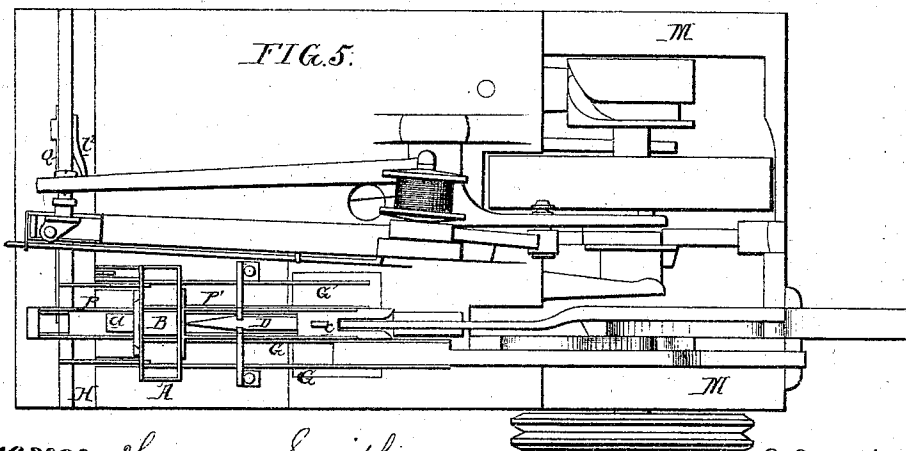
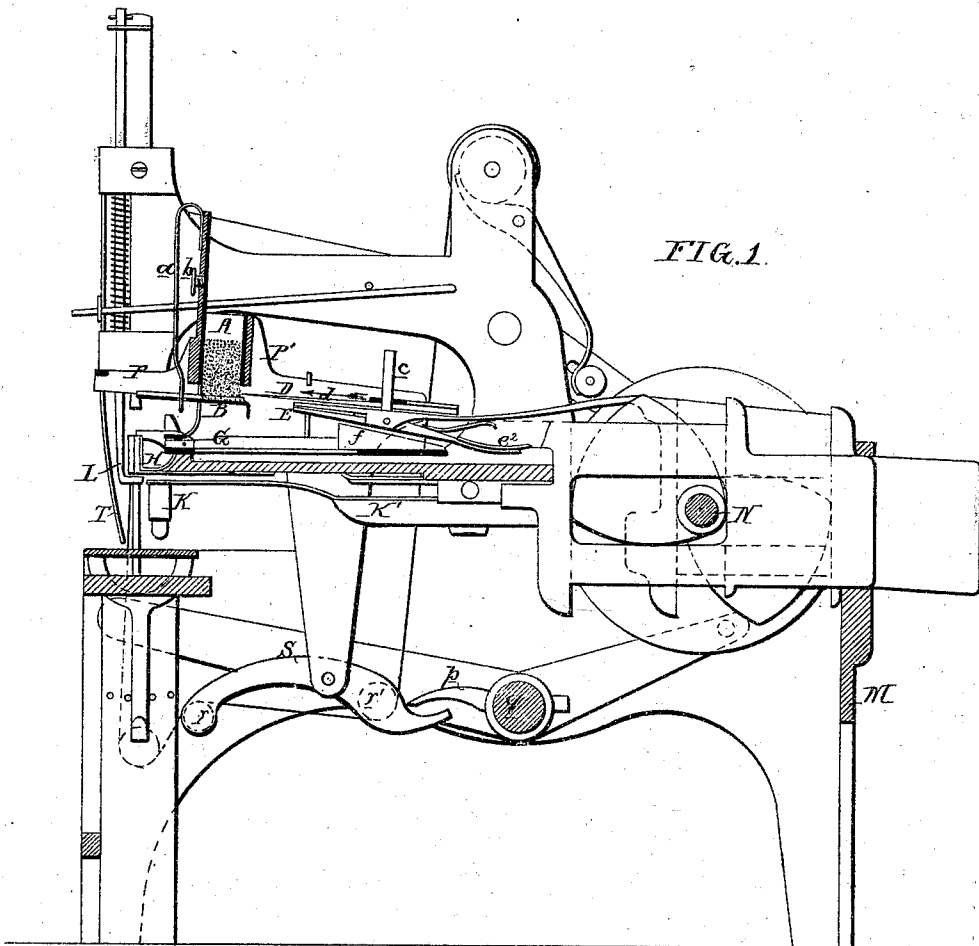


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Brush-Machines.

