No. 677,502. Patented July 2, 1901.

F. G. FARNHAM.

ROTARY BRUSH.

(Application filed June 5, 1900.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.

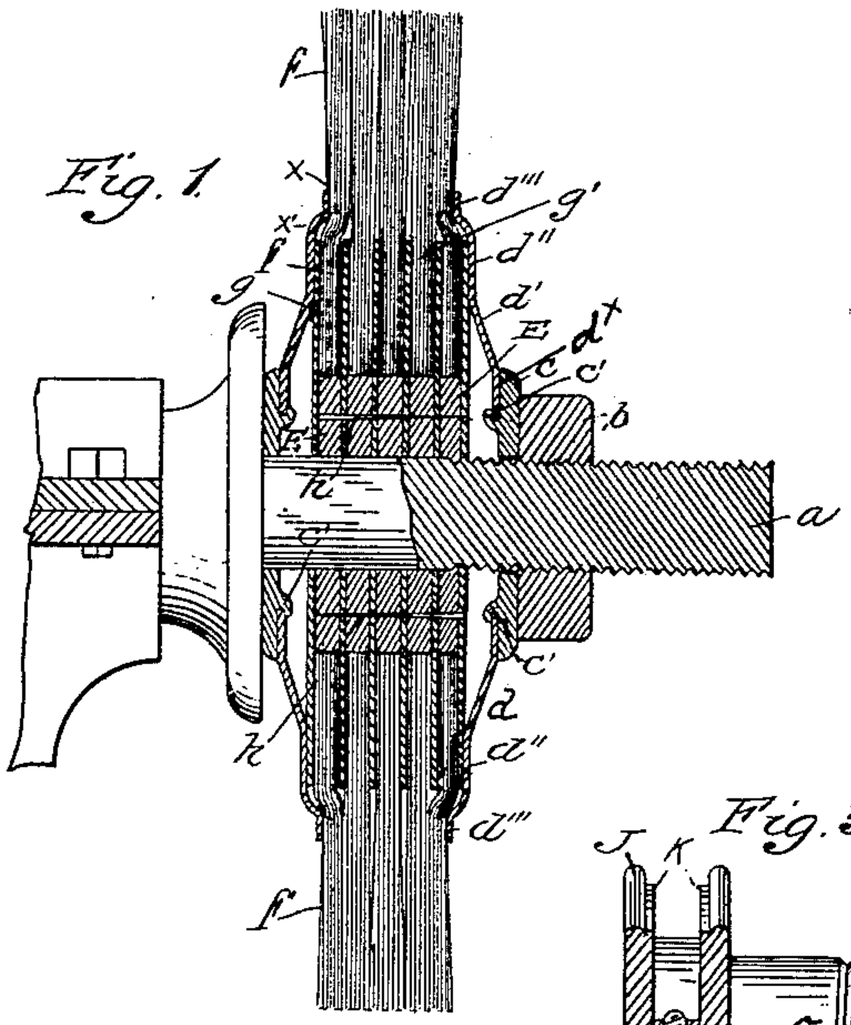


Fig. 5.

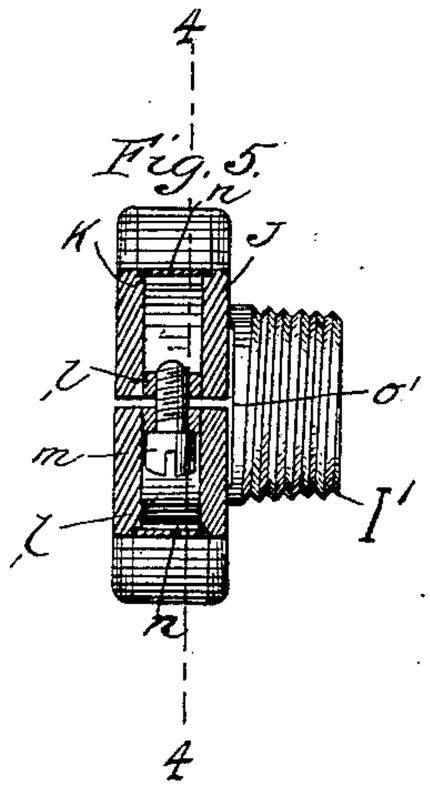


Fig. 3.

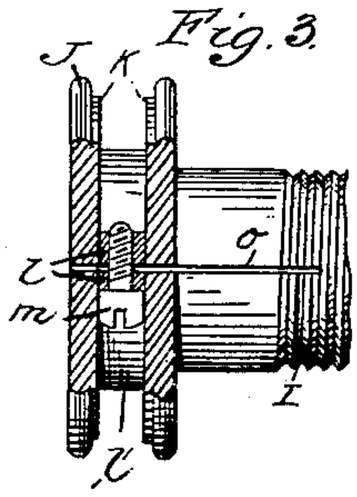


Fig. 4.

