Nov. 29, 1932. R. E. BECKERT 1,889,309

FOUNTAIN BRUSH

Filed June 7, 1932

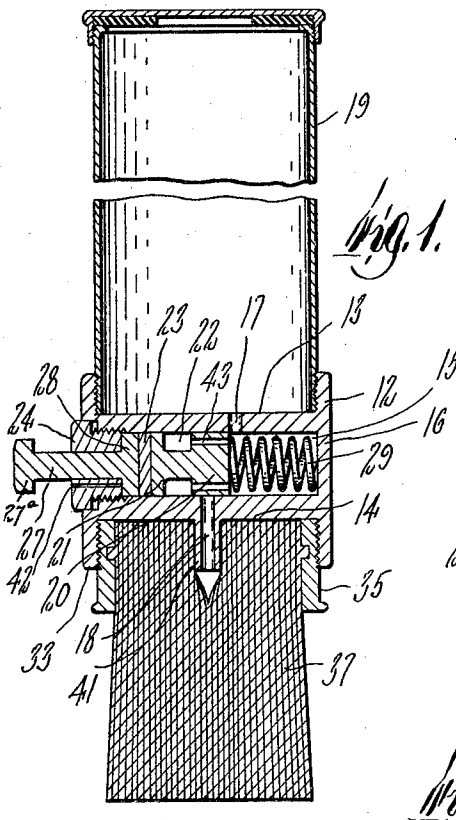


Fig. 1.

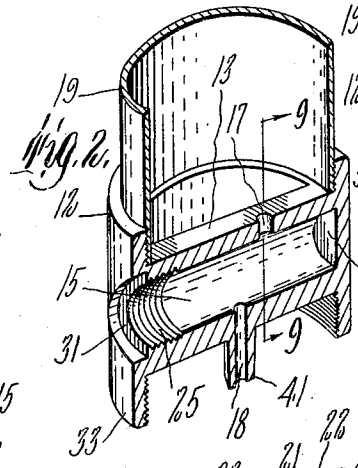


Fig. 2.

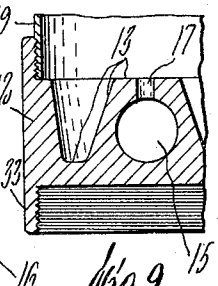


Fig. 9.

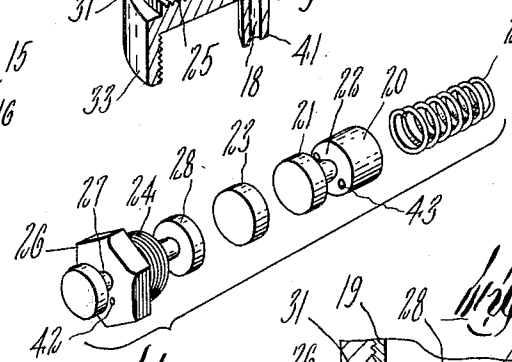


Fig. 3.

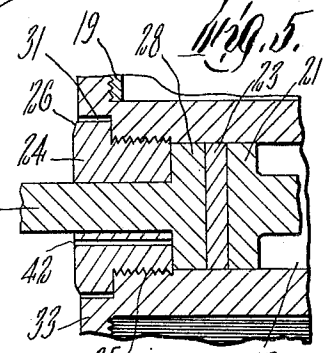


Fig. 5.

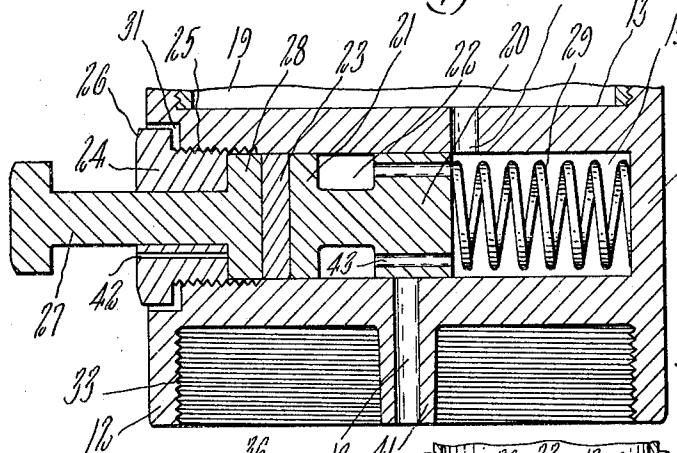


Fig. 4.

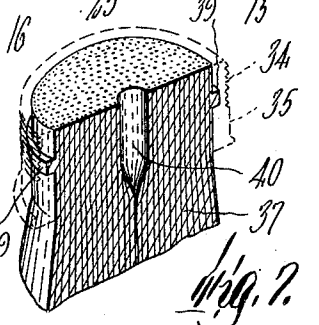


Fig. 7.

