United States Patent [19]

Kane

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[54] **SWIMMING POOL CLEANING APPARATUS**

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[52] **U.S. Cl.**..... **4/172.15,** 134/168 R, 134/167 R

[51] **Int. Cl.**..... **E04h 3/16,** E04h 3/18

[58] **Field of Search**..... 4/172.15, 172.17, 172.16; 15/315, 301, 313; 134/167 R, 167 C, 168 R, 168 C; 239/567, 590.3, 590.5

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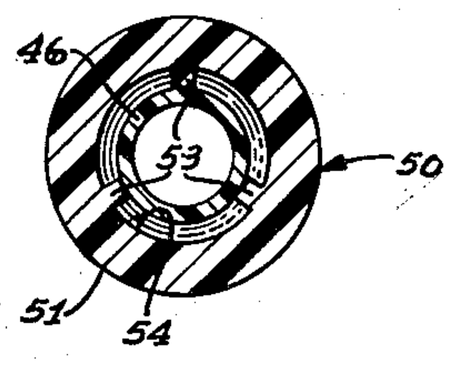
[57] **ABSTRACT**

Flexible sweep hoses for use in swimming pools for cleaning purposes which are provided with specially constructed high velocity, multi-jet cleaning nozzles at their outer ends and a plurality of long-lasting, adjustably positioned wear rings surrounding the flexible hoses in strategic locations to prevent excessive hose wear. The hoses are demountably connected to quick disconnect plug outlets in the pool walls or associated cleaning apparatus for the pool.

3 Claims, 16 Drawing Figures



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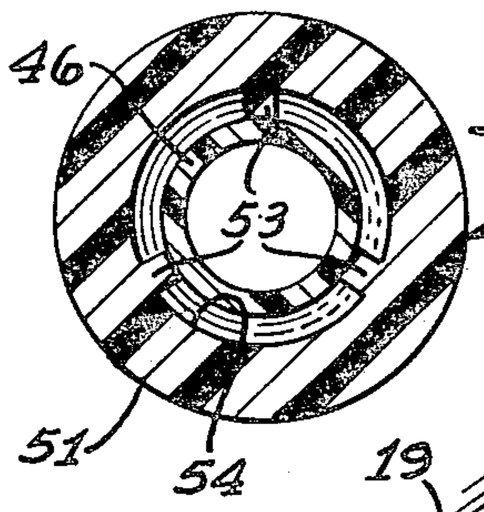


