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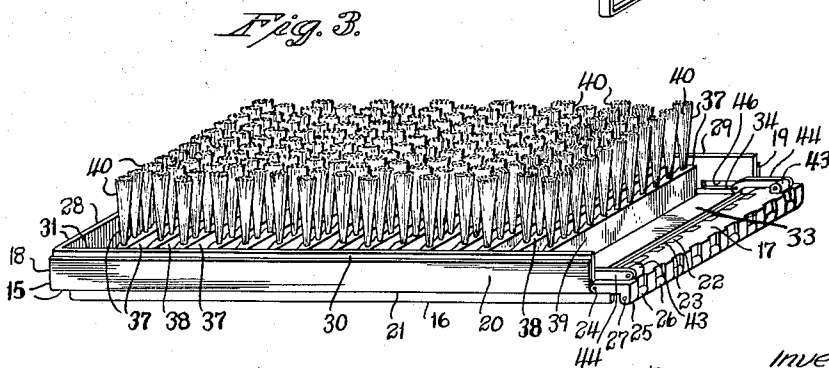
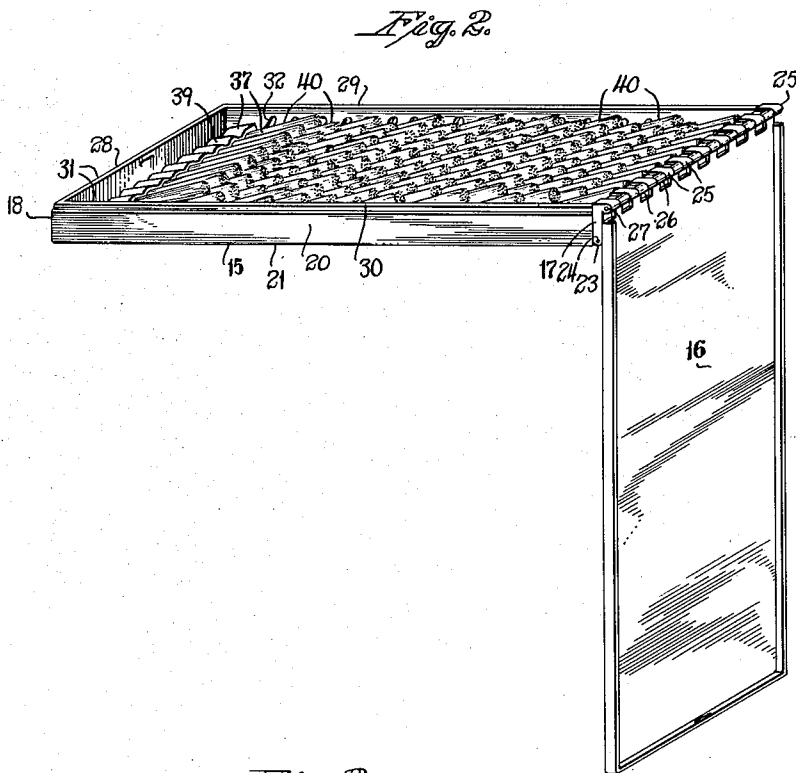
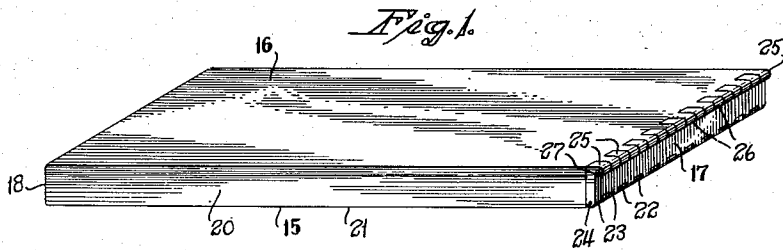
G. E. LA VIETES ET AL

