July 1, 1941. R. MAROGG 2,247,957

MACHINE AND METHOD FOR FORMING BRISTLES

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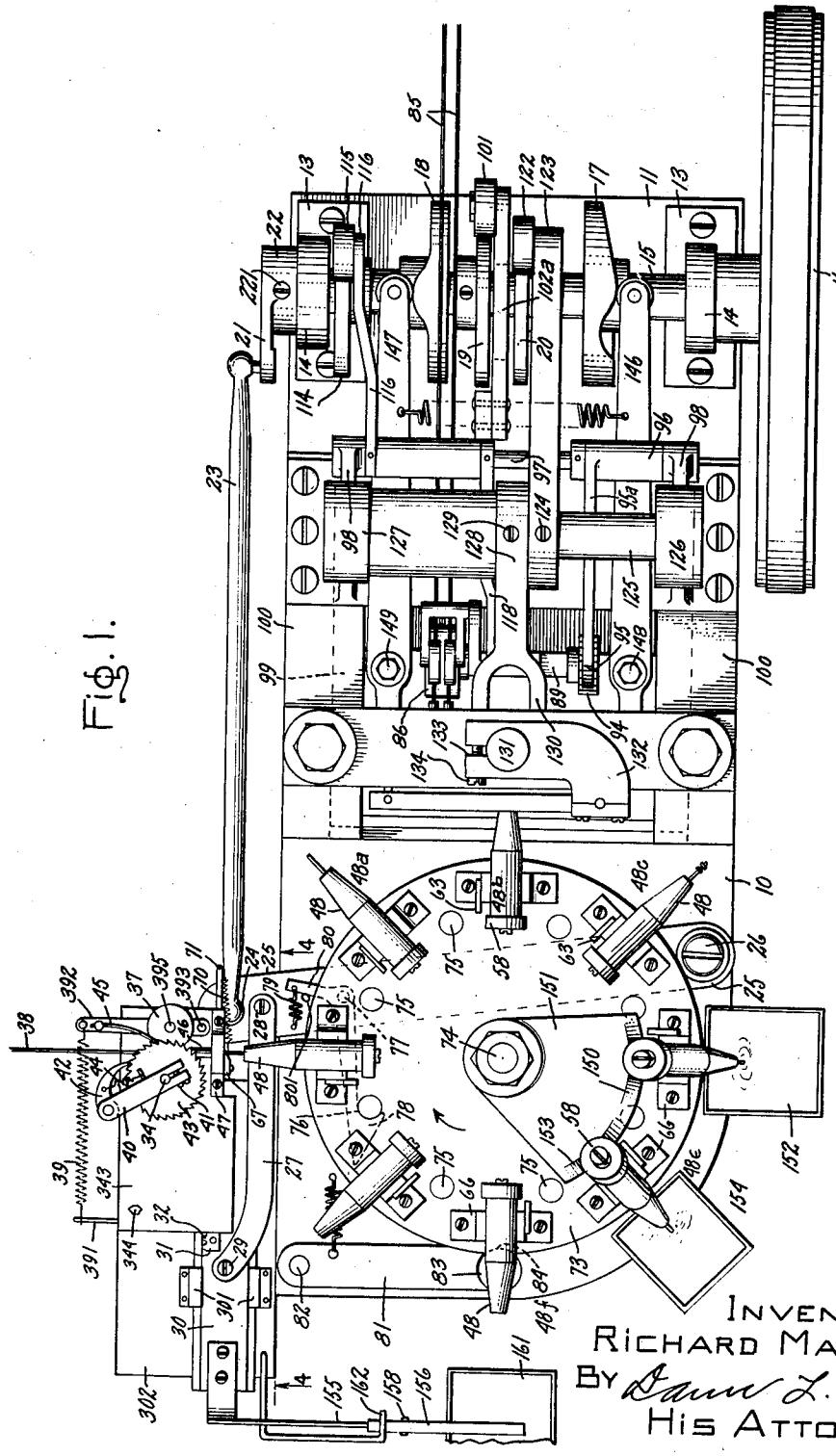


Fig. 1.

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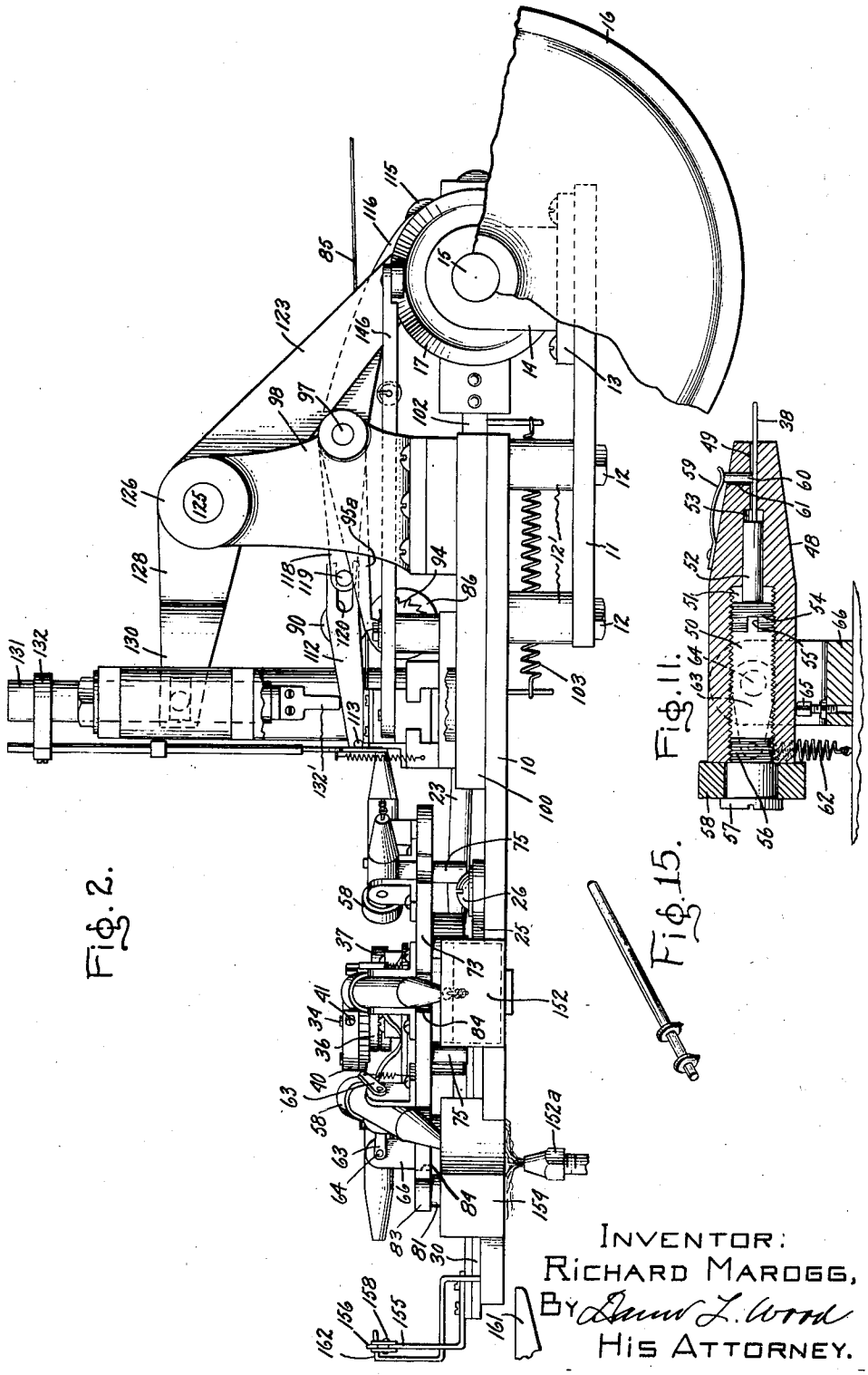