No. 138,545.

Patented May 6, 1873.



Witnesses, Harry Smith
Thomas McIlwain

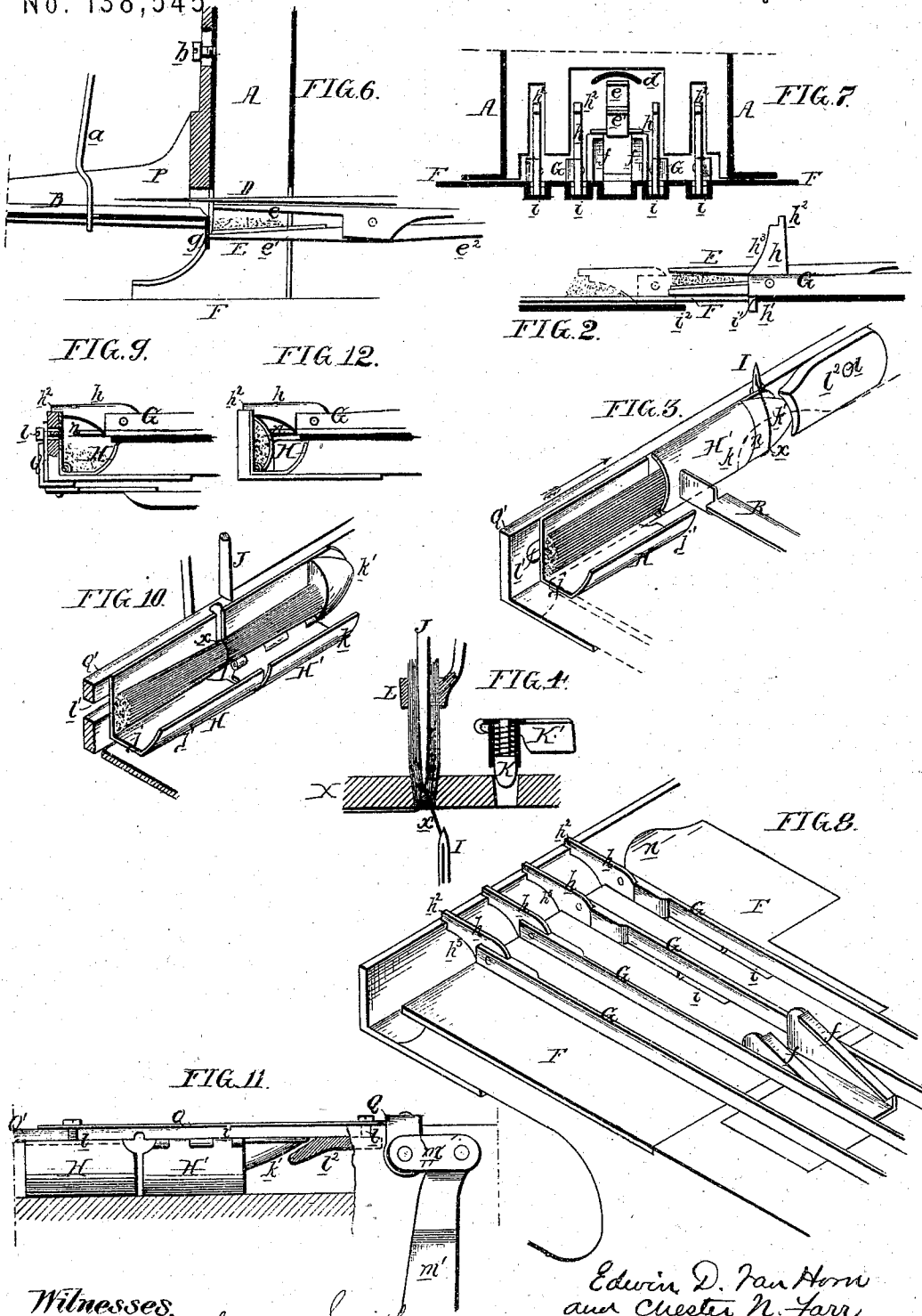
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UNITED STATES PATENT OFFICE.