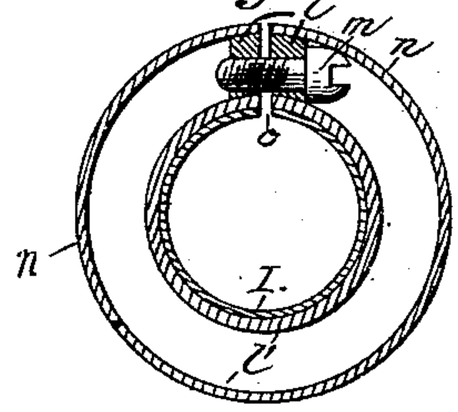
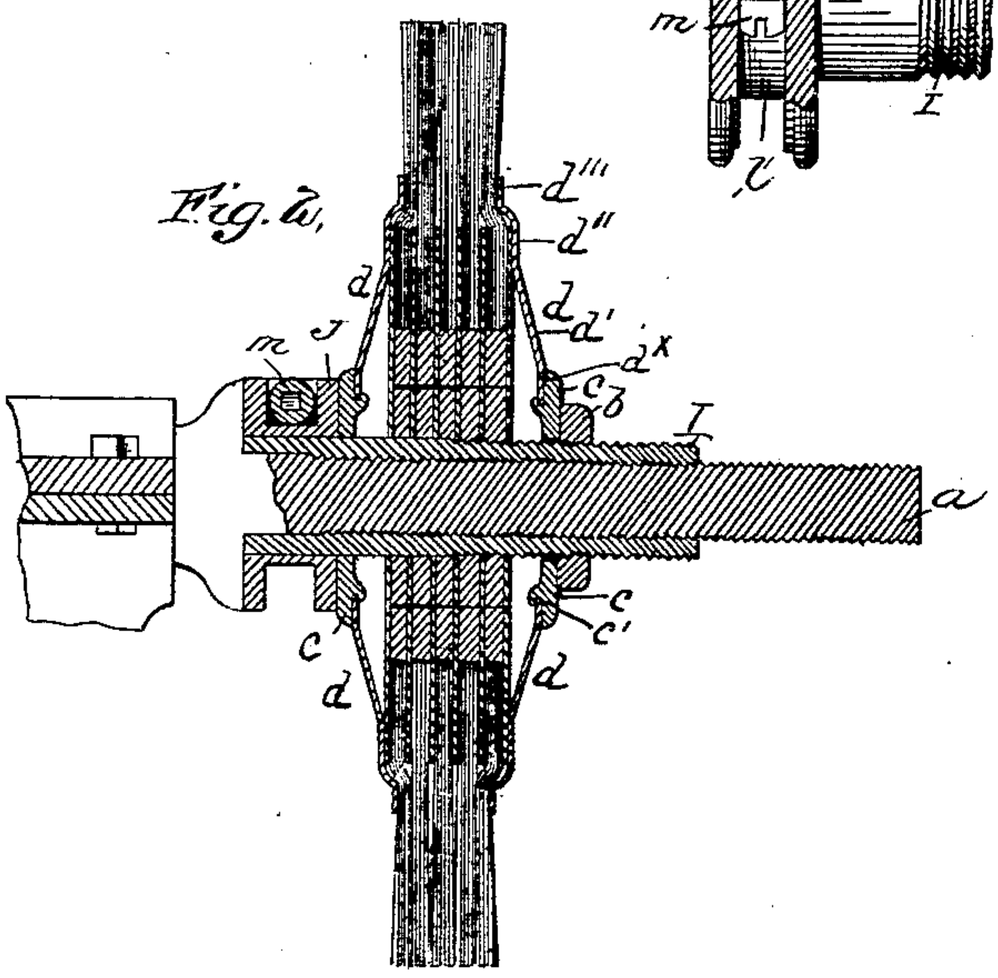


Fig. 2.



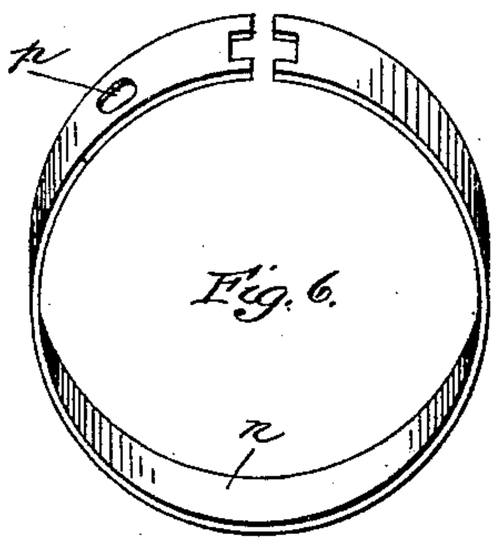


Fig. 6.