Fig. 2.

Fig. 11.

Fig. 15.

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MACHINE AND METHOD FOR FORMING BRISTLES

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Fig. 3.

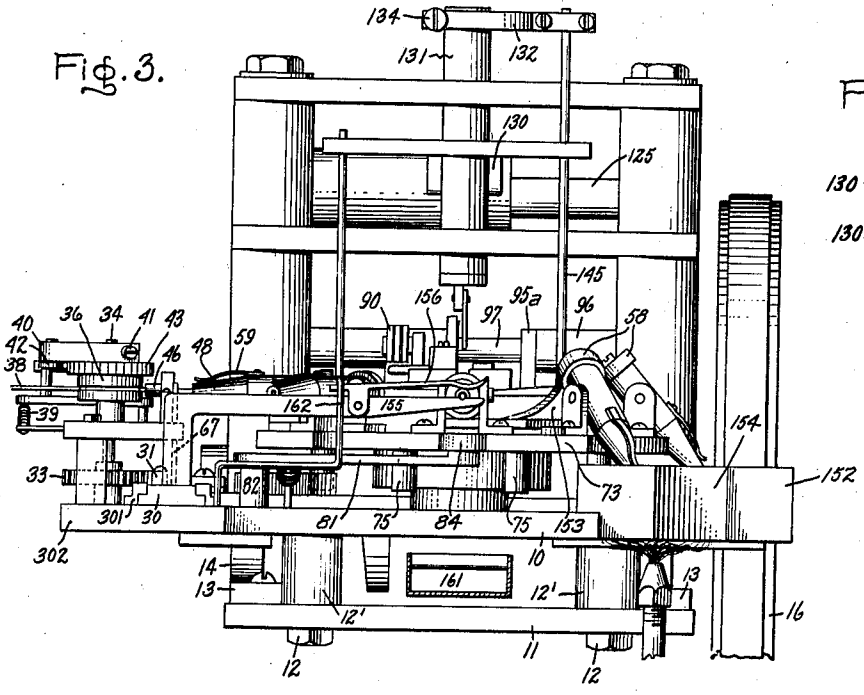


Fig. 3a.

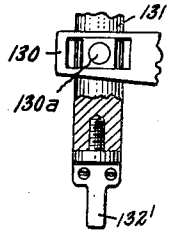


Fig. 13.

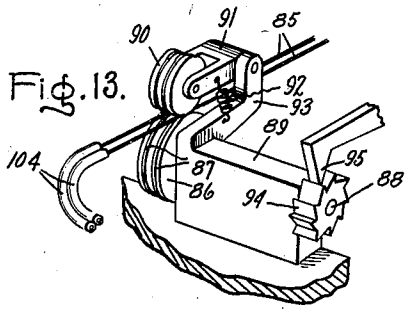


Fig. 12.

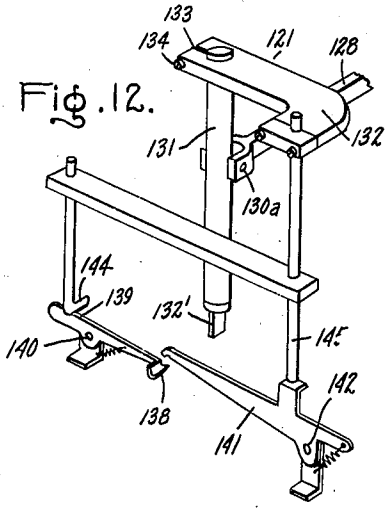
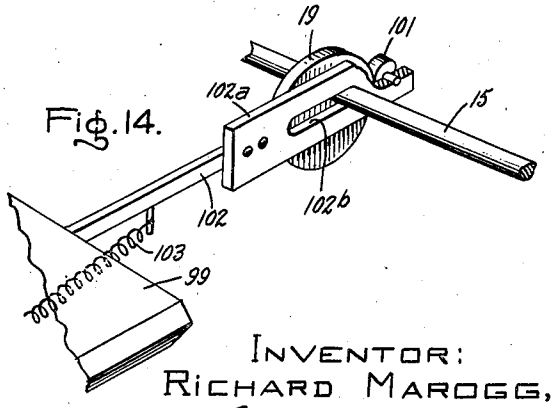


Fig. 14.



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MACHINE AND METHOD FOR FORMING BRISTLES

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Fig. 4.

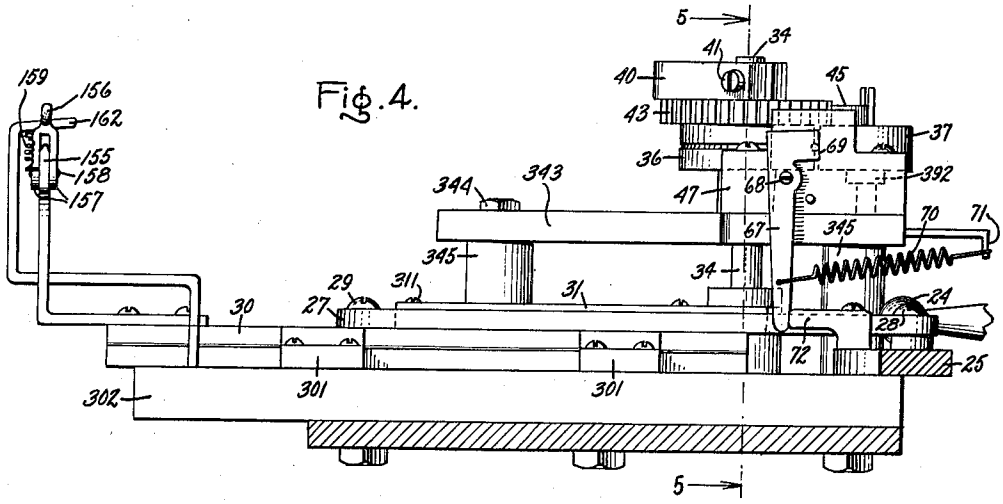


Fig. 5.