2,507,340

COLLAPSIBLE BRUSH

Filed June 26, 1946

4 Sheets-Sheet 1



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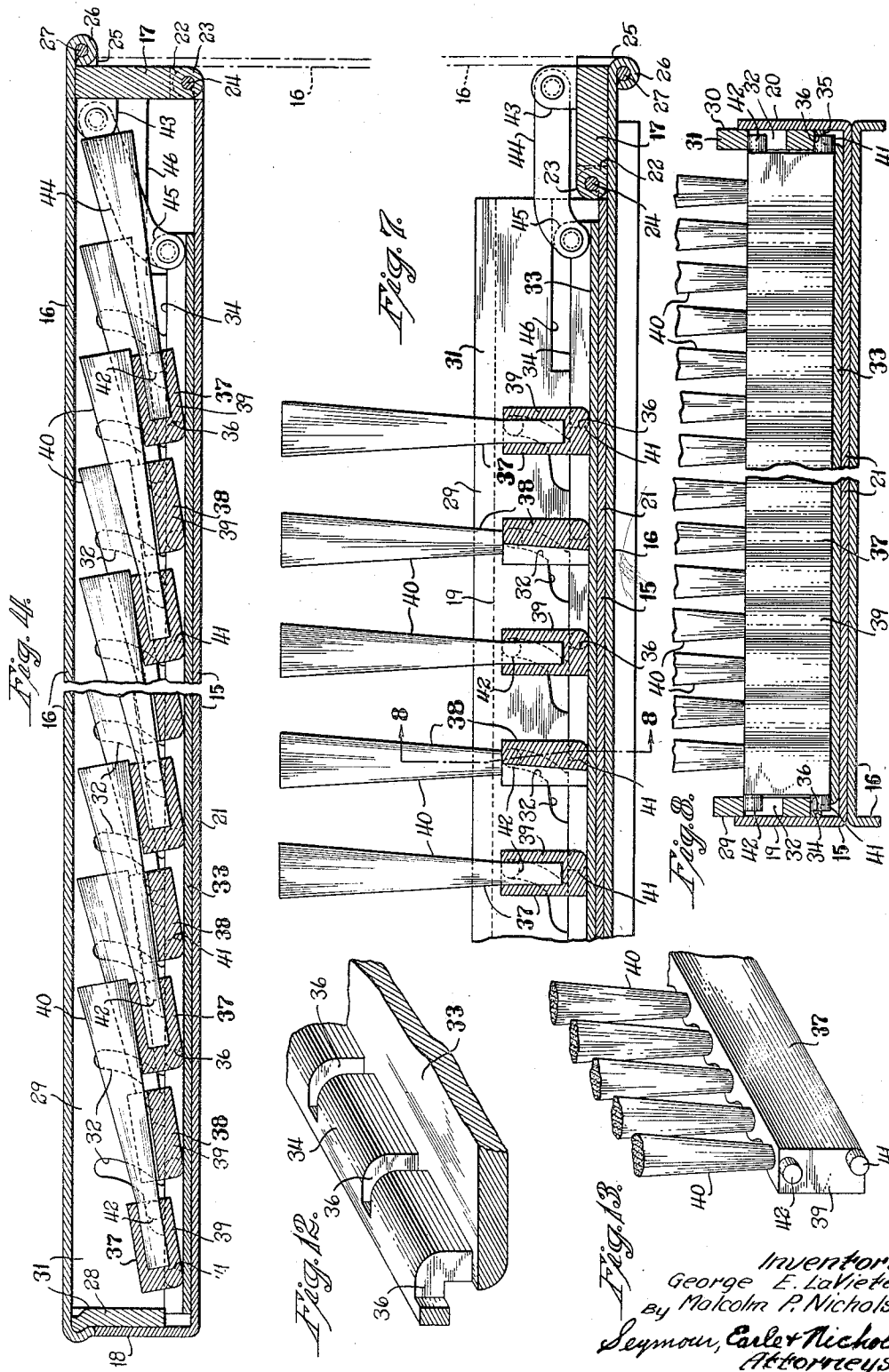
May 9, 1950

