No. 772,089. PATENTED OCT. 11, 1904.

W. DIXON.

BRUSH AND PROCESS OF MAKING SAME.

APPLICATION FILED SEPT. 18, 1903.

NO MODEL. 3 SHEETS—SHEET 1.

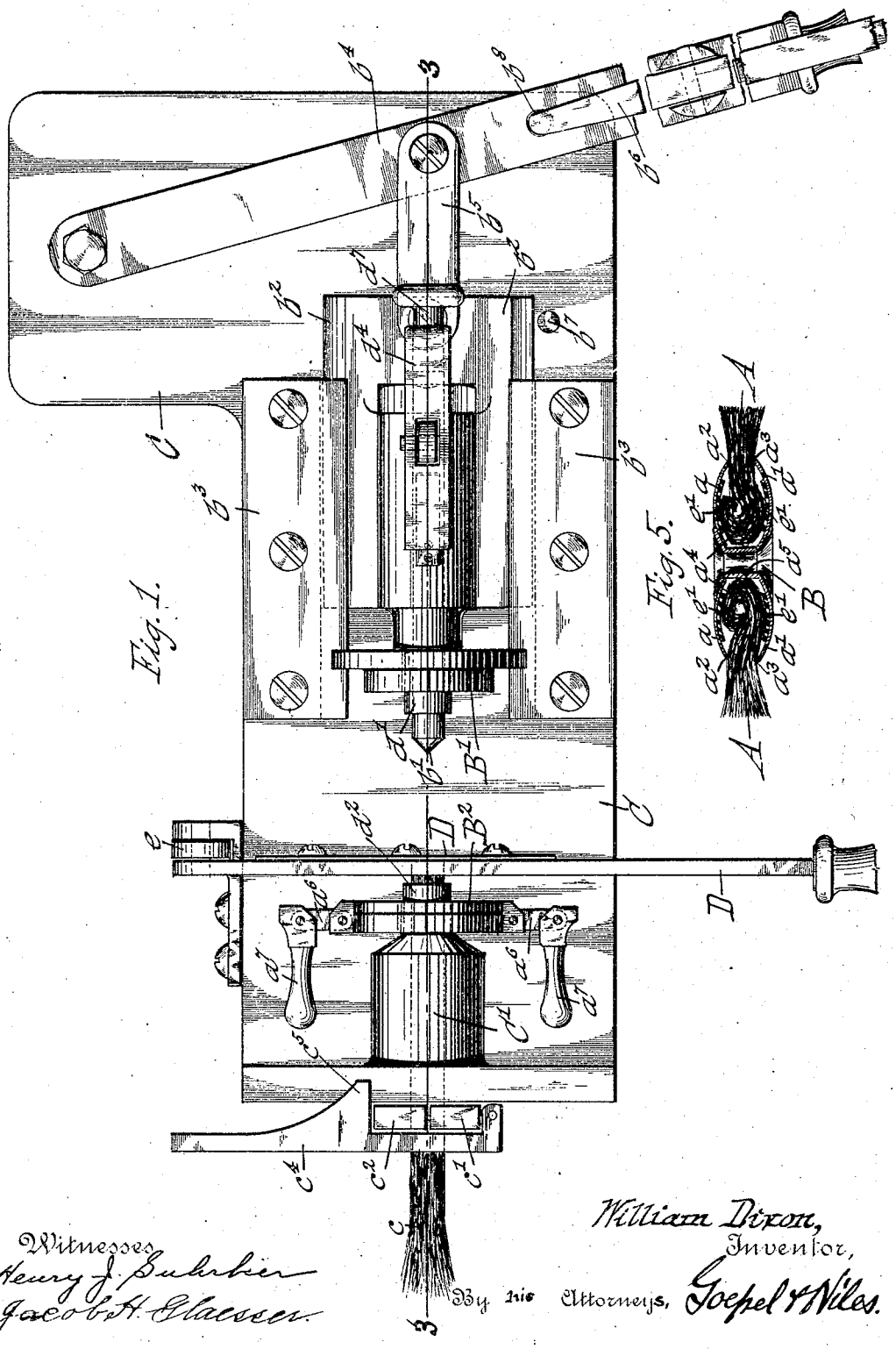


Fig. 1.



Fig. 5.

Witnesses,
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Jacob H. Glaessen.

William Dixon,
Inventor,
By his Attorneys, Goepel & Niles.