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Atty.

No. 677,502.

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ROTARY BRUSH.

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(No Model.)

3 Sheets—Sheet 2.

Fig. 7.

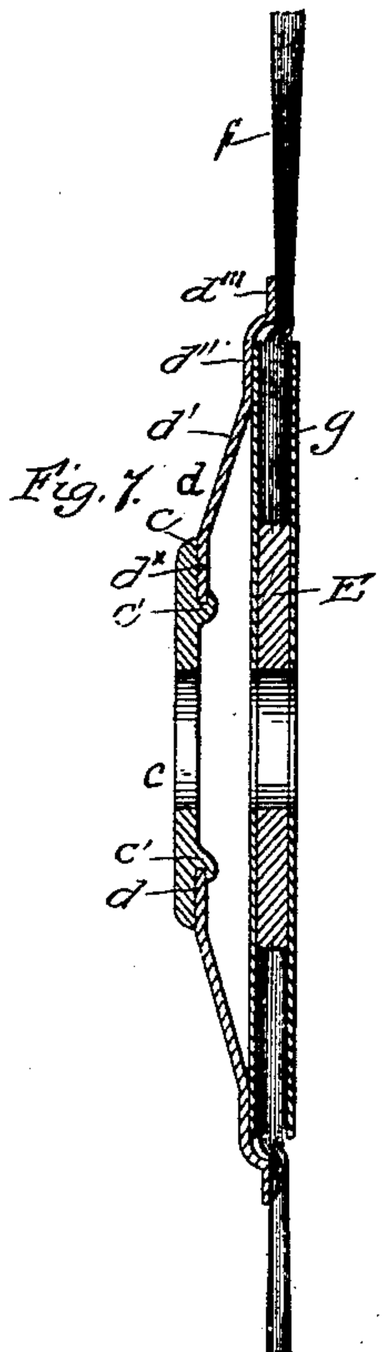


Fig. 12.

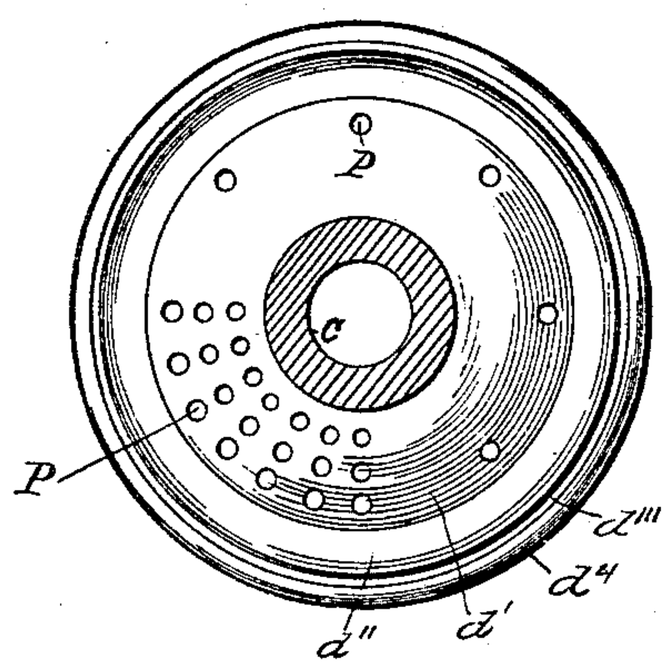


Fig. 13.