EDWIN D. VAN HORN AND CHESTER N. FARR, OF PHILADELPHIA, PA.

IMPROVEMENT IN BRUSH-MACHINES.

Specification forming part of Letters Patent No. 138,545, dated May 6, 1873; application filed March 14, 1873.

To all whom it may concern:

Be it known that we, EDWIN D. VAN HORN and CHESTER N. FARR, both of Philadelphia, Pennsylvania, have invented a Brush-Making Machine, of which the following is a specification:

The object of our invention is to automatically separate bunches or knots of bristles from a mass to convey the said bunches to a position directly opposite a perforated brush blank or block to loop a wire or thread around the said bunches to simultaneously double and force or draw the same into the holes in the block to so feed the latter as to bring its holes directly opposite the bunches of bristles, and to finally wipe or straighten up the latter after they have been secured to the block.

We accomplish this object by the use of the machine illustrated in the vertical section, Fig. 1, of the accompanying drawing, in which A is a reservoir containing a mass of bristles sustained by a movable bottom, B, the bristles being separated in the required quantity from the bottom of the mass by a needle-like separator, D, and the portion or bunch thus separated being seized by nippers, E, which, as they advance in the direction of the arrow, push back the movable spring bottom B of the reservoir, the bristles thus seized being carried down by the nippers and deposited on a bed, F, in advance of a carrier, G, (see enlarged section, Fig. 2,) which as it advances pushes the bunch of bristles before it, and deposits them in a shuttle, H, the latter moving in a direction at right angles to the carrier and conveying the bunch of bristles through the loop of wire or thread *x*, (see perspective view, Fig. 3,) and to a position opposite the needle I, above the brush-block *x*, Fig. 4, and beneath a punch, J, the latter descending simultaneously, or nearly so, with the drawing of the wire, which is controlled by a take-up lever, S, thus doubling the bunch of bristles and forcing the same into one of the holes in the block, which is brought to a proper position by a feeding-stud, K, Fig. 4, a spring-wiper, L, through which the doubled bunch of bristles is passed when forced downward, slipping upward over the bunch and wiping or straightening the same after the fastening operation.

The machine will be fully understood from the following detailed description of its construction and operation.

In suitable bearings in the rear portion of the frame M of the machine, which may be of any suitable form, turns the driving-shaft N through the medium of cams on which and certain levers and arms motion is transmitted to the various parts of the machine, (see Fig. 1 and plan view, Fig. 5.) The reservoir A consists of a simple oblong box secured to the bed F, as best observed in Fig. 1, and in the enlarged sections, Figs. 6 and 7. At one side of the said reservoir is a frame, P, which sustains and guides the sliding bottom B, the latter being acted on by a spring, *a*, which tends to maintain it within the reservoir, and the said frame, with the sliding bottom, being rendered vertically adjustable on the reservoir by means of a set-screw, *b*, so as to regulate the position of the said sliding bottom in respect to the separator D, and to thus determine the quantity of bristles which shall be separated to form a bunch. The needle-like separator D is sustained by and slides in guides on a frame, P', secured to the rear of the reservoir, and derives its motion from the nippers E, a projection, *c*, on which extends upward through a hole in the rear portion of the separator, as shown in Fig. 1. The portion *d* of the separator immediately above the upper jaw *e* of the nippers is rounded or recessed for the reception of the latter, as best observed in Fig. 7, and for a purpose described hereafter.

In operating the machine, the nippers are forced forward by one of the cams on the driving-shaft toward the reservoir simultaneously with the drawing back of the carrier G; and during this movement the said nippers are raised to the position shown in Fig. 1, and on continuing the forward movement the arm *e*² of the lower jaw *e*¹ of the nippers passes over an incline, *f*, on the carrier G, and thus opens the jaws of the said nippers, the upper jaw *e* being contained within the recessed portion *d* of the separator, so as to pass over without disarranging the bristles previously detached from the mass by the point of the separator, and the lower jaw *e*¹ of the nippers striking a projection, *g*, of the sliding bottom

