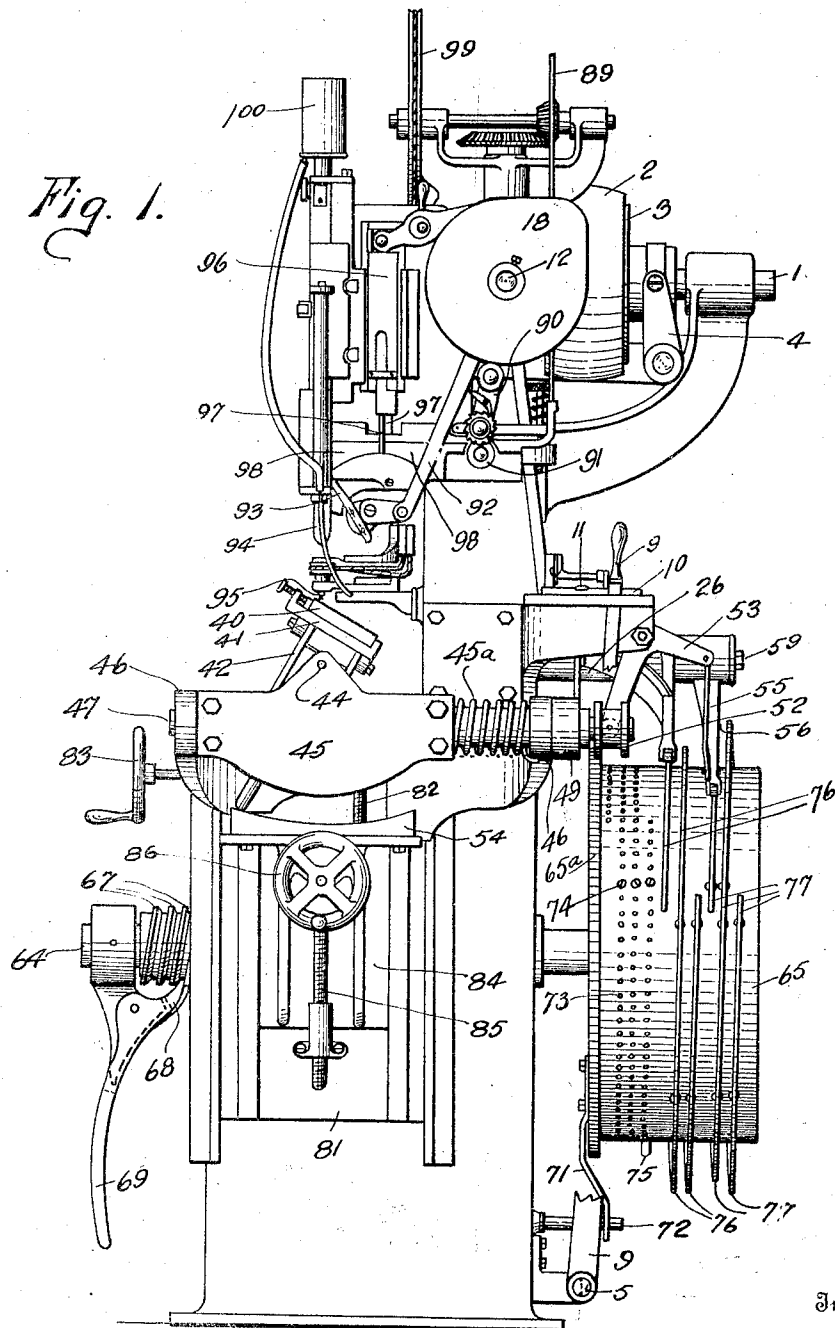


1,058,498.

5 SHEETS—SHEET 1.



Anthony Vandeweld

J. E. Liverance.

L E Carrall

By Frank E. Livernance, Jr.

