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SPRAY DEVICE

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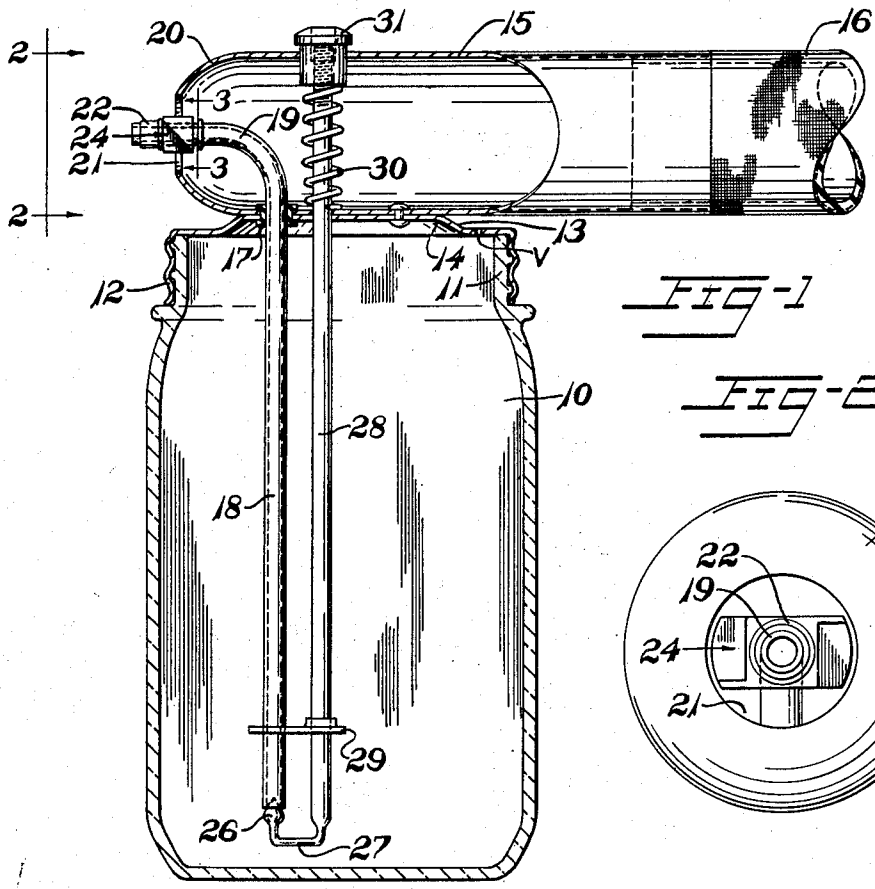


Fig-1

Fig-2

Fig-3

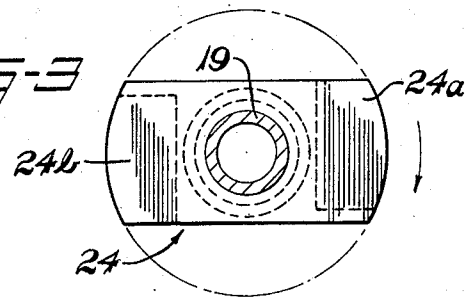
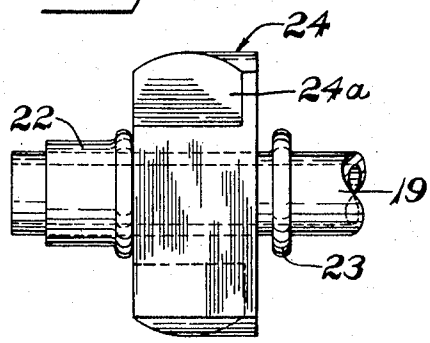


Fig-4



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SPRAY DEVICE

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6 Claims. (Cl. 299—86)

This invention relates to spray units, but more particularly to such units employed as attachments to vacuum cleaners, wherein the stream of air generated by the vacuum cleaner is employed to spray liquids, such as paints, insecticides and the like, and an object is to produce an improved spray unit of the above type, having the novel features of construction, arrangement and operation hereinafter described.

By way of illustration but not of limitation, an embodiment of the invention is shown on the accompanying drawings, in which:

Figure 1 is a vertical sectional elevation of the spray unit, showing a portion of the vacuum cleaner hose attached thereto;

Figure 2 is a front end view of the spray nozzle substantially on the line 2—2 of Figure 1;

Figure 3 is a transverse sectional view on an enlarged scale, taken on the line 3—3 of Figure 1; and

Figure 4 is an enlarged view of the end portion of the spray nozzle showing the spinner mounted thereon, the same being shown in elevation.

