April 27, 1965 E. W. HAGADORN 3,180,578

SPRAYING APPARATUS HAVING CAP, NIPPLE AND SLEEVE CONSTRUCTION

Filed April 22, 1963 4 Sheets-Sheet 1

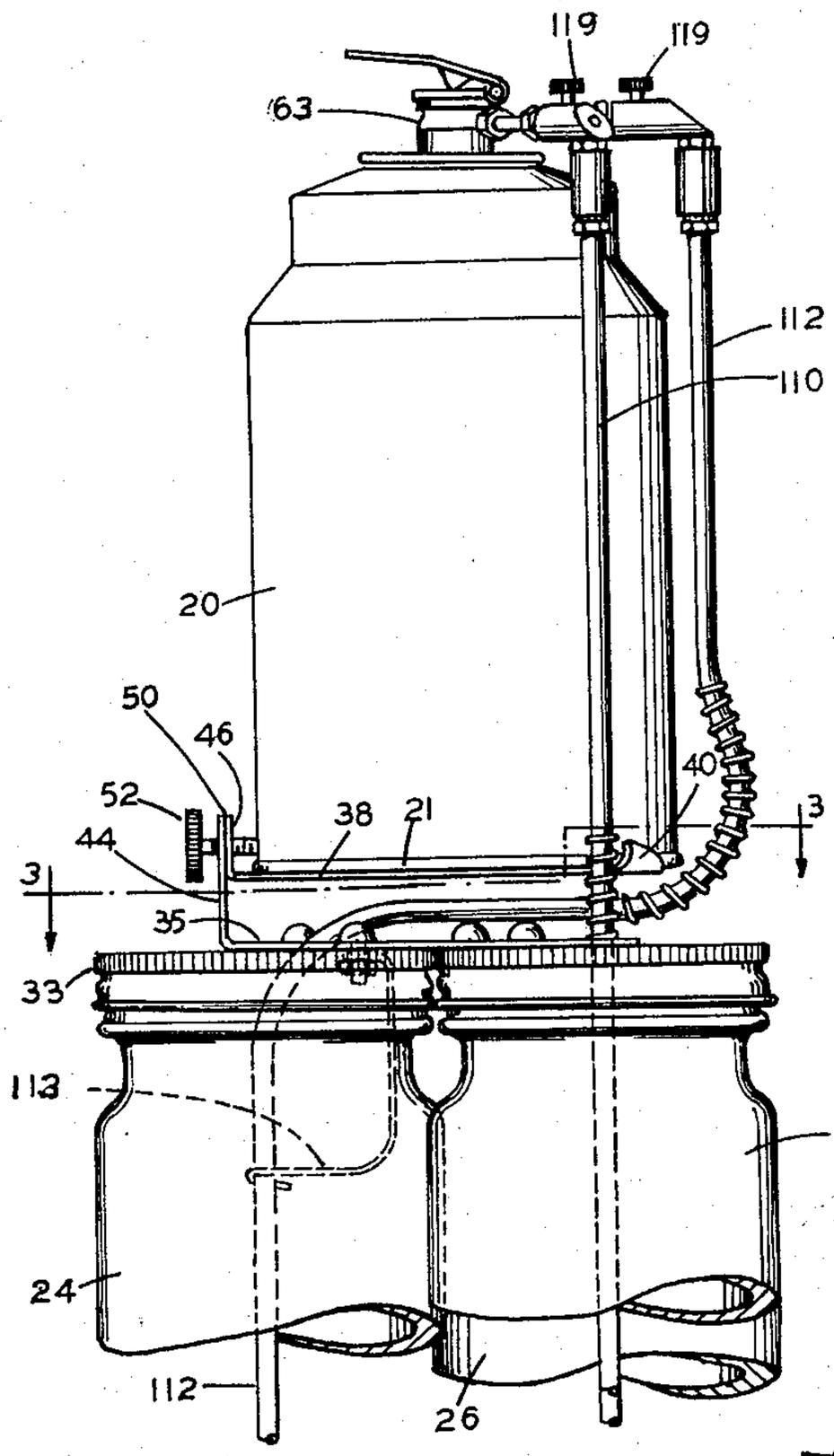


FIG. 1

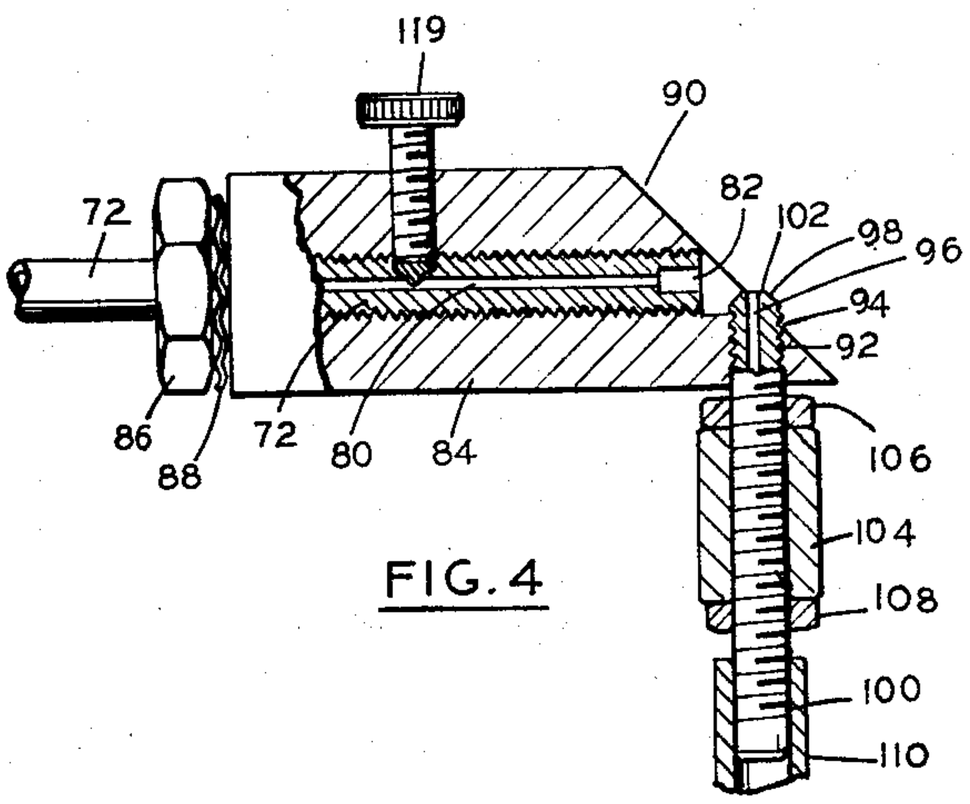
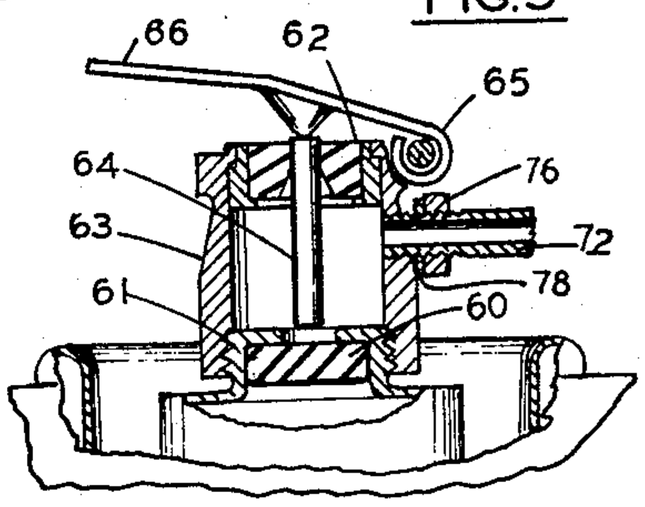


FIG. 4

FIG. 5



INVENTOR.
ELMORE W. HAGADORN.

