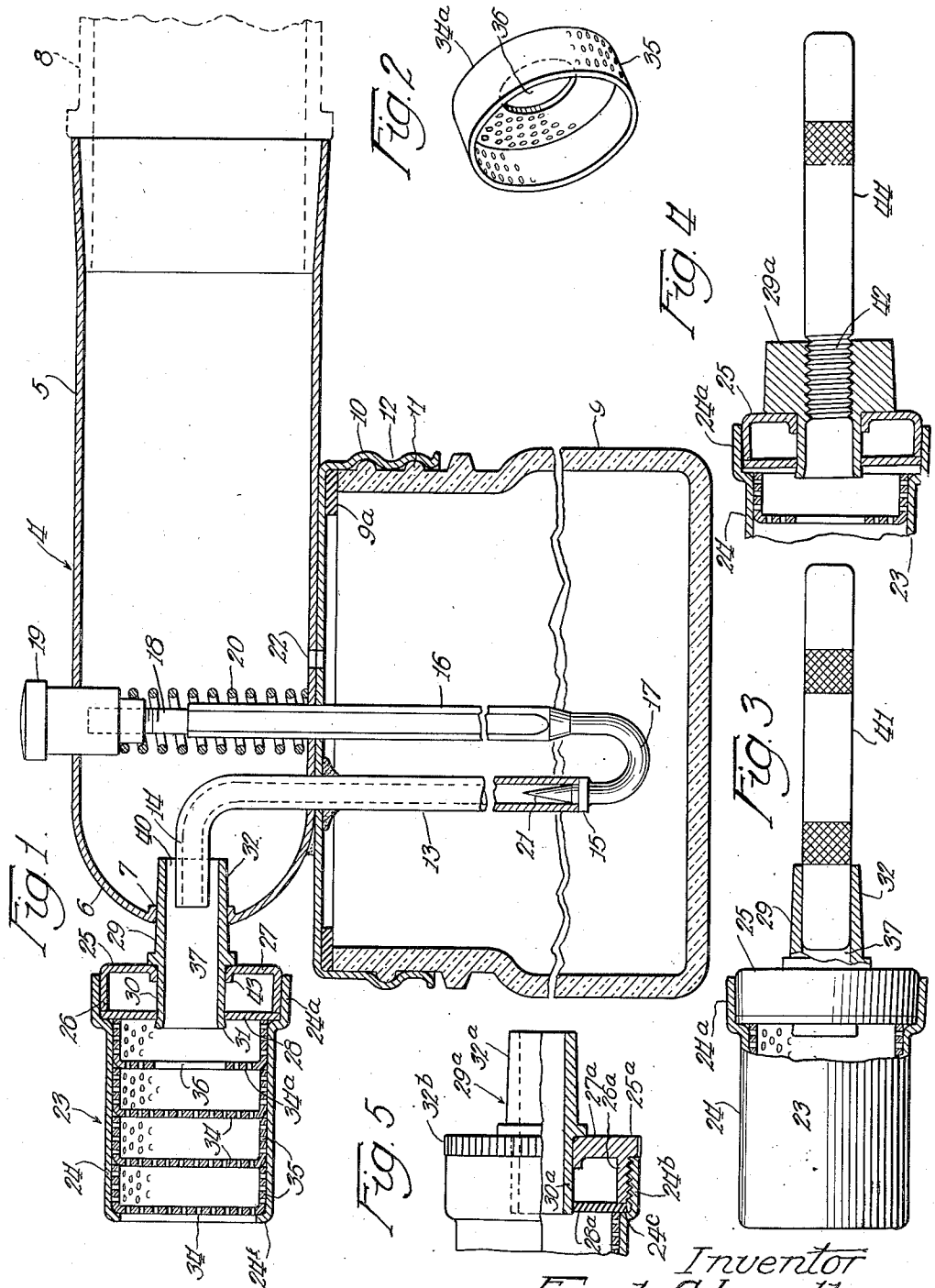
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FOAM NOZZLE ATTACHMENT FOR SPRAY GUNS

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FOAM NOZZLE ATTACHMENT FOR SPRAY GUNS

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4 Claims. (Cl. 299—89)

1

This invention relates to a foam spray gun for spraying cleaning compound, in a foamy condition upon articles which are to be cleaned. The invention relates more particularly to the sprayer nozzle for the gun. Another embodiment of my invention is disclosed and claimed in my copending application Serial No. 768,994, filed August 16, 1947.

One of the objects of this invention is to provide a sprayer nozzle that most effectively breaks down the cleaning compound into a light foam or froth which when discharged by air under pressure, discharges in the form of a spray.

Sometimes lint or other light particles are blown into the sprayer nozzle, which makes it necessary to take the nozzle apart for the purpose of cleaning it, and one of the objects of this invention is to provide a sprayer nozzle which may be readily taken apart by inexperienced persons, cleaned and reassembled for use.

Another object is to provide a number of spaced foraminated foam forming discs in the sprayer nozzle of which the one next adjacent the inlet to the nozzle is provided with a centrally disposed hole or aperture through which the cleaning fluid is blown by compressed air upon the next adjacent foraminated disc, whereby part of the cleaning fluid is recirculated.

Another object is to provide the sprayer nozzle with a detachable connector head secured to the shell of the nozzle by a friction fit, the connector head being provided with a nipple through which the cleaning fluid and compressed air is blown into the nozzle.

Another object is to provide a sprayer nozzle composed of a few parts and easily assembled.

Another object is to provide a sprayer nozzle that is highly efficient, durable, simple and comparatively inexpensive.

With these and other objects and advantages in view, this invention consists in the several novel features hereinafter fully set forth and more particularly defined in the appended claims.

The invention is clearly illustrated in the drawing accompanying this specification, in which:

Fig. 1 is a central vertical section taken through a foam spray gun embodying a simple form of the present invention;

Fig. 2 is a perspective view of a certain foam forming disc used in the nozzle;

Fig. 3 is a side elevation partly broken out of the nozzle, illustrating a handle for facilitating the work of disconnecting the nozzle shell from the connector head;

Fig. 4 is a side elevation of a slightly modified form of handle, and

2

Fig. 5 is a fragmental view part in side elevation and partly in section of a modified form of the invention.

The views are upon an enlarged scale.

The present invention is in nature of an improvement upon the foam spray gun disclosed in my application for patent Serial No. 768,994 filed August 16, 1947.

Referring to said drawing, the reference character 4 designates the spray gun as a whole; it is here shown in the form of a cylinder 5 open at one end, its other end preferably being dome-shaped as shown at 6 and formed with a central opening 7. The open end of the cylinder is arranged to be attached to a flexible tubular connection 8 which may lead from the discharge side of a vacuum carpet cleaner or from any other suitable blower or fan (not shown) to provide the compressed air for the gun.

A reservoir 9 for the cleaning compound is removably secured to the cylinder 5 as by a cap 10 rigidly secured to the cylinder as by soldering it thereto or otherwise. The reservoir and cap are shown as formed with complemental screw threads 11, 12, whereby the reservoir may be readily attached to the cap or detached therefrom. A gasket 9a is interposed between the cap 10 and edge of the reservoir to provide a leak proof joint between the cap and reservoir.

Leading up from a point adjacent the bottom of the reservoir is a discharge tube 13 which extends through the walls of the cap and cylinder and is secured to the cap as by soldering it thereto. The upper end of the discharge tube is bent at right angles to itself as at 14 to lie in coaxial alignment with the opening 7 in the cylinder 5 with its discharge end terminating at a point adjacent the dome end of the cylinder.

A valve 15 controls the inlet to the discharge tube and said valve is connected to a stem 16 by a goose neck 17. The stem extends into the interior of the cylinder, through holes in the cap and cylinder and is formed with a threaded reduced end 18 upon which is secured a push button 19. The push button extends out through the upper part of the wall of the cylinder and a coiled spring 20 interposed between the push button and lower part of the wall of the cylinder functions to yieldably hold the valve 15 closed. A pilot pin 21 projects from the valve into the discharge tube. Registering holes 22 in the cap and wall of the cylinder admit air to the reservoir under pressure from the cylinder 5.

The sprayer nozzle, indicated generally by the reference character 23, comprises an open ended cylindrical shell 24 terminating at one end in a

portion that flares outwardly slightly as at 24a to receive a connector head 25, the annular wall 26 of which converges slightly on the same angle as the outwardly flaring end 24a of the shell whereby the connector head and shell may be detachably secured together with a friction fit. I have found that an angle of 2° between the flaring end and the axis of the nozzle shell provides an efficient friction fit. The connector head comprises a cup like member 27 and disc 28, the edge portion of which engages the edge of the wall 26 of the cup like member 27.

The connector head carries a nipple 29 formed with a reduced part 30 which extends through holes in the cup like member 27 and disc 28, and its extreme inner end is flared or spread outwardly as at 31 whereby to clamp the connector head to the nipple. The nipple may be staked on the cup like member as at 43.

The sprayer nozzle may be removably secured to the sprayer head by a clip as in my above identified application if desired, but I prefer to secure the sprayer nozzle to the end wall of the sprayer head by the nipple 29 which is formed with a tapered outer portion 32 that may be inserted into the tapered hole 7 in the end wall of the sprayer head and secured therein by a friction fit, whereby the sprayer nozzle, as a whole may be disconnected from the sprayer head.

The discharge end 14 of the discharge tube 13 enters the bore 37 of the nipple, leaving an annular passage 40 between the wall of the bore and the end 14 of the discharge tube 13, through which compressed air may flow from the sprayer head to the sprayer nozzle.

At its discharge end, the shell is formed with an inturned annular flange 24^1 and in the shell between the flange 24^1 and disc 28 are several spaced foraminated foam forming discs 34, 34a which may be constructed of wire mesh or very light gauge sheet metal formed with a multiplicity of perforations of very small diameter. The discs 34, may be spaced apart in any suitable manner, but in the form illustrated each disc is formed with an annular flange 35 which engages the next adjacent disc. The flange of the disc 34a next adjacent to the disc 28 engages said disc 28. The edge portion of the outermost disc 34 bears against the inturned flange 24^1 of the shell and all of said foraminated discs are held in place by the flange 24a and disc 28.

The disc 34a next adjacent the connector head has a centrally located hole 36 therein axially disposed with respect to the bore 37 in the nipple 29 so that the stream of cleaning fluid and compressed air pass directly through the hole or aperture 36 and strike the next adjacent foraminated disc 34, over which the cleaning fluid and compressed air are spread, some of the cleaning fluid passing through the perforations therein and some rebounding back against the disc 34a and through the perforations therein into the space between the disc 34a and the disc 28 from which it is again blown through the hole 36 and through the next adjacent disc and through the other discs in the shell.

In use the reservoir is filled with a suitable liquid cleaning compound and air under pressure is admitted to the cylinder and reservoir and discharges through the sprayer nozzle. By depressing the push button 19 the valve 15 is unseated, permitting the air under pressure in the reservoir to discharge the cleaning compound from the end 14 of the discharge tube 13. The compressed air in the sprayer head flows through the passage 40 and blows the cleaning compound into the sprayer nozzle where it passes through the hole in the first disc, is spread over the surface of the second disc, some of the air and cleaning compound passing through the perforations of the second disc and some being recirculated through the first disc and the space between the disc 34a and the disc 28 of the connector head. The air and cleaning compound encounter the several foraminated discs and the cleaning compound is blown through the perforations thereof, being thereby agitated and broken down into a foamy condition. This is augmented by the air under pressure flowing through the nozzle. The discharging air reduces the foam to a spray as it is being discharged from the nozzle to the article to be cleaned. Thereafter the article is wiped off as is customary.

Any suitable liquid cleaning compound which can be broken down into a foamy condition may be used. The compound may comprise a soapy solution or may be composed of chemicals such as are used in the "foam" method of cleaning. A spray gun equipped with the above described sprayer nozzle may be used to spray a cleaning compound foam upon upholstery, carpets, rugs and many other articles.

In case it becomes necessary to clean the sprayer nozzle, it may be detached from the sprayer head by merely pulling it therefrom, and the connector head may be detached from the shell by rocking the two relative to each other. Means are provided to facilitate disconnecting the shell from the connector head in case it is difficult to disconnect them. As shown in Fig. 3, a handle is provided in the form of a rod 41, of a diameter to be freely inserted into the bore 37 of the nipple 29. When so inserted the handle is grasped by one hand, the shell by the other hand and the shell and connector head rocked with respect to each other, thus breaking the grip between them.

If desired the rod 44 may be threaded at one end as at 42 (see Fig. 4) and the wall of the bore of the nipple 29a may be threaded for the reception of the threaded end of the rod. With this construction, the user may not only rock the shell and connector head relative to each other, but he may exert considerable pull on the rod to detach the connector head from the shell.

In the modified form of spray nozzle shown in Fig. 5, the connector head 25a is also removably secured in the nozzle shell 24. In this form of nozzle the skirt 26a of the connector head is screw threaded and the outwardly offset end part 24b of the nozzle shell is screw threaded to receive the threaded skirt 26a. A centrally apertured end wall 27a extends inward from the skirt and a nipple 29a has a reduced end 30a which extends through the aperture in the wall 27a, which wall is staked to the nipple. The nipple has a shoulder which bears against the outer face of the wall 27a and from said shoulder said nipple extends in an outward direction and is tapered as at 32a whereby it may be secured in the hole in the end wall of the spray head as in the preferred form of the invention. The threads on the skirt and on the shell may be rolled thereon. The connector head is knurled as at 32b to facilitate screwing it upon the nozzle shell and unscrewing therefrom. A perforated pliable disc 28a is interposed between the edge of the skirt and an annular shoulder 24c on the nozzle shell. In other respects, the modified form

of spray nozzle is constructed substantially as in the other form illustrated in Fig. 1.

Having thus described my invention, it is obvious that various immaterial modifications may be made in the same without departing from the spirit of my invention; hence, I do not wish to be understood as limiting myself to the exact form, construction, arrangement and combination of parts herein shown and described or uses mentioned.

What I claim as new and desire to secure by Letters Patent is:

1. As an article of manufacture, a detachable, foam producing nozzle attachment for spray guns having an air outlet opening and a tubular fluid outlet axially aligned with said opening, a shell open at both ends, a plurality of spaced foraminous discs positioned in said shell and extending transversely with respect to the axis of the latter, a hollow connector head removably mounted in one end of the shell, a hollow nipple provided intermediate its ends with a shoulder, one end of said nipple extending through said head with said shoulder seated on the outer face of the latter, the free end of said nipple at the inner face of said head being outwardly deformed to rigidly secure the nipple to said head, the opposite end portion of the nipple being externally tapered and of a size to be inserted into the air outlet opening of a spray gun and frictionally engage the latter, with the bore of said nipple being of a size to encircle the tubular fluid outlet of such a spray gun.

2. As an article of manufacture, a detachable, foam producing nozzle attachment for spray guns adapted to spray a stream of fluid and air under pressure and having an air outlet opening, a shell open at both ends, a plurality of spaced foraminous discs positioned in said shell and extending transversely with respect to the axis of the latter, a hollow connector head mounted in one end of the shell, a hollow nipple extending through and rigidly secured to said head, the opposite end portion of the nipple being constructed for engagement with a spray gun at the air outlet opening thereof, the foraminous disc adjacent said nipple having a relatively large opening therein axially aligned with said nipple whereby the fluid and air sprayed discharges through said opening and impinges the contiguous foraminous disc over which the fluid and air are spread, and a portion of the fluid rebounds from said disc and returns through perforations in said foraminous disc adjacent said nipple to be redischarged through said large opening.

3. As an article of manufacture, a detachable, foam producing nozzle attachment for spray guns having an air outlet opening and a tubular fluid outlet axially aligned with said opening, a shell open at both ends, a plurality of spaced foraminous discs positioned in said shell and extending transversely with respect to the axis of the latter, a connector head comprising a cup-like member, the peripheral face of which is removably engageable with said shell at one end of the latter, a hollow nipple provided intermediate its ends with a shoulder, one end of said nipple extending through said cup-like member, with said shoulder seated on the adjacent outer face of the latter, a disc positioned in said shell engaging the annular edge of the cup-like member and having an opening therein through which the inner end of said nipple extends, the latter end of said nipple being outwardly deformed to rigidly secure the cup-like member and last-mentioned disc together, the opposite end portion of the nipple being externally tapered and of a size to be inserted into the air outlet opening of a spray gun and frictionally engage the latter, with the bore of said nipple being of a size to encircle the tubular fluid outlet of such a spray gun.

4. As an article of manufacture, a detachable, foam producing nozzle attachment for spray guns having an air outlet opening and a tubular fluid outlet axially aligned with said opening, a shell open at both ends, a plurality of spaced foraminous discs positioned in said shell and extending transversely with respect to the axis of the latter, said discs each having peripheral flanges therein forming spacing means between adjacent discs, a connector head comprising a cup-like member, the peripheral face of which is removably engageable with said shell at one end of the latter, a hollow nipple provided intermediate its ends with a shoulder, one end of said nipple extending through said cup-like member, with said shoulder seated on the adjacent outer face of the latter, a disc positioned in said shell engaging the annular edge of the cup-like member and having an opening therein through which the inner end of said nipple extends, the latter end of said nipple being outwardly flared to rigidly secure the cup-like member and last-mentioned disc together, the foraminous disc adjacent said nipple having a relatively large opening therein axially aligned with said nipple, the opposite end portion of the latter being externally tapered and of a size to be inserted into the air outlet opening of a spray gun and frictionally engage the latter, with the bore of said nipple being of a size to encircle the tubular fluid outlet of such a spray gun.

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