Jan. 26, 1954 R. W. DAVISON 2,666,940

BRUSH

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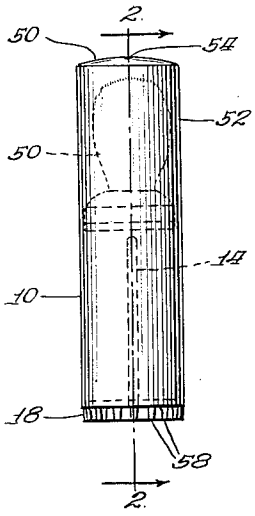


Fig. 1.

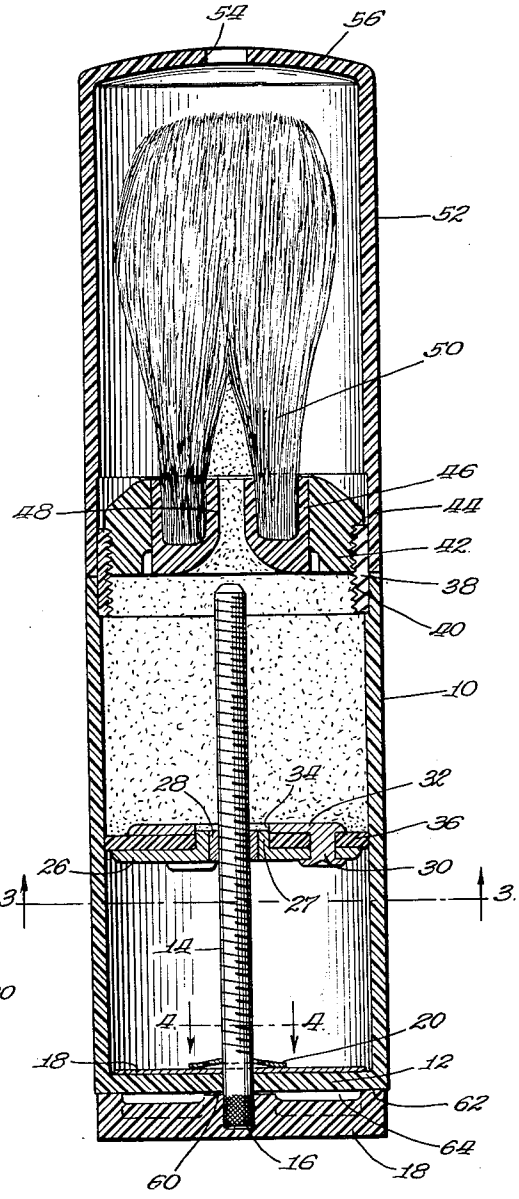
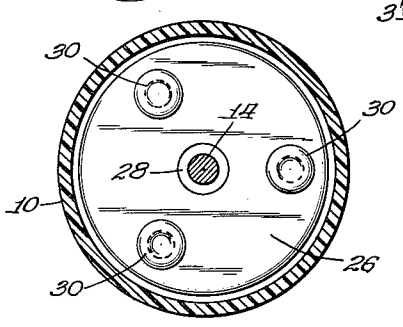


Fig. 2.

Fig. 3.



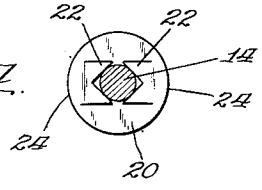


Fig. 4.

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BRUSH

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4 Claims. (Cl. 15—137)

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My invention relates to toilet articles and includes among its objects and advantages the provision of a shaving brush with shaving cream stored in the handle that will be sufficiently effective, sanitary, and convenient to use, to survive continued use. Brushes of this type have been proposed and patented and actually put on the market repeatedly for at least the last 50 years, but to the best of my knowledge, not one has remained permanently on the market, and the substantially universal practice is to keep the paste in a collapsible tube and use the tube to apply paste to a separate brush at the time of shaving.

I believe this failure to result from the fact that prior art devices have been fatally lacking in one or more of several respects. First, the operation of the device at the time of shaving must be a simple, normal movement not requiring great precision or nicety. Second, the friction or other resistance to the movement for expelling the paste must be reliably kept within definite limits. If, after a protracted period of service, the device slips or sticks, the erratic operation resulting will soon result in dissatisfaction and discard. Third, the paste must remain uncontaminated, either by the other materials it contacts or by oxidation, and especially by non-homogeneous intermixing of old and new paste. Fourth, the filling and refilling must be reasonably simple and easy to do without wasting the paste or soiling the hands or other toilet articles. Finally, the operation must be reasonably fool-proof throughout, so that the absent-minded or curious user does not injure the device by incorrect manipulation.

In the accompanying drawings,

Figure 1 is a side elevation of a fountain brush in its casing;

Figure 2 is a section on line 2—2 of Figure 1;

Figure 3 is a section on line 3—3 of Figure 2; and

Figure 4 is a detail section on line 4—4 of Figure 2.

