

Feb. 4, 1964

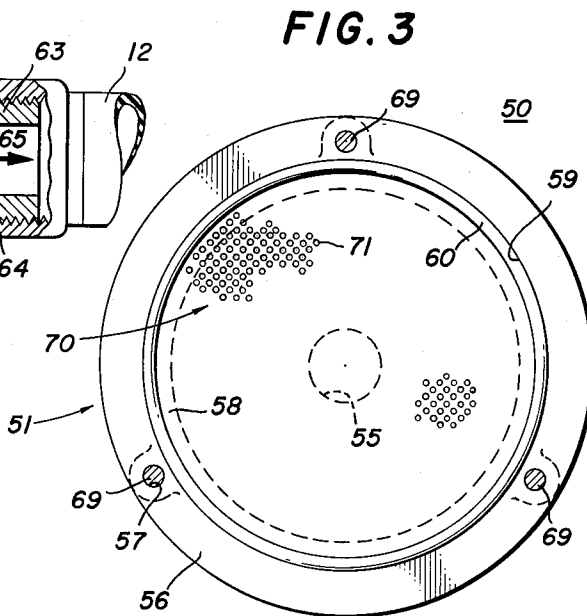
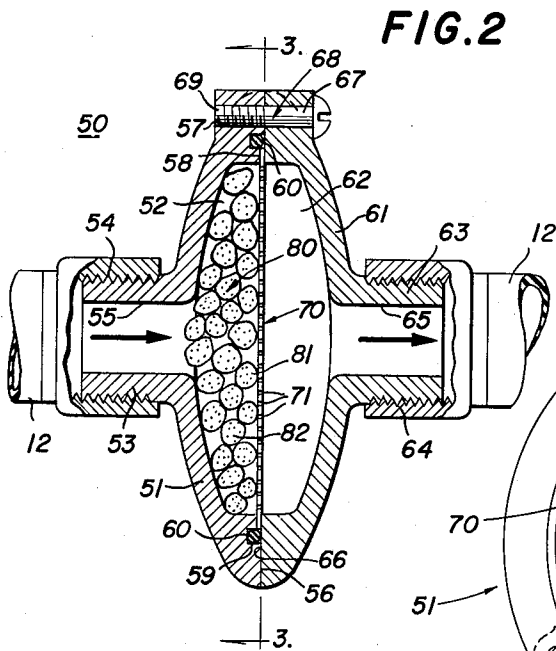
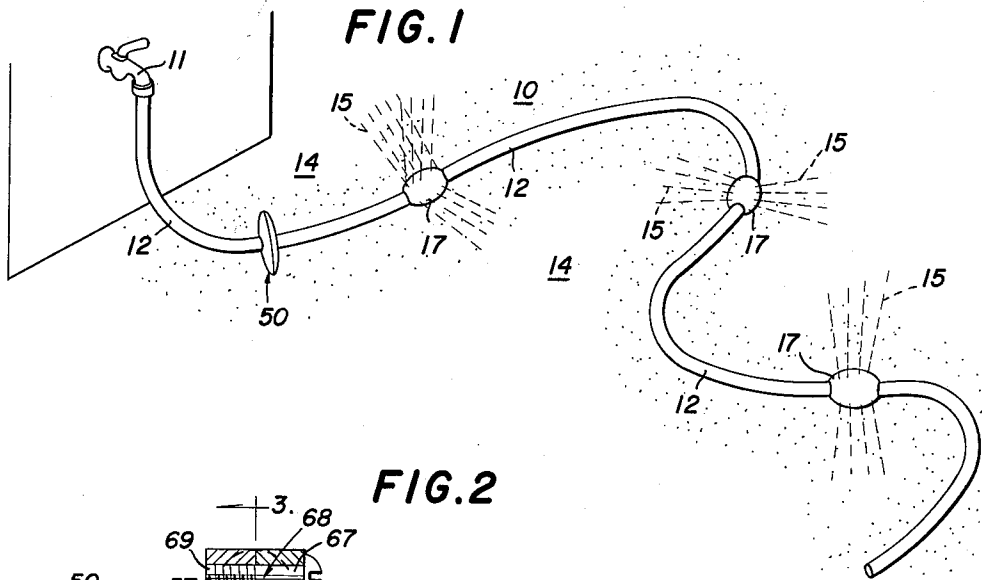
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3,120,015

