

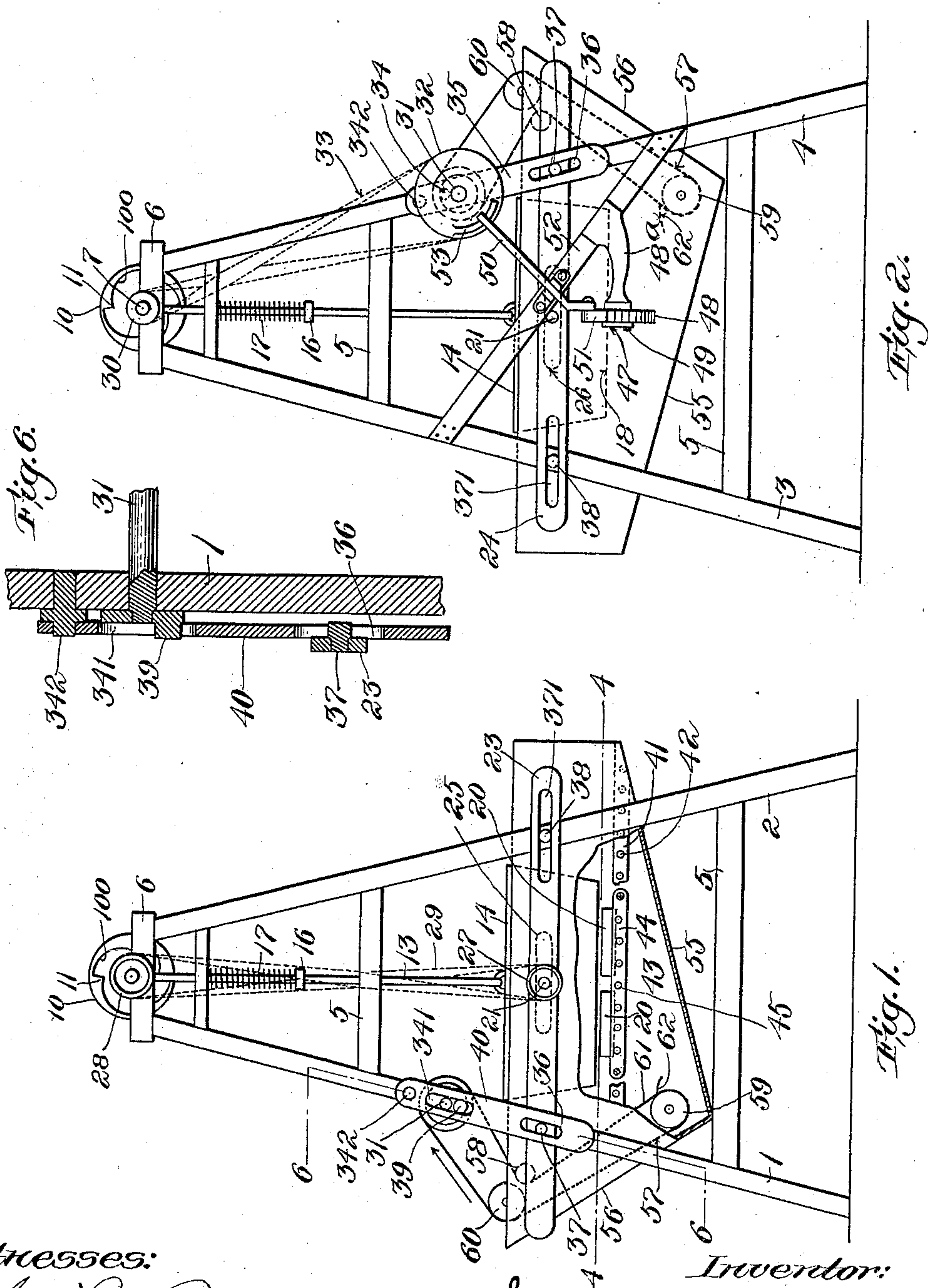
H. M. SCHWARTZ.

