This invention relates to a sanitary spray gun suitable for spraying edible fluids onto food. For example, it may be used to spray coat cookies or buns with a sugar solution, to spray pies with the liquid which gives them a glossy finish, and for other similar uses.

Health departments will not usually permit the use of such a device unless it can be completely disassembled so as to freely expose all parts for periodic cleaning. The spray gun parts should permit their sterilization when it is required. Disassembly and reassembly of such a gun should be quickly accomplished with adequate simplicity to be within the capabilities of those primarily familiar with the cooking arts. In addition to these requirements, such a gun should provide a satisfactory spray and be operatively reliable.

One object of the present invention is to provide a spray gun which functions like a paint spray gun but which meets the above outlined requirements. Another object is to provide a simple spray gun which through the use of compressed air will atomize and spray a liquid and which may be completely disassembled without tools quickly so as to make all of its surfaces accessible for thorough cleaning. Other objects may be inferred from the following:

The accompanying drawings illustrate an example of a spray gun embodying the present invention. This gun was particularly designed to function as a sanitary spray gun which satisfactorily meets the requirements usually made by health departments. However, the gun may be used for general spray coating purposes, it being particularly adapted for use when the character of the sprayed material requires the material to be completely cleaned from the gun periodically or at the termination of each spraying operation.

In these drawings the various figures are as follows:

Fig. 1 shows a side view of the gun;

Fig. 2 is a horizontal section taken on the line 2—2 in Fig. 1;

Fig. 3 is a front view of the gun;

Fig. 4 is a section showing schematically the construction of the gun's valve and the valve controlling elements, the valve being shown in off position;

Fig. 5 duplicates Fig. 4 excepting that the valve is shown in its on position;

Fig. 6 is a front end view of the inner tip of the gun's nozzle or spray head assembly; and

Fig. 7 is a side view showing how the gun may be adapted to function as an automatic spray gun.

The gun, illustrated by Figures 1 through 6, has a hand grip 1 having a top 2 with a screw 3 projecting upwardly therefrom. The hand grip 1 may have a threaded hole in its top 2 into which the lower end of the screw 3 is screwed. The top of the screw 3 may be provided with an unthreaded extension formed into a hook 4 which may be used to turn the screw 3 and also as a means for hanging up the gun.

The gun body 5 is formed with two longitudinally extending passages 6 and 7 intersected by a transverse bore 8. The body has a front end formed with a forwardly facing annular shoulder 9 having a relatively reduced neck 10 projecting forwardly therefrom. The front end of this neck forms a male seat 11. The passage 6 at its forward end opens to the face of the shoulder 9 and the other passage 7 at its forward end opens to the end of the neck 10.

The body 5 is provided with two backwardly projecting nipples 12 constructed to telescope inside of flexible hose connections 13. These nipples straddle the screw 3. Cross head clamps 14 and 15 are constructed respectively to underlie and overlie the two nipples 13, each clamp having a hole through which the screw 3 passes, the screw 3 extending upwardly like a post. The clamps 14 and 15 may be made with semi-cylindrical grooves which clamp the nipples 12 which are sandwiched between them. The hose connections 13 may be pushed completely over the nipples 12 so as to be also clamped by the cross head clamps 14 and 15. A wing nut 16 screws down on the screw 3 on top of the upper clamp 15 so as to exert the clamping force. The hook 4 is shaped so that this wing nut 16 and the clamps 14 and 15 may be slipped completely off the screw 3 during disassembly of the gun.

A rotary plug valve 17 is removably fitted rotationally in the bore 8 by being inserted through the right-hand side of this bore. This bore 8 is shown as being tapered slightly as is the interfitting plug valve 17. The rotary valve is held at its position by having a screw shank 18 which projects through the left-hand end of the bore 8 and is provided with a wing nut 19. A spring washer 20 is positioned between the nut 19 and the adjacent side of the body 5 so as to keep the plug valve 17 seated firmly and free from looseness in the bore. The right-hand end of the plug valve 17 is provided with a flange 21 which may be grasped so that the plug valve may be quickly removed after manually unscrewing the nut 19.

