May 9, 1967 R. W. NEW 3,318,535

FLUID SPRAY GUN ASSEMBLY

Filed Oct. 5, 1964 3 Sheets-Sheet 1

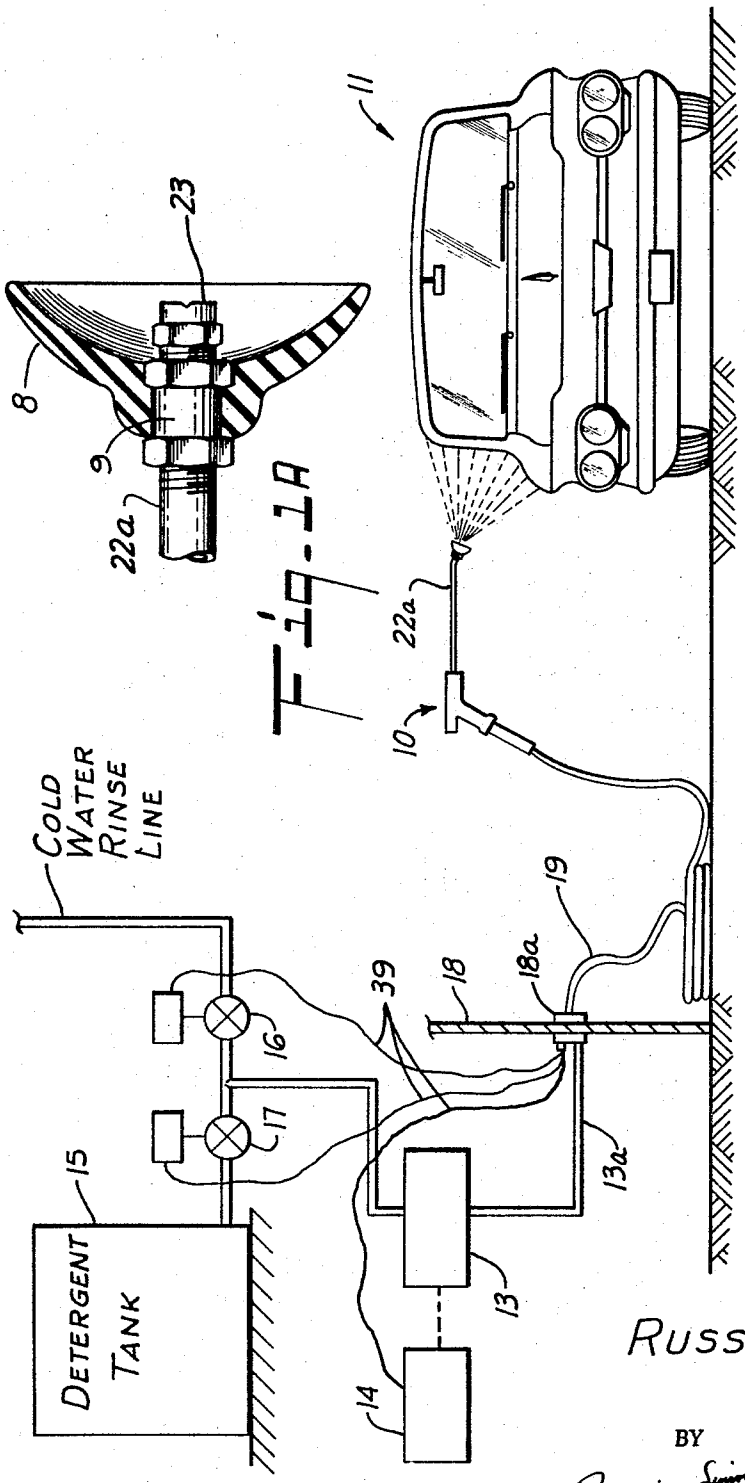