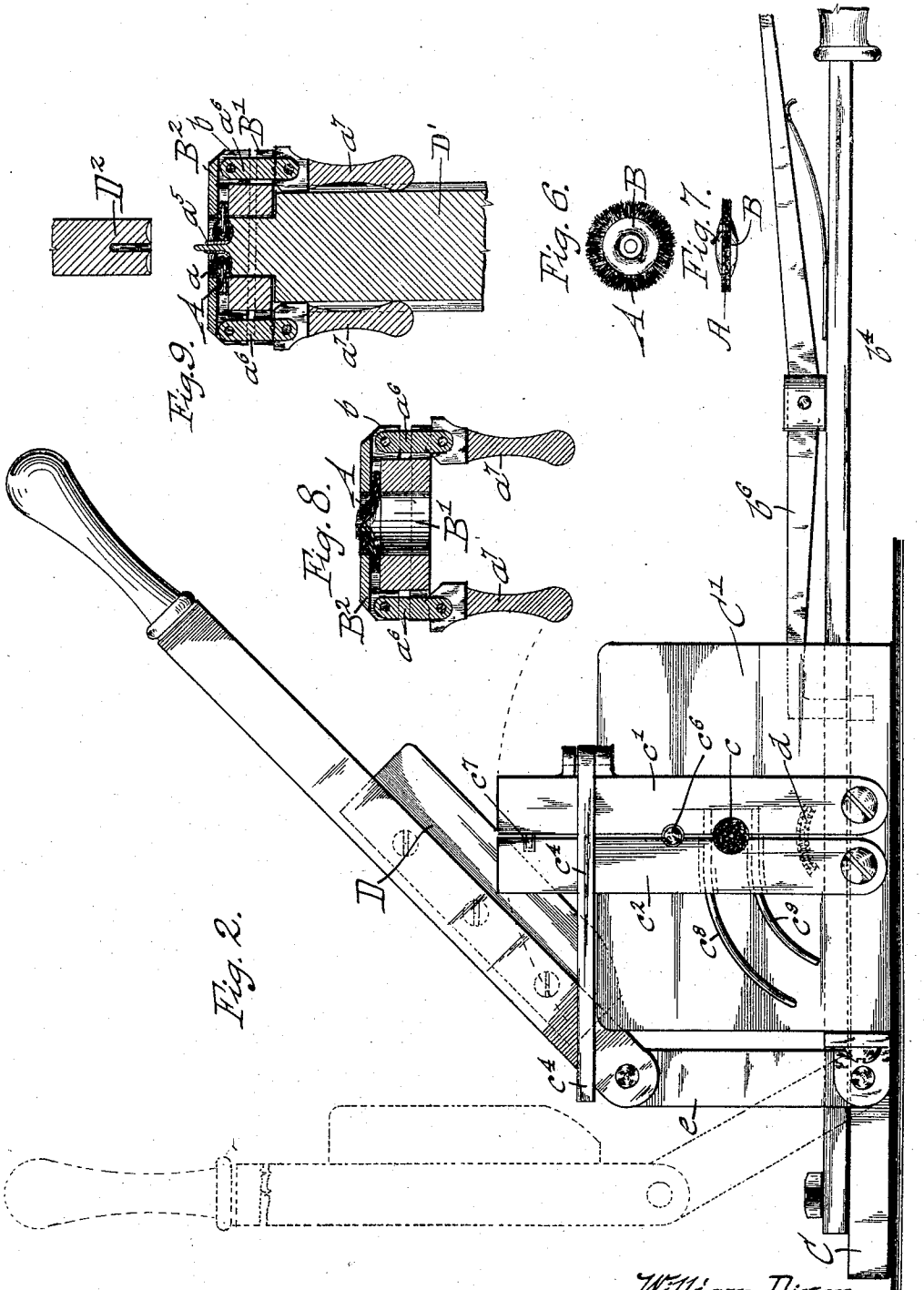
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NO MODEL. 3 SHEETS—SHEET 2.




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NO MODEL. 3 SHEETS—SHEET 3.

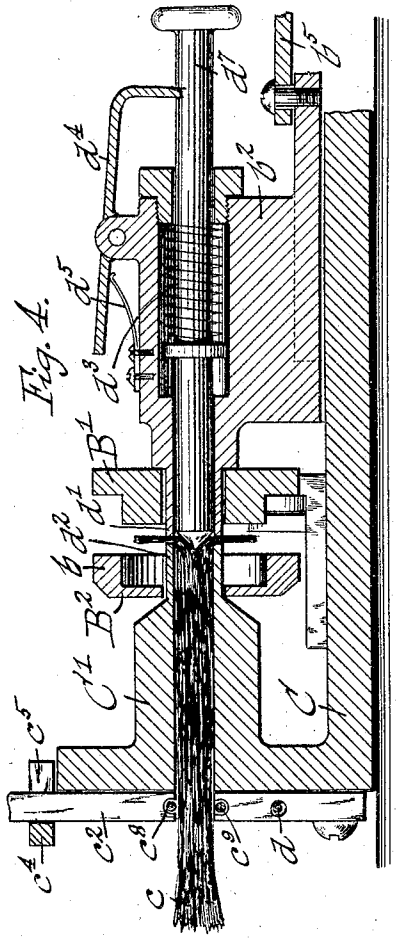


Fig. 4.



