July 21, 1942. N. D. POTTER 2,290,575

WHEEL BRUSH

Filed Oct. 29, 1940

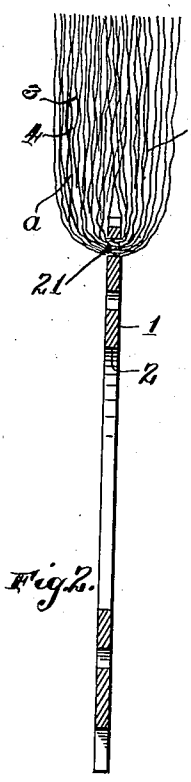


Fig. 2.

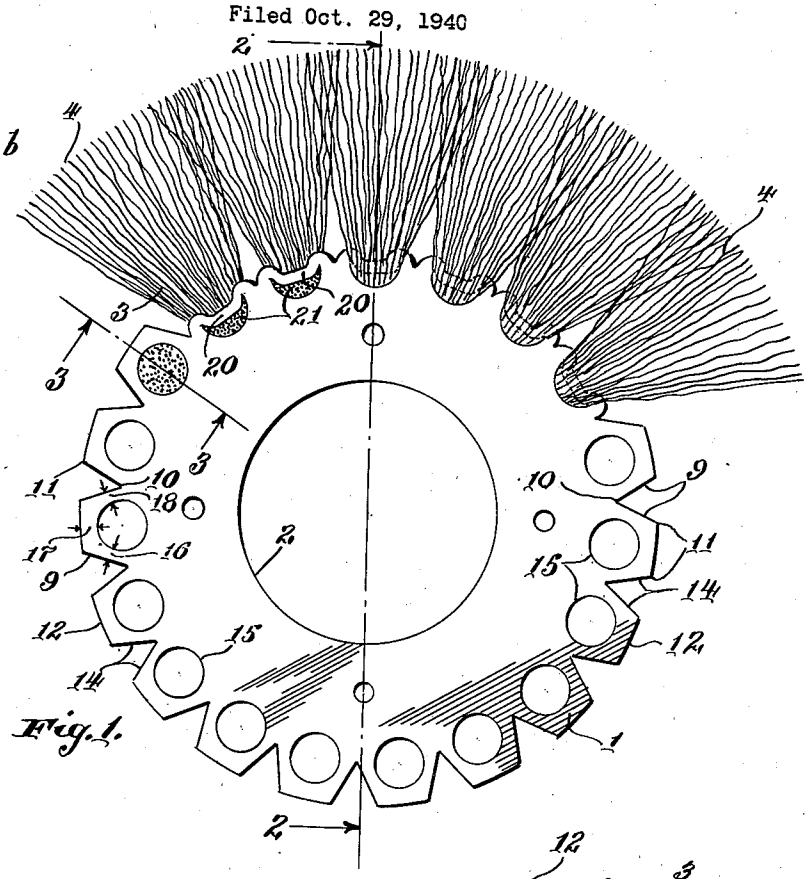


Fig. 1.

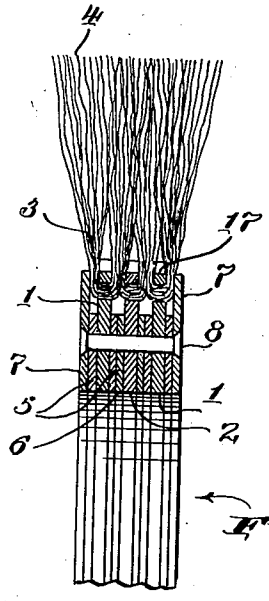


Fig. 5

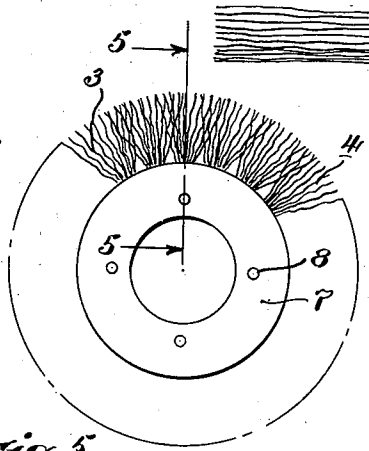


Fig. 4.