Fig. 1A

Fig. 1

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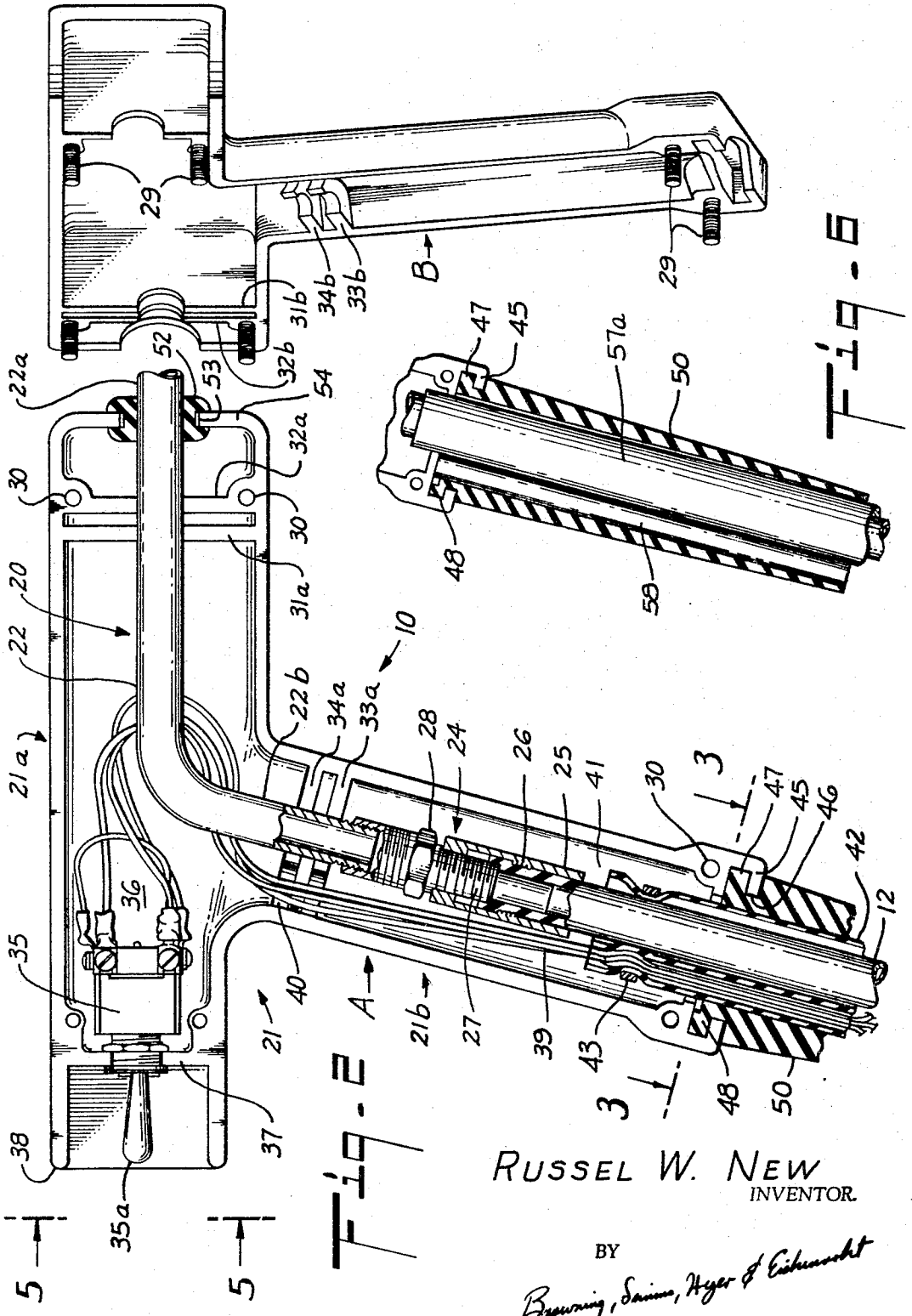