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Filed June 26, 1946

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May 9, 1950

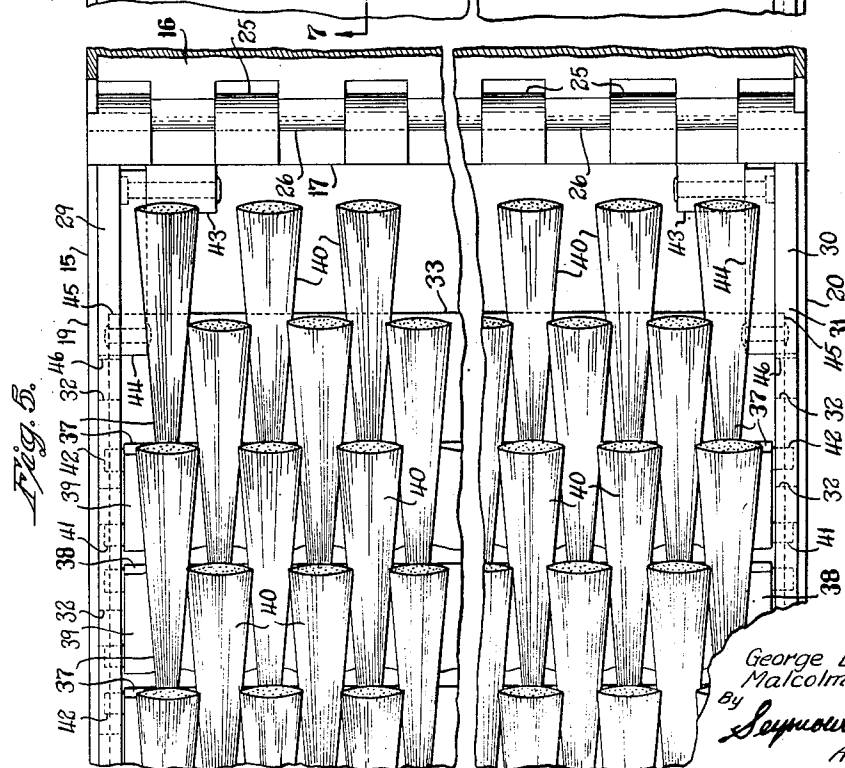
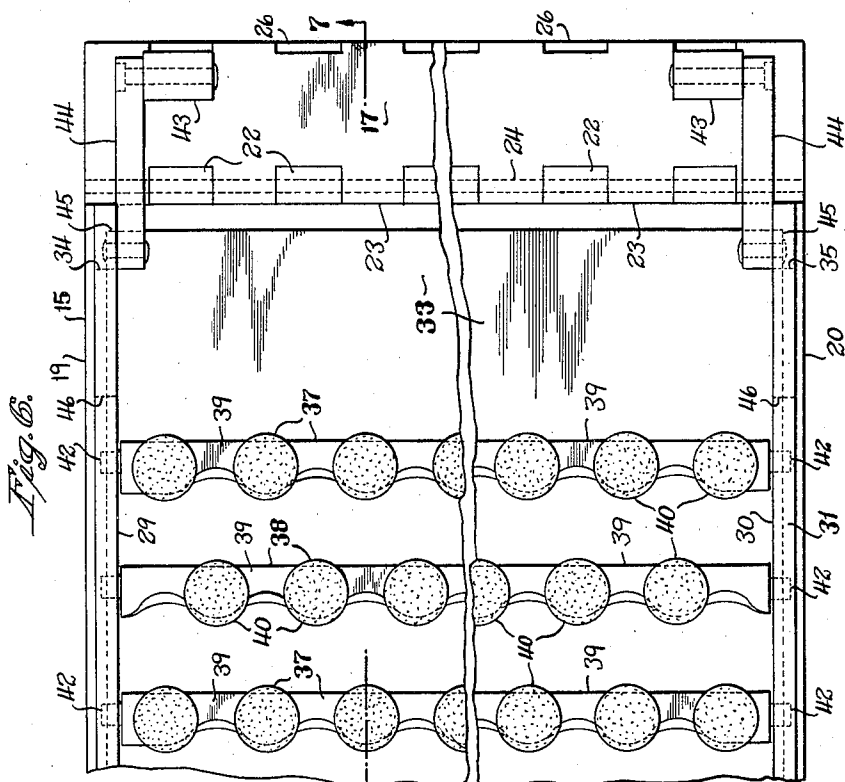
G. E. LA VIETES ET AL

2,507,340

COLLAPSIBLE BRUSH

Filed June 26, 1946

4 Sheets-Sheet 3



May 9, 1950

G. E. LA VIETES ET AL
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2,507,340

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4 Sheets-Sheet 4

Fig. 9.

