Jan. 24, 1950 K. E. WEILER 2,495,559

INDUSTRIAL BRUSH

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Fig. 1

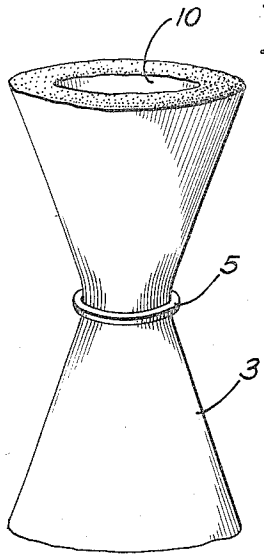


Fig. 2

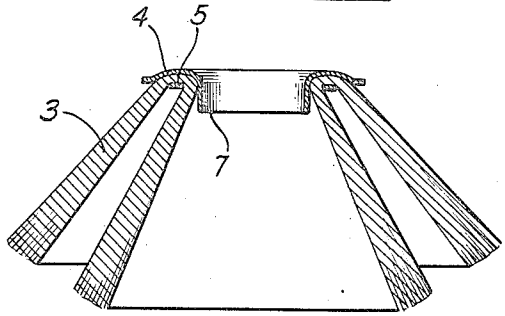


Fig. 3

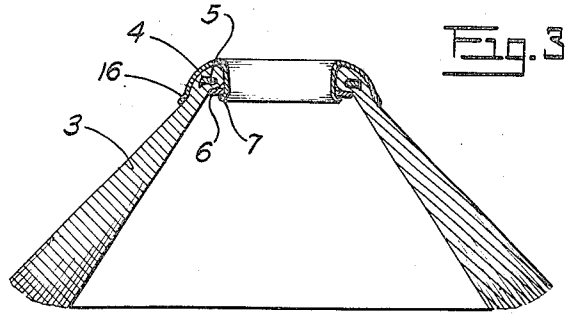
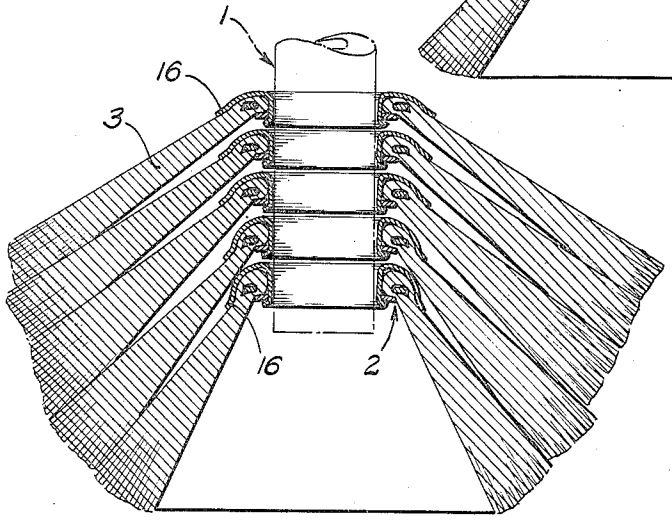