BRUSH MACHINE.

(Application filed June 22, 1900.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses:

Arthur D. Randall.  
Robert Wallace.

Inventor:

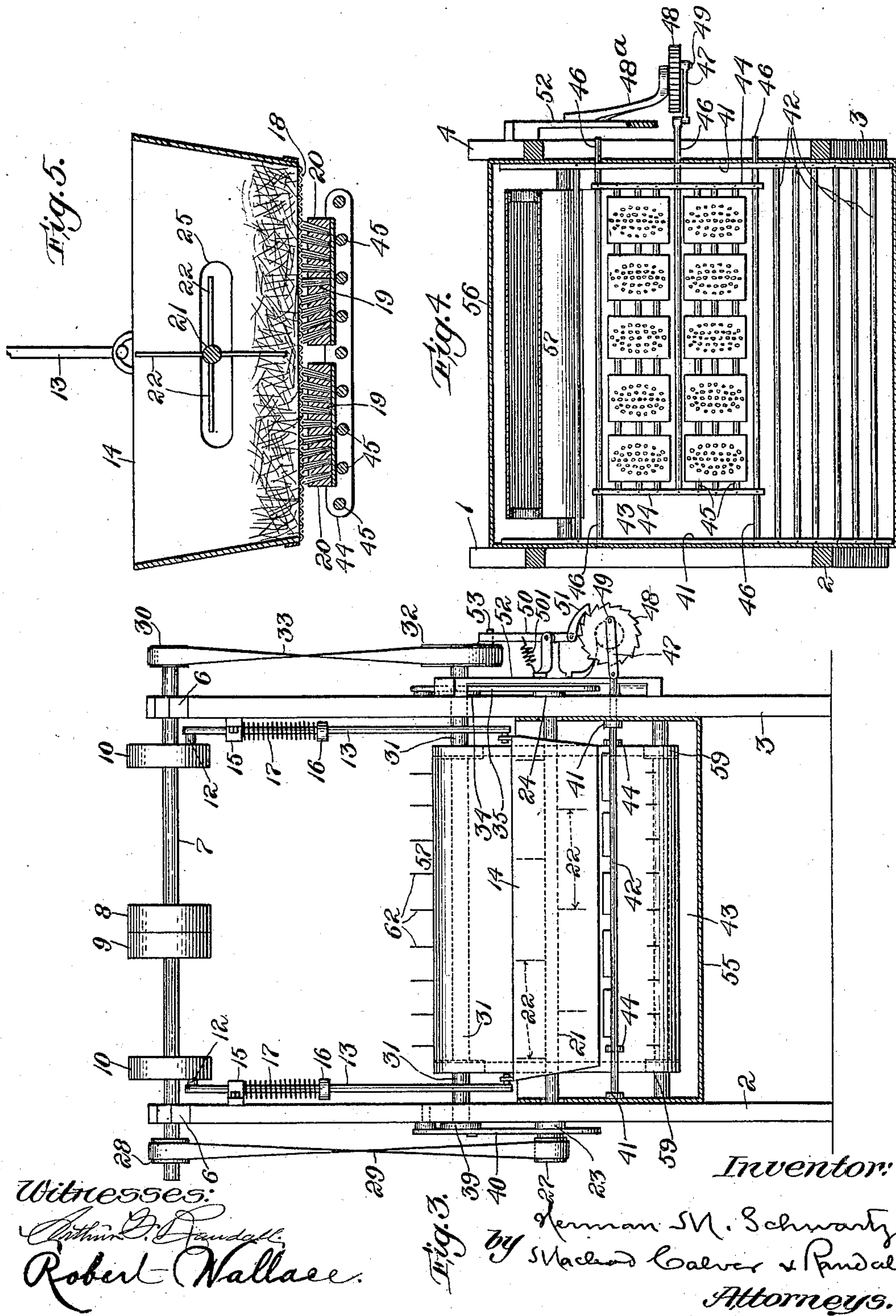
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# UNITED STATES PATENT OFFICE.