In the embodiment of the invention selected for illustration, the plastic barrel 10 has an internal diameter of about 1.45 inches and a wall thickness about 0.065 inch. The bottom 12 is integral and is axially apertured to receive the feed screw 14 which is $\frac{3}{16}$ inch in diameter and carries left-hand screw threads, 24 threads per inch. The screw 14 is of non-ferrous medium hard aluminum alloy and has a knurled butt 16 fastened in the plastic operating cap 18 by molding the cap on the screw.

To secure a light and substantially permanent

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degree of friction in the turning of the screw, I provide first a large metallic end plate 18 laid in contact with the bottom 12, and a special toggle grip fastening washer 20. The washer 20, as clearly illustrated in Figure 4, has a square central opening to receive the screw 14. The threads on the screw terminate at least a sixteenth of an inch above the point where the washer grips the screw. The square opening is defined by inwardly extending tongues 22 having V-shaped notches in their inner ends, and struck out of the body of the washer. The body of the washer is slightly arched up along a line transverse to the tongues 22 so that when it is pushed down into the position shown with a predetermined force, its edge will bear against the liner 18 substantially at the opposite points indicated at 24 in Figure 4, and the sharp edges of the tongues 22 will slightly indent and press into the material of the screw. This forms a toggle joint such that any tension exerted on the screw merely jams the tongues harder against the screw. In practice it is impossible to disassemble such an assembly without destruction of one or more of the parts.

The piston comprises a die cast lower plate 26 having a central boss 27 with a brass liner 28, and three equally spaced apertures to receive the downwardly extending rivets 30 formed on the die cast cover plate 32, which has a center aperture at 34 snugly fitting the central boss 27 on the bottom plate 26. The disc 36 is of synthetic rubber about $\frac{1}{16}$ inch thick and is punched with apertures to receive the rivets 30. After the parts are juxtaposed the rivets 30 are swedged on the bottom plate 26 to complete the assembly. After the assembly is completed, the assembled piston is set up and the edge of the washer 36 is ground so that the undistorted diameter of the washer exceeds the inner diameter of the barrel 10 by about 0.010 inch. The contact area of the bottom plate 26 terminates short of the wall of the barrel by about the thickness of the washer and the contact area of the top plate 32 has a clearance about twice as great.

Because of these clearances, when the piston is forced upward to expel the contents of the barrel its edge bites with substantial force against the smooth barrel wall, but because the clearance on the following side is only the thickness of the washer, there is relatively little flexure of the projecting edge. However, when the piston has been moved to the top and is being run back down for a refill, there is enough clearance beyond the outer edge of the top plate 32 to allow

substantial flexure and a much lighter wiping contact between the washer and the barrel.

After the parts so far described have all been assembled, I insert a bridge ring 38 of the same plastic material as the barrel 10. This ring sets in a rabbet in the upper end of the barrel 10 and is permanently cemented in place with plastic cement. The ring 38 has interior screw threads 40 to receive co-operating threads on the shank of a nipple 42. The nipple 42 has a shoulder at 44 to limit its movement. The nipple carries a conventional holding ring 46 having an axial aperture at 48 for the exit of paste and a conventional set of hairs or bristles 50 constituting the brush proper.

The cap or cover 52 is a barrel of the same inside diameter as the barrel 10, and its lower open end fits snugly over the bridge ring 38. It differs from the barrel in having its closed end provided with an air vent 54. The upper end 56 of the cap is also slightly dome-shaped. The curvature of the dome is such that if the device is placed on a flat support with the cap lowermost, it will not tip over, but it will stand in a very wobbly way, whereas the flat bottom of the operating head 18 provides a much firmer support, to such an extent that the user can readily tell by the sense of touch which end up he is placing the device.

When such a device is new and is first put in service, the piston is screwed down to the bottom of the barrel and the nipple 42 and brush unscrewed and laid aside. Then the barrel is filled in any convenient way. In the case of paste purchased in a collapsible tube, the tube can be held pointed down over the barrel and squeezed, and the barrel can thus be filled quite quickly and substantially completely without any particular degree of skill or attention being required. Then the nipple is replaced and the device is ready for use.

When the charge in the barrel 10 is nearly exhausted, the washer 36 comes into abutment with the bridge ring 38, and the user experiences an increase in resistance not unlike that experienced when one completes the winding of an ordinary pocket watch and the final tightening of the mainspring of the watch abruptly increases the resistance to movement. When this happens, the user should screw the piston back to the bottom and refill the barrel. It is particularly emphasized that there is nothing less he can do. The parts are strong enough so that only a deliberate attempt to smash them, employing a maximum of muscular force, will injure them, but the user cannot get the piston out to look at it or perform any action of disassembly except the removal of the nipple 42 for refill purposes.

Because the screw 14 is left handed, a right handed user naturally grips the barrel 10 with his left hand and turns the operating head in a clockwise direction, being assisted in gripping the same by suitable irregularities in the edge of the head 18 as indicated at 58 in Figure 1. This is the usual and almost instinctive direction in which to turn the head, but to enable the user to expel the paste by turning in this direction requires that the screw be left-handed.