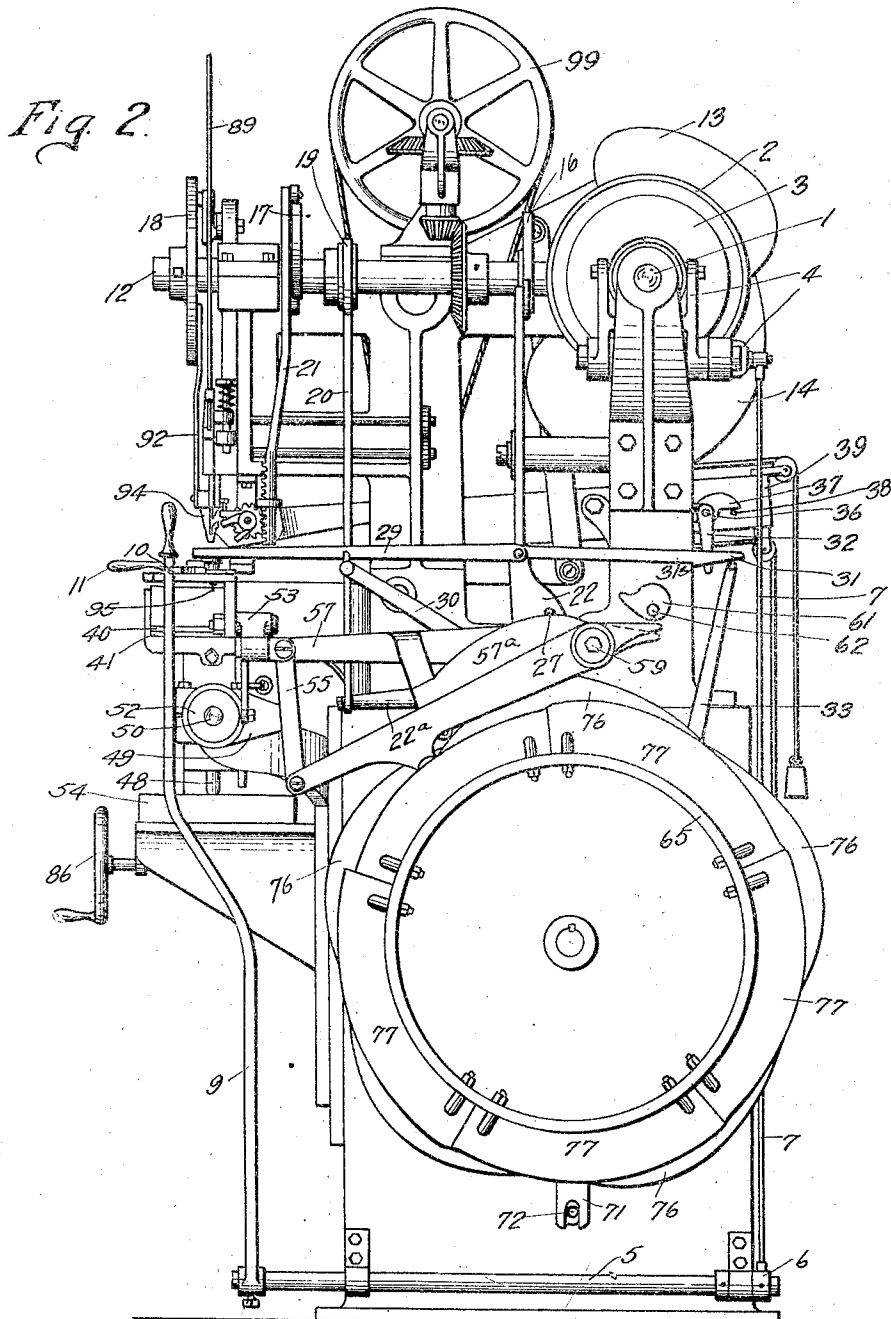
Attorney

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BRUSH MAKING MACHINE.
APPLICATION FILED JAN. 13, 1913.

1,058,498.

Patented Apr. 8, 1913.

5 SHEETS—SHEET 2.



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5 SHEETS—SHEET 3.