FIG. 6

FIG. 2

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FLUID SPRAY GUN ASSEMBLY

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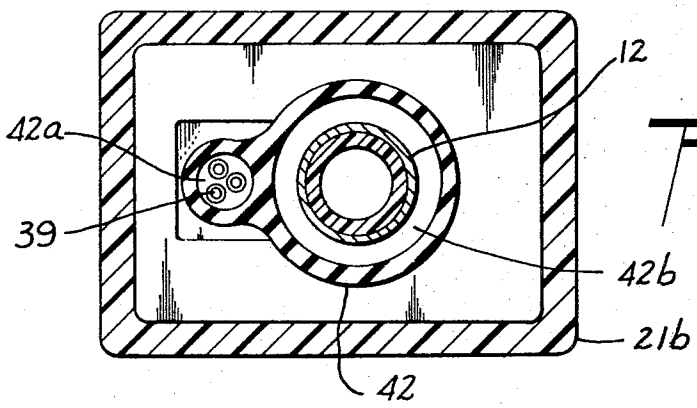
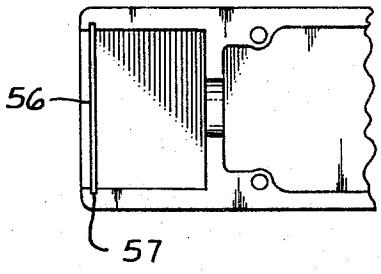


Fig. 3

Fig. 4



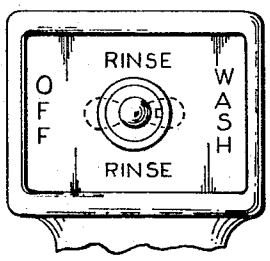


Fig. 5

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3,318,535

FLUID SPRAY GUN ASSEMBLY

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10 Claims. (Cl. 239—310)

The application relates to spray guns, generally, and more particularly to a hand held spray gun assembly for washing cars and the like, that is supplied through a flexible hose with fluid for spraying.

Hand held spray guns are supplied with fluid through a flexible hose to give the operator thereof freedom to move the gun relative to the work being sprayed. As the operator moves he usually drags the hose with him through the connection between the hose and the gun. This connection then, and the portion of the hose adjacent to the connection, are subjected to considerable bending stress which greatly shortens the life of the hose and the connection.

It is an object of this invention to provide a hand held spray gun assembly, which includes a flexible hose for supplying fluid for spraying to the gun, that keeps the connection between the gun and the hose from being subjected to bending stresses as the gun is moved relative to the work being sprayed and that also protects the flexible hose from any sharp bends adjacent its point of connection to the gun.

The type of hand held spray gun to which this invention relates also includes a nozzle assembly for providing a spray of the desired shape of the fluid supplied to the gun through the hose. Where the nozzle assembly is attached to a pistol shaped housing, which can be comfortably held by the operator with one hand as he directs the nozzle in the desired direction, such housing also serves to conduct the fluid being sprayed from the flexible hose to the nozzle assembly. Thus, at least a portion of the housing must be constructed as a flow conduit, which complicates and increases the cost of such housing.

It is another object of this invention to provide a hand held spray gun assembly having a nozzle assembly supported by a pistol shaped housing in which the nozzle assembly is connected directly to the flexible hose supplying the gun with liquid for spraying.

It is another object of this invention to provide a hand held spray gun including a nozzle assembly, in which the nozzle assembly is connected directly to the flexible hose, and in which the pistol shaped housing encloses the connection between the nozzle assembly and the flexible hose.

Where the fluid being sprayed is supplied to the gun under considerable pressure, the operator has to exert a considerable force to hold the gun against the reactive force of the fluid flowing from the nozzle. Unless he is very alert, when the supply of fluid is cut off, he will move the gun forward involuntarily and if the gun is being held close to the object being washed, its nozzle end may strike it. This is to be avoided particularly when washing automobiles for such a blow can mar its finish.

It is therefore another object of this invention to provide a hand held spray gun of the type described, which will not mar a surface even if its nozzle end strikes it, which has a nozzle end that can be used to scrape the surface being cleaned to help in the cleaning operation, and which will reduce the splatter of the liquid being sprayed.

It is an additional object of this invention to provide a hand held spray gun assembly of novel design that has a minimum number of parts, that is easily assembled and disassembled for repair and service, and that is economical to manufacture.

These and other objects, advantages and features of the invention will be apparent to those skilled in the art from

a consideration of this specification, attached drawings and appended claims.