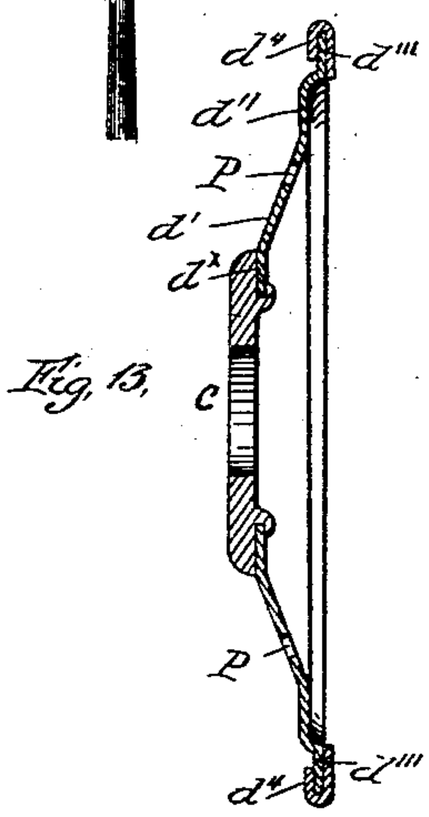
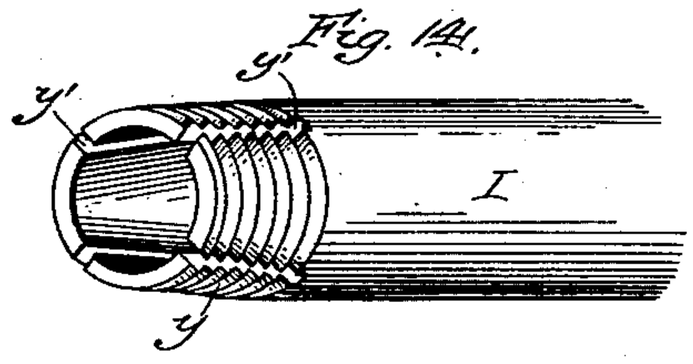


Fig. 14.



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No. 677,502. Patented July 2, 1901.

F. G. FARNHAM.

ROTARY BRUSH.

(Application filed June 5, 1900.)

(No Model.) 3 Sheets—Sheet 3.

Fig. 8.

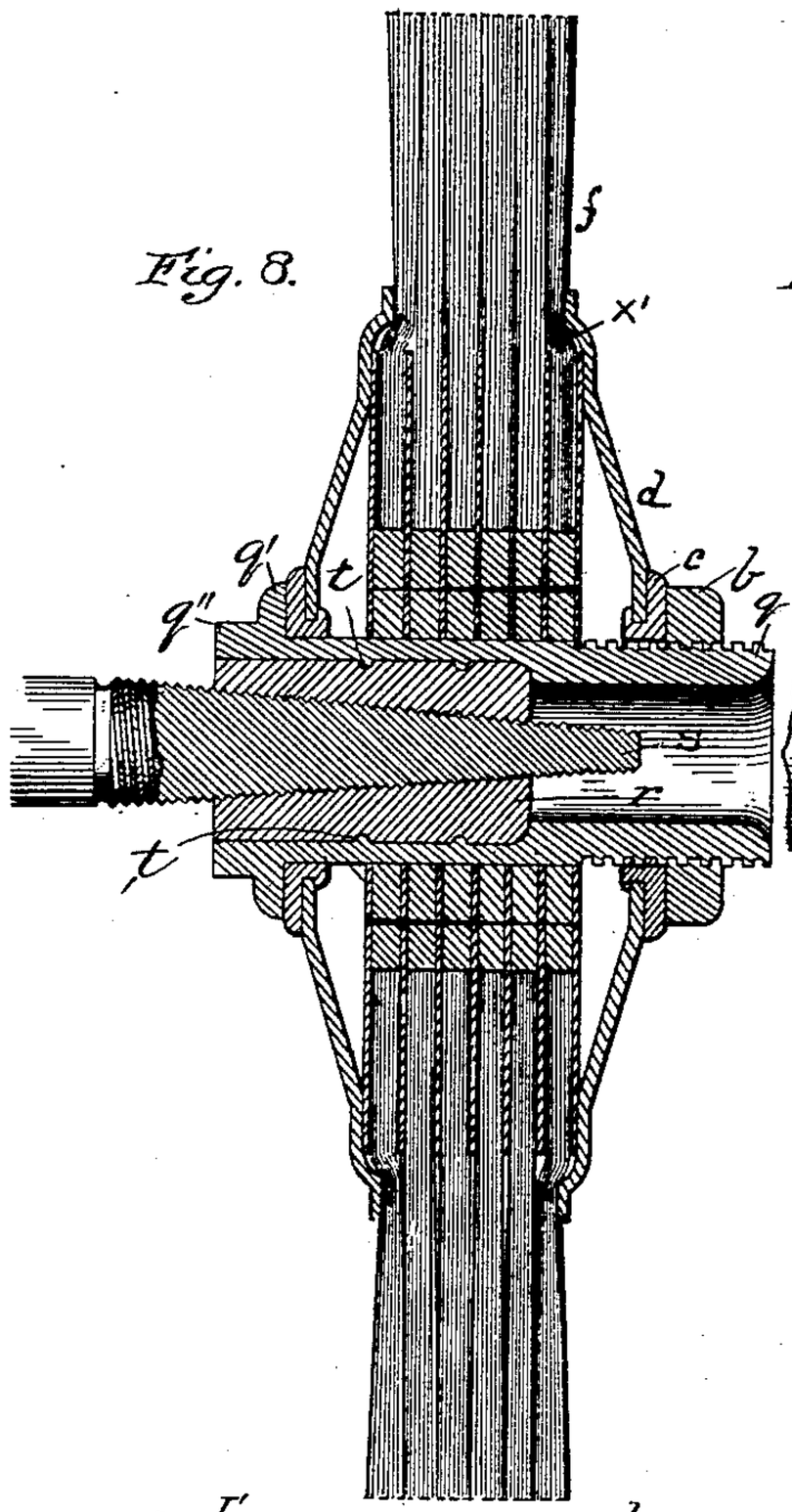


Fig. 11.