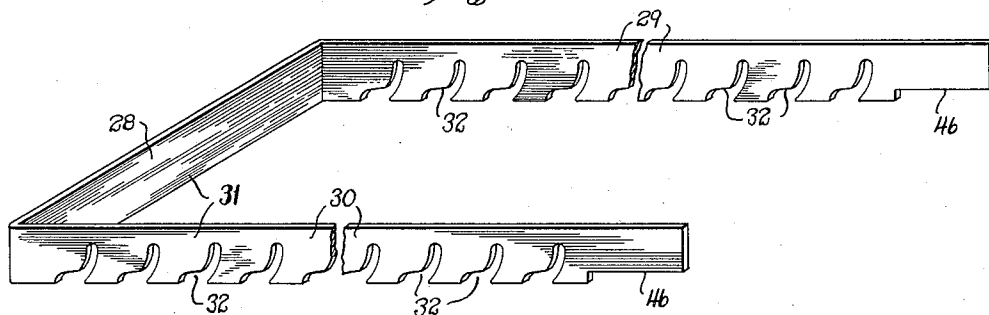


Fig. 10.

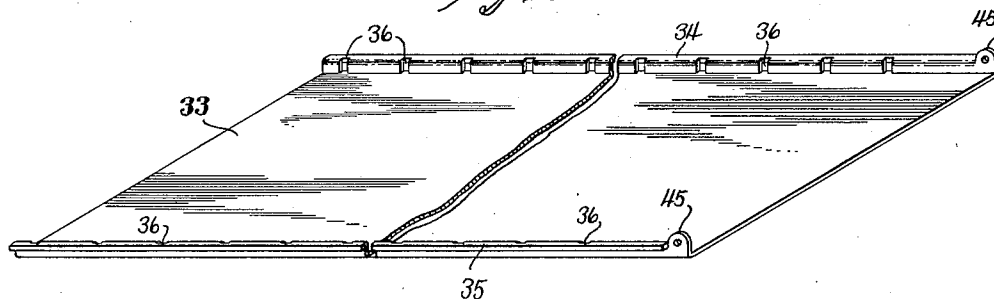
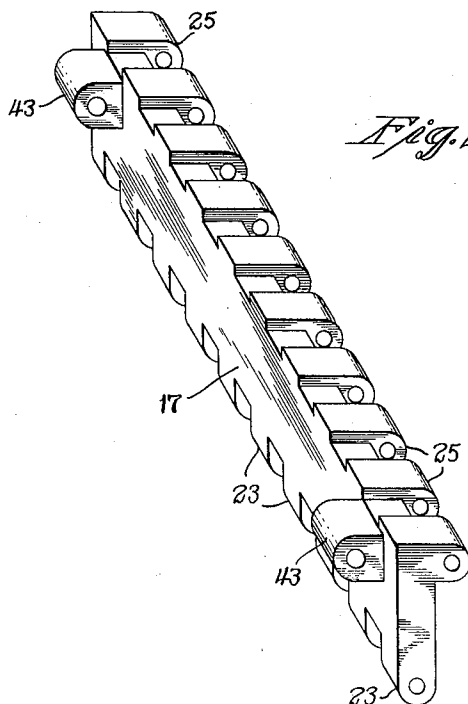


Fig. 11.



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UNITED STATES PATENT OFFICE

2,507,340

COLLAPSIBLE BRUSH

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Application June 26, 1946, Serial No. 679,396

5 Claims. (Cl. 15—203)

1

The present invention relates to improvements in collapsible brushes and relates more particularly to collapsible brushes of the type which may be used as hair brushes or clothing brushes, though available for other uses.

Collapsible brushes have heretofore been proposed but have been open to many objections, among which may be mentioned the fact that the erection and retirement of the brush-elements has been more or less uncertain and has required difficult and generally unsatisfactory manipulation of mechanisms by the user.

One of the main objects of the present invention is to provide a superior collapsible brush having its elements so constructed and arranged that the advancement and retirement of the brush-elements are rendered certain, convenient and almost effortless.

Another object of the present invention is to provide a superior collapsible brush having a plurality of brush-elements pivotally connected to a frame structure, together with operating-means so constructed and arranged as to combine convenience in use and low cost for manufacture.

Another object of the present invention is to provide a superior brush of the character referred to and which includes a casing having two relatively-hinged case-elements, together with operating-means so associated with the said hinged case-elements as to automatically effect the movement of a plurality of brush-elements as an incident to hinging movement between the two said case-elements.

