Feb. 18, 1958 R. M. HYMAN 2,823,404

TWO-PIECE TOOTHBRUSH

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Fig. 1

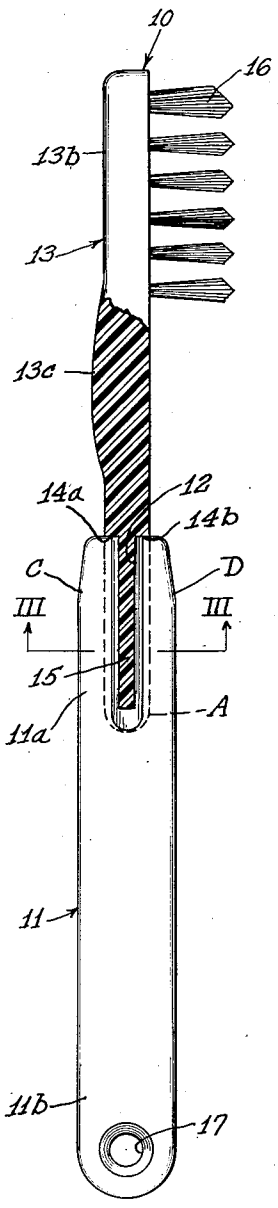


Fig. 2

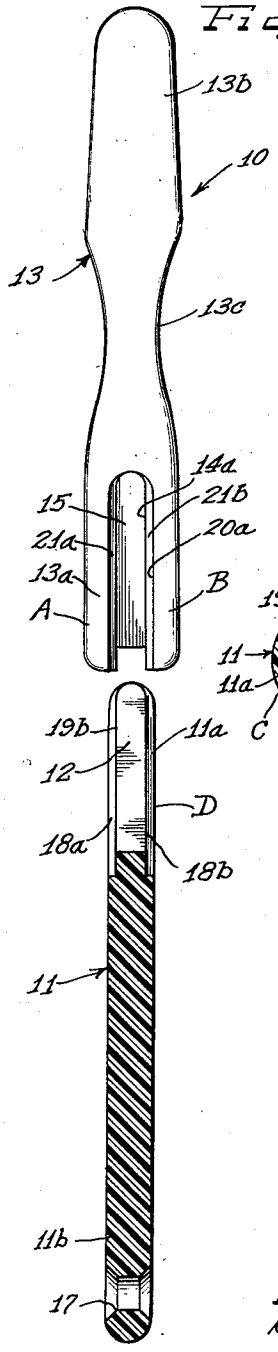
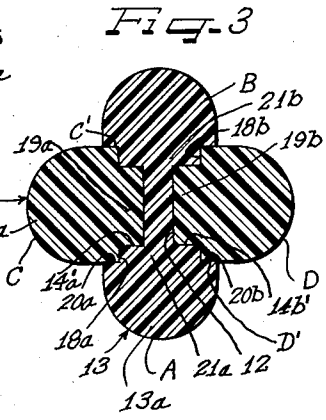


Fig. 3



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TWO-PIECE TOOTHBRUSH

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2 Claims. (Cl. 15—145)

This invention relates to collapsible handles for brushes and the like instruments, and more particularly, to a collapsible toothbrush having a two-piece handle.

A number of prior art workers have suggested collapsible toothbrush structures; but in most instances these leave something to be desired in that they are too awkward to handle, either too complicated or not sturdy enough, too difficult to manufacture, difficult to keep clean, etc. In contrast, the unitary or integral toothbrush handle now employed almost universally made from cellulose acetate or cellulose acetate butyrate has a number of advantages as a toothbrush handle, but such toothbrush handle is not collapsible and, particularly for traveling kits and similar uses where space is of importance, the demand for collapsible toothbrushes has not been satisfied.

The instant invention provides a unique collapsible toothbrush structure which is readily made and readily assembled and disassembled. Moreover, this toothbrush structure may be made of the cellulose acetate and cellulose acetate butyrate materials hereinbefore mentioned as the most acceptable commercially for this purpose. In addition, the instant toothbrush structure provides a handle portion, at the junction between the two pieces of the handle, which has a number of advantages in manual graspability, as well as in assembly and disassembly.

It is, therefore, an important object of the instant invention to provide an improved collapsible toothbrush or similar tool.

It is another important object of the instant invention to provide a collapsible toothbrush formed of a first member having a generally elongated flat body with a generally longitudinally extending slot formed in one end thereof, a second member having a generally flat body with generally longitudinally extending grooves formed on opposite sides of one end thereof and separated by a thin wall fitting into the slot in a snug fit to removably receive the two members together, and brush bristles mounted on the end of one of said members opposite the end thereof secured to the other.

Other objects, features and advantages of the present invention will become apparent to those skilled in the art from the following detailed disclosure thereof and drawings attached hereto and made a part hereof.