Fig. 4



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Fig. 5

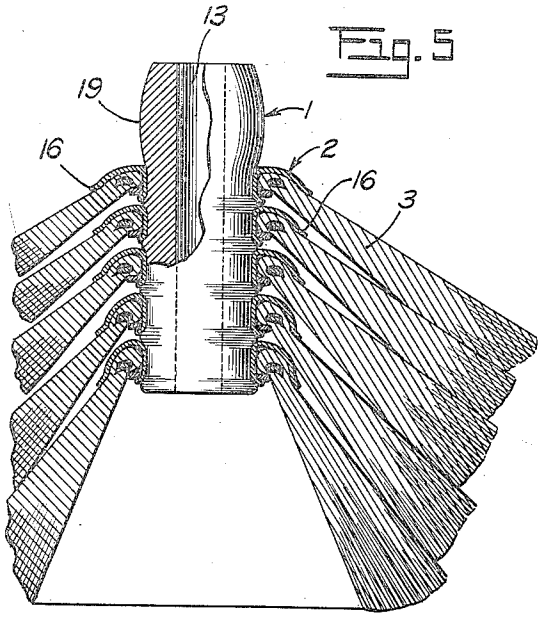


Fig. 6

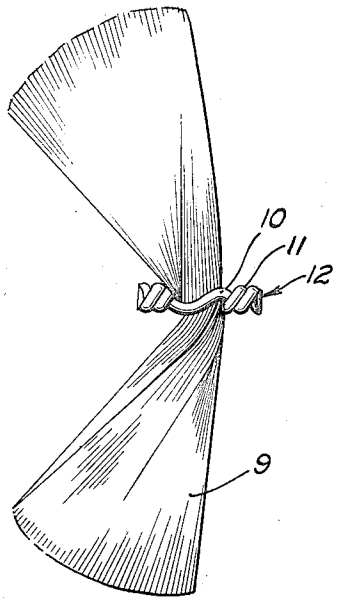


Fig. 7

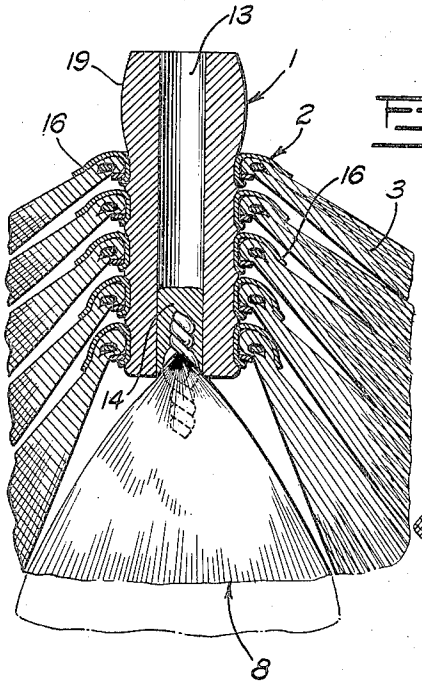
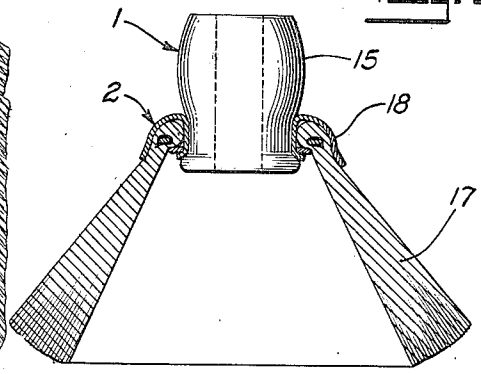


Fig. 8



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UNITED STATES PATENT OFFICE

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INDUSTRIAL BRUSH

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5 Claims. (Cl. 15—198)

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This invention relates to industrial brushes in general and more especially to industrial brushes having bristles inclined to the axis of the holder.

Among the objects of the present invention, it is aimed to provide an improved industrial brush of the type extensively used for polishing the inner faces of metal goblets, cocktail shakers, and the like, characterized by bristles formed in circular rows around a holder, such as a shaft, and in which the bristles are inclined to the axis of the holder or shaft.

With brushes of this type heretofore extensively used, the bristles have been secured to wooden cores or the like which would crack or otherwise be impaired after a very limited use, thereby materially reducing the life of the brush long before the bristles had shown any perceptible wear. To this end the present invention aims to provide a brush of this type in which the bristles composed of animal hair, vegetable fibres, or metal wire, would be mounted upon a metal core and so secured in place that the life of the brush would be determined, not by the life of the core, but rather the wear upon the bristles.

These and other features, capabilities and advantages of the present invention will appear from the subjoined detail description of specific embodiments thereof illustrated in the accompanying drawings, in which

Fig. 1 is a perspective view of a bundle of bristles disposed inside of a ring and ready to be spread out over the ring.