With the above and other objects in view, as will appear to those skilled in the art from the present disclosure, this invention includes all features in the said disclosure which are novel over the prior art.

In the accompanying drawings, in which certain modes of carrying out the present invention are shown for illustrative purposes:

Fig. 1 is a perspective view of a collapsible brush embodying the present invention and shown with the case-cover closed;

Fig. 2 is a similar view but showing the case-cover swung into an open position but with the brush-units still collapsed;

Fig. 3 is a perspective view, but showing the case-cover fully turned against the outer face of the main case-member to effect the advancement or erection of the brush-units;

Fig. 4 is a broken view in longitudinal section of the collapsing brush, showing the brush-units collapsed and the case-cover closed, the parts

2

being shown on a larger scale than in the preceding figures;

Fig. 5 is a broken top or plan view of the right end portion of the collapsing brush with the case-cover partly swung into its open position but with the end wall in its normal position and the brush-units fully collapsed;

Fig. 6 is a view similar to Fig. 5 but showing the parts in the positions which they assume when the case-cover is swung into its fully open position, as is shown in Fig. 3;

Fig. 7 is a broken longitudinal sectional view taken on line 7—7 of Fig. 6;

Fig. 8 is a transverse sectional view taken on the line 8—8 of Fig. 7;

Fig. 9 is a broken perspective view of the brush-guiding member, detached;

Fig. 10 is a similar view of the brush-operating slide, detached;

Fig. 11 is a perspective view of the pivotal end wall, detached;

Fig. 12 is a fragmental perspective view in transverse section on a greatly enlarged scale of a portion of the brush-operating slide; and

Fig. 13 is a fragmental perspective view of one of the pivotal brush-units.

The particular collapsing brush chosen for illustration in the accompanying drawings for purposes of making clear a preferred form of the present invention, includes a main case-member generally designated by the reference character 15 and a case-cover 16 which, together with a lateral or end wall 17, provide a complete casing or enclosure for the reception of pivotal brush-units in a manner as will hereinafter appear.

For purposes of clarity of description, the main case-member 15 may be said to include an integral end wall 18 located opposite the hinged end wall 17 and integral side walls 19 and 20 extending between the hinged end wall 17 and the opposite end wall 18 and integral with the latter. The said main case-member 15 also includes a bottom wall 21 which, in the instance shown, is integral with all three of the lateral walls 18, 19 and 20.

The edge of the bottom wall 21 adjacent the hinged end wall 17 is notched and formed with a plurality of spaced-apart hinge-knuckles 22 interfitting with hinge-knuckles 23 formed on the lower edge of the end wall 17. Both sets of knuckles 22 and 23 jointly receive a hinge-pin 24 by means of which the said end wall is pivotally secured to the adjacent edge of the bottom wall 21.

The upper portion of the end wall 17 is notched at intervals and formed with a series of later-

ally-spaced-apart rearwardly-projecting hinge-knuckles 25 which interfit with hinge-knuckles 26 formed on the adjacent end of the case-cover 16. Extending through both sets of hinge-knuckles 25 and 26 is a hinge-pin 27 serving to pivotally interconnect the upper end of the end wall 17 and the adjacent end of the case-cover 16.

Respectively secured to the inner faces of the walls 18, 19 and 20 of the case-member 15 are the end wall 28 and the side walls 29 and 30 of a brush-guiding member, generally designated by the reference character 31, and of U-shaped longitudinal form. The said member may be secured in place in any approved manner such, for instance, as by solder, welding or cementing.

The inner edge of the brush-guiding member 31 is spaced above the inner face of the bottom wall 21 of the main case-member 15, while its outer edge is extended above the upper edge of the said case-member, all for purposes as will hereinafter appear.

The respective opposite side walls 29 and 30 are each formed with a plurality of guide-notches 32, all inclined in the same direction and intersecting the lower or inner edges of the said side walls 29 and 30.

Interposed between the upper or inner surface of the bottom wall 21 of the main case-member 15 and the inner or under edges of the brush-guiding member 31, is a brush-operating slide generally designated by the reference character 33. The said slide is formed on its respective opposite side edges with upwardly-extending side-flanges 34 and 35, each of which is pierced at spaced intervals corresponding to the intervals between the guide-notches 32, to provide a plurality of sockets 36.

