Feb. 20, 1951 C. G. ROWLAND 2,542,709

BRUSH STRUCTURE WITH BRISTLES HELD IN CHANNEL STRIP

Filed Sept. 27, 1947

Fig. 1

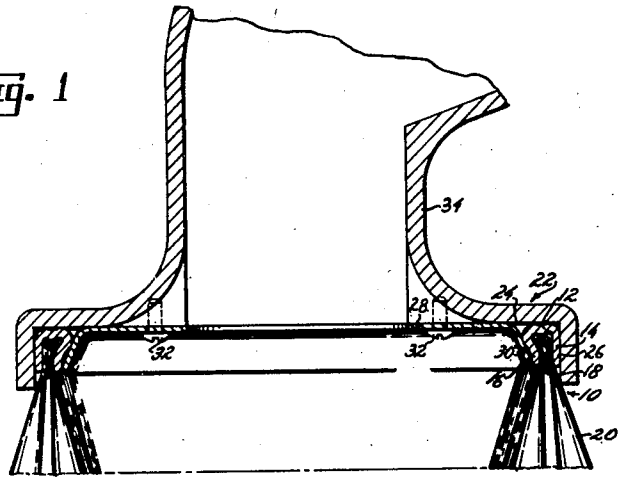


Fig. 2

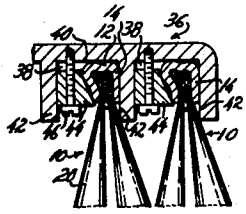


Fig. 3

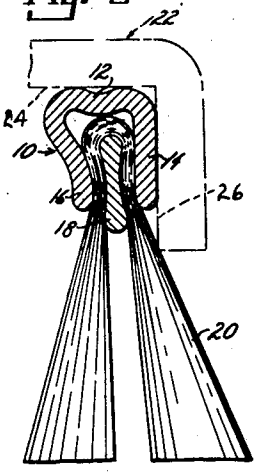


Fig. 4

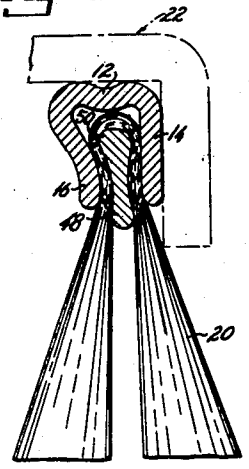


Fig. 5

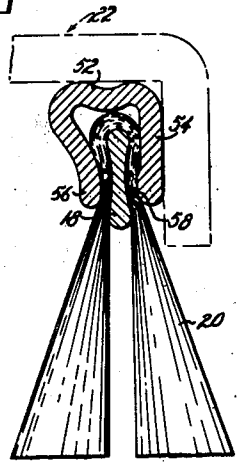


Fig. 6



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BRUSH STRUCTURE WITH BRISTLES HELD IN CHANNEL STRIP

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7 Claims. (Cl. 15—205)

1

The invention relates to a brush element of the type disclosed in the Cave Patent No. 1,871,775, the Thacher Patent No. 1,749,744 and the Rowland Patent No. 2,101,799, and it also relates to a brush including a brush element of the said type.

One object of the invention is to provide a brush element having a bristle-holding channel strip of such shape that it can properly engage with and be secured to a base having a strip-engaging forward facing wall and having a strip-engaging side wall perpendicular to the said forward facing wall. Such a base can be manufactured at considerably less cost than a base with an undercut side wall, but brush elements as heretofore known were not adapted to properly engage with bases having perpendicular walls such as aforesaid.

Another object of the invention is to provide a brush incorporating a brush element such as last above set forth.

Other objects of the invention will be apparent from the drawing and from the following specification and claims.

In the drawing I have shown alternative embodiments of the invention but it will be understood that various changes may be made from the constructions shown and that the drawing is not to be construed as defining or limiting the scope of the invention, the claims forming a part of this specification being relied upon for that purpose.

Of the drawing,

Fig. 1 is a vertical sectional view of a brush embodying the invention.

Fig. 2 is a vertical sectional view of an alternative brush embodying the invention.

Fig. 3 is an enlarged transverse sectional view through a brush element such as shown in Figs. 1 and 2.

Figs. 4, 5 and 6 are views similar to Fig. 3 but showing alternative brush elements.

