Aug. 14, 1962 V. R. SEARS 3,049,304

PORTABLE HOSE SPRAYING APPARATUS

Filed May 18, 1960 3 Sheets-Sheet 1

Fig. 1

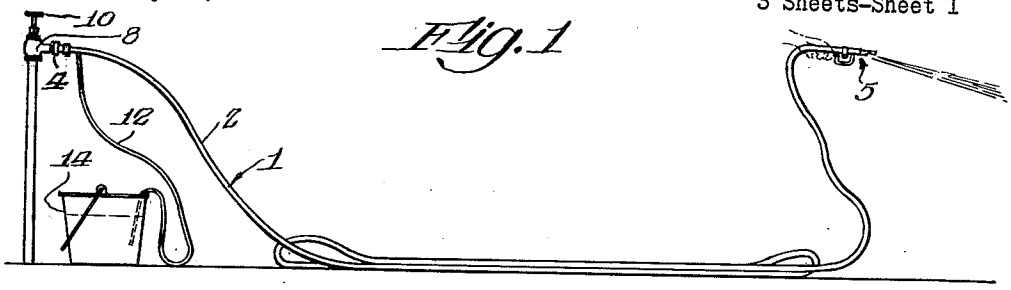


Fig. 2

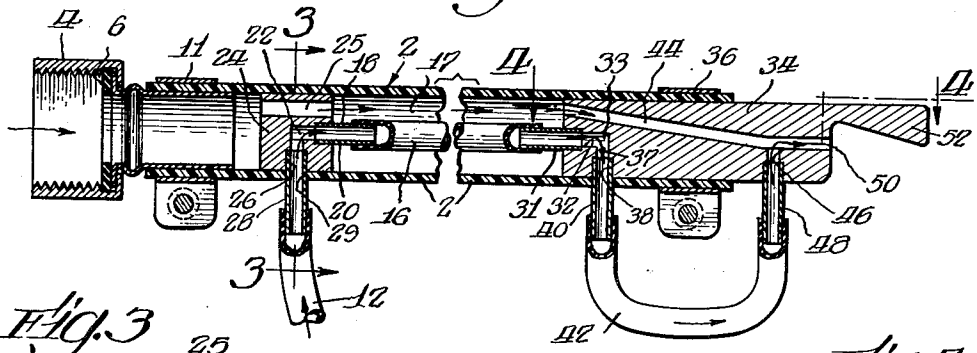


Fig. 3

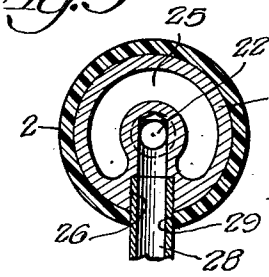


Fig. 4

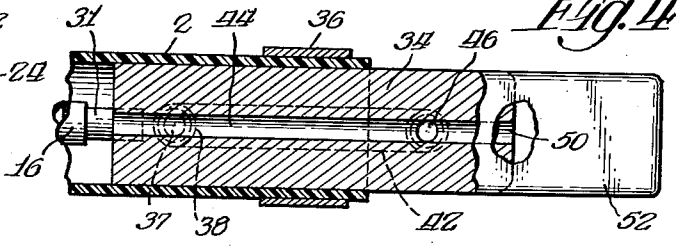
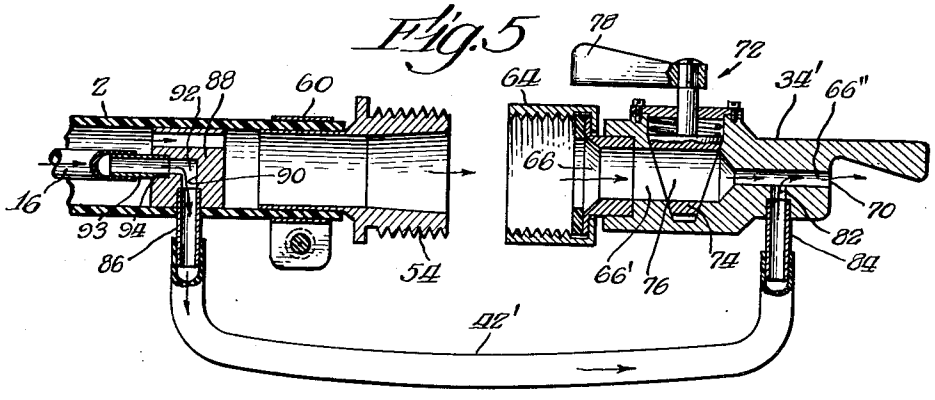


Fig. 5



Inventor:
Vernon R. Sears
By Wallenstein & Spangenberg attys

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PORTABLE HOSE SPRAYING APPARATUS

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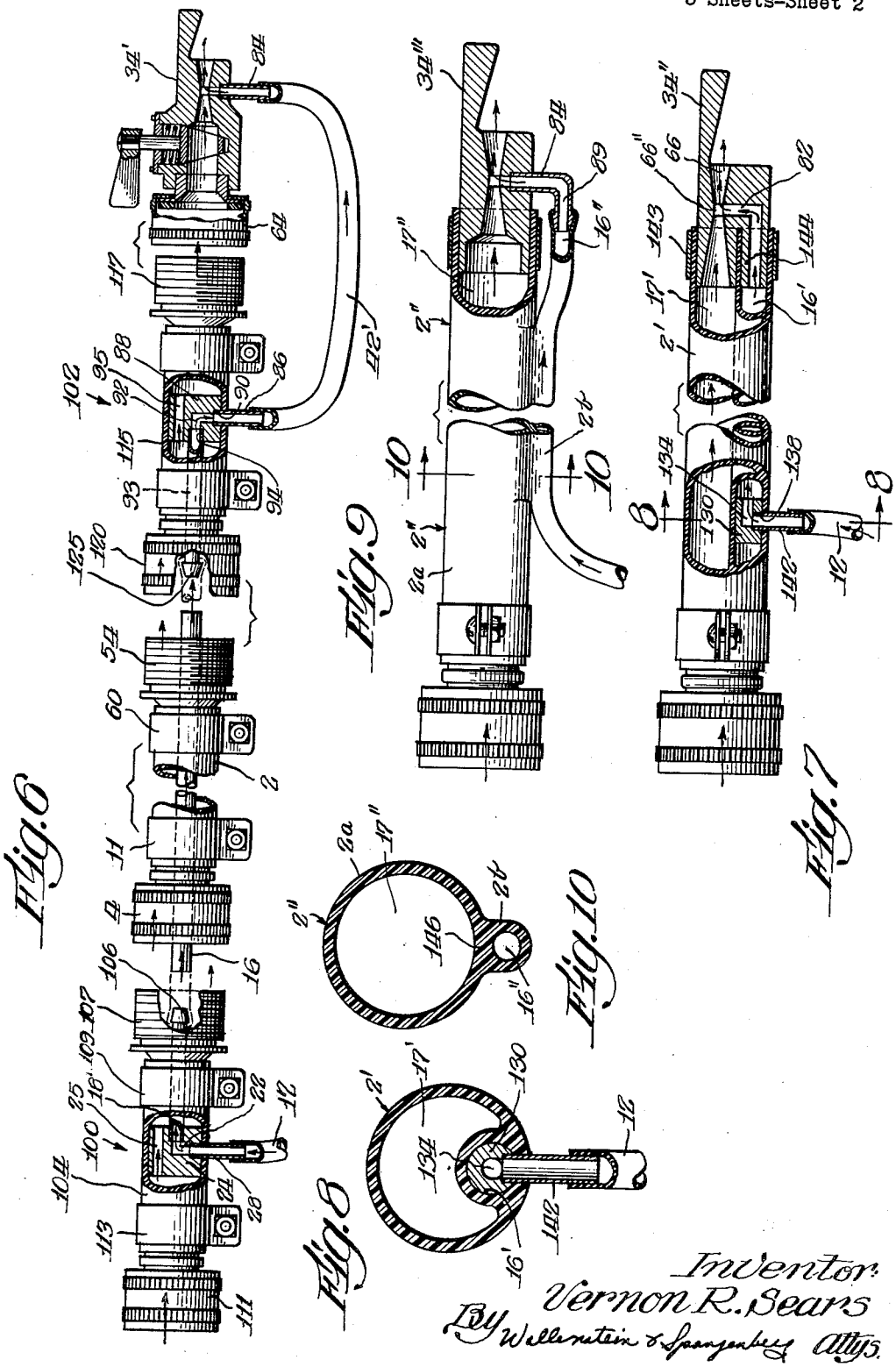


