Feb. 20, 1968 J. R. AYMAR 3,370,214

STABLE RECHARGING STAND FOR BATTERY OPERATED TOOTHBRUSH

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Fig. 1

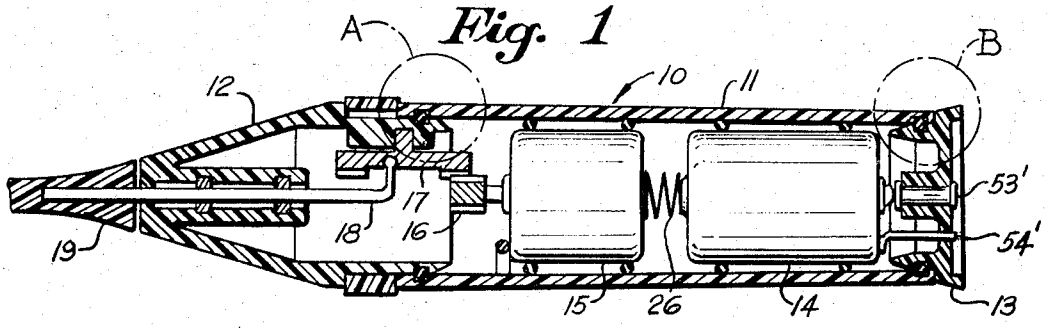


Fig. 2

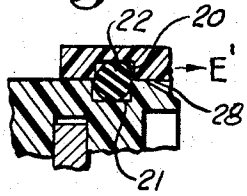


Fig. 3

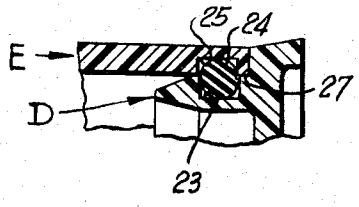


Fig. 5

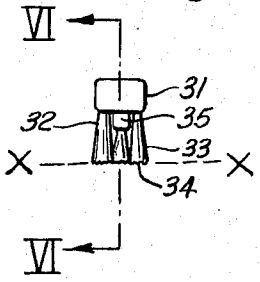


Fig. 4

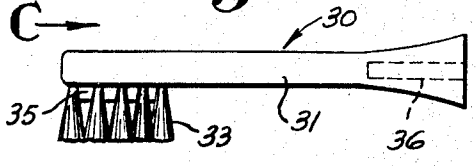
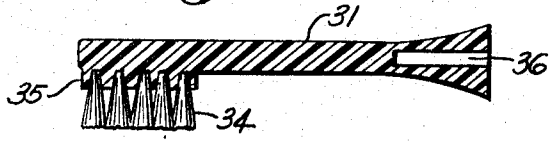