Fig. 4

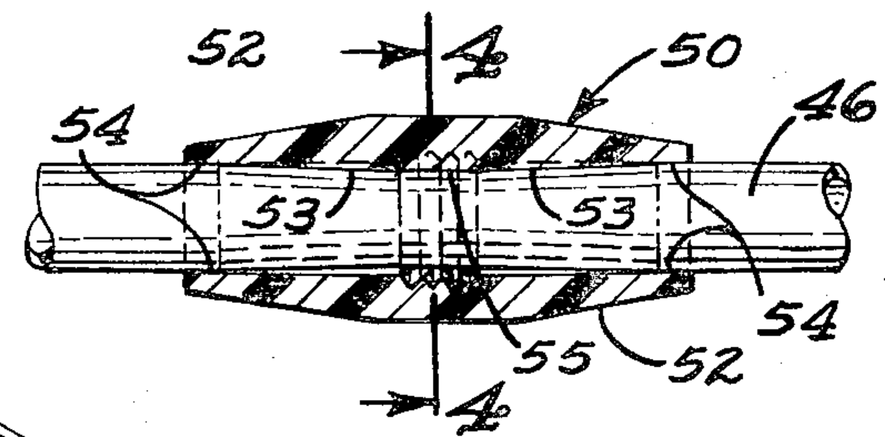


Fig. 3

Fig. 1

Fig. 2

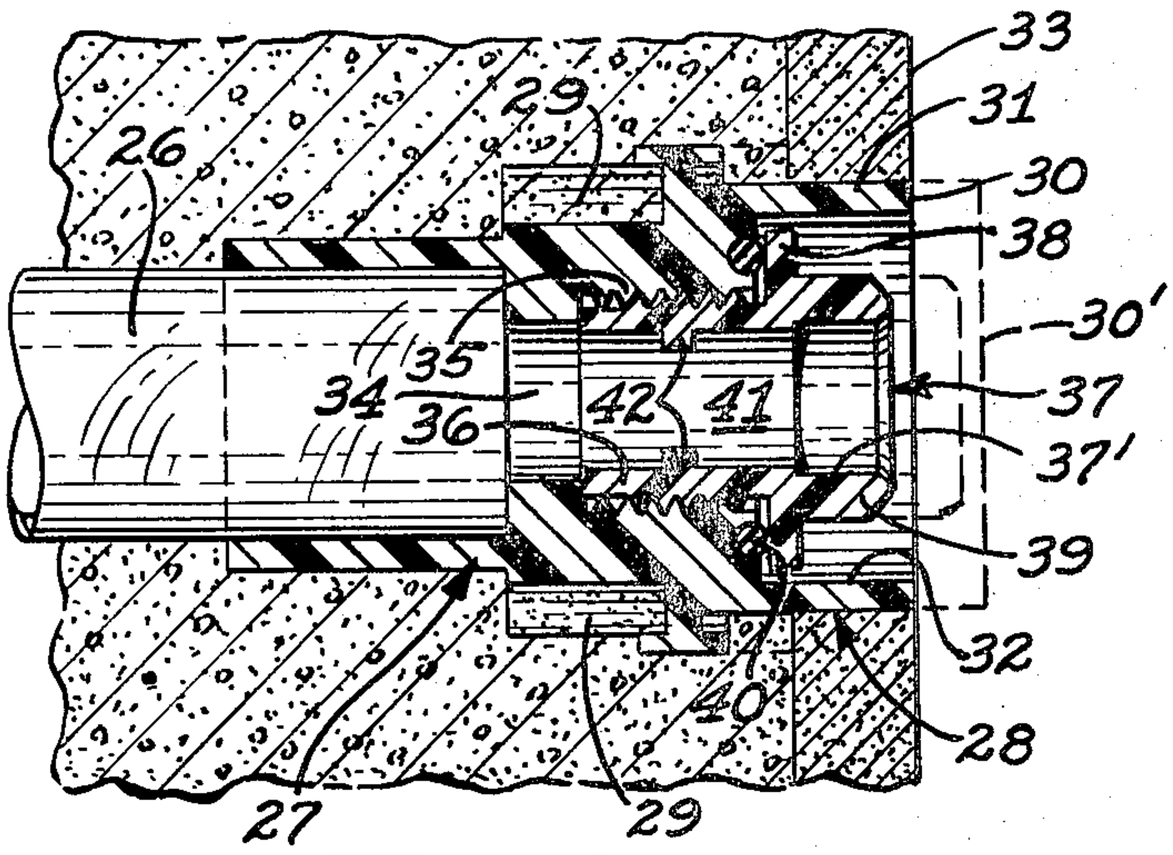


Fig. 6

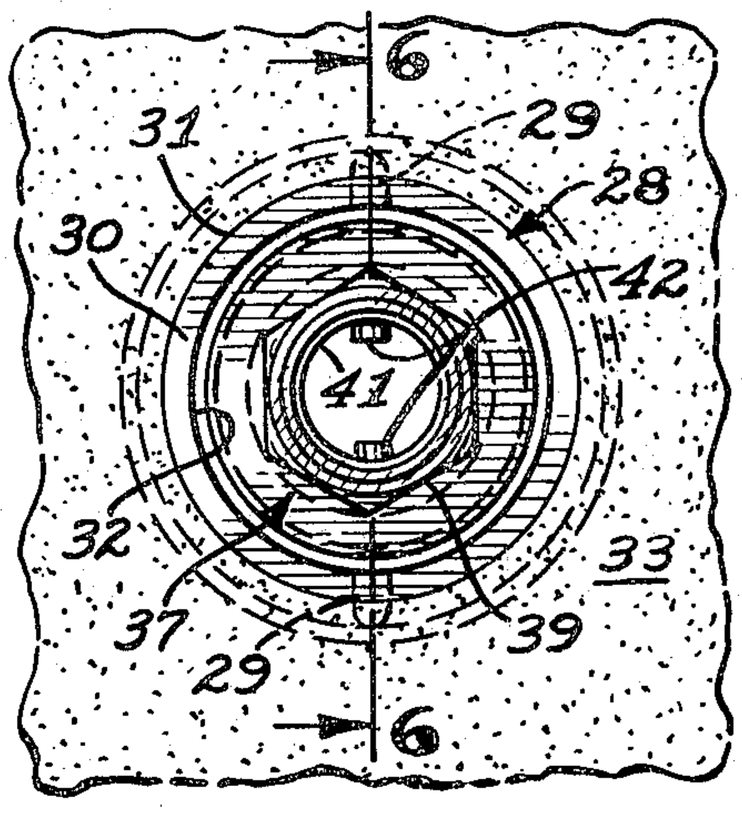


Fig. 5

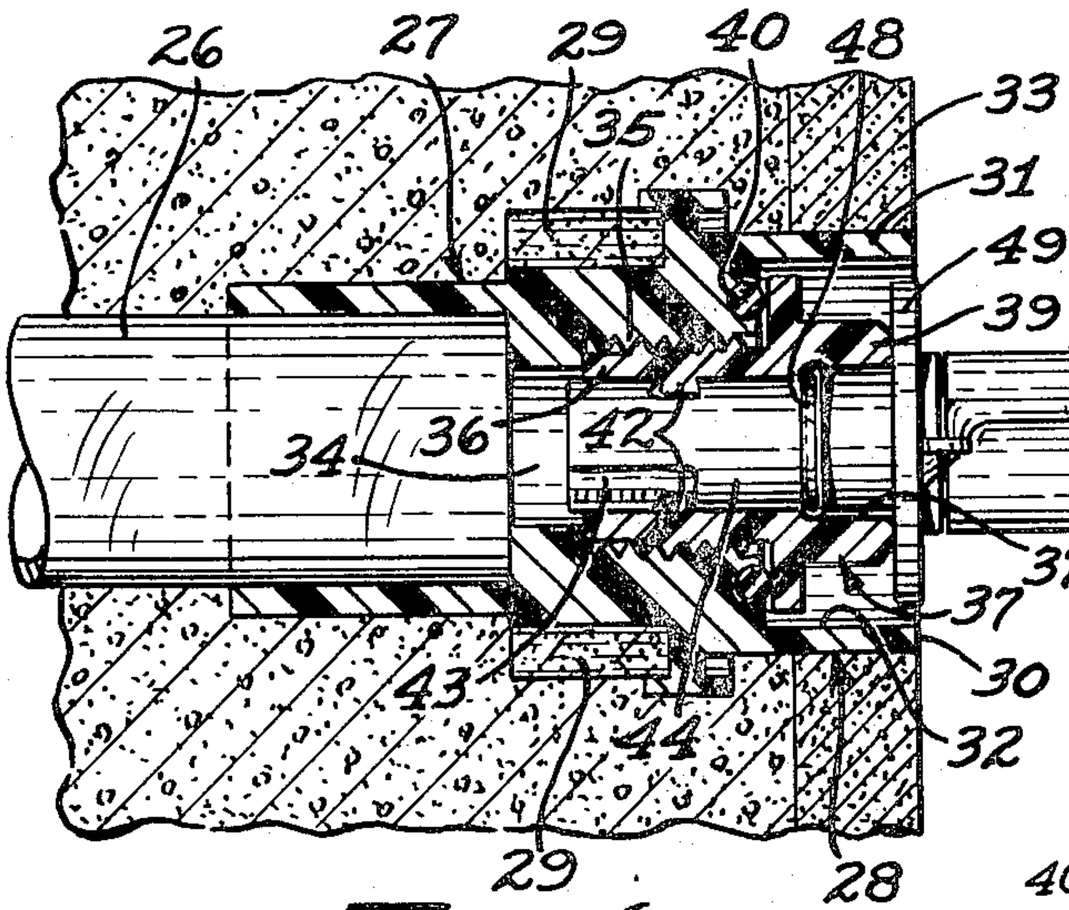


Fig. 6a