Fig. 6

Fig. 9

Fig. 7

Fig. 10

Fig. 8

Inventor:
Vernon R. Sears
By Wellenstein & Spangenberg Attys.

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PORTABLE HOSE SPRAYING APPARATUS

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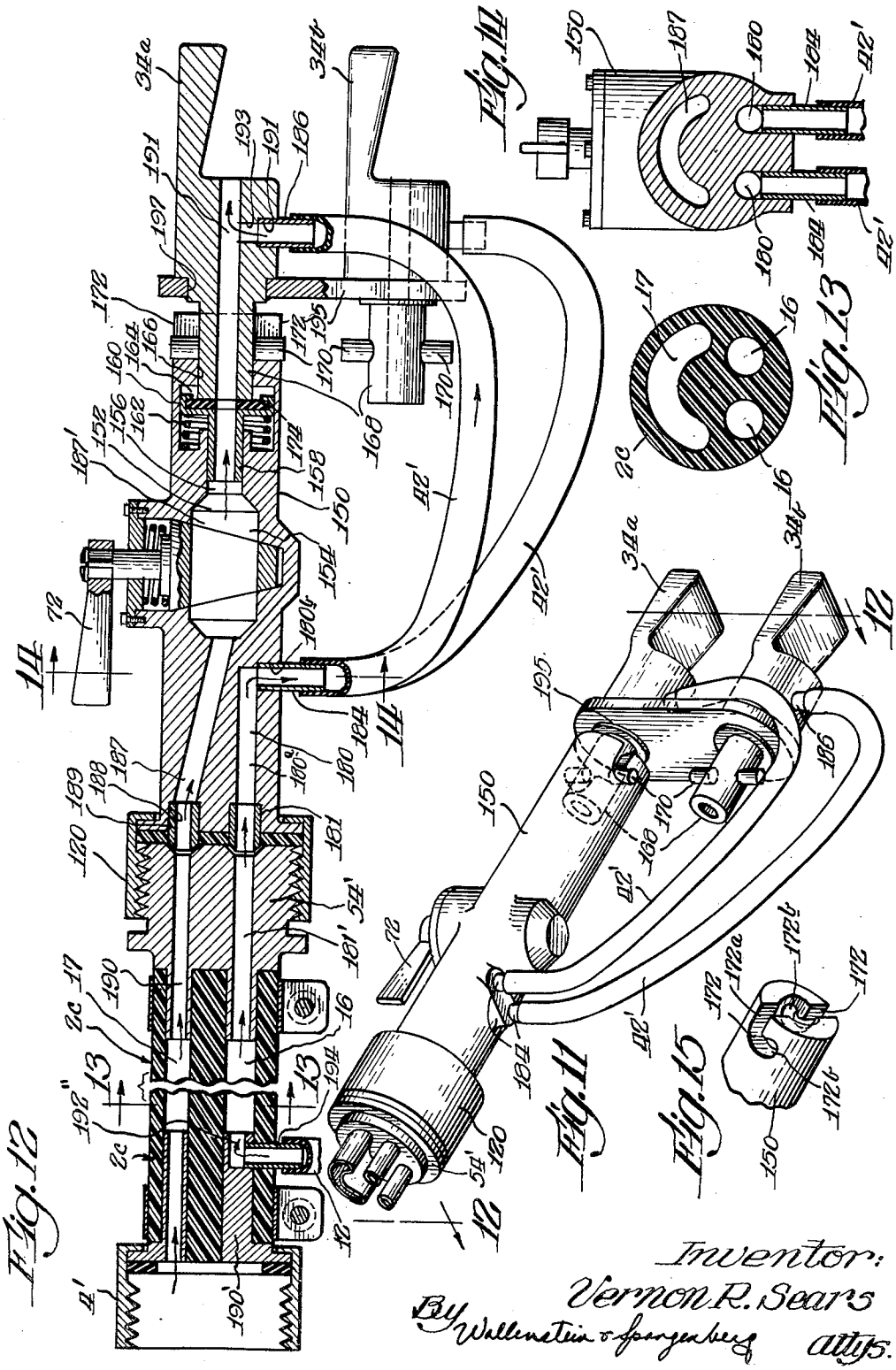


Fig. 12

Fig. 14

Fig. 13

Fig. 11

Fig. 15

Inventor:
Vernon R. Sears
By Wallenstein & Spangenberg attys.

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PORTABLE HOSE SPRAYING APPARATUS

Vernon R. Sears, Tulsa, Okla.

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12 Claims. (Cl. 239—318)

The invention, in general, relates to portable hose spraying apparatus having particular utility for spraying garden chemicals or liquid detergents in manual car washing applications, although the invention has other applications as well.

In recent years, it has become increasingly popular to spray garden chemicals admixed with water flowing through a venturi unit or the like connected to a water hose, the venturi unit providing a region of low pressure which sucks a concentrated chemical fluid in a bottle through an inlet passageway into the main stream of water flow. Insecticides, fungicides and soluble fertilizers are commonly dispensed in this way. The bottle carrying the chemical fluid is usually provided with a cap which includes a venturi and nozzle unit which attaches to the end of a garden hose. An obvious disadvantage with this arrangement is that the size of the bottle and the quantity of the chemical which can be carried in the bottle are greatly limited since the user must carry the weight of the bottle and its contents at the end of the hose as the venturi and nozzle unit is moved about to dispense the chemical at the desired point. The proportion of chemical to water obtained is fixed by the particular venturi and nozzle unit utilized. Since various chemicals require different proportions depending on the uses to be made thereof, it is apparent that different venturi and nozzle units must be used for various applications of the type of hose spraying apparatus now being described.