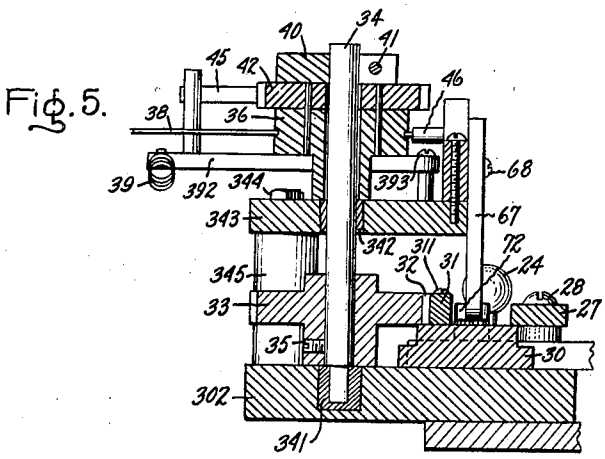
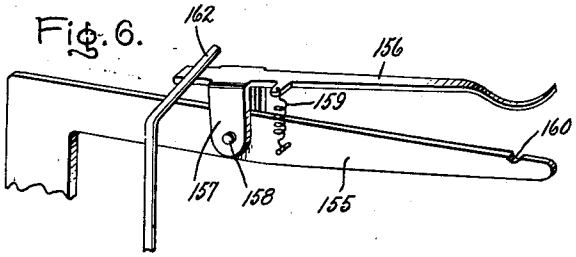


Fig. 6.



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MACHINE AND METHOD FOR FORMING BRISTLES

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Fig. 7.

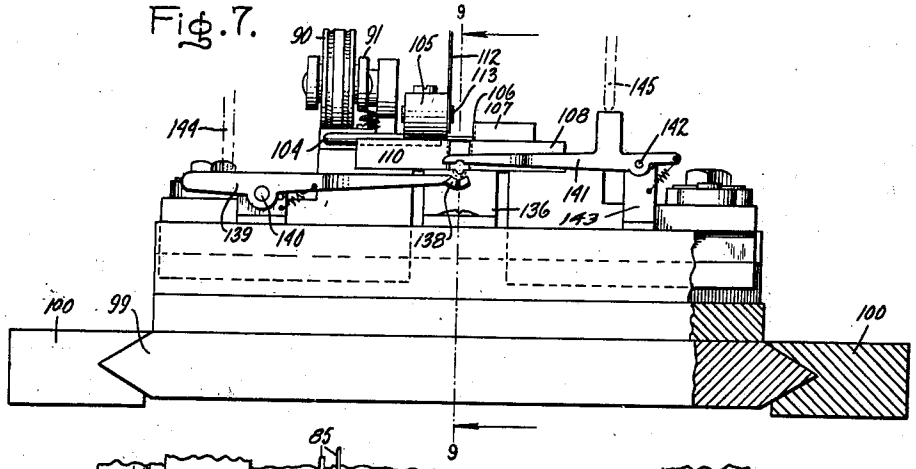


Fig. 8.

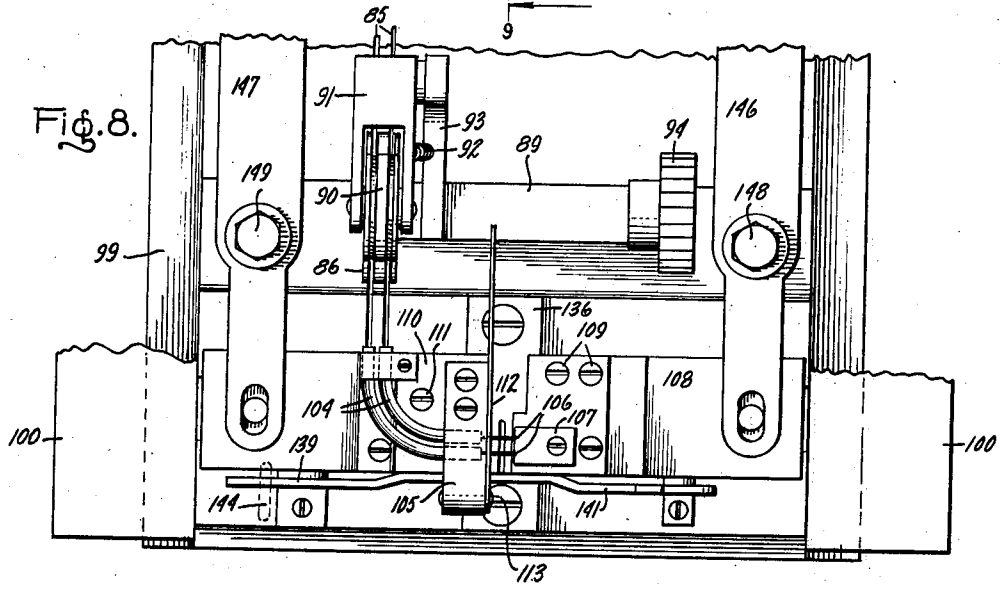


Fig. 9.

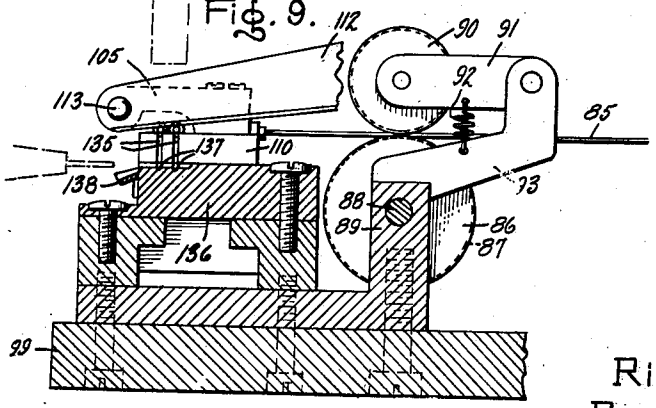
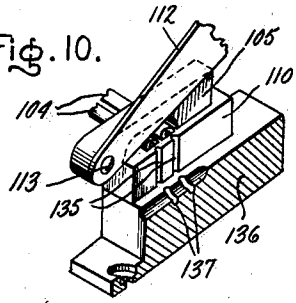


Fig. 10.



