

G. SCHLEMMER.
 CONDUIT CLEANING DEVICE.
 APPLICATION FILED JUNE 19, 1915.

1,218,005.

Patented Mar. 6, 1917.
 2 SHEETS—SHEET 1.

Fig. 1.

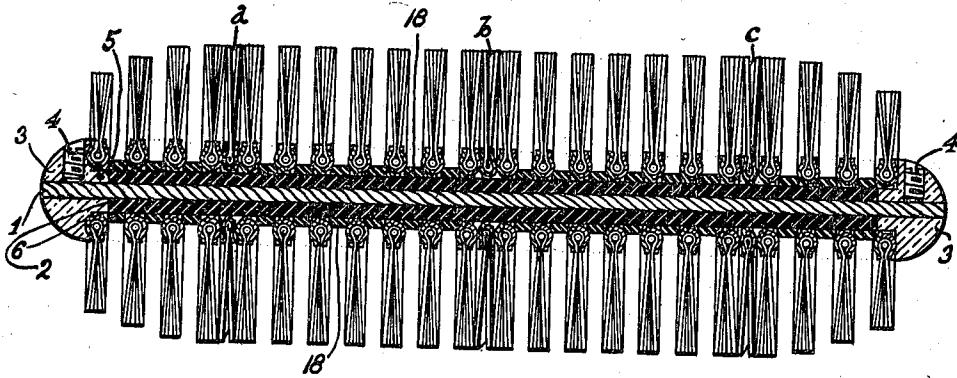


Fig. 2.

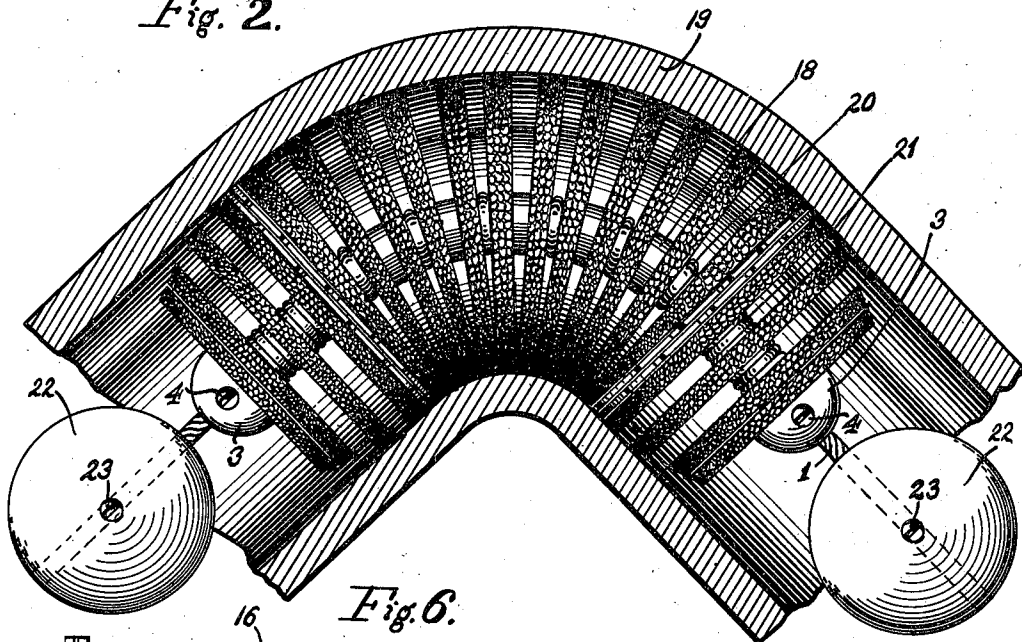


Fig. 6.