B, and forcing the latter before it, as shown in Fig. 6, until the whole of the separated bristles are contained between the jaws of the nippers. The forward movement of the nippers is still continued until the arm e^2 of the same has passed the inclines f of the carrier, when the jaws will be closed by the action of a spring, the said arm e^2 will drop to a position beneath the inclines, and the nippers, with their bunch of bristles, will be carried bodily downward onto the bed F in advance of the carrier G, as shown in Fig. 2. As soon as the nippers have dropped the sliding bottom b , owing to the action of its spring a , will resume its original position, Fig. 1, within the reservoir, and the nippers and separator will then be drawn rearward simultaneously with the forward movement of the carrier G, the mass of bristles in the reservoir being then sustained by the bottom plate B while the bunch separated and carried down by the nippers will be pushed from between the jaws of the latter, and moved forward over the bed F toward the shuttle by the carrier G. The latter, as best observed in Figs. 2, 7, and 8, consists of a series of parallel bars connected together at their rear ends, so as to be operated simultaneously by the same cam on the driving-shaft. At the extreme front end of each of the bars of the carrier is a jointed pusher-plate, h , formed with tongues h^1 and h^2 , having a curved edge, h^3 , and arranged to slide in a groove, i , of the bed F. During the rearward movement of the carrier the tongues h^1 of these plates strike shoulders i^1 in the grooves i , thus elevating the said plates, as shown in Fig. 2, and on the forward movement of the carrier the plates remain in this upright position until the bunch of bristles has been pushed by the same from between the jaws of the nippers, when they strike other shoulders, i^2 , in the grooves, and are depressed to the position indicated by dotted lines in Fig. 2, the bristles being thus held down by the plates as they are pushed forward over the bed, until they are discharged into the shuttle-race, and upon the open shuttle H, as shown in the cross-section, Fig. 9, the jointed ends on plates h of the carrier overhanging the shuttle, as best observed in Fig. 8, with their tongues h^2 overlapping the edge of the race, and thus preventing the escape of any of the bristles from the shuttle. The latter is of the peculiar construction best observed in the perspective views, Figs. 3 and 10, and inverted-plan view, Fig. 11. It consists of two entirely separate and distinct sections, H H', one arranged in advance of the other, the section H consisting of a vertical portion, j , and of a bottom and curved inner side, j' , secured rigidly to the said vertical portion, while the section H' is provided with a nose, k , and has a hinged bottom and side, k , constantly acted on by a spring, which tends to hold it open and on line with the portion j' of the section H, as shown in Fig. 10. Both sections of the shuttle are driven by one carrier, Q, Fig. 11, consisting of a flat plate adapt-

ed to the exterior of the vertical portion Q of the shuttle-race, and connected by bolts l l passing through a longitudinal slot l' , of the latter to the section H and to a bent plate, l^2 , which partially envelops the end or nose of the section H' of the shuttle. The shuttle-carrier is connected by a link, m , to an operating arm, m' , which derives its motion from one of the cams on the cam-shaft. As soon as the bunch of bristles has been deposited upon the shuttle by the carrier G a spring-bar, R, shoots forward and closes the hinged portion k of the section H' of the shuttle, as shown in Figs. 3 and 12, the bunch being thus securely clamped and held by the shuttle throughout one-half of its length, so that the disarrangement of any of the bristles is prevented when the shuttle moves forward in the direction of the arrow, Fig. 3, toward the needle I and punch J. The carrier G is retracted while the shuttle moves forward, and the latter during its movement is carried past a cam-like projection, n , on the bed F, which retains the hinged portion k of the shuttle in its closed condition, and enables the bar R to be drawn back by a cam on the driving-shaft out of the way of the rear section of the shuttle. The nose of the shuttle and the entire section H' pass through the loop of wire or thread x , which has been elevated by and with the needle, as shown in Fig. 3; and as soon as the section H' has passed the fixed cam n it is opened by the action of its spring, leaving the loop of thread or wire around the bunch of bristles, as shown in Fig. 10. The punch J then descends and strikes the center of the bunch doubling the same, and forcing it downward between the two sections of the shuttle through the opening in the bottom of the race, through the spring-wiper L, and into the conical opening in the brush-block X, as shown in Fig. 4, the needle descending in advance of the punch, either slightly before or simultaneously with the same, and drawing the wire tightly so as to retain the double bristles within the hole in the block.