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Patented July 1, 1941 2,247,957

UNITED STATES PATENT OFFICE

2,247,957

MACHINE AND METHOD FOR FORMING BRISTLES

Richard Marogg, New York, N. Y.

Application April 27, 1939, Serial No. 270,277

29 Claims. (Cl. 140—71)

My present invention relates to an improvement over the bristle shown in my Patent No. 2,138,872, which issued December 6, 1938, and to a novel machine and method for making the bristle.

My said patent illustrates a bristle, and particularly one formed of metal, which is especially intended for use with a cushion back hair brush provided with wire bristles. In accordance with my prior invention, the bristle is formed with an enlargement at the end of the bristle and a second enlargement or head thereon spaced from the first mentioned head sufficiently to secure the bristle in position in an opening in the brush pad with the two heads engaging opposite sides thereof. In practice, the heads or enlargements on the wire bristles were up-set from the metal. Bristles of the gauge that are contemplated by my present invention cannot be formed by up-setting the metal and I have provided a machine and method by which enlargements, either singly or in spaced relation, may be secured to the bristle without the necessity of up-setting the metal.

My present invention relates to the machine for forming the bristles, and to the novel method employed for forming bristles.

The objects of my invention will appear in the specification and the novel features thereof will be more particularly pointed out in the claims.

My invention will best be understood by reference to the accompanying drawings in which I have illustrated a preferred embodiment thereof and in which

Fig. 1 is a plan view of an automatic machine embodying my invention;

Fig. 2 is a side view thereof, partially broken away;

Fig. 3 is an end view;

Fig. 3*a* is a fragmentary side view, partially in section, of the device for forming U-shaped elements from short, straight wires;

Fig. 4 is a sectional elevation taken along the line 4—4 of Fig. 1;

Fig. 5 is a section taken along the line 5—5 of Fig. 4, looking in the direction of the arrows;

Fig. 6 is a fragmentary perspective view of a device for removing formed bristles from the machine;

Fig. 7 is an end view of the carriage and associated parts;

Fig. 8 is a fragmentary plan view illustrating the feeding mechanism and associated parts for feeding to the machine the two wires which form spaced rings around the bristle;

Fig. 9 is a sectional view taken along the line 9—9 of Fig. 7 and illustrating the means for cutting the wires which form the encircling rings about the bristle;

Fig. 10 is a sectional perspective view through the bottom portion of the die and illustrating one of the slidable die members on the upper side thereof and other associated parts in elevation;

Fig. 11 is a sectional view through one of the bristle receiving nozzles;

Fig. 12 is a perspective view of the mechanism for operating the former for the U-shaped members which later encircle the bristle;

Fig. 13 is a perspective view of the mechanism for feeding the two wires from which the rings are formed, to the device;

Fig. 14 is a perspective view showing the cam which operates the carriage plate, and

Fig. 15 is a perspective view of one of the pins which forms a bristle.

Like reference characters indicate like parts throughout the drawings.

Referring to the drawings in which I have illustrated the preferred form of the device for carrying out my invention, a bed plate 10 is supported on a table, on legs, or in any desired manner. A frame 11 is supported beneath the bed plate 10 by suitable bolts 12 and spacers 12'. Bearing supports 13 are mounted on the plate 11 and is provided with upstanding standards 14 in which an operating shaft 15 has its bearings, the shaft being driven by any suitable means, here illustrated as a pulley 16.

Cams 17, 18, 19, 20 and 114 (Fig. 1) are mounted on the shaft 15 for a purpose which will be more fully hereinafter described. A crank arm 21 (Fig. 1) is mounted on a hub 22 (Fig. 1) suitably secured, as by a set screw 221 to the shaft 15. A connecting rod 23 is attached at one end to said crank arm and the opposite end thereof is connected by a ball and socket joint 24 to one end of an arm 25 which is pivoted at its opposite end as at 26 (Fig. 1) as by a screw to bed plate 10.

Wire feeding and bristle forming mechanism

The connecting rod 23 and the arm 25 which is actuated thereby operate the mechanism which feeds the bristle forming wire, in the manner hereinafter described, into nozzle 48 (Figs. 1 and 5). A link 27 is pivoted as at 28 to the arm 25 and is connected as at 29 to a sliding plate 30 guided in its movements by brackets 301 (Figs. 1 and 4) secured to plate 302. A rack bar 31 is mounted on and secured to the sliding plate 30, as by bolts 311 (Fig. 5) and is provided at one side with teeth 32 meshing with the teeth of a gear 33 secured to a shaft 34 as by a set screw 35, as best indicated in Fig. 5. The shaft 34 is supported in a stepped bearing 341 in the plate 302 and has a bearing as at 342 in a plate 343 which is supported by bolts 344 and spacers 345 on plate 302.

The shaft 34 actuates a feed wheel 36 between which and a friction wheel 37 (Fig. 1) the bristle forming wire 38 is fed. The friction wheel 37 (Fig. 1) is pressed against the wire 38 by a tension spring 39 (Fig. 1) which is connected at one end to a fixed pin 391 and at its opposite end to an arm 392 pivoted at 393 to the plate 343. The friction feed wheel 37 which is pivoted at 395 on the arm 392 is thus forced against the wire 38 which is, in turn, forced against the feed wheel 36. An operating arm 40 (Fig. 1) which is actuated by shaft 34 is secured to the upper end thereof by means of a clamping screw 41 passing through the split end thereof. To the outer end of the arm 40 is pivoted a pawl 42 which is held in engagement with a ratchet wheel 43 by means of a spring 44. During the forward movement of the rack bar 31 to the position indicated in Fig. 1, the shaft 34 is rotated clockwise as viewed in Fig. 1 and rotates the arm 40 and the pawl 42 to move the ratchet wheel 43 in a clockwise direction where it is retained in an advanced position by a stationary pawl 45. Then, during the reverse movement of the rack bar, the arm 40 is moved counterclockwise as viewed in Fig. 1, the pawl 42 merely riding over the teeth of the ratchet wheel 43.