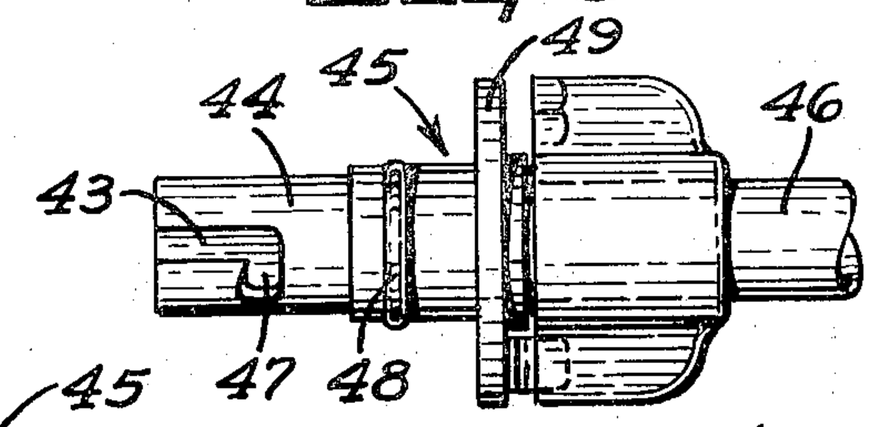


Fig. 7

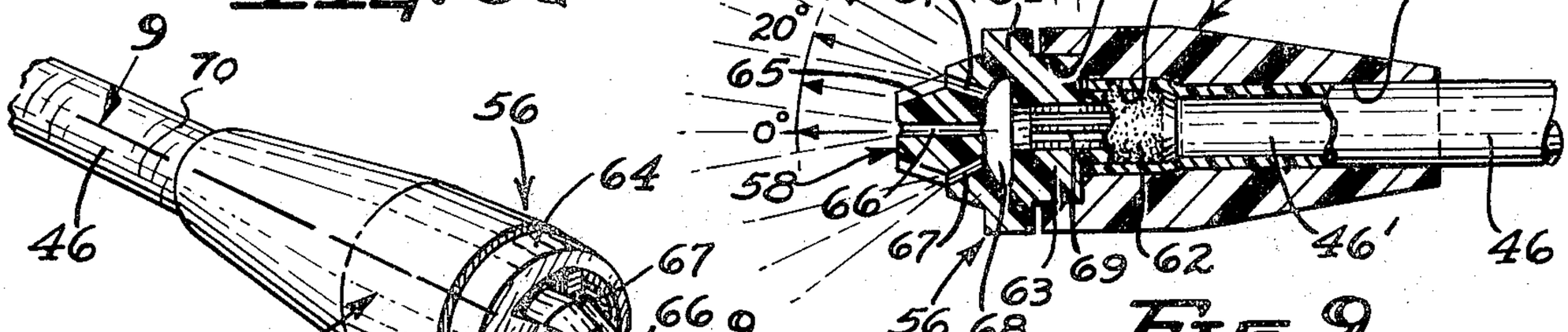


Fig. 9

Fig. 8

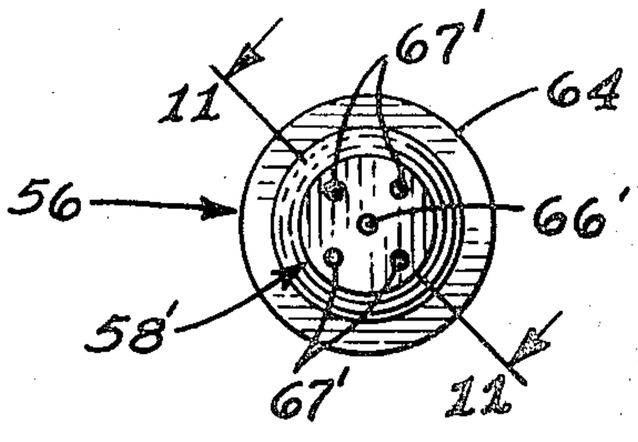


Fig. 10

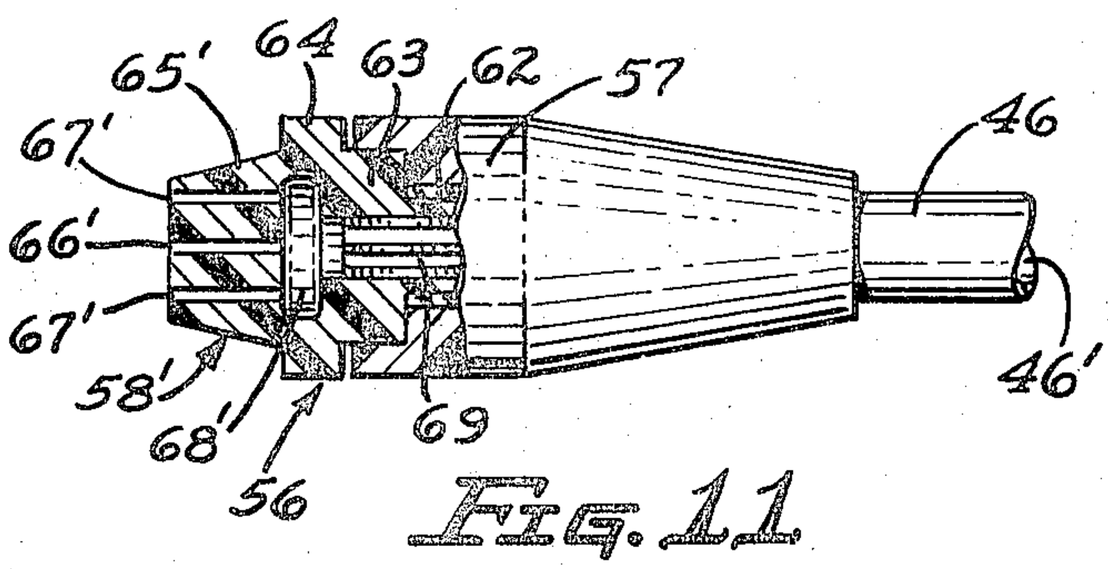
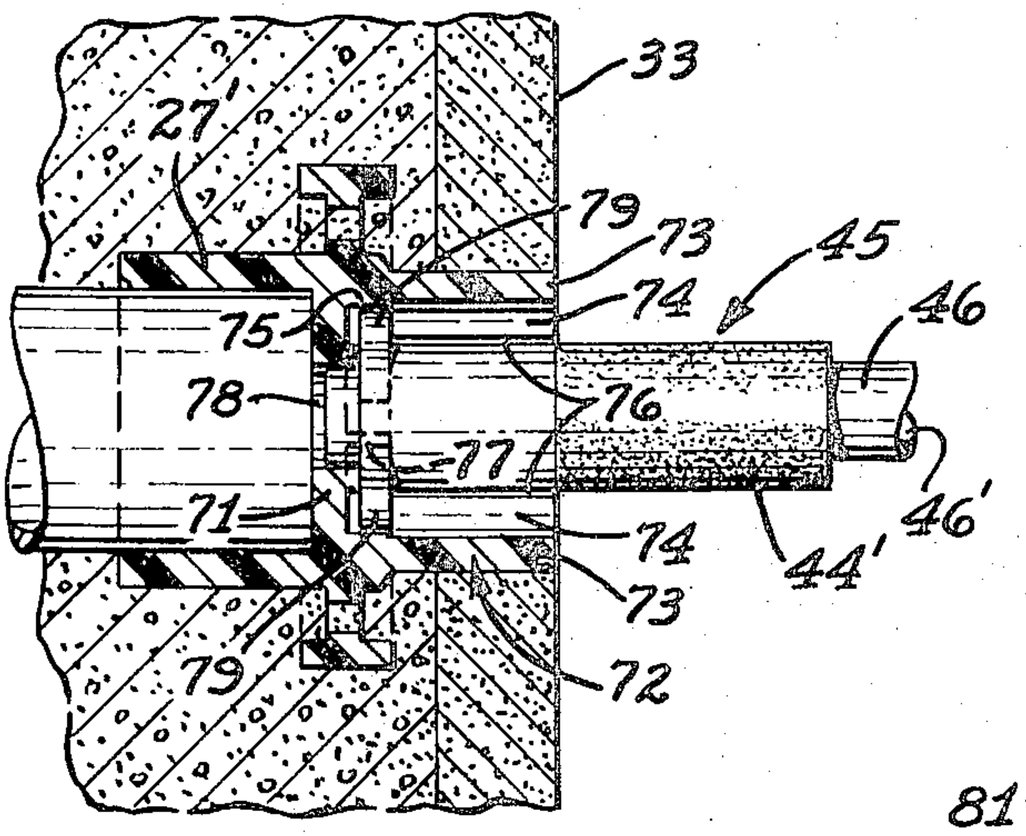