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TO FLORENCE MANUFACTURING COMPANY, OF NORTHAMPTON, MASSA-  
CHUSETTS, A CORPORATION OF MASSACHUSETTS.

## BRUSH-MACHINE.

SPECIFICATION forming part of Letters Patent No. 696,761, dated April 1, 1902.

Application filed June 22, 1900. Serial No. 21,189. (No model.)

*To all whom it may concern:*

Be it known that I, HERMAN M. SCHWARTZ, a citizen of the United States, residing at Northampton, in the county of Hampshire, State of Massachusetts, have invented a certain new and useful Improvement in Brush-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

In the manufacture of brushes of certain kinds—such, for example, as hair-brushes—a bristle-block or bristle-die is employed. This block or die is usually made of metal and is provided with a series of holes or apertures corresponding in size and relative location with the tufts of bristles in the brush which it is desired to make.

The object of my present invention is to provide a simple, durable, and efficient brush-machine for filling the bristle blocks or dies employed in brush manufacture with bristles.

My invention is fully set forth in the following description, reference being had to the accompanying drawings, and the novel features thereof are pointed out and clearly defined in the claims at the close of this specification.

In the drawings, Figure 1 is a side elevation of a machine embodying my invention, the bristle-hopper being partly broken away. Fig. 2 is a similar view from the opposite side of the machine. Fig. 3 is a front elevation. Fig. 4 is a plan view of the bristle-block-supporting device, showing the means employed for causing the said support to be reciprocated horizontally. Fig. 5 is a sectional view of the bristle-hopper, two bristle-blocks beneath the same, and the support for the said bristle-blocks. Fig. 6 is a view in section on line 6 6, Fig. 1.

The frame of the machine consists of four uprights 1, 2, 3, and 4, the uprights 1 and 2 being at one end of the machine and the uprights 3 and 4 at the opposite end. The uprights at each end are inclined toward each other at their upper ends, forming an A-shaped frame at each end of the machine. The uprights are also strengthened and stiffened by tie-pieces 5. The precise form and construction of the frame is, however, not

material. At the top of each pair of uprights is a cross-piece 6. The main shaft 7 is supported in suitable journals on the said cross-piece 6. On the said shaft 7 are the usual fast and loose pulleys 8 and 9, which are employed in driving the said shaft. Toward each end of the shaft 7, and preferably inside the uprights of the frame, I secure a cam-wheel 10, having on the face thereof a cam 100, with which a pin 12 engages, the said pin being secured in and projecting laterally from the upper end of the connecting-rod 13. The lower end of the said connecting-rod is secured to the end of the bristle-hopper 14. The connecting-rod 13 passes through a lug or projection 15, secured to one of the cross-pieces 5 of the frame, and below said cross-piece is provided with a collar 16, firmly secured thereon. Between the lug 15 and collar 16 is placed a spiral spring 17, which as the rod 13 moves upwardly is compressed and tends to move the rod downwardly. The cam formed in the face of the wheel 10 is of the shape shown, Figs. 1 and 2, and operates when the wheel revolves to cause a vertical vibration or reciprocation of the bristle-hopper 14. As the wheel rotates the pin 12 will be caused to roll or slip from one of the points 11 of the cam to another, thus raising and lowering the connecting-rod 13 and bristle-hopper 14 four times during each revolution of the wheel 10. This results in a very rapid reciprocation through a short range of movement, which is desirable. This means for supporting and reciprocating the bristle-hopper is duplicated at the opposite end of the machine, as will be clear. The bottom of the bristle-hopper is reticulated and is formed, preferably, of wire-netting 18. The bristles are placed in the bristle-hopper and are caused by the reciprocation thereof to pass downwardly through the reticulated bottom and into the bristle apertures or holes 19 in the bristle-blocks, one of which is shown at 20, as will be hereinafter more fully set forth.