The bristle forming wire 38 is fed through a tubular member 46 (Fig. 1) and through a suitable opening (not illustrated) in a guide member 47 into a bristle supporting nozzle 48, the details of which are more particularly illustrated in Fig. 11. The nozzle 48 is provided with an opening 49 into which the wire 38 is fed. In the embodiment of my invention illustrated, the nozzle 48 is provided with a threaded opening 50 in which is received a stop member indicated generally at 51 provided with a stem 52 which is received in a contracted opening 53. The threaded head 54 of the stop member is preferably split as at 55 in order that the head may be slightly spread by a suitable tool and retained in any desired position within the nozzle. The end of the nozzle may conveniently be closed by a threaded member 56 formed with a scarfed head 57. A roller 58 is mounted on the plain cylindrical portion of the threaded member 56 for a purpose which will be hereinafter more fully described. The wire 38 is retained in position against the front end of the stem 52 by a spring 59 mounted on the exterior of the nozzle and the free end of which engages a plunger 60 passing through an opening 61 in the nozzle, the inner end of the plunger 60 engaging the wire and thus retaining it in the position to which it is fed. The nozzle 48 is normally retained in the horizontal position illustrated in Fig. 2 by means of a spring 62 which is connected to the outer end of an arm 63 (Figs. 2 and 11) which is secured to a trunnion 64 on which the nozzle is mounted. The spring 62 normally retains the nozzle in the position illustrated in Fig. 11 against a threaded stop 65 in the base of a standard 66 on which the nozzle is mounted.

When the correct amount of wire has been fed into the nozzle against the stem 52, it is severed by a cutting element 67 (Fig. 4) pivoted at 68 and provided with a cutting edge 69 which is normally retained away from the wire by a spring 70, one end of which is attached to the lower end of the cutting element 67 and the opposite end of which is attached to a fixed member 71. The cutting element 67 is actuated by an L-shaped member 72 mounted on the arm 25 (Fig. 4) which engages the lower end of the cutting element 67 on the forward movement of the connecting rod 23, thereby severing a length of wire appropriate for forming a bristle, the length of the bristle being determined by the position of the stop 52 in the nozzle 48.

A plurality of nozzles are mounted in equally spaced relation on a rotatable disc 73 mounted on a vertical shaft 74. The disc is provided with a plurality of pins 75 extending through and secured within suitable openings in the disc and projecting beneath the same as shown in Fig. 2. Means are provided for moving the disc angularly through a desired angle, here illustrated at 45° at each movement, when there are eight nozzles, as illustrated, and during the reverse movement of the connecting rod 23. An operating arm 76, as best indicated in dotted lines in Fig. 1, is pivoted at 77 and is provided at its forward end with a hook 78 which successively engages pins 75 so that when the connecting rod 23 and the arm 25 are retracted, the disc 73 is moved through one step. The hook may conveniently be retained in engagement with a given pin by a spring 79 attached at one end to the arm 25 and at the opposite end to an arm 80 forming a bell crank with the arm 76 and normally holding the arm against a stop 801. The disc is retained in the exact position to which it is moved by an arm 81 (Fig. 1) pivoted at 82 and provided at its free end with a roller 83 which is received in successive notches 84 formed in the periphery of the disc 73 and one of which is illustrated in dotted lines in Fig. 1 adjacent the bristle holder 48.

The nozzle 48 which has now been supplied with a bristle, is first moved to the neutral position 48*a* and at the next step is moved to the position 48*b* where it is ready for the reception and formation of two spaced rings thereon.

Ring forming operation

One or more wires are also fed to the machine from which one or more rings are formed which are then caused to surround the bristle and are later integrally secured thereto. In the embodiment of my invention illustrated, two wires 85 are fed from suitable reels (not illustrated) to the machine by a feed wheel 86 (Figs. 9 and 13) which is provided with grooves 87 for the wires. The feed wheel 86 is mounted on a shaft 88 having its bearing in a block 89. The wires 85 are retained against the feed wheel 86 by a friction wheel 90 which is mounted on a frame 91 (Figs. 9 and 13) and retained in engagement with the feed wheel and the wires 85 by a spring 92 attached at one end to said frame 91 and at the other end to a stationary part 93. The feed wheel is actuated by a ratchet wheel 94 secured to the shaft 88 and which engages a pawl 95 on an arm 95*a* which is pivoted by means of a sleeve 96 (Fig. 1) on a shaft 97 having its bearings in a frame 98 (Fig. 1). The block 89 in which the feed wheel and associated parts are mounted is itself mounted on a carriage 99 (Figs. 7 and 8), preferably beveled at its edges, as indicated, and slidable in guides 100, suitably secured to the frame. The carriage 99 is reciprocated by the cam 19 (Figs. 1 and 14) which engages a roller 101 mounted at the side and one end of a pitman 102 which is connected at its forward end to an intermediate portion of the carriage 99 (Fig. 14). The cam 19 moves the pitman and the carriage to the right, as viewed in Fig. 14, against the action of a spring 103 connected to the pitman and to a stationary part while the said spring

moves the carriage and associated parts in the opposite direction. When the carriage, therefore, is moved to the right as viewed in Fig. 13, the ratchet wheel **94** engages the pawl **95** which actuates the feeding mechanism, it being understood that while the pawl is pivotally mounted, it does not move with the carriage. The end of the pitman adjacent the cam **19** is preferably provided with a plate **102***a* having an elongated opening **102***b* surrounding the shaft **15** in order that the shaft may not interfere with the movement of the pitman.

The two wires **85** which may be received from suitable spools, not illustrated, pass through curved guide tubes **104** (Fig. 13) from which they pass through openings in a block **105** (Fig. 10) into engagement with grooves **106** (Figs. 7 and 8) in one edge of a block **107** suitably secured on the upper side of one of the dies **108**, suitably secured to the plate **99** by screws **109** or otherwise, the complementary die being indicated at **110** and secured to the plate **99** by one or more screws **111**.

The wires **85** are now in position to be severed by a cutting element **112** pivoted as at **113** (Fig. 9). The cutting element **112** is operated by a cam **114** on the shaft **15**, which in turn actuates a roller **115** mounted on an arm **116** which is pinned on shaft **97** having its bearings in the frame **98**. Also attached to the shaft **97** is an arm **118** (Fig. 2) provided at its end with a pin **119** which is received in a slot **120** of the cutting element **112** pivoted, as stated, at **113**. The cam **114** is timed to actuate the cutting element at the time the two wires pass through the openings in the block **105**.

In accordance with my invention means are provided first for forming the pieces cut from the ring forming wire into U-shape, then inserting the wire bristle into the bottom of the U-shaped wires and then closing the U-shaped wires around the bristle and attaching the same thereto. The described dies are mounted on the carriage, and at the time that the nozzle carrying the bristle arrives at the position **48***b*, the dies are retracted. Otherwise they would interfere with the movement of the bristle which at this time is projecting from the forward end of the nozzle in the position **48***b*. When the nozzle has arrived at the position **48***b*, the dies **108** and **110** are moved forwardly to the position indicated in Fig. 8 by a mechanism which has already been described.

