Dec. 23, 1958 P. KAYE ET AL 2,865,039

RETRACTABLE BRUSH

Filed June 7, 1957

FIG. 1

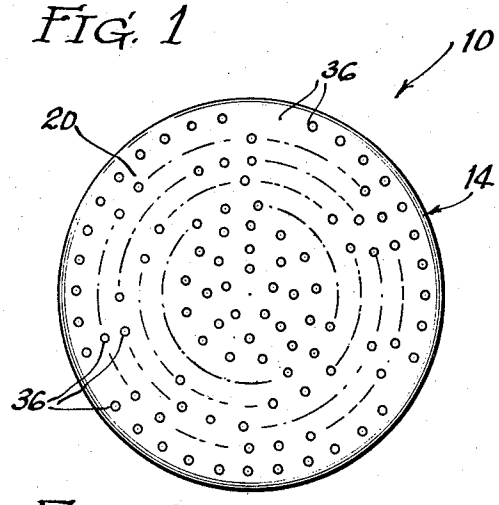
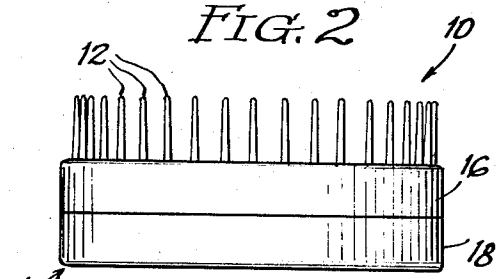


FIG. 2



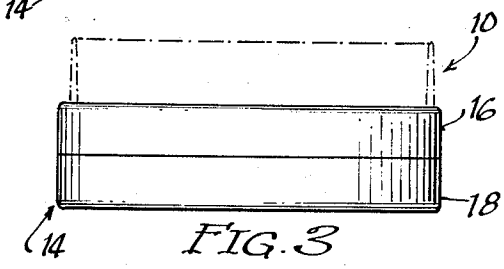
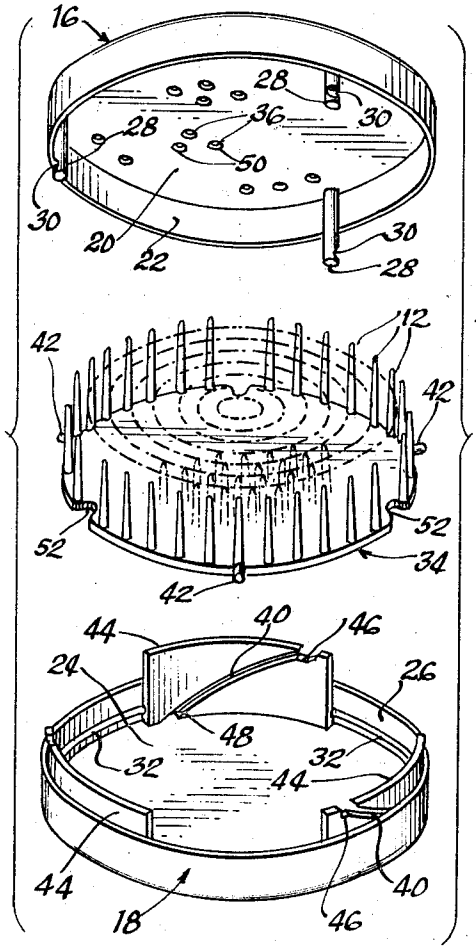


FIG. 3

FIG. 6



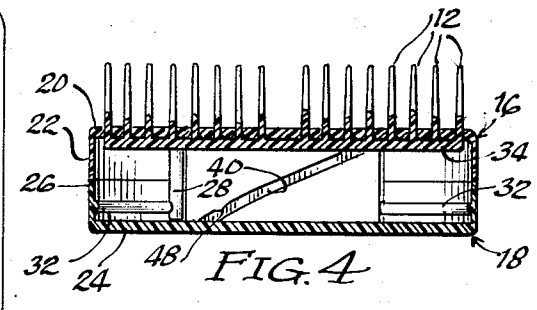


FIG. 4

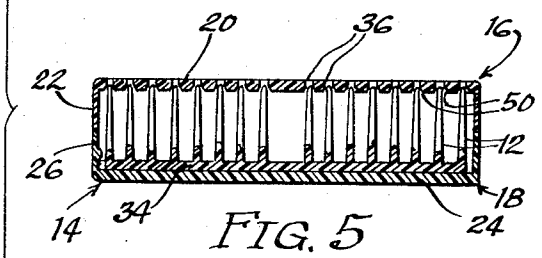


FIG. 5

INVENTORS
Philip Kaye
Edward E. Tate
BY
Dorus, McDougall, Williams & Welsh
Attorneys