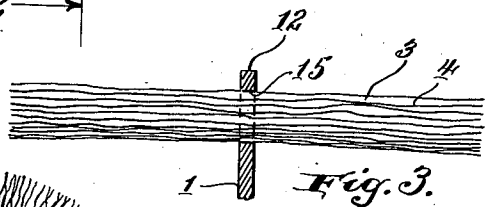


Fig. 3.

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Witness

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2,290,575

WHEEL BRUSH

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Application October 29, 1940, Serial No. 363,243

7 Claims. (Cl. 15—181)

The invention relates to a wire wheel brush for cleaning castings, molds, gears, storage battery parts, and also for cleaning welds and removing scales from forged and hardened parts, also for cleaning various metals before brazing and polishing and for treating automobile bodies, stoves, etc., and removing paint and otherwise treating surfaces preparatory to painting, also for buffing tires, tubes and the like and for many other purposes.

The brush construction which is the subject of the invention is in the nature of an improvement on an existing type of wheel brush. These brushes are made up of brush sections, each section consisting of a brush ring or plate and a series of tufts of brush wire or other suitable brush material seated in the outer portion of the ring and its periphery and individual wires extending outwardly from the ring.

In the particular construction referred to the brush rings are in the form of flat circular ring like plates with a concentric hole and a slotted periphery. Each slot contains a bunch or tuft of brush material which extends through its slot and protrudes on both sides of the ring plates. The tufts or bristles are clamped by closing the outer portions of the slots, which are initially open at the outer periphery of the ring and are chambered or enlarged at their inner ends to accommodate the tufts. The chambers are contracted by thus closing the slots which gives the desired clamping action. The brush sections including the rings are then assembled, three or any suitable number being employed in each brush, and these brush rings, being suitably spaced, are secured together in axial registration by means of pins or bolts forming the completed brush.

The brushes produced according to the above description were formerly made by hand, but more recently the same construction has been produced automatically or partially so. In this operation, the brush wire formed into a strand is fed against a stop and cut off to the desired length and is then by fingers passed into the corresponding slots in the ring and a hammer blow is applied at the proper time to close each slot as it is filled clamping the wire tuft in the chamber at the inner end of the slot.

It has been found, however, that this slotted ring construction is not satisfactory because of the tendency of the brush wires or part of them from the respective tufts to remain in the outer portion of the slot beyond the chamber which is intended to enclose the tuft or brush wires. The wires so placed prevent complete closing of the slot and this limits the contraction of the chamber and interferes with and prevents satisfactory clamping of the tuft of brush wires so that the brush wires tend to work loose at some later time when the brush is in operation. The product cannot, for this reason, be accepted as satisfactory.

To overcome this difficulty and thus to provide a type of brush which can be made in satisfactory quality by automatic machinery, the new type of ring to which the application relates has been provided. The new type of ring, like the old one, is flat in a radial plane transverse to the axis. Instead of chambered slots, V notches are cut in the outer edge portion of the ring, being spaced along its periphery and holes are punched in the projecting portions between the notches. In this way eyes are provided for the tufts, the eyes having their entire periphery closed and continuous so that the above described difficulty cannot occur.

The bunches or tufts of wire are introduced into these holes or eyes in any suitable manner being, according to the present practice of the invention, fed through a ferrule. It is of particular importance that by thus notching the periphery and placing the holes between the notches as more particularly hereinafter described, there is a wall or strip of metal around the outer half of each hole which is relatively narrow and tends to approach uniformity of width. This wall or marginal portion is of suitable dimension so that it can be accurately deflected by properly applied stress collapsing the holes or eyes in turn to clamp the bundles of wires or tufts as they are fed. The short edge portions of the ring between the notches thus bend to become concave and the holes crescent shaped.

In the accompanying drawing, I have illustrated a wire wheel brush embodying the features of the invention in the preferred form.

In the drawing:

Fig. 1 is a side elevation of a brush ring, a portion of which is provided with brush tufts clamped as in a completed brush section, and one tuft is shown inserted but not clamped, being, however, cut off in the plane of the surface of the ring, illustrating the condition of the ring and tuft prior to clamping.