The wiper L is a simple straight bar acted on by a spring tending to raise it, and having an eye or ring at its lower end for the passage of the bunch of bristles, this eye being, if desired, split at one point, so as to cause the same to bind against the bristles with a slight degree of pressure. The wiper descends with the bunch of bristles until it strikes the block X, and remains in this position until the withdrawal of the punch, when it springs upward over the bristles, and wipes or rounds the bunch up into symmetrical shape.

It is absolutely necessary to the successful operation of the machine that there should be an effective "take-up" for the wire or thread. We employ for this purpose a lever, S, Fig. 1, hung to the fixed frame, and vibrated at intervals by an arm, p , on the needle-lever rock-shaft q , the thread or wire passing beneath a roller, r , on one arm of the said lever, and over a roller, r' , at the extremity of the opposite

arm, the effect, when the needle descends, being to so vibrate the lever as to take up the whole of the slack wire or thread. Another important feature of our invention is the feeding device K, shown in Fig. 4. This consists of a simple rounded stud acted on by a spring and attached to the feed-bar K', to which the required movements are imparted by a cam on the driving-shaft. The block X is held upon the work-plate by a presser-foot, T, and after a bunch has been forced into one of the holes in the same, and fastened or knotted, the stud K is, by the movement of its bar K', drawn over the surface of the block, and, by a slight adjustment of the latter, directed to a position over the hole into which it is desired to force the next bunch of bristles. The stud, owing to the action of its spring, will enter this hole, and a movement of its arm K' will carry the same to a position directly beneath the punch and above the needle.

It may be remarked as one of the peculiarities of our machine, that in the whole of the successive operations to which the bristles are subjected, they are never left in a loose condition, but are always tightly held, and all risk of their disarrangement thus avoided.

We claim as our invention—

1. The combination with the reservoir A of a sliding bottom, B, acted on by a spring.

2. The said sliding bottom B, rendered vertically adjustable upon the reservoir, for the purpose specified.

3. The combination of the concave or recessed portion *d* of the separator D with the upper jaw of the nippers.

4. The combination of the spring bottom-plate B of the reservoir with the lower jaw of the nippers.

5. The separator D, operated substantially as described through the medium of a projection, *e*, of the nippers.

6. The carrier G, consisting of a series of parallel bars caused to reciprocate simultaneously beneath the reservoir, substantially as and for the purpose described.

7. The jointed ends or plates *h* of the carrier-bars, adapted to grooves in the bed-plate and operated by shoulders within the said grooves, substantially as herein set forth.

8. The combination, substantially as described, of the nippers E with the carrier G.

9. The combination, substantially as described, of the arm *e*² of the nippers with the inclines *f* of the carrier.

10. The combination of the reservoir A, the carrier G, and the shuttle-race, all arranged, in respect to each other, substantially as described.

11. The shuttle H H', constructed in two separate sections, substantially as and for the purpose described.

12. The combination of the shuttle, its race, and the jointed ends *h* of the carrier, all arranged and operating, substantially as described, to prevent the escape or disarrangement of the bristles during their transfer from the said carrier to the shuttle.

13. The section H' of the shuttle, constructed substantially as described, with a nose, *k'*, and a hinged portion, *k*, acted on by a spring.

14. The combination of the sliding-bar R with the hinged portion *k* of the shuttle.

15. The combination of the cam-like projection *h* with the said hinged portion of the shuttle.

16. The combination and arrangement, in respect to each other and the shuttle, of the sliding bar R and cam projection *n*.

17. The combination, substantially as described, of the punch J and needle I with the divided shuttle.

18. The punch J and needle I, arranged in respect to and operating in conjunction with each other upon the bunch of bristles, substantially as described.

19. The wiper L, constructed and operating substantially as described.

20. The feeding device, consisting of the yielding stud K and bar *k'*, in combination with a cam on the driving shaft or equivalent operating mechanism.

21. The shuttle-driver Q, adapted to the exterior of the shuttle-race, connected to the two sections of the shuttle through a slot in the said race, and operated as described by a lever, *m'*, through the medium of a link, *m*.

22. The take-up lever S, arranged and operating in combination with the needle I, substantially as specified.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

EDWIN D. VAN HORN.
CHESTER N. FARR.

Witnesses:

WM. A. STEEL,
HUBERT HOWSON.