BY

ATTORNEY

April 27, 1965 E. W. HAGADORN 3,180,578

SPRAYING APPARATUS HAVING CAP, NIPPLE AND SLEEVE CONSTRUCTION

Filed April 22, 1963 4 Sheets-Sheet 2

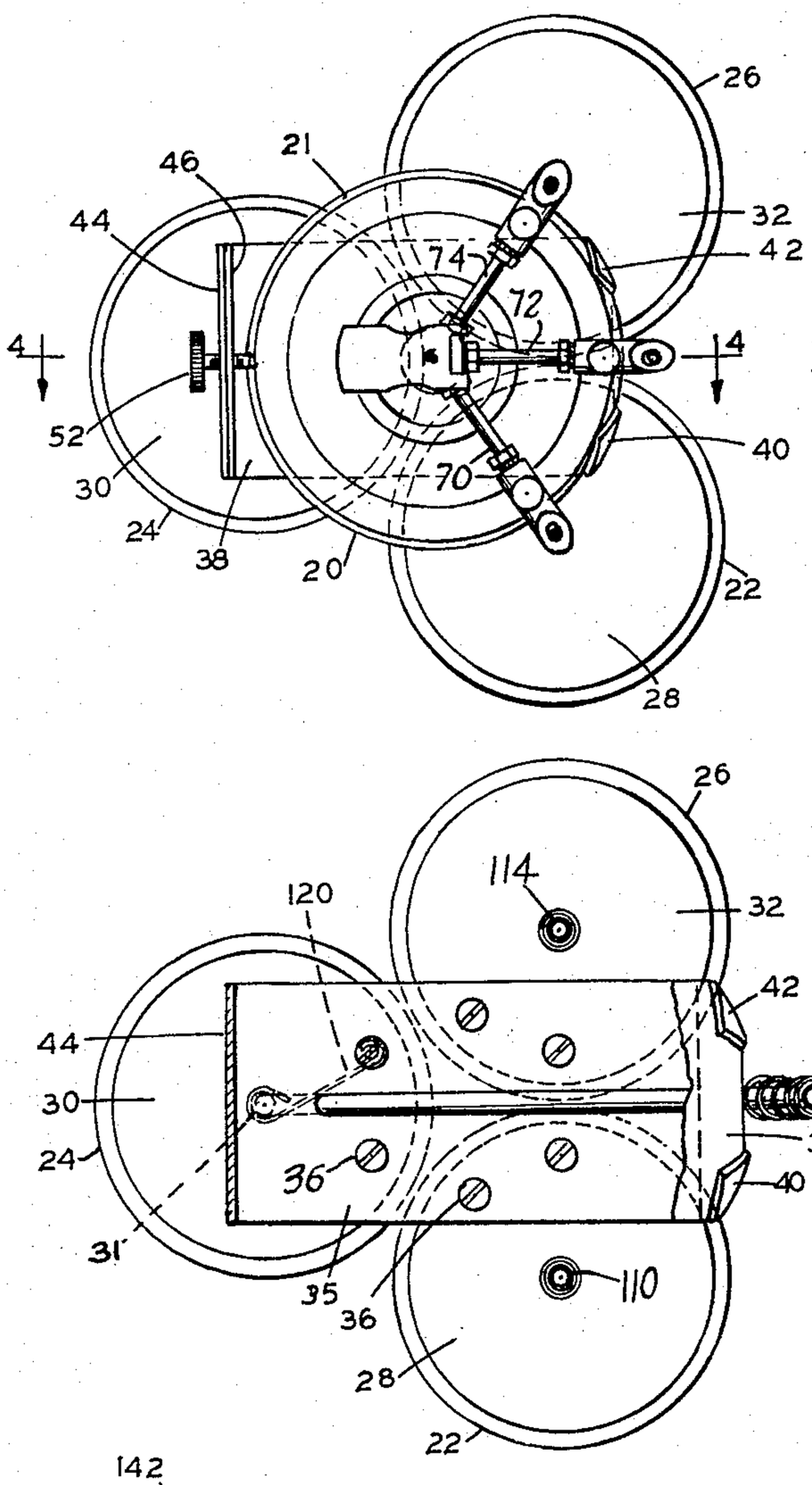


FIG. 2

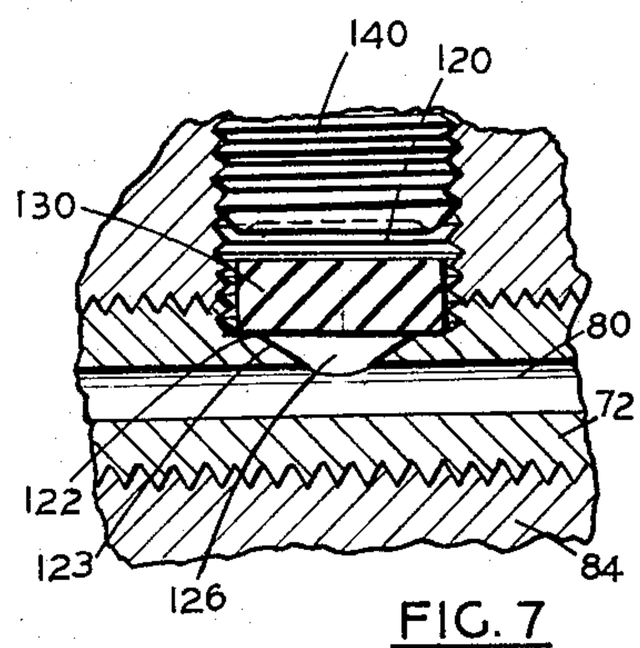


FIG. 7

FIG. 3

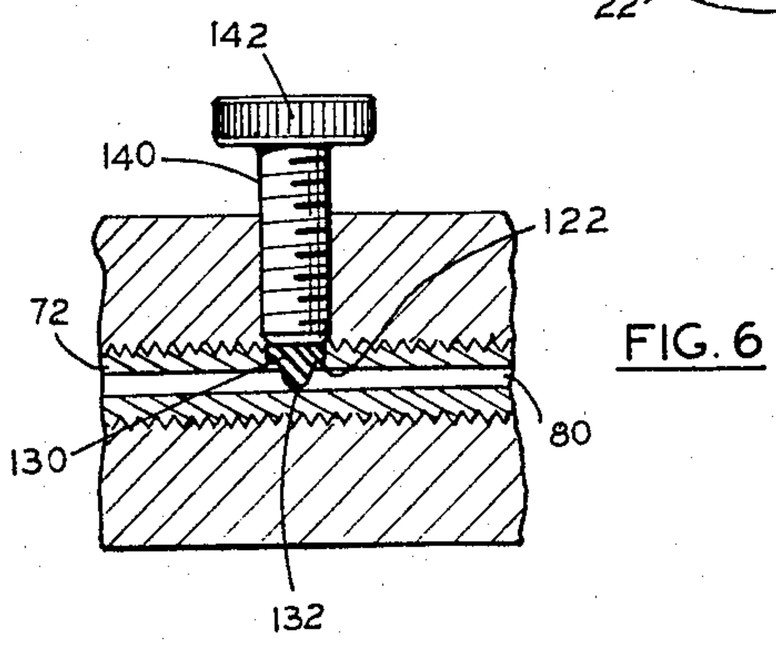


FIG. 6

INVENTOR.
ELMORE W. HAGADORN
BY E. P. Kenyon

ATTORNEY

April 27, 1965 E. W. HAGADORN 3,180,578

SPRAYING APPARATUS HAVING CAP, NIPPLE AND SLEEVE CONSTRUCTION

Filed April 22, 1963 4 Sheets-Sheet 3

FIG. 8

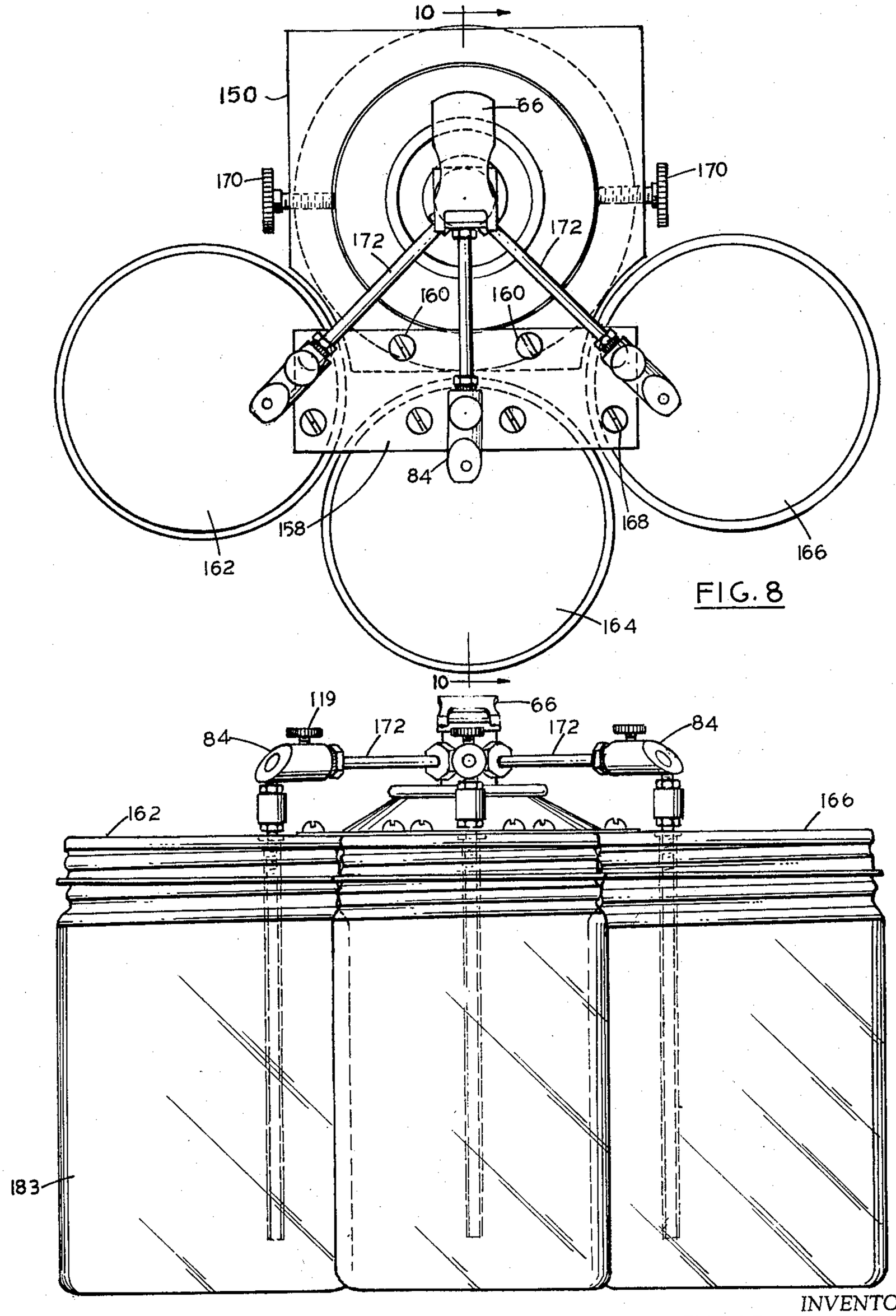


FIG. 9

INVENTOR.
ELMORE W. HAGADORN

BY

ATTORNEY

April 27, 1965 E. W. HAGADORN 3,180,578

SPRAYING APPARATUS HAVING CAP, NIPPLE AND SLEEVE CONSTRUCTION

Filed April 22, 1963 4 Sheets-Sheet 4

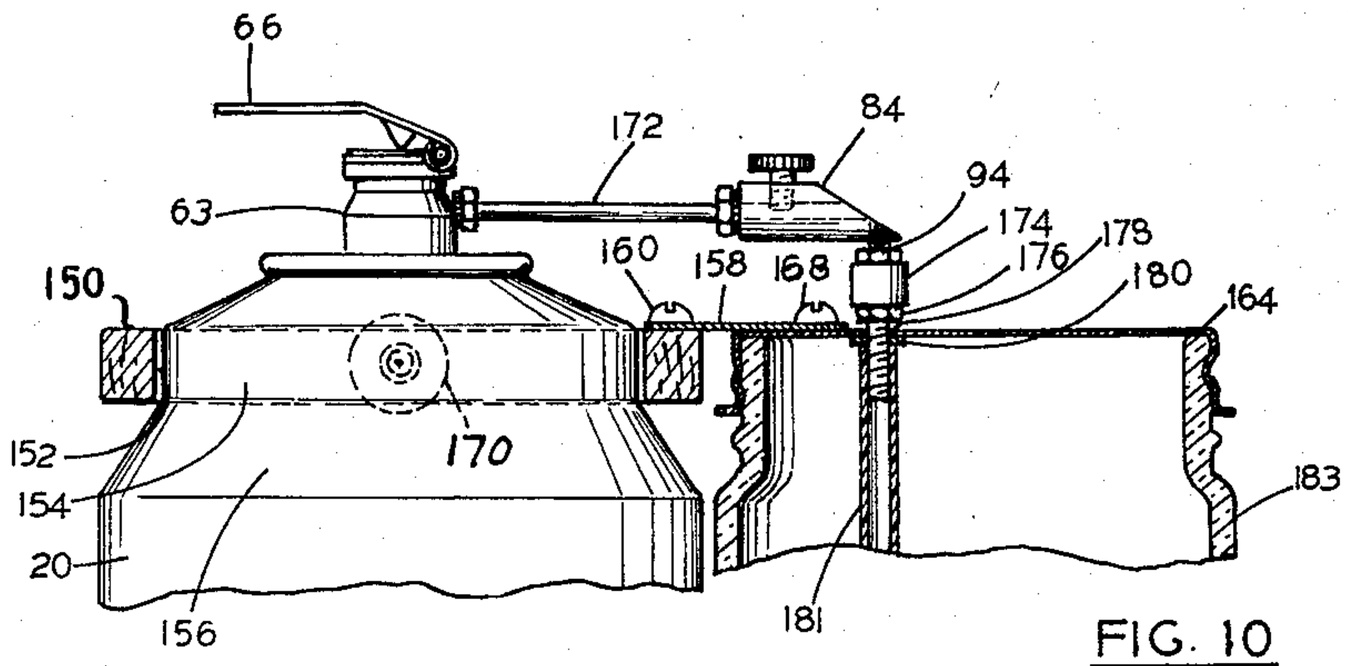


FIG. 10