CLEANING ASSEMBLY FOR USE IN A GARDEN HOSE OR THE LIKE

Filed May 16, 1962

2 Sheets-Sheet 1



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FIG. 4

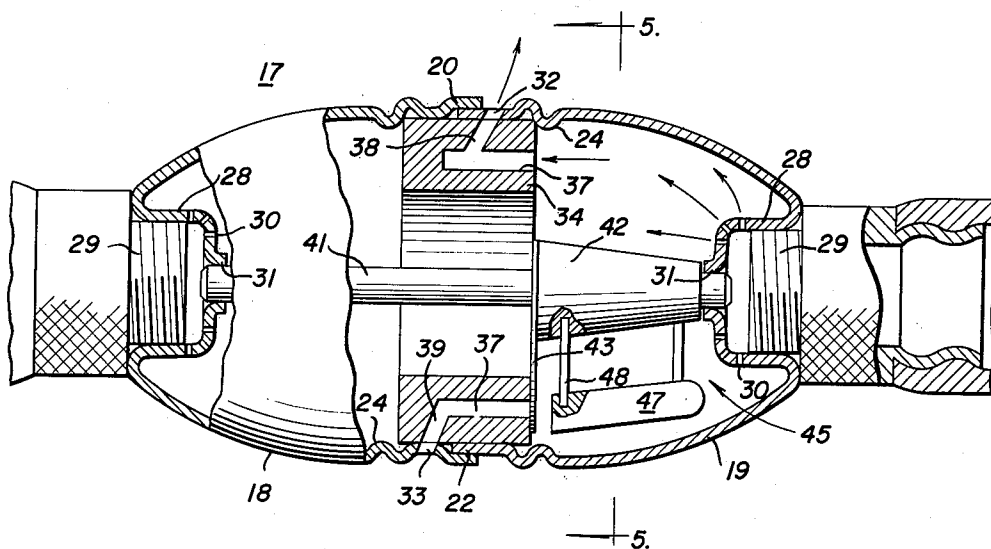


FIG. 5

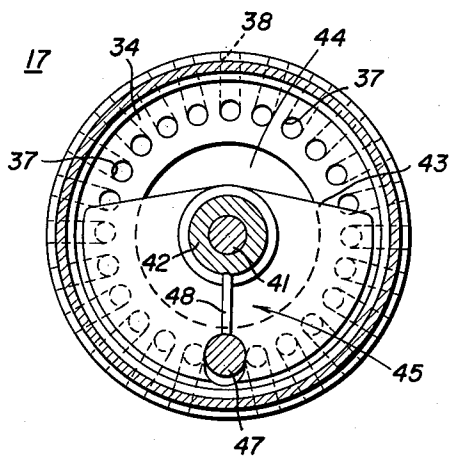
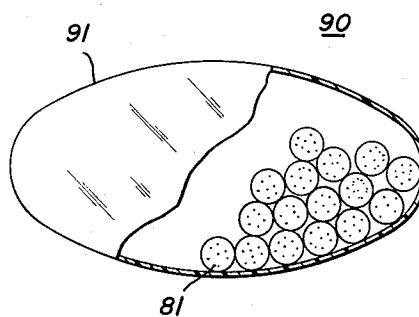


FIG. 6



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CLEANING ASSEMBLY FOR USE IN A GARDEN HOSE OR THE LIKE

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This invention relates to a new and improved cleaning assembly for use in a garden hose, or the like, to clean orifices in attachments connected thereto.

