and permits a relatively large surface to be coated before the material sets or dries sufficiently to cause a variance in the thickness of the coating.

Ordinary air brushes or spraying apparatus, such as are now commonly used, are not particularly well adapted for spraying lacquer, because of the construction of the container for the coating material, and the means for supporting the container on the air brush, which means also forms a closure for the container. The common type of container is constructed of a non-porous material, usually glass or metal, and is detachably secured to the closure by suitable clamping means or threads. The joint between the upper open end of the container and the closure, is usually sealed by a flexible gasket of a suitable material such as leather, for example. In use, this gasket soon becomes saturated with the coating material, which, in its flowing state, also tends to seep into the joints or between the parts employed for securing the container to the closure, thereby making it difficult to detach the container from the closure, because of the liquid setting and drying in these joints.

When an air brush is to be used for spraying different kinds of coating material as, for example, lacquer and paint, it is necessary to thoroughly cleanse the container and its closure of one material, before introducing another therein, as will readily be seen, when it is understood that lacquer will not mix with a coating material having an oil base, and usually mixing one such material with another of a different characteristic, will destroy the quality of the material. This requires the removal of the saturated gasket

and the substitution of a new one, each time the air brush is to be used for a different material, particularly when changing from one color to another. Also, due to the chemical reaction resulting from mixing some materials, it is essential that the apparatus be thoroughly cleaned and free from one material before using it for another.

An object of the present invention is to provide in combination with an air brush or spraying apparatus, an inexpensive easily replaceable container and means for detachably securing it thereto. The container may be constructed of a suitable inexpensive material so that it may be destroyed or discarded after use and a new one substituted therefor, particularly, when changing from one color to another, thereby eliminating the expensive operation of cleaning the container, which is now common practice. I have found that by using my improved container in connection with an air brush, it is cheaper to substitute a new container for the one used, than it is to clean the used container, because of the labor required to remove the coating material from the walls thereof.

A further object is to provide an improved liquid container for an air brush, and an improved means for detachably securing the container thereto. The container is preferably constructed of a suitable inexpensive material such as paper, which may be manufactured in quantity production, at a very low cost, whereby it may be destroyed or discarded after use; and the means for detachably securing the container to the air brush, comprises a member adapted to surround the container and to engage and secure the upper portion thereof to the container closure, the latter usually forming a part of the air brush structure.

A more specific object is to provide an inexpensive container constructed of a suitable material, whereby the walls of the container will have the inherent characteristic of compressibility, and in a novel means for attaching the container to the closure of a spray gun, said means being adapted to grip and compress a portion of the container wall to secure the container to the closure, and the

compressibility of the container wall rendering it capable of acting as a gasket, whereby the container may be attached to the closure in leak-proof relation without the use of separable gaskets. This is an important feature of the invention in that it eliminates the use of ordinary gaskets. Because of the fact that common gaskets are usually more or less porous, they absorb coloring matter from the material in the container, which renders them very difficult to clean. Gaskets, such as are commonly used in connection with ordinary spray guns, must be cleaned thoroughly and often, otherwise they may carry one color into another with disastrous results.

Other objects of the invention will appear from the following description and accompanying drawings and will be pointed out in the annexed claims.

In the accompanying drawings, there has been disclosed a structure designed to carry out the various objects of the invention, but it is to be understood that the invention is not confined to the exact features shown, as various changes may be made within the scope of the claims which follow.

In the drawings;

Figure 1 is a view, partially in section, showing the invention embodied in the construction of a well-known type of air brush;

Figure 2 is a perspective view showing the container removed from the air brush;

Figure 3 is a view showing a container supporting means of modified form;

Figure 4 is a view showing another type of air brush with the invention embodied therein;

Figure 5 is a view showing the container illustrated in Figure 4, before the clamping ring is tightened;

Figure 6 is a view showing a modification wherein the container is provided at its upper portion with an outwardly turned flange adapted to be secured to the closure by a clamping member;

Figure 7 is a view showing a container similar to the one illustrated in Figure 6, secured to the closure by a threaded member;

Figure 8 is a view similar to Figure 7, but showing a container whose walls are cylindrical and not tapered, as in the other figures;

Figure 9 is a detail view illustrating the forked terminals of the yoke;

Figure 10 is a view illustrating another manner of attaching the container to the closure;

Figure 11 is a plan view of the clamping member shown in Figure 10;

Figure 12 is a fragmental view illustrating a portion of the container, closure, and clamping band, shown in Figures 10 and 11;

Figure 13 illustrates the invention applied to an air brush of ordinary construction, in this instance the liquid supporting member

forming a liner for the usual non-destructible container;

Figure 14 is a view illustrating the liner used in connection with a container having a screw top; and

Figure 15 is a view showing a cup similar to the one shown in Figure 2, supported within a skeleton frame.