Fig. 6



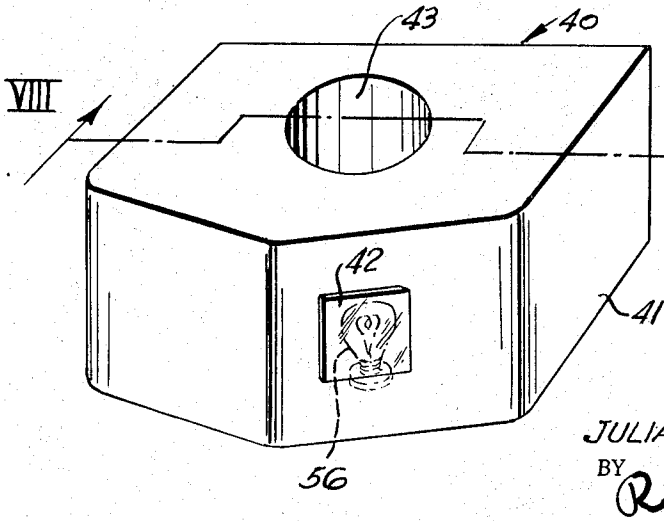


Fig. 7

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Fig. 8

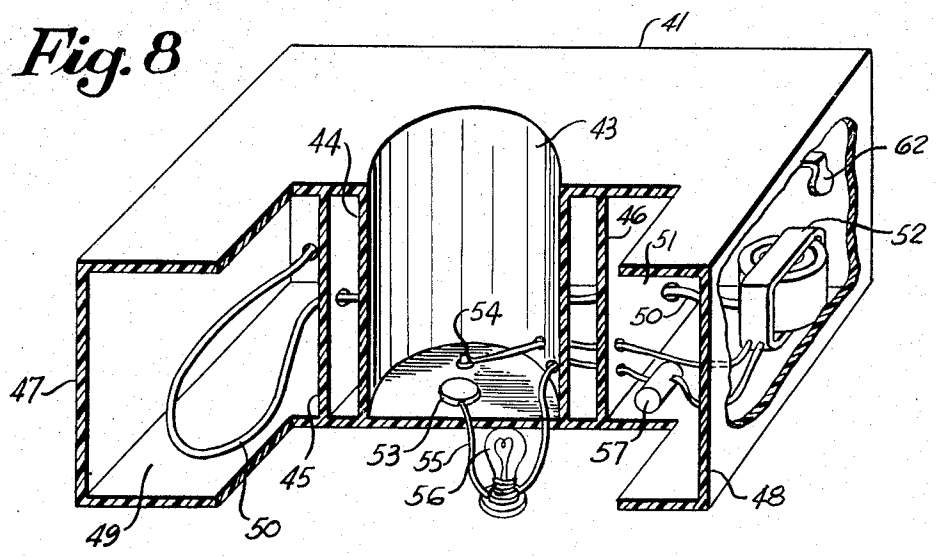


Fig. 10

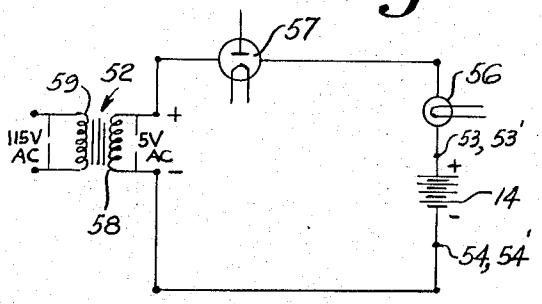
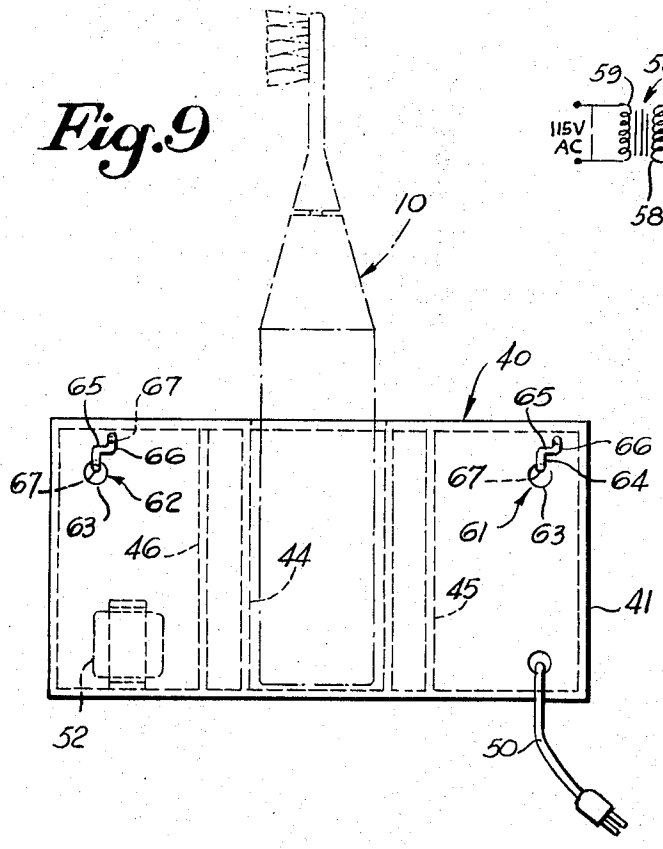


Fig. 9



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3,370,214

STABLE RECHARGING STAND FOR BATTERY OPERATED TOOTHBRUSH

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Filed July 27, 1964, Ser. No. 385,179
1 Claim. (Cl. 320—2)

This invention relates to improvements in mechanical toothbrushes and refers more particularly to improvements in mechanical toothbrush casings, brush element construction and the recharging stand employed with mechanical toothbrushes which are powered by a rechargeable type battery.