It is a general object of the invention to provide a cleaning assembly which may be connected in a garden hose, or the like, and which will operate automatically upon passage of water through the garden hose to discharge cleaning particles into the hose downstream from the cleaning assembly, the cleaning particles having dimensions to pass through orifices in attachments connected to the hose, thereby to clean the orifices to remove debris, rust, organic growths and the like therefrom.

Another object of the invention is to provide a cleaning assembly of the type set forth which can be readily inserted in a garden hose at a desired point and which during operation and use of the garden hose and the connected attachments does not materially reduce the rate of flow of water through the garden hose and the attachments and does not otherwise interfere with the normal operation thereof.

A further object of the invention is to provide a cleaning assembly of the type set forth including a housing having an inlet water connection and an outlet water connection with a screen mounted therebetween to provide a treatment chamber between the screen and the inlet water connection, the treatment chamber having a mass of solid cleaning composition therein including a solid binder that is only slightly soluble in water and a dispersion of water insoluble abrasive particles in the binder, the abrasive particles having dimensions less than those of the openings in the screen and the orifices to be cleaned thereby.

A still further object of the invention is to provide an improved cleaning charge for use in a cleaning assembly of the type set forth, the cleaning charge having an envelope formed of water-soluble film containing pellets of solid cleaning composition including a solid binder that is only slightly soluble in water and a dispersion of water insoluble abrasive particles in the binder.

Further features of the invention pertain to the particular arrangement and construction of the elements of the cleaning assembly and of the charge therefor, whereby the above-outlined and additional operating features thereof are attained.

The invention, both as to its organization and principles of operation, together with further objects and advantages thereof, will best be understood by reference to the following specification taken in connection with the accompanying drawing, in which:

FIGURE 1 is a perspective view of a garden hose having a cleaning assembly embodying the present invention and also a plurality of sprinkler attachments connected therein;

FIG. 2 is an enlarged view in vertical section of the cleaning assembly as viewed in the direction of the arrows along the line 2—2 of FIG. 1;

FIG. 3 is a transverse section through the cleaning assembly taken along the line 3—3 of FIG. 2;

FIG. 4 is a view partially in vertical section of a sprinkler attachment illustrative of such attachments that may be connected in series with the cleaning assembly of

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the present invention for the purpose of cleaning the orifices in the sprinkler attachment;

FIG. 5 is a sectional view taken along the line 5—5 of FIG. 4; and

FIG. 6 is a perspective view of a cleaning charge of the present invention particularly useful in the cleaning assembly of FIGS. 2 and 3.

Referring to FIG. 1 there is shown an assembly generally designated by the numeral 10 of a hose 12 having inserted and connected therein a cleaning assembly, embodying the features of the present invention, generally designated by the numeral 50, and a plurality of sprinkler attachments 17, the input end of the garden hose 12 being connected through a faucet 11 to a source of water supply and the remaining portions of the garden hose 12 and the associated cleaning assembly 50 and the sprinkler attachments 17 resting upon a lawn generally designated by the numeral 14. The hose 12 and the sprinkler attachments 17 are shown in operation with sprays of water 15 extending upwardly and outwardly from each of the sprinkler attachments 17.

