Jan. 22, 1957 R. K. FORST 2,778,684

DIVERSIFIED SPRAY DEVICE

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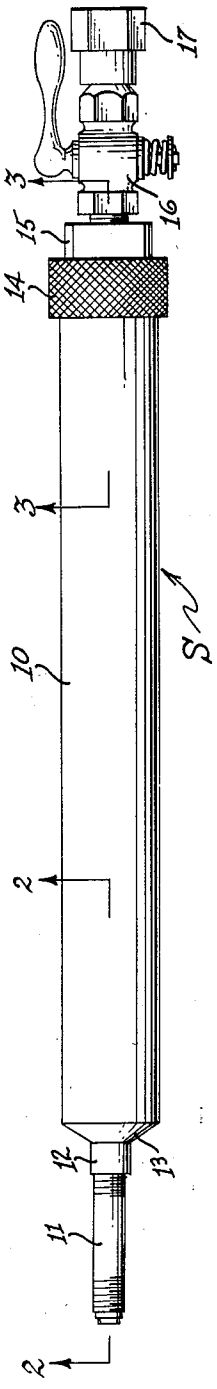


Fig. 1.

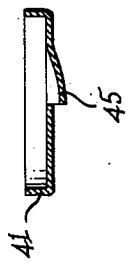


Fig. 8.

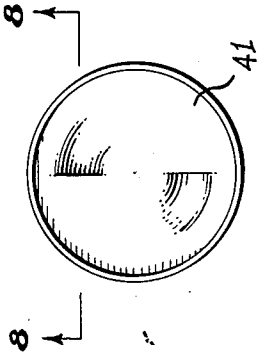


Fig. 7.

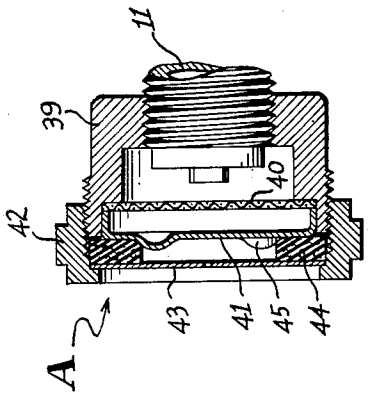


Fig. 6.

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Fig. 2.

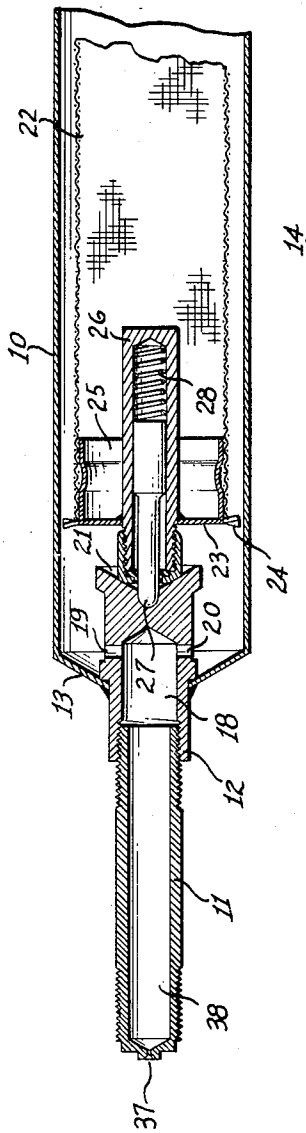


Fig. 3.

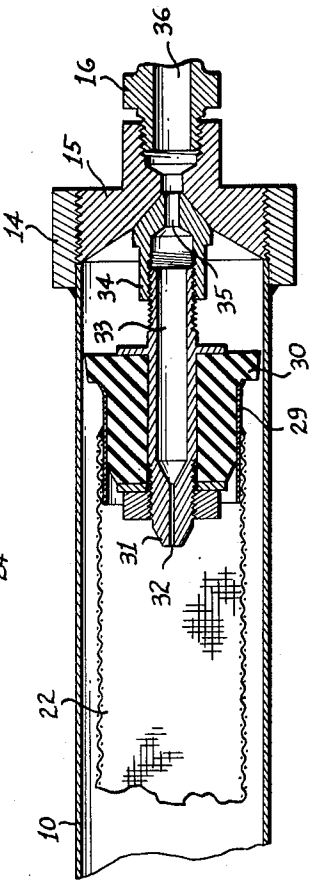


Fig. 5.