The plug valve 17 has two transverse passages 9a and 10a respectively registering with the pas-
sages 6 and 7 when the plug valve is turned as shown in Fig. 5. When turned to the position shown by Fig. 4 the valve is closed. The passage 7a has end openings which are elongated circumferentially respecting the plug valve and the bore 8. The plug valve 17 has a transverse hole 22 formed through it transversely to the passages 6a and 7a and offset sufficiently to be free therefrom. That is to say, the hole 22 does not have any communication with the passages 6a and 7a. An upwardly extending slot 23 is formed in the top portion of the body 8 and a downwardly extending downward slot 24 is formed in the bottom portion of the body, and these slots register with the hole 22. A lever 25 is slidably passed through the hole 22 and the slots 23 and 24, this lever 25 being long enough to project both above and below the top and bottom of the gun body 8. The upper end of the lever 25 has a groove 26 and the shank of the screw 3, which projects upwardly behind this end of the lever 25, has a corresponding groove 27. A coil tension spring 28 has hook ends 29 which are releasably hooked around the grooves 26 and 27 respectively. This arrangement biases the lever 25 to turn the plug valve 17 to its open position as shown by Fig. 4. The spring also serves to position the lever 25 in the hole 22, release of the spring 28, by unhooking its ends, permitting the lever 25 to slide freely from the gun assembly. As shown by Fig. 1 the lower end of the lever 25 may be provided with a finger piece 30 so that it functions as a trigger. The slots 23 and 24 are mutually oriented so that their respective ends hold the plug valve 17 against the tension of the spring 28 when the valve is in its off position, and these slots provide room so that the lever 25 may be swung against the spring bias to rotate the valve 17 to its open position.

The nozzle head assembly is formed by an inner nozzle tip 31 having a female seat 32 releasably fitted on the male seat 11. This tip 31 is formed with an outer substantially conical male seat 33 formed with one or more flat segments 34, as shown by Fig. 6. The tip is hollow and has a forwardly pointing orifice 35, and it is generally conical with a cylindrical base, except for the flats 34.

This inner tip 31 may be simply constructed so as to be entirely free from crevices or small passages other than the single necessary passage 35. As noted, it may be made as a conical part having a short cylindrical base section, with flats machined in its exterior to provide the segments 34. Ordinarily more than one of the segments 34 are provided and they are mutually oriented to form balanced flows through the nozzle head, as will be appreciated from the following.

The nozzle assembly also includes an outer tip 36 having a conical female seat 37 fitted on the inner tip’s male seat 33. Now it can be seen that the flat segments 34 form flow passages which completely open up for cleaning when the two nozzle tips are separated from each other. This outer tip 36 is engaged by a union nut 39 which is internally threaded so as to screw onto the annular end of the gun surrounding and defining the flange 9. Both parts are appropriately threaded. This collar or union nut 39 is shaped to close in a space into which the passage 6 opens so that fluid flowing through this passage flows through the passageways defined by the flat segments 34 of the inner tip. The forward end of the outer tip 36 is provided with an orifice 40 which may be shaped as required to produce the desired type of spray.

As the gun is shown by Fig. 7 a bracket 1a is substituted for the grip 1 and this bracket is mounted on top of an electric solenoid 41. The same screw 3 projects upwardly from the bracket 1a but the hook piece 4 is eliminated since it is not needed in this kind of application. A lever extension 30a is shown substituted for the finger piece or trigger 30, this part 30a pivotally connecting 42 with the armature 43 of the solenoid 41. Each time the solenoid 41 is energized the valve of the gun is turned to its on position.

The illustrated gun may be used in the normal fashion for spray coating purposes. Compressed air may be supplied through the passage 7 and liquid through the passage 6, the nozzle head assembly atomizing the liquid and forming the spray. The elongated openings of the passage 7a permits the air to go on and off ahead of the liquid. Assuming the gun is to be used with edible materials it should be periodically dismantled, cleaned and perhaps sterilized, and reassembled. Ordinarily this is done by persons relatively unskilled with the mechanical arts. With the above in mind the advantages of the illustrated gun become apparent. For example, let it be assumed that the gun has handled a composition including milk and sugar. Immediately after its use it is necessary to disassemble, clean, sterilize, and reassemble the parts. The nozzle assembly may be quickly taken apart by unscrewing the union nut 39, the nut slipping forwardly off the outer tip and the outer tip falling forwardly off of the inner tip, the latter then being free for removal from the neck 16. Excepting for the absolutely necessary spray orifices 39 and 45, none of the parts have any cracks or small passages, so cleaning and sterilizing is simple and easy.

By unhooking the spring 28 the lever 25 may be withdrawn from the hole 22 and by unscrewing the nut 19 the plug valve 17 may be pulled from the bore 8. Again, all of the parts may be easily cleaned and sterilized. Finally, simply by unscrewing the nut 16 the clamp 15 may be removed so that the gun body 5 is freed from the hand grip 1. If necessary the screw 3 may be unscrewed from the hand grip. The hose connections 13 are, of course, simply pulled from the nipples 12. Thus the entire gun is dismantled.

It can be seen from the foregoing that dismantling of the gun is substantially foolproof. This also applies to reassembly after the cleaning and sterilization. Each of the parts is distinctive in appearance and can be assembled with other parts only in the proper manner. Thus both disassembly and reassembly may be accomplished without any material mechanical ability. When disassembled every part may be easily cleaned and may be sterilized.

It is to be understood that the hose connections 13 are of a flexible nature, an adequately inert flexible type of plastic tubing being preferred for handling food mixtures.