The details of construction of the cleaning assembly 50 are illustrated in FIGS. 2 and 3 of the drawing, the cleaning assembly 50 being operative when connected to a source of water under pressure to release from a cleaning composition contained therein a quantity of abrasive particles into the water passing therethrough to be carried thereby downstream into the attached garden hose and through the orifices in the sprinkler attachments 17 connected thereto to clean from the orifices dirt, rust, organic growths and the like during the normal operation of the sprinkler attachments. The cleaning assembly 50 includes a first housing member 51, and a second housing member 61 holding therebetween a screen 70, the housing members 51 and 61 being held together by bolts 68, and the junction therebetween being sealed by an O-ring 59. More specifically, the first housing member 51 is generally cup-shaped and defines with the screen 70 a treatment chamber 52. Disposed centrally of the housing member 51 is an inlet water connection 53 generally cylindrical in form and having the outer surface thereof threaded as at 54 for receiving a garden hose coupling thereon thus to insert the cleaning assembly 50 in the garden hose 12, the connection 53 defining an inlet water passage 55 therethrough which is generally circular in cross section and which communicates with the treatment chamber 52. The outer rim of the housing member 51 has formed thereon a joining surface 56 which is substantially flat and planar, the plane of the joining surface 56 being disposed substantially perpendicular to the longitudinal axis of the inlet water connection 53, the joining surface 56 extending completely around the circumference of the housing member 51. The joining surface 56 has formed therein an annular groove 59 which is substantially rectangular in cross section as seen in FIG. 2 and which extends completely around the circumference of the housing member 51 and is adapted to receive therein the O-ring 60, the dimensions in cross section and in circumference of the groove 59 being such as snugly to receive the O-ring 60 therein. Formed concentric with the outer perimeter of the housing member 51 and the groove 59 is a recessed surface 58 which has a circular shape to receive the screen 70 therein, the surface 58 being recessed sufficiently so that the surface of the screen 70 disposed to the right as viewed in FIG. 2 does not extend to the right beyond the joining surface 56.

The second housing member 61 is shaped generally like the first housing member 51 and more specifically is cup-shaped and is provided centrally thereof with an outlet water connection 63 generally cylindrical in shape and

having formed on the outer surface thereof suitable threads as at 64 for connection to a garden hose coupling, the connection 63 surrounding and defining an outlet water passage 65 which is generally circular in cross section and in general axial alignment with the inlet water passage 55. The surface of the housing member 61 opposite the outlet water connection 63 is formed substantially flat and planar to provide a joining surface 66 adapted to bear against and to mate with the joining surface 56 on the housing member 51. The housing members 51 and 61 have three sets of aligned apertures 57 and 67, respectively, therethrough for receiving three bolts 68 therein, the walls defining the apertures 57 being threaded for threaded engagement with the threaded shank 69 on the bolts 68. The three bolts 68 in clamping the housing members 51 and 61 together urge the joining surfaces 56 and 66 thereof toward each other and compress the O-ring 60 therebetween to form a watertight seal, the housing 51 and 61 also holding the screen 70 in the proper operative position.

As illustrated in FIGS. 2 and 3, the diameter of the treatment chamber 52 and of the corresponding downstream chamber 62 as well as the effective diameter of the screen 70 is several times the diameter of the inlet passage 55 and the outlet passage 65, whereby to minimize the impedance to the flow of water through the cleaning assembly 50. The screen 70 is also formed so that the open areas therethrough are greater than the cross sectional area of the inlet passage 55 and the outlet passage 65, also to present as small an impedance to the passage of water therethrough as practicable. In one preferred embodiment of the invention the screen 70 is provided with holes 71 therein which have a diameter of 0.033 inch, there being 237 holes 71 per square inch of the screen 70, the holes 71 constituting 21% of the area of the screen 70.

There is disposed within the treatment chamber 52 a mass of the solid cleaning composition generally designated by the numeral 80 and, as illustrated, including a plurality of individual pellets 81 each comprising a solid binder having a dispersion of abrasive particles therein. A preferred binder for the cleaning composition is substantially full hydrated calcium sulfate, the cleaning composition being preferably prepared by mixing partially hydrated granular calcium sulfate, such as that commonly known as plaster of paris ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$), with the abrasive particles, after which water is added to convert the plaster of paris to the substantially full hydrated form of calcium sulfate, $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$, known as gypsum. In general, the binder must be only slightly soluble and preferably has a solubility on the order of that of fully hydrated calcium sulfate, one part of which is soluble in about 375 parts of cold water; other binders may also be used provided that they can readily have mixed therein the abrasive particles and further provided that they are only slightly soluble in water and have the same order of solubility in cold water as fully hydrated calcium sulfate, although slightly less soluble and slightly more soluble binders can be utilized. The abrasive particles must be substantially insoluble in water and should provide sharp cleaning or cutting edges thereon so as to enable the abrasive particles to remove dirt, rust, organic growths and the like from the walls of the orifices in the sprinkler attachment 17 used with the cleaning assembly 50. Suitable examples of abrasive particles are small cast iron particles, carborundum particles, sharp edged sand, and the like. The overall dimensions of the abrasive particles must be such that they can pass through the openings 71 in the screen 70 and through the orifices to be cleaned in the associated sprinkler attachments.