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RETRACTABLE BRUSH

Philip Kaye, Norridge, and Edward E. Tate, Chicago, Ill., assignors to Lester R. Peilet, Chicago, Ill.

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11 Claims. (Cl. 15—184)

This invention relates to hair brushes and various other kinds of brushes.

One object of the present invention is to provide a new and improved hair brush or the like in which the bristles are fully retractable into the body of the brush.

A further object is to provide a new and improved retractable brush which is so arranged that it is very easy and convenient to extend and retract the bristles.

Another object is to provide a new and improved retractable brush which is extremely compact and thus is easy to carry in a pocket, purse, handbag or the like.

A further object is to provide a retractable brush which is comparable in size and appearance, when retracted, to a cosmetic compact.

Still another object is to provide a new and improved retractable brush which is extremely useful and attractive in appearance, yet is easy to manufacture and low in cost.

Further objects and advantages of the present invention will appear from the following description, taken from the accompanying drawings, in which:

Fig. 1 is a plan view of a retractable brush to be described as an illustrative embodiment of the present invention.

Figs. 2 and 3 are elevational views of the brush, with the bristles extended and retracted, respectively.

Figs. 4 and 5 are central elevational sectional views, with the bristles extended and retracted.

Fig. 6 is an exploded perspective view of the retractable brush shown in Figs. 1–5.

As already indicated, the drawings illustrate a brush **10** having bristles **12** which are adapted to be extended and retracted so that the brush may be conveniently carried in a pocket, purse or the like, yet will be quickly available for convenient use. The brush **10** is especially well adapted for use as a hair brush, but it may be employed as a clothes brush, or for any other use, as desired.

It will be seen that the bristles **12** are retractable into a body or housing **14**. As illustrated, the housing **14** is generally cylindrical and drum shaped. From Figs. 4–6 it will be apparent that the housing **14** comprises upper and lower opposed hollow half shells **16** and **18** which are generally cup shaped. Thus, the upper half shell **16** has a flat, circular, generally disc shaped top wall **20**, together with a depending cylindrical side wall **22**. Similarly, the lower half shell **18** has a flat circular bottom wall **24** with a cylindrical side wall **26** extending upwardly therefrom. The upper and lower side walls **22** and **26** are positioned in edge to edge sliding engagement.

Means are provided to hold the upper and lower half shells **16** and **18** together, while providing for relative rotation thereof through a limited range. In this case, the upper half shell **16** has a plurality of legs **28** which extend downwardly into the lower half shell **18** just inside the side wall **26**. Each of the legs **28** is formed with an outwardly facing groove **30** which is slidably engaged with a corresponding horizontal ridge **32** on the inside of the lower side wall **26**. In this case, there are three of the legs **28** and three of the ridges or ribs **32**. The engagement between the grooves **30** and the ridges **32** prevents separation of the half shells **16** and **18**, while providing for relative rotation therebetween. The upper and lower half shells **16** and **18** may be made of resilient materials so that the half shells may be deformed slightly to provide for assembly and disassembly of the casing **14**. In assembling the casing, the half shells **16** and **18** are merely pushed together, whereupon the lower ends of the legs **28** will snap over the ridges **32** until the grooves **30** engage with the ridges. It is advantageous to mold the upper and lower half shells **16** and **18** from resinous plastics or the like. Thus, the upper half shell **16** and the legs **28** may be molded in one piece. Likewise, the lower half shell **18** may be molded in one piece.

It will be apparent from Figs. 4–6 that the bristles **12** are mounted on the carrier plate **34** which is movable within the housing **14**. It is highly convenient and advantageous to mold the individual bristles **12** and the carrier plate **34** in one piece from suitable plastics, such as polyethylene, nylon or the like.