In my copending patent application Serial No. 257,239, filed February 8, 1963, now Patent No. 3,160,902 there is disclosed a mechanical toothbrush wherein the brush element is simultaneously reciprocated and oscillated so that the user may employ this movement for brushing the teeth in the preferred manner. I have since made certain improvements in this toothbrush construction with regard to the manner of connecting together the various elements comprising the toothbrush casing. The brush element, and particularly the arrangement of the bristles thereon, has also been improved. An improved battery recharging stand which includes visual, charging indicator means has also been provided.

It is, therefore, a primary object of the present invention to provide an improved mechanical toothbrush.

Another object is to provide a more effective connection of the elements comprising the toothbrush casing.

Still another object is to improve the watertight character of mechanical toothbrush casings.

A further object is to provide an improved brush element for mechanical toothbrushes particularly with regard to increasing the stiffness in the bristles used for cleaning the teeth while maintaining an optimum degree of softness in the bristles utilized for massaging the gums.

Another object is to provide an improved recharging stand for recharging the batteries employed for powering mechanical toothbrushes.

Another object is to provide a battery recharging stand which has visual indicator means for enabling the user to determine at a glance the charging condition of the battery.

Other objects of the present invention will become apparent in the course of the following specification.

The aforementioned objectives of the present invention may be achieved by providing the elongated tubular casing of the toothbrush with annular inner grooves at each end. Similarly, the nose cone at one end of the casing is provided with an annular groove as is the plug which is utilized to close the other end of the casing. When the nose cone and plug are inserted in the casing, the respective grooves align with each other. O rings retained in the grooves prevent relative movement between the various elements, and provide a watertight seal to obstruct the entry of water into the working components of the toothbrush.

In accordance with the present invention, the brush element is provided with outer rows of bristles the purpose of which is to massage the user's gums during brushing. To that end, the bristles are of sufficient length to permit them to flex at the tip so that no harmful abrading of the delicate gum tissue will occur. On the other hand, the inner, row or rows of bristles which actually clean the teeth are shortened to reduce flexing. This is achieved by supporting the bristles in an outstanding block on the body of the brush element. In this manner, the effective length of these bristles may be less than that of the bristles in the outer rows.

According to the invention, the recharging stand comprises a housing for receiving and supporting the toothbrush. Suitable charging means are carried in the housing for recharging the battery in the toothbrush. In addition a visual indicator is connected with the charging means to indicate that the battery is being charged or is fully charged.

The invention will appear more clearly from the following detailed description when taken in conjunction with the accompanying drawings showing, by way of example, preferred embodiments of the inventive concept.

In the drawings:

FIGURE 1 is a longitudinal sectional view of a mechanical toothbrush embodying the improvements of the present invention, the section being taken on a cutting plane passing through the axis of the toothbrush with some of the parts being shown in elevation.

FIGURE 2 is a fragmentary sectional view on enlarged scale of the toothbrush casing included within the circle A shown in FIGURE 1.

FIGURE 3 is a fragmentary sectional view on enlarged scale of the toothbrush casing within the circle B shown in FIGURE 1.

FIGURE 4 is a side elevation view of an improved brush element.

FIGURE 5 is an end elevational view of the brush element shown in FIGURE 4 and as viewed along the arrow C.

FIGURE 6 is a sectional view as taken along line VI—VI of FIGURE 5.