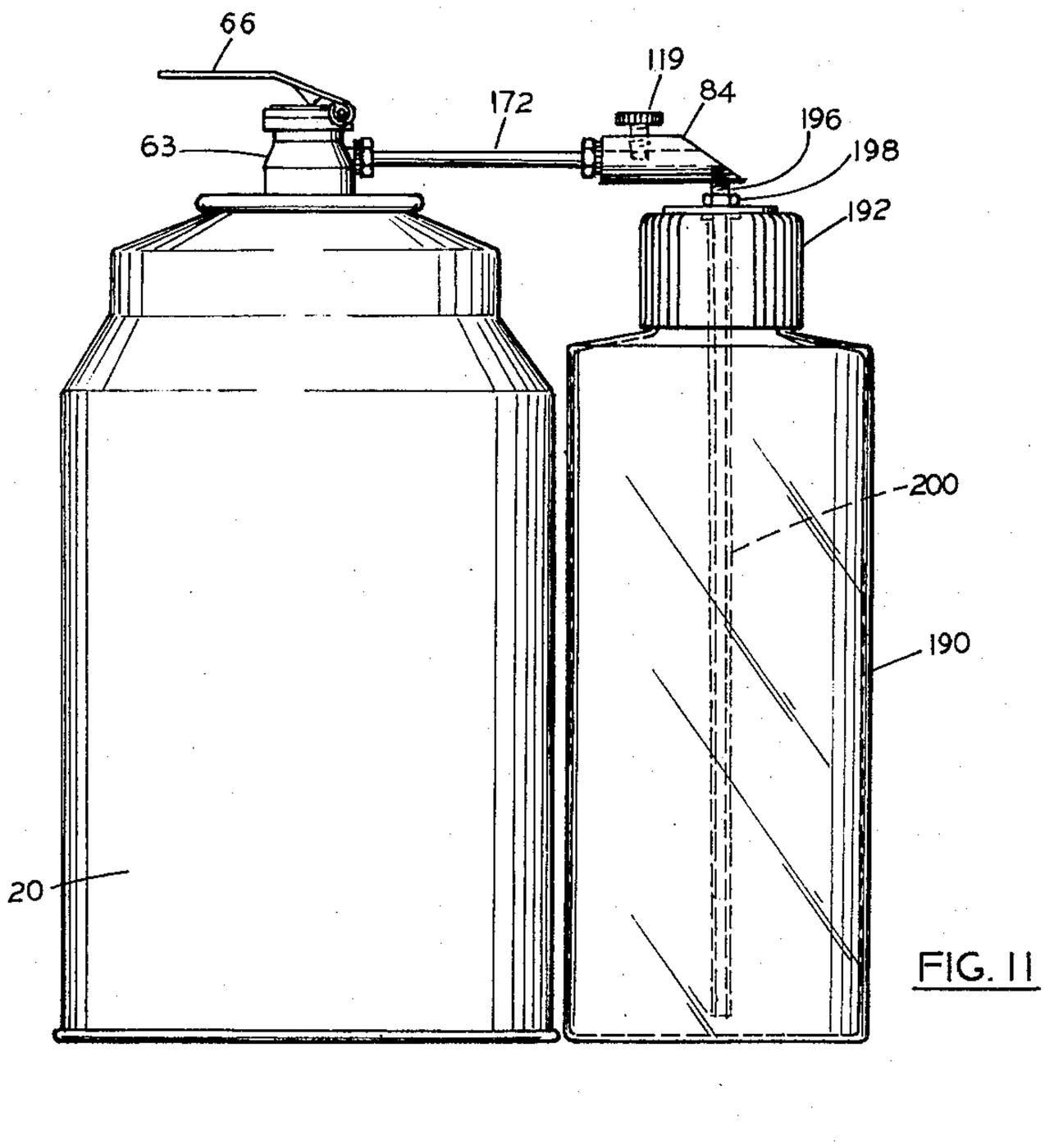


FIG. 11

INVENTOR.
ELMORE W. HAGADORN

BY

ATTORNEY

United States Patent Office

3,180,578

Patented Apr. 27, 1965

3,180,578
SPRAYING APPARATUS HAVING CAP, NIPPLE AND SLEEVE CONSTRUCTION

Elmore W. Hagadorn, 515 N. Orchard Road, Solvay 9, N.Y.

Filed Apr. 22, 1963, Ser. No. 274,427
8 Claims. (Cl. 239—307)

This invention relates to paint sprayers and more particularly to handy apparatus for selectively spraying any one of a plurality of sprayable fluids.

More particularly, the invention has to do with readily portable apparatus employing a container having Freon or other suitable gas under pressure in combination with a plurality of sprayable fluid containers, the contents of any one of which may be selectively aspirated and atomized in a spray jet, for use in furniture