There is illustrated in FIG. 6 of the drawings a preferred cleaning charge to be placed in the cleaning assembly 50, the cleaning charge being generally designated by the numeral 90 and comprising an envelope or bag 91 containing pellets 81 of the cleaning composition

therein. The envelope 91 is formed of a synthetic organic plastic resin which is highly soluble in cold water and which is completely sealed to retain the pellets 81 therein. A suitable example of the water soluble resin useful for forming the bag 91 is methyl cellulose, but it is to be understood that any other suitable water soluble resin may be used also. A quantity of the pellets 81 is contained within the envelope 91 which will fit nicely within the treatment chamber 52 and particularly between the screen 70 and the inlet water connection 53. In order to place the cleaning charge 90 within the cleaning assembly 50, the bolts 68 are removed thus permitting separation of the housing members 51 and 61 and the removal of the screen 70 from the housing member 51. The cleaning charge 90 is then placed in position, the flexibility and pliability of the plastic envelope 91 accommodating the distribution of the pellets 81 throughout the cleaning chamber 52 without rupturing the envelope 91. The various parts are thereafter reassembled and the bolts 68 re-engaged, this all being accomplished without rupture of the bag 91, whereby the pellets 81 are held in the proper desired position within the treatment chamber 52. As soon as water is admitted into the treatment chamber 52 through the water inlet connection 53, the plastic envelope 91 will be dissolved and will permit the water to contact the pellets 81, thus dissolving a portion of the binder and releasing some of the abrasive particles 82 into the water stream issuing through the outlet water connection 63.

There is shown in FIGS. 4 and 5 a typical sprinkler attachment which can be cleaned by use with the cleaning assembly 50 of the present invention, the sprinkler attachment being generally designated by the numeral 17. The details of construction and the method of operation of the sprinkler attachment 17 are fully set forth in the United States Letters Patent No. 2,737,418, issued March 6, 1956, to Chester M. MacChesney for Sprinkler Attachment for Garden Hose. In general the sprinkler attachment 17 includes a pair of cup-shaped housing members 18 and 19 provided with interlocking annular flanges 20 and 22, respectively, which are spot-welded together. A cup-shaped coupling member 28 is provided on each of the members 18 and 19 to receive a threaded hose connection 29, each coupling member 28 having therein a plurality of orifices or apertures 30 therethrough of the type which is desired to clean utilizing the cleaning assembly 50 of the present invention. The members 18 and 19 are further provided with two annular series of sprinkler ports 32 and 33 disposed about the periphery of the attachment 17 and also being of the type which may be advantageously cleaned utilizing the cleaning assembly 50 of the present invention.