I claim:

1. A sanitary spray gun including a gun body in which is formed a longitudinally extending passage intersected by a transverse bore, said body having a front end constructed to mount a nozzle connecting with said passage in front
of said said bore and having means for connecting a fluid feed with said passage in back of said bore, and a rotary plug valve fitted in said bore and having a transverse passage registering with said passage in said body to control flow through said body passage by rotation of said valve, said plug valve being removable through an end of said bore and having releasable means for holding said valve in said bore, said plug valve having a transverse hole and said body having longitudinal slots registering with said hole, and a lever releasably fitted through said slots and hole and projecting at both ends beyond said body, and a rotary plug valve fitted in said bore and having a transverse passage registering with said passage in said body to control flow through said body passage by rotation of said valve, said plug valve being removable through an end of said bore and having releasable means for holding said valve in said bore, said plug valve having a transverse hole and said body having longitudinal slots registering with said hole, and a lever releasably fitted through said slots and hole and projecting at both ends beyond said body, a spring releasably connected to one of said projecting ends, and an anchor for said spring and positioned to cause said spring to bias said plug valve to turn to a predetermined position, said body having a hand grip projecting transversely therefrom behind the other projecting end of said lever so that the latter may be used as a trigger.

4. A sanitary spray gun including a gun body in which is formed a longitudinally extending passage intersected by a transverse bore, said body having a front end constructed to mount a nozzle connecting with said passage in front of said bore and having means for connecting a fluid feed with said passage in back of said bore, said plug valve being movable through an end of said bore and having releasable means for holding said valve in said bore, said plug valve having a transverse hole and said body having longitudinal slots registering with said hole, and a lever releasably fitted through said slots and hole and projecting at both ends beyond said body, a spring releasably connected to one of said projecting ends, and an anchor for said spring and positioned to cause said spring to bias said plug valve to turn to a predetermined position, said body having a hand grip projecting transversely therefrom behind the other projecting end of said lever so that the latter may be used as a trigger, said fluid feed connecting means comprising a backwardly extending nipple constructed to telescope inside of a hose connection, and said anchor comprising a post projecting upwardly from said hand grip past said nipple and hose to said hand grip and said post having a releasable fastening exerting force on said clamping member.

5. A sanitary spray gun including a gun body in which is formed a longitudinally extending passage intersected by a transverse bore, said body having a front end constructed to mount a nozzle connecting with said passage in front of said bore and having means for connecting a fluid feed with said passage in back of said bore, said plug valve being removable through an end of said bore and having releasable means for holding said valve in said bore, said plug valve having a transverse hole and said body having longitudinal slots registering with said hole, and a lever releasably fitted through said slots and hole and projecting at both ends beyond said body, a spring releasably connected to one of said projecting ends, and an anchor for said spring and positioned to cause said spring to bias said plug valve to turn to a predetermined position, said body having a hand grip projecting transversely therefrom behind the other projecting end of said lever so that the latter may be used as a trigger, said fluid feed connecting means comprising a backwardly extending nipple constructed to telescope inside of a hose connection, and said anchor comprising a post projecting upwardly from said hand grip past said nipple and hose to said hand grip and said post having a releasable fastening exerting force on said clamping member.
seat fitted on said male seat and having an outer substantially conical male seat with a flattened segment, an outer nozzle tip having a substantially conical female seat fitted on said inner tip's male seat with said segment forming a flow passage, and a collar rotatively engaging the outside of said outer tip, said body and said collar having interfitting screw threads and being removably screwed together.

6. A spray gun including a gun body in which is formed a transverse bore and a passage intersected by said bore, means for connecting a nozzle to one end of said passage, means for connecting a fluid supply to the other end of said passage, a rotary plug valve releasably fitted in said bore and having a transverse passage registering with said passage formed in said gun body upon rotation of said plug valve, said plug valve being removable through one end of said bore and having a portion through which a transverse hole is formed, a lever releasably passed through said hole in said portion of said plug valve and having opposite ends extending oppositely beyond said gun body and which swing transversely to said bore to cause rotation of said plug valve, said gun body being constructed to provide clearance for said hole and said lever's ends, a spring connected to one of said lever's ends, and an anchor for said spring and positioned to cause said spring to bias said valve to turn in a predetermined direction, said spring being releasably connected between said anchor and said lever's end.

HOWARD WARREN BEACH.

References Cited in the file of this patent

UNITED STATES PATENTS

<table>
<thead>
<tr>
<th>Number</th>
<th>Name</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,539,946</td>
<td>Jansson</td>
<td>June 2, 1935</td>
</tr>
<tr>
<td>2,484,942</td>
<td>Guise</td>
<td>Oct. 18, 1949</td>
</tr>
<tr>
<td>2,540,970</td>
<td>WaeSelynck</td>
<td>Feb. 6, 1951</td>
</tr>
</tbody>
</table>

FOREIGN PATENTS

<table>
<thead>
<tr>
<th>Number</th>
<th>Country</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>341,435</td>
<td>France</td>
<td>Oct. 4, 1904</td>
</tr>
</tbody>
</table>