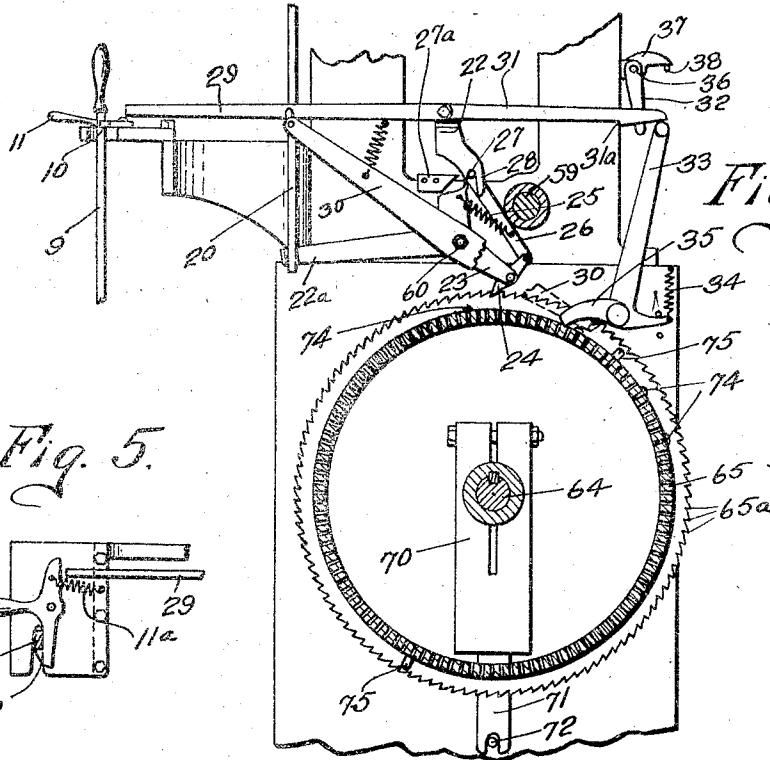


Fig. 3.

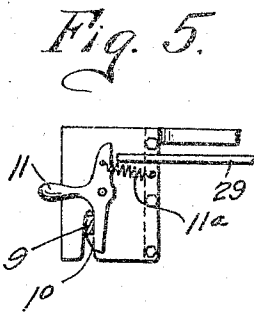


Fig. 5.