In the earlier development of hose sprayers, the venturi unit was located at the inner end of the hose next to the water faucet. In such case, the container for the chemical fluid was a large tub or pail which did not have the size limitations of the aforementioned bottle since the user did not have to lift the weight of the filled pail or tub. One serious disadvantage of this arrangement, however, was that appreciable back pressure was developed by the length of hose attached to the front of the venturi unit and, most importantly, by the nozzle required at the end of the hose to provide an acceptable spray pattern. This back pressure practically destroyed the venturi action of the venturi unit so that the degree of suction produced by it was generally insufficient to draw useful quantities of chemical fluid into the stream of water flowing in the hose, and back flow of water into the pail or tub sometimes occurred which contaminated the chemical liquid involved.

It is, accordingly, an object of the present invention to provide hose spraying apparatus of the general type above described which avoids the disadvantages of the prior hose spraying apparatus described above. More specifically, it is an object of the present invention to provide a hose spraying apparatus wherein the user does not need to carry the weight of the supply of chemical fluid involved and where at the same time maximum suction efficiency may be maintained. A related object of the invention is to provide a hose spraying apparatus as just described wherein the proportion of chemical fluid to water may be readily varied without requiring a change in the venturi or eductor unit. A related object of the invention is to provide hose spraying apparatus as just described wherein conventional water hose apparatus may be utilized if desired.

Another object of the invention is to provide hose apparatus which may be assembled with a conventional water hose by the ultimate user in a simple and convenient manner to provide the hose spraying apparatus of the invention.

Still another object of the invention is to provide portable hose apparatus for spraying selectively one of two (or more) chemical fluids in admixture with water (or other carrier fluid) forced through the apparatus under pressure, by changes or adjustments made by the user only at the end of the hose apparatus.

A further object of the invention is to provide the hose spraying apparatus above described which is of relatively simple and economical construction.

In accordance with one aspect of the present invention, the portable hose apparatus comprises means forming a first passageway for carrying the water or other carrier fluid, and means forming at least one additional passageway for carrying the chemical fluid to be sprayed. The means forming the first and second passageways may be telescoping hose units with the inner hose unit carrying the chemical fluid and having an outer diameter which is substantially smaller than the inside diameter of the outer hose unit so that a relatively large annular water-carrying space is provided. Means are provided for immovably anchoring the two hose units together so that they form an integral unit. In the alternative, the first and second passageways are formed in juxtaposed relation in a single molded body. The chemical fluid-carrying passageway-forming means in each of these embodiments includes an inlet tube portion extending laterally of the inner end of the water-carrying passageway-forming means so that it may be extended into a pail, tub or the like containing the chemical fluid involved. An eductor nozzle unit is connected to the outlet end of the hose apparatus, the eductor nozzle unit having a longitudinal pasageway with a reduced throat portion forming a region of low static pressure and a suction passageway connecting the outlet end of the chemical fluid-carrying passageway of the hose apparatus to the throat portion of the eductor nozzle unit. The low pressure developed at the throat portion of the eductor nozzle unit upon flow of water therethrough will provide the necessary suction for drawing the proper proportion of chemical fluid from the pail, tub, etc. containing the fluid.

It is apparent that the user does not have to carry the weight of the chemical fluid so that he can manipulate the end of the hose apparatus in the same easy way as with a conventional water hose. Furthermore, since the eductor unit is at the end of the hose apparatus, instead of the inner end thereof, the eductor unit may form a spray nozzle as well and the suction-destroying back pressure present in the prior hose spraying devices above described is avoided.

In accordance with another aspect of the invention, the water hose portion of the apparatus may be a conventional water hose having the usual threaded hose couplings at the opposite ends thereof. In such case, the hose unit for the chemical fluid most advantageously extends through the water hose, the ends of the latter hose unit being anchored within insert coupling members bridging the end portions of the water hose. The coupling members each include one or more water-carrying passageways extending longitudinally therethrough, and a chemical fluid carrying passageway having a laterally extending portion terminating in an opening on the outside of the water hose unit and a longitudinally extending portion terminating in a longitudinally inwardly facing opening through which connection is made to the inner hose unit. An inlet tube which extends into the container holding the supply of chemical fluid to be sprayed connects with the laterally extending portion of the chemical fluid passageway of the coupling member at the inner end of the hose assembly, and a flexible tube connects

with the laterally extending portion of the chemical fluid passageway of the coupling member at the outer end of the hose assembly. The eductor nozzle unit is provided with a swiveled coupling at its inlet end which makes threaded engagement with the complementary coupling at the outer end of the water hose. The reduced throat portion of the eductor nozzle unit is connected to the inner hose unit by the last mentioned flexible tube.

In accordance with another form of the invention, instead of placing the aforementioned coupling members within the water hose, they are inserted or incorporated in separate inlet and outlet coupling units which respectively have suitable threaded couplings for connection with the opposite ends of a conventional water hose, and the ends of the chemical fluid hose unit are removably connected to the coupling members. This permits the hose apparatus of the invention to be sold to the ultimate user without the water hose which the user may have already purchased. The user may detach one end of the latter hose unit from the associated coupling member and then manually push it through this water hose and then reconnect the hose unit to the associated coupling member.

Another aspect of the invention relates to the provision of an additional chemical fluid-carrying passageway in the water hose and an added inlet tube to be extended into a pail or tub carrying a second chemical so that one of two chemical fluids may be selectively dispensed by the user by making certain adjustments or changes only at the outer end of the hose apparatus. For example, in accordance with a preferred form of the invention, a separate eductor nozzle unit is provided for each chemical fluid involved with separate flexible tubes extending between the throats of these eductor nozzle units and the respective chemical fluid carrying passageways associated with the water hose. A coupling unit is provided which interconnects the water-carrying passageway of the water hose with an eductor nozzle-receiving socket formed in the coupling unit into which either of the eductor nozzle units may be inserted. The chemical fluid which is dispensed is determined by the eductor nozzle unit inserted into the aforementioned socket. Most advantageously, both eductor nozzle units are supported on a common frame or otherwise connected together so that the unused eductor nozzle unit is readily available for use at all times. This application of the invention has particular use for car washing applications where different types of soap mixtures are to be sequentially used on different parts of a car or other object being sprayed.