Fig. 11



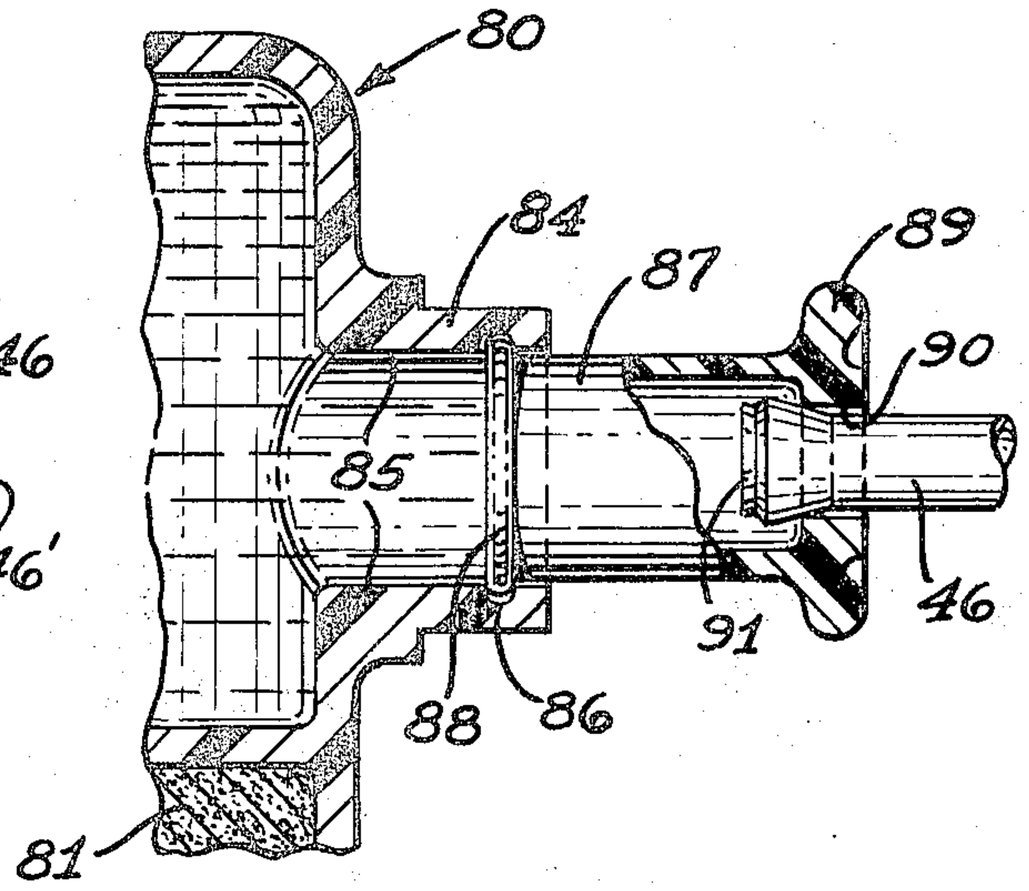
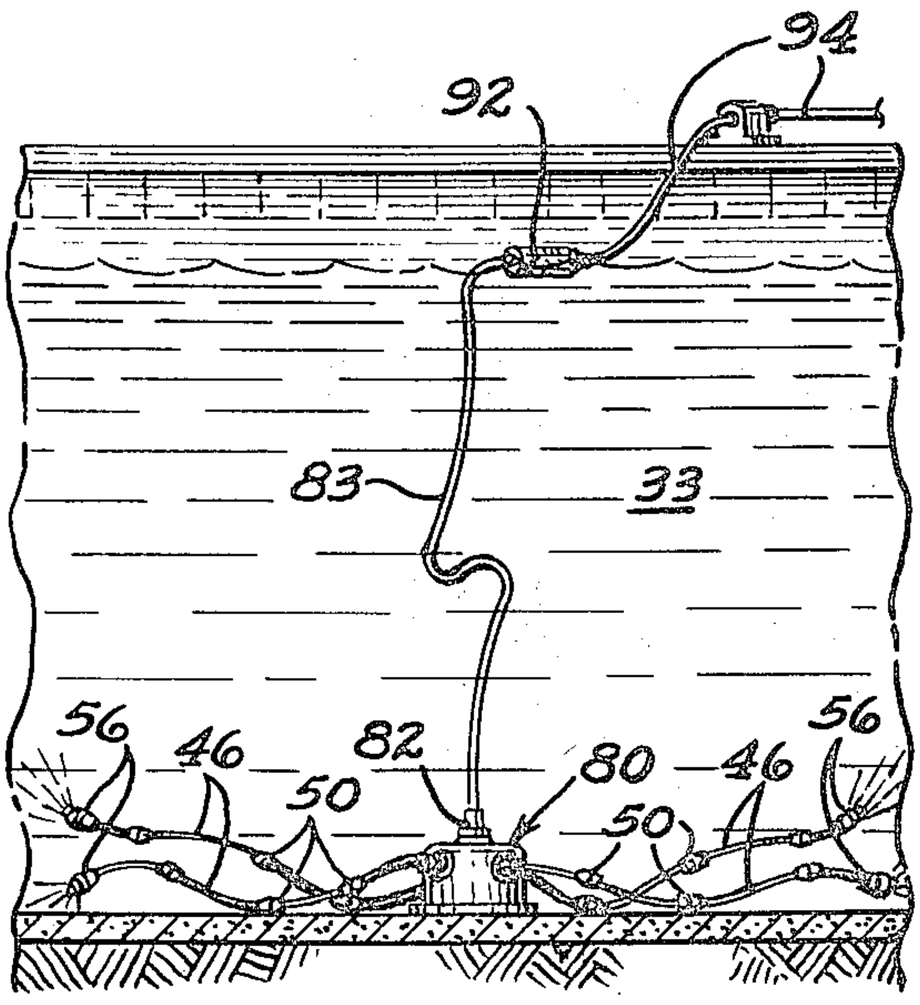