It will be seen that the bristles **12** are mounted on the upper side of the carrier plate **34** and are arranged to extend through a multitude of individual openings **36** in the top wall **20**. In this case, each bristle **12** has an individual opening **36**. The engagement between the bristles **12** and the openings **36** connects the plate **34** to the upper half shell **16** for rotation therewith. The bristles **12** are movable through the openings **36** as the plate **34** is moved upwardly and downwardly to advance and retract the bristles.

Means are provided to advance and retract the bristle plate **34** in response to rotation of the lower housing member **18** with respect to the upper housing member **16**. In this case, the lower housing member or half shell **18** is formed with a plurality of cams **40** which are engaged by a plurality of cam follower elements **42** on the bristle plate **34**. The illustrated cams **40** take the form of rather steeply inclined grooves formed in arcuate members **44** on the lower half shell **18**. It will be seen that the members **44** are cylindrically curved and are formed on the lower half shell **18** just inside the side wall **26**. The members **44** and the lower half shell **18** may be molded in one piece. Each groove **40** extends through the corresponding member **44** and is disposed opposite the edge of the bristle plate **34**. The cam followers **42** take the form of pins or ears projecting radially from the edge of the bristle plate **34**. Each ear or pin **42** is received in the corresponding cam groove **40**. In this case, there are three cam grooves **40** and three ears **42**. The members **44** are interspersed between the ridges **32** on the inside of the lower side wall **26**.

In order to lock the bristle plate **34** with the bristles **12** extended, each cam groove **40** is formed with a substantially horizontal or level upper portion **46**. When the ears **42** are positioned in the horizontal portions **46** of the grooves **40**, downward pressure may be exerted on the bristles without causing the bristles to retract into the housing. Thus, the brush may be used vigorously, as in the brushing of hair, without causing the bristles to retract.

In order to prevent accidental extension of the bristles **12** from their retracted position, each cam groove **40** is formed with a detent projection **48** which extends into the groove to a slight extent adjacent the lower end of the groove. The projections **48** detain the ears **42** in the lower ends of the cam grooves **40**, when the bristles **12** are fully retracted. The detaining action of the projections **48** is sufficient to prevent accidental extension of the bristles, while affording only a small, unobjectionable resistance to normal extension and retraction of the

bristles. The ears **42** will readily snap past the projections **48** during normal extension and retraction of the bristles.

It will be apparent from Fig. 6 that the brush **10** may be manufactured in three pieces, comprising the upper casing member **16**, the lower member **18**, and the bristle plate **34** with its integral bristles **12**. The brush may readily be assembled by inserting the bristles **12** through the openings **36** in the upper half shell **16**. The ears **42** are then lined up with the horizontal upper portions **46** of the cam grooves **40**, and the upper and lower half shells **16** and **18** are pushed together so that the grooves **30** in the legs **28** will snap over the ridges **32**. The assembly may be facilitated by forming the bristle openings **36** with downwardly flaring lower portions **50**. Notches **52** may be formed in the edge of the bristle plate **34** to provide adequate clearance for the legs **28**.

The bristles **12** are extended and retracted by rotating the upper and lower casing members **16** and **18** with respect to each other through an angle of about 60°. If the upper half shell **16** is rotated clockwise with respect to the lower half shell **18**, the ears **42** on the bristle plate **34** will ride up the cam grooves **40** and along the horizontal locking portions **46** of the cam grooves. The brush may then be used with all reasonable vigor without causing the bristles to retract.

Rotating the upper half shell **16** in a counterclockwise direction, with respect to the lower half shell **18** will cause the ears **42** to ride down the cam grooves **40** until the ears snap past the detents **48** and enter the extreme lower ends of the grooves **40**. With the bristle plate **34** thus fully retracted, the bristles **12** are withdrawn completely within the housing **14**, as shown in Fig. 5. However, the upper ends of the bristles **12** remain positioned in the openings **36** so that the bristle plate **34** will rotate with the upper half shell **16** when the half shells are again rotated to extend the bristles. It will be understood that the apertured top wall **20** of the casing **14** is effective to strip or clean any hair or other debris off the bristles **12** when the bristles are retracted into the casing.