Fig. 2 is a section through the construction Fig. 1, taken on line 2—2 in Fig. 1.

Fig. 3 is a section on the radial line 3—3 in

Fig. 1, showing the brush wire prior to clamping as in Fig. 1.

Fig. 4 is an elevation of a completed brush on a reduced scale, portions of the tufts of brush wire being illustrated and the remainder of the tufts being merely indicated.

Fig. 5 is a fragmentary section through a completed brush, taken on a radial plane of the axis.

Referring to the drawing by numerals, each of which is used to indicate the same or similar parts in the different figures, the construction shown comprises a flat sheet metal ring 1, of disc like form having a central hole or opening 2 which, in the finished brush, admits the usual brush arbor bushing.

The brush ring 1, as shown in Fig. 1, is provided for purposes of illustration with a partial quota only of tufts 3 of brush wires 4. Each respective ring 1, equipped with the full quota of tufts 3 of brush wires in the final form, constitutes a brush section and the completed brush illustrated in Figs. 4 and 5 consists of a suitable number of brush sections, three sections being shown in this instance. In the assembled brush the brush sections are placed with the rings 1 in registration, the bushing holes 2 being in alignment and the construction preferably includes spacing rings 5 located between the brush rings to provide sufficient space between the latter for the brush wires which extend outward radially or substantially so between the rings as in Fig. 5. These spacing rings 5 are also provided with bushing holes or openings 6 of the same size as the openings 2 in the rings 1 and in alignment with them.

Cover plates 7 are preferably placed on the outer surfaces overlying the outer spacing rings 5. All of the brush rings and spacing rings 5 may be secured together by rivets or bolts or other suitable securing means indicated at 8. The new type of ring and the method of making the new brush sections will now be described.

In accordance with the preferred method of construction, each ring blank is provided with V notches 9 spaced along the outer periphery of the blank, the points of the V notches at 10 being inwardly disposed and the notches being to best advantage spaced as to the outer ends of their outer walls at 11 by a distance closely corresponding to the depth of the notches, the peripheral arcs 12 between the notches being, in the form shown, substantially equal to the length of the side walls of the notches at 14.

The discs before or after notching in this way are punched with holes 15 to receive the tufts 3 of brush wires. It is regarded as helpful in the production of a satisfactory result that the width of the marginal portion of the ring plate around the outer half of the periphery of the holes 15 as indicated at 16, 17 and 18 approaches uniformity and to best advantage approximates the thickness of the ring or ring plate 1, so that the cross section at these locations 16, 17, 18 would be nearly square, as shown at 17 in Fig. 5. This arrangement contributes in an important way to the satisfactory bending and collapsing of the peripheral portion 16, 17, 18, producing by the final hammering step on the periphery of each hole the shape of the collapsed wall illustrated approximately at 20, in Fig. 1, which is concave outwardly.

Prior to the hammering and collapsing of the outer walls of the holes as above suggested, the tufts or bunches of wire 3 are threaded through the openings or holes 15 being fed by means of a ferrule or other suitable guide, substantially equal portions of brush wire of each tuft projecting on each side of the ring 1 as indicated at 4.

As the bunches or tufts of brush wires are thus fed into place or threaded into the holes and particularly as each tuft reaches its final position, the corresponding hole is collapsed by a hammer blow at 17 directed inwardly, or by other stress suitably applied to the outer periphery of the ring opposite the hole and directly inwardly, whereby the tuft is clamped in place as illustrated by the cross section of clamped brush wire tufts at 21. The section shown at 21 is most conveniently crescent shaped with its concave side turned outwardly the crescent area extending from one V notch 9 to the next.

The portions *a* and *b* of the brush wires of each tuft on each side of the ring are then folded together, the brush wires being thus turned out radially as indicated in Figs. 1 and 5. In the manufacture of brushes, the brush sections 6, each section comprising a brush ring 9 and the corresponding tufts 3 combined therewith are assembled to form brushes of various widths and sizes, using two or three sections or more with spacing rings between as may be desired.