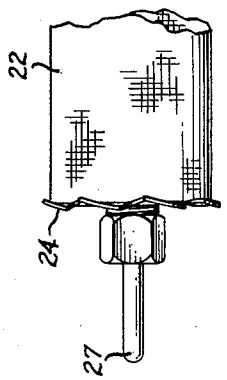
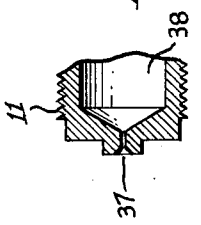


Fig. 4.



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DIVERSIFIED SPRAY DEVICE

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6 Claims. (Cl. 299—117)

This invention relates to spraying devices, and particularly to a diversified spray device for producing pressure jets and mist spray, as desired.

The basic objective of the present invention is to provide a novel spraying device which is capable of producing various spray patterns.

Another objective of this invention is to provide a spraying device in the nature of an attachment for ordinary water hose, which is capable of furnishing issuing jets of various patterns for great distances.

These objects, together with other objectives and advantages to be derived from the present invention, will at once become apparent from the following detailed description and accompanying drawings, wherein similar numerals refer to similar parts throughout the several views.

Figure 1 is an elevational view of the present spraying device.

Figure 2 is a sectional view of the forward end of the spraying device, taken along the line 2—2 of Fig. 1.

Figure 3 is a sectional view of the aft end of the present spraying device, taken along the line 3—3 of Fig. 1.

Figure 4 is an enlarged sectional view, with parts broken away, of the end of the nozzle shown in the forward end of the spraying device in Figs. 1 and 2.

Figure 5 is a partial elevational view of the forward end of the filter screen which resides within the device casing.

Figure 6 is a sectional view of a nozzle attachment for producing a mist spray.

Figure 7 is a plan view of a swirl disc which forms part of the nozzle attachment of Fig. 6.

Figure 8 is a sectional view of the swirl disc taken along the line 8—8 of Fig. 7.

Referring to the drawings, and particularly Fig. 1 thereof, the spraying device of the present invention is shown therein in its entirety and referred to by the letter S. As shown, this spraying device S consists of a cylindrical casing 10 which has a nozzle 11 threadably mounted in a fitting 12 which resides in the conically shaped forward end 13 of said casing. The opposite end of said casing 10 has a knurled sleeve 14 fixedly attached thereto, and said sleeve is internally threaded so as to receive the valve fitting 15 which threadably carries valve 16. The other end of the valve 16, remote from the valve fitting 16, carries a hose fitting 17 which is adapted to receive the threaded end of a conventional ¾ inch garden hose, or the like.

Turning now to Fig. 2, the fitting 12 has an opening 18 in one end thereof, which end has internal threads for receiving the nozzle 11. A pair of opposed apertures 19 and 20 is provided in the wall of said fitting, which apertures communicate with the opening 18 for a purpose to be described below. The other end of the fitting 12, remote from the opening 18, is bored in conical fashion as at 21 and is counterbored at the apex of the conical bore.

Residing within the cylindrical casing 10 is a cylindrical filter screen 22 made from 30-mesh steel screen and of a diameter slightly smaller than the diameter of said casing

so as to leave a space therebetween. The end of said filter screen adjacent to the fitting 12 carries a metallic cup 23 from which circumferentially projects a plurality of vanes 24. Residing within the cup 23 is a metallic core 25 having a central opening therein which receives a nipple 26 which projects outwardly from the end of the filter screen 22 through the cup 23. A projecting pin 27 slidably resides within the nipple 26 and is biased into an ever-projecting position by virtue of an expansion spring 28. The end of the pin 27 is made to fit into the counterbored apex in the conical bore 21 of the fitting 12.