The illustrated embodiment of the invention comprises a spray unit consisting of a glass jar **10** for holding the material to be sprayed, the jar having a reduced screw neck **11** to receive a metallic screw cap **12** which has a raised central portion **14** which is flat to receive a transversely arranged metallic air tube **15**, the rear end of which projects beyond the side of the jar and is open to receive the usual fitting **16** on the end of a vacuum cleaner hose it being understood that air is forced by the vacuum cleaner through the hose, and of course then through the transverse tube **15**.

Securing the transverse air tube **15** to the flattened portion **14** of the closure cap is a tubular rivet **17** to which extends a metallic tube **18** which projects vertically downward and terminates a short space from the bottom of the jar **10**. Above the rivet **17**, the tube **18** is bent at substantially right angles to provide a nozzle **19**, the end of which projects outside of the air tube **15**. As shown, the adjacent end of the air tube is reduced as indicated at **20**, and in the end is a central aperture **21** substantially larger in diameter than that of the nozzle **19** which is arranged coaxially of the aperture.

On the extreme outer end portion of the nozzle **19** is a sleeve **22** which has an outwardly extending flange at the inner end. As shown, the sleeve **22** is disposed wholly outside of the inner tube, and rigid with the nozzle **19** on the inner side of the aperture **21** is a collar **23**. Arranged between the flange on the sleeve **22** and the collar **23** is a spinner **24** which is rotated in response to the stream of air passing out from the aperture **21** in the reduced end or nozzle **20** of the air tube **15**. As shown, the spinner **24** is generally rectangular in shape with the opposite ends curved in order that it may spin freely within the aperture **21** and with the curved ends in close juxtaposition to the rim of the aperture **21** substantially as indicated on Figure 2.

The rear face of the spinner **24** is flat but the front face has a pair of axially inclined surfaces **24***a* and **24***b*, the inclinations being oppositely arranged as indicated on the drawing. The stream of air passing out of the nozzle end **20** creates a negative pressure on the oppositely inclined surfaces **24***a* and **24***b* and not only causes the spinner to rotate at a speed somewhat less than that of the air stream, but also creates an aspirating effect at the outer end of the tube **18** for drawing liquid up from the jar **10**. It will be understood that the air from the nozzle end **20** forms substantially a vortex with the center disposed coaxially of and close to the end of the tube **18**. The spinner **24** may be of a bright colored plastic so that in operation, it not only presents an attractive appearance but functionally aids in effecting the desired aspirating effect to draw up the liquid in the jar. The action is such that air is prevented from moving rearwardly thereby militating against liquid particles, such as paint, from being carried upon the spinner and adjacent tube, which would interfere with the rotation of the spinner.

The lower end of the vertical tube **18** is adapted to be closed by a conical valve **26** which is vertically movable into and out of seating engagement with the open end of the tube **18**. The valve **26** has a U-shaped stem **27** which is integral with a vertically disposed actuating rod **28** arranged substantially parallel to the tube **18** and extending through a hole in the cap portion **14**, the upper end terminating in a screw-threaded end portion projecting through an aperture in the wall of the air tube **15**. For guiding the vertical movements of the rod **28** is a guide plate **29** rigid with the lower end portion of the tube **18** and having a sleeve-like portion through which the rod **28** may reciprocate. A helical coil spring **30** surrounds the upper end portion of the rod **28** and the lower end of the spring bears against the adjacent wall of the air tube **15**. On the upper screw-threaded end portion of the rod **28** and projecting outwardly of the air tube **15** for convenient manual operation is a button **31**. Manifestly by depressing the button **31**, the valve **26** is unseated to allow the liquid within the jar **10** to be drawn upwardly through the tube **18** by the aspirating action of the air passing at high velocity over the free outer end of the nozzle **19**.

A conventional vent hole V is provided through screw cap **12** to prevent the building up of negative pressures in jar **10** as liquid is removed.

It is to be understood that numerous changes in details of construction, arrangement and operation may be effected without departing from the spirit of the invention especially as defined in the appended claims.