refinishing and other similar operations. The apparatus comprises an economical support for a fluid pressure container, and the sprayable fluid containers, connecting tubes, a common pressure control valve, and novel valve and aspirating means for at will selecting the particular sprayable fluid desired.

The above and other novel features of the invention will appear more fully hereinafter from the following detailed description when taken in conjunction with the accompanying drawings. It is expressely understood that the drawings are employed for purposes of illustration only and are not designed as a definition of the limits of the invention, reference being had for this purpose to the appended claims.

In the drawings wherein like reference characters indicate like parts:

FIGURE 1 is a side elevational view of the spraying apparatus with the lower ends of the jars broken away;

FIGURE 2 is a top plan view of the apparatus;

FIGURE 3 is a sectional view taken substantially on the broken line 3—3 of FIGURE 1;

FIGURE 4 is an enlarged sectional view through an aspirating nozzle, taken on the line 4—4 of FIGURE 2;

FIGURE 5 is a fragmentary sectional view, further enlarged of the valve of FIGURE 1;

FIGURE 6 is an enlarged sectional view of the control valve, also taken on the line 4—4 of FIGURE 2;

FIGURE 7 is a further enlarged fragmentary sectional view of a valve, in open position;

FIGURES 8 and 9 are a top plan, and front elevational view respectively of a modification;

FIGURE 10 is a fragmentary sectional view taken on the line 10—10 of FIGURE 8, and

FIGURE 11 is a side elevational view of a further modification.