For the purpose of properly agitating and separating the bristles in the hopper and preventing them from becoming matted and massed together I provide an agitator which extends lengthwise of the said bristle-hopper



and comprises a rod 21, having a series of outwardly-extending teeth or pins 22 thereon. This agitator is journaled in cross-pieces 23 and 24, located at opposite ends of the machine and supported on uprights of the frame. The shaft or rod 21 of the agitator extends through horizontal slots 25 and 26, formed at opposite ends of the said hopper, the said slots being greater in width than the diameter of shaft 21, thereby providing for independent vertical play or movement of the hopper to a slight extent. To one end of the said rod or shaft a pulley 27 is secured, to which power is communicated from the main shaft 7 by means of the pulley 28 on said main shaft and the connecting-belt 29. By this means the agitator-shaft is caused to rotate, forcing the teeth 22 through the mass of bristles in the hopper and operating to separate and agitate them. In addition to its rotary movement, however, the agitator is greatly increased in effectiveness if it is given a horizontal vibratory movement, so that it will at times assume a diagonal position within the hopper instead of a position parallel with the sides thereof, and will then move horizontally, its opposite ends moving in opposite directions until it assumes the opposite diagonal position. In this way the entire contents of the hopper are more effectually agitated and separated. To give the agitator this swinging or vibratory movement simultaneously with its rotary movement, the cross-pieces 23 and 24, in which the shaft 21 of the agitator is journaled, are caused to reciprocate horizontally by the following mechanism: At one end of the main shaft 7, outside the uprights 3 and 4, I secure a pulley 30. A shaft 31 is journaled in the uprights 1 and 4 at a somewhat higher level than the top of the hopper 14. Outside the uprights 4, on the end of the shaft 31, I secure a pulley 32, which is connected by means of a belt 33 with the pulley 30 of the main shaft. The shaft 31 is provided at the opposite ends thereof with cranks 34 39, the pins of which work in longitudinal slots 341, Fig. 1, in arms 35 and 40, which are pivoted to the uprights 1 and 4, as at 342. The lower ends of the arms 35 40 are provided with longitudinal slots 36, receiving pins 37, provided on the horizontal supports 23 and 24. The opposite ends of the horizontal supports 23 24 are provided with slots 371, through which pins 38 on the uprights 2 and 3 project. By this arrangement the throw of the cranks 34 39 causes the horizontal supports 23 24 to have a horizontal reciprocating movement.

The agitator-shaft 21 is journaled at one end in the horizontal support 23 and at the opposite end in the horizontal support 24, and the cranks 34 and 39 are set on opposite phases, so that as the horizontal support 23 moves in one direction the horizontal support 24 at the other side of the machine moves in the other direction. This causes the agitator-shaft 21 to assume diagonal positions within the bristle-hopper 14 and to move from

one diagonal position to the opposite, while at the same time it is given a rotary movement, and thus the teeth or pins 22 on the agitator are caused to engage the entire mass of bristles within the hopper and to so act upon the said mass of bristles as to separate the mass and prevent it from matting or massing together.