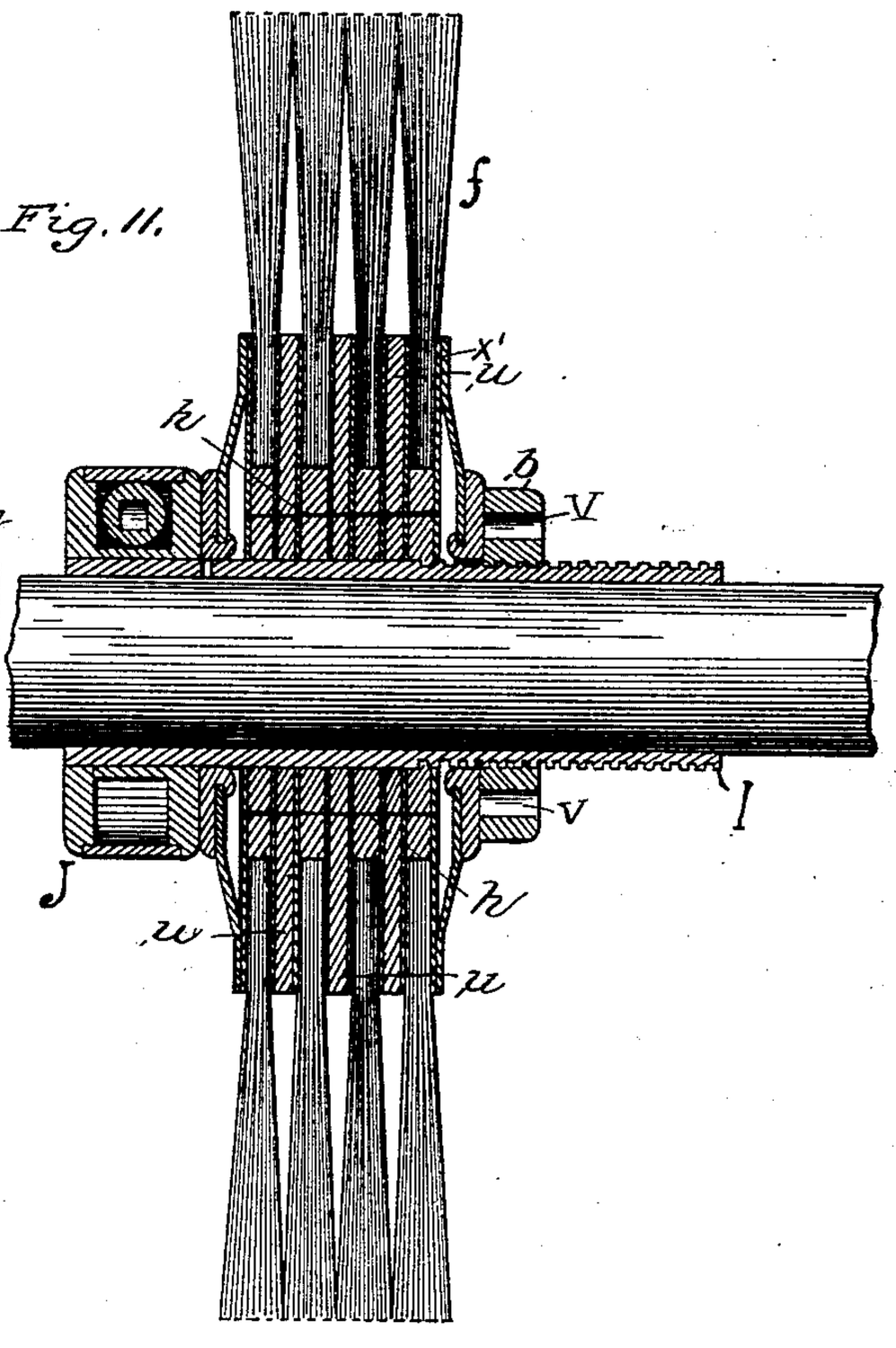


Fig. 9.