Fig. 3.

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No. 772,089. Patented October 11, 1904.

# UNITED STATES PATENT OFFICE.

WILLIAM DIXON, OF NEWARK, NEW JERSEY.

## BRUSH AND PROCESS OF MAKING SAME.

SPECIFICATION forming part of Letters Patent No. 772,089, dated October 11, 1904.

Application filed September 18, 1903. Serial No. 173,697. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM DIXON, a citizen of the United States, residing in Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Brushes and Processes of Making the Same, of which the following is a specification.

The object of this invention is to provide a brush the bristles of which are held with great firmness and security to the brush-body.

The invention relates more especially to rotary brushes—*i. e.*, brushes having a circular periphery and which are adapted to be rotated for use.

The object is, further, to provide a process by which the new brush may be made.

The invention consists of a brush comprising a brush-body having an opening and a plurality of unbound bristles clamped in said body and having therein a thickness greater than the width of said opening.

The invention consists also in the process of making the new brush, as hereinafter set forth.

In the accompanying drawings, Figure 1 is a plan of a machine adapted to be employed in making my improved brush according to the new process. Fig. 2 is an elevation from the ingoing end of the machine. Fig. 3 is a vertical longitudinal section on line 3 3, Fig. 1. Fig. 4 is a similar section of a portion of the machine, showing the parts in a different position. Fig. 5 is a vertical transverse section through a brush constructed according to my invention. Fig. 6 is a plan of such brush, on a smaller scale, before the bristles are finally trimmed. Fig. 7 is a side elevation of the brush shown in Fig. 6. Fig. 8 is a vertical longitudinal section through a bristle die or holder with bristles held therein, and Fig. 9 shows the holder in position during one of the operations in the making of the brush.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, A indicates the bristles of a rotary brush constructed according to my invention. B indicates the body of said brush. The opposed side walls $a$ $a'$ of the body are preferably constructed of sheet metal. From one of the side walls extends a tube $a^5$ toward the other side wall, which is formed as a washer. At its end at the outside of the wall the tube $a^5$ is expanded, as indicated in Fig. 5, whereby the two walls are securely connected. The space back of the opening between the peripheries $a^2$ $a^3$ of the side walls $a$ $a'$ is wider than said opening, and the bristles have back of said opening a thickness of material greater than the width of said opening. This extra thickness is caused by the radial arrangement of the bristles, whereby their inner end portions are caused to form a thicker mass than that at the opening, and said thickness is materially increased by the use of bristles having each a surplus portion, which is bent over within the brush-body. Such construction is shown in Fig. 5, in which $a^4$ indicates the place of bending. The short portions beyond the point $a^4$ are the surplus portions. The thickness of bristle substance back of the opening being greater than the width of said opening, the bristles are locked to the brush-body by engagement of the side walls with the thicker portion of the bristle mass. For the further security of the bristles a layer of india-rubber or other suitable binding material is clamped at one side of said bristles, between the same and the side wall $a$, and a similar layer is clamped between the opposite side and the side wall $a'$.

A brush of this new type is produced, according to my new process, by first arranging a plurality of bristles in a mass having a thicker inner portion and then clamping upon said portion a brush-body having an opening of less width than the thickness of said portion.

B′, Figs. 8 and 9, indicates the inner member, and $B^2$ the outer member, of a suitable bristle-clamp. Both members are preferably of annular form. They are detachably clamped together by means of links $a^6$, pivoted to the outer member $B^2$, and cam-levers $a^7$, pivoted to said links and bearing against the inner member, Fig. 8. The bristles $a^8$ are clamped between the adjacent faces of the two clamp members. B′ is guided relatively to $B^2$ by a rim $b$ on the latter.