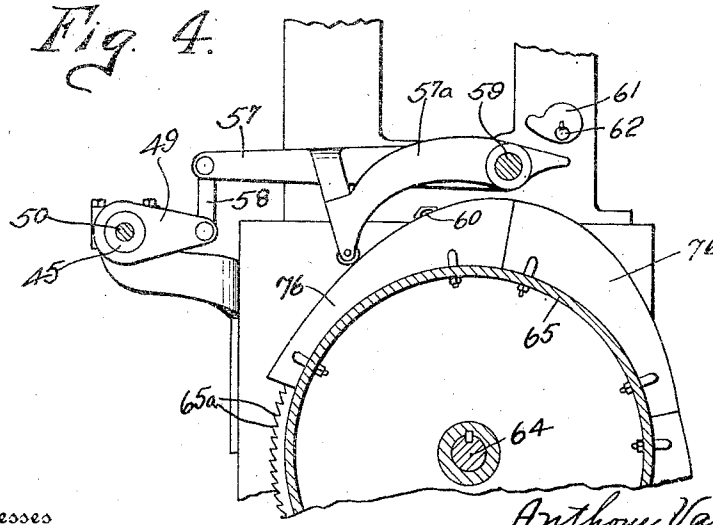


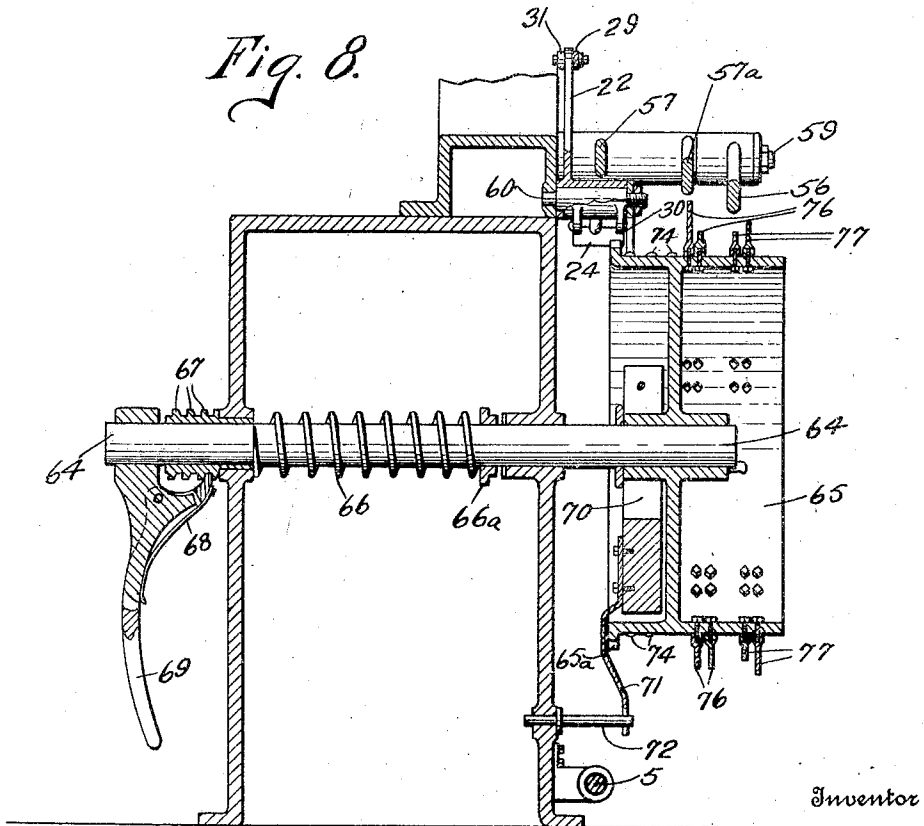
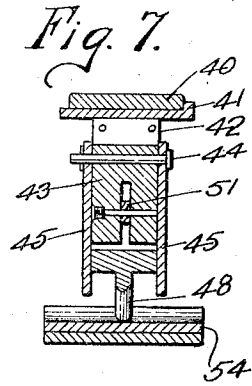
Fig. 4.

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1,058,498.

5 SHEETS—SHEET 4.



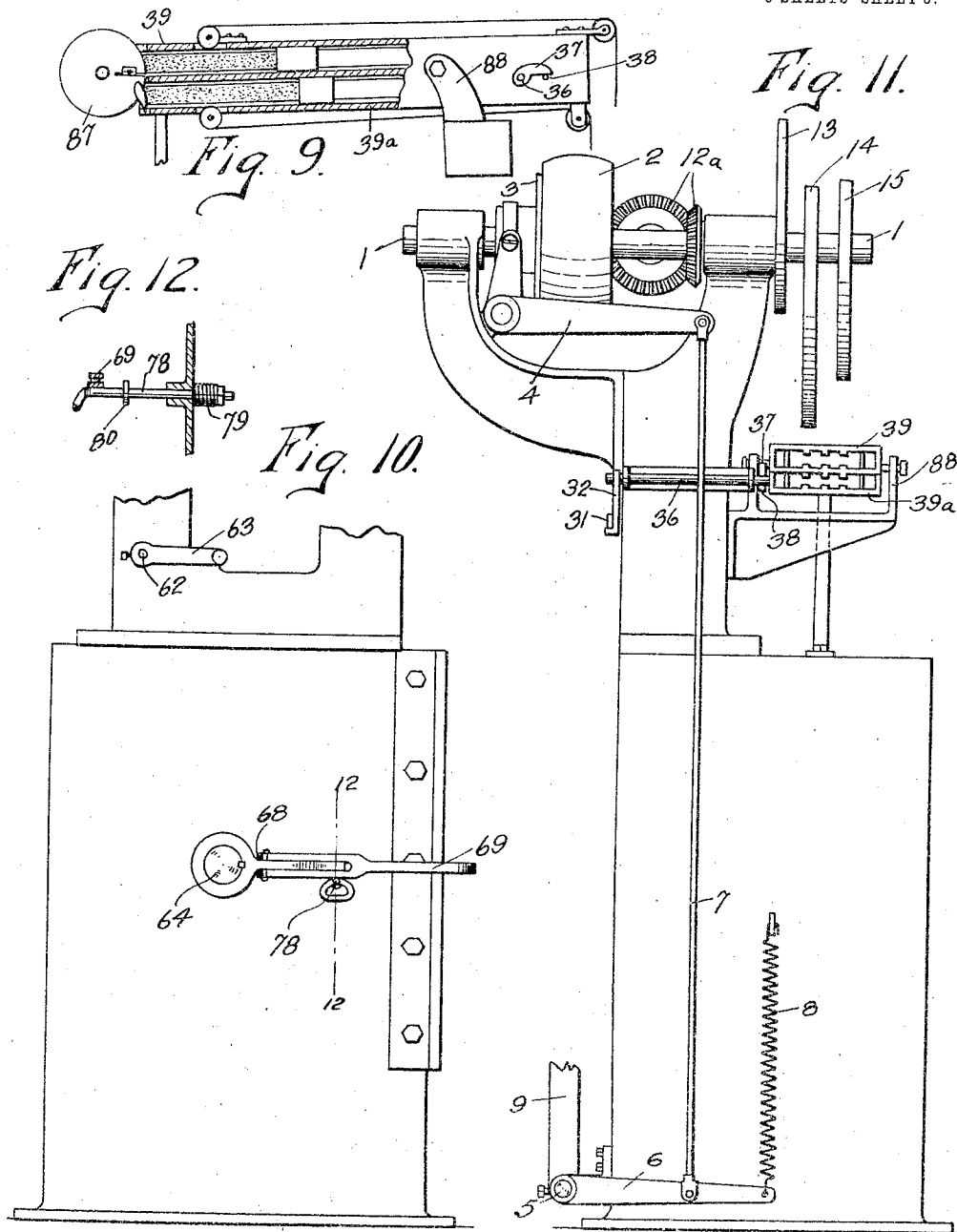
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APPLICATION FILED JAN. 13, 1913.