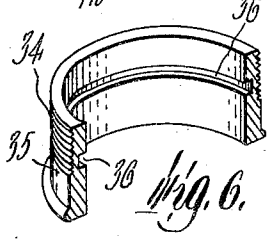


Fig. 6.

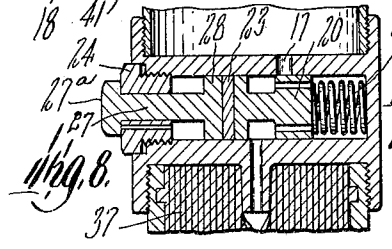


Fig. 8.

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Patented Nov. 29, 1932 1,889,309

UNITED STATES PATENT OFFICE

RICHARD E. BECKERT, OF REVERE, MASSACHUSETTS

FOUNTAIN BRUSH

Application filed June 7, 1932. Serial No. 615,799.

This invention relates chiefly to a fountain brush used to apply liquid such as ink through a stencil plate to a surface on which the plate bears. A brush for this purpose includes a head, a combined reservoir and handle above the head, and a bristle bunch secured in a socket below the head. The head is provided with a force pump, including a barrel, between the reservoir and socket, and with ducts arranged to conduct liquid from the reservoir to the barrel, and from the barrel to the bristle bunch.

The pump includes a piston in the barrel movable in one direction by a plunger extending through a bushing at one end of the barrel, and in the opposite direction by a spring.

One object of the invention is to provide in a fountain brush structure, improved means for preventing leakage of liquid between the plunger and bushing when the liquid is under pressure exerted thereon by the plunger and piston.

Another object is to provide improved means for both firmly securing the bristle bunch to the socket and permitting the convenient removal of the bunch when it is worn out, and requires replacement.

Other objects will hereinafter appear.

Of the accompanying drawing forming a part of this specification,—

Figure 1 is a sectional view of a fountain brush structure embodying the invention.

Figure 2 is a fragmentary perspective sectional view showing portions of the brush head and reservoir.

Figure 3 shows in perspective, and separated from each other, elements of the pump and of the means associated therewith for preventing leakage of liquid between the plunger and bushing.

Figures 4 and 5 are enlargements of portions of Figure 1 showing different adjustments.

Figure 6 is a perspective sectional view of the ring forming an element of the socket.

Figure 7 is a perspective sectional view of the bristle bunch as conditioned by the socket, and as it would appear without the socket.

Figure 8 is a sectional view similar to a portion of Figure 1 showing a different condition.

Figure 9 is a fragmental section on the plane indicated by line 9—9 of Figure 2.

The same reference characters indicate the same parts in all of the figures.

In the drawing 12 designates the brush head, which may be a die casting formed from aluminum, and has a cylindrical or circular periphery, a top face 13 forming the bottom of the reservoir, a bottom face 14 forming the inner end of the bristle bunch socket, a cylindrical pump barrel 15 between said faces, said barrel having an open end and a closed end 16 forming a spring abutment, and upper and lower ducts 17 and 18 extending through said faces, the upper duct 17 connecting the reservoir with the barrel. The lower duct 18 which is out of alinement with the upper duct, connects the barrel with the brush socket.

The reservoir, which constitutes the brush handle, includes a tube 19 fixed in any suitable way to the head 12, so that the top face 13 forms the bottom of the reservoir.

Movable endwise in the barrel 15 is a slide including a duct-opening and closing cylindrical piston 20, and having a peripheral groove 22 which cooperates with the barrel in forming an annular passage extending across the barrel.

A helical spring 29 is interposed between the piston 20 and the closed end 16 of the barrel, and normally holds the piston in the mid length portion of the barrel.

27 designates a plunger movable in a bushing 24 fixed in the open end of the barrel. The plunger is separable from the slide which includes the piston 20, said slide and plunger being provided with means hereinafter described, including a sealing washer, said means cooperating with the spring and slide so that the plunger is normally projected from the head and is adapted to be pushed inward by pressure on its enlarged end portion 27^a to move the piston to the position shown by Figure 8, and thereby compress the spring.

The arrangement is such that when the

plunger is projected from the head, the upper duct 17 is opened, and the lower duct 18 is closed; so that liquid from the reservoir accumulates in the spring-containing end of the barrel, and when the plunger is pushed inward the upper duct is closed and the lower duct is opened, so that during the inward movement of the plunger the accumulated liquid is forced by the piston, under pressure, through the passages 43, the peripheral groove 22, and the lower duct 18 to the brush socket, the pressure of the liquid being sufficient to force sediment out of its path.

To precent the liquid under pressure from taking any course except that above described, or in other words from leaking to the external surface of the head, I provide the means next described.