The invention will now be described in connection with the attached drawings, in which,

FIGURE 1 shows an embodiment of the spray gun assembly of this invention being used to wash an automobile;

FIGURE 1A is a vertical cross-sectional view on an enlarged scale of the nozzle end of the nozzle assembly of the spray gun assembly of FIGURE 1;

FIGURE 2 is a side view of the embodiment of the spray gun assembly of FIGURE 1 with one-half of the pistol grip housing disconnected from the other half thereof and rotated to a position to clearly show the novel manner that the parts of the fluid spray gun assembly are arranged when assembled and showing partially in section the connection between the nozzle assembly of the gun and the flexible hose, which provides it with fluid to be sprayed along with a portion of the hose, the conduit, and the sheath surrounding the hose and the electrical lines, which lead from the gun to the electrically operated devices that control the type of fluid being supplied to the gun, and which also starts and stops the pump supplying the fluid, and further showing the hollow construction of the housing which allows the control switch to be easily mounted therein, and which also allows the nozzle assembly to be directly connected to the hose within the housing thereby relieving the housing of any of the pressure of the fluid being sprayed;

FIGURE 3 is a cross sectional view taken along line 3—3 of FIGURE 2;

FIGURE 4 is a fragmentary sectional view illustrating a novel arrangement whereby the opening in the end of the housing through which the switch lever extends, when the switch is mounted therein, can be quickly and conveniently closed when the switch is removed from the gun assembly;

FIGURE 5 is a view taken along line 5—5 of FIGURE 2 showing how the outwardly extending flanges on the housing enclose and protect the operating lever of the control switch from damage should the gun be dropped on the floor or otherwise hit against something; and

FIGURE 6 is a cross-sectional view, on a reduced scale, of the sheath that encloses the portion of the hose adjacent the housing; the electrical lines are removed in this view and replaced by a plug designed to transmit the stiffness of the sheath, along with whatever it may have, to the side of the hose adjacent the opening in the sheath for the electric wires.

The hand held spray gun assembly **10** in FIGURE 1 is shown being used to wash an automobile **11**. The gun is supplied with cleaning fluid by pump **13** through line **13***a* and flexible conduit **19**. The pump is powered by motor **14**. Either water containing dissolved detergent from tank **15** or cold water for rinsing is pumped through the gun depending upon which of the two electrically controlled valves **16** and **17** are open.

As will be explained in detail below, means are provided in the gun assembly to allow the operator of the gun to control electrically operated valves **16** and **17** to deliver the desired cleaning fluid and also to start and stop motor **14** which drives pump **13**. Electrical wires **39** lead from these electrically controlled devices to gun assembly **10** through conduit **19**.

Referring now to FIGURE 2, gun assembly **10** includes nozzle assembly **20** and pistol shaped housing assembly **21**. The nozzle assembly comprises a generally L-shaped flow pipe **22** having an outlet leg **22***a* and nozzle **23**, which as shown in FIGURE 1A, is connected to the end of outlet leg **22***a* of the flow pipe by a connecting bushing **9**. The nozzle is designed to emit the fluid flowing through the flow pipe and bushing in a spray of the desired shape.

The spray can be concentrated where desired by movement of the gun by the operator.

Bonded to bushing **9** and encircling nozzle **23** is cup-shaped member **8**. It is made of a resilient material such as rubber and serves to add weight to the end of the nozzle assembly for better overall balance of the gun. It also catches a large portion of the liquid that splashes toward the operator from the surface being washed. In the preferred form, the cup **8** extends beyond the end of nozzle **23**, as shown in the drawings, to keep the operator from involuntarily striking nozzle **23** against the surface he is washing when the pressure of the fluid flowing through the nozzle is reduced suddenly. With this arrangement it also can be used to scrub particularly hard to remove debris from the surface, such as insects from the front of an automobile.

Inlet leg **22***b* of flow pipe **20** is connected to hose **12** through connection **24**. Any type of connection can be used to connect the hose to the flow pipe. Preferably, however, the connection is of the type that allows either the hose or the flow pipe to be disconnected from the connection and replaced or repaired. The connection shown includes an outer sleeve **25**, which slips down over the outside of the end of the hose until ribs **26** are well below the end of the hose. The mandrel **27**, which is threadedly connected to sleeve **25**, is then forced into the open end of the hose by rotating it relative to the sleeve. Wrench flats **28** are provided on the mandrel for that purpose. The mandrel forces the walls of the hose into engagement with ribs **26** which hold the hose in the sleeve and prevent it from being inadvertently pulled therefrom. Inlet leg **22***b* of the flow pipe is then threadedly connected to mandrel **27** as shown in FIGURE 2. Thus, the nozzle assembly is connected directly to the hose inside housing **21**, thereby relieving the housing of having to provide a conduit for carrying the fluid from the hose to the nozzle assembly, and which further allows the housing to protect the connection and the hose adjacent thereto from bending stresses as the gun is moved by the operator.

In the embodiment shown, pistol shaped housing **21** is provided to facilitate holding of the nozzle assembly by the operator. It has a barrel section **21***a* and a handle or pistol grip section **21***b*. The housing is split vertically down the middle into a left-hand half A and a right-hand B, as viewed in FIGURE 2, for assembly around the nozzle assembly and a portion of the hose. Thus, the housing can be disassembled easily to remove and inspect or work on the nozzle assembly without having to disconnect the nozzle assembly from the hose. In the embodiment shown, the two halves are held together by machine screws **29** which extend through appropriately located openings in housing half B and are threadedly connected to tapped holes **30** in housing half A. The housing is hollow when assembled and encloses a portion of outlet leg **22***a* of flow pipe **20**, all of inlet leg **22***b* of the flow pipe and a portion of hose **12** beyond the point where it is connected to inlet leg **22***b* of the flow pipe.

Each half of the barrel section of the housing is provided with laterally extending cross members to engage leg **22***a* of the flow pipe. Thus, half A has cross members **31***a* and **32***a* and half B has cross members **31***b* and **32***b*, Each cross member has an arcuate groove to receive the flow pipe leg and to combine with the other cross members in holding the leg against lateral movement relative to the longitudinal axis of the barrel section of the housing.

Similarly cross members **33***a* and **34***a* located in half A and cross members **33***b* and **34***b* in half B of the handle section of the housing engage inlet leg **22***b* of flow pipe **22** and hold it against lateral movement relative to the longitudinal axis of the handle portion of the housing. With the housing engaging the flow pipe in this manner, movement of any kind of the flow pipe relative to the housing is prevented. In other words, longitudinal movement of leg **22***a* of the flow pipe in either direction is prevented by the cross members in the handle section of the housing because longitudinal movement of leg **22***a* would of necessity be accompanied by lateral movement of leg **22***b* relative to the longitudinal axis of the handle. Conversely, longitudinal movement of leg **22***b* in either direction would cause lateral movement of leg **22***a* relative to the longitudinal axis of the barrel portion of the housing which is, of course, prevented by cross members **31** and **32**. Thus, when the housing is in position engaging the flow pipe in this manner the pipe is held against movement in any direction relative to the housing.

In the embodiment shown two cross members are provided in each half of the housing to engage each leg of the flow pipe. One cross member in each half of the housing to each leg of the flow pipe would be sufficient, however, to accomplish the desired result. Thus, the L-shaped flow pipe need only be engaged and supported at two points in the housing as long as these two points are on different legs thereof. With this arrangement housing **21** can be substantially hollow, thereby providing space for control switch **35** which along with electric lines **39** is located in cavity **36** formed within the housing. The switch, which in this embodiment is a toggle switch, is mounted on rear wall **37** of the barrel portion of the housing with its switch operating lever or toggle **35***a* extending therethrough to be in position to be manipulated by the thumb of an operator holding the gun by the handle section of the housing, as shown in FIGURE 5. The words "wash," "off" and "rinse" are stenciled, molded or otherwise formed in the back wall of the housing to show where to move the toggle for the function desired.

To protect the switch lever or toggle from being damaged should the gun be dropped on the floor, or slammed into a wall, etc., the barrel portion of the housing is provided with outwardly extending flanges **38** that extend outwardly from the housing beyond the toggle. As shown in FIGURE 5, these flanges are spaced close enough to the toggle to protect it, but far enough apart to allow it to be manipulated by the operator of the gun.

As explained above, switch **35** is connected to the electrically operated valves **16** and **17** and pump motor **14** through electrical lines **39**. These lines extend from switch **35** through cavity **41** in the handle portion of the housing and out the lower end of the handle portion adjacent hose **12**. In the embodiment shown, the electrical lines and hose **12** are both located in conduit **42** which has an opening **42***a* therethrough for the electrical lines and an opening **42***b* for the hose. The conduit serves to keep the hose and the electrical lines from becoming tangled or otherwise interfering with the movement of the gun by the operator. It is held in place on the hose within the handle portion of the housing by clamp **43**.

Hose **12**, being resilient, can stretch, when subjected to a longitudinal force, much more readily than can electrical lines **39**. This could cause the wires to break unless they are provided with ample slack. As an alternate solution, braided wires can be used for the electrical lines which can stretch as much as can the hose. Braided wires are usually not insulated and so when they are used conduit **42** is provided with a separate opening for each line to insulate each one from the others.

Means are also provided to hold hose **12** in axial alignment shown, end wall **45** in handle section **21***b* of the imposed on the connection between the two as the gun is moved from one position to the other. In the embodiment shown, end wall **45** in handle section **21***b* of the housing is provided with an opening **46** through which passes conduit **42** along with hose **12** and electrical lines **39**. Wall **45** is provided with an annular slot **47** in which is positioned outwardly extending annular flange **48** on the end of sheath **50**. By providing the flange with an outside diameter such that it fits the groove closely and by providing sheath **50** with an inside diameter such that it fits conduit **42** closely, the lateral movement of the

conduit and, consequently, the hose will be held to a minimum.

Sheath **50** is made of a plastic material such as rubber, and is sufficiently flexible to be bent by the portions of the conduit and hose in the sheath. Preferably, however, it has sufficient inherent stiffness to resist this bending and keep the hose from bending at a sharp angle adjacent the handle. By providing a sheath with a gradually decreasing outside diameter, as in the embodiment shown, the stiffness of the sheath decreases from a point adjacent the housing of the gun to its outer end. Thus, the sheath serves to form the portion of the hose adjacent the gun into a gentle curve and keeps it free of sharp bends, which result in early failures in the hose, even though the hose is pulling at a right angle to the centerline of the handle of the housing.

Flange **48** on sheath **50** also serves to help keep moisture out of the handle section of the housing. To keep water out of the barrel section of the housing, rubber grommet **52** is provided which encircles outlet leg **22***a* of the pipe and is positioned in opening **53** in front end wall **54** of the barrel section of the housing.

Should switch **35** be removed from the gun and placed somewhere else, a hole will be left on the rear wall of the housing. To close this hole, blank plate **56** is located in annular groove **57** as shown in FIGURE 4.

When the switch is removed, wires **39** are removed and thus a conduit for them is no longer needed. Thus hose **12** may be encased in a conventional single opening conduit **57***a* as shown in FIGURE 6. Sheath **50** being designed for conduit **42** will then have one side spaced from the hose and will not be able to immediately support it should it start bending in that direction. The sheath could be changed, of course, to fit hose conduit **57**. If not, plug **58** should be inserted in the sheath as shown in FIGURE 6.

From the foregoing, it will be seen that this invention is one well adapted to attain all of the ends and objects hereinabove set forth, together with the other advantages which are obvious and which are inherent to the apparatus and structure.

It will be understood that certain features and subcombinations are of utility and may be employed without reference to other features and subcombinations. This is contemplated by and is within the scope of the claims.

As many possible embodiments may be made of the invention without departing from the scope thereof, it is to be understood that all matter herein set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

The invention having been described, what is claimed is:

1. A hand held fluid spray gun assembly for cleaning automobiles and the like, comprising, a nozzle assembly including a rigid, generally L-shaped flow pipe having an outlet leg and an inlet leg, and a nozzle attached to the end of the outlet leg; a flexible hose connected to the end of the inlet leg through which fluid under pressure can flow into the inlet leg, through the outlet leg of the flow pipe and out the nozzle; a pistol shaped housing enclosing a portion of the outlet leg, all of the inlet leg, and a portion of the hose, said housing having a barrel portion and a handle portion; means in the housing for engaging both legs of the flow pipe to hold it against movement relative to the housing; and means in the handle portion to engage the hose and to hold the enclosed portion of the hose in alignment with the inlet leg of the flow pipe to which it is attached as the gun is moved to direct the fluid spray in various directions to keep the hose from bending at the connection between the hose and the flow pipe.