Other objects, advantages and features of the invention become apparent upon making reference to the specification to follow, the claims and the drawings wherein:

FIG. 1 is an elevational view of a hose apparatus incorporating features of the present invention;

FIG. 2 is a fragmentary vertical longitudinal sectional view through the hose apparatus shown in FIG. 1;

FIG. 3 is an enlarged transverse sectional view through the hose apparatus of FIG. 2, taken substantially along the line **3—3** therein;

FIG. 4 is an enlarged horizontal longitudinal sectional view through the eductor nozzle portion of the hose apparatus of FIG. 2, taken substantially along the line **4—4** therein;

FIG. 5 is a vertical sectional view through the eductor nozzle end portion of a modified form of hose apparatus of the present invention, wherein a conventional water hose forms an element thereof;

FIG. 6 is an exploded view, partly broken away, of a still further modified form of the present invention which also uses a conventional water hose, and wherein all of the components which are added thereto form a completely separate integral assembly of parts which can be connected to the water hose by the ultimate user;

FIG. 7 is a fragmentary elevational view, partly in section, of a still further modified form of the present invention which uses a special hose construction which includes both chemical and water carrying passageways in a single extruded body;

FIG. 8 is a transverse sectional view through the hose body of FIG. 7, taken substantially along the line **8—8** therein;

FIG. 9 is a fragmentary elevational view, partially in section, of another form of the present invention where both chemical and water carrying passageways are formed in a single extruded body;

FIG. 10 is a transverse section of a view through the hose body of FIG. 9, taken substantially along line **10—10** therein;

FIG. 11 is a perspective view of the eductor nozzle end portion of a still further modified form of the present invention wherein the hose apparatus may selectively spray one of two different chemical fluids;

FIG. 12 is a longitudinal sectional view through the hose apparatus of FIG. 11, taken substantially along the line **12—12** in FIG. 12;

FIG. 13 is a transverse sectional view through the hose apparatus shown in FIG. 12, taken substantially along the line **13—13** therein;

FIG. 14 is a transverse sectional view through the hose apparatus shown in FIG. 12, taken substantially along the line **14—14** therein; and

FIG. 15 is a fragmentary perspective view of the front end portion of the eductor coupling unit forming part of the apparatus shown in FIGS. 11 through 14.

Referring now to the embodiment of the invention illustrated in FIGS. 1 through 4, the hose apparatus there-shown comprises a home assembly **1** having an outer water hose body **2** of circular cross section and made of any suitable material such as rubber or a synthetic plastic material. The hose body **2** has a swiveled internally threaded female coupling **4** and associated washer **6** at its inner end for connecting the water hose body **2** to a water faucet **8** having the usual shut-off valve **10**. The coupling **4** is held in place by a hose clamp **11**. A flexible inlet tube **12** extends laterally from the inlet end portion of the water hose body **2**, the inlet tube extending into the open top of a pail **14** filled with the chemical fluid to be sprayed.

A chemical fluid passageway may be provided in any one of a number of advantageous ways to be described in or in connection with the water hose body **2** which passageway extends substantially the full length of the water hose body and is immovably connected thereto so that an integral water hose and chemical fluid hose assembly results. In the form of the invention illustrated in FIGS. 1 through 4, a separate inner hose unit **16** is provided for the chemical fluid which extends within the water hose body **2**. The inner hose unit has an outer diameter much less than the inside diameter of the water hose body **2** so that a substantial annular space **17** is provided between the inner and outer tubes for free passage of water. As shown in FIGS. 2 through 4, the inlet end of the inner hose unit **16** extends snugly around a short tubular nipple member **18** anchored within a longitudinally inwardly facing section **20** of a chemical fluid-carrying passageway or bore **22** formed in an insert block **24** often referred to as a coupling member. The coupling member **24** is force fitted within the inlet end of the water hose body **2**. The passageway **22** has a transversely extending portion **26** within which is anchored a short tubular extension **28** which passes through a laterally facing opening **29** in the walls of the water hose body **2**. The aforesaid flexible inlet tube **12** is secured over the tubular extension **28** in tight fitting relation thereto. The coupling member **24** is further provided with an annular longitudinal passageway **25** permitting free flow of water therethrough.

The outlet end of the inner hose unit **16** is snugly

applied over the end of a short tubular nipple member 31 anchored within a longitudinally extending portion 32 of a chemical fluid-carrying passageway or bore 33 formed in the body 34 of a member which, in the form of the invention shown in FIGS. 1 through 4, forms an eductor and nozzle unit. The eductor and nozzle unit body 34 telescopes within the outlet end of the water hose body 2 which is clamped snugly therearound by suitable clamping means 36. The passageway 33 has a transversely extending portion 38 in which is anchored a short tubular extension 40. A flexible connecting tube 42 is snugly applied around the end of the tubular extension. The eductor and nozzle unit body further includes a generally longitudinally extending passageway 44 which communicates at one end with the annular space 17 between the hose units 2 and 16 to receive the water flowing therein. The passageway 44 may take a variety of forms, such as a simple tapered venturi passageway or a restricted passageway of more or less fixed size, as illustrated, to provide a throat at which a relatively low static pressure is present when water flows through the eductor and nozzle unit. The eductor and nozzle unit body 34 further has a transversely extending chemical fluid-carrying passageway 46 which extends between the throat portion of the eductor and nozzle unit passageway 44 and the outside thereof. A short tubular extension 48 is anchored in the passageway 46 and the end of the flexible tube 42 is snugly applied therearound. The low static pressure developed at the throat of the passageway 44 will thus suck chemical fluid from the pail 14, through the inlet tube 12, the inner hose unit 16, and then through the connecting tube 42 into the longitudinal eductor and nozzle unit passageway 44 where the water and the chemical fluid are intermixed. The stream of water and chemical fluid then pass through an exit opening 50 where they impinge against a deflector baffle 52 which forms a generally fan-shaped spray pattern.

In the embodiment of the invention of FIGS. 1 through 4, control over the flow of water as well as the chemical fluid is by means of the shut-off valves 10 on the faucet 8, and control over the flow of the chemical fluid alone may be obtained by manually or otherwise pinching or releasing the flexible tube 42.

Referring now to FIG. 5 which shows a modification of the discharge end of the hose apparatus of FIGS. 1 through 9 wherein the end of the water hose body 2 is provided with a conventional externally threaded male coupling 54 which extends into the hose body 2 where it is clamped thereto by a suitable hose clamp 60. In this form of the invention, the eductor and nozzle generally indicated by reference numeral 34' is removably mounted upon the end of the water hose body 2 by means of a swiveled internally threaded female coupling 64 threading around the male coupling 54. The eductor and nozzle unit 34' has a longitudinal passageway 66 with an enlarged cylindrical inlet portion 66' and a restricted throat portion 66'' which terminates in a spray opening 70. The eductor and nozzle unit has its own shut-off valve 72 which may take any one of a variety of forms. In the illustrated embodiment of the invention, the shut-off valve has a valve body 74 with a longitudinal opening 76 therein which may be oriented in or out of alignment with the longitudinal passageway 66 by means including a manually operable lever 78 on the outside of the eductor and nozzle unit. The eductor and nozzle unit is further provided with a transverse chemical fluid inlet passageway 82 which extends between the throat portion 66'' of the longitudinal passageway 66 and the outside of the eductor and nozzle unit. A short tubular extension 84 is anchored within passageway 82, and receives thereover one end of a flexible connecting tube 42'. The other end of the tube 42' extends over a short tubular extension 86 projecting through hose body 2 from a coupling member 88 press-fitted within the outlet end of the hose body. The tubular extension 86 is anchored within a laterally extending portion 90 of a chemical fluid-carrying passageway 92. A short tubular nipple member 93 is anchored within a longitudinally extending portion 94 of the passageway 92 and receives thereover the outer end of the inner hose unit 16. The inner end portion of the hose apparatus shown in FIG. 5 may be identical to that shown in FIGS. 2 through 4. It is thus apparent that when the shut-off valve 72 is closed nothing flows through the hose apparatus and when the valve is opened a stream of water will flow through the eductor and nozzle unit so as to create a region of low static pressure in the throat portion 66'' of the longitudinal passageway 66 thereof, to effectively suck chemical fluid from the pail 14 and through the inner hose unit 16 and connecting tube 42''. The flow of chemical fluid can be stopped without affecting the flow of water by simply pinching the connecting tube 42'. One advantage of the embodiment of the invention shown in FIG. 5 over that shown in FIGS. 1 through 4 is that the water hose body 2 may be used as a conventional water hose by replacing the eductor and nozzle unit 34' with a sprinkler unit.