On the drawings:

Figure 1 is a side elevational view, with part broken away and part shown in section, of a collapsible toothbrush embodying the instant invention;

Figure 2 is an exploded top plan of the toothbrush assembly of Figure 1, showing part in section; and

Figure 3 is an enlarged detail sectional view of the joined portions of the two members shown in Figure 1 taken substantially along the line III—III of Figure 1.

As shown on the drawings:

A toothbrush, indicated generally by the reference numeral **10**, embodying the instant invention comprises a first member **11** having a generally elongated flat body having a generally longitudinally extending slot **12** formed in one end **11***a* thereof, a second member **13** having a

generally elongated flat body with generally longitudinally extending grooves **14***a* and **14***b* formed on opposite sides of one end **13***a* thereof and separated by a thin wall **15** fitting into the slot **12** in a snug fit to removably secure the two members **11** and **13** together and brush bristles **16** (of the usual type used in a toothbrush) mounted at the end **13***b* of the second member **13** opposite the end **13***a* thereof secured to the other member **11**.

It will be appreciated that the brush bristles **16** might be mounted at the far end **11***b* of the first member with only minor changes in the structure. As here shown, the far end of the first member **11***b* is provided with an aperture **17** so that the brush may be hung on a peg in the customary manner. It will also be appreciated, that the instant brush handle structure is not limited solely to a toothbrush, but may be used on a number of other types of brushes or on tools of comparable character and strength requirements.

As here shown, particularly in Figure 2, the second member **13**, which carries the bristles **16** at its outer end **13***b* possesses the general shape characteristics of a flat elongated body at the securing end **13***a*, but is narrowed somewhat to a substantially circular neck portion **13***c* before flattening out again to provide the bristle mounting head portion **13***b*. This rounded neck portion intermediate the securing portion **13***a* and the bristle bearing portion **13***b* does facilitate the handling of the brush and also adds to the general ornamental character thereof; but the important feature of manual graspability afforded by the instant brush structure **10** is in the secured or interlocking end portions **11***a* and **13***a* of the two members **11** and **13**, respectively. It will be seen that by the use of elongated flattened body members in the regions where the two members **11** and **13** are secured together a cross-section (shown in detail in Figure 3) is provided with the shape of a "plus" sign. In effect, this portion is provided with a central interlocking portion formed by the interengagement of the groove **12** and the thin wall **15** with radially outwardly extending ribs A and B derived from the second member **13** and extending laterally with respect to the brush head **13***b*, and C and D provided by the first member **11** and extending in the vertical plane with respect to the brush head **13***b*. These ridges A, B, C and D provide unusually handy gripping elements which permit rotation of the brush **10** between the thumb and index finger during use thereof and afforded a firm grip as well as guide members in the form of the ridges A, B, C and D to indicate the angle at which the brush head **13***b* and bristle **16** are tilted. In addition, the ridges A, B, C and D afford readily graspable means for disassembling the brush **10**. For example, the first member **11** may be grasped in the palm of the hand and the second member **13** may be slipped off the first member **11** merely by pressure of the thumb against the ridges A or B.

Referring now to Figure 3, it will be noted that there are certain specific structural features in the two members **11** and **13** which afford unique interlocking between the two members **11** and **13** by virtue of complementary grooves and ridges opposing each other so that the grooves on one of the members **11** or **13** will receive the ridges on the other of such members during interlocking engagement. The interlocking groove and ridge arrangement which will be described in detail is of critical importance in the instant invention because it provides secure interlocking by snug or forced fit between the elements **11** and **13** in such a manner that the usual toothbrush forming material such as cellulose acetate and cellulose acetate butyrate may be employed and will hold up under numerous assemblies and disassemblies. A single slot and a single thin wall received in the slot may have a tendency to develop permanent distortion in response to the force fit applied therebetween so as to

fit only loosely after a number of assemblies and disassemblies. On the other hand, an arrangement wherein a force fit is provided between opposed ridges and grooves as well as the main securing fit between the thin wall and the slot provides a number of contiguous face portions whereat force fit conditions exist so that distortion or weakness created in the fit along one pair of contiguous faces will be compensated for by increased friction between another set of contiguous faces.

Referring in detail to Figure 3, it will be noted that the first member **11** has a generally elliptical cross-section, with the major axis extending generally in a horizontal direction and the minor axis extending generally in a vertical direction and the slot **12** therein being aligned generally with the minor axis. The member **11** is bifurcated at the end **11***a* (Figures 1 and 2) to provide a first pair of legs, hereinbefore referred to as the ridges C and D which extend along opposite ends of the ellipse major axis. A first pair of opposed grooves **18***a* and **18***b* are formed along the inside of the first pair of legs C and D thereby defining a first pair of opposed ridges **19***a* and **19***b* extending along the inside of the first pair of legs C and D. It will be noted that the groove **18***a* is cut in from the bottom side (as shown in Figure 3) of the member **11** and is broader than the slot **12** which is defined between the first pair of opposed ridges **19***a* and **19***b*; and the other groove **18***b* is cut in from the top side of the first member **11** so as to define the side walls of the ridges **19***a* and **19***b* on the top side.