In the other end of the cylindrical filter screen 22, as shown in Fig. 3, is a metallic sleeve 29 in which removably resides a rubber plug 30. The plug 30 carries a nozzle fitting 31 having a small orifice 32 in one end thereof, which orifice 32 expands into an enlarged opening 33 within the nozzle fitting 31. The end of the fitting 31 remote from the orifice 32 is externally threaded so as to receive thereon an induction fitting 34. The fitting 34 is normally seated within a concavity provided therefor in the valve fitting 15, and has an axial opening 35 communicating with the bore 36 of the valve 16.

The nozzle 11 shown in Figs. 1 and 2, and in enlargement in Fig. 4, is adapted to produce a high-pressure jet capable of issuing forth for great distances. As will be noted from Fig. 4, said nozzle is provided with a small cone-shaped orifice 37 in the end thereof, which orifice suddenly expands into the much larger bore 38. For producing a fine mist spray, a nozzle attachment A as shown in Fig. 6 is provided, which attachment is adapted to threadably fit on the end of the nozzle 11. The attachment A comprises a cup 39 having a threaded opening in one end thereof which receives the nozzle 11. The opposite end of said cup is counterbored so as to provide a shoulder upon which resides a screen 40 and a swirl disc 41. The cup 39 is threaded externally and carries a sleeve 42 inside of which resides an orifice plate 43 with a small orifice therein in adjacent spaced relationship with the swirl disc 41. A rubber washer 44 is interposed between the orifice plate 43 and swirl disc 41, as shown in Fig. 6. Turning to Figs. 7 and 8, it will be seen that the swirl disc 41 is of a cuplike configuration, having a pair of arcuate channels 45 depending therefrom in scooplike fashion. These channels impart a spiral flow to the liquid passing through the disc 41.

Operation

Although the operation of the present device should be quite apparent from the above description of its various elements and their relationship to one another, a brief discussion of its operation will be given below for the sake of completeness and clarity.

The spraying device is connected to the ordinary garden hose or the like by means of the hose fittings 17 and the valve 16 is normally maintained in a closed position. If it is desired to produce a pressure jet, the attachment A is removed from the nipple 11. As the valve 16 is opened so as to permit the flow of liquid into the spraying device S, the liquid will pass through the axial opening 35 in the induction fitting 34 into the enlarged opening 33 of the nozzle fitting 31. As the opening 33 gradually decreases to become the orifice 32, the velocity of the liquid flowing therethrough will increase so that a high-velocity stream issues forth from the nozzle fitting 31 into the interior of the filter screen 22. This stream passes outwardly through said filter screen 22, where all solid impurities are removed therefrom while said stream is broken down into a spray within the casing 10. As the thus finely divided stream continues forwardly within the casing 10, it passes through the circumferential vanes 24 on the end of the filter screen, where a special motion

is imparted thereto. Continuing forwardly in this spiral fashion, the stream passes through the opposed apertures **19** and **20** into the opening **18** of the fitting **12**, where the velocity of said stream is further increased. The stream then passes, at this velocity, into the bore **38** of the nozzle **11** and then outwardly through the orifice **37** in the end thereof. It will be noted that since the orifice **37** decreases suddenly in diameter compared with the larger bore **38**, the stream issuing forth from the nozzle **11** will partake the nature of a high-velocity jet capable of reaching great distances. In the present case, it has been found that a jet which reaches 30 feet high is produced.

It will be noted that filter screen **22** is always maintained in a tight, assembled relationship relative to the fitting **12** by virtue of the spring-biased pin **27** which resides within the counterbored apex of the bore **21** in the end of said fitting.

With the attachment A secured to the end of the nozzle **11**, a fine mist spray is produced. Thus, as the high-velocity stream issues from the nozzle **11**, it is reduced in velocity by the screen **40**. It then passes through the arcuate channels **45** in the swirl disc **41**, where spiral motion is again imparted thereto, and finally outwardly through the small orifice in the orifice plate **43**. In passing through said small orifice, the stream is reduced to a spray.