On one end of the slide which includes the piston 20 is formed a washer pressing disk 21, which incidentally forms one side of the peripheral groove 22. On the adjacent end of the plunger 27 is formed a washer-pressing disk 28, said disks having a sliding fit in the pump barrel. Between the disks 21 and 28 is loosely interposed a discoidal washer 23 of leather or other compressible material. The thickness and diameter of the washer are such that lateral compression of the washer, by pressure of the disks 21 and 28 against its sides, expands its periphery into sealing contact with the barrel. Such pressure is due to the spring when the parts are at rest and positioned as shown by Figures 1 and 4, and to the spring and the muscular force of the operator when the plunger is moving from the position shown by Figures 1 and 4 to that shown by Figure 8. In either case the pressure is sufficient to suitably expand the periphery of the washer, and cause said periphery to effectively oppose leakage of liquid across it.

The bushing 24 is preferally screw-threaded and engaged with an internal thread 25 at the open end of the barrel. The bushing may therefore be adjusted inwardly by rotation after the expanded periphery of the washer has been reduced by wear, to additionally expand said periphery and compensate for wear. The outer end of the bushing may have a polygonal enlargement 26, (Fig. 3), so that it may be conveniently rotated until the enlargement abuts the bottom of a recess 31 formed in the head 12 as shown by Figure 5.

The brush head 12 has an annular internally threaded extension 33 projecting below the bottom face 14, said face forming the inner end of a bristle bunch socket, which is completed by a ring forming the margin of said socket.

Said ring has an externally threaded upper zone 34 screwed into the extension 33 and abutting the bottom face 14, and a non-threaded zone 35 projecting below the extension 33, and formed to be engaged by a pipe wrench.

In the inner surface of said ring is formed a continuous circular groove 36.

37 designates a cylindrical bristle bunch, the inner end portion of which is inserted and compressed in the socket. Said inner end portion is impregnated with cement which is in a plastic condition when the bunch is first inserted, and may be solidified in any suitable way to bind the inner end portions of the bristles together.

A portion of the cement is caused by the compression of the bunch to exude from between the bristles, enter the groove 36, and form a circumferential ridge 39 (Figure 7), on the periphery of the inserted end portion of the bunch. When the cement is hardened, said ridge constitutes a rigid circumferential flange which is firmly interlocked with the surfaces of the groove 36.

The wrench-engaging zone 35 permits the removal of the ring and the brush 37 from the brush head 12 by a pipe wrench. When the ring and bristle bunch are removed, the bristles may be forced out of the ring in any suitable way.

The brush head is provided with a teat 41 through which the duct 18 extends. Said teat forms a hole 40 in one end of the bristle bunch.

To permit the entrance of air into the barrel 15 when the plunger is moving inward, and the escape of air from the barrel when the plunger is moving outward, and thereby permit free movements of the plunger, I provide an air duct 42 extending from the outer to the inner end of the bushing. Said duct is preferably formed wholly in the bushing. It may be otherwise formed, however, as by providing the plunger with a longitudinal groove which is open from end to end, and arranged to permit a flow of air through the bushing.

To reduce the weight of the head 12, the top surface 13 thereof may be diversified as shown by Figures 2 and 9, portions of said surface defining a ridge within which a portion of the pump barrel is formed.

It is obvious that the brush may be used to apply liquids other than ink, such as glue, paint and oil.

I claim:

A fountain brush structure including a head, a liquid reservoir above the head, a brush socket below the head holding a bristle bunch, a cylindrical force pump barrel in the head having a closed end and an open end, an upper duct connecting the reservoir with the barrel, a lower duct out of alinement with the upper duct, connecting the barrel with the socket, a cylindrical slide in the barrel including a piston having longitudinal passages and a peripheral groove communicating with said passages, a helical spring

between the piston and the closed end of the barrel normally maintaining the piston in the mid length portion of the barrel, a bushing engaged with the open end of the barrel, a plunger movable in the bushing and normally projected from the head by the force of the spring, and adapted to be pushed inward to cause a spring-compressing movement of the piston, the arrangement being such that when the plunger is projected from the head, the upper duct is opened, the lower duct is closed, and liquid from the reservoir accumulates in the spring-containing end of the barrel, and when the plunger is pushed inward the upper duct is closed, and the lower duct opened, and the accumulated liquid is forced by the piston under pressure through the piston passages, the peripheral groove, and the lower duct, to the brush socket, the slide and plunger being provided at their adjacent ends with washer-pressing disks having a sliding fit in the barrel, the structure including a discoidal washer interposed between said disks, and peripherally expanded into sealing contact with the barrel by the force of the spring, so that leakage of the forced liquid across the periphery of the washer is prevented.

In testimony whereof I have affixed my signature.

RICHARD E. BECKERT.