The invention relates to the brush ring and to the completed brush sections and to the method of producing the latter.

I have thus described a brush ring and brush section and the method of producing the same according to my invention, the description being specific and in detail in order that the manner of constructing, applying and using the invention may be clearly understood, however, the specific terms herein are used in a descriptive rather than in a limiting sense, the scope of the invention being described in the claims.

What I claim as new and desire to secure by Letters Patent is:

1. The method of making a wheel brush which consists in providing radially flat sheet metal rings forming therein closely related V shaped notches spaced along the outer periphery of each ring, the points of the V's being disposed toward the center of the ring, forming holes for tufts of brush material between the notches near the said periphery said holes each having a continuous closed circumference, threading tufts of brush material into each of the holes in turn and clamping each tuft by collapsing the outer wall of each hole changing the peripheral portions between the notches to outwardly disposed concavities.

2. The method of making a wheel brush which consists in providing radially flat sheet metal rings forming closely related V shaped notches spaced along the outer periphery of each ring, the points of the V's being disposed toward the center of the ring, forming holes for tufts of brush material between the notches near the said periphery, said holes each having a closed peripheral wall threading tufts of brush material into each of the holes and collapsing each hole and clamping each tuft by pressure directed inwardly toward the center of the ring and applied to the outer periphery of the ring at a point opposite each hole thus completing brush sections, and assembling the sections in axial alignment, the sides of the notches at the outer periphery of the ring being spaced by a distance corresponding to their depth and to the diameter of the holes, and the centers of the holes being spaced in-

wardly from the outer periphery of the ring by a similar distance.

3. A wire wheel brush section consisting of a radially flat ring of sheet metal having holes for tufts of brush material extending parallel to the axis through said sheet metal and spaced along the periphery of the ring and tufts of brush material extending in the direction of the ring axis through said holes, each tuft having its ends on each side of the plate disposed outwardly in radial directions, the cross section of each tuft taken in the plane of the plate being in the form of a crescent, with its short radius concave side faced outwardly of the ring, and a radially narrow and circumferentially elongated integral outwardly concave peripheral portion of the ring supporting said short arcuate side of the tuft and conforming to said concave face of the tuft.

4. A wire wheel brush section consisting of a radially flat ring of sheet metal and tufts of brush material extending in the direction of the ring axis through the ring near its periphery each tuft having its ends on each side of the plate disposed outwardly in radial directions, the ring having closely related V notches in its outer periphery and circumferentially elongated holes enclosing the tufts, the holes each having a continuously closed integral peripheral wall and said holes being respectively between the notches and extending approximately from one notch to the next, the outer wall of each hole forming the periphery of the ring between the notches being concave from without.

5. The method of making a wheel brush which consists in providing radially flat sheet metal rings, forming therein closely related V shaped notches spaced along the outer periphery of each ring, the points of the V's being disposed toward the central portion of the ring, forming holes for tufts of brush material between the notches near the said periphery, said holes each having a continuous closed circumference, threading tufts of brush material into each of the holes and clamping each tuft by collapsing the outer wall of each hole inwardly toward the central portion of the ring.

6. A wire wheel brush section consisting of a radially flat ring of sheet metal and tufts of brush material extending in the direction of the ring axis through the ring near its periphery, and having their opposite end portions outside the ring extending outward radially, said ring having a series of holes closely adjacent its periphery, each hole containing one of said tufts and being elongated in the direction of the outer circumference of the ring, the holes each having a continuously closed integral peripheral wall, the outer wall of each hole forming the periphery of the ring being curved inwardly toward the center of the ring.

7. The method of making a brush ring which comprises, providing a radially flat plate ring, having holes parallel to the ring axis spaced along the outer periphery of the ring closely adjacent the outer edge of the same so that each hole has a radially narrow outer wall portion at the outer edge of the ring, each hole having a continuously closed integral wall, passing a tuft of brush material through each hole, the opposite end portions of each tuft outside the plate extending outward radially of the ring and bending the outer peripheral wall of each hole inwardly to clamp the tufts.

NATHANIEL D. POTTER.