Mounted within the case-member 15 for pivotal movement, are two sets of brush-units respectively generally designated by the reference characters 37 and 38. The said brush-units 37 and 38 each comprise a frame 39 and a series of groups of bristles 40 projecting from one edge of the said frame.

The brush-units 37 and 38 correspond to each other with the single exception that their series of groups of bristles 40 are different in number and differently located in a direction lengthwise of the said frames, in order that the groups of bristles of the series projecting from one frame 39 may fit between a similar group of bristles of the series projecting from an adjacent frame 39. To achieve the result referred to, the brush-units 37 and 38 alternate with each other.

Each of the frames 39 has projecting from its respective opposite ends adjacent its inner or lower edge, one of two integral studs 41, each of which extends into one of the sockets 36 in the adjacent one of the side flanges 34 and 35, as the case may be, of the brush-operating slide 33. Each frame 39 is also formed at its respective opposite ends with one of two studs 42—42 projecting into the guide-notches 32 of the adjacent one of the side walls 29 and 30 of the U-shaped brush-guiding member 31, as the case may be.

On the upper portion of its inner face, the end wall 17 is provided with two inwardly-projecting lugs 43 respectively located adjacent its opposite ends and having respectively pivotally connected thereto, one of a pair of similar links 44—44. The inner ends of the links 44—44 just referred to, are respectively pivotally connected to one of two similar ears 45—45. One of the said ears extends upwardly from each of the side flanges 34 and 35 of the brush-operating slide 33. To provide clear-

ance for the ears 45—45, the under or inner edge of each of the side flanges 29 and 30 of the brush-guiding member 31 is formed with one of two similar clearance-notches 46.

The frames 39 of the brush-units 37 and 38 above described are preferably formed of a suitable plastic, while the groups of tufts or bristles 40 thereof may be formed of nylon or other suitable bristle material. The remaining parts may be conveniently formed of sheet metal, though plastic material has been found to be admirably suited, either alone or in combination with sheet metal.

Operation

For purposes of description, let it be assumed that the flanged case-cover 16 is closed and that the hinged end wall 17 is also closed, as is shown in Figs. 1 and 4. Under these conditions, the brush-units 37 and 38 will be inclined or collapsed into the positions in which they are shown in Figs. 2, 4 and 5.

Now, when it is desired to utilize the brush-structure, the case-cover 16 may be swung into the position shown by full lines in Fig. 2, and by broken lines in Fig. 4, wherein it extends in parallelism and in engagement with the outer face of the hinged end wall 17. The further swinging movement of the case-cover into the position in which it is shown in Figs. 3 and 7, will cause the said case-cover to act as a lever-extension of the end wall 17 and forcibly swing the latter into the position in which it is shown in the figures just referred to.

The described swinging movement of the end wall 17 will pull outwardly upon the links 44 and hence will pull outwardly upon the brush-operating slide 33. The outward movement of the brush-operating slide 33 will pull upon the lower studs 41—41 of each of the frames 39 of the brush-units 37 and 38 and cause the upper studs 42 thereof to ride up into the upper portions of the guide-notches 32 in the brush-guiding member 31. This latter movement will cause the erection or advancement of all of the said brush-units into the positions in which they are shown in Figs. 3, 6, 7 and 8.

Now, by grasping the now-opened casing in such manner as to hold the case-cover 16 against the back face of the main case-member 15, the brush-units 37 and 38 may be firmly held in their erected or advanced positions and the structure conveniently employed as a brush.

When it is desired to collapse or retire the brush-units 37 and 38, the case-cover 16 may be reversed in direction, and when it reaches the position indicated by the broken lines at the right of Fig. 7, it will engage its inner face with the upper edge of the hinged end wall 17 and thereafter act as a lever-extension of the said end wall. By continuing the swinging movement of the case-cover 16 from the position in which it is indicated by broken lines in Fig. 7 into the position in which it is shown, for instance, in Fig. 4, the links 44—44 will be forced inwardly, thereby similarly forcing the brush-operating slide 33 in the same direction.

The described movement of the slide 33 will carry with it the lower studs 41—41 of each of the brush-units 37 and 38 and will force the upper studs 42—42 of the said brush-units to ride down the surfaces of the guide-notches 32, to thus tilt all of the said brush-units and restore them to the positions in which they are shown in Figs. 2, 4 and 5 when the case-cover 16 has reached its fully-closed position, as is shown in Figs. 1 and 4.

5

The invention may be carried out in other specific ways than those herein set forth without departing from the spirit and essential characteristics of the invention, and the present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive, and all changes coming within the meaning and equivalency range of the appended claims are intended to be embraced therein.

We claim:

1. A collapsible brush, including in combination: a casing-structure constructed and arranged to provide a housing for a plurality of pivotal brush-units, the said casing-structure including a main case-member, a plurality of fixed edge walls, and an edge wall pivotally connected to the said main case-member to complete the edge boundaries of the latter; a plurality of brush-units pivotally connected to the said main case-member and constructed and arranged to swing with respect thereto into and out of advanced and retired positions; and brush-operating means operatively interconnecting the said pivotal edge wall and the said plurality of pivotal brush-units to concurrently move the latter into and out of advanced and retired positions with respect to the said main case-member when the said edge wall is swung with respect to the said main case-member.

2. A collapsible brush, including in combination: a casing-structure constructed and arranged to provide a housing for a plurality of pivotal brush-units, the said casing-structure including a first case-member, a second case-member pivotally connected to the said first case-member and a third case-member pivotally connected to the said second case-member to move the same and pivoting about an axis substantially parallel with the pivoting axis of the said second case-member; a plurality of brush-units pivotally connected to the said first case-member and constructed and arranged to swing with respect thereto into and out of advanced and retired positions; and brush-operating means operatively interconnecting the said second case-member and the said plurality of pivotal brush-units to concurrently move the latter into and out of advanced and retired positions with respect to the said first case-member when the said second case-member is swung with respect to the said first case-member by the said third case-member.

3. A collapsible brush, including in combination: a casing-structure constructed and arranged to provide a housing for a plurality of pivotal brush-units, the said casing-structure including a main case-member, a lateral wall pivotally connected to the said main case-member and a case-cover pivotally connected to the said lateral wall to move the same and pivoting an axis substantially parallel with the pivoting axis of the said lateral wall; a plurality of brush-units pivotally connected to the said main case-member and constructed and arranged to swing with respect thereto into and out of advanced and retired positions; and brush-operating means operatively interconnecting the said lateral wall and the said plurality of pivotal

6

brush-units to concurrently move the latter into and out of advanced and retired positions with respect to the said main case-member when the said lateral wall is swung with respect to the said main case-member by the said case-cover.

4. A collapsible brush, including in combination: a casing-structure constructed and arranged to substantially enclose a plurality of pivotal brush-units, the said casing-structure including a main case-member having a fixed lateral wall and a hinged lateral wall; a case-cover hinged to the said hinged lateral wall at an edge of the latter remote from its hinged connection with the said main case-member and constructed and arranged to engage an outer portion of itself with an outer portion of the said hinged lateral wall to function as a lever-extension of the latter; a plurality of brush-units pivotally connected to the said main case-member and constructed and arranged to swing with respect thereto into and out of advanced and retired positions; and brush-operating means operatively interconnecting the said hinged lateral wall of the main case-member to the said plurality of pivotal brush-units to concurrently move the latter into and out of advanced and retired positions when the said hinged lateral wall is swung with respect to the main portion of the said main case-member by the said case-cover.

5. A collapsible brush, including in combination: a casing-structure constructed and arranged to substantially enclose a plurality of pivotal brush-units, the said casing-structure including a main case-member having a fixed lateral wall and a hinged lateral wall, a case-cover hinged to the said hinged lateral wall at an edge of the latter remote from its hinged connection with the said main case-member and constructed and arranged to engage an outer portion of itself with an outer portion of the said hinged lateral wall to function as a lever-extension of the latter; a plurality of brush-units pivotally connected to the said main case-member and constructed and arranged to swing with respect thereto into and out of advanced and retired positions; and brush-operating means including pivotal link-means operatively interconnecting the said hinged lateral wall of the main case-member to the said plurality of pivotal brush-units to concurrently move the latter into and out of advanced and retired positions when the said hinged lateral wall is swung with respect to the main portion of the said main case-member by the said case-cover.

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MALCOLM P. NICHOLS.

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