1,058,498.

Patented Apr. 8, 1913.

5 SHEETS—SHEET 5.



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UNITED STATES PATENT OFFICE.

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BRUSH-MAKING MACHINE.

1,058,498.

Specification of Letters Patent.

Patented Apr. 8, 1913.

Application filed January 13, 1913. Serial No. 741,833.

To all whom it may concern:

Be it known that I, ANTHONY VANDERVELD, a citizen of the United States, and resident of Grand Rapids, in the county of Kent and State of Michigan, have invented certain new and useful Improvements in Brush-Making Machines, of which the following, taken in connection with the accompanying drawings, is a specification.

My invention relates to improvements in brush making machines and its object is to provide a machine of the class shown in my co-pending application Serial No. 741,834, filed Jan. 13, 1913, with automatic means for adjusting a brush blank step by step in the various positions necessary to insert tufts of bristles, to automatically stop the machine at a predetermined point in its operation, and to provide the same with various new and useful features hereinafter more fully described and particularly pointed out in the claims.

In the drawings, Figure 1 is a front elevation of a machine that embodies my invention. Fig. 2 is a side elevation of the machine as it appears viewed from the right of Fig. 1. Fig. 3 is an elevation of a part of the machine viewed from the same direction as Fig. 2. Fig. 4 is an elevation of another portion of the machine viewed similarly. Fig. 5 is a plan view of the holding and releasing mechanism which controls the starting lever. Fig. 6 is a sectional view of a part of the mechanism by which the work is automatically adjusted. Fig. 7 is a sectional view as it appears taken on the line 7—7, Fig. 6. Fig. 8 is a vertical section taken centrally of and at right angles to Fig. 3. Fig. 9 is a side view of the bristle beds, part of the side being broken away to disclose its structure. Fig. 10 is an elevational view from the left of Fig. 8, showing manually operated means for placing the parts in starting position. Fig. 11 is an elevation looking at the side of the machine opposed to that shown in Fig. 1, and illustrating a part of the starting and stopping mechanism, and a part of the bristle bed shifter. Fig. 12 is a vertical sectional view taken on line 12—12, Fig. 10.

The mechanisms for boring the holes in the blank; for making the fasteners; for placing the same; and for feeding and placing the tufts of bristles, are substantially

the same as in the co-pending application referred to, and in the drawings such mechanism is shown to illustrate its relation to the novel features and construction described and claimed in this application.

Similar reference numerals refer to similar parts throughout the several views.