Fig. 2 is a side elevation partly in section of a bundle of bristles after they have been bent over a ring and a grommet has been positioned upon the bend in the bundle.

Fig. 3 is a side elevation partly in section showing a third step in the process of making the brush, in which the bundle of bristles after having been spread over a ring and disposed in a grommet, are secured in the grommet by a second ring with a part of the grommet bent over the same, in rivet fashion.

Fig. 4 is a fourth step in the process of making one embodiment of the invention in which a plurality of units, such as illustrated in Fig. 3, are mounted upon a hollow metal core.

Fig. 5 is a fifth step in the process showing how the metal core, if composed of a moldable metal, such as lead, can be compressed to fixedly anchor the units illustrated in Fig. 3 on the metal core.

Fig. 6 is a side elevation of another bundle of bristles secured at their middle by two twisted wires.

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Fig. 7 is a seventh step in the process showing how the bundle shown in Fig. 6 is bent into a tuft with the connecting wires pressed into the chamber of the core and anchored therein by molten metal.

Fig. 8 is a side elevation partly in section of another embodiment showing a core with a single bundle of bristles secured thereto to form an open cup brush, as distinguished from the tufted center brush illustrated in Fig. 7.

In the embodiment shown in Fig. 7, the brush there illustrated is provided with a chambered metal core 1, preferably composed of some suitable moldable material such as lead, having mounted thereon a plurality of units 2, each unit 2 of which, see Fig. 3, consists of a bundle of bristles 3 bent over an inner ring 5, which is secured inside of a grommet 4 by an outer ring 6 and the crimped-over edge 7 of the grommet 4. In addition to the units 2, the core 1 has also secured thereto a unit 8 consisting of a bundle of bristles 9 secured at their middle by two twisted wires 10 and 11, constituting a wire unit 12, which wire unit 12 is forced into the chamber 13 and then sealed therein by a deposit 14 of molten metal, such as melted lead.

Obviously, the number of units 2 depends upon the use to which the brush is to be put. When five units 2 and a central tuft 8 are used as shown in Fig. 7, it has been found that the brush so equipped is particularly suitable for polishing or buffing the inner surfaces of goblets, cocktail shakers, and the like.

In some instances, on the other hand, when it is desired to produce an open cup brush, it may be preferred to use only a single unit 2, such as shown in the embodiment illustrated in Fig. 8, dispensing entirely with the central tuft 8. In the embodiment shown in Fig. 8, the unit 2 there illustrated is substantially identical to the units 2 illustrated in Fig. 7. The core 15 of this embodiment, however, may be considerably shorter than the core 1 for obvious reasons.

The method for forming the brush illustrated in Fig. 7 consists essentially in selecting a bundle of bristles 3 composed of animal hair, vegetable fibres, or fine wires, ranging in diameter from .0025 of an inch to .010 of an inch, and composed of brass, steel, nickel, silver, phosphor bronze, stainless steel, or the like, thereupon inserting the same into a ring, such as the ring 5, thereupon inserting a tapered rod into the center of one end of the bundle 3 to form the clearance 10, Fig. 1, thereupon bending the portions of the bristles of the bundle 3 so arranged away

from the clearance 10 over the ring 5 into the form shown in Fig. 2, and thereupon positioning the bundle 3 of bristles so bent into the U-shape or hair pin form illustrated in Fig. 2, in the grommet 4 to assume the position shown in Fig. 2. Thereupon an outer ring 6, see Fig. 3, is positioned between the lip 7 of the grommet 4 and the adjacent bristles of the bundle 3 and the ensemble thereupon placed into a riveting tool which will crimp the lip 7 over onto the ring 6 to lock the bundle 3 of bristles to the grommet 4.

At the same time, the outer flange 16 will be bent over the bristles 3, depending upon the angle which the bristles of the bundle 3 are intended to assume relative to the axis of the core 1.