Reference should now be made to FIG. 6 which shows a still further modified form of the present invention where the present invention is sold in standard lengths as an integral hose assembly less the water hose 2. The ultimate user may use a water hose of a standard length (which he may already have purchased) in association with the hose apparatus shown in FIG. 6 of matching size. This apparatus comprises the aforesaid inner hose unit 16 connected between an inlet coupling unit 100 and an outlet coupling unit 102. The inlet coupling unit 100 has an open-ended cylindrical body 104 made of any suitable material which may be metal or a plastic having a short hose section of the same size and material as the water hose body 2, as illustrated in FIG. 6. A coupling member 24 is press fitted within the coupling unit body 104 and may be constructed identically to the coupling member 24 previously described. Thus, it is provided with an arcuate, water-carrying passageway 25 and a chemical fluid-carrying passageway 22 having a laterally extending portion in which is anchored a short tubular extension 28 to which the inlet tube 12 is connected. The longitudinally extending portion of the passageway 22 has a tubular nipple member 18' which is somewhat longer than the corresponding tubular nipple member 18 previously described in connection with the embodiment shown in FIGS. 2 through 4 and terminates in an externally tapered head portion 106 over which the end portion of the inner hose unit 16 may be readily pushed to anchor removably the outer end of the latter hose unit. An externally threaded male coupling 107, adapted to engage the female coupling 4 at the inlet end of water hose 2, is secured to the right hand end of the coupling unit body 104 in any suitable way, as by a hose clamp 109, and an internally threaded swiveled female coupling 111 adapted to engage with the water faucet 8 is mounted on the inlet end of the body 104 by any suitable means, as by a hose clamp 113. The end of the tubular nipple member 18' terminates a short distance within the end of the coupling 107 so that ready access to the same may be had for connecting the hose unit 16 thereto.

The outlet coupling unit 102 is similar to the inlet coupling unit 100 and includes an open-ended tubular body 115 having an externally threaded male coupling 117 secured to the outlet end thereof which is adapted to thread into the female coupling 64 of an eductor and nozzle unit 34' like that decsribed in connection with FIG. 5. The outlet coupling unit 102 has a swiveled internally threaded female coupling 120 at the inlet end thereof adapted to thread over the male coupling 54 at the outlet end of the water hose 2.

A coupling member 88 similar to that described above in connection with FIG. 5 is press fitted within the coupling unit body 115. The coupling member 88 thus has an arcuate water-carrying passageway 95 and a chemical

fluid-carrying passageway 92 with a longitudinally extending portion 94 and a laterally extending portion 90. A tubular nipple member 93 is anchored within the longitudinal portion 94 of the passageway 92 and terminates in an enlarged tapered head portion 125 around which may be positioned the outlet end of the hose unit 16.

The laterally extending portion 90 of the passageway 92 has a short tubular extension 86 anchored therein which projects through an opening in the coupling unit body 115 to receive one end of the flexible connecting tube 42'. The other end of the flexible connecting tube 42' extends over the end of the short tubular extension 84 projecting from the eductor and nozzle unit 34' and communicating with the throat portion of the eductor and nozzle unit.

To assemble the hose apparatus in FIG. 6 with the water hose 2, one end of the hose unit 16 is detached from the associated tapered head portion of the nipple member 18' or 93 and pushed through the water hose 2 and reconnected to the nipple member. The complementary couplings 4 through 107 and 54 through 120 are then connected together and the inlet coupling 111 connected to the water faucet 8.

In the various forms of the invention previously described, the water hose 2 and chemical fluid-carrying hose 16 are manufactured as separate unit. In the modified form of the invention shown in FIGS. 7 and 8 these two hoses are combined into a single extruded cylindrical body 2' having a segmental cylindrical water-carrying passageway 17' and a smaller cylindrical chemical fluid-carrying passageway 16'. A coupling member 130 is press fitted within the inlet end of the chemical fluid-carrying passageway 16' to plug the end thereof, the coupling member having a passageway 134 including a laterally extending portion 138 in which is anchored a short tubular extension 142 over which extends the inlet tube 12. The eductor and nozzle unit 34'' used with this form of the invention may be press fitted into the end of the water hose 2' and clamped in place by a hose clamp 143. The eductor and nozzle unit has a longitudinal passageway 66 with a throat portion 66'' which communicates with the water-carrying passageway 17' and an inlet suction passageway 82 extending from the throat portion 66'' through an extension 144 projecting into the chemical fluid-carrying passageway 16'.

In the embodiment of the invention shown in FIGS. 9 and 10, an extruded hose body 2'' is shown having large and small interconnected cylindrical tubular portions 2*a* and 2*b* having cylindrical water and chemical-carrying passageways 17'' and 16''. In this embodiment of the invention, an inlet tube which extends into the pail 14 is formed by an inlet end section of the tubular portion 2*b* which has been severed from the tubular body portion 2*a*, and the tubing which joins the chemical fluid-carrying passageway to the chemical fluid inlet 89 of the eductor and nozzle unit 34''' used therewith is formed by severing the outlet end section of the tubular portion 2*b* from the tubular portion 2*a*.

Refer now to the embodiment of the invention shown in FIGS. 11 through 15 which enables the selective spraying of one of two chemical fluids. In the form of the invention illustrated in these drawings, a water hose unit is provided having an extruded cylindrical body 2*c* having an arcuate water-carrying passageway 17 and a pair of chemical fluid-carrying passageways 16—16. The hose body 2*c* is provided with an externally threaded male coupling 54' at one end and an internally threaded female coupling 4' at the other end. The coupling 54' threads into a female coupling 120 of an eductor and nozzle coupling unit 150. The coupling unit may be made of brass or other suitable material and includes a central longitudinal water-carrying passageway 152 which has an enlarged passageway portion 154 which joins a reduced passageway portion 156 in which is mounted a cylindrical slide member 158 having a flange 160. A compression spring 162 mounted within an enlarged recess 164 in the coupling unit bears against the flange 160 to urge the slide member 158 outwardly. The reduced passageway portion 156 and the recess 164 open onto a socket 166 for receiving the reduced neck portion 168 of either one of a pair of eductor and nozzle units 34*a* and 34*b*. Each of these eductor and nozzle units has a pair of aligned transversely extending pins 170—170 extending from the opposite sides of the neck portion 168 thereof. These pins are adapted to slide along a pair of oppositely facing hook-shaped slots 172—172 formed in the opposite sides of the walls of the coupling unit body, as shown most clearly in FIG. 15. Each of the slots 172—172 has a longitudinally extending portion 172*a* and a hooked end portion 172*b*. The inner end of the selected eductor and nozzle unit bears against a sealing washer 174 carried on the end of the flange 160 of the slide member 158. The compression spring 162 urges the slide member against the end of the neck portion 168 of the selected eductor and nozzle unit to hold the pins 170—170 in the hooked end portions of the slots 172—172. The pins 170—170 may be removed from the slots 172—172 by rotating the selected eductor and nozzle unit in a direction which will bring the pins into the longitudinal portions 172*a*—172*a* of the slots, permitting removal thereof by axial movement of the eductor and nozzle unit.