The driving shaft 1 of the machine carries a driving pulley 2 loosely thereon which is engaged by a driving friction clutch 3 to connect the same to the shaft upon operation by bell crank mechanism 4, which is connected by a rod 7 to an arm 6 on the rocker shaft 5, this shaft being provided with a lever 9 which may be operated to thereby hold the clutch in engagement with the pulley to operate the machine. On the driving shaft are located cams 13, 14 and 15 which operate, respectively, the staple guide, the staple driver and the drill arm. A counter shaft 12 at right angles to the driving shaft 1 is connected thereto by miter gears 12^a and is driven by means of such connection. Cams 16, 17 and 18 are located on the counter shaft and operate, respectively, the drill arm in its horizontal movement, the bristle feed wheel by means of the reciprocable rod 21, and the staple forming mechanism. I have also shown in this application a pulley 99 for driving the drill, a staple guide 94, two superposed bristle beds 39 and 39^a pivoted in brackets 88, the bristle feed wheel 87, the air pump 100, the dies 98, the transfer finger 93, the fastener strip 89, the feed rollers 91 and operating rod 92, all substantially the same and serving the same functions as in the other application previously referred to.

To automatically stop the machine, I provide a contractile spring 8 connected to the arm 6, which when the lever 9 is released will cause the clutch 3 to be thrown out of engagement with the pulley 2, thereby automatically disconnecting the power and stopping the machine. When the machine is running, the lever 9 is held in position to engage the clutch with the driving pulley by means of a latch or hook 10, best shown in Fig. 5, which hook may at any time be manually released through the handle 11. The hook is normally held firmly in engagement with lever 9 by a spring 11^a.

As a means to automatically release the lever 9 and stop the machine, I have pro-

vided a push rod 29 pivoted at one end to the vertical member 22 of a bell crank lever, which is pivoted on a stud 60, the horizontal member 22^a of this lever being connected by rod 20 to an eccentric 19 on the counter shaft 12, the lever through such connection being oscillated at each cycle of the machine. Rod 29 is slidably supported on the upper end of a lever 30 and normally moves close above the latch 10. The lower end of lever 30, which is pivoted intermediate its ends on the stud 60, is in close proximity to a cam drum 65, hereafter to be described, and in this drum there is inserted at the proper place, a lifting pin 75 adapted to engage the end of the lever 30 and raise the same, thereby lowering the other end of lever 30 sufficiently that push rod 29 may engage the latch 10 and raise the same, releasing lever 9 and through it the clutch, and stopping the machine. Cam drum 65 is rotated step by step by means of a pawl 24 mounted on an arm 23 extending from the bell crank 22 and oscillating therewith. Pawl 24 extends in opposite directions from its pivot and at the end opposite the drum engaging end it is pivotally attached to a rod 26, at one end thereof, the other end being provided with a pin 27 slidable in a recess 28 in the side of lever 22. A spring 25 interposed between members 22 and 26 serves to hold the pin always in contact with member 22.

As a means of limiting the movement of the drum 65 to the last part of the movement of the pawl 24, whereby the drum is shifted in proper time, the stroke of the pawl being greater than the spacing of the ratchet 65^a on the drum, the pawl is lifted to go clear of all but one of the ratchet teeth by means of an inclined wedge 27^a which engages the pin 27 and depresses it during a portion of the movement of the pawl, raising the pawl clear of the teeth traversed thereby, while the pin is in contact with the incline.

In the drum 65 are numerous holes 73 arranged spirally therein to provide a sufficient number to correspond to the number of tufts of bristles to be inserted in the brush blank. The drum is mounted on a longitudinally movable shaft 64, which rotates therewith, and a worm 67 having a pitch corresponding to the spiral arrangement of the rows of holes in the drum is fixed in the frame of the machine and loosely mounted on the shaft 64. A pawl 68 is fixed on the shaft 64 and rotates therewith, and it traverses this worm, moving the shaft longitudinally and with it the drum whereby the spirally arranged row of holes will pass under a given point as the drum rotates. Pawl 68 is yieldingly held in engagement with the worm by a spring, and is provided with a lever 69 having pivotal attach-

ment with respect to the shaft 64 allowing the pawl 68 to be disengaged from the worm.