Fig. 12

Fig. 13



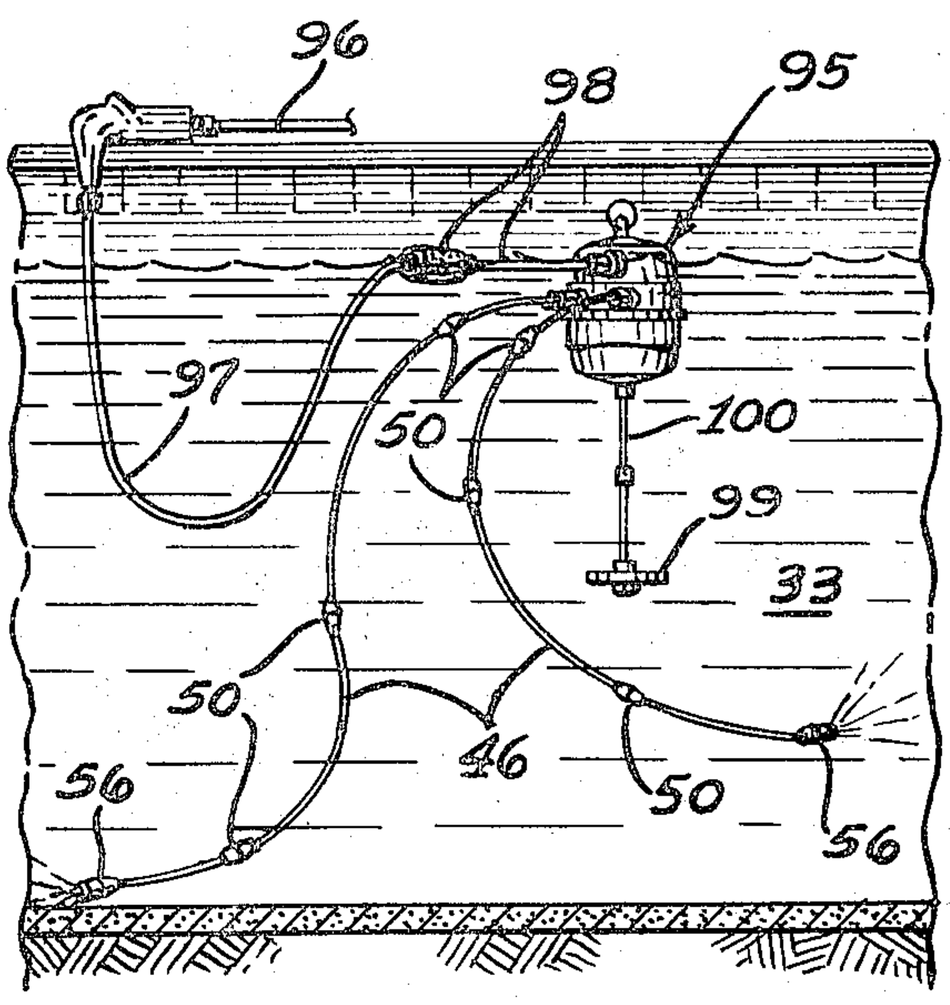


Fig. 14

Fig. 15

SWIMMING POOL CLEANING APPARATUS

BACKGROUND OF THE INVENTION

This invention pertains to swimming pool cleaning apparatus and is particularly directed to systems which utilize flexible sweep hoses employing high velocity, multi-jet cleaning nozzles and weighted wear rings to minimize wear on the hoses and to keep the nozzle ends of the hoses under water adjacent the bottom of the pool during high pressure ejection of water from the cleaning nozzles. This action more thoroughly agitates the silt and keeps the paticulate matter in suspension so that it can be readily picked up and removed by the regular filtering system of the swimming pool and also aids in moving the heavy particles of silt to the main drain sump.

DESCRIPTION OF THE PRIOR ART

Heretofore, removal of particulate matter from the swimming pool was accomplished by manually sweeping and brushing the matter from the walls and bottom of the pool toward the main outlet drain or by vacumming the bottom of the pool. These procedures are not very effective because such operations cause much of the silt and solid matter to be stirred up into suspension, only to settle out later on the bottom and side walls of the pool after the cleaning operations are finished.

Other methods for removing particulate matter from swimming pools have been used, such as the pressurized flexible sweep hose method used in the present invention; but most of these systems have failed to perform a satisfactory cleaning operation because the high velocity, lightweight, single port cleaning nozzles utilized did not create sufficient agitation of the silt and particulate matter to keep it in suspension. This occurred because the high pressure water ejected from the lightweight, single port cleaning nozzles utilized caused the nozzle ends of the flexible cleaning hoses to move up, down and sometimes completely out of the pool water. This action provides only limited agitation of the particulate matter, making it necessary to use the cleaning system for longer periods to obtain a satisfactory cleaning operation.

SUMMARY OF THE INVENTION

In accordance with the invention claimed, new and improved detachably connected high pressure flexible hoses are provided having at their outer ends interchangeable, high velocity, relatively heavy multi-jet nozzles. Each hose employs a plurality of relatively heavy wear rings which are dispersed at relatively wear-prone locations along the length of the flexible hoses.

It is therefore one object of this invention to provide a new and improved flexible sweep hose assembly for a swimming pool cleaning system which includes a removable, interchangeable, relatively heavy, multi-jet cleaning nozzle and a plurality of relatively heavy adjustable wear rings which surround the flexible sweep hose at wear-prone locations.

Another object of this invention is to provide flexible sweep hoses for swimming pool cleaning systems employing improved cleaning nozzles having orifices on and radially about the nozzles' centerline, all of said orifices being adapted to eject fluid at high pressure therefrom to provide thorough agitation of the silt.

A still further object of this invention is to provide new and improved nozzles for the ends of flexible sweep hoses for swimming pool systems which assist in maintaining the level of the sweep hose nozzles near the bottom of the pool during operation by the stabilizing action of the fluid ejected from said orifices.

A still further object of this invention is to provide an improved nozzle for flexible sweep hoses for swimming pool cleaning systems which have a plurality of orifices ejecting water toward the centerline of the nozzle.

A still further object of this invention is to provide new and improved wear rings for flexible sweep hoses which are formed for slidably gripping the hoses in a new manner along the length of the hoses, where they will remain until manual adjustment is required.

Further objects and advantages of this invention will become apparent as the following description proceeds and the features of novelty which characterize this invention will be pointed out with particularity in the claims annexed to and forming part of this specification.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention may be more readily described by reference to the accompanying drawings, in which:

FIG. **1** is a general perspective view and piping diagram showing a swimming pool cleaning system incorporating the features of this invention.

FIG. **2** is an enlarged fragmentary perspective view showing one of the high velocity flexible sweep hose assemblies attached to an outlet fitting in the side wall of the pool.

FIG. **3** is an enlarged longitudinal sectional view of one of the wear rings showing it installed surrounding a section of flexible hose, taken on line **3—3** of FIG. **2.**

FIG. **4** is an enlarged transverse sectional view through the wear ring and flexible hose taken on line **4—4** of FIG. **3.**

FIG. **5** is a fragmentary front elevational view of a side wall of the pool showing the front outer end of one of the quick-disconnect outlet fittings as installed flush with the face of the pool wall.

FIG. **6** is a fragmentary longitudinal sectional view of the outlet fitting assembly shown in FIG. **5** taken on the line **6—6,** showing its flush installation in the pool wall, with a modified non-flush form of installation indicated by dotted line.

FIG. **6***a* is a fragmentary longitudinal sectional view similar to FIG. **6** showing the male portion of the quick-disconnect fitting attached to one end of the flexible hose installed in locked relation in the female outlet fitting in the pool wall.

FIG. **7** is a side elevational view showing the male portion of the quick-disconnect fitting installed on one end of the flexible hose.

FIG. **8** is a perspective view of the multi-jet cleaning nozzle assembly installed on the outlet end of the flexible hose.

FIG. **9** is a longitudinal sectional view through the multi-jet cleaning nozzle assembly shown in FIG. **8** taken on line **9—9,** showing the central outlet port on the horizontal centerline of the nozzle tip and the radial outlet ports arranged at 20° angles about the centerline,

and diagrammatically indicating the angles from 0° to 90°, at which the radial ports could be arranged in modified forms of the nozzle tips.

FIG. **10** is a front end elevational view of a modified form of the multi-jet cleaning nozzle assembly shown in FIGS. **8** and **9.**

FIG. **11** is a side elevational view, partly broken away and in section, taken on the line **11—11** of FIG. **10.**

FIG. **12** is a fragmentary longitudinal sectional view similar to FIG. **6***a* showing a modified form of a quick-disconnect fitting with the male portion of the fitting attached to one end of the flexible hose, inserted in unlocked relation in the female outlet portion of the fitting embedded in the pool wall, and with its locked relation indicated by dotted line.

FIG. **13** is a fragmentary longitudinal sectional view of another modified form aof a quick-disconnect fitting of the male portion of the fitting attached end of the flexible hose, inserted in locked relation in the female outlet portion of the fitting, said female portion being formed integral with the side wall of a high pressure water distributor head.

FIG. **14** is a fragmentary sectional view through a portion of a conventional swimming pool, illustrating one method of utilizing the flexible sweep hoses of this invention in conjunction with a single high pressure water distributor head for cleaning at least a portion of the pool.

FIG. **15** is a fragmentary sectional view through a portion of a conventional swimming pool similar to FIG. **14** illustrating another method of utilizing the flexible sweep hoses of this invention in conjunction with a float suspended, high pressure water distributor head for cleaning at least a portion of the pool.

DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. **1** illustrates a swimming pool cleaning system **10** comprising a pump **11** and filter tank **12.** The pump has the usual suction return line **13** connected to it and terminating at a skimmer outlet **14** and a main drain sump **15.** An outlet pressure supply line **16** connects the filter tank **12** through a shut-off control valve **17,** main water return line **18,** circulating pipe **19** and inlets **20** to poool **25.**

Another water return line **21** connects pressure supply line **16** through a shut-off control valve **22,** pressure gauge **22′**, and line **23** to piping **24,** forming a continuous loop around pool **25.** A plurality of outlet pipes **26** are connected to perimeter piping **24** at appropriate locations around the loop and extend into the pool walls, where they are connected to body portions **27** of suitable quick-disconnect plug outlet assemblies **28.** These assemblies are embedded in non-rotative relation in the cement of the pool walls by means of the radially projecting lugs **29** formed integrally with body portions **27.**

It should be noted that the outer faces **30** of the cylindrical flanges **31** forming the counterbores **32** in the outer open end of body portions **27** of the plug outlet assemblies **28** are preferably positioned to be flush with the finished outer surface of the pool wall **33,** as shown in full line in FIG. **6** and **6***a*. This construction eliminates any projections from the pool wall into the pool of the plug outlet assembly when the cleaning system is not in use. If so desired, the outer face of the cylindrical flange **31** may extend slightly beyond the finished surface of pool wall **33,** as indicated at **30′** by dotted line in FIG. **6,** with the major portion of the outlet body **27** with its radial lugs **29** firmly embedded in the cement of the pool wall.

The central bore **34** of the outlet body portion **27** of the plug outlet assembly **27** is **28** with internal threads **35** which are adapted to receive the male external threaded stem **36** of a removable bushing **37.** Bushing **37** is provided with an integral, flat-sided circular flange **38** having an integral hexagon head portion **39** extending outwardly therefrom into the open end of counter bore **32.** The hexagon head portion **39** may be easily rotated by a suitable socket wrench to screw bushing **37** in or out of the fixed body portion **27** of the plug outlet assemblies **28.**

The bottom face of counter bore **32** formed in flange **31** in body portion **27** of plug outlet assembly **28** provides a seat, which seat is provided with an arcuate groove adapted to receive and retain an O-ring **40.** O-ring **40** contacts the inner face of circular flange **38** to seal bushing **37** in body portion **27** of plug outlet assembly **28** against high pressure water leakage when the bushing is tightly screwed in place. Bushings **37** are each provided with a bore **41** and are so designed that a pair of diametrically opposed, inwardly projecting lugs **42** extend thereinto. Lugs **42** of each bushing are adapted to be received in a pair of diametrically opposed, longitudinally arranged slots **43** formed in the outer peripheral surface of a male stem portion **44** of a quick-disconnect fitting assembly **45.** Assembly **45** is securely but removably attached in any suitable manner to one end of a flexible sweep hose **46.** The longitudinal slots **43** are provided with the usual right angle circumferential extensions which, together with the integral lugs **42** in bushing **37,** are utilized to form a bayonet-type locking connecting means for the flexible sweep hoses **46.** By merely pushing the male stem portion **44** of the quick-disconnect fitting assembly **45** into the bore **41** of bushing **37** with slots **43** aligned with the lugs **42** as far as possible and then rotating the fittings **45** about one quarter turn clockwise, the quick-disconnect assembly **45** and its attached sweep hose are locked in place in the pool wall. To quickly disconnect, the procedure is reversed.

The male stem portions **44** of the quick-disconnect fitting assemblies are provided with annular grooves that retain suitable O-rings **48.** O-rings **48** are adapted to contact the walls of the central bore **37′** of bushings **37** to seal the fitting from high pressure water leakage. The male stem portions **44** are also provided with an integral circular flange **49,** which is adapted to abut the outer end of the hexagon head portion **39** of the removable bushing **37** to limit the inward movement of the quick-disconnect fitting assembly **45** when inserted and locked in bushing **37.**

The sweep hoses **46** utilized in this invention are fabricated of high pressure strength, long wearing, flexible plastic material such as vinyl or the like.

To provide a longer life and thus more economical usage of these flexible sweep hoses, each hose is provided with a plurality of heavy duty, hollow tubular wear rings **50** such as shown in the enlarged sectional views of FIGS. **3** and **4** of the drawings. Each wear ring is preferably fabricated of a high density, relatively heavy, abrasive resistant plastic material of a comparatively short length, for example 2 inches, which is short

enough so as not to interfere with the normal flexing of the sweep hoses when in use.

The wear rings **50** are formed with a relatively thick central section having a flat circumferential area **51** around its periphery which is adapted to take the brunt of the abrasive wear imposed on the ring. This center section is tapered from the flat circumferential area **51** toward each end to form the gripping areas **52.** These gripping areas are used to forcibly slide the wear rings **50** on the hoses to their desired positions, where they are caused to remain by squeezing action applied to the flexible hose **46** by several inwardly projecting radial splines **53** which taper inwardly from a point near the outer ends of the central bore **54** of the wear ring toward its center, where they form flat surface areas **55** having a diameter somewhat less than the outer diameter of the flexible hose **46.** The radial splines **53** tapering inwardly from rings **50** define a reduced diameter area **55** in the center of the ring which is adapted to depress the surface area of the flexible hose, thereby causing sufficient friction to lock the wear rings **50** in a given location on the hose and to allow only forced manual movement of the same.

After several wear rings have been installed in desired locations on the flexible sweep hoses **46,** a multi-jet cleaning nozzle assembly **56** is installed, one on the outer end of each of the flexible hoses to complete the sweep hose assemblies of this invention.

Each cleaning nozzle assembly **56** consists of a nozzle **57** in which a plurality of cleaning nozzle orifices **58** are arranged. These nozzles are preferably fabricated of a high density, abrasion resistant plastic material such as nylon or the like which may be impregnated, if so desired, with heavier material to increase its weight. Each nozzle is formed in a tapered tubular configuration and is provided with a central annular bore **59.** One end of the bore is sized to slidably receive one end of the flexible sweep hose **46** as shown in FIG. **9.** The other end of bore **59** opens into a cavity **60,** the diameter of which is somewhat larger than the diameter of bore **59.** A further larger diameter bore **61** at the tip end of the nozzle interconnects with bore **60.**

Bore **60** in nozzle **57** is sized and adapted to receive in clamped relation the extreme outer end of the flexible hose **46.** The flexible hose has previously been expanded by being forced onto a rearwardly integral projecting stem portion **62** of the cleaning nozzle **57.** Stem portion **62** is provided with an enlarged cylindrical portion **63** which extends therefrom and is adapted to fit into bore **61** of nozzle **57** to limit axial movement of the flexible hose **46** therein. If so desired, bore **60** may be provided with integral tapered internal splines (not shown) similar to those used in wear rings **50** to increase the clamping action on the end of the flexible hose, thereby diminishing the possibility of its separation from the nozzles during usage.

Each stem portion **62** is provided with a circular flange **64** terminating in a conical-shaped, flat-ended tip portion **65.** Tip portion **65** is provided with a central orifice **66** and a plurality of radial orifices **67** arranged therearound. Orifices **66** and **67** communicate with a central pressure chamber **68** in stem portion **62** which in turn communicates with bore **69** in the inner end of stem portion **62.** Bore **69** communicates with bore **46'** of flexible hose **46.** Bore **69** has radial inwardly projecting splines around its periphery which serve to further increase the velocity of the water being ejected from orifices **66** and **67.**

The plurality of radially positioned orifices **67,** shown in FIG. **9,** may be, for example, located **20°** from the horizontal centerline **70** of the cleaning nozzle **57.** It should be understood that these radial bores could be located at any other desirable angle from the centerline **70,** for example, from 0° to 90° as indicated in FIG. **9** to provide efficient silt agitation. This agitation occurs by ejection of high pressure jets of water from the cleaning nozzle assemblies **56** to the pool water.