The coupling unit body 150 has a pair of chemical fluid-carrying passageways 180—180 at the inlet end thereof each of which has a longitudinally extending portion 180*a* and a transversely extending portion 180*b*. Each longitudinally extending portion 180*a* receives a tubular projecting portion 181 extending from the body of the male coupling 54' of the hose body 2*c*. The tubular projecting portions 181—181 communicate with coupling passageways 181'—181' which interconnect the chemical fluid-carrying passageways 180—180 of the coupling unit 150 with the passageways 16—16 of the hose body 2*c*. Laterally extending tubular extensions 184—184 are anchored within the laterally extending portions 180*b*—180*b* of the coupling unit passageways 180—180 to project laterally beyond the coupling unit where they extend within flexible connecting tubes 42'—42'. The other ends of the connecting tubes 42'—42' extend over short tubular members 186—186 extending from the eductor and nozzle units 34*a*—34*b*. The inlet ends of the hose body passageways 16—16 are each plugged with a prospecting portion 190 of coupling 4' with a short bore 192'' communicating with one of the passageways 16 and a tubular extension 194 over which fits the inlet tube 12.

The longitudinal passageway 156 of the coupling unit 150 has a slanting annular passageway portion 187 joining an enlarged inlet portion 187' containing a manually operable shut-off valve 82. The slanting passageway portion 187 terminates at its outer end in a straight axial annular socket 188 which receives a tubular annular projecting portion 189 extending from the male coupling 54' and communicating with an annular coupling passageway 190 which interconnects the water-carrying passageway 17 of the hose body 2*c* with the coupling unit passageway 187. The inlet end of the hose body passageway 17 connects with the water faucet through the female coupling 4' clamped onto the inlet end of the hose body 2*c*.

Each eductor and nozzle unit has a longitudinal restricted passageway 191 which communicates with the longitudinal water-carrying passageway in the coupling unit body 150. A lateral passageway 193 formed in each eductor and nozzle unit extends from the passageway 191, and one of the aforesaid tubular members 186 is anchored in the end thereof to connect the passageway 193 with the associated connecting tube 42'.

The eductor and nozzle units 34*a* and 34*b* are most advantageously carried on a common support plate 195 having a pair of mounting openings 197—197 sized to receive the enlarged inner ends of the neck portions 168—168 of the eductor and nozzle units with a locking

fit. The eductor and nozzle unit which is connected at any movement with the coupling unit **150** may be quickly removed and replaced by the other eductor and nozzle unit.

It is apparent that when the valve **80** is opened to start flow of water through the hose apparatus, suction is developed at the juncture of the passageways **191** and **193** of the selected eductor and nozzle unit to effect the spraying of the selected chemical fluid.

In all of the embodiments of the invention, an eductor and nozzle unit is positioned at the end of the hose apparatus where a maximum suction efficiency is obtained, and the supply of fluid to be sprayed is located in a large container at the inlet end of the hose apparatus where the user does not have to support the weight thereof. The concentrated chemical fluid in the large container may be diluted to any desired extent to obtain any desired proportion of the mixture of chemical and water to be sprayed without requiring any change in the eductor and nozzle unit, provided however, that the size of the passageways of the eductor and nozzle unit involved are selected to provide the highest expected proportion of chemical fluid to water for the particular chemical fluid or fluids to be sprayed therewith.

It should be understood that numerous modifications may be made in the preferred forms of the invention above described without deviating from the broader aspects of the present invention.

I claim:

1. Portable hose apparatus for spraying a chemical fluid admixed with a carrier fluid, said hose apparatus comprising first and second hose passageway-forming means for respectively carrying said carrier fluid and chemical fluid and each having an open inlet end and an open outlet end, the open inlet end of said first hose passageway-forming means including coupling means for connecting the same to a source of said carrier fluid under pressure, means holding said first and second hose passageway-forming means immovably together for substantially their full lengths to form a substantially integral hose unit, the outlet end of which can be readily carried about as a unit in one hand and moved to any point to the extent permitted by the length of substantially the entire hose apparatus to spray the fluid mixture where desired without the weight of the chemical fluid being borne by the user, the open inlet end of said second hose passageway-forming means being separated and extendable laterally from the corresponding end of said first hose passageway-forming means where it may be placed into the bottom of a container filled with said chemical fluid, and an eductor nozzle unit for spraying the fluid mixture connected to the ends of said hose passageway-forming means, said nozzle unit having a first open ended passageway forming a reduced throat portion and communicating with said first hose passageway-forming means, and a second open-ended suction passageway connecting said second hose passageway-forming means and said throat portion of said eductor nozzle unit at which a low pressure is developed which sucks said chemical fluid from the inlet end of said latter means into the stream of carrier fluid flowing through said first eductor unit passageway.

2. Portable hose apparatus for spraying a chemical fluid admixed with water, said hose apparatus comprising first and second hose passageway-forming means for respectively carrying said water and chemical fluid and each having an open inlet end and an open outlet end, the open inlet end of said first hose passageway-forming means including a female swiveled hose coupling means for connecting the same to a public water supply system, means holding said first and second hose passageway-forming means immovably together for substantially their full lengths to form a substantially integral hose unit, the outlet end portion of which can be readily carried about as a unit in one hand and moved to any point to the extent permitted by the length of substantially the entire hose apparatus to spray the fluid mixture involved where desired without the weight of the chemical fluid being borne by the user, the open inlet end of said second hose passageway-forming means being separated and extendable laterally from the corresponding end of said first hose passageway-forming means where it may be placed into the bottom of a container filled with said chemical fluid, and an eductor nozzle unit for spraying the fluid mixture connected to the ends of said hose passageway-forming means, said nozzle unit having a first open ended passageway forming a reduced throat portion and communicating with said first hose passageway-forming means and a second open-ended suction passageway connecting said second hose passageway-forming means and said throat portion of said eductor nozzle unit at which a low pressure is developed which sucks said chemical fluid from the inlet end of said latter means into the stream of water flowing through said first eductor unit passageway, and a spray baffle in the path of flow of the water leaving said eductor nozzle unit for fanning out the stream of water flowing therefrom.