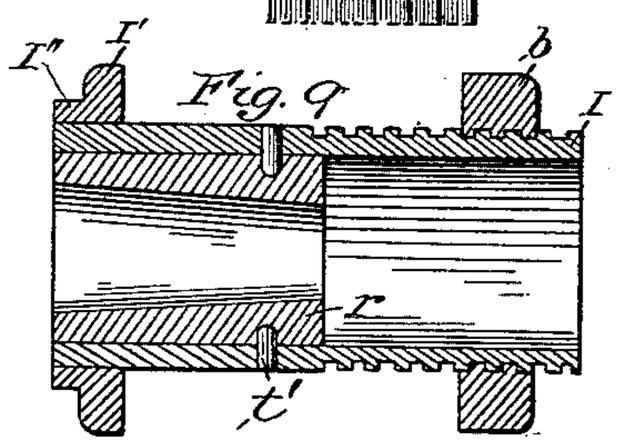


Fig. 10.

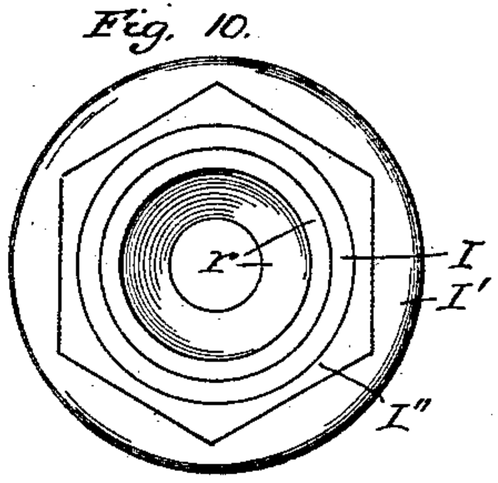


Fig. 15.

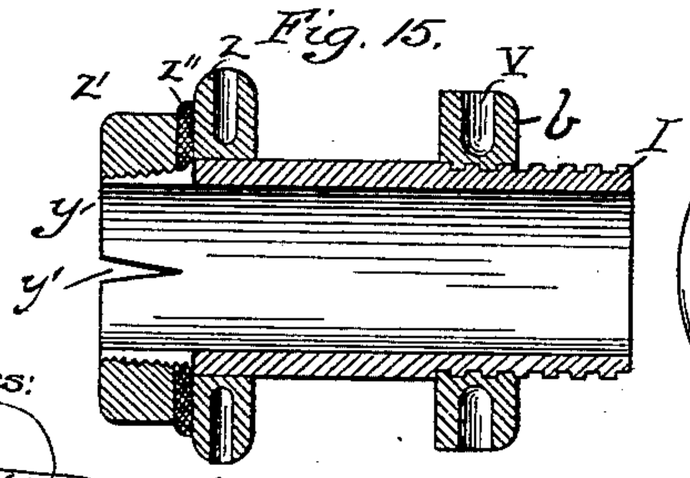
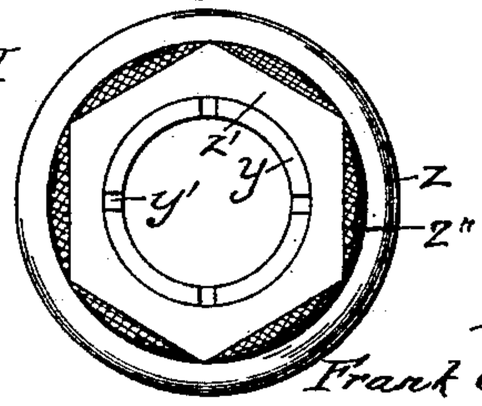


Fig. 16.



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UNITED STATES PATENT OFFICE.

FRANK GUNN FARNHAM, OF HONESDALE, PENNSYLVANIA.

ROTARY BRUSH.

SPECIFICATION forming part of Letters Patent No. 677,502, dated July 2, 1901.

Application filed June 5, 1900. Serial No. 19,162. (No model.)

To all whom it may concern:

Be it known that I, FRANK GUNN FARNHAM, a citizen of the United States, residing at Honesdale, Pennsylvania, have invented certain new and useful Improvements in Rotary Brushes, of which the following is a specification.

My invention relates to that class of brushes known as "rotary" or "wheel" brushes used for polishing glass, metal, leather, &c.

My invention relates more particularly to the manner of mounting the sections of which the brush is composed upon a spindle, whereby I secure a cheap and strong brush.

My invention will be better understood by reference to the inclosed drawings.