Directly underneath the hopper 14 and suitably supported on the frame I place a frame comprising end pieces 41 41 and bars 42, which extend between said end pieces and are secured thereto. The said bars form a support for the bristle blocks or dies and at the same time permit any loose or surplus bristles which do not enter the holes in the dies or which are brushed off the dies by the operator to fall between the bars 42 into the receptacle 43 below the latter. In the operation of filling the bristle-blocks they are placed directly beneath the hopper 14, and I have found it desirable to slowly move the said bristle-blocks laterally in the operation of filling them. One of the advantages of thus moving the bristle-blocks while they are being filled results from the fact that since the bottom of the hopper is formed from wires some of the wires may be located directly over some of the bristle holes or receptacles in the bristle-blocks, and will thus to some extent interfere with the proper and speedy filling of the hole or receptacle with the bristles. By moving the die-blocks laterally or diagonally the said holes will be uncovered and all of the bristle receptacles or holes in the bristle-blocks will be quickly and evenly filled. To this end I place the bristle-blocks on a horizontally-reciprocating portion of the barred support, said reciprocating portion being directly underneath the hopper. This portion of the support consists of a frame comprising end pieces 44 44 and a series of connecting-bars 45, secured at either end to said end pieces 44. Each of the end pieces 44 is provided with a projecting guide or support 46, which passes through an opening in the proximate end pieces 41 and serves to support the reciprocating frame, upon which the bristle-blocks are placed while being filled. The said reciprocating frame has preferably a slow reciprocating movement between the end pieces 41, the extent of its reciprocation being comparatively slight. For the purpose of causing reciprocation of the said frame I provide one of the projections 46 with a link 47, which is pivoted at 49 to the face of a ratchet-wheel 48. The said wheel 48 is mounted upon a suitable arbor carried by a bracket 48<sup>a</sup>, Fig. 2, and is actuated by means of a bent lever 50, having a tooth 51, which engages with the teeth of the ratchet 48. The lever 50 is pivoted to a cross-piece 52, extending between the uprights 3 and 4, and its upper end projects over and is in proximity to the face of the pulley 32. On the face of the said pulley 32 I secure a projection or tappet 53, which as the pulley 32 revolves acts against



one side of the lever 50, moving the said end away from the face of the upper end of the pulley, causing the lower end of the said lever to move in the opposite direction and to rotate the ratchet 48 the space of one tooth. The upper end of the lever 50 is held by means of a suitable spring against the face of the pulley 32, so that after the projection 53 has passed the end of the said lever 50 the said end will be snapped back against the face of the pulley, throwing the lower end of the said lever 50 outwardly over the next tooth in the ratchet 48 in position to again move the ratchet the space of one tooth at the next revolution of the pulley 32. By this means a slow reciprocation of the barred frame, upon which the bristle-blocks are supported while being filled, is effected.

The receptacle 43 is provided, as above described, for the purpose of catching the surplus bristles which fail to get properly into the bristle holes or receptacles in the bristle-blocks. The said receptacle 43 has an inclined bottom 55 extending from the front of the machine rearwardly and downwardly to a point at the rear of the bristle-hopper. The rear wall of this receptacle is shown at 56. As the bristles fall into the receptacle 43 they slide downwardly and rearwardly toward the lowest position thereof and are then carried upward by a toothed conveyer 57, which returns them to the bristle-hopper 14. This conveyer is actuated by the shaft 31, previously described, and consists of a sheet of smooth flexible material secured at its opposite edges to a belt formed of material suitable to engage the guide-rolls over which it passes. The conveyer passes over the shaft 31, thence downwardly and rearwardly over the guide-rolls 58, located at and engaging with the edges of the conveyer, thence outwardly and forwardly around the shaft or roll 59, near the deepest part of the receptacle 43, thence up around the guide-roll 60. The conveyer is provided with transverse rows of curved fingers 62. The fingers 62 pass downwardly into the mass of bristles in the deepest portion of the receptacle 43 and then pass upwardly, carrying a portion of the bristles with them, and as they pass over the shaft 31, above the rear edge of the hopper 14, the bristles carried upwardly from the receptacle 43 would be discharged into the hopper.

The machine fills the bristle-blocks evenly and quickly and is automatic in its operation. The operator requires only to place the empty bristle-blocks in position underneath the hopper, withdraw them after they have been filled, and brush off the extra or surplus bristles.

What I claim is—

1. In a brush-machine, the combination, with a bristle-feeding hopper, and mechanism for agitating the contents of the hopper, of means for supporting the bristle-block below the hopper and changing its position while being filled.