It will be apparent that the brush is highly serviceable, yet is conveniently retractable. The brush is extremely compact and easy to carry when retracted. Thus, the brush has been made satisfactorily in the actual size shown in the drawings. When retracted, this brush is comparable in size and appearance to a cosmetic compact. Inasmuch as the brush has only three parts, all of which may be molded from plastic materials, the brush may be made at extremely low cost.

Various modifications, alternative constructions and equivalents may be employed without departing from the true spirit and scope of the invention, as exemplified in the foregoing description and defined in the following claims.

We claim:

1. A retractable brush, comprising a generally drum shaped casing having upper and lower generally cup shaped half shells rotatable relative to each other, said upper half shell having a substantially flat generally circular top wall with a multitude of apertures formed therein, a plurality of legs extending downwardly from said upper half shell into said lower half shell, each of said legs having an outwardly facing groove therein, said lower half shell having an inwardly projecting ridge engaging said groove in each of said legs for disengageably retaining said half shells together while providing for relative rotation thereof, a generally disc shaped carrier movable upwardly and downwardly within said casing, said carrier having a multitude of individual bristles formed integrally therewith and extending upwardly therefrom through said apertures in said upper half shell, said lower half shell having a plurality of arcuate members extending upwardly into said upper half shell and formed with respective inclined cam grooves, and a plurality of ears projecting outwardly on said carrier and received in said respective cam grooves for moving said carrier upwardly and downwardly in response to relative rotation of said half shells, said bristles thereby being extensible and retractable through said apertures, said top wall being effective to strip any hair and other debris off said bristles when said bristles are retracted through said apertures, the engagement of said bristles with said apertures being effective to connect said carrier to said upper half shell for rotation therewith, each of said cam grooves having a substantially horizontal locking portion at its upper end for locking said carrier with said bristles extended, each of said cam grooves having a detent element projecting into said groove adjacent the lower end thereof for detaining the corresponding ear with the bristles retracted.

2. In a retractable brush, the combination comprising a housing having hollow generally cup shaped upper and lower members interconnected for relative rotation, said upper member having a top wall with a plurality of openings herein, a bristle carrier plate movably received in said housing and having a plurality of bristles mounted on said plate and extending upwardly therefrom through said openings, the engagement between said bristles and said openings being effective to connect said plate to said upper member for rotation therewith, means on said lower member defining a plurality of angularly spaced inclined cams thereon, and a plurality of cam follower elements on said carrier plate and engaged with said cams for moving said plate upwardly and downwardly and thereby extending and retracting said bristles in response to relative rotation of said members, said cams having substantially horizontal upper portions for locking said carrier plate with said bristles extended.

3. In a retractable brush, the combination comprising a generally drum shaped housing having a pair of opposed generally cup shaped members, means retaining said members in opposed relation while providing for limited relative axial rotation therebetween, one of said members having an end wall with a plurality of openings therein, a plate-like carrier having a plurality of bristles mounted on one side thereof and extending through said openings to connect said plate to said one housing member for rotation therewith, the other of said housing members having means defining a plurality of inclined cam grooves opposite the edge of said carrier, and a plurality of cam follower elements projecting outwardly from the edge of said carrier into said cam grooves for extending and retracting said bristles in response to relative rotation of said housing members, each of said cam grooves having a substantially level locking portion at its upper end for locking said carrier with said bristles extended, each of said groves having a detent element extending into said groove for detaining said cam follower elements with said bristles retracted.

4. In a retractable brush, the combination comprising a housing having hollow upper and lower members interconnected for relative rotation, said upper member having a top wall with a plurality of openings therein, a bristle carrier plate movably received in said housing and having a plurality of bristles mounted on said plate and extending upwardly therefrom through said openings, the engagement between said bristles and said openings being effective to connect said plate to said upper member for rotation therewith, means on said lower member defining a plurality of angularly spaced inclined cams thereon, and a plurality of cam follower elements on said carrier plate and engaged with said cams for moving said plate upwardly and downwardly and thereby extending and retracting said bristles in response to relative rotation of said members, said top wall being effective to clean any hair and other debris off said bristles when said bristles are retracted into said housing through said openings.