To automatically shift the bristle beds to change from one kind of bristle to another, as for instance in putting in alternate rows of white and black bristles, or an outer margin of one kind and an inner portion of another kind, a pin 38 is inserted in the side of the bristle beds and engaged by an arm 37 on a rock shaft 36. The brackets 88 are pivoted nearest to this end of the beds and the end of the beds next to the feed wheel 87 normally drops to a position adapted to feed bristles from the upper bed. Whenever tufts are to be fed from the lower bed, screws 74 are inserted in suitable holes 73 corresponding to these tufts when the machine operates, and each of these screws engages one arm 35 of a bell crank lever and raises the same, the other arm 33 of which projects upward and supports a hook 31 having a shoulder 31^a adapted to engage a projection on an arm 32 on the rock shaft 36. Whenever the arm 33 is moved from under hook 31 by reason of one of the screws 74, the shoulder 31^a will engage and move the lever 32 and depress the rear end of the bristle beds and raise the end of the lower bed into proper position to discharge bristles into the feed wheel 87. By this arrangement any number of tufts in any part of the blank can be fed from the lower bed by inserting screws in the proper holes in the drum corresponding to the desired openings in the blank to be supplied with tufts of bristle.

The brush blank 40 is securely clamped to a bed plate 41 mounted on a frame 42 vertically slidable on a bar 43 pivoted at 44 on a horizontal axis and swinging within a yoke 45 journaled in bearings 46 to turn on a horizontal axis at right angles to the axis 44. The bed accordingly has an oscillating movement about two horizontal axes at right angles to each other, and also a vertical movement. The oscillating movement about the axis 44 is effected by means of a rod 50 longitudinally slidable in the axis 47 of the yoke 45 and attached to the rocker bar by a connecting rod 51. This slidable rod 50 is provided at its outer end with a grooved collar 52 engaged by a bell crank lever 53 operated by a rod 55 connected to the same and extending downward the lower end thereof being pivotally connected to an arm 56 journaled on the stud 59, said arm resting upon a spirally arranged and changeable cam 77 detachably secured to the drum 65 and adapted as the drum rotates to raise and lower the arm 56 thereby properly oscillating the bed 41 about the axis 44. To set the tufts at various angles relative to the surface of the blank 40 and to properly determine the position of the frame 42, it is

provided at its lower end with a supporting pin 48, having a smooth rounded end slidably engaging a suitably formed pattern support 54.

To oscillate the yoke 45 about its axis, an arm 49 is attached to the journal of this yoke and its movable end connected by a rod 58 to an arm 57, also pivoted on stud 59 and having an offset 57^a integral therewith adapted to engage and traverse another series of interchangeable and detachable cams 76 spirally arranged on the cam drum. To permit the cam drum to be returned to starting position, the arms 56 and 57 are prolonged oppositely from the stud 59 and engaged by a lifting cam 61 mounted on a rotating shaft 62, the opposite end of which is provided with a manually operated crank 63. And to properly locate the drum for starting position, a stop 78 is provided consisting of a rod slidably mounted in a side of the frame of the machine, and normally drawn inwardly under the influence of spring 79 so that collar 80 mounted on the rod contacts against the side of the frame, such rod, however, being capable of being drawn outward into the path of the handle or lever 69 by which the drum may be moved bodily toward and from the frame, the rod when drawn outward serving to stop the lever at such position that the drum is placed in proper starting position. To automatically return the drum, a spiral spring 66 surrounds the shaft 64 and engages a collar 66^a, whereby when the pawl 68 is released, the shaft 64 is moved endwise to starting position. To hold the drum from turning except as moved by the pawl 24, a friction brake 70 is provided which is bifurcated and clamped by a bolt through the same on the hub of the drum and provided with an arm 71 slidably engaging a stop pin 72. The drum can turn only against the friction of the brake and accordingly is not open to accidental movement except under extraordinary circumstances. Yoke 45 is journaled on a vertically movable frame 81 adjusted by a screw 82, provided with a hand wheel 83 geared thereto.

The form 54 is carried on a slide 84 vertically adjustable on the frame 81 and adjusted by a screw 85 provided with a hand wheel 86.