U forming mechanism

When the two wires of suitable length have been cut, means are provided for forming the wires into the shape of two U's. A former, indicated generally at **121**, in Fig. 12, is now actuated by the operating shaft **15**. The cam **20** operates a roller **122** mounted on an arm **123** which is fixed, as by a screw **124**, to a shaft **125** having its bearings at **126** and **127** mounted on the frame **98**. An arm **128** is also secured on the shaft **125** as by a screw **129** and is provided at its outer end with a yoke **130** which embraces and is pivotally attached at **130***a* to a vertically extending post **131** attached at its upper end to a plate **132**, the end of the plate **132** in which the post **131** is received preferably being split as at **133** and clamped about the stem as by a set screw **134**.

When the post **131** is thus depressed the lower end of the plate **132'** engages the short lengths of wire which have been severed by the cutting element **112** and forces the same downwardly between the two dies **108** and **110** which are, at this time, slightly spaced apart. The dies are preferably provided at their ends with grooves **135** (only one set being illustrated in Fig. 10), the plate **136** over which the dies move preferably being provided beneath the short wires with grooves **137** (Fig. 10). The plate **132'** thus presses the short wires into the grooves and shapes them into U-shaped members.

The nozzle with its bristle and the dies are now in the position indicated in Figs. 7 and 9 and by moving the dies forwardly in the manner described, the bristle is guided by a funnel shaped member **138** into position in the U's formed by the pieces of wire. Means are also provided for retaining the bristle in position during the time that the U-shaped members are bent around the bristle. An arm **139**, pivoted at **140** is mounted on the carriage and moves forwardly with the dies to a position where the inner end thereof is located beneath the bristle. A second arm **141**, pivoted at **142**, on a bracket **143** is disposed above the bristle. When the dies arrive at the position illustrated in Figs. 8 and 12, the outer end of the arm **139** engages a fixed curved member **144** thereby tilting the arm **139** about its pivot and exerting an upward force against the bristle. At the same time a plunger **145** (Figs. 7 and 12) engages the arm **141** to the left of its pivot thereby depressing the inner end of the arm above the bristle and gripping the bristle in position between the inner ends of the arms **139** and **141** and holding the same in position during the operation of forming the rings around the bristle as will now be described.

The two dies are now moved together by means of side cams **17** and **18** which engage levers **146** and **147** (Fig. 1) and force the same apart. The levers are pivoted at **148** and **149**, respectively, thereby moving together the dies **108** and **110** to which the inner ends of the levers **146** and **147** are connected and which thereby engage the upper ends of the U-shaped members and pinch them together around the bristle and creating sufficient friction between the bristle and the rings that are now formed to prevent the latter from dropping from the bristle. Then, when the dies have opened and been retracted, the nozzle and its bristle are ready to be rotated a further step to the neutral position **48***c* in Fig. 1.

Means for soldering rings to the bristle

Means are also provided for soldering or otherwise making the circular members which have thus been formed integral with the bristle. In the embodiment of my invention illustrated, the bristle is dipped successively into an acid bath and then into a bath of solder. A cam **150** is mounted at the outer edge of a sector plate **151** and in a position where it engages the roller **58** on the bristle receiving nozzle and tilts the outer end thereof downwardly about the axis **64** thereof into an acid bath **152** which is radially opposite said cam **150** and the bristle and the rings surrounding the same are thus prepared for the succeeding solder treatment. When the nozzle arrives at the position **48***e* the nozzle is again similarly tilted by a second cam **153** and the end of the bristle is dipped into a bath of solder **154** and the rings are thus soldered to the bristle in spaced relation, the space between the rings being just sufficient for the reception of the rubber pad in which the bristle is to be mounted. The bath of solder may conveniently be heated by a gas flame **152***a* or other desired heating means. While I have specifically described the rings or projections as being made integral with the bris-

tles by soldering the same thereto, it will be understood that they may be made integral therewith by brazing, welding or other like operations.

In accordance with my invention means are also provided for automatically withdrawing the formed bristle from the nozzle. In the embodiment of my invention illustrated, an arm 155 (Fig. 6) is mounted on the sliding member 30 (Fig. 1) and when the latter is moved to a position at the right, as viewed in Fig. 1, the arm 155 is likewise at the right of the position illustrated in Fig. 1. An arm 156 is provided with downwardly extending spaced ears 157 pivoted to the arm 155 as at 158. The arm 156 is normally retained against the arm 155 by a spring 159. At the time that the free end of the bristle which is still retained in the nozzle arrives at the position where the arm 155 is located, the arm 156 is in engagement with the arm 155 and the bristle rides between the arms 155 and 156 into a notch 160 where it is temporarily held by the spring 159 attached at its ends to the arms 155 and 156, respectively. Now, when the member 30 (Fig. 1) moves to the left, the bristle is withdrawn from the nozzle to a position over a receptacle 161. At this time the rear end of the arm 156 rides beneath a fixed arm 162 thereby lifting the free end of the arm. The bristle is thereby released and drops into the receptacle 161.

The operation of the device embodying my invention is as follows:

The rotation of the shaft 15 and the crank arm 21 which is secured thereto, actuates the connecing rod 23 and through the described mechanism actuates the feed device, more particularly illustrated in Fig. 5. The bristle forming wire is at this time in alignment with the bristle holder 48. The feed mechanism feeds the wire into the bristle holder against the stem 52 which is in a fixed position and which provides a bristle of predetermined length. The wire is then severed by the cutting element 67. The bristle holder 48 is then rotated to the neutral position 48*a* and then to the position 48*b*, the dies 108 and 110 at this time being retracted and out of the path of movement of the bristle in the bristle holder. The ring forming wires 85 are fed through the guide tubes 104 and block 105 at the forward edge of which the ring forming wires are cut by the cutting element 112, to form pieces of wire of lengths appropriate for forming rings which are to surround the bristle. The plate 132' (Fig. 12) is then forced downwardly against the wires and forms them into U-shaped pieces between the dies, as best shown in Fig. 10. The dies are then moved forwardly around the bristle, the bristle occupying a position within the U-shaped wires. The dies are then closed and the U-shaped wires are pinched around the bristle with sufficient force to cause the rings which are thus formed to grip the bristle sufficiently to retain them temporarily in position thereon. The dies are then opened and again retracted and the bristle holder with the bristle contained therein continues its movement until the bristle holder occupies the position 48*d* over the acid bath 152, at which time the roller 58 on the bristle holder engages the cam 150 which tilts the bristle holder about its axis and plunges the end of the bristle to which the rings are attached into the acid bath preparatory to the soldering operation. At the next position, 48*e*, of the bristle holder, the roller 58 engages the cam 153 and plunges the end of the bristle into a bath of solder which is maintained in fluid condition by the burner 152*a*.