C indicates the bed-plate of a machine employed in the operation of securing the bristles in the clamp. A tubular bristle-guide C′ is arranged on the bed C. In line with said guide is a yielding and spring-actuated spreader-cone $b'$, mounted upon a suitable slide $b^2$, which is guided longitudinally on the bed by means of suitable ways $b^3$. The slide is actuated by means of a hand-lever $b^4$, connected, by means of a link $b^5$, with the slide. A latch $b^6$, pivoted to lever $b^4$ and adapted to engage in sockets $b^7$ $b^8$ of the base C, retains the slide in position at the beginning or end of its stroke. A bunch $c$ of bristles is inserted in the guide C′ and retained therein against outward movement by means of a bunch-vise comprising two jaws $c'$ $c^2$, pivoted at their lower ends to the bed-plate C and recessed at $c^3$ in line with the bore of the guide C′ for receiving the bunch. A clamping-lever $c^4$ is pivoted to one of the jaws and extends horizontally across and engages by a lug $c^5$ the other jaw. The jaws are centered by a stationary pin $c^6$, projecting from the guide C′, and at their upper portion are guided by a pin $c^7$, projecting from one jaw into engagement with the other. Guide-rods $c^8$ $c^9$ extend one at each side of the recesses $c^3$, thereby retaining the bristles of the bunch within the recess. The jaws of the bunch-vise are normally spring-actuated in open position by means of a spring $d$, interposed between them. The bunch $c$ being thus held in the position indicated in Figs. 1 and 3, member B′, which is provided with an axial opening, is placed upon a forwardly-extending sleeve $d'$ of the slide or carriage $b^2$. The clamp member $B^2$, which is also provided with an axial opening, is placed upon a similar sleve $d^2$ of the guide C′. Lever $b^4$ is moved toward the left. Cone $b'$ meets the bristles and spreads them equally in radial directions. On further movement of the lever $b^4$ the carriage, with sleeve $d'$, moves forward until the radially-arranged bristles are clamped between sleeves $d'$ and $d^2$, Fig. 4. The cone during this movement retreats, the shank of the same moving back in the carriage against tension of its actuating-spring $d^3$. A latch-finger $d^4$, actuated by spring $d^5$, snaps into a socket $d^6$ of the shank $d^7$ and retains the parts. The clamp members B′ and $B^2$ are now brought together upon the radial bristles by the operator and clamped together by means of the cam-levers $a^7$. The lever $b^4$ is moved back a short distance, whereby the carriage $b^2$ is moved, with the bristle-clamp upon it, rearwardly to such extent as to permit the sweep of a knife D, which is pivoted by a link $e$ to base C, to swing transversely to the bunch $c$. Prior to retreat of carriage the bunch-vise has been released to permit advance of the bunch. During retreat of carriage the clamp is held, if necessary, by the operator in position on the carriage, and the bunch $c$ is thereby drawn a short distance through the guide C′ equal to the length of the bristles of the next brush. The bunch $c$ is now clamped in advanced position. The knife D is operated and cuts off the bristles in line with the outer face of the member $B^2$. The clamped bristles then stand in the position shown in Fig. 8. The clamp, with its bristles, is removed from the machine. An eyelet such as before described is placed upon one member, D′, of a punch. A rubber washer $e'$ is placed upon said eyelet. The clamp is then placed upon the punch, as indicated in Fig. 9. A layer of rubber is placed upon the upper face of the inner portion of the bristle mass projecting at the interior of the clamp, the washer placed thereon, and the upper member $D^2$ of the punch brought down. The same forcibly compacts the inner portion of the bristle mass between the eyelet and washer, thereby further displacing the bristles at their inner portions and turns over the outer end of tube $a^5$ upon the washer, whereby the brush is formed. The clamp is then removed from the punch, opened by swinging the levers $a^7$ outwardly, and the brush freed. The bristles are trimmed, so as to render the periphery of the brush entirely even and perfectly circular, by any suitable cutter or trimming device. This operation completes the brush. The operations described are successively repeated and a new brush thereby formed for each advance of the bunch until the bunch is consumed. A new bunch is then inserted in the machine and manipulated in the same manner described.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination, with a brush-body having an opening and a space of greater width than said opening back of the same, of a plurality of bristles having within said space a thickness of material greater than the width of said opening and locked in said body by engagement of the walls of the same with said thicker portion, substantially as set forth.

2. The combination, with a brush-body having an opening and a space of greater width than said opening back of the same, of a plurality of bristles having within said space a thickness of material greater than the width of said opening, and washers interposed between said thicker portion and the walls of said body, substantially as set forth.

3. The process herein described of making a brush, which consists in spreading a portion of a bunch of bristles, and then cutting the bunch, so as to sever the spread portion from the remainder of the bunch and clamping said spread portion in a suitable brush-body, substantially as set forth.

4. The process herein described of making brushes, which consists in spreading a portion of a bunch of bristles, and then cutting the bunch, so as to sever the spread portion from the remainder of the bunch and clamping said

spread portion in a suitable brush-body, spreading another portion of said bunch and cutting the bunch and clamping the severed spread portion in a brush-body, and repeating said cutting and clamping operations successively, for successive portions of the bunch, until the latter is consumed, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

WILLIAM DIXON.

Witnesses:

FRANCIS J. MCLOUGHLIN,

SAMUEL F. DIXON.