In FIGURE 1 there is shown a pressure fluid container 20 containing a gas such as Freon and one or more containers 22, 24 and 26, or jars, three being shown, containing a selection of stains, lacquer, paint or the like, which are likely to be of use on a particular job. The jars are held in position on standard screw thread caps 28, 30 and 32. The caps are fastened to a support plate 35, in clover leaf formation, by screws 36, and above the support plate is a sheet metal shelf bracket 38 to which is detachably affixed the container 20. Such container has a bottom annular rib 21 adapted to be seated within the upwardly projecting inbent fingers 40 and 42, formed integral with the bracket 38. The bracket 38, and plate 35 have overlapping flanges 44 and 46 along their back edges, and if desired the plate 35 and shelf bracket 38 may be formed all of one piece folded over at 50, or the plate and shelf and their flanges may be soldered or otherwise secured together. A thumbscrew 52, threaded through the overlapping portions of the flanges 44 and 46 is adapted to engage the backside of the container 20

immediately above the annular rib 21. It will thus be seen that the container 20 is readily replaceable, as often as its supply of pressure medium becomes expended. Also it will appear that the containers 22, 24 and 26 are likewise readily removed and replaced or refilled, as desired. While screw threaded engagement with the caps 28, 30 and 32 have been indicated as at 33, any bayonet type engagement for quick attachment and detachment may be employed as will be understood by those skilled in the art.

The container 20 is provided at its upper end with a threaded nippe 61 within which is disposed a valve 60, for controlling the release of gas from the container. Threaded on the nipple is a cap 63, having a flexible diaphragm 62 in its upper end, from which depends a valve depressing plunger 64, which is actuated by the thumb lever 66 pivoted to the cap as at 65. The cap makes sealed engagement with the nipple, and is readily removed from the container for removal or replacement thereof.

Projecting laterally from the cap at divergent angles, are nipples 70, 72 and 74, such nipples being threaded into the caps in leak tight manner. Lock nuts such as 76 may be employed behind which is a sealing washer 78. Each of the nipples has a small bore 80 extending therethrough which may be of a diameter of the order of 25 thousandths of an inch and such bore is enlarged at its outlet end as at 82. Threaded over the end of the nipple is a shroud or sleeve 84, and a nut 86, and lock washer 88 serve to fix the sleeve upon the nipple. The end of the sleeve is cut on a slant as at 90, and the projecting lower portion or lip thereof is threaded as at 92 to receive an aspirating nipple 94 having a bore 96. The upper end of the nipple 94 is conical, as at 98, and the lower end is unthreaded as at 100. The nipple may be screwthreadedly elevated or lowered within the sleeve to align the aspirating end 102 with the jet flow of pressure gas from the outlet end 82 of the bore 80. A finger sleeve 104 is disposed upon the nipple 94, and locked in place between clamping nuts 106 and 108 to facilitate rotation of the nipple and to establish correct aspirating adjustment of the aspirating end 102 in relation to the aspirating gas stream.

Each of the nipples 70, 72, and 74 are provided with identical sleeves 84. The aspirating nipple 94 of each sleeve 84 is provided with a plastic tube connection such as 110, 112 and 114 extending to the respective jars 22, 24 and 26, the tubes 110 and 114 projecting directly through the jar caps 28 and 32 to extend into the jars in a concentric fashion, while the tube 112 extends between the platform 35 and shelf 38 and enters the jar 24 through an aperture 31 in cap 30. A wire bracket 113, affixed to the underside of cap 30 depends into jar 24 and loops around the tube 112 to hold the same concentric within the jar. It will be understood that the tubes are of a length to substantially reach the bottom of the jars, and are held concentric to assure that the tubes will in no way interfere with the quickly removal of or replacement of the jars.

In order to select the jar from which liquid is to be aspirated, each of the nipples 70, 72 and 74 and their respective sleeves 84 are provided with a valve 119, so that by closing off any two of the nipples 70, 72 and 74, and opening the valve of the other, the contents of a selected jar may be aspirated and sprayed. As shown in FIGURE 5 the sleeve and nipple is provided with a threaded recess 120 having a flat bottom that extends to within a short distance of the bore of the nipple. The flat annular bottom 122 has a central conical annulus 123, as formed by a drill point, the conical annulus providing a surface of generation at about 60 degrees from the axis of the threaded recess. The conical annulus defines an aperture 126 into the bore 80 of a diameter, a little larger than

the diameter of the bore. A circular disk of rubber 130 of a thickness of about one half the diameter of the disk is disposed in the bottom of the recess 120. A thumb screw 140, having a knurled head 142, and standard end configuration, may be brought to bear upon the rubber disk, and cause a central portion 132 to elastically distend into the bore 80 to seal the same. Upon releasing the pressure of the thumb screw upon the disk, the disk tends to elastically return to its disk like configuration, the distended portion reducing in extent, as the screw pressure is released, to permit the flow of gas from the reservoir container 20. Any desired adjustment of the thumb screw 140 may be made to nicely control the jet stream velocity.

