Oct. 13, 1925. 1,557,166

H. J. HORN

METAL BRUSH

Filed April 7, 1923

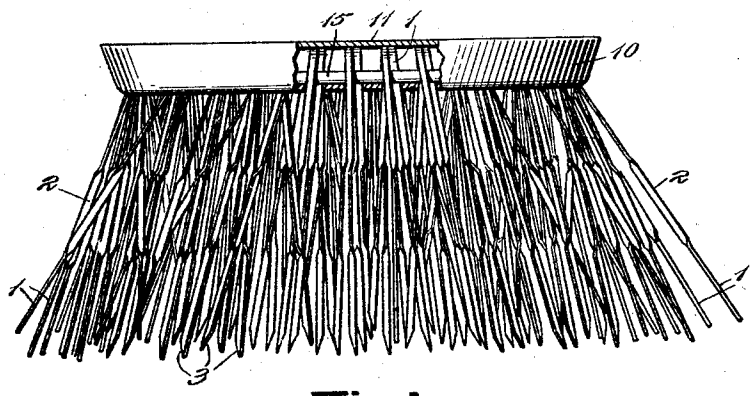


Fig. 1.

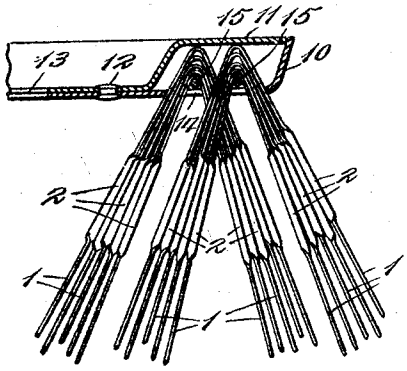
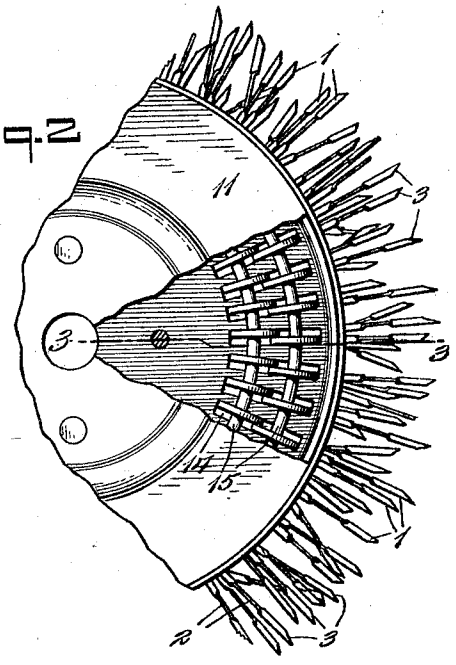


Fig. 3

Fig. 2



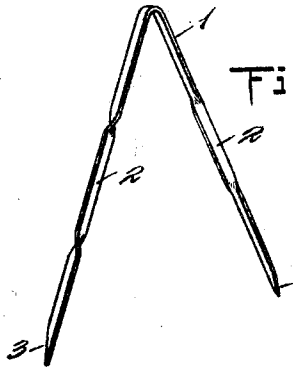


Fig. 4.

INVENTOR

Harold J. Horn

BY

Philip Dunwoody Rice Kennedy

ATTORNEYS

Patented Oct. 13, 1925. 1,557,166

UNITED STATES PATENT OFFICE.

HAROLD J. HORN, OF TRENTON, NEW JERSEY, ASSIGNOR TO JOHN A. ROEBLING'S SONS COMPANY, OF TRENTON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

METAL BRUSH.

Application filed April 7, 1923. Serial No. 630,445.

To all whom it may concern:

Be it known that I, HAROLD J. HORN, a citizen of the United States, residing at Trenton, county of Mercer, and State of New Jersey, have invented certain new and useful Improvements in Metal Brushes, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to improvements in wire brushes.

It is the principal aim of the present invention to provide an improved form of wire bristle which may be advantageously used in revolving brushes of the motor driven type commonly employed for scraping and cleaning purposes. In prior brushes of this kind, breakage of the wire bristles at or near the brush head or point of support, due to lack of efficient means for preventing localized bending and resultant crystallization of the metal at this point, not only materially shortens the life of the brush, but during the entire period of use its efficiency gradually diminishes until it is useless. Briefly stated, the invention avoids localized bending of the bristles at or near the point of support by providing each bristle with a flattened portion, intermediate its free end and base or point of support, of sufficient area to receive and distribute the bend of the bristle without crystallization of the metal at this point. The invention also provides novel means for positioning the bristles so that when they are formed of either round or flat metal, such intermediate flattened portion on each bristle will face in the direction of rotation of the brush so as to readily flex at this point when bending strains are imposed thereon. In the case of flat metal, also, the bristles will be so positioned as to rotate in an edgewise direction except with respect to such flattened portion, whereby any bending strains imposed thereon and not taken care of by such flattened portion, will be resisted at the base sufficiently to prevent breakage at that point. The above features, in connection with the means for holding the bristles in the brush head, provides a brush having not only the characteristics of simplicity and cheapness in manufacture, but also high efficiency and very long life.

To enable the invention to be fully understood. it will now be described in detail in connection with the accompanying drawings and the novel features thereof then be specifically pointed out in the claims.

In the drawings—

Figure 1 is a side elevation of the brush with the brush head casing partly broken away;

Figure 2 is a top plan view of a portion of the same with the brush head cover plate broken away to show the manner of positioning and securing the bristles in place;

Figure 3 is a section on the line 3—3 of Fig. 2, and

Figure 4 is a detail perspective view of one of the improved metallic bristles.