The cam drum 65 is provided with holes 73 corresponding in number to the number of tufts to be set in the brush to be made on the machine. Screws 74 or equivalent projecting members are inserted in as many of these holes as correspond to the tufts required to be set in bristles from the lower bed. In a hole counting from the first or starting hole, corresponding to the next after the last tuft to be set, a stop pin 75 is inserted which operates to stop the machine when the work is completed. Suitably

formed cams 76 are attached to the drum they operating to oscillate the frame 42 about the pivot 44 to properly adjust the blank in one direction of the machine as described, and other cams 77 are attached and suitably positioned to adjust the yoke 45 about its axis and present the blank properly in respect to its transverse form. If the blank is to be presented horizontally without change of position the cams are all omitted and the cam stop 61 turned to proper position to adjust the blank. To move the form 42 vertically in proper position, a pattern form 54 is placed under the supporting pin 48 and traversed thereby.

At each cycle of the machine a hole is bored in the blank and a tuft of bristles inserted and anchored in place by a fastener for the same, as described in my co-pending application, during which interval the adjusting mechanism for the blank and the cam drum remains stationary. During the short interval of time between this operation and the next corresponding operation, the pawl 24 shifts the cam drum one notch of the ratchet, which movement shifts the brush blank to proper position for the next tuft of bristles, the blank being moved about the axis of the shaft 50 by the cam 76 acting through the levers 57 and 57^a, the rod 58 and arm 59, and shifting the blank properly to space apart the tufts in the respective rows, and, at the end of each row the cam 77 slides the shaft 50 longitudinally sufficiently to adjust the blank about the axis of the pivot 44 to properly space apart the respective rows of bristles. It will be noted that in Fig. 2 there are points in the cam 77 where an abrupt change in the surface of the cam is shown, these changes being of small degree but well defined. It is at these points that the shifting of the blank to set another row of bristles occurs; and at the abrupt drop of considerable degree shown, the brush is finished, and the blank and holder swung over to the original or starting row. In the meantime the form 54 supports the blank in proper elevation to determine the depth at which the bristles are to be inserted in the blank. By changing the outline of said cams and form, the machine may be utilized to make various forms of brushes. At each shift which brings a screw or projection 74 under the arm 35, said arm is lifted by the projection and removes the support 33 from beneath the hook 31 allowing it to drop and engage the arm 32 and turn the rock shaft 36, carrying the arm 37 which engages the pin 38 and depresses the rear end of the bristle bed, bringing the discharge end of the lower bristle bed in position to feed bristles into the wheel 87. Where no projections are inserted, the device feeds from the upper bristle bed. The machine is thus adapted to operate auto-

matically and stop when the work is completed, and is also adapted to make a great variety of different forms of brushes, and a great variety of arrangement of the grades of bristles in the same.

I have fully and specifically set forth an embodiment of my invention. Such specific disclosure is not to be taken as limiting the invention in any respect, however, other than is called for by the terms of the appended claims.

What I claim as new and desire to secure by Letters Patent is:—

1. A brush making machine comprising a holder for a brush blank, means for adjusting said holder, tuft setting mechanism adapted to operate at intervals, a rotative drum to operate said adjusting means, a ratchet wheel connected to the drum, an oscillating pawl to engage the ratchet wheel and having a stroke greater than the spacing of the teeth of the wheel, a pin connected to the pawl, and an incline engaging the pin during a portion of the stroke of the pawl to lift it clear of the ratchet teeth during the operation of the tuft setting mechanism and permit it to engage a tooth during the latter part of the stroke when the tuft setting mechanism is inoperative.

2. A brush making machine comprising a holder for a brush blank, means for adjusting said holder, tuft setting mechanism adapted to operate at intervals, a rotative drum having ratchet teeth, an oscillating lever, a pawl on the lever and having a stroke greater than the spacing of the teeth, a rod connected to the pawl, a pin on the rod slidable in a recess in the lever, a spring to move the pawl in contact with the ratchet teeth and a fixed incline engaging the pin to hold the pawl out of engagement with the teeth during a part of the stroke of the pawl while the tuft setting mechanism is operating.

3. A brush making machine comprising two superposed and movable bristