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SPRAY GUNS

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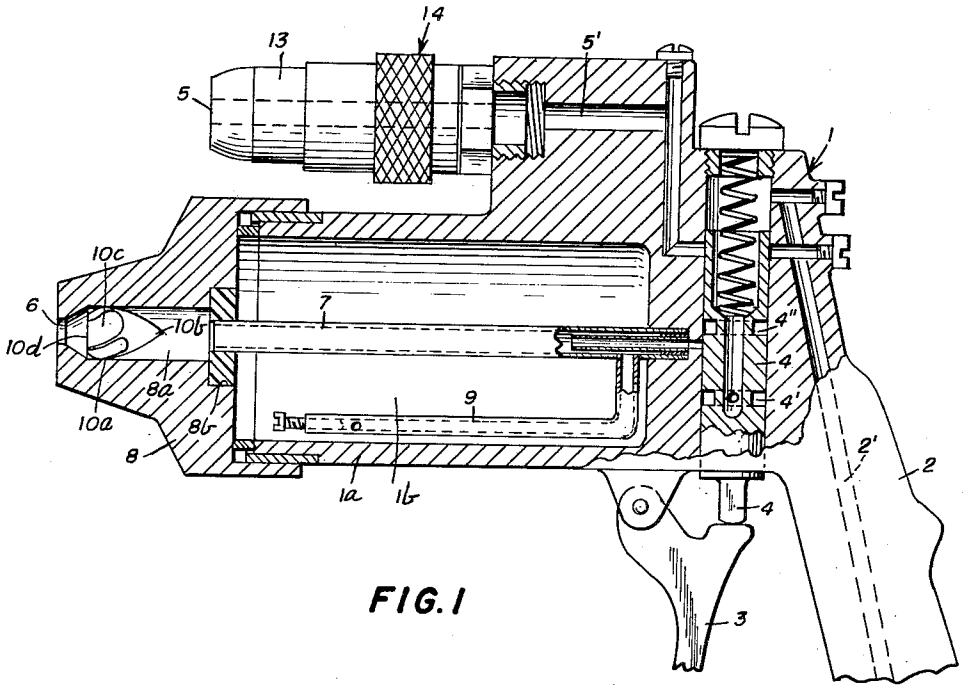


FIG. 1

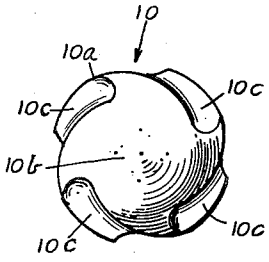


FIG. 2

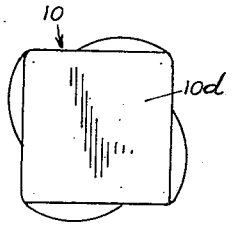


FIG. 3

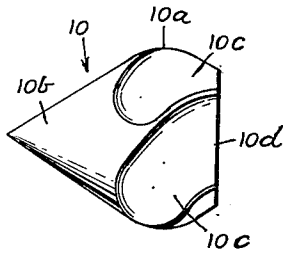


FIG. 4

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SPRAY GUNS

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The invention relates to a spray gun for connection to a supply of water under pressure and designed for selectively spraying such water or water enriched with a spray substance from separate nozzles which are supplied through separate supply ducts, one of which is in the form of a tube of relatively narrow cross-section connected to a suction conduit projecting into a container for receiving the spray substance, a manually operable control being provided for selectively connecting the water supply to the supply duct of one or other of the nozzles.

In spray guns of this kind, the supply duct connected to the conduit for drawing in the spray substance is given a very small cross-section in order to provide economical consumption of the spray substance and the desired enriching of the water. Hitherto, the liquid was allowed to discharge from the nozzle as an uninterrupted jet, i.e. without diversions or the use of an insert member provided with helical impelling ducts. This has the advantage, especially for the spraying of cleansing materials such as for cleaning vehicles, that the liquid jet impinges with a higher velocity on the surface to be cleaned. However, it is disadvantageous that the liquid jet strikes a very small, almost punctiform surface and no foaming is obtained. Although attempts to provide beyond the nozzle a cylindrical insert-member with peripheral impelling ducts have resulted in satisfactory foam formation, the velocity of the liquid was too severely impaired so that an effectively strong cleansing jet could no longer be obtained. This invention aims at overcoming these disadvantages.

According to the invention, in a spray gun of the kind indicated, the tube of relatively small cross-section receiving the spray substance opens into a substantially cylindrical chamber which is constricted at one end to form the associated nozzle, an insert member provided with peripheral impelling ducts and having the form of a substantially cylindrical portion merging into a substantially conical portion at one end being arranged in the said chamber spaced from the said tube so that the liquid jet leaving the said tube strikes the apex of the substantially conical portion from a distance.

The thin liquid jet can thus pass over the conical surface into the preferably helical impelling ducts of the insert member. In order to keep the resistance offered by the impelling ducts to a minimum, it is advisable to provide a small number of such ducts, preferably four, having a shape such that the end of the insert member facing the nozzle is substantially square. The lead of the driving ducts is preferably chosen to be 45° and the taper of the conical portion of the insert member less than 90°. This decreases or eliminates the possibility of the liquid damming up behind the insert member. The liquid passing along the conical surface of the insert member is divided into four separate jets which are deflected by the impelling ducts and, because such ducts are preferably very large, the jets pass through them with a high velocity and leave the nozzle with sufficient velocity and turbulence. In this way, a desired large region of the surface to be cleaned is struck with a good foam formation.