In the selected embodiment of the invention, there is illustrated in Figure 1, a conventional spraying apparatus or air brush of the suction type, comprising a body 1, having a valve chamber 2 therein provided with a spring-actuated air control valve 3. This valve is shown as having a stem 4, slidable in a suitable guide and adapted to be engaged by a projection 5, provided on a trigger 6, pivotally mounted in the body 2, as shown. The valve chamber 2 has an air intake 7, adapted for connection with a suitable source of fluid pressure, such as compressed air. For the sake of clarity, I have shown this intake located on top of the body 1. A suitable liquid-spray head 8 is secured to the body 1, and communicates with the valve chamber 2, by means of a duct 9. The body 1 has a suitable hand grip 11.

The spray head 8 is of ordinary construction, and is here shown provided with the usual liquid control valve 12, formed at one end of a rod 13, the opposite end of which is operatively connected with the trigger 6, so that when the latter is actuated to open the air control valve 3, the liquid control valve 12 may also be opened. The coating liquid or material is delivered by suction, to the valve 12 through a passage 14, and a suction tube 15, having its lower end submerged in the coating liquid. The action of the air passing through the spray head 8, creates a suction in the passage 14 and tube 15, in the usual manner.

In apparatus of this character, the liquid to be sprayed is usually held in a container or receptacle, demountably supported beneath the body 1, and positioned so that the lower end of the suction tube 15 will be submerged in the coating liquid contained therein, as will be understood by reference to Figure 1. It is to the container, and the novel means provided for attaching it to the air brush, that this invention particularly pertains.

As shown in Figure 1, a container 16, is constructed of a suitable material such, for example, as paper, having the inherent characteristic of compressibility. This container is adapted to be supported beneath the body 1 of the air brush. The upper portion of the container is secured in a closure 17, having a tubular member 18 secured thereto by means of a nut 19. The upper portion of the suction tube 15 is suitably secured in the tubular member 18, and is provided with a terminal head 21 having a conical face 22 adapted to

be seated in a correspondingly shaped seat 23, provided in the threaded extension 24, preferably integrally formed with the portion 25 of the spray head 8. The head 21 of the suction tube is secured to the threaded extension 24 by a suitable nut 26, shown in Figure 1. The portion 25 of the spray head 8 is secured in the body 1 of the air brush by a nut 27 received in threaded engagement with the extension 24. The upper portion of the nut 24 is counterbored to receive the depending portion 28 of the body 1, to detachably secure the spray head 8 thereto.

A feature of the invention resides in the construction of the container 16 and in the means provided for securing it to the closure 17. The preferred form of container, and means for securing it to the closure 17, is shown in Figures 1 and 2. As here shown, the container 16 has tapering walls and is frusto-conical in shape. The upper edge of the container is adapted to receive a correspondingly tapered depending flange 29, provided on the closure 17. The diameter of the flange 29 is such that when the container is fitted thereto, it will snugly engage the outer surface of the flange. A lock ring 31 is received in threaded engagement with a flange 32, provided exteriorly of the flange 29. The bore of the lock ring 31 is tapered to correspond with the taper of the container wall and also the taper of the flange 29. When the lock ring is screwed into the flange 32, the upper marginal portion of the container will be securely clamped between the ring 31 and the inner flanges 29, as shown in Figure 1, thereby detachably securing the container to the closure. Because of the container wall being capable of being compressed, the portion thereof which is seated between the flange 29 and the ring 31, will act as a gasket and seal the connection between the closure and the container and thus eliminate the use of a separate gasket, as will readily be understood by reference to Figure 1.

The form of container above described is inexpensive, so that it may be thrown away or discarded after use, and a new one substituted therefor, when the air brush is again used, rather than to go to the expense of cleaning it, as is now common practice, when changing from one job to another. Thus, the costly operation of cleaning the container, each time the air brush has been used, may be dispensed with. It will also be seen that no gaskets of any kind are used for sealing the joint between the container and the closure 17. The upper portion of the container wall forms in effect a gasket, when secured between the lock ring 31, and the flange 32 of the closure.