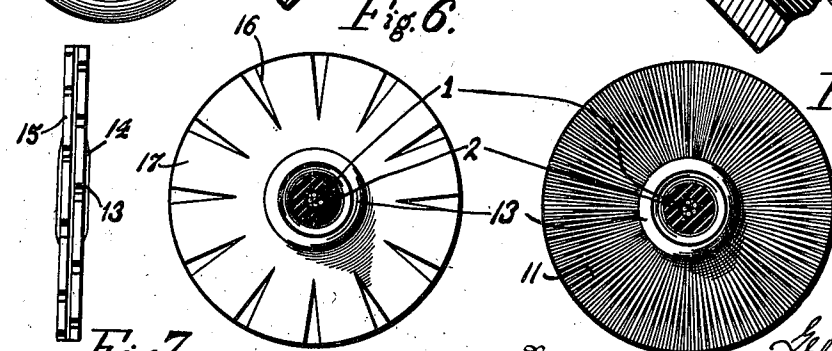


Fig. 5.

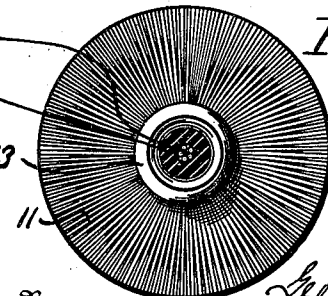


Fig. 7.



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Fig. 3.

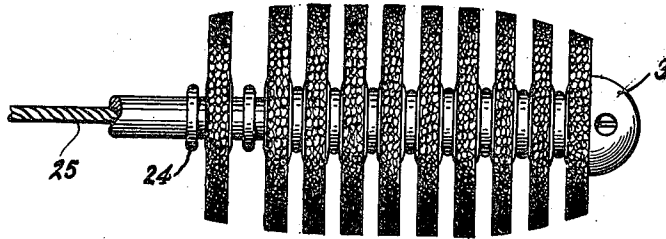


Fig. 4.

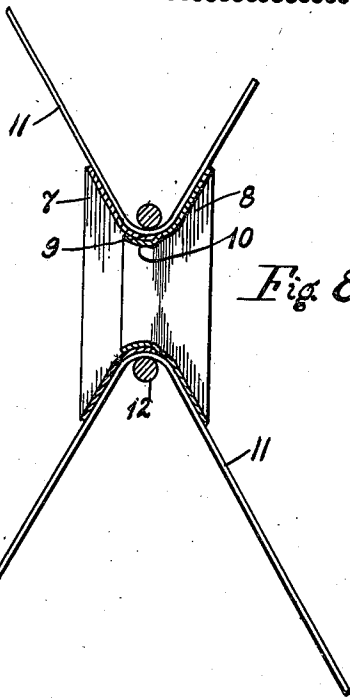
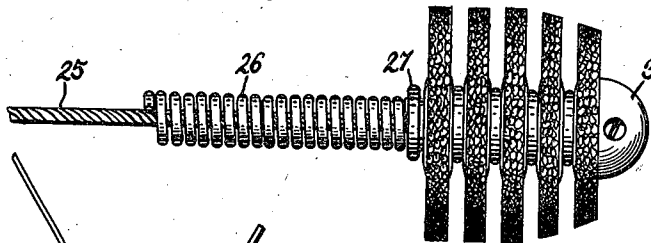


Fig. 8.

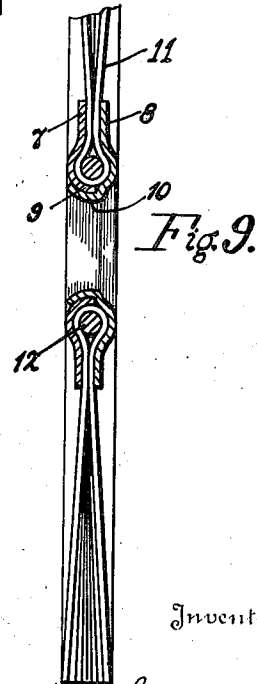


Fig. 9.

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UNITED STATES PATENT OFFICE.

GEORGE SCHLEMMER, OF NEW YORK, N. Y.

CONDUIT-CLEANING DEVICE.