Referring now to the drawings, the brush head comprises a member 10, preferably dish-shaped, as shown, having a cover plate 11 which is depressed in its central region so as to lie against the bottom of the member 10, to which it may be readily secured by rivets 12 at such point, after the bristles have been inserted as hereafter explained. The member 10 and cover plate 11 have central registering openings 13 to enable the brush to be mounted on the end of a motor or other power driven shaft (not shown). In the dish-shaped member 10, and within the area of the annular space provided by forming the members 10 and 11 as above described, are formed slots 14 (Fig. 2), preferably and as shown arranged radially with respect to the axis of such dish-shaped member. In such slots are positioned the bristle groups or tufts, made up of a plurality of the bristles 1.

The bristles 1 are preferably formed of flat metal strands bent upon themselves to form two integrally connected bristles of approximately hairpin or inverted V-shape. When the bristles 1 are thus formed, each of the bristle legs is provided with a flattened or thinned portion 2 intermediate its free end and base, and this flattened or thinned portion may readily be formed, when flat wire strands are used, by imparting to the strands a quarter turn, or 90° twist, first in one direction and then in the opposite direction (Fig. 4). When the bristle groups or tufts, nested together as shown in Fig. 3, are positioned in the radial slots, they may be easily and firmly secured therein by running wire hoops 15 through the bent or base portions thereof which project into the annular space referred to, and

are thus so held that the flat surface on each bristle leg between its base and free end will face in the direction of rotation of the brush, while the ends and base portions of such bristles will move in an edgewise direction. The radial slots are preferably so proportioned with respect to the size of the bristle groups or tufts, which are each composed of, say, five folded metal strands, as shown, that at least two groups or tufts will more than fill each slot and be forced to overlap slightly at the centers thereof, thus preserving the nested relation of the bristles and also securing a better distribution of the bristle points. The bristles may be provided with sharp points in any well-known manner, but preferably and as shown in Fig. 4, this is done by tapering off the edge on one side of one bristle leg and on the opposite side of the other bristle leg, as at 3, so that the brush will be equally effective when rotated in either direction.

It will be understood that wire of any cross-sectional shape may be used, the flattened portion between the free ends of the bristle and point of support, being produced by deforming the bristles as above described, or otherwise upsetting the metal so as to produce an area which is deformed with respect to the parts of the bristle outside of such area, so as to favor bending within such area. The above shaping operations are, of course, performed before tempering, and bristles thus formed may be secured in the brush-head in the same manner as above described with reference to flat wire bristles. It will be understood, also, that the shaping or twisting operation above described as to such flat wire bristles is also done before tempering.

While the invention has been shown and described in what is now believed to be its preferred form, it will be understood that various changes may be made while still retaining the invention defined by the claims. It will also be understood that the invention is not to be confined to use solely with revolving or power driven wire brushes, but may be advantageously embodied in brushes of other classes.

What is claimed is:

1. A wire bristle for brushes having a base portion arranged to be mounted in a brush head and having a straight portion between the free end of the bristle and said base portion of less thickness in the direction of movement of the brush than the rest of the bristle and arranged to bend in the movement of the brush, whereby localized bending of the bristle at its base is avoided.

2. A folded wire bristle for brushes having on each leg a base portion arranged to be mounted in a brush head and a straight portion between the free end of the bristle leg and said base portion of less thickness in the direction of movement of the brush than the rest of the bristle and arranged to bend in the movement of the brush, whereby localized bending of the bristle legs near their base is avoided.

3. A wire bristle for brushes formed of a flat wire having a base portion arranged to be mounted in a brush head so as to move edgewise therewith, and a portion intermediate the free end of the bristle and said base portion turned at a right angle to the latter and arranged to present the flat surface of said intermediate portion in the direction of movement of the brush, whereby localized bending of the bristle at its base is avoided.

4. The combination with a brush body, of wire bristles having their base portions mounted thereon, each of said bristles having a straight portion between the free end of the bristle and said base portion of less thickness in the direction of movement of the brush than the rest of the bristle and arranged to bend in the movement of the brush, whereby localized bending of the bristles at their base is avoided.

5. The combination with a revolving brush head, of wire bristles mounted in said head, said bristles having an area intermediate their free ends and point of support of less thickness in the direction of rotation than the parts outside of said area to favor bending within such area and prevent localized bending of the bristles near their point of support,

6. The combination with a power driven brush head, of wire bristles mounted in said head, said bristles having intermediate their point of support and free ends a flat area of less thickness in the direction of movement than the parts outside said area to favor bending within such area and prevent localized bending at the base of the bristles, and means for mounting said bristles in the brush head so that said flat bending area will face in the direction of movement.

7. The combination in a revolving brush, of a brush head having radial slots therein, flat wire bristles mounted in said slots, and means for securing said bristles in place said bristles being deformed intermediate their free ends and point of support to present an area of less thickness in the direction of rotation than the parts outside said area, to favor bending within such area, and being mounted in the brush head so as to rotate in an edgewise direction along their entire length with the exception of said intermediate area.

8. The combination in a revolving brush, of a brush head having radial slots therein, flat wire folded bristles of approximately inverted V-shape arranged in groups in said slots and with the base portions of the bristles projecting therethrough, and a wire arranged to engage said base portions of said

bristle groups to hold the same in place, said bristles being twisted so as to present a flattened portion intermediate their free ends and base to the direction of movement and with the remainder of the bristles moving edgewise.

9. The combination with a revolving brush head, of folded bristles of approximately inverted V-shape mounted in said head, said bristles each having the edge on one side of one bristle leg tapered off to the end and the edge on the opposite side of the other bristle leg likewise tapered off, to render the brush equally effective when rotated in either direction.

In testimony whereof, I have hereunto set my hand.

HAROLD J. HORN.