2. A hand held fluid spray gun assembly for cleaning automobiles and the like, comprising, a nozzle assembly including a rigid, generally L-shaped flow pipe having an outlet leg and an inlet leg, and a nozzle attached to the end of the outlet leg; a flexible hose connected to the end of the inlet leg through which fluid under pressure can flow into the inlet leg, through the outlet leg of the flow pipe and out the nozzle; a pistol shaped housing split longitudinally into two mating portions along a plane common to the longitudinal axes of both legs of the flow pipe and enclosing a portion of the outlet leg, all of the inlet leg, and a portion of the hose, said housing having a barrel portion and handle portion; means for releasably holding the two mating portions of the housing in position enclosing the aforesaid portions of the nozzle assembly and the flexible hose connected thereto; means in the housing for engaging both legs of the flow pipe to hold it against movement relative to the housing; and means in the handle portion to engage the hose and to hold the enclosed portion of the hose in alignment with the inlet leg of the flow pipe to which it is attached as the gun is moved to direct the fluid spray in various directions to keep the hose from bending at the connection between the hose and the flow pipe.

3. A hand held fluid spray gun for washing automobiles and the like, comprising, a generally L-shaped flow pipe having an outlet leg and an inlet leg, a nozzle attached to the outlet leg and a flexible hose connected to the inlet leg through which fluid is forced through the pipe and out the nozzle attached to the outlet leg, a pistol shaped housing having a grip portion and a barrel portion; the grip portion enclosing the inlet leg of the pipe and a portion of the hose connected thereto, the barrel portion enclosing a portion of the outlet leg of the pipe, said housing being hollow with at least two transverse ribs; one being located to engage the outlet leg and one being located to engage the inlet leg of the pipe and hold the pipe against movement relative to the housing.

4. The fluid spray gun of claim **3** further provided with means for controlling the type of cleaning fluid being supplied through the hose, including an electrical switch located in the hollow barrel portion of the housing with its operating lever extending outwardly therefrom in the opposite direction from the outlet leg of the pipe and electrical wires connected to the switch and extending from the switch through the grip portion of the housing to connect the switch to the cleaning fluid controlling means.

5. The gun assembly of claim **4** in which the flexible hose and the electrical wires are enclosed in a flexible conduit.

6. The gun assembly of claim **3** further provided with an elongated sheath having one end attached to the grip portion of the housing and covering the portion of the flexible conduit adjacent the housing to add additional resistance to bending to the portions of the conduit and flexible hose adjacent the housing.

7. The gun assembly of claim **6** further provided with means located in the grip portion of the housing to hold the sheath and in turn the conduit and flexible hose against lateral movement relative to the housing to keep the hose from bending at its connection to the outlet leg of the flow pipe.

8. The gun assembly of claim **7** in which the wall of the sheath diminishes in thickness away from the housing to provide a sheath of diminishing stiffness to resist bending of the hose adjacent the housing.

9. A hand held fluid spray gun for washing automobiles and the like, comprising, a nozzle assembly including a generally L-shaped flow pipe having an outlet leg and an inlet leg, a nozzle attached to the end of outlet leg, and a flexible hose connected to the inlet leg, a pistol shaped hollow housing having a barrel portion and a grip portion, split into two halves to be assembled around the nozzle assembly, each half of the housing having at least two lateral cross members with arcuate grooves, one cross member being positioned in the barrel portion to receive the outlet leg and one positioned in the grip portion to receive the inlet leg of the pipe to hold the pipe against movement relative to the housing.

10. A spray gun comprising, a nozzle assembly, including an L-shaped flow pipe having an inlet leg and an outlet leg, a nozzle connected to the outlet leg, and a flexible hose connected to the inlet leg, a pistol shaped hollow housing having a barrel section for enclosing a portion of the outlet leg and a handle section for enclosing the inlet leg, said barrel section having a rear wall provided with an opening through which a switch operating lever can extend and outwardly extending flanges to enclose such lever, said flanges having an annular groove therein, and a plate removably positioned in the groove and extending between the flanges parallel to the wall to cover the opening therein.

References Cited by the Examiner

UNITED STATES PATENTS

1,603,270	10/1926	Childs	15—576 X
2,356,865	8/1944	Mason	239—527 X
3,118,610	1/1964	Teahler	239—304

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