When a plurality of units 2 are desired to be mounted on the core 1, as shown in Figs. 4, 5 and 7, the riveting tools will be equipped to form different relative angles of the flanges 16 relative to the axis of the core 1. In other words, if five units 2 are desired, the angle of the flange 16 of the innermost unit 2 will be inclined so that the angle of the inner face of the bundle 3 of bristles of the innermost unit 2 will approximate 60° to the axis of the core 1. The flange 16 of the succeeding unit will form a smaller angle with the axis of the core 1, and so on. In the present instance, the flange 16 of the outermost unit 2 will form the smallest angles with the axis of the core 1 so that the angle of the inner face of the bundle 3 of bristles of the outermost unit 2 will approximate 25° to the axis of the core 1.

The angles of the flanges 16 are obviously selected so that the inner face of each relatively inner unit 2 will substantially aline with the outer face of the adjacent relatively outer unit 2 to form a compact brush, and for the same reason the inner face of the outermost unit 2 will substantially aline with the outer face of the central tuft 8.

In Fig. 3 the angle of the flange 16 corresponds to the angle of the fourth unit 2 reading downwardly, as illustrated in Fig. 4.

After the units 2 have been so formed, thereupon the same are mounted on the core 1 composed of some suitable moldable metal such as lead, and in the order illustrated in Fig. 4 as heretofore described. Thereupon the core 1 with the units 2 is placed in a press, hydraulic or foot press, which includes a guiding rod or mandrel extending through the central opening or central chamber 13 of the core 1 and pressure exercised on the outer ends of the core 1 until the metal of the core 1 assumes a shape similar to that illustrated in Fig. 7 where the units 2 will be positioned in recesses formed on the outer periphery of the core 1, slightly spacing the units 2 from one another and in addition fixedly anchoring the units 2 on the core 1.

Thereupon the mandrel or guiding rod is removed from the chamber 13 of the core 1 and the unit 8 is thereupon inserted. The unit 8 is formed preferably by selecting a bundle 9 of bristles larger or smaller than the bundle 3 of bristles for a unit 2, depending upon the type of brush to be produced. This bundle 9 of bristles is first locked in the unit 12 preferably consisting of two wires 10 and 11 twisted at their ends to form a unit such as the unit 12, secured to the middle of the bundle 9 of bristles, thereupon the unit 12 is forced into one end of the chamber 13, as shown in Fig. 7, and thereupon sealed in position by pouring a deposit 14 of molten metal such as molten lead onto the same. Obviously the size of the bundle 9 of bristles and unit 12 relative to

the diameter of the chamber 13, will be selected so that a tight frictional fit will be effected to cooperate with the seal 14 to anchor the tuft 8 in place. In turn that angle of the flange 16 of the outermost unit 2 and that quantity of bristles of this outermost unit 2 and of the tuft 8 will be selected which will enable the inner face of the bristles of the outermost unit 2 to aline with the outer face of the bristles of the tuft 8, all in the interest of forming a substantially compact brush.

After the units 2 and unit 8 have been so anchored to the core 1, then the outer edges of the bristles are preferably trimmed so that they will aline with one another to assume any suitable form, not only the cylindrical form suitable for a cylindrical interior, but also pear shaped, or any other desired shape depending upon the interiors to be treated.

In the embodiment illustrated in Fig. 8, a so-called open cup brush is illustrated. Here too the outer edges of the bristles 17 may be variously trimmed, depending upon the use to which the brush is to be put and, similarly, the angle of the flange 18 inclined to cause the bristles 17 to form either a smaller or greater angle with the axis of the core 15, according to the use to which the brush is to be put.