As soon as the roller 58 is disengaged from the cam 153, the bristle holder is again moved to the horizontal position. At this time the arm 155 and the arm 156 carried thereby are in the forward position due to the movement of the sliding rack 30 and the continued movement of the bristle holder to the position 48*f*, caused the bristle to ride between the arms 155 and 156 and be gripped thereby. The movement of the sliding rack 30 then causes the arms 155 and 156 to be moved to the position illustrated in Fig. 6 where the opposite end of the arm 156 engages the fixed arm 162 and opens the arms 155 and 156, as illustrated in Fig. 6, and permits the bristle in finished condition with two rings or projections attached thereto to drop into the receptacle 161.

While I have illustrated two rings applied to the bristle in spaced relation, it will be obvious that one ring only may be applied if desired. Furthermore, while I have described the bristle as formed from a wire, it will be understood that materials other than metal may be used for the bristle.

While I have described my invention in its preferred embodiment it is to be understood that the words which I have used are words of description rather than of limitation and that changes within the purview of the appended claims may be made without departing from the true scope and spirit of my invention in its broadest aspects.

What I claim is:

1. In a bristle forming machine, means for feeding a bristle forming wire to said machine, means for cutting said wire into lengths appropriate for a wire bristle, means for forming a laterally metal projection on said bristle and separate therefrom, and means for rendering said projection integral with said bristle.

2. In a bristle forming machine, means for feeding a bristle forming wire to the machine, means for cutting the wire into lengths appropriate for a wire bristle, means for forming a metal ring about said bristle, and means for applying molten solder to the joint between said ring and said bristle.

3. In a bristle forming machine, means for feeding a bristle forming wire to the machine, means for cutting the wire into lengths appropriate for a wire bristle, means for forming two metal rings about said bristle in spaced relation, and means for applying molten solder to the joint between said ring and said bristle.

4. In a bristle forming machine, a bristle holder, means for feeding a bristle forming wire into said holder, means for cutting the wire in said holder of a length appropriate to form a bristle, means for feeding a ring forming wire to said machine, means for cutting said ring forming wire into a length appropriate for forming a ring about said bristle, means for transferring said bristle holder with its bristle to a position adjacent the cutting means for the ring forming wire, and means for forming a length of wire cut from said ring forming wire into a substantial ring surrounding said bristle.

5. In a bristle forming machine, a bristle holder, means for feeding a bristle forming wire into said bristle holder, means for cutting said wire in said holder of a length appropriate to form a bristle, means for feeding a ring forming wire to said machine, means for cutting said ring forming wire into lengths appropriate for forming rings about said bristle, means for transferring said bristle holder with its bristle to a

position adjacent the cutting means for the ring forming wire, means for forming a length of wire cut from said ring forming wire to a ring surrounding said bristle and means for integrally attaching said ring to said bristle.

6. In a bristle forming machine, a bristle holder, means for feeding a bristle forming wire into said bristle holder, means for cutting the wire in said holder of a length appropriate to form a wire bristle, means for feeding two ring forming wires to said machine in spaced relation, means for cutting said ring forming wires into lengths appropriate for forming rings about said bristle, means for transferring said bristle holder with its bristle to a position adjacent to the cutting means for said ring forming wires, and means for forming two lengths of ring forming wires into rings surrounding said wire bristle.

7. In a bristle forming machine, a bristle holder, means for feeding a bristle forming wire into said bristle holder, means for cutting said wire in said holder of a length appropriate to form a bristle, means for feeding a ring forming wire to said machine, means for cutting said ring forming wire into lengths appropriate for forming rings about said bristle, means for transferring said bristle holder with its bristle to a position adjacent the cutting means for the ring forming wire, means for forming a length of wire cut from said ring forming wire to a ring surrounding said bristle, and means for integrally attaching said ring to said bristle.

8. In a bristle forming machine, a rotatable platform, a plurality of substantially equally spaced bristle holders mounted on said platform and having outwardly directed wire receiving orifices, means for feeding a bristle forming wire into an orifice of a given bristle holder, means for cutting said wire in said bristle holder into a length appropriate for forming a bristle, means for feeding two ring forming wires in spaced relation to said machine, means for cutting said ring forming wires into lengths appropriate for forming rings about said bristle, means for rotating said platform step-by-step to a position to bring said bristle holder and its bristle to a point adjacent the cutting means for said ring forming wires, and means for forming said lengths of ring forming wires into rings surrounding said bristle.

9. In a bristle forming machine, a bristle holder, means for feeding bristle forming wire into said bristle holder, means for cutting said wire while in said bristle holder of a length appropriate to form a bristle, means for feeding two ring forming wires in spaced relation to said machine, means for cutting said ring forming wires of lengths appropriate to form rings around said bristle, means for forming said lengths into generally U-shaped wires, means for transferring said bristle while in said bristle holder to a position adjacent to said U-shaped wires and means for forming said U-shaped wires into rings in spaced relation about said bristle.

10. In a bristle forming machine, a bristle holder, means for feeding a bristle forming wire into said bristle holder, means for cutting said wire while in said bristle holder of a length appropriate to form a bristle, means for feeding two ring forming wires in spaced relation to said machine, means for cutting said ring forming wires of lengths appropriate to form rings around said bristle, means for forming said lengths into generally U-shaped wires, means for transferring said bristle while in said bristle holder to a position adjacent to said U-shaped wires, means for forming said U-shaped wires into rings in spaced relation about said bristle and means for integrally securing said rings in spaced relation about said bristle.

11. In a bristle forming machine, a bristle holder, means for feeding a bristle forming wire into said bristle holder, means for cutting said wire while in said bristle holder of a length appropriate to form a bristle, means for feeding two ring forming wires in spaced relation to said machine, means for cutting said ring forming wires of lengths appropriate to form rings around said bristle, means for forming said lengths of ring forming wires into generally U-shaped wires, means for transferring said bristle while in said bristle holder to a position adjacent to said U-shaped wires, means for forming said U-shaped wires into rings in spaced relation about said bristle and means for soldering said rings to said bristle while the latter is in said bristle holder and in spaced relation on said bristle.

12. In a bristle forming machine, a bristle holder, means for feeding bristle forming wire into said bristle holder, means for cutting said wire while in said bristle holder to a length appropriate to form a bristle, means for feeding two ring forming wires in spaced relation to said machine, means for cutting said ring forming wires of lengths appropriate to form rings around said bristle, means for forming said lengths into generally U-shaped wires, means for transferring said bristle while in said bristle holder to a position adjacent to said U-shaped wires, means for forming said U-shaped wires into rings in spaced relation about said bristle, a solder bath, and means for tilting said bristle holder when in a position over said bath and thereby bringing the end of said bristle into said bath.