Having thus described the preferred features of construction of the pool cleaning apparatus, the use of this apparatus will now be described to perform an efficient and economical pool cleaning function.

Each of the flexible sweep hoses **46** with its previously installed quick-disconnect fitting assembly **45** at one end thereof and a plurality of wear rings **50** positioned therealong nozzle assembly attached at its other end a cleaning nozzlassembly **56.** The assembly **45** on hose **46** is then quickly and easily connected in the removable bushing **37** of the female quick-disconnect outlet assembly **28** in the pool walls **33.** The sweep hose is then allowed to hang down into the pool with the major portion of each hose containing the heavy wear rings **50** and cleaning nozzle **56** resting on the floor of the pool ready to perform its sweeping and cleaning action.

With all of the flexible hose assemblies connected to the quick-disconnect outlets **28** in their several locations in the pool wall as described above and shown in FIGS. **1** and **2** of the drawings, the pool's water recirculating system is energized, causing pump **11** to recirculate and filter with the associated equipment the pool water in the conventional manner.

This action occurs by opening control valve **22** in the return line **21.** Water under pressure then flows from the outlet pressure supply line **16** through pressure gauge **22'**, return line **23,** perimeter piping or loop **24,** the several outlet pipes **26,** into and out of the flexible hoses **46** through the high pressure multi-jet cleaning nozzle assemblies by way of the central orifice **66** and the plurality of angular radial orifices **67** into the pool water. The control valve should be opened sufficiently to allow the pressure created in the flexible hoses to cause each hose to have a slow "lazy" movement or sweeping action in a substantially horizontal plane along the pool floor. The sweep hoses are maintained along and above the pool bottom, and are prevented from flying out of the pool water by the combined weight of the wear rings **50** and the weight of the cleaning nozzle assemblies **56,** having frusto-conical configurations with their larger diameter ends at the nozzle ends of these structures, together with the effects of the multi-jet action of water under pressure being forced out of cleaning nozzle assemblies **56.** The nozzles **57** also assist in maintaining the ends of the sweep hoses along the floor of the pool by the stabilizing action of water under high pressure being ejected from the orifices of the nozzles outwardly in a diverging manner and in some cases in a converging manner at the same time.

If the nozzles should start to break the surface of the pool water, the jets of water dispersing into the pool water will pull the nozzle back into the water, where it will sink to the bottom of the pool under action of gravity.

With the flexible sweep hoses **46** and their multi-jet cleaning nozzles **57** operating as described above, it is evident that the pool cleaning apparatus of this invention is capable of thoroughly performing the function of removing silt from the walls and floor of the pool by thorough agitation, thereby keeping particulate matter in suspension to be picked up and removed by the regular filtering system of the pool.

The wear rings **50** and cleaning nozzles **56** are subject to severe wear due to their contact with the rough textured surfaces of the pool walls and floor, and normally would require replacement at frequent intervals. To eliminate this frequent replacement problem, the wear rings **50** may be rotated about the flexible hoses to which they are attached, thereby bringing another portion of the surface of the ring into functional contact with the walls or floor of the pool.

After a cleaning operation, the shut-off control valve **22** may be closed and the main control valve **17** adjusted to resume the proper pressure and recirculation in the regualr filtering system. At this time the flexible hose assemblies may be quickly detached from the outlets **28** in the walls of the pool or allowed to remain connected in the pool along its bottom for future use.

It should be noted that the swimming pool cleaning apparatus, its use, and operation shown in FIGS. **1** through **9** of the drawings and described in the foregoing paragraphs, has been directed particularly to use of the novel apparatus in conjunction with a swimming pool cleaning system which includes a loop or perimeter piping surrounding the pool and a plurality of outlet pipes which extend from the loop into the walls of the pool.

This type of construction presents a neat appearance in the finished pool and provides a very efficient cleaning system which is easily operated and maintained when used in conjunction with the quick-disconnect fitting assemblies previously described. It is also evident that this type of swimming pool cleaning system is economical when installed at the time of pool construction; but if this is not done, it is still feasible and economical to utilize the flexible sweep hose assemblies of the invention with portable pressure-operated pool cleaning systems which may be quickly and easily installed, operated and removed from the pool with a minimum of manual effort.

FIGS. **10** through **15** illustrate the design features of some of the components which may be utilized in conjunction with either the perimeter (loop) piping concept or the portable system concept of the invention.

FIGS. **10** and **11** show a modified version of the multijet cleaning nozzle assembly **56** and nozzle **57** attached to one end of sweep hose **46,** as shown in FIG. **9,** with simplified multijet assembly cleaning orifices **58'**. The nozzle is provided with a conical tip portion **65'** having a plurality of longitudinal bores terminating in orifices **67'** which are radially and equally spaced around a central longitudinal bore terminating in orifice **66'**. Bores **66'** and **67'** communicate with pressure chamber **68,** bore **69** in the stem portion **62** of the cylindrical portion **63** of the nozzle and bore **46'** of the flexible sweep hose **46.**

FIGS. **12** and **13** show modified versions of simpler, less expensive quick-disconnect fitting assemblies which could be used with any type of pressure pool cleaning system and the flexible sweep hoses of this invention.

FIG. **12** shows a modified quick-disconnect fitting assembly **45'** as used with the perimeter (loop) piping arrangement previously described. It includes the female body portion **27'** which is embedded in the concrete wall of the pool and attached by cementing or otherwise to one of the outlet pipes **26** in a similar manner as that shown in FIGS. **6** and **6***a*.

The body portion **27'** is provided with an integral central partition wall **71** and an integral semi-cylindrical extension **72** which is adapted to end flush with the finished surface of the pool wall **33.** Extension **72** is provided with a pair of diametrically opposed projections **73** containing longitudinal slots **74** which are open at their outer ends and communicate with the annular groove **75** at their inner ends. A bore **76** of extension **72** also communicates with the annular groove **75** and is provided with a pair of diametrically opposed, inwardly radial projection lugs **77** (shown in dotted line). A partition wall **71** is provided in body portion **27'** and defines a central aperture **78** which is adapted to communicate with the bore of outlet pipe **26** and bore **46'** of the flexible sweep hose **46.**

The male stem portion **44'** of the quick-disconnect fitting assembly **45'** comprises a hollow tubular section in the bore of which one end of the sweep hose **46** is secured. This male stem portion **44'** is provided with a smooth outer surface at its inner or contained end which is sized to slide easily in the bore **76** of the extension **72.** A pair of diametrically opposed radially projecting integral lugs **79** on male stem portion **44'** are adapted to fit and slide in the longitudinal slots **74** formed in extension **72** and to fit and be rotated one quarter of a turn in the annular groove **75** until stopped against the inwardly projecting lugs **77** to lock the male stem portion **44'** together with the attached sweep hose **46** in the extension **72** of the body portion **27'** of the quick-disconnect fitting. The male stem portion **44'** is provided with a rough end or gripping surface on its outward projection diameter surface to allow for easy turning and withdrawal of the stem with its projecting lugs **79** through slots **74** by reversing the procedure for insertion described above.