Figure 1 is a cross-section of a sectional brush, showing it with mountings on a straight spindle. Fig. 2 is a cross-section of a similar brush, showing a modified manner of mounting. Fig. 3 is a plan view, partly in section, of a clamping-sleeve as used in Fig. 2. Fig. 4 is a section on line 4 4 of Fig. 5. Fig. 5 is a plan view, partly in section, showing the inclosing spring-band. Fig. 6 is a perspective view of the steel spring for closing the channel in the split sleeve. Fig. 7 is a cross-section of my improved clamping-disk, showing it compressing one section. Fig. 8 is a sectional view showing the manner of mounting a brush on a taper spindle. Fig. 9 is a modification of same. Fig. 10 is an end view of Fig. 9. Fig. 11 is a view similar to Fig. 2, showing a modified form of clamping-disk and filler-rings *u* and spanner-holes V. Fig. 12 is a plan view of a modified form of steel disk. Fig. 13 is a cross-section of same. Fig. 14 is a perspective of a modified form of clamping-sleeve. Fig. 15 is a longitudinal section of same. Fig. 16 is an end view of Fig. 15.

In Fig. 1 the carrying member *a* is an ordinary straight spindle, and *b* a nut fitting same. *c* is a brass or malleable-iron ring with a flange *c'*, adapted to be turned over to clench it to the metal disk *d*. Disks of this shape may be cast from metal and turned to desired shape; but I prefer to make them of sheet steel or brass, adapted to be drawn in a die to form different bends to gain the result desired—first the flat face $d^{\times}$, the arched portion *d'*, the base *d''*, and a secondary base portion or rim *d'''*. Heretofore I have used a plain slightly-dished disk, but I have found that this would spring in to such an extent as to prevent a firm clamping action being secured. My improved disk is designed to overcome this objection and is best defined as a section of a truncated cone flattened at the vertex to receive the ring *c*, the flange *d''* forming the base. This gives me the truss *d'*, which cannot be depressed under any ordinary pressure by the nut *b* when screwed up. The base *d''* rests upon the cemented part of the brush, compressing the brush firmly when screwed up, while the part *d'''* reaches over and compresses the brush material, as shown, making a very stiff and strong construction and allowing that portion of the brush material between lines *x' x* to be flexible. Flexibility is here desired—in fact, is necessary, when doing heavy work, otherwise the brush material will cut off at *x'*. The body of brush material is by this method made so dense at *x* that the article being polished cannot be forced down upon the cement at *g'*. Therefore the brush material cannot be cut off. In Fig. 1 I show the core E, the cloth disks *g*, the brush material *f*, and the clench-nails *h*. I find it desirable in many instances to provide the disk with a plurality of openings P, whereby air may penetrate freely to prevent heating of the brush when in use, as shown in Figs. 12 and 13. At times it may be necessary to get more pressure on the brush material without changing the shape of the disk, and this may be accomplished by providing the rim *d'''* with a ring d^4, of leather, rubber, or similar material, as shown in said figures. This thickens up the rim *d'''* and acts the same as if a deeper rim were used and at the same time it protects any delicate article from injury by striking the steel rim. The auxiliary band or ring may be molded from rubber or compressed from leather or other material to fit different sizes of disks and kept in hand for use when wanted. In making these disks I prefer to use soft annealed steel from one-sixteenth to three thirty-seconds of an inch thick, depending on the diameters. Sheet-brass may also be used, but is expensive. They may, however, be cast from metal and turned upon a lathe; but at the expense of lightness, balance, and cost I gain here

the greatest amount of strength. There is nothing to break, crack, or fly. As one pair of these disks costs but little more than a pair of wood disks of similar diameter, as generally used heretofore, a great saving in cost is secured.

In Fig. 2 I show a carrying member in the shape of a tube or sleeve I, adapted to clamp upon either a spindle with or without a thread. Referring to Fig. 3, I is preferably a steel tube threaded at one end, the other end being fitted with a collar J, brazed to tube I. Two lugs *l l* are arranged to receive the screw *m*, the slot *o* being sawed through the lugs and a short distance along the tube I. When the screw *m* is drawn up by means of a wrench the end of which is squared to fit the socket in head of screw, the whole device is clamped upon the spindle. A recess K may be turned in the rim of collar J and a spring *n* fitted thereto, thus preventing any possible injury to the article being polished by hitting the head of screw *m*. An opening *p*, Fig. 6, allows the admission of the wrench. Fig 5 is a modification showing a short threaded tube I′ and with an additional slot *o′* in same running across the tube.