FIGURE 7 is a perspective view of a recharging stand for recharging the battery of a mechanical toothbrush and constructed in accordance with the principles of the present invention, the front of the recharging stand being closest to the viewer.

FIGURE 8 is a sectional view as taken along line VIII—VIII of FIGURE 7.

FIGURE 9 is a rear elevational view of the recharging stand and illustrates the elongated slots in the rear wall of the recharging stand housing by means of which the stand may be mounted on a partition, wall, etc.

FIGURE 10 is a wiring diagram of the recharging stand.

Throughout the specification like reference numerals are used to indicate like parts.

Referring in detail to FIGURE 1, the mechanical toothbrush **10** has a tubular casing **11**, a front nose cone **12** and a rear body plug **13**, the nose cone and rear plug being provided to close and seal the ends of casing **11**. Supported within casing **11** is a nickel cadmium battery **14** which powers motor **15**. A pinion **16** is driven by the motor and meshes with gear **17** which is supported in nose cone **12**, the gear **17** having an eccentric opening in its face for receiving one end of brush rod **18**. When gear **17** rotates, it imparts a combined reciprocating-oscillating motion to brush rod **18** and hence the removable brush element **19** connected therewith. This particular motion and the means for achieving it is the subject matter of my copending application Serial No. 257,239 and as such, is not included per se as part of the present invention.

Referring again to FIGURE 1, the manner of connecting the nose cone **12** and rear body plug **13** to the ends of tubular casing **11** is illustrated within the circles A and B respectively. Referring now to FIGURE 2 which shows in enlarged scale that portion of the connection within circle A, the front end of tubular casing **11** is provided with an inner annular groove **20**. Likewise, the adjacent end portion of nose cone **12** is provided with an annular groove **21**. An O ring **22** is carried in groove **21**. Thus, when nose cone **12** is inserted in the front end of tubular casing **11** and pressed fully into place until the groove **20** and **21** are almost in alignment as shown in

FIGURE 2, the O ring 22 which is of a resilient material, preferably rubber, will expand into and also fill groove 20. The result is that axial relative movement between casing 11 and nose cone 12 is prevented. The same is true of the manner of connecting the rear body plug 13 to the other end of the casing as seen in FIGURE 3. Rear body plug 13 is provided with an annular groove 23 wherein is retained O ring 24. When rear body plug 13 is inserted in the rear end of casing 11, the O ring 24 will snap into a similar groove 25 in the rear end of the casing and relative movement between these two elements is prevented. As seen in FIGURE 1, a spring 26 extending between motor 15 and battery 14 exerts a rearwardly directed force on the battery and hence the rear body plug. The plug thus tends to move out of the casing as shown by arrow D (FIG. 3). However, the O ring 24 prevents this from happening so the O ring deforms against the edges of grooves 23 and 25 as at 27 and effects a totally watertight seal at the rear of the casing. Since the rear body plug 13 tends to move out of the casing 11, it exerts an axial force on the casing in the direction of arrow E (FIG. 3). This force in turn tends to move the casing in the direction of arrow E' with respect to nose cone 12 (FIG. 2). This causes O ring 22 to deform against the edges of grooves 20 and 21 as at 28 so that a watertight seal is also effected at the front of the casing.

Referring to FIGURES 4–6, the brush element 30 comprises a resilient brush body 31 which is provided at one end with parallel outer bristle rows 32 and 33, the bristle rows being made up of a plurality of bristle packs. The outer bristle rows are provided for the purpose of massaging the user's gums during brushing. The bristles are thus rather long to insure flexing at the tips so as to be soothing in contact with the gums. The brush element is also provided with at least one inner row of bristles 34 which are the bristles which are used for scrubbing the teeth. Since these latter bristles must apply a vigorous scrubbing action, it is essential that they remain rather stiff and not flex to any appreciable degree. This is best achieved by shortening the effective length of the bristles which is effected by mounting the shorter inner row bristles in an outstanding block portion 35 on the brush element body 31. The block portion 35 extends longitudinally of the brush body as shown and is symmetrically arranged on the longitudinal centerline of the brush body. In this manner, the tips of the bristles in both the inner and outer rows lie in the same plane X—X (FIG. 5) but the inner row bristles are shorter and will flex less than those in the outer rows. The brush element 30 is provided with a slot 36 for receiving the brush rod 18 (FIG. 1).