FIG. **13** shows still another modified version of a quick-disconnect fitting arrangement which may be used with the flexible sweep hoses of this invention to quickly secure or remove said sweep hoses to or from a high pressure water distribution unit **80** of a portable pool cleaning system such as shown in FIGS. **14** and **15.**

The water distribution system **80** used with portable pool cleaning systems usually consists of a high strength plastic cylindrical reservoir which has a separate compartment **81** into which sand or other heavy material is sealed to provide weight and vertical stability for the unit when in the pool. The top cover portion of the unit is provided at its center with an upwardly projecting interior threaded extension **82** which is adapted to receive a coupling secured to one end of a feed hose **83.**

A plurality of integrally formed cylindrical bosses **84** project radially outwardly from the wall of unit **80.** Each boss is provided with a bore **85** having an annular groove **86** near its outer end forming the female or receiving portion of the quick-disconnect fitting. The male or insertable portion **87** of the fitting is tubular in

shape, having a somewhat flexible thin wall section throughout most of its length with integrally formed cylindrical ring portions **88** and **89**, respectively, at each end of the tubular portion. The ring portion **88** has an outside diameter slightly greater than bore **85** and slightly less than the depth diameter of the annular groove **86** so that the male portion **87** of the fitting can be manually forced into locked relation with the ring portion **88** secured in the annular groove **86**.

The heavier outer ring portion **89** is formed to provide a gripping flange for aiding in manipulation of the male member **87** into or out of locked relation in groove **86** and also to provide a closure for the outer end of the fitting. Ring portion **89** is provided with a central bore **90** which is adapted to receive and removably secure one end of the flexible sweep hose **46** by means of a hollow expansion cork **91**, shown in FIG. **13**, to allow water under pressure to flow into and out of the sweep hoses when desired.

FIGS. **14** and **15** disclose two of several methods utilizing the novel flexible sweep hoses together with the multi-jet cleaning nozzle assemblies, wear rings and quickdisconnect fitting assemblies of this invention in association with other components of portable pool cleaning systems.

The flexible sweep hoses **46** each have one of the multi-jet cleaning nozzle assemblies **56** attached to its outer dispensing end together with several wear rings **50**. The male portion of a quick-disconnect fitting assembly such as **44, 44'** or **87** is installed at its receiving end and is connected in locked relation with the female portion of the quick-disconnect fitting in the cylindrical side walls of the distribution unit **80**.

The distribution unit **80** with the assembled sweep hoses attached thereto are connected to a flexible feed hose **83** attached to one side of a suitable feed hose **83** attached to one side of a suitable float **92** shown in FIG. **14**. The other side of the float is connected to a supply hose **94**. Hose **94** is connected to the filter system return line **23** (shown in FIG. **1**) for supplying filtered water under pressure to the pool through the distributor unit **80**, sweep hoses **46** and the multi-jet nozzles **56**.

When using the portable pool cleaning apparatus shown in FIG. **14**, all of the components of the system described above, with the exception of the supply line hose **94**, are assembled out of the pool and are placed in the pool with the distributor unit allowed to rest on the pool floor. The distribution unit **80** is guided to the preferred location in the pool by manipulation of the supply hose **94** and may be relocated or removed from the pool in the same manner.

The portable pool cleaning apparatus shown in FIG. **15** comprises a distribution unit **95** designed to float on water and transport the flexible sweep hoses **46** into positions of the pool to be cleaned. A pair of feeder hoses **96** and **99** connected to the filter system return line **23** of the pool components is attached to the distribution unit **95** through a float arm **98**. The float arm **98** is designed to keep the distribution unit in a vertical position and aid in the flotation of the attached flexible sweep hoses. One or more sweep hoses are suitably attached to the distribution unit as shown for cleaning the pool bottom and side walls. A special bumper wheel **99** is attached with adjustable shaft **100** to keep the distribution unit on a desired tracking path around the pool sides.

Although the sweep hoses connected to an outlet on the bottom of the pool have not been illustrated, it should be recognized that this type of connection and use of the new hose assembly may also by utilized.

Having thus described in the preceding pages of this specification and illustrated in the several views of the drawings the various features of construction and operation of the preferred embodiments of the swimming pool cleaning apparatus of this invention, it will be apparent to those skilled in the art that various changes and modifications may be made therein without departing from the spirit of the invention or from the scope of the appended claims.

What is claimed is:

1. A flexible conduit assembly for use on swimming pool cleaning apparatus comprising:

a flexible hose,

nozzle means fastened at one end of said hose,

said nozzle means comprising an elongated tubular member for ejecting water transmitted through said hose outwardly thereof,

a connector means attached to the other end of said hose for detachably connecting with a receiving means on the swimming pool cleaning apparatus for attachment with pressurized water supplied to said swimming pool cleaning apparatus, and

a plurality of wear rings selectively positioned along said hose for weighting said hose when positioned in a pool and providing a surface between the pool walls and said hose for wear purposes, said nozzle means comprising a first orifice arranged along its longitudinal axis for ejecting water transmitted through said hose outwardly thereof in a direction substantially axially with its longitudinal axis and a plurality of second orifices radially spaced around said longitudinal axis of said nozzle means with their centerlines at acute angles with the centerline of said first orifice,

said second orifices ejecting water away from the water ejected by said first orifice at an acute angle thereto,

said tubular member of said nozzle means having an outer shape of a substantially frusto-conical configuration with its end having a larger diameter arranged at the orifice end of said nozzle means to aid in keeping its nozzle end in the pool during the whipping action of the conduit assembly when transmitting water therethrough.

2. The flexible conduit assembly set forth in claim **1** wherein:

said wear rings comprise hollow tubular members having larger diameters at their centers than at their ends wherein said diameters are slightly smaller than the outside diameter of the associated hose.

3. A device for cleaning swimming pools comprising:

a flexible conduit assembly including a plurality of elongated flexible hoses, each provided with a nozzle means at one end thereof and a connector means attached to the other end thereof,

said nozzle means comprising an elongated tubular member having a first orifice arranged along the longitudinal axis of the nozzle means and a plurality of other orifices equally spaced around said first orifice with their centerlines intersecting the centerline of said first orifice at an acute angle,

said first and other orifices ejecting water under pressure from the associated hose,

means mounted in the wall of the pool to cooperate with each connector means to releasably attach the hose thereto with pressurized water supplied to said cooperating means to pass through said hoses, said connector means being a rigid cylindrical member received over the other end of said hose and fixed therearound, said means mounted in the wall of the pool being a cylindrical casing receiving pressurized water in one end and removably receiving the cylindrical member in the other end,

said cylindrical casing having means thereon cooperating with means on said cylindrical member to releasably hold the cylindrical member within said cylindrical casing to enable quick-connect and quick-disconnect of said hoses,

the end of the casing removably receiving the cylindrical member is substantially flush with the wall of the pool to eliminate projections into the pool when the conduit assembly is removed, and

a plurality of wear rings selectively positioned along each of said hoses,

said wear rings comprising hollow tubular members having larger diameters at their centers than at their ends,

said tubular member having an outer shape of a substantially frusto-conical configuration with its end having a larger diameter arranged at the nozzle end of said nozzle means to aid in keeping its nozzle end in the pool during the whipping action of the conduit assembly when transmitting water therethrough.

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