April 25, 1967 H. M. ARNESON 3,315,692

FLOATING HOSE POOL CLEANER

Filed Jan. 25, 1965 3 Sheets-Sheet 1

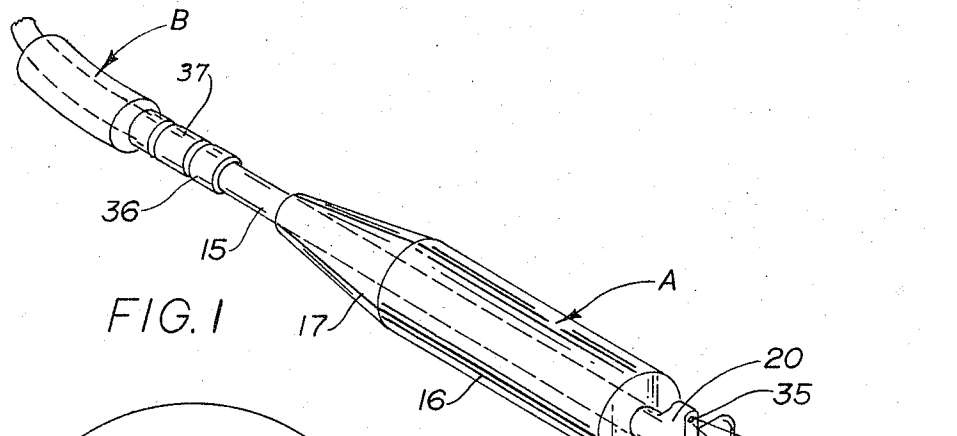


FIG. 1

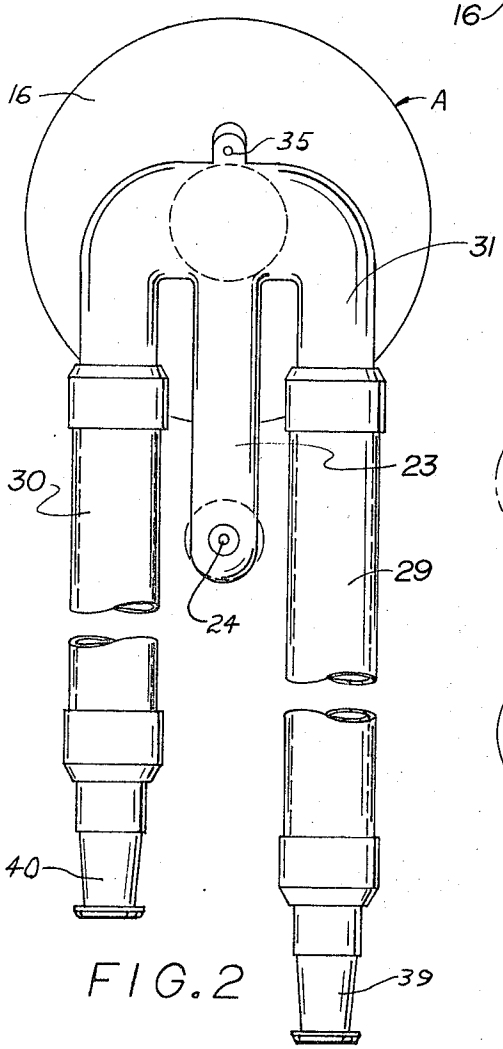


FIG. 2

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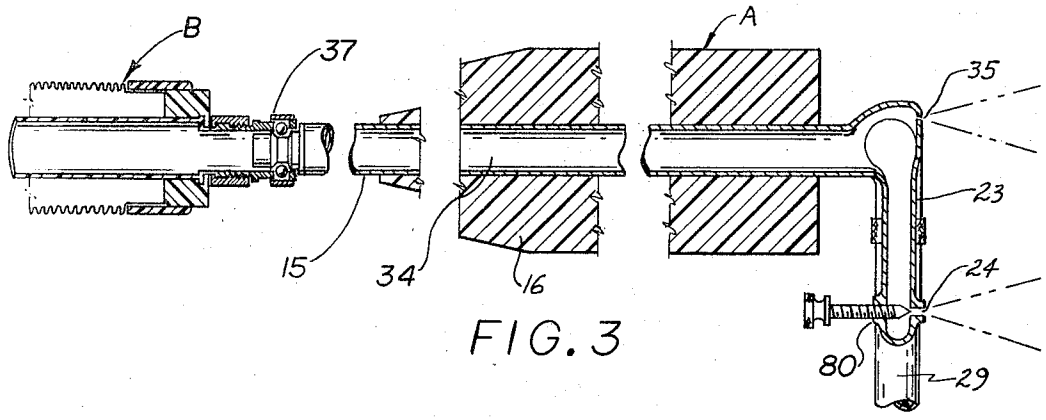


FIG. 3

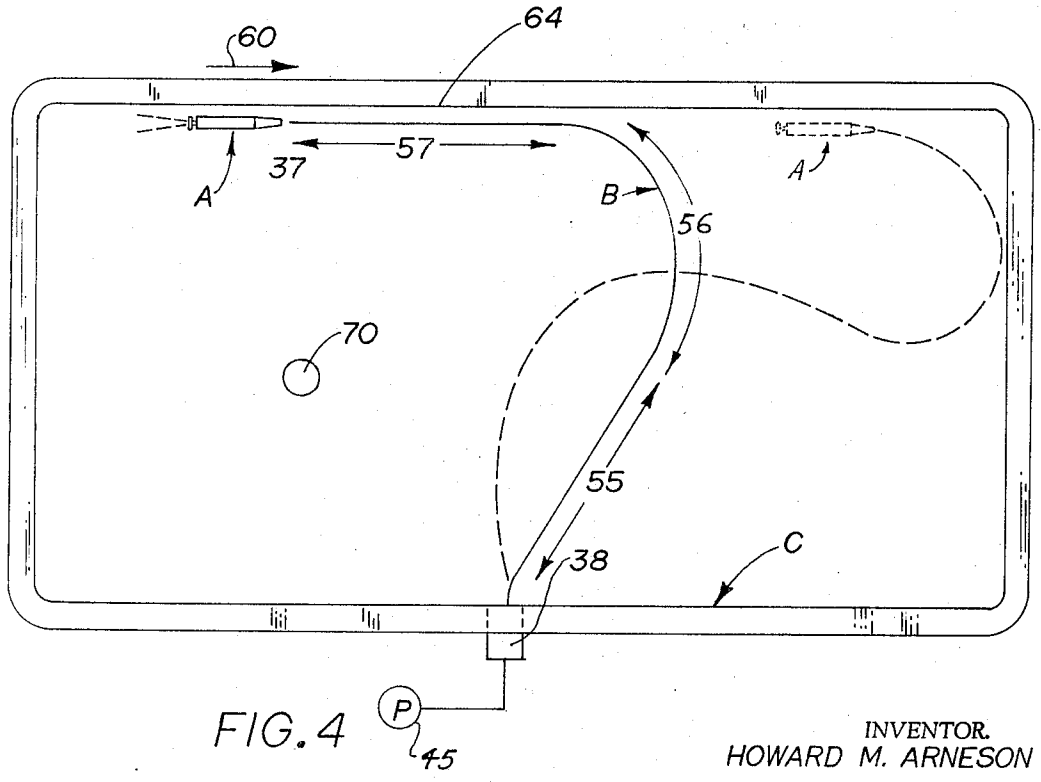


FIG. 4

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FLOATING HOSE POOL CLEANER

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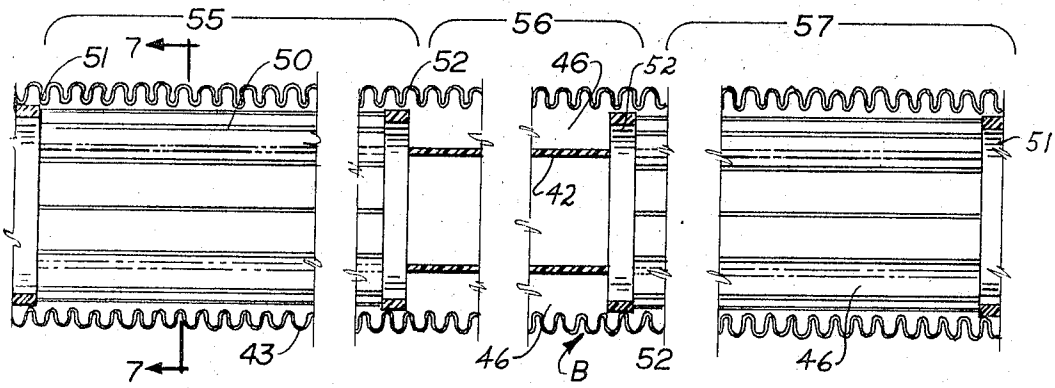


FIG. 6

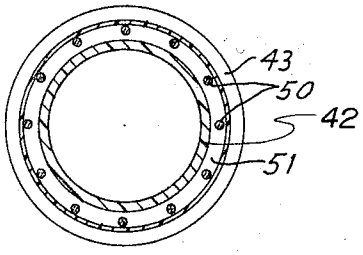


FIG. 7

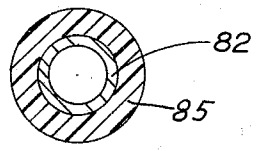


FIG. 9

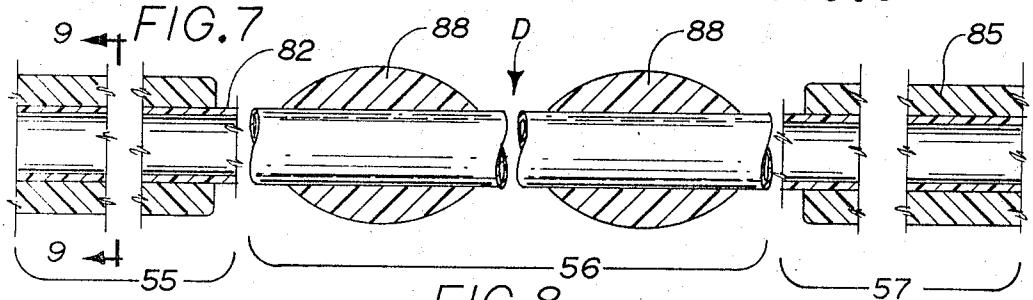


FIG. 8

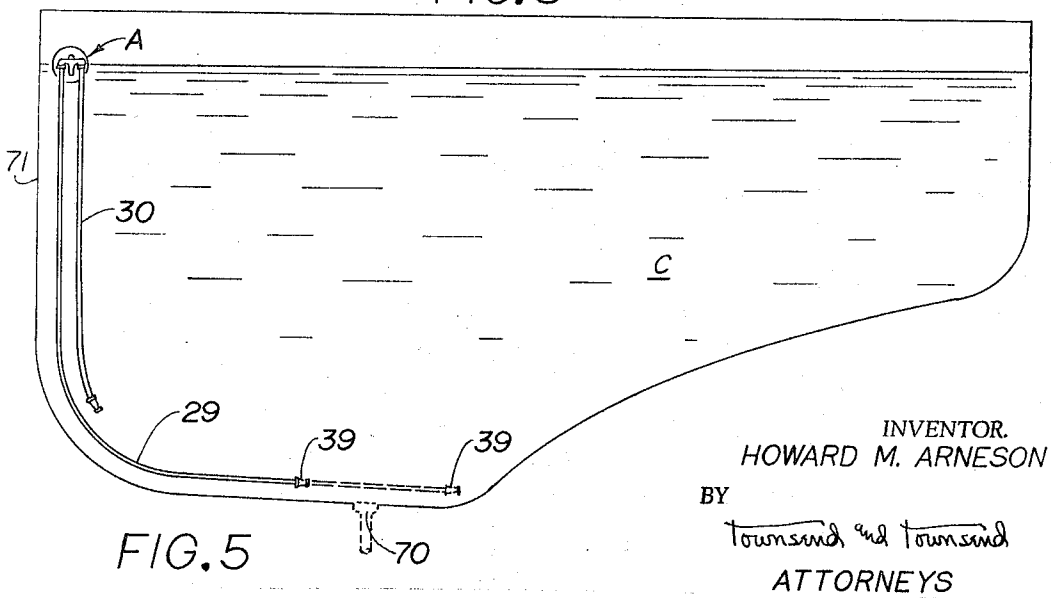


FIG. 5

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FLOATING HOSE POOL CLEANER

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Filed Jan. 25, 1965, Ser. No. 427,815
2 Claims. (Cl. 134—167)

This invention relates to an improved swimming pool cleaner of the type employing a float with flexible hoses depending from the float in which the hoses have a liquid exhaust nozzle at their ends to cause hydraulic cleansing action.

Automatic or semi-automatic pool cleaning devices have been built such as, for example, those shown in Patent No. 2,919,027, issued Dec. 29, 1959, to C. M. Blumenfeld; Patent No. 3,032,044, issued May 1, 1962, to Andrew L. Pansini; and Patent No. 2,975,791, issued Mar. 21, 1961, to Andrew L. Pansini. Such swimming pool cleaning apparatus were shown to comprise an arm suspended generally over the pool in which a float member connected to the arm was arranged to carry a flexible hose with an output nozzle. Water flow from the nozzle caused the flexible hose to move in whip-like fashion to carry the jet spray to various areas of the pool sidewall and bottom. At the same time a mechanism was employed to move the support arm to various positions so that the hose would eventually cover the substantial portion of the pool wall and bottom area.

In the present invention there is provided a driving head which is connected by a length of floating hose to the sidewall of the pool in which a jet stream from the head is arranged to drive the head at the whiplash portion of the floating flexible hose in such a way as to cause the combination of the jet-forced drive of the head and the whiplash function of the hose to effect movement of the head in a more or less regular pattern. By virtue of the pattern of movement afforded by the head, depending flexible jet-ended hoses are carried to positions adjacent substantially all the bottom and sidewalls of the pool.

A feature and advantage of this device lies in the fact that rigid overhanging arms required in the prior art devices are eliminated together with the mechanisms that normally are afforded to cause the rigid arms to oscillate.

A further feature and advantage of the present invention lies in the fact that the device moves in a defined pattern but with far less regular positioning to afford a regular pattern of movement with certain random deviations from the pattern. The addition of the random deviations in combination with the more or less regular overall pattern of the movement affords a substantially greater coverage of the pool area than can be afforded by the fixed limitations of the prior art rigid supports. It can be seen that the more random pattern will cause a more uniform cleansing of the pool area whereas the more regular pattern afforded by the prior art devices normally results in certain areas of the pool being overcleaned while other areas are less efficiently cleansed. In the present invention the random pattern substantially overcomes the disadvantage of the prior art devices. It is to be noted, however, that the device of the present invention still maintains a more or less regular directional and pattern characteristic but moves in random variations within the limitations of the more general pattern of movement, thus obtaining both a regularity at generalized positioning with more or less random variations accompanying the general movement.

In cleaning swimming pools it has been found desirable to position the depending hoses adjacent to the sidewalls of the pool approximately 75% of the time. It is particularly desirable to cause the head carrying the depending jet hoses to move along the sidewall of the pool during the aforesaid 75% interval. Under such conditions the depending hoses will move in whip-like fashion from the sidewall of the pool towards the center in an oscillating pattern. The action of the hose thus causes the cleansing of the sidewall and the general sweeping of the sediment towards the central area of the pool. It is further desirable to have the hoses extend towards the center approximately 25% of the time to effect more substantial cleansing of the pool bottom and to sweep sediment towards the main drain. The present device is adapted to traverse along the sidewall of the pool following the pool's contours during approximately 75% of the time. Thence the device, because of the whiplash function of the hose, will change directions and be diverted towards the center of the pool and thereafter return again to the sidewall which later function is approximately 25% of the working time. The aforesaid travel and directional characteristics of the float head are superior to the directional patterns that can be obtained by the rigid limitations of the overhead bars employed in the prior art devices.

As a further object of the present invention there is provided a novel hose construction which is important in controlling the directional movements of the float head which generally includes a hose construction having greater flexibility at the central portion than at the two terminal ends, so that the bend in floating hose will occur mainly in the more central portion and only to a lesser extent at the two terminal ends. The effect of the aforesaid hose construction is to cause the more regular and controlled pattern of movement of the float head.

A further feature and advantage of the present invention lies in the fact that the flow pattern of the float head can be varied by the variation of floating hose length, hose stiffness and the jet flow velocity driving the float head. Further within the scope of this invention is the discovery of optimal length of floating hose linkages for the float head to effectuate the more desirable float head patterns of movement.

Another object of this invention lies in the fact that the pattern of movement is such that by the selection of appropriate depending jet nozzle hoses, control of the jet nozzle action can be such that the vast majority of jet force streams from the depending hose will be toward the main drain of the pool, thus enhancing the efficiency of the device.

A still further feature of the invention includes the provision of a jet stream nozzle mounted on the float head above the water surface which functions to provide a jet stream adapted to impinge upon the tile area above the water line and effectuate the cleaning of said tile surface during the traversing of the float head.

These and other objects, features, and advantages will be more apparent after referring to the following specification and accompanying drawing in which:

FIG. 1 is a perspective view of the head of this invention.

FIG. 2 is a front view of the head of this invention.

FIG. 3 is a cross-sectional view.

FIG. 4 is a plan view of a typical swimming pool with the device of the invention installed therein.

FIG. 5 is a cross-sectional view of a typical swimming pool of the device installed therein.

FIG. 6 is a sectional view of the transport hose for the device.

FIG. 7 is a cross-sectional view of the hose taken at line 7—7 of FIG. 6.

FIG. 8 is a sectional view of an alternative hose construction; and

FIG. 9 is a cross-sectional view of the hose of FIG. 8 taken at line 9—9.

The cleaning head of this invention comprises a head assembly generally indicated at A, comprising a pipe **15** to which is affixed a flotation member **16**. The flotation member is streamlined in a conical configuration at its trailing end **17** to allow the head to be moved more readily in the water. The forward end **20** of head assembly A is provided with a depending pipe section **23** which is formed with a jet outlet **24** on its depending end. Normally, when the head assembly A is in the water, the flotation afforded by float **16** will maintain the head on the surface of the water in such a condition that depending pipe **23** will be submerged below the water surface whereat jet **24** is positioned to emit water through the jet opening to cause a jet action. A pair of cleaning hoses **29** and **30** is connected in fluid communication with the front end **20** of head A. Fluid communication to the depending pipe or jet leg section **23** and the two hoses **29** and **30** is afforded by a generally U-shaped pipe assembly **31** which is integral of the front end **20** of the head and in fluid communication with the central bore **34** of pipe **15**. The upper end of the front end **20** is formed with a jet opening **35** positioned to normally ride above the water line, which function is to provide a jet spray for tile cleaning, as will be hereinafter described. The rear end **36** of the head is connected by a coupling **37** to a floating hose assembly B the opposite end of which is connected to a deck stand **38** mounted on the sidewall of a typical swimming pool C. A pump **45** is connected to supply water to deck stand **38** and through the deck stand to hose assembly B for delivery to the two jets **24** and **35** and the two cleaning hoses **29** and **30**. Each of the hoses **29** and **30** is provided with output nozzles **39** and **40** which will provide a jet spray which functions to cause a whiplash at the end of the hose by virtue of the jet force afforded by the fluid flow from nozzles **39** and **40**. The jet flow from the nozzle thereby functions as a hydraulic cleaning force for action against the pool side and bottom walls as will hereinafter be further described. As the hose assembly B can in one embodiment as shown in FIGS. 6 and 7 comprise a central hose **42** having an accordion sheathing **43** completely surrounding the hose **42** and spaced therefrom to provide an airspace **46** in the space between the hose and the sheathing to afford flotation for the hose. Hose **42** is formed of flexible material such as polyethylene, rubber and other similar type materials as are useful for construction of flexible hydraulic hoses. Sheathing **43** is formed of a relatively soft material in an accordion configuration to allow for full flexibility of the sheathing. Within the airspace **46** there are provided a plurality of stiffener wires **50** which are mounted to run longitudinally of the hose and which are connected to anchor rings **51** and **52**. Hose assembly B is functionally divided into an input end section **55**, a central section **56**, and an output section **57**. The stiffening wires **50** are arranged only in the input section **55** and the output section **57** to render more stiffness in the aforesaid terminal end sections than in the central portion of the hose.

As viewed in FIG. 4 it can be seen that, in operation, the water under pressure provided by pump **45** and fed through deck stand **38** will flow through the floating hose assembly B to working head A. The jet flow velocity of water from jet **24** will cause head A to move rearwardly in the direction indicated by arrow **60**. The substantial quantity of water fed to head A, however, is diverted through the pipe couplings **31** to the two depending non-floating cleansing hoses **29** and **30** whereat the water is emitted from the two nozzles **39** and **40**. The flow of water causes a whiplash at the terminal ends of hoses **29** and **30** which functions to both rapidly change the direction and position of the two nozzles and a high velocity water flow which functions to scrub the side and bottom walls of the pool upon impingement thereon.