What I claim is:

1. A spray unit comprising a jar having a screw neck, a cap in threaded engagement with said neck, said cap having a flattened raised portion, an air tube arranged transversely on said raised portion, means securing said tube to said cap, a nozzle-like end portion on one end of said air tube, the opposite end being open to receive a vacuum cleaner hose, said nozzle-like end portion having a relatively large circular opening, a relatively small liquid carrying tube having a portion outside of said nozzle-like end portion and arranged coaxially of the latter extending inside of the air tube and through the walls thereof and the raised cap portion and terminating adjacent the bottom of the jar, a conical valve adapted to close the bottom end of the liquid carrying tube, a vertical actuating rod connected to said valve and slidably extending through the cap and adjacent wall of the air tube, there being an opening in the opposite wall of the air tube, an operating button on the end of said rod and slidable through said last opening, a coil spring on said rod

between said button and a wall of the tube for urging said valve closed, a substantially rectangular spinner on said liquid tube disposed within said relatively large opening and having curved ends close to the edge of such opening, and a pair of oppositely inclined air impinging surfaces on the outer side of said spinner to cause rotation thereof, and a collar on the liquid tube arranged on opposite sides of the spinner to retain same on such tube but afford free rotation thereof.

2. A spray unit comprising a jar having a screw neck, a cap in threaded engagement with said neck, said cap having a flattened raised portion, an air tube arranged transversely on said raised portion, means securing said tube to said cap, a nozzle-like end portion on one end of said air tube, the opposite end being open to receive a vacuum cleaner hose, said nozzle-like end portion having a relatively large circular opening, a relatively small liquid carrying tube having a portion outside of said nozzle-like end portion and arranged coaxially of the latter extending inside of the air tube and through the walls thereof and the raised cap portion and terminating adjacent the bottom of the jar, manually operated means for opening and closing said liquid tube, a substantially rectangular spinner on said liquid tube disposed within said relatively large opening and having curved ends close to the edge of such opening, and a pair of oppositely inclined air impinging surfaces on the outer side of said spinner to cause rotation thereof, and a collar on the liquid tube arranged on opposite sides of the spinner to retain same on such tube but afford free rotation thereof.

3. A spray unit comprising a jar, a cap detachably connected to said jar, said cap having a flattened raised portion, an air tube arranged transversely on said raised portion, means securing said tube to said cap, a nozzle-like end portion on one end of said air tube, the opposite end being open to receive a vacuum cleaner hose, said nozzle-like end portion having a relatively large circular opening, a relatively small liquid carrying tube having a portion outside of said nozzle-like end portion and arranged coaxially of the latter extending inside of the air tube and through the walls thereof and the raised cap portion and terminating adjacent the bottom of the jar, manually operated means for opening and closing said liquid tube, a substantially rectangular spinner on said liquid tube disposed within said relatively large opening and having curved ends close to the edge of such opening, and a pair of oppositely inclined air impinging surfaces on the outer side of said spinner to cause rotation thereof, and a collar on the liquid tube arranged on opposite sides of the spinner to retain same on such tube but afford free rotation thereof.

4. A spray unit comprising a jar, a cap detachably connected to said jar, an air tube arranged transversely on said cap, means securing said tube to said cap, a nozzle-like end portion on one end of said air tube, the opposite end being open to receive a vacuum cleaner hose, said nozzle-like end portion having a relatively large circular opening, a relatively small liquid carrying tube having a portion outside of said nozzle-like end portion and arranged coaxially of the latter extending inside of the air tube and through the walls thereof and the raised cap portion and terminating adjacent the bottom of the jar, manually operated means for opening and closing said liquid tube, a plastic spinner on said liquid tube disposed within said relatively large opening and having curved peripheral portions disposed close to the edge of such opening, and a pair of oppositely inclined air impinging surfaces on the outer side of said spinner to cause rotation thereof, and a collar on the liquid tube arranged on opposite sides of the spinner to retain same on such tube but afford free rotation thereof.

5. A spray unit comprising an air tube adapted to be connected with a source of air under pressure, said air tube having an outlet and with a relatively large outlet opening, a relatively small liquid tube with an outlet end arranged coaxially within the air tube and projecting centrally through said outlet opening the outlet end of said liquid tube terminating outwardly of the outlet end of said air tube, a spinner rotatably mounted on the outlet end of the liquid tube, said spinner being disposed within the end of said outlet opening and having oppositely inclined surfaces thereon for causing rotation thereof in response to pressure imposed thereon by the air stream issuing through said outlet opening, the outlet end of the liquid tube being so related to the nozzle that the air issuing through the outlet opening of the air tube and past the spinner creates a vortex at the outlet end of the liquid tube to create an aspirating effect thereon.

6. A spray unit as claimed in claim 5, in which the spinner comprises a substantially rectangular elongate plastic member, and curved end walls on opposite ends of the spinner.

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