1,218,005.

Specification of Letters Patent.

Patented Mar. 6, 1917.

Application filed June 19, 1915. Serial No. 35,052.

To all whom it may concern:

Be it known that I, GEORGE SCHLEMMER, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Conduit-Cleaning Devices, of which the following is a specification.

This invention relates to improvements in devices for cleaning endless conduits wherein a cleaning element is propelled through the conduit by pressure of the circulating fluid or liquid in the latter, a typical form of such mechanism being illustrated in my pending application filed April 9, 1914, Serial No. 830,771.

The present invention has to do more particularly with improvements in the cleaning element itself and the same is herein shown to be of the bristle or brush type.

My invention includes a flexible spindle on which is strung a series of bristle or brush units of a sufficient number to form a cleaning element of elongated contour so that a relatively extensive length of periphery will be presented to the interior of the conduit.

A further object of the invention is to provide the cleaning element with one or more imperforate diaphragms the function of which is to form an abutment to the circulating liquid so as to cause the latter to advance the cleaning element through the conduit. This feature of my invention involves an improved type of diaphragm which is preferably flexible and which is so constructed that flexure of the same will not impair the efficiency of the diaphragm when the same acts to prevent passage of water past the cleaning element.

A further object of the invention is to provide an improved type of brush unit wherein the bristles are firmly secured in disk or final form by an improved metal mounting which is bent into a bristle anchoring position or shape when the unit is formed.

My invention also involves novel forms of flexible spindles, the construction of which is such that the maximum flexibility is obtained in addition to firm anchorage of the bristle units thereon.

A further object of my invention is to provide the cleaning element with guiding and propulsive headers adapted to be ar-

ranged at opposite ends of the cleaning element to effectively guide and to assist in advancing the cleaning element through sharp turns in the conduit.

Other features of novelty will be more fully described in connection with the accompanying drawings and will be more particularly pointed out in and by the appended claims.

In the drawings—

Figure 1 is a longitudinal sectional view of a form of my invention, with metal separating rings between the bristle units.

Fig. 2 is a view in elevation of a cleaning element showing the same as it would appear in negotiating a sharp turn in the conduit, the separating rings being alternately of rubber and metal.

Fig. 3 shows a modified form of my invention,

Fig. 4 shows a further modification,

Fig. 5 is a transverse sectional view showing one of the brush units in elevation,

Fig. 6 is a transverse sectional view illustrating one of the diaphragms in elevation,

Fig. 7 is an edge view of the diaphragm shown in Fig. 6,

Fig. 8 is an enlarged sectional view of one of the brush units during the method of formation thereof,

Fig. 9 is a view similar to Fig. 8 showing the unit completed.

Like characters of reference designate corresponding parts throughout the different figures of the drawings.

First referring to the preferred form of my invention, and more particularly to Figs. 1, 2, 5, 6 and 7, it will be seen that my improved flexible spindle includes a length of flexible wire 1 of sufficient size to afford the required tensile strength and also provide for the required flexibility. Sleeved on the wire core 1 is a flexible tubing 2 which may be of rubber and which provides for a sufficient diameter in order to facilitate the location thereon of the brush units. End connecting heads 3, preferably of metal, are bored to fit the wire core 1 and said heads abut against the end of the sleeve 2. Said connecting heads are shown securing the wire core 1 by entering screws 4 which are threaded into radially disposed threaded bores which intersect the axial bores of said heads. In the present construction, the connecting heads are provided with hubs 5 of a diame-

ter equal to the sleeve 2 so that shoulders 6 are formed to receive the endmost units, which will presently be described.

I will next describe the particular novel construction of the brush units before detailing the manner in which they are assembled upon the flexible spindle.