It is seen from the above description of the present invention that a novel and convenient spraying device is provided which is capable of producing either a high-velocity jet, or a fine mist spray, as desired.

Although the present discussion of this invention has been limited to the above-described preferred embodiment, variations thereof are possible without departing from the spirit of the invention. It is to be understood, therefore, that the invention is not to be limited to the particular embodiment disclosed, but rather only to the inventive concept as defined by the appended claims.

What is claimed is:

1. A spraying device comprising, a cylindrical housing, a nozzle projecting from one end of said cylindrical housing, a discharge fitting connected to said nozzle and residing within said housing, the discharge fitting having induction openings in its walls, a cylindrical filter screen within said housing having one end in spring-biased contact with said discharge fitting, guide vanes circumferentially disposed about the end of said cylindrical filter screen adjacent to the discharge fitting, and a valve on the other end of said cylindrical housing.

2. A spraying device comprising, a cylindrical housing, a nozzle projecting from one end of said cylindrical housing, a discharge fitting connected to said nozzle and residing within said housing, the discharge fitting having induction openings in its walls, a cylindrical filter screen within said housing having one end in spring-biased contact with said discharge fitting, guide vanes circumferentially disposed about the end of said filter screen adjacent to the discharge fitting, a nozzle fitting residing in the other end of said cylindrical filter screen, and a valve in the other end of said housing, said valve being connected to said nozzle fitting.

3. A spraying device comprising, a cylindrical housing, a nozzle projecting from one end of said cylindrical housing, a discharge fitting connected to said nozzle and residing within said housing, the discharge fitting having induction openings in its walls, a cylindrical filter screen within said housing having one end in spring-biased contact with said discharge fitting, a removable plug in the other end of said filter screen, a nozzle fitting residing within said plug and projecting into the interior of said cylindrical filter screen, and a valve in the other end of said housing, said valve being connected to said nozzle fitting.

4. A spraying device comprising, a cylindrical housing, a nozzle projecting from one end of said cylindrical housing, a discharge fitting connected to said nozzle and residing within said housing, the discharge fitting having induction openings in its walls, a cylindrical filter screen within said housing having one end in spring-biased contact with said discharge fitting, guide vanes circumferentially disposed about the end of said cylindrical filter screen adjacent to the discharge fitting, a removable plug in the other end of said filter screen, a nozzle fitting residing within said plug and projecting into the interior of said cylindrical filter screen, and a valve in the other end of said housing, said valve being connected to said nozzle fitting.

5. A spraying device comprising, a cylindrical housing, a nozzle projecting from one end of said cylindrical housing, a discharge fitting connected to said nozzle and residing within said housing, the discharge fitting having induction openings in its walls, a cylindrical filter screen within said housing having one end in spring-biased contact with said discharge fitting, guide vanes circumferentially disposed about the end of said cylindrical filter screen adjacent to the discharge fitting, a removable plug in the other end of said filter screen, a nozzle fitting residing within said plug and projecting into the interior of said cylindrical filter screen, a valve in the other end of said housing, said valve being connected to said nozzle fitting, and a mist-spray attachment on the end of said nozzle.

6. A spraying device comprising, a cylindrical housing; a nozzle projecting from one end of said cylindrical housing; a discharge fitting connected to said nozzle and residing within said housing, the discharge fitting having induction openings in its walls; a cylindrical filter screen within said housing having one end in spring-biased contact with said discharge fitting; guide vanes circumferentially disposed about the end of said cylindrical filter screen adjacent to the discharge fitting; a removable plug in the other end of said filter screen; a nozzle fitting residing within said plug and projecting into the interior of said cylindrical filter screen; a valve in the other end of said housing, said valve being connected to said nozzle fitting; and a mist-spray attachment on the end of said nozzle, said attachment comprising a cup having a threaded bore which receives said nozzle, a screen residing within said cup, a swirl disc adjacent to said screen, an orifice plate in spaced adjacent relationship with said swirl disc, a washer interposed between said orifice plate and swirl disc, and a sleeve threadably attached to said cup and containing said orifice plate and washer.

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