If the supply duct which is in the form of a tube of relatively small cross-section is surrounded by the container for receiving the spray substance and this container

is closed at the front by a cover containing the nozzle orifice, then, according to a further aspect of the invention, the chamber containing the insert member is formed in the cover. This chamber can be sealed from the container by a resilient disc or washer which is seated in an enlargement in the form of an annular groove and which is penetrated by the end of the tube.

The drawings illustrate an example of the invention. In the drawings:

FIG. 1 is a part sectional side view of the spray gun,

FIG. 2 is an enlarged plan from the conical side of the insert member,

FIG. 3 is an enlarged underneath plan thereof, and

FIG. 4 is an enlarged side elevation of the insert member.

The spray gun comprises a housing **1**, a handle **2**, a slide valve **4** controlled by means of an actuating lever **3**, a cover **8** formed with a nozzle **6** for the water-jet enriched with the spray substance, and a member **14** enclosing the supply duct and nozzle **5** for an uninterrupted pure water jet. The nozzles **5** and **6** are supplied through a duct system which, not being part of the present invention, may be as shown or any other conventional system, a supply conduit **2'** for water under pressure, indicated by dotted lines, being connected to the mains, and leading through the handle **2**. The supply conduit is selectively connected by the slide valve **4** as shown, or other appropriate valve, to a supply duct **5'** for the nozzle **5**, or to a supply duct **7** in the form of a tube of narrow cross-section for the nozzle **6**. Valve **4** is indicated as being in the shut off condition.

The walls **1***a* of the housing **1**, together with the cover **8** containing the nozzle **6**, form a container **1***b* for spray substances. A suction conduit **9**, which projects into this container and is provided with a suction opening **9***a*, opens into the tube **7**. In the cover **8** a chamber **8***a* is provided which is constricted at the front to form the nozzle **6**, and in this chamber an insert member **10** is fixedly mounted against rotation. The insert member **10** comprises a substantially cylindrical portion **10***a* which merges at the rear with a substantially conical portion **10***b* and is so positioned that the liquid jet discharged by the tube **7** strikes the apex of the cone. Four impelling ducts **10***c* with a lead of about 45° are provided on the periphery of the cylindrical portion **10***a*. These have such a shape that the rear end **10***d* facing the nozzle **6** is square. The cover **8** is screwed onto the wall **1***a* of the container **1***b* and the chamber **8***a* is sealed from the container **1***b* by means of a washer **11**, which is mounted in a groove **8***b*. The tube or duct **7** passes through the hole **11***a* in the washer in a pressure-tight manner. A second washer **12** seals the container **1***b* from atmosphere.

A peripheral wall **13** for the nozzle **5** is adjustable for varying the nozzle orifice.

The valve **4** shown comprises a plunger having two annular grooves the lower of which **4'** will come into registry with passage **7** when the trigger **3** is squeezed, the water under pressure being lead to this lower annular passage through the coaxial bore in the valve element. This lower annular passage will pass beyond the passage **7**, whereupon flow to passage **7** is stopped and then the upper annular passage **4''** comes opposite the passage **5'** to deliver water thereto. It will be seen, then, that a simple valve can be used to provide water under pressure selectively to one or the other nozzle **5** or **6**. Clearly any other valve device that performs this function will be suitable.

What is claimed is:

1. A spray gun for connection to a supply of water under pressure and designed for selectively spraying such

water or water enriched with a spray substance from respective separate nozzles which are supplied from a single source of water under pressure through separate supply ducts, one of which ducts is in the form of a tube of relatively narrow cross-section, a suction conduit connected to said tube and projecting into a container for receiving the spray substance, a manually operable control valve provided for selectively connecting the supply of water under pressure to the supply duct of one or other of said nozzles, said tube of relatively narrow cross-section receiving the spray substance opening into a substantially cylindrical chamber which is constricted at one end to form the associated nozzle, an insert member provided with peripheral impelling ducts and having the form of a substantially cylindrical portion merging into a substantially conical portion at one end being arranged in the said chamber spaced from said relatively narrow tube so that the liquid jet leaving said tube strikes the apex of the substantially conical portion from a distance.

2. A spray gun according to claim 1, wherein the conical portion of the insert member is tapered less than 90°.

3. A spray gun according to claim 1, wherein four impelling ducts are arranged on the cylindrical periphery

of said insert member with a pitch of about 45°, said insert and ducts having such a shape that the flat end of the insert member facing the nozzle is substantially square.

4. A spray gun according to claim 1, wherein the supply duct is formed as a tube of narrow cross section and is surrounded by the container for receiving the spray substance, said container being closed at the front by a cover, said cover including the associated nozzle orifice, the chamber containing the insert member being formed in the cover, and an enlargement in the form of an annular groove in said cover concentric with said chamber, a washer in said enlargement which is penetrated by the end of the tube to seal said tube from said container.

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