Referring to Figs. 8 and 9, a thimble is shown comprising sections 7 and 8 which are initially shaped as shown in Fig. 8, the outer margins having a greater diameter than the inner margins. The inner margin 9, of section 7, telescopes or seats in an offset margin 10, of section 8 so that there will be formed an annular flaring cavity extending peripherally about said section. Lengths of bristles 11 are secured at their centers in said cavity by a binding cord or wire 12 so that the ends of said bristles will project radially from said thimble when the same is completed. I preferably locate the bristles in sufficiently compact form to form a complete disk, as shown in Fig. 5. It is also desirable to shellac or otherwise treat the bristles so that they will adhere to one another thereby preventing the formation of any gaps or spaces in the continuity of the disk which might otherwise be caused by circumferential displacement of the bristles. After the parts have been assembled as shown in Fig. 8, the thimble sections are placed under pressure so that the outer margins thereof will be collapsed toward each other and against the interposed bristles to clamp the latter in place as shown in Fig. 9. By reason of the clamping pressure of the thimble sections, and because of the shellac applied to the bristles, the latter will be firmly held in place upon the thimble in true disk-like formation.

Next referring to my improved abutment diaphragm, and more particularly to Figs. 6 and 7, 13 designates a clamping thimble similar in all respects to that described in connection with Fig. 8, and between the margin of which is firmly compressed a plurality of sheets or disks 14 and 15, only two being shown in the present construction. These disks may be composed of sheet rubber or other flexible material which is impermeable to liquid and each sheet is provided with a plurality of radially disposed V-shaped slits 16. The slits 16 result in the formation of radially disposed sections 17 which are free to be flexed when under pressure. The disks 14 and 15 are disposed in the thimble 13 in staggered relation, as shown in Fig. 7. Thus imperforate sections 17 will be abreast of the slits of the abutting disk so that flexure of the radial sections 17 will not form gaps through which the liquid could pass, the diaphragm remaining in all positions substantially imperforate to liquid.

Now referring to Fig. 1 it will be seen that the brush units are of larger diameter near

the center than at the ends and the units are selected and strung upon the flexible spindle as shown in said figure. At points *a*, *b* and *c*, I interpose between the brush units the diaphragms shown in Figs. 6 and 7. Between each of the brush units is interposed a spacing element and the same are shown in Fig. 1 as consisting of rubber rings 18. No spacing element is shown between those units which inclose the diaphragms as it is desirable to have the diaphragms in close relation with the brush units, and the diaphragms constitute sufficient spacers. It will be understood that after the brush units and diaphragms have been strung upon the spindle in close relation with each other and with the endmost unit seated against one of the connecting heads, then the remaining connecting head will be secured in place.

In Fig. 2 I have shown a portion of a conduit as designated at 19 illustrating the manner in which the brush cleaning element can negotiate a sharp turn. The cleaning element shown in Fig. 2 is provided with spacing elements comprising alternately arranged rubber spacing rings 18 and metal spacing rings 20. Near the ends of said element I provide coiled wire spacing elements 21 which are preferably of resilient spring wire so that when the units are assembled, these spring spacers will be placed under compression thereby always acting to maintain the units in close abutting relation.

The wire core 1, extends beyond the connecting heads 3 and I mount upon the ends of said wire 1 suitable guiding and propelling elements 22, which are identical in construction. These guiding elements may be in the form of spherical rubber balls suitably secured by pins 23, extending there-through and through the strands of wire core 1, or in any other suitable manner. A suitable space is provided between these guiding elements and the connecting heads 3 so that as the cleaning element approaches a sharp turn, such guiding element, in advance of the brush, will engage the wall of the conduit and act to flex the advance end of the brush in accordance with the curvature of the turn in the conduit. Furthermore, these guiding or propelling elements are sufficiently large in size to approximately fit the interior of the conduit with a good working clearance so that they will arrest the flow of liquid and thereby assist in the propulsion of the cleaning element through the conduit. This will be especially so when the advance guiding element initially enters a turn in the conduit.

Usually, the conduit will be of less diameter than the normal or maximum unflexed diameter of the brush so that as the latter passes through the conduit the peripheral portions of the brush units and diaphragms will be flexed so as to lap against the interior

of the conduit with considerable pressure, thereby greatly enhancing cleaning action.