Referring to the drawing, 10 represents a brush element embodying the invention. The brush element may vary as to details, but as shown in Figs. 1, 2 and 3, it includes a channel which is preferably rolled from a longitudinal strip to provide a rear wall 12 and two side walls 14 and 16, the said walls forming a channel. A longitudinal core member 18 is positioned at least partly within the channel of the channel strip, and bristles 20 constituting a longitudinal layer are folded around the core member within the channel, the end portions of the bristles protruding transversely from the channel through the neck between the front portions of the side walls thereof. During manufacture the bristles 20, while straight, are deposited with the core member 18 on the channel strip before the sides thereof are closed to their final positions. The core member is guided into the channel, thus folding the bristles around it. The sides 14 and 16 of the channel strip are then rolled or pressed against the bristles to bind the several parts together by pressure. The character of the metal of the channel strip is such that the sides of the strip are permanently set so as to maintain the pressure against the bristles.

2

When a considerable spreading of the bristles is required, the core strip 18 has substantially the cross-sectional shape shown and it is positioned with the narrower portion in the neck between the front portions of the side walls and with the wider portions at the rear of the neck and at the front thereof. The wider portion at the front effects spreading of the bristles.

A brush element as shown and described is particularly adapted for use with a suitable base and associated parts to constitute a brush, one form of brush being shown in Fig. 1. A base 22 is provided, and as shown, the base is circular, although the invention is not so limited. The base 22 has a flat downward or forward facing wall 24 and a cylindrical side wall 26 which is adjacent the wall 24 with its inner face perpendicular thereto. When the base 22 is circular, the brush element 10 is circularly curved so as to conform to the curvature of the side wall 26.

The top or rear face of the top or rear wall 12 of the channel strip is flat or substantially flat so as to be in face-to-face engagement with the downward or forward facing wall 24 of the base, and the outer face of the side wall 14 is perpendicular to the rear face of the rear wall 12 so as to be in face-to-face engagement with the perpendicular side wall 26 of the base. As shown, the rear face of the rear wall 12 is not exactly flat but has a slightly concave curvature which provides assurance against any possible convexity. Inasmuch as the rear face of the rear wall 12 engages the forward facing wall 24 of the base along two transversely spaced longitudinal lines, it may be regarded as substantially flat. If desired it may be exactly flat. The other side wall 16 of the base has its outer face inclined laterally inward at an acute angle to the rear face of the rear wall. The width of the inclined side wall 16 is substantially greater than the width of the perpendicular side wall 14, the fronts of the two side walls being thus substantially

equally spaced from the rear face of the rear wall 12.

The lateral inclination of the outer face of the side wall 16 makes it possible for the said side wall to be firmly engaged by a means for holding the channel strip in fixed relation to the base. When the brush element is circularly curved as shown, the means for holding the channel in place may be a circular plate 28 having a flange 30 which is inclined at the proper angle to engage the outer face of the side wall 16. The plate 28 is held in place by screws 32, 32.

While the invention is not so limited, the brush as shown in Fig. 1 is adapted to serve as a cleaning attachment for use in connection with a vacuum cleaner. The base 22 has an integrally formed duct portion 34 which is adapted to be connected with a hose leading to the vacuum cleaner. The plate 28 is centrally apertured to permit the passage of air.

In the manufacture of a base such as 22 a considerable saving in cost can be effected by making the inner face of the side wall 26 perpendicular to the forward facing wall 24. Such a base is ordinarily made by diecasting, and the cost is substantially reduced by the avoidance of any undercut portions. The brush element 10 is constructed to closely fit the relatively perpendicular walls 24 and 26, the outer face of the side wall 14 being perpendicular to the rear face of the rear wall 12. The laterally inclined outer face of the side wall 16 enables the brush element to be held firmly in place, as for instance by the flange 30 on the plate 28. The channel strip of the brush element as shown and described is in contrast with prior channel strips which have been symmetrical with the side walls either parallel or both inclined inward. Prior channel strips having parallel side walls had convex rear walls, rather than flat rear walls.

An alternative brush is shown in Fig. 2, this brush including a plurality of straight brush elements instead of a single circularly curved brush element. A base 36 is provided having a plurality of parallel grooves 38, 38 for the reception of a plurality of brush elements 10, 10. The brush elements 10, 10, as shown in Fig. 2, may be exactly like the brush element 10 as already described except that they are straight instead of circularly curved. Each groove 38 has a flat downward or forward facing wall 40 and a side wall 42 which is adjacent the wall 40 with its inner face perpendicular thereto. The rear face of the rear wall of the brush element 10 in each groove is in face-to-face engagement with the downward or forward facing wall 40, and the outer face of the side wall 14 is in face-to-face engagement with the side wall 42 of the groove. For holding each brush element 10 in place in its groove there is provided a longitudinal bar 44 which engages at one side with the opposite wall of the groove and which is beveled at its other side to engage with the outer face of the inclined side wall 16 of the channel strip. In lieu of a single longitudinal bar 44 there may be two or more longitudinally spaced short blocks. The bar or blocks 44 can be drawn upward or rearward by means of screws 46 so as to firmly engage the channel strip. The economies of manufacture referred to in connection with the base 22 are also applicable to the base 36.