From the foregoing it will be apparent that I have accomplished at least the objects specifically stated hereinabove. Tests have demonstrated that a product according to the invention is substantially immune from breakage other than intentional breakage and that a single device can be refilled scores of times with any of the common pastes employed for shaving, and still not develop any contamination of the walls of the barrel 10 nor accumulation of material below the piston to an objectionable extent.

Because the washer 20 ordinarily rotates with respect to the liner 18 with relatively light metallic friction contact at a small radius and because the head 18 and bottom 12 are formed so that the central boss 60 is a few thousandths of an inch below the bottom when the peripheral lip 62 is in frictional engagement, with a depressed clearance area 64 intervening, the friction encountered is that of lip 62 rubbing on the bottom 12 with a force determined by the force used to push down the washer 20. Experience indicates that it is possible in mass production to keep this friction force within narrow limits and that in each assembled device, the amount of the friction will remain substantially constant throughout a long period of use.

Others may adapt the invention for use under various conditions of service by employing one or more of the novel features herein disclosed or equivalents thereof. As at present advised with respect to the apparent scope of my invention, I desire to claim the following subject matter:

1. A fountain brush comprising, in combination: a bridge ring having a smooth outer surface in the form of a circular right cylinder, and oppositely facing annular end surfaces in planes normal to the cylinder axis; the interior surface of said ring being threaded from end to end; an apertured brush structure having a threaded portion shaped to fit the threads of said bridge ring, and an abutment shoulder positioned to engage one end of said bridge ring; cup-shaped cylindrical barrels of identical outside diameter; said barrels having identical inside diameter; the inside diameter of said barrels being intermediate between the outside diameter of said bridge ring and the inside diameter of said bridge ring; one of said barrels having an axially shallow rabbet at its open end fitting tightly over one end of said bridge ring, and permanently cemented thereto; the other of said barrels constituting a cap and having a rabbet dimensioned to be a free-sliding fit over the other end of said bridge ring; said last mentioned rabbet being of greater axial dimension than the portion of said bridge ring projecting beyond said axially shallow rabbet; whereby end abutment between said barrels limits the axial movement of said cap when put in place; and means for ejecting the contents of said barrel through said brush structure; said ejecting means being located in the barrel which is fastened to said bridge ring.

2. A fountain brush comprising, in combination: a bridge ring having a smooth outer surface in the form of a circular right cylinder and oppositely facing annular end surfaces in planes normal to the cylinder axis; the interior surface of said ring being threaded from end to end; an apertured brush structure having a threaded portion shaped to fit the threads of said bridge ring, and an abutment shoulder positioned to engage one end of said bridge ring; cup-shaped cylindrical barrels; one of said barrels having a rabbet at its open end fitting over one end of said bridge ring and permanently cemented thereto; the other of said barrels constituting a cap and having a rabbet dimensioned to be a free-sliding fit over the other end of said bridge ring.

3. In a fountain brush unit of the type comprising a one-piece cylindrical barrel having one end open and the other closed; a piston in said

barrel; a piston rod for actuating said piston; said closed barrel end having an axial aperture receiving said piston rod, and closed by said piston rod; a removable apertured brush structure adapted to be mounted in the open end of said barrel; the combination of means for removably receiving said brush and for retaining said piston within said barrel, comprising: a cylindrical bridge ring having internal threads and a smooth outer surface; said barrel at its open end having a rabbet fitting and receiving one end of said bridge ring; said bridge ring being permanently fastened to said barrel; said brush structure having an externally threaded portion adapted to be screwed into the threads in said bridge ring; a shoulder at the end of said threaded portion adapted to abut said bridge ring and limit the inward movement of said brush structure; said bridge ring extending radially inward in the plane of the base of said rabbet to a radius smaller than the diameter of said barrel, whereby said bridge ring prevents the user from removing said piston; and a removable cap for housing said brush structure when not in use; said cap having the shape of a cylindrical continuation of said barrel; said cap having a rabbet adapted to receive the portion of said bridge ring projecting beyond said barrel in sliding engagement; said barrel end defining a shoulder to abut said cap and limit the axial downward movement of said cap.

4. In a fountain brush unit of the type comprising a one-piece cylindrical barrel having one end open and the other closed; a piston in said barrel; a piston rod for actuating said piston; said closed barrel end having an axial aperture receiving said piston rod, and closed by said piston rod; a removable apertured brush structure

adapted to be mounted in the open end of said barrel; the combination of means for removably receiving said brush and for retaining said piston within said barrel, comprising: a cylindrical bridge ring having internal threads and a smooth outer surface; said barrel at its open end having a rabbet fitting and receiving said bridge ring; said bridge ring being permanently cemented to said barrel; said brush structure having an externally threaded portion adapted to be screwed into the threads in said bridge ring; said bridge ring extending radially inward in the plane of the base of said rabbet to a radius smaller than the diameter of said barrel, whereby said bridge ring prevents the user from removing said piston.

ROY W. DAVISON.

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