Figure 3 illustrates a modified construction wherein the container 16 is supported on a closure 34, by a depending flange 33, and a clamping ring 35, axially movable with re-

spect to the flange 33 by a yoke 36, operable by a rotatable member 37, having a sleeve portion 38 received in threaded engagement with the yoke 36, and provided with a finger grip 39, whereby it may be conveniently rotated. The member 37 is mounted for rotary movement upon the tubular member 18, and by reason of its threaded engagement with the yoke 36, when it is rotated, the yoke will be axially translated with respect to the tubular member 18 and closure 34, thereby causing the clamping ring 35 to clamp the upper marginal portion of the container between it and the annular flange 33. The clamping ring 35 is provided with oppositely projecting pins 41, received in the forked terminals 42 of the yoke 36, (see Figure 9).

To remove the container 16 from the closure 34, shown in Figure 3, the member 37 is rotated to cause the yoke 36 to be moved in a downward direction, thereby causing the clamping ring 35 to release its grip upon the upper portion of the container. The clamping ring is then relatively rotated with respect to the closure, sufficiently to cause the pins 41 to become disengaged from the forked terminals 42 of the yoke, after which the container and ring may be removed from the flange 33. To attach the container to the closure 34, the closure may be fitted onto the tapered flange 33, and the clamping ring 35 slipped over the container, and its opposed pins 41 engaged with the terminals 42. The member 37 is then relatively rotated to cause the yoke 36 to be moved in an upward direction, thereby clamping the upper portion of the container between the clamping ring 35 and tapered flange 33.

Figures 4 and 5 illustrate the invention as applied to an air brush 43 differing somewhat in construction from the brush shown in Figure 1. The brush 43 is provided with the usual nozzle 44 and has a hollow hand grip 45, having its lower end adapted to be connected to a flexible connection 46, leading to a suitable source of air supply. A trigger 47 is provided for operating a suitable valve mechanism, not shown, which is adapted to control the supply of air to the nozzle 44.

A threaded extension 48 is provided at the forward portion of the body of the air brush 43, and has a closure 49 secured thereto by suitable threads 51. A suction tube 52 is received in threaded engagement with the closure 49, and is preferably aligned with the extension 48 and depends downwardly into the container 53, as indicated by the full and dotted lines in Figure 4. The construction of the container shown in Figures 4 and 5 is similar to that shown in Figures 1 and 2.

The means provided for securing the container 53 to the closure 49, consists of a depending flange 54, preferably integrally formed with the closure 49. This flange is provided with a relatively coarse thread

adapted to receive a lock ring 55, having a tapered bore adapted to fit the upper portion of the container wall, as particularly shown in Figure 5. The diameter of the lock ring 55 is of such size that when the ring is slipped over the container 53, the bore will snugly engage the walls of the container just before the upper portion of the ring reaches the upper edge of the container. In other words, when the lock ring snugly engages the upper portion of the container, the upper edge of the latter will be spaced from the upper edge of the lock ring, as shown in Figure 5. Thus, it will be seen that when the lock ring is screwed into the threaded flange 54 of the closure 49, the upper edge of the container 53, when it engages the bottom of the closure 49, will upset, thereby sealing the joint between the container and the closure to prevent leakage. The container may be readily detached from the closure 49, by simply unscrewing the lock ring 55, after which the container may be disengaged from the ring 55.

Figure 6 illustrates a modified construction wherein a container 56 is provided at its upper portion with an outwardly turned marginal flange 57, adapted to be clamped between a closure 58 and the clamping ring 35, supported in the yoke 36, as shown and described with reference to Figure 3. The closure 58 is preferably provided with a depending annular flange 59 to provide means for centering the container in the closure 59. This flange may be dispensed with, if desired, as the container will be substantially centered in the closure, when the clamping ring 35 is engaged with the yoke 36. In the form here shown, the marginal flange 57 at the upper portion of the container is clamped between the upper edge of the clamping ring 35 and the closure 58, when the yoke 36 is moved upwardly by rotation of the member 37.

Figure 7 illustrates another form comprising a closure 61 having a depending threaded flange 62, adapted to receive a lock ring 63 similar to the one shown in Figure 1. The container 56 here shown, is similar to that shown in Figure 6, and the marginal flange 57 provided at the upper portion thereof is adapted to be clamped between the lock ring 63 and the bottom face of the closure 61, when the ring 63 is screwed into the flange 62.