It will be seen from the foregoing that there is provided a relatively inexpensive holding bracket for securing a container of fluid pressure, such as Freon in association with one or more liquid containers with means for selectively aspirating and spraying any one of the liquids within the liquid containers. Furthermore, the apparatus is handy to use, and subject to easy and quick replacement of the various containers, as replenishment or variations in the liquids to be sprayed becomes desirable. In order to replace the fluid pressure container, release of the screw 52, and unthreading of the container from cap 63 is all that is required. As soon as a fresh container is threaded into the cap and secured to the bracket 38, operation may continue. The placement of jars, or refilling of any one of the jars is also easily effected, by the mere unscrewing of the particular jar from plate supported cap. Furthermore by rotation of the jet 94, by manipulation of the thumb and finger sleeve 104 the jet 102 is moved up or down in reference to the jet from any one of the nipples, such as 72, and ready regulation of the power of such jet is had by the manipulation of the thumb screw 119, to regulate the discharge. The lower end of the nipple 92 is left smooth as at 100 so that the nipple is readily rotated relative to the tube 110, without causing the tube to move axially, and at the same time forms a sealed connection to the tube.

While three liquid containers are illustrated, it will of course appear that any number of such containers may be accommodated in accordance with the number of jar caps and aspirating nozzles provided. In practice a single such jar may be all that is desired.

In FIGURES 8 to 10 there is shown a modified form of the invention wherein the jar containers are located along side of the pressure fluid container. As shown, the pressure container 20 supports a yoke 150, having a circular aperture 152 to fit over the cylindrical portion 154 of the pressure container, above the shoulder 156. Such yoke may be made of hardwood, plastic or the like. The yoke is provided with a plate 158 secured thereto by small bolts 160. Affixed to the plate are three screw cap jar tops 162, 164 and 166 as by bolts 168. The yoke is provided with a pair of thumb screws 170 to grip the container. The pressure container cap 63 is provided with three nipples 172 extending radially therefrom at 45° angles. Each of the nipples are provided with sleeves 84, each having a valve 119, and aspirating nipple 94, as shown in FIGURE 4. Each aspirating nipple is provided with a thumb and finger sleeve 174 clamped between nuts 176, to permit threaded adjustment of the nipple in respect to the gas stream from the pressure container 20. The lower ends of the nipples extend through apertures 178 in their respective jar covers, and have an unthreaded portion 100 at the lower end, over which a straight section of suction tube 181 is fitted of sufficient length to reach approximately to the bottom of the jar 183. A small washer 180 is threaded on the nipple above the tube and the clearance between the sleeve 174 and washer is sufficient to permit the nipple and its tube to be screwed up or down freely to adjust the aspirating effect as desired.

As before, the operator opens one of the valves 119, as desired and operates the spray through manipulation of the valve lever 66. In FIGURE 11, the yoke is eliminated, and a small plastic vial 190, with a screwcap 192 is provided with a nipple 196 screw threaded into the sleeve 84. The nipple is clamped in the cap head by nuts 198, and the lower end of the nipple is unthreaded, and fitted with a suction tube 200.

In this modification, adjustment of the aspirating effect is had by rotation of the vial, cap and nipple as a unit. While a single vial, and nipple 196 are shown, it will be understood that the three nipple arrangement of FIGURES 8 to 10 may be used without the yoke and cap assembly, by using three vials directly hung from the sleeves 84 by their respective nipples 196. Suitable air vents in the caps are provided.

In FIGURES 9–11 inclusive, to replace a pressure container 20, it is merely necessary to loosen the thumbscrews 170, and unscrew the container 20 from the cap 63. Various jars of different paints, enamels, or finishing materials may be readily substituted by unscrewing the jars from the jar tops. It will be seen that the apparatus is handy in that up to three different finishing materials are readily available, and applied by a single replaceable pressure container. Although reference to paints, enamel and finishing liquids have been referred to it, it will at once appear that the apparatus is economical and can readily be employed for spraying any liquid. The invention avoids the uneconomical mixing of a liquid to be sprayed with the pressure liquid in a single container, and at the same time provides for the handy application of any one of a multiple of sprayable liquids. In each modification the aspirating sleeve 84 provides a handy economical valve, and opportunity for precision adjustment of the aspirating spray.

While several applications of the invention have been illustrated and described, it is to be understood that the invention is not limited thereto. As various changes in the construction and arrangement may be made without departing from the spirit of the invention, as will be apparent to those skilled in the art, reference will be had to the appended claims for a definition of the limits of the invention.

What is claimed is:

1. A spraying apparatus comprising a container of pressure gas, a cap threaded on the upper end of said container, said cap having a valve operator for controlling flow of gas from said container into said cap, a nipple having a fine bore extending radially from said cap, a sleeve disposed over the outer end of said nipple, said sleeve and nipple having a radially extending flat bottom threaded bore of substantially greater diameter than said fine bore, extending through the wall of said sleeve and part way through the wall of said nipple, said flat bottom bore having a central shallow conical bore merging into said fine bore, a resilient slug of rubberlike material seated on the flat bottom of said bore, and a compression screw having a knurled head threaded in said bore behind said slug and adapted to resiliently distend a portion of said slug into said fine bore to seal or open the same, said sleeve having an inclined outer end forming a lower outwardly extending lip having a transverse threaded aperture therein, and a jet nipple threaded in said aperture, having its upper end substantially in alignment with axis of said fine bore.

2. In spraying apparatus addapted for use with a container of pressure gas having a cap, a nipple having a fine bore extending radially from said cap, a sleeve disposed over the outer end of said nipple, said sleeve and nipple having a radially extending flat bottom threaded bore of substantially greater diameter than said fine bore, extending through the wall of said sleeve and part way through the wall of said nipple, said flat bottom bore having a central shallow conical bore merging into said fine bore, a resilient slug of rubberlike material seated on the flat bottom of said bore, and a compression screw having a knurled head threaded in said bore behind said

slug and adapted to resiliently distend a portion of said slug into said fine bore to seal or open the same.