The second member **13** is also generally elliptical in cross-section, with the ellipse major axis extending generally vertically (in Figure 3) and the minor axis extending generally horizontally. The general elliptical cross-section of the second member **13** is substantially the same size as that of the first member **11** and this results in the generally plus sign shaped cross-section of the two members in interlocking engagement, thereby providing advantageous gripping means in the form of the ridges or legs A, B, C and D. In the second member **13**, it will be noted that it is bifurcated at the end **13***a* here shown in Figure 3 to provide a second pair of legs A and B extending along opposite ends of the ellipse major axis. A second pair of opposed grooves **20***a* and **20***b* are formed along the inside of the second pair of legs A and B thereby defining a second pair of opposed ridges **21***a* and **21***b* which are received snugly by the first pair of opposed grooves **18***a* and **18***b* in the first member **11**. Actually, it will be noted that the second pair of opposed grooves **20***a* and **20***b* formed in the second member **13** receive and snugly fit inside portions C′ and D′ of the legs C and D. In the next set of grooves **18***a* and **18***b* and ridges **21***a* and **21***b* which interlock, the groove portions **18***a* and **18***b* are formed in the first member **11** and the ridges **21***a* and **21***b* are provided by the second member **13**.

Finally, in the middle of the assembly, the thin wall **15** is received and snugly fit in the slot **12**. However, the thin wall **15** extends between the second pair of ridges **21***a* and **21***b* and defines therewith a third pair of opposed grooves, previously indicated as the only grooves **14***a* and **14***b* or the sole pair of grooves in the generic concept, and indicated in Figure 3 as **14***a*′ and **14***b*′. This third pair of opposed grooves **14***a*′ and **14***b*′ receives the first pair of opposed ridges **19***a* and **19***b* on the member **11** and snugly fits these ridges not only with respect to the thin central wall **15** and slot **12**, but also with respect to the side walls of the grooves **14***a*′ and **14***b*′ and the ridges **19***a* and **19***b*.

In the formation of the instant members **11** and **13**, particularly at the bifurcated ends **11***a* and **13***a* thereof, the elliptical or generally elliptical cross-section should involve a major axis of about one-half inch or about two to four times the minor axis in each case. Actually, the cross-sectional shape is that of a "flattened" ellipse in the preferred embodiment. The slot **12** and thin wall portion **15** should preferably be from about one to about three times the major axis or the maximum lateral dimension of each of the members **11** and **13**; and the members **11** and **13** are generally elongated flattened bodies having lengths of from about five to about ten times the major axis or maximum lateral dimension. The two members **11** and **13** are assembled and disassembled by longitudinal movement with respect to either of them and the slot **12** and thin wall **15** therein are both longitudinally aligned with respect to the members **11** or **13** carrying the same. So also are the various grooves hereinbefore described.

It will be understood that modifications and variations may be effected without departing from the scope of the novel concepts of the present invention.

I claim as my invention:

1. In a collapsible toothbrush, in combination, a first generally elongated member having a generally elliptical cross-section bifurcated at one end to provide a first pair of legs extending along opposite ends of the ellipse major axis, a first pair of opposed grooves formed along the inside of said first pair of legs thereby defining a first pair of opposed ridges extending along the inside of said first pair of legs, said ridges defining therebetween a narrow slot generally aligned with the ellipse minor axis, a second generally elongated member having substantially the same sized generally elliptical in cross-section bifurcated at one end to provide a second pair of legs extending along opposite ends of the ellipse major axis, a second pair of opposed grooves formed along the inside of said second pair of legs thereby defining a second pair of opposed ridges received by said first pair of opposed grooves, a thin wall extending between said second pair of ridges and defining with said second pair of ridges a third pair of opposed grooves receiving said first pair of opposed ridges, said thin wall snugly fitting said slot to removably secure the two members together, and brush bristles mounted on the end of one of said members opposite the end thereof secured to the other, the secured ends of said members having a generally plus sign shaped cross section for improved manual graspability in manipulation of the brush.

2. In a collapsible toothbrush, in combination, a first generally elongated member having a generally elliptical cross-section with a thin slot formed at one end thereof generally along the minor axis of the elliptical cross-section and grooves formed in alignment with said slot and on opposite sides thereof, a second generally elongated member having a generally elliptical cross-section with generally longitudinally extending grooves formed on opposite sides of one end thereof and separated by a thin wall fitting snugly into the slot to removably secure the two members together, said grooves of said first member receiving and snugly fitting longitudinally extending portions of said second member positioned along opposite sides of said wall to further secure the fit between such members, and brush bristles mounted on the end of one of said members opposite the end thereof secured to the other, the secured ends of said members having a generally plus sign shaped cross-section for improved manual graspability in manipulation of the brush.

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