The sprinkler attachment 17 is further of the type in which the ports 32 and 33 disposed downwardly are closed by means of a valve structure including a valve insert 34 snugly fitting between shoulders 24 on the members 18 and 19, the insert 34 having a plurality of connected passages 37, 38 and 39 therein which communicate with the ports 32 and 33, the passages 37, 38 and 39 also being of the character which are particularly adapted to be cleaned by use of the cleaning assembly 50 of the present invention. In the operation of the sprinkler attachment 17, selected ones of the passages 37 are continuously blocked by a diaphragm 43 (see FIG. 5) which is carried by a shaft 41 journaled in bearings 31 provided on the members 28, the shaft 41 having a hub 42 carrying a pair of arms 48 supporting a pendulum weight 47, these parts forming a pendulum generally designated by the numeral 45 which is always disposed downwardly with respect to the axis of the shaft 41 and held into position by gravity, whereby to hold the attached diaphragm 43 in the position illustrated in FIG. 5 to close the passages 37 communicating with the sprinkler ports 32 and 33 disposed downwardly, all as is more fully described and illustrated

in the United States Patent No. 2,737,418 referred to above.

In the operation of the sprinkler attachment 17, the housing members 18 and 19 ride along the lawn 14 and as a consequence there is a possibility of collecting debris in the ports 32 and 33 and even in the passages 37, 38 and 39, the debris tending to clog the various orifices and thus interfering with the proper operation of the sprinkler attachment 17. Furthermore, in the areas where hard water is used for sprinkling, the various orifices 30, 32, 33, 37, 38 and 39 tend to have a build-up of scale thereon after prolonged use, the build-up of scale interfering with the proper operation of the sprinkler attachment 17; there also is a possibility in certain climates of having a growth of algae or other organisms within the various parts of the sprinkler attachment 17 including the various orifices 30, 32, 33, 37, 38 and 39.

In accordance with the present invention, the above described obstructions in the orifices of the sprinkler attachment 17 can be readily removed therefrom by passing therethrough sharp edged abrasive particles which will scrape debris, scale and organic matter from the walls defining the orifices. More specifically, the water passing through the hose 12 and the cleaning assembly 50 through the inlet water connection 53 comes into contact with the cleaning composition within the treatment chamber 52 and dissolves a portion of the binder from the pellets 81 therein. As the binder is dissolved away from the pellets 81, abrasive particles 82 are released into the stream of water and are carried thereby through the screen 70, and specifically the holes 71 therein, into the outlet chamber 62 and through the outlet water connection 63 into the downstream portions of the hose 12. As a portion of the water passes into a sprinkler attachment such as the sprinkler attachment 17, the abrasive particles are carried therewith and through the various restricted openings and orifices therein such as those designated by the numerals 30, 32, 33, 37, 38 and 39 in FIGS. 4 and 5. The abrasive particles which have dimensions slightly less than the dimensions of these various orifices are brought into contact with the walls thereof and the sharp edges of the abrasive particles scrape from the walls any deposits thereon including debris, hard water scale, algae or other organic growths, and the like, without interrupting the operation of the sprinkler attachment 17, the cleaning assembly 50 actually working continuously while the sprinkler attachment 17 is being operated.

In an illustrative constructional example of the cleaning assembly 50, the overall diameter of the housing members 51 and 61 may be about $3\frac{3}{16}$ inches; the axial length from the outer end of the inlet connection 53 to outer end of the outlet connection 63 is $2\frac{7}{8}$ inches; the diameters of the inlet passage 55 and the outlet passage 65 is $\frac{9}{16}$ inch; the diameter of the treatment chamber 52 is $2\frac{3}{4}$ inches; and the diameter of the screen 72 is 3 inches. The housing members 51 and 61 are preferably formed of aluminum; the screen 70 is preferably formed of brass $\frac{1}{32}$ inch thick; the O-ring 60 is formed of rubber and has a cross sectional diameter of $\frac{3}{32}$ inch; and the bolts 68 are formed of brass.

From the foregoing, it is apparent that there has been provided an improved cleaning assembly and cleaning charge therefor which may be connected in a garden hose and will operate automatically to discharge abrasive particles into the downstream portions of the garden hose for passage through orifices in the various sprinkler attachments connected therein, the passage of the abrasive particles through the orifices cleaning the orifices by removing therefrom and from the walls defining the orifices various debris, hard water scale, algae growth, and the like.