In the form shown in Fig. 3, all of the spacing elements are formed of simple metal rings 24 and I omit the guiding elements 22.

In the form shown in Fig. 4, the spindle is formed of a wire core 25 about which is disposed a sleeve composed of a coil of spring wire 26 which will be seated against the hubs 5 of the end pieces 3 in a manner similar to the construction shown in Fig. 1. The spring sleeve 26 will preferably be placed under compression when the brush units are assembled thereon and I provide spacing elements 27 composed of simple metal rings. The diaphragms and brush units will be the same in construction in all forms of the invention, but I wish it to be understood that it is not essential that the diaphragms should be composed of flexible material as owing to my improved construction, they could be formed of metal.

It is believed that the advantages and utility of my invention will be clearly understood from the foregoing description and while I have herein shown and described specific forms of my invention, I do not wish to be limited thereto except for such limitations as the claims may import.

I claim:

1. A hose or like conduit cleaning device comprising, a flexible spindle composed of a flexible core, a flexible tube sleeved on said core, a plurality of cleaning units strung upon said sleeve, and connecting heads fixed to said core and abutting against said sleeve and the endmost units to hold the latter in position, substantially as described.

2. A hose or like conduit cleaning device comprising, a flexible spindle composed of a flexible wire core, a flexible tubing sleeved on said core, a plurality of cleaning units strung upon said sleeve, metallic connecting heads, and devices for securing said heads to said core and in abutting relation with respect to said tubing and the endmost units, substantially as described.

3. A hose or like conduit cleaning device comprising a flexible spindle composed of a flexible wire core and a coil spring sleeved on said core, a plurality of cleaning units threaded on said sleeve, and connecting heads anchored to said core in abutting relation with said resilient sleeve to hold the latter under compression and engage the endmost units, substantially as described.

4. A hose or like conduit cleaning device comprising, a flexible spindle, circular bristle units strung on said spindle, and expansively acting spacing devices interposed between said units, substantially as described.

5. A hose or like conduit cleaning device

comprising, a flexible spindle, a plurality of cleaning units disposed on said spindle, expansively acting spacing devices interposed between said units, and connecting heads secured to said spindle and holding said units thereon, substantially as described.

6. A hose or like conduit cleaning device comprising, a flexible spindle, a plurality of circular bristle units strung on said spindle, and flexible diaphragms interposed between adjacent units, substantially as described.

7. A hose or like conduit cleaning device comprising, a flexible spindle, a plurality of circular cleaning units strung on said spindle, and flexible diaphragms interposed between certain of said units and comprising abutting radially slitted imperforate flexible disks with the slits of said disks in staggered relation, substantially as described.

8. A hose or like conduit cleaning device comprising, a flexible spindle, and a plurality of circular cleaning units strung upon said spindle and each comprising a thimble having outwardly flared outer margins and overlapping inner margins, lengths of bristles having their intermediate portions seated peripherally on said inner margins and between the flared margins of said thimble, means for binding such intermediate portions of the bristles to said thimble, said flared margins being crimped against said bristles, substantially as described.

9. A hose or like conduit cleaning device comprising, a spindle, a plurality of cleaning units mounted on said spindle and each comprising a thimble composed of interlocked inner edge sections, and bristles clamped between said sections and projecting radially therefrom, substantially as described.

10. A cleaning unit of the character described, comprising a thimble having outwardly flared outer margins, tufts of bristles having their intermediate portions secured between said margins, the inner of the thimble margins being overlapped upon each other and in clamping relation against said bristles, substantially as described.

11. A flow abutting diaphragm of the character described comprising, abutting flexible disks having radial slits extending to the margins thereof, and a thimble clamped against said disks to hold the latter in abutting relation and with their slitted portions in staggered relation, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE SCHLEMMER.

Witnesses:

JULIUS REICHELT,
ASLAM HOCKER.