In Fig. 8 I show as a carrying member a sleeve *q*, cast in one piece, having a flange *q′* and a shoulder *q″*. I fill this sleeve partly full of some soft metal *r*, and this has a tap or hole to secure the taper spindle S. Small projections *t t* prevent the filling from turning inside. I prefer, however, to use that construction shown in Fig. 9, using a steel tube I with a brass collar I′ brazed on. An end view is shown in Fig. 10, in which I is the steel tube; I′, the flange; I″, the hexagon nut part, and *r* the metal filling. The pins *t′* may be used. The filling *r* is soft enough to allow the spindle S to make its own thread. The nut *b* may be worked by an ordinary wrench or made round and a spanner-wrench used in the holes V V, as in Fig. 15.

In Fig. 11 a longitudinal section of sleeve and collar is shown, with a brush mounted thereon and clamped to a straight spindle having no threads upon it. Spindles made in this way are used almost exclusively in shoe-factories.

With the construction in Fig. 1 it is only necessary to slip on one disk and ring, then the brush, with the second disk and ring, and screw up the nut, and the brush is ready to run. When a brush is worn out, it is removed and a new one substituted, using the same disks over and over again. In Fig. 2 the same ring and nut are used, but mounted on the steel tube I, which is clamped to the spindle *a* by the screw *m*. In Figs. 8 and 9 the same ring and nut are used without the clamping device, since it is intended for a taper spindle, while in Fig. 11 the same device is used as in Fig. 1, excepting in this case I show a spindle without any threads at all. The hexagon-shaped nut on the collar in Figs. 8, 9, and 10 is intended for use in screwing up and unscrewing from the taper spindle and is adapted to be used in a vise to hold the tube while putting on the brush before going onto the spindle. This is not required in Fig. 1 nor in Fig. 2, as we already have a fulcrum to work on.

It is sometimes desirable to get an open brush with less material; but I find, however, that unless I fill up to the thickness of the paper core pieces or in excess of same the fiber will not lay flat, but will draw either to one side or the other and make it dishing, and to avoid this I use fillers as shown at *u* in Fig. 11. The fillers *u* are of common strawboard, cut into rings or disks and laid in between each section of the brush when they are assembled, the clench-nails passing through the whole structure and binding all together. In an open brush like this used in leather-polishing I dispense with the rim *d‴*, Fig. 1, and use that form shown in Fig. 11, so as to get the pressure on the cemented portion of the fiber at the edge only at *x′*.

Instead of making the sleeve in the manner shown in Figs. 2 and 3, I may adopt the form shown in Figs. 14 to 16, in which the sleeve I is provided with a plurality of slits *y′* in its tapered threaded end *y*. A tapered nut *z′* is adapted to be screwed upon this threaded end, and thus to contract the split portion upon the spindle. In order to hold the sleeve against turning while the nut *z′* is being turned, a nut *z* is secured rigidly to the sleeve and provided with spanner-holes, as shown, and, if desired, an intermediate washer *z″* may be used.

Having thus described my invention, what I claim is—

1. A rotary brush comprising a carrying member, brush material carried thereby, opposing disks having parallel portions abutting against opposite sides of said brush material, and inner truss portions inclining outwardly leaving open spaces between the disks and brush material, and means on said carrying member for applying pressure to said truss portions, substantially as described.

2. A rotary brush comprising a carrying member, rings carried thereby, opposing disks carried by said rings, and brush material interposed between said disks, each of said disks comprising a flat portion abutting against its respective ring and having its inner edge seated in a groove therein, an inclined or conical truss portion, and a flat portion bearing against the face of the brush material, substantially as described.

3. A rotary brush comprising a tubular carrying member, brush material thereon, disks abutting against said brush material and having trussed central portions, spaced from said brush material, means for applying pressure to said trussed central portions, and means for securing said carrying member upon an operating shaft or spindle, substantially as described.

4. A rotary brush comprising a tubular

split carrying member, brush material carried thereby, lugs on said member on opposite sides of said split or division, and a screw coöperating with said lugs for binding the member on an operating-shaft, substantially as described.

5. In a rotary brush, a tubular carrying member having a split channeled portion or ring provided with lugs in said channel, a screw coöperating with said lugs for tightening said split portion, a guard-spring encircling the same and closing said channel, and brush material carried by said member, substantially as described.

6. In a rotary brush, a carrying member, brush material thereon comprising brush fiber cloth and cement with the fiber projecting beyond the cloth and cement, rings on said member, disks carried by said rings having inclined truss portions and flat portions abutting against the cemented portion of said brush material and having inwardly-turned outer edges projecting beyond the cemented portion and serving to compress and support the uncemented portion, substantially as described.

7. A rotary brush comprising a carrying member, rings carried thereby, opposing disks carried by said rings and reinforcing-bands of flexible material carried by the edges of said disks, and brush material between said disks, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

FRANK GUNN FARNHAM.

Witnesses:

NORMAN C. FARNHAM,

W. H. STONE.