Figure 8 illustrates a construction similar to that shown in Figure 7 with the exception that the walls of the container 64 are cylindrical, and not tapered, as shown in the other figures. In the form shown in Figures 6, 7, and 8, where the container is provided with the outwardly turned annular flange 57, a slight variation in the bore of the securing rings 35, 63, and 65 will have no particular effect upon the sealing of the joint between the upper portion of the receptacles and their respective closures, as these joints

are sealed by pressure of the rings against the flanges 57 of the containers.

In Figures 1 to 5, it is desirable that the bores of the locking members be of such size with respect to the upper portions of the containers that they will snugly engage the upper portions thereof, before the locking members are moved into clamping engagement with their respective members. A slight variation, however, in the locking members 31 and 35, shown in Figures 1 and 3 respectively, will have no effect on the securing of the upper portion of the container to the closures, because of the taper provided in the bores of the locking members and the flanges 29 and 33.

Figures 10, 11, and 12 illustrate another form wherein the closure 66 is provided with an annular member 67, adapted to be engaged by the upper portion of a container 68, as shown in Figure 10. A band 69 is adapted to encircle the upper marginal edge of the container 68 and the member 67, and is here shown as being provided with terminal lugs 71 and 72. A threaded stem or eye bolt 73 is pivoted to the lug 71, and the other lug 72 is forked to receive the stem 73. A wing nut 74 is received in threaded engagement with the stem 73 to contract the band to secure the container to the member 67. A peripheral groove 75 is preferably provided in the member 67, and a longitudinally extending rib or bead 76 is provided in the band 69, which cooperates with the groove 75 to secure the container wall to the member 67 in leak-proof fashion.

Figure 13 illustrates the invention as applied to an air brush comprising the usual non-destructible container 7, having pins 78 in the upper portion thereof adapted to be engaged by the yoke 36, for attaching it to the closure 79. The upper rolled edge 81 of the container is adapted to be seated against the outwardly turned flange 82 of a liner 83, constructed of an inexpensive, destructible material such as paper.

The closure 79, shown in Figure 13, is of ordinary construction, and has an annular seat or depression 84, wherein the usual porous gasket is adapted to be seated. The gasket is not shown in the drawings. When my improved liner 83 is used in connection with such an air brush, the usual gasket is dispensed with, as it will be seen that the flange 82 of the container takes the place thereof and tightly seals the joint between the container and closure.

Figure 14 illustrates a closure 49, such as shown in Figures 4 and 5, having a non-destructible container 85 received in threaded engagement therewith, and in which a liner 86 is secured, the upper portion of which is provided with a flange 87 adapted to be seated against the upper edge of the container 85. This flange acts as a gasket in a

manner similar to the one shown in Fig. 13.

Figure 15 illustrates another form wherein a container or liner 88 is supported within an open frame 89. The upper portion of the frame 89 is preferably secured in a ring 91, having pins 92 adapted to be engaged by the forked terminals 42 of the yoke 36. The upper marginal edge of the liner 88 is secured in leak-proof fashion between the depending tapered flange 33, and the upper portion of the frame 89, which is strengthened by the ring 91. When the containers for the coating liquid are to be supported within an outer enclosing member, such as the usual non-destructible containers 77 and 85, or the frame 89, shown in Figures 13, 14, and 15, respectively, they may be made of a comparatively thin material, with a resultant reduction in the cost of manufacture. In each instance, however, a portion of the container wall acts as a gasket whereby the use of separable gaskets is dispensed with. This is made possible as a result of the container being constructed of a suitable material having the inherent characteristic of being capable of being compressed, as hereinbefore stated. It is to be understood that the various forms of destructible containers and liners, shown in the various figures of the drawings are treated with a suitable material to render the walls thereof substantially non-absorbent, to prevent seepage of the coating liquid there-through.