When the channel strip is formed as shown in Figs. 1, 2 and 3, the unsymmetrical side walls 14 and 16 cause the axis of the core member 18 to be positioned at a slight angle, the result being that the bristles 20 are not spread uniformly in both directions. This unsymmetrical arrangement of the bristles may be unobjectionable or it may even be desirable for some purposes. For other purposes, however, it may be desirable to have the bristles symmetrically arranged. In order to provide a symmetrical arrangement a longitudinally extending lateral projection is provided. This lateral projection may be on the core member as shown in Fig. 4 or on the perpendicular channel side wall as shown in Figs. 5 and 6.

The channel strip as shown in Fig. 4 may be exactly the same as that shown in Fig. 3, but a somewhat different core member 48 is provided. The core member 48 is similar to the core member 18 but the wider portion thereof at the rear is unsymmetrical, with a longitudinally extending lateral projection 50 thereon adjacent the inclined side wall 16 of the channel strip. The projection 50 is of such size and shape as to bring the axis of the core member into a position perpendicular to the rear face of the rear wall and parallel to the outer face of the side wall 14. When the axis of the core member is perpendicular as shown by reason of the lateral projection 50, the bristles 20 are arranged symmetrically with the bristle portions at opposite sides of the core member at opposite equal angles to the substantially flat rear wall of the channel.

As an alternative to the construction shown in Fig. 4, the construction shown in Fig. 5 may be provided. The channel strip has a rear wall 52 and side walls 54 and 56. The core member 18 is the same as the core member 18 shown in Fig. 3. The rear wall 52 and the side wall 56 are the same, or substantially the same, as the rear wall 12 and the side wall 16 shown in Fig. 3, but the side wall 54 differs from the side wall 14 in that it is provided with a longitudinally extending lateral projection 58 on the inner side thereof adjacent the front. This lateral projection is of such size and shape that it serves to position the core member 18 with its axis perpendicular to the rear face of the rear wall 52 and parallel with the outer face of the side wall 54.

A shaped core member as shown in Figs. 3, 4 and 5 is provided when it is desired to obtain a considerable spreading of the bristles 20. When a lesser spreading of the bristles is sufficient, a round wire core member 60 may be provided which is entirely within the channel of the channel member. The channel member has a rear wall 62 is shown as having an entirely flat rear 62 and the side wall 66 may be the same, or substantially the same, as the rear wall 12 and the side wall 16 shown in Fig. 3. However, the rear wall 62 is shown as having an entirely flat rear face, but this is optional. The side wall 66 has a longitudinally extending lateral projection 68 on the inner side thereof adjacent the front. The projection 68 is of such size and shape as to provide a symmetrical arrangement of the bristles 20.

What I claim is:

1. A brush element comprising in combination, a longitudinal channel strip having a rear wall and two side walls forming a channel which strip has the rear face of its rear wall substantially flat and has one side wall positioned with its outer face perpendicular to the rear face of the rear wall, the said strip having its other side wall positioned with its outer face inclined laterally inward and at an acute angle to the rear face of the rear wall which inclined side wall is substantially wider than the said perpendicular side wall so that the fronts of the two side walls are

substantially equally spaced from the rear face of the rear wall, a longitudinal core member at last partly within the channel, and bristles folded around the core member within the channel and having their end portions protruding transversely from the channel through the neck between the front portions of the side walls thereof.

2. A brush element comprising in combination, a longitudinal channel strip having a rear wall and two side walls forming a channel which strip has the rear face of its rear wall substantially flat and has one side wall positioned with its outer face inclined laterally at an acute angle to the rear face of the rear wall and has the other side wall positioned with its outer face perpendicular to the rear face of the rear wall, a longitudinal core member at least partly within the channel, and a longitudinally extending lateral projection for maintaining a relationship between the core wire and the channel neck such that the bristle portions at opposite sides of the core member are at opposite equal angles to the substantially flat rear wall of the channel.