3. Portable hose apparatus for spraying a chemical fluid admixed with a carrier fluid, said hose apparatus comprising first and second hose passageway-forming means for respectively carrying said carrier fluid and chemical fluid and each having an open inlet end and an open outlet end, the open inlet end of said first hose passageway-forming means including coupling means for connecting the same to a source of said carrier fluid under pressure, said second hose passageway-forming means passing through most of the length of said first hose passageway-forming means and being immovably anchored thereto to form a substantially integral hose unit, the outlet end of which can be readily carried about in one hand and moved to any point to the extent permitted by the length of substantially the entire hose apparatus to spray the fluid mixture where desired without the weight of the chemical fluid being borne by the user, the open inlet end of said second hose passageway-forming means extending laterally outside of said fluid hose passageway-forming means where it may be extended into the bottom of a container filled with said chemical fluid, and the open outlet end of said second hose passageway-forming means extending externally outside of said first hose passageway-forming means, and an eductor nozzle unit for spraying the fluid mixture connected to the ends of said hose passageway-forming means, said nozzle unit having a first open ended passageway forming a reduced throat portion and communicating with said first hose passageway-forming means, and a second open-ended suction passageway connecting said second hose passageway-forming means and said throat portion of said eductor nozzle unit at which a low pressure is developed which sucks said chemical fluid from the inlet end of said latter means into the stream of carrier fluid flowing through said first eductor unit passageway.

4. Portable hose apparatus for spraying a chemical fluid admixed with a carrier fluid, said hose apparatus comprising first and second hose passageway-forming means for respectively carrying said carrier fluid and chemical fluid and each having an open inlet end and an open outlet end, the open inlet end of said first hose passageway-forming means including coupling means for connecting the same to a source of said carrier fluid under pressure, said second hose passageway-forming means being attached to the first hose passageway-forming means for most of the length of the latter to form a substantially integral hose unit, the outlet end of which can be readily carried about in one hand and moved to any point to the extent permitted by the length of substantially the entire hose apparatus to spray the fluid mixture where desired without the weight of the chemical fluid being borne by the user, the open inlet end of said second hose passageway-forming means extending laterally from said first hose passageway-forming means where it may be extended

into the bottom of a container filled with said chemical fluid, and an eductor nozzle unit for spraying the fluid mixture connected to the ends of said hose passageway-forming means, said nozzle unit having a first open ended passageway forming a reduced throat portion and communicating with said first hose passageway-forming means, and a second open-ended suction passageway connecting said second hose passageway-forming means and said throat portion of said eductor nozzle unit at which a low pressure is developed which sucks said chemical fluid from the inlet end of said latter means into the stream of carrier fluid flowing through said first eductor unit passageway.

5. Portable hose apparatus for spraying a chemical fluid admixed with a carrier fluid, said hose apparatus comprising first and second hose passageway-forming means for respectively carrying said carrier fluid and chemical fluid and each having an open inlet end and an open outlet end, the open inlet end of said first hose passageway-forming means including coupling means for connecting the same to a source of said carrier fluid under pressure, said second hose passageway-forming means being attached to the outside of the first hose passageway-forming means for most of the length of the latter to form a substantially integral hose unit, the outlet end of which can be readily carried about in one hand and moved to any point to the extent permitted by the length of substantially the entire hose apparatus to spray the fluid mixture where desired without the weight of the chemical fluid being borne by the user, the open inlet end of said second hose passageway-forming means extending laterally from said first hose passageway-forming means where it may be extended into the bottom of a container filled with said chemical fluid, and an eductor nozzle unit for spraying the fluid mixture connected to the ends of said hose passageway-forming means, said nozzle unit having a first open ended passageway forming a reduced throat portion and communicating with said first hose passageway-forming means, and a second open-ended suction passageway connecting said second hose passageway-forming means and said throat portion of said eductor nozzle unit at which a low pressure is developed which sucks said chemical fluid from the inlet end of said latter means into the stream of carrier fluid flowing through said first eductor unit passageway.

6. Portable hose apparatus for spraying selectively one of two chemical fluids admixed with a carrier fluid, said hose apparatus comprising: first hose passageway-forming means for carrying said carrier fluid, second and third hose passageway-forming means for respectively carrying said two chemical fluids, each of said hose passageway-forming means having an open inlet end and an open outlet end, the open inlet end of said first hose passageway-forming means including coupling means for connecting same to a source of said carrier fluid under pressure, means holding said first, second and third hose passageway-forming means immovably together for substantially their full lengths to form a substantially integral hose unit the outlet end of which can be carried about as a unit in one hand to spray the fluid mixture where desired, the open inlet end of said second and third hose passageway-forming means being separated and extendable laterally from the corresponding end of said first hose passageway-forming means where they may be placed in the bottoms of respective containers filled with the chemical fluids to be sprayed, and eductor nozzle means at the outlet end of said passageway-forming means and including restricted carried fluid-carrying passageway-forming means adapted to communicate with said first passageway-forming means for forming a region of low pressure and means for selectively coupling said second and third passageway-forming means to said region of low pressure where the associated chemical fluid is drawn into said eductor and nozzle means, a first open ended passageway with a reduced throat portion which communicates with said longitudinal passageway in said coupling unit and a section passageway extending from the throat portion of the said associated passageway and a laterally facing opening therein, and a flexible conduit extending between said laterally facing opening in each of the eductor units and one of said second and third hose passageway-forming means beginning and a holder for said eductor nozzle units providing a common support therefore which enables either eductor nozzle unit to be attached to said coupling unit beginning a pair of eductor nozzle units having a carrier fluid passageway which may be positioned in communication with the outlet end of said first hose passageway-forming means and a suction passageway communicating with the outlet end of one of said second and third hose passageway-forming means.

7. Portable hose apparatus for spraying selectively one of two chemical fluids admixed with a carrier fluid, said hose apparatus comprising: first hose passageway-forming means for carrying said carrier fluid, second and third hose passageway-forming means for respectively carrying said two chemical fluids, each of said hose passageway-forming means having an open inlet end and an open outlet end, the open inlet end of said first hose passageway-forming means including coupling means for connecting same to a source of said carrier fluid under pressure, means holding said first, second and third hose passageway-forming means immovably together for substantially their full lengths to form a substantially integral hose unit the outlet end of which can be carried about as a unit in one hand to spray the fluid mixture where desired, the open inlet end of said second and third hose passageway-forming means being separated and extendable laterally from the corresponding end of said first hose passageway-forming means where they may be placed in the bottoms of respective containers filled with the chemical fluids to be sprayed, and a pair of eductor nozzle units for respectively spraying said chemical fluids, each of said eductor nozzle units having a carrier fluid passageway having a throat portion which may be connected with the outlet end of said first hose passageway-forming means and a suction passageway extending from said throat portion and adapted to be connected to one of said second and third hose passageway-forming means.