In all of the above forms, it will be seen that the container or liner may readily be detached from the closure of the air brush without loss of time, and because of the inexpensive construction of the container, it may be discarded after use and a new one substituted therefor, when the air brush is again used, or when changing from one color to another. By thus discarding the used container, the cost of cleaning the container each time it is to be used is dispensed with, thereby reducing the cost of operation, as it is well known that the operation of cleaning a container after use, particularly, if it is to be used for another color, is an expensive one, because of the inherent tendencies of the coating material, particularly lacquer, to adhere to the walls of the container. It will also be noted that no gaskets are employed, and the construction and arrangement of the parts is such as to positively prevent the coating material from coming in direct contact with the threads provided for securing the lock rings or members to their respective closures. This is an important feature as it prevents the threads from becoming locked to one another, which is a common occurrence when the coating material is permitted to seep between the threads.

In the drawings, I have shown an air brush of the well-known suction type, wherein the coating liquid is delivered to the spray head

from the liquid container, by suction, caused by the flow of air under pressure through the spray head. It is to be understood, however, that the invention is not limited to this particular type of air brush, as it readily lends itself for use in connection with other types such as the well-known pressure and gravity types.

I claim as my invention:

1. A container unit comprising a container for coating materials, having tapering walls, a closure for said container, an annular member on said closure having a portion tapered to substantially fit the inner tapered wall portion of the container, a correspondingly tapered member received in threaded engagement with said closure and adapted to cooperate with said fixed member to clampingly grip the tapered wall portion of the container to detachably secure said container to said closure in leak-proof relation.

2. A container unit comprising a container for coating materials, having tapering walls, a closure for said container, an annulus secured to and depending from said closure and having its outer surface adapted to substantially fit the inner tapered wall portion of said container, a threaded flange on said closure encircling said annulus, and a ring member received in threaded engagement with said flange and cooperating with said annulus to clampingly engage the tapered wall portion of said container to detachably secure the container to said closure in leak-proof relation.

3. A container unit comprising a container for coating materials, having tapering walls, a closure for said container, an annulus secured to and depending from said closure and having its outer surface tapered to substantially fit the upper inner wall portion of said container, a threaded flange on said closure encircling said annulus, and a ring member received in threaded engagement with said flange and cooperating with said annulus to clamp the upper marginal edge of the container therebetween in substantially leak-proof relation.

4. A container unit comprising a container for coating materials, having tapering walls, a closure for said container, an annulus secured to and depending from said closure and having its outer surface tapered to substantially fit the upper inner wall portion of said container, an interiorly threaded flange on said closure encircling said annulus and spaced therefrom to provide an annular recess adapted to receive the upper marginal wall portion of the container, and an exteriorly threaded ring member adapted to be received in threaded engagement with said flange within said recess adapted to cooperate with said tapered flange to detachably secure the container to the closure, in substantially leak-proof relation.

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5. A container unit adapted for use in connection with a spray gun, said unit comprising a container of a compressible material whose walls are substantially impervious to a coating material, a closure for said container having a depending flange adapted to be fitted into the upper portion of the container, a member having a bore adapted to receive the container and to fit an outer wall portion thereof, and rotatable means for relatively axially translating the member whereby the upper marginal wall portion of the container may be clamped between said member and said closure flange in leak-proof relation.

6. A container unit adapted for use in connection with a spray gun, said unit comprising a semi-rigid container of a compressible material whose walls are substantially impervious to a coating material, a closure for said container, an annular member fixed to said closure and having a portion adapted to be fitted into the upper portion of the container, a movable member adapted to encircle said fixed member and cooperable therewith to clampingly engage the upper wall portion of the container, and threaded means operatively connected with said movable member whereby said member may be relatively axially moved to cause the upper marginal wall portion of the container to be securely clamped between said members in leak-proof relation.

7. A container unit adapted for use in connection with a spray gun, said unit comprising a container of a compressible material whose walls are substantially impervious to spraying materials, a closure for the container covering the mouth and extended over the upper edge of the container and having an annular seat adapted to be engaged by an upper portion of the container, a member having a bore adapted to receive the container and to fit an outer wall portion thereof, and means for relatively axially translating the member whereby the upper marginal wall portion of the container may be clamped between said member and said seat in leak-proof relation.

8. A container unit, comprising a container and a closure for the container covering the mouth and extended over the upper edge of the container and having an annular seat adapted to be engaged by an upper portion of the container, a member having a bore adapted to receive the container and to fit an outer wall portion thereof, and means for relatively axially translating the member whereby the upper marginal wall portion of the container may be clamped between said member and said seat in leak-proof relation.

In witness whereof, I have hereunto set my hand this 26th day of February, 1929.

LEO W. CAPSER.