3. A brush element comprising in combination, a longitudinal channel strip having a rear wall and two side walls forming a channel, the rear face of the rear wall being substantially flat and one side wall having its outer face inclined laterally at an acute angle to the rear face of the rear wall and the other side wall having its outer face perpendicular to the rear face of the rear wall, a longitudinal core member having a relatively thin portion in the neck between the front portions of the channel side walls and having wider portions at the rear and at the front of the neck, the said wider portion at the rear of the core member having a longitudinally extending lateral projection at the side thereof adjacent the inclined channel wall, and bristles folded around the core member within the channel and having their end portions protruding transversely from the channel through the said neck at the sides of the core member and between the said member and the front portions of the channel side walls, the bristle portions at opposite sides of the core member being at opposite equal angles to the substantially flat rear of the channel.

4. A brush element comprising in combination, a longitudinal channel strip having a rear wall and two side walls forming a channel, the rear face of the rear wall being substantially flat and one side wall having its outer face inclined laterally at an acute angle to the rear face of the rear wall and the other side wall having its outer face perpendicular to the rear face of the rear wall and having a longitudinally extending lateral projection on the inner side thereof adjacent the front, a longitudinal core member at least partly within the channel, and bristles folded around the core member within the channel and having their end portions protruding transversely from the channel through the neck between the front portion of the inclined side wall and the lateral projection on the perpendicular side wall, the bristle portions at opposite sides of the core member being at opposite equal angles to the substantially flat rear of the channel.

5. A brush element comprising in combination, a longitudinal channel strip having a rear wall and two side walls forming a channel, the rear face of the rear wall being substantially flat and one side wall having its outer face inclined laterally at an acute angle to the rear face of the rear wall and the other side wall having its outer face perpendicular to the rear face of the rear wall and having a longitudinally extending lateral projection on the inner side thereof adjacent the front, a longitudinal core member having a relatively thin portion in the neck between the front portion of the inclined side wall and the lateral projection on the perpendicular side wall, the said core member having wider portions at the rear and at the front of the neck, and bristles folded around the core member within the channel and having their end portions protruding transversely from the channel through the said neck at the sides of the core member, the bristle portions at opposite sides of the core member being at opposite equal angles to the substantially flat rear of the channel.

6. A brush comprising in combination, a base having a flat forward facing wall and an adjacent side wall perpendicular to the first said wall, a longitudinal channel strip having a rear wall and two side walls forming a channel, the rear face of the rear wall of the channel strip being substantially flat and in face-to-face engagement with the said forward facing wall of the base and one side wall of the channel strip having its outer face in face-to-face engagement with the said side wall of the base and the other side wall of the channel strip having its outer face inclined laterally at an acute angle to the rear face of the rear wall of the said strip, a longitudinal core member at least partly within the channel, bristles folded around the core member within the channel and having their end portions protruding transversely from the channel through the neck between the front portions of the side walls thereof, and means connected with the base and engaging the outer face of the inclined side wall of the channel strip to hold the said strip in fixed relation to the base.

7. A brush comprising in combination, a base having a flat forward facing wall and an adjacent cylindrical side wall perpendicular to the first said wall, a circularly curved longitudinal channel strip having a rear wall and two side walls forming a channel, the rear face of the rear wall of the channel strip being substantially flat and in face-to-face engagement with the said forward facing wall of the base and one side wall of the channel strip having its outer face in face-to-face engagement with the said cylindrical side wall of the base and the other side wall of the channel strip having its outer face inclined laterally at an acute angle to the rear face of the rear wall of the said strip, a circularly curved longitudinal core member at least partly within the channel, bristles folded around the core member within the channel and having their end portions protruding transversely from the channel through the neck between the front portions of the side walls thereof, and means connected with the base and engaging the outer face of the inclined side wall of the circularly curved channel strip to hold the said strip in fixed relation to the base.

CLARENCE G. ROWLAND.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,549,258	Jernholm	Aug. 11, 1925
1,845,209	Thatcher	Feb. 16, 1932
2,108,742	Bickel	Feb. 15, 1938

Certificate of Correction

Patent No. 2,542,709 February 20, 1951

CLARENCE G. ROWLAND

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows:

Column 4, line 53, strike out the words "is shown as having an entirely flat rear" and insert instead *and side walls 64 and 66. The rear wall*;

and that the said Letters Patent should be read as corrected above, so that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 5th day of June, A. D. 1951.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.