5. In a retractable brush, the combination comprising a housing having first and second opposed members,

means retaining said members in opposed relation while providing for limited relative axial rotation therebetween, said first member having an end wall with a plurality of openings therein, a plate-like carrier having a plurality of bristles mounted on one side thereof and extend.ng through said openings to connect said plate to said first housing member for rotation therewith, said second housing member having means defining a plurality of inclined cam grooves opposite the edge of said carrier, and a plurality of cam follower elements projecting outwardly from the edge of said carrier into said cam grooves for extending and retracting said bristles in response to relative rotation of said housing members, each of said cam grooves having a substantially level locking portion at its upper end for locking said carrier with said bristles extended.

6. In a retractable brush, the combination comprising a housing having first and second opposed members, means retaining said members in opposed relation while providing for limited relative axial rotation therebetween, said first member having an end wall with a plurality of openings therein, a plate-like carrier having a plurality of bristles mounted on one side thereof and extending through said openings to connect said plate to said first housing member for rotation therewith, said second housing member having means defining a plurality of inclined cam grooves opposite the edge of said carrier, and a plurality of cam follower elements projecting outwardly from the edge of said carrier into said cam grooves for extending and retracting said bristles in response to relative rotation of said housing members.

7. A retractable brush, comprising a generally drum shaped casing having upper and lower generally cup shaped half shells rotatable relative to each other, said upper half shell having a substantially flat generally circular top wall with a multitude of apertures formed therein, means for disengageably retaining said half shells together while providing for relative rotation thereof, a generally disc shaped carrier movable upwardly and downwardly within said casing, said carrier having a multitude of bristles formed integrally therewith and extending upwardly therefrom through said apertures in said upper half shell, said lower half shell having a plurality of arcuate members extending upwardly into said upper half shell and formed with respective inclined cam grooves, and a plurality of ears projecting outwardly on said carrier and received in said respective cam grooves for moving said carrier upwardly and downwardly in response to relative rotation of said half shells, said bristles thereby being extensible and retractable through said apertures, the engagement of said bristles with said apertures being effective to connect said carrier to said upper half shell for rotation therewith, each of said cam grooves having a substantially horizontal locking portion at its upper end for locking said carrier with said bristles extended.

8. In a retractable brush, the combination comprising a housing having first and second opposed members interconnected for relative rotation, said first member having a plurality of openings therein, a carrier member having

a plurality of bristles mounted thereon, said bristles being movable through said openings to connect said carrier member to said first housing member for rotation therewith, and a plurality of cam means interconnecting said members for moving said carrier member axially and thereby projecting and retracting said bristles through said openings in response to relative rotation of said housing members.

9. In a retractable brush, the combination comprising a housing having first and second opposed members interconnected for relative rotation, said first member having a plurality of openings therein, a carrier member having a plurality of bristles mounted thereon, said bristles being movable through said openings to connect said carrier member to said first housing member for rotation therewith, and a plurality of cam means interconnecting said members for moving said carrier member axially and thereby projecting and retracting said bristles through said openings in response to relative rotation of said housing members, said cam means including locking means for locking said carrier member and said bristles in projected position.

10. In a retractable brush, the combination comprising a housing having first and second opposed members interconnected for relative rotation, said first member having a plurality of openings therein, a carrier member having a plurality of bristles mounted thereon, said bristles being movable through said openings to connect said carrier member to said first housing member for rotation therewith, and a plurality of cam means interconnecting said members for moving said carrier member axially thereby projecting and retracting said bristles through said openings in response to relative rotation of said housing members, said cam means including locking means for locking said carrier member and said bristles in retracted position.

11. In a retractable brush, the combination comprising a housing having first and second opposed members interconnected for relative rotation, said first member having a plurality of openings therein, a carrier member having a plurality of bristles mounted thereon, said bristles being movable through said openings to connect said carrier member to said first housing member for rotation therewith, and a plurality of cam means interconnecting said members for moving said carrier member axially and thereby projecting and retracting said bristles through said openings in response to relative rotation of said housing members, said cam means including first and second locking means for locking said carrier and said bristles in projected and retracted positions respectively.

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