In the use of these brushes the diameter of the chamber 13 of the final brush, see Fig. 7, will, of course, preferably be predetermined to receive the shaft of a lathe or motor, or else the outer face of the portion 19 of the units 2 may be conformed to be received by the chuck of a lathe or motor. Furthermore, especially when removing the skin or scale of plated ware to produce either a polished or satin finish, it has been the practice either to allow water to drop on the brush during the operation or to dip the brush into water before starting an operation. With the brushes heretofore in use, the core for this type of brush was generally made of wood. The water so used would have injurious effects on the wood, causing it to swell, warp or split. In turn after use, should the brush with the wooden core be allowed to remain unused for any length of time in a dry atmosphere, the evaporation of the moisture from the wooden core would not infrequently cause the wooden core to change its shape, particularly the size of the chamber, making it difficult, if not impossible, thereafter properly to fit the core on to the shaft of a lathe or motor, and sometimes also to fracture the core. With the present metal core, all of these disadvantages encountered with a wooden core would be definitely avoided and overcome.

The rings 5 and 7 are preferably composed of some shape-retaining metal such as steel, and the grommets 4 of any suitable sheet metal conventionally used in the manufacture of rivets or grommets.

It is obvious that various changes and modifications may be made to the details of construction without departing from the general spirit of the invention as set forth in the appended claims.

I claim:

1. The combination of a bristle unit including a bundle of bristles extending in an annular hair pin shape across an inner ring to form an annulus with the inner ring inside of the bend in the bristles, a second ring disposed adjacent the inner periphery of the annulus, a grommet with its free edges disposed radially outward of the inner portion of the grommet and extending

around the annulus and second ring to secure the bristles in place, and a chambered metal core extending through said annulus and into locking engagement with said annulus.

2. The combination of a bristle unit including a bundle of bristles extending in an annular hair pin shape across an inner ring to form an annulus with the inner ring inside of the bend in the bristles, a second ring disposed adjacent the inner periphery of the annulus, a grommet with its free edges disposed radially outward of the inner portion of the grommet and extending around the annulus and second ring to secure the bristles in place, and a chambered metal core extending through said annulus and into locking engagement with said annulus, the flanges of the grommet and the rings maintaining the bristles to extend at an acute angle to the axis of the core.

3. The combination of a metal wire bristle unit including a bundle of bristles extending in an annular hair pin shape across an inner steel ring to form an annulus with the inner steel ring inside of the bend in the bristles, a second steel ring disposed adjacent the inner periphery of the annulus, a sheet metal grommet with its free edges disposed radially outward of the inner portion of the grommet and extending around the annulus to secure the bristles in place, and a chambered lead core extending through said annulus into locking engagement with said annulus.

4. The combination of a plurality of bristle units each including a bundle of bristles extending in an annular hair pin shape across an inner ring to form an annulus with the inner ring inside of the bend in the bristles, a second ring disposed adjacent the inner periphery of the annulus, a grommet with its free edges disposed radially outward of the inner portion of the grommet and extending around the annulus to secure the bristles in place, and a chambered metal core extending through said annuli into locking engagement with said annuli, the flanges

of the grommets and the rings maintaining the bristles of the several units to extend at different acute angles to the axis of the core but in engagement with one another to form a compact brush.

5. The combination of a plurality of bristle units each including a bundle of bristles extending in an annular hair pin shape across an inner ring to form an annulus with the inner ring inside of the bend in the bristles, a second ring disposed adjacent the inner periphery of the annulus, a grommet with its free edges disposed radially outward of the inner portion of the grommet and extending around the annulus to secure the bristles in place, a chambered metal core extending through said annulus and into locking engagement with said annulus, a tuft forming bundle of bristles in hair pin shape with its bent portion extending into the chamber of said core, and a deposit of metal sealing the bent end of said tuft forming bundle of bristles in said core with the bristles flaring out into intimate engagement with the bristles of the adjacent bristle unit, the grommet and rings maintaining the bristles of the several units to extend at different acute angles to the axis of the core but in engagement with one another and with the bristles of said tuft forming bundle to form a compact brush, the metal of said core and deposit being the same.

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