2. In a brush-machine, the combination

with a bristle-feeding hopper, and mechanism for agitating the hopper, of means for supporting the bristle-block below the hopper and changing its position while being filled.

3. In a brush-machine, the combination with a bristle-feeding hopper, and a bristle-stirrer working within the said hopper, of a support below the hopper to receive the bristle-block.

4. In a brush-machine, the combination with a bristle-feeding hopper, and a bristle-stirrer working within the said hopper, of means for supporting the bristle-block below the hopper and changing its position while being filled.

5. In a brush-machine, the combination with a bristle-feeding hopper, and mechanism for agitating the hopper, of a bristle-stirrer working within the hopper, and a support below the hopper to receive the bristle-block.

6. In a brush-machine, the combination with a bristle-feeding hopper, and mechanism for agitating the hopper, of a bristle-stirrer working within the hopper, and means for supporting the bristle-block below the hopper and changing its position while being filled.

7. In a brush-machine, the combination with a bristle-feeding hopper, and mechanism for agitating the contents of the hopper, of a bristle-block support below the hopper and means for moving said support to shift the position of the bristle-block while being filled.

8. In a brush-machine, the combination with a bristle-feeding hopper, and mechanism for agitating the hopper, of a bristle-block support below the hopper, and means for moving said support to shift the position of the bristle-block while being filled.

9. In a brush-machine, the combination with a bristle-feeding hopper, and a bristle-stirrer working within the said hopper, of a bristle-block support below the hopper, and means for moving said support to shift the position of the bristle-block while being filled.

10. In a brush-machine, the combination with a bristle-feeding hopper, mechanism for agitating the hopper, and a bristle-stirrer working within the hopper, of a bristle-block support below the hopper, and means for moving said support to shift the position of the bristle-block while being filled.

11. In a brush-machine, the combination with a bristle-feeding hopper and means for supporting a bristle-block in position to be filled, of a rotary stirrer within the hopper, and means for traversing the said stirrer.

12. In a brush-machine, the combination with a bristle-feeding hopper, and a support for a bristle-block, of a rotary stirrer working within the hopper, supports for the said stirrer, and means for moving the said supports transversely of the hopper to traverse the stirrer in the latter.

13. In a brush-machine, the combination with a bristle-feeding hopper, and means for supporting a bristle-block of a rotary stirrer working within the hopper, supports for the



said stirrer and means for moving the said supports oppositely with relation to each other and transversely of the hopper to traverse the stirrer in the latter.

5 14. In a brush-machine, the combination with a bristle-feeding hopper, a support for a bristle-block, and a receptacle for the loose bristles, of a conveyer for returning the said loose bristles to the hopper.

10 15. In a brush-machine, the combination with a bristle-feeding hopper, and a support for a bristle-block, of a receptacle for loose bristles, the said receptacle having an inclined bottom and a conveyer for returning  
15 the bristles from the said receptacle to the hopper.

16. In a brush-machine, the combination with a bristle-feeding hopper, a support for a bristle-block, and a receptacle for the loose  
20 bristles, of a moving conveyer having teeth to take the said loose bristles from the said receptacle and return them to the hopper.

17. In a brush-machine, the combination

with a bristle-feeding hopper, and a support for a bristle-block, of a grid or grating adjacent the said support and adapted to sustain the bristle-blocks while being handled by the workmen, and a receptacle below the said support and grid or grating to receive the loose bristles. 25

18. In a brush-machine, the bristle-feeding hopper, means to agitate the same vertically, and a support for the bristle-block, combined with a bristle-stirrer rotating within the hopper, supports for the said stirrer independent  
30 of the hopper, and means for moving the said supports to traverse the rotary stirrer transversely with relation to the vertically-moving hopper.

In testimony whereof I affix my signature  
in presence of two witnesses. 40

HERMAN M. SCHWARTZ.

Witnesses:

S. W. WARREN,  
FRANK N. LOOK.