13. In a bristle forming machine, a rotatable platform, a plurality of bristle holders mounted on said platform in spaced relation, means for rotating said platform step-by-step, means for feeding a bristle forming wire into a bristle holder in a given position, means for limiting the movement of said wire into said bristle holder, means for cutting said wire while in said bristle holder to form a bristle of a desired length, means located at another position of said holder for feeding two ring forming wires to said machine in spaced relation, means for cutting said ring forming wire of lengths appropriate to form encircling rings about said bristle, means for forming said lengths of wire into U-shaped wires, means for rotating said platform to a position where said bristle is adjacent to said U-shaped wires, means for moving said U-shaped wires into a position around said bristle while the latter is in said bristle holder, and means for forming said U-shaped wires into rings around said bristle.

14. In a bristle forming machine, a rotatable platform, a plurality of bristle holders mounted on said platform in spaced relation, means for rotating said platform step-by-step, means for feeding a bristle forming wire into a bristle holder in a given position, means for limiting the movement of said wire into said bristle holder, means for cutting said wire while in said bristle holder to form a bristle of a desired length, means located at another position of said holder for feeding two ring forming wires to said machine in spaced relation, means for cutting said ring

forming wire of lengths appropriate to form encircling rings about said bristle, means for forming said lengths of wire into U-shaped wires, means for rotating said platform to a position where said bristle is adjacent to said U-shaped wires, means for moving said U-shaped wires into a position around said bristle while the latter is in said bristle holder, means for forming said U-shaped wires into rings around said bristle, and means for soldering said rings to said bristle while the latter is in said bristle holder.

15. In a bristle forming machine, means for feeding a bristle forming wire to said machine, means for cutting said wire into lengths appropriate to form a bristle, means for forming a metal projection around a given bristle, means for rendering said projection integral with said bristle, and means for automatically discharging said bristle from said machine.

16. In a bristle forming machine, a bristle holder, means for feeding a bristle forming wire into said bristle holder, means for cutting said bristle forming wire to a length appropriate to form a wire bristle, means for feeding a ring forming wire to said machine, means for cutting said ring forming wire into lengths appropriate to form a ring around said bristle, means for forming a given length of said ring forming wire into a ring surrounding said bristle, means for integrally securing said ring to said bristle, and means for automatically discharging said wire bristle from said machine.

17. In a bristle forming machine, a holder for an individual bristle, means for inserting a wire bristle in said holder and means for integrally securing a projection to said bristle while in said holder.

18. In a bristle forming machine, a holder for an individual bristle, means for inserting a wire bristle in said holder, means for integrally securing a projection to said bristle while in said holder and means for automatically withdrawing said bristle from said holder.

19. In a bristle forming machine, a holder for an individual bristle, means for inserting a wire bristle in said holder and means for integrally securing two rings in spaced relation on said bristle.

20. In a bristle forming machine, a holder for an individual bristle, means for inserting a wire bristle in said holder, means for integrally securing two rings in spaced relation on said bristle and means for automatically withdrawing said bristle from said holder.

21. In a bristle forming machine, a bristle holder, means for feeding a bristle forming wire into said bristle holder, means for cutting said bristle forming wire of a length appropriate to form a bristle while in said bristle holder, means for feeding two ring forming wires in spaced relation to said machine, means for cutting said ring forming wires into lengths appropriate to provide rings surrounding said bristle, a carriage, means for advancing and retracting said carriage, co-acting dies mounted on said carriage, means for bending two lengths of ring forming wires into generally U-shaped forms and in spaced relation between said dies while said dies are retracted, means for advancing said dies to a position where said U-shaped members surround said bristle, and means for closing said dies while in said advanced position, said dies being constructed and arranged to form said U-shaped members into rings surrounding said bristle when closed.

22. The method of preparing a wire bristle which comprises cutting a wire to a length appropriate to form a wire bristle, and securing rings to a given wire in spaced relation by a soldering or like operation.

23. The method of forming a wire bristle which comprises preparing a wire of appropriate length to form a bristle, forming a second wire into a U-shaped member surrounding said wire, and forming said member to a ring surrounding said wire.

24. The method of forming a wire bristle which comprises cutting a wire to a length appropriate to form a wire bristle, forming two U-shaped wire members around said wire in spaced relation, closing said U-shaped members around said wire to form rings, and integrally securing said rings to said wire by a soldering or like operation.

25. The method of forming a wire bristle which comprises cutting wire bristles from a wire to a length appropriate to form a wire bristle, cutting a second wire into lengths appropriate to form rings about said wire bristle, forming a length cut from said second wire to a U-shaped member, placing said U-shaped member around said wire bristle, and shaping said U-shaped member around said bristle to a ring.

26. The method of forming a wire bristle which comprises cutting from a wire a length appropriate for forming a wire bristle, cutting a second wire into lengths appropriate for forming rings surrounding said wire bristle, forming a length of wire cut from said second wire into a generally U-shaped wire, enclosing said wire bristle in said U-shaped wire, forming said U-shaped member to a ring surrounding said wire bristle, and integrally securing said ring to said wire bristle.

27. The method of preparing a wire bristle which comprises cutting a wire into lengths appropriate to form a wire bristle, cutting a second wire into a length appropriate to form a ring about said wire bristle, forming said second wire to a generally U-shaped member in a die, moving said wire bristle to a position adjacent said die, moving said die and the U-shaped member carried thereby to a position where said wire bristle is surrounded by said U-shaped member, then forming said U-shaped member into a ring surrounding said wire bristle.

28. The method of preparing a wire bristle which comprises cutting a wire into lengths appropriate to form a wire bristle, cutting a second wire into a length appropriate to form a ring about said wire bristle, forming said second wire to a generally U-shaped member in a die, moving said wire bristle to a position adjacent said die, moving said die and the U-shaped member carried thereby to a position where said wire bristle is surrounded by said U-shaped member, then forming said U-shaped member into a ring surrounding said wire bristle and integrally securing said ring to said wire bristle.

29. The method of preparing a wire bristle which comprises cutting a wire into lengths appropriate to form a wire bristle, cutting a second wire into a length appropriate to form a ring about said wire bristle, forming said second wire to a generally U-shaped member in a die, moving said wire bristle to a position adjacent said die, moving said die and the U-shaped member into a ring surrounding said wire bristle and soldering said ring to said wire bristle.

RICHARD MAROGG.

CERTIFICATE OF CORRECTION.

Patent No. 2,247,957. July 1, 1941.

RICHARD MAROGG.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 4, second column, line 37, claim 1, after "laterally" insert the word --extending--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 16th day of September, A. D. 1941.

Henry Van Arsdale,
Acting Commissioner of Patents.

(Seal)