FIGURES 7 to 10 illustrate a recharging stand 40 which may be used for recharging the battery 14 in toothbrush 10. As seen in FIGURE 7, the recharging stand 40 has a housing 41 which is provided with a window 42 in its front side and a central cylindrical cavity 43 for receiving the toothbrush 10 as shown in FIGURE 9. Referring in detail to FIGURE 8, the housing 41 has central cavity 43 which is enclosed by cylindrical wall 44. The housing also includes transverse partitions 45 and 46 which with the end walls 47 and 48 respectively enclose a void 49 wherein may be stowed the electric cord 50 by a means of which the recharging stand is connected with a source of electricity, and a void or space 51 for housing transformer 52. A pair of contacts 53 and 54 are located in the housing at the bottom of cavity 43, these contacts being engaged by contacts 53' and 54' on the toothbrush (FIG. 1) when the toothbrush is inserted in the stand for recharging. Contact 53 is connected by wiring 55 with an incandescent lamp 56 which is located in the housing just behind window 42. The lamp 56 is in turn wired to a diode 57 which in turn is connected to the secondary 58 of the transformer. The secondary 58 of the transformer is also connected to the contact 54.

The manner in which the recharging stand operates will be better understood by referring to FIGURE 10. When the toothbrush 10 is inserted in the stand, the contacts 53 and 54 engage the contacts 53' and 54' so that the battery 14 is hooked into the circuitry of the recharging stand. Power cord 50 is then plugged into a 115 volt A.C. source which causes a current flow in transformer primary 50. This is stepped down to 5 volts A.C. in the transformer secondary 58. The diode 57 further drops and converts the recharging circuit voltage to 1.4 volts D.C. The charging current thus flows through the 100 milliamp lamp 56 causing it to light so that it may be seen through window 42 (FIG. 7) as a visual indication that current is flowing through battery 14. Current will continue to flow through the battery until it is fully charged. Thereafter, the battery acts as a high resistance in the circuit so that current continues to flow in the lamp 56. The lamp may thus be used as a night light, etc.

It is also possible to make the recharging stand housing of transluscent material of a thin gauge so that the lamp will be visible without the need for a transparent window 42.

As seen in FIGURE 9, the recharging stand 40 is designed to be supported on a wall surface. For that purpose, the rear wall of the housing is provided with slots 61 and 62. The slots each have a large lower portion 63, and a narrower upper portion 64 which is angled into the two offset branches as at 65 and 66. The housing may be mounted on a pair of wall studs 67 by inserting the lower portion 63 of the slots over the studs, pulling down to force the upper portion 64 around the stud and displacing the housing laterally to pass the angled portions 66 onto the studs. In this manner the housing will remain secured on the studs and cannot accidentally slide off.

While there is disclosed but some embodiments of mechanical toothbrush improvements of the present invention, it is possible to produce still other embodiments without departing from the scope of the inventive concept herein disclosed.

What is claimed is:

1. A recharging stand for recharging the battery of a mechanical toothbrush having electrical contacts, said stand comprising a housing having a bottom, a front side, end walls and a cylindrical wall enclosing a central cavity for receiving the toothbrush, transverse partitions extending between opposed end walls and forming two opposed chambers in the interior of the housing, contacts located upon the bottom of the housing within said cavity and adapted to be engaged by the contacts of the toothbrush, the front side of the housing having a window, an incandescent lamp located within said housing behind said window and connected to one of said contacts, a transformer having primary and secondary wirings and located in one of said chambers, a diode connected to said lamp and to the secondary wiring of said transformer, said secondary wiring being connected to the other one of said contacts, and an electric power cord connected with the primary wiring of said transformer and extending through the other one of said chambers and out of said housing.

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