3. In spraying apparatus adapted for use with a container of pressure gas, having a cap, a nipple having a fine bore extending radially from said cap, a sleeve disposed over the outer end of said nipple, said sleeve and nipple having a radially extending flat bottom threaded bore of substantially greater diameter than said fine bore, extending through the wall of said sleeve and part way through the wall of said nipple, said flat bottom bore having a central shallow conical bore merging into said fine bore, a resilient slug of rubberlike material seated on the flat bottom of said bore, and a compression screw having a knurled head threaded in said bore behind said slug and adapted to resiliently distend a portion of said slug into said fine bore to seal or open the same, said sleeve having an inclined outer end forming a lower outwardly extending lip having a transverse threaded aperture therein, and a jet nipple threaded in said aperture, having its upper end substantially in alignment with axis of said fine bore.

4. A spraying apparatus comprising a container of pressure gas, a cap threaded on the upper end of said container, said cap having a valve operator for controlling flow of gas from said container into said cap, a nipple having a fine bore extending radially from said cap, a sleeve disposed over the outer end of said nipple, said sleeve and nipple having a radially extending flat bottom threaded bore of substantially greater diameter than said fine bore, extending through the wall of said sleeve and part way through the wall of said nipple, said flat bottom bore having a central shallow conical bore merging into said fine bore, a resilient slug of rubberlike material seated on the flat bottom of said bore, and a compression screw having a knurled head threaded in said bore behind said slug and adapted to resiliently distend a portion of said slug into said fine bore to seal or open the same, said sleeve having an inclined outer end forming a lower outwardly extending lip having a transverse threaded aperture therein, a jet nipple threaded in said aperture, having its upper end substantially in alignment with the axis of said fine bore, means for supporting a liquid container beneath said jet nipple, and a suction hose extending from said jet nipple into said liquid container.

5. A spraying apparatus comprising a container of pressure gas, a cap threaded on the upper end of said container, said cap having a valve operator for controlling flow of gas from said container into said cap, a plurality of nipples extending radially from said cap beyond said container at divergent angles from one another, a sleeve disposed over the outer end of each of said nipples, valvular means in each of said sleeves for closing off the nipple, each of said sleeves having an inclined outer end providing a lower outwardly extended aspirating jet supporting lip, a transverse threaded aperture in each of said lips, an aspirating jet nipple threaded in said apertures, and having their upper ends disposed substantially in alignment with the axis of their respective sleeves, and their lower ends extending below said sleeve, a thumb adjusting sleeve secured on said nipples below said lip, and means for supporting liquid containers beneath said jet nipples, one for each jet nipple, and a suction tube from each jet nipple extending substantially to the bottom of a liquid container.

6. A spraying apparatus comprising a container of pressure gas, a cap threaded on the upper end of said container, said cap having a valve operator for controlling flow of gas from said container into said cap, a nipple

extending radially from said cap beyond said container, a sleeve disposed over the outer end of said nipple, valvular means in said sleeve for closing said nipple, said sleeve having an inclined outer end providing a lower outwardly extended aspirating jet supporting lip, a transverse threaded aperture in said lip, an aspirating jet nipple threaded in said aperture, and having its upper end disposed substantially in alignment with the axis of said sleeve and its lower end extending below said sleeve, a thumb adjusting sleeve secured on said nipple below said lip, means clamped upon said container and having a jar cap, a jar supported from said cap, and a suction conduit extending from said jet nipple through said jar cap to substantially the bottom of said jar.

7. A spraying apparatus comprising a container of pressure gas having a reduced diameter portion adjacent the upper end thereof, a cap threaded on the upper end of said container, said cap having a valve operator for controlling flow of gas from said container into said cap, a nipple extending radially from said cap beyond said container, a sleeve disposed over the outer end of said nipple, valvular means in said sleeve for closing said nipple, said sleeve having an inclined outer end providing a lower outwardly extended aspirating jet supporting lip, a transverse threaded aperture in said lip, an aspirating jet nipple threaded in said aperture, and having its upper end disposed substantially in alignment with the axis of said sleeve, and its lower end extending below said sleeve, a thumb adjusting sleeve secured on said nipple below said lip, and a suction conduit extending from the lower end of said jet nipple, an annular yoke clamped around said reduced diameter portion, a plate extending laterally from said yoke, a jar cap secured to the underside of said plate beneath said jet nipple, a jar supported from said cap, and a suction conduit extending from said jet nipple through the jar cap to substantially the bottom of said jar.

8. A spraying apparatus comprising a container of pressure gas, a cap threaded on the upper end of said container, said cap having a valve operator for controlling flow of gas from said container into said cap, a nipple extending radially from said cap beyond said container, a sleeve disposed over the outer end of said nipple having an inclined outer end providing a lower outwardly extended aspirating jet supporting lip, a transverse threaded aperture in said lip, an aspirating jet nipple threaded in said aperture, and having its upper end disposed substantially in alignment with the axis of said sleeve, and its lower end extending below said sleeve, a liquid container supported solely from the lower end of said jet nipple, and a suction conduit extending from the lower end of said jet nipple to approximately the bottom of said liquid container.

References Cited by the Examiner

UNITED STATES PATENTS

2,348,083	5/44	McCabe	251—331
2,368,536	1/45	Gersmehl	239—434
2,553,159	5/51	Able	239—308
2,628,057	2/53	Holderith	251—331
2,892,317	6/59	Holmes	239—303
3,044,713	7/62	Ellis	239—308
3,058,669	10/62	Drell	239—304
3,084,870	4/63	Hagadorn	222—132
3,085,752	4/63	Drell	239—303
3,107,058	10/63	Corbett	239—434

RAPHAEL M. LUPO, *Primary Examiner.*

LOUIS J. DEMBO, *Examiner.*