8. Portable hose apparatus for spraying selectively one of two chemical fluids admixed with a carrier fluid, said hose apparatus comprising: first hose passageway-forming means for carrying said carrier fluid, second and third hose passageway-forming means for respectively carrying said two chemical fluids, each of said hose passageway-forming means having an open inlet end and an open outlet end, the open inlet end of said first hose passageway-forming means including coupling means for connecting same to a source of said carrier fluid under pressure, means holding said first, second and third hose passageway-forming means immovably together for substantially their full lengths to form a substantially integral hose unit the outlet end of which can be carried about as a unit in one hand to spray the fluid mixture where desired, the open inlet end of said second and third hose passageway-forming means being separated and extendable laterally from the corresponding end of said first hose passageway-forming means where they may be placed in the bottoms of respective containers filled with the chemical fluids to be sprayed, a pair of eductor nozzle units for respectively spraying said chemical fluids, and a coupling unit including a longitudinal passageway communicating with said first hose passageway-forming means and terminating in a portion which removably receives either of said eductor nozzle units, and a manually operable shut-off valve for selectively opening and closing said longitudinal passageway, each of said eductor nozzle units having a first open ended passageway with a reduced throat portion which com-

municates with said longitudinal passageway in said coupling unit when inserted thereinto and a suction passageway extending from the throat portion of the associated first open ended passageway and a laterally facing opening therein, and a pair of conduits respectively extending between said laterally facing openings in the eductor nozzle units and said second and third hose passageway-forming means.

9. Portable hose apparatus for spraying selectively one of two chemical fluids admixed with a carrier fluid, said hose apparatus comprising: first hose passageway-forming means for carrying said carrier fluid, second and third hose passageway-forming means for respectively carrying said two chemical fluids, each of said hose passageway-forming means having an open inlet end and an open outlet end, the open inlet end of said first hose passageway-forming means including coupling means for connecting same to a source of said carrier fluid under pressure, means holding said first, second and third hose passageway-forming means immovably together for substantially their full lengths to form a substantially integral hose unit the outlet end of which can be carried about as a unit in one hand to spray the fluid mixture where desired, the open inlet end of said second and third hose passageway-forming means being separated and extendable laterally from the corresponding end of said first hose passageway-forming means where they may be placed in the bottoms of respective containers filled with the chemical fluids to be sprayed, a pair of eductor nozzle units for respectively spraying said chemical fluids, a coupling unit including a longitudinal passageway communicating with said first hose passageway-forming means and terminating in a portion which removably receives either of said eductor nozzle units, and a manually operable shut-off valve for selectively opening and closing said longitudinal passageway, each of said eductor nozzle units having a first open ended passageway with a reduced throat portion which communicates with said longitudinal passageway in said coupling unit when inserted thereinto and a suction passageway extending from the throat portion of the associated first open ended passageway and a laterally facing opening therein, and a pair of conduits respectively extending between said laterally facing openings in the eductor nozzle units and said second and third hose passageway-forming means and a holder for said eductor nozzle units providing a common support therefor which enables either eductor nozzle unit readily to be attached to said coupling unit.

10. Portable hose apparatus for spraying a chemical fluid admixed with a carrier fluid, said hose apparatus comprising: a main hose body for carrying said carrier fluid and having an inlet end adapted to receive the carrier fluid under pressure and an outlet end from which said carrier fluid is to be discharged, coupling members respectively inserted in the inlet and outlet ends of said hose body and each having a first longitudinal passageway means through which said carrier fluid passes, and a chemical fluid-carrying passageway comprising a longitudinally extending portion passing partially through the coupling member and a laterally extending portion opening onto the side of said hose body, said longitudinal passageway means in the coupling members being sized readily to pass fluid with relatively small pressure drop, an eductor nozzle unit at the outlet end of said main hose body which unit has a longitudinal passageway having a restricted portion providing a region of relatively low static pressure and communicating with said main hose body, and a suction passageway opening at one end onto the outside of the eductor nozzle unit and at the other end onto said restricted portion of said last mentioned longitudinal passageway, a second hose body within said main hose body and extending substantially the length thereof, the opposite ends of said second hose body respectively communicating with said longitudinally extending portions of said chemical fluid-carrying passageways of said coupling members, a connecting tube extending between the end of said suction passageway on the outside of said eductor nozzle unit and the longitudinally extending portion of said chemical fluid-carrying passageway of the coupling member on the outlet end of said main hose body, and an inlet tube extending from said opening of the laterally extending portion of the chemical fluid-carrying passageway of said coupling member at the inlet end of the hose apparatus and adapted to extend into a container filled with said chemical fluid.

11. Hose apparatus for converting the conventional water hose to a hose spraying apparatus for spraying chemical fluid admixed with the water, said hose apparatus comprising an inlet unit having coupling means at its outlet end for connecting the outlet end to the inlet end of the water hose and coupling means at the other end of the inlet unit for connecting the same to a faucet, said inlet unit having a longitudinal open-ended passageway for carrying water through the inlet unit and a chemical fluid carrying passageway which is separate from said longitudinal passageway and which includes a transversely extending portion opening onto the side of the inlet unit and a longitudinally extending portion opening longitudinally inwardly of the inlet unit, and an outlet unit having coupling means at its inlet end for removably coupling the outlet unit to the outlet end of said water hose, a second hose unit for carrying said chemical fluid removably connected between said longitudinal portion of said chemical fluid-carrying passageway of the inlet unit and said outlet unit and having an outer diameter which is substantially less than the inside diameter of said water hose and having a length to extend completely through said water hose with which the hose apparatus is to be associated, said outlet unit including a water-carrying longitudinal passageway for communication with the space between said water hose and second hose unit, and said last mentioned water carrying passageway having a restricted throat portion for providing a region of low pressure and a discharge opening downstream from said throat for spraying fluid therefrom, and said outlet unit having a chemical fluid-carrying passageway which connects with the outlet end of said second hose unit and with said throat portion of the longitudinal passageway of said outlet unit.

12. Portable hose apparatus for spraying a chemical fluid admixed with a carrier fluid, said hose apparatus comprising: a hose body having a passageway therein for carrying said carrier fluid and having an inlet end adapted to receive the carrier fluid under pressure and an outlet end from which said carrier fluid is to be discharged, coupling members respectively at the inlet and outlet ends of said hose body and having longitudinal passageways through which said carrier fluid passes respectively into and out of said hose body, and chemical fluid-carrying passageways through which said chemical fluid passes respectively into and out of said hose body, each of the latter passageways comprising a longitudinally extending inwardly open portion passing partially through the associated coupling member and a laterally extending and open portion opening onto the side of said hose body, said longitudinal passageway in the coupling members being sized readily to pass carrier fluid with relatively small pressure drop, eductor nozzle means at the outlet end of the main hose body which means has a longitudinal passageway having a restricted portion providing a region of relatively low static pressure and forming an extension of the adjacent coupling member longitudinal carrier fluid passageway, said eductor nozzle means also having a laterally opening suction passageway which communicates at its inner end with said restricted portion of said last-mentioned longitudinal passageway, said hose body having passageway-forming means forming an integral part thereof and extending substantially the length thereof, for providing a passageway for carry-

ing said chemical fluid, the opposite ends of said last-mentioned passageway respectively communicating with said longitudinally extending portions of said chemical fluid-carrying passageways of said coupling members, a connecting tube extending between the laterally open ends of said suction passageway of said eductor nozzle means and the laterally extending portion of said chemical fluid-carrying passageway of the coupling member on the outlet end of said hose body, and an inlet tube extending from the laterally open end of the laterally extending portion of the chemical fluid-carrying passageway of said coupling member at the inlet end of the hose

body and adapted to extend into a container filled with said chemical fluid.

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