The traversing of the head such as along the sidewall **64** of the pool constantly changes the supporting position of the cleansing hoses **29** and **30**, so that they are traversed along the pool length. Hose assembly B is normally in the condition of operation as shown in solid lines in FIG. 4, which is in a generally C or modified L shape. As head assembly A traverses further, hose assembly B is forced into a generally S-shaped configuration, as indicated by the broken lines in FIG. 4, whereafter the hose will cause a directional change of the head in a whiplash function. The head will then traverse inwardly from the sidewalls **64** of the pool and across the center of the pool, whereinafter it will cause the hose assembly to again resume a generally C-shaped configuration with the head directed against one of the sidewalls **64** but normally facing in the opposite direction as from which the process started. Thus, the sequence of operation is continued in the aforesaid pattern. The pattern has been found to exhibit a predictable regularity with some substantial spacial deviations within the pattern. The stiffening of the terminal ends **55** and **57** cause a greater bending of the hose to occur in the central section **56** which affords a control in the path prescribed by head A.

It has been found that floating hose B should be in a length roughly equal to the width of the pool plus one half of the pool's length. The ratio between the stiffened sections **55** and **57** and the unstiffened sections **56** of hose B will depend upon the systematic patterns desired but generally each stiffened section **55** and **57** should be from about ¼ to ⅛ of the hose length with the unstiffened section **56** constituting the remainder. The depending jet hoses are arranged with the shorter hose **30** being at about an average of 10½ feet and the longer hose being at a length as can be specifically seen in FIG. 5 to be in facing operation to main drain **70** of the pool. To calculate the length, a length of hose **29** is employed which will extend from the deepest end **71** of the pool at the water line downwardly along the pool side to a position where the jet **39** is approximately at 1 foot beyond the main drain **70**. The force of the jet pressure from jet **39** will cause the jet to remain at its farthest axis about 1 foot ahead or facing the main drain **70** during its various modes of movement. The aforesaid dimensioning of the longer hose **29** insures that the jet blast will be directed toward the main drain and therefore not force dirt and sediment at the bottom of the pool away from the drain, but will rather force the dirt toward the drain in conditions of operation where the head is moving along a sidewall of the pool.

The systematic pattern as previously stated is controlled by the amount of velocity afforded through jet **24**. A control valve **80** is provided in the depending arm **23** to control the waterflow output from jet **24**. A control of the aforesaid valve can regulate the systematic pattern for the device. A valve can also be employed at the deck stand **38** which controls the overall flow and pressure in the system. This also has some influence on the systematic pattern of the device.

In FIGS. 8 and 9 there is provided an alternative floating hose assembly D having a hose **82** which is divided into the same three sections **55**, **56**, and **57** as hose assembly B, except that the hose **82** is provided along sections **55** and **57** with a sleeve **85** formed of flexible material, but which imparts more rigidity to the sleeved area than to the unsleeved area **56**. Buoyancy for the hose can be imparted by holding styrofoam floats **88** along the length of the hose or by simply attaching buoyant floats as by tieing.

It can be seen therefore in the present invention that the head will go through a repetitive, systematic pattern due to the whiplash relationship of the combination of the hose and the jet-motivated head assembly. The pattern, however, is subject to variations during each pass which are inherent in unguided floating bodies; for example, slight changes of wind, water currents and the like can cause periodic variations in the pattern while still

maintaining the same generalized systematic pattern. The aforesaid variations are beneficial in providing a more random placement of the jet nozzles **39** and **40**, so that eventually the entire pool is subjected to jet blasts.

While one embodiment of the invention has been shown and described it will be apparent that other adaptations and modifications may be made without departing from the true spirit and scope of the invention.

What is claimed is:

1. A pool cleaner comprising a transport head, float means mounted on said head to maintain floating buoyancy therefor, a high-pressure water source located adjacent the side of said pool, a transport hose connected to said water source, a sleeve mounted over said hose formed in accordion-like cylindrical configuration of larger diameter than said hose, means creating an air-seal in the space between the inner wall of said sleeve and said hose to provide flotational buoyancy for said hose throughout its length, said hose means mounted on a first end of said head, jet means mounted on the opposite end of said head and under the water surface to direct a water jet stream in a direction opposite said first end, and pendulant flexible non-floating hose means connected to said head in fluid communication with said transport hose means, said jet means and said hose means.

2. A pool cleaner according to claim **1** having stiffening wires extending longitudinally between said sleeve and said hose in the area immediately adjacent the connection to said source of high-pressure water and in the areas immediately adjacent said transport head and not located in the central portion of the hose, anchor means mounted within the space between said hose and said sleeve to anchor said stiffening wires in longitudinal spaced relationship between said hose and said sleeve.

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