While there has been described what is at present considered to be the preferred embodiment of the invention, it will be understood that various modifications may be made therein, and it is intended to cover in the appended

claims all such modifications as fall within the true spirit and scope of the invention.

What is claimed is:

1. A cleaning assembly for use in a garden hose, or the like, to clean orifices in attachments connected thereto, comprising a housing having an inlet water connection and an outlet water connection, a screen mounted in said housing between said inlet water connection and said outlet water connection and forming with said housing a treatment chamber disposed between said screen and said inlet water connection, and a mass of a solid cleaning composition disposed in said treatment chamber, said cleaning composition including a solid binder that is only slightly soluble in water and a dispersion of water insoluble abrasive particles in said binder, said abrasive particles having dimensions less than those of the openings in said screen and the orifices to be cleaned, said inlet water connection being adapted to be connected to a source of water under pressure for admitting water to said treatment chamber to dissolve a portion of said binder thus to release a quantity of said abrasive particles into the water to be carried thereby through said outlet water connection into the attached garden hose and through the orifices in the attachments connected thereto to clean the orifices therein.

2. The cleaning assemblies set forth in claim 1, wherein said cleaning composition is in the form of a plurality of pellets disposed in said treatment chamber between said inlet water connection and said screen.

3. The cleaning assembly set forth in claim 2, and further comprising a water-soluble envelope initially containing said pellets and disposed in said treatment chamber.

4. The cleaning assembly set forth in claim 1, wherein said solid binder comprises substantially fully hydrated calcium sulfate.

5. The cleaning assembly set forth in claim 1, wherein said abrasive particles consist essentially of Carborundum.

6. A cleaning assembly for use in a garden hose, or the like, to clean orifices in attachments connected thereto, comprising a first cup-shaped housing member having a first joining surface around the outer edge thereof and an inlet water connection centrally thereof, a second cup-shaped housing member having a second joining surface around the outer edge thereof in abutting relation with said first joining surface and an outlet water connection centrally thereof, a screen mounted between said housing sections and forming with said first housing section a treatment chamber disposed between said screen and said inlet water connection, fastener means interconnecting said housing members for holding said joining surfaces against each other and for holding said screen in position, and a mass of a solid cleaning composition disposed in said treatment chamber, said cleaning composition including a solid binder that is only slightly soluble in water and a dispersion of water insoluble abrasive particles in said binder, said abrasive particles having dimensions less than those of the openings in said screen and the orifices to be cleaned, said inlet water connection being adapted to be connected to a source of water under pressure for admitting water to said treatment chamber to dissolve a portion of said binder thus to release a quantity of said abrasive particles into the water to be carried thereby through said outlet water connection into the attached garden hose and through the orifices in the attachments connected thereto to clean the orifices therein.

7. The cleaning assembly set forth in claim 6, wherein the area for the flow of water through said treatment chamber and said screen is at least as great as the area for the flow of water through said inlet water connection and said outlet water connection.

8. The cleaning assembly set forth in claim 6, wherein a deformable annular gasket is disposed between said joining surfaces and extends completely therearound to provide a watertight seal therebetween.

9. A cleaning charge for use in a cleaning assembly in

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a garden hose, or the like, to clean orifices in attachments connected thereto, comprising an envelope formed of a material that is soluble in water, a plurality of pellets of a solid cleaning composition disposed in said envelope, said cleaning composition including a solid binder that is only slightly soluble in water and a dispersion of water insoluble abrasive particles in said binder, said abrasive particles having dimensions less than those of the orifices to be cleaned by the passage of said particles therethrough.

10. The cleaning charge set forth in claim 9, wherein said envelope is formed from a methyl cellulose synthetic organic resin that is soluble in cold water.

11. The cleaning charge set forth in claim 9, wherein said solid binder comprises substantially fully hydrated calcium sulfate.

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12. The cleaning charge set forth in claim 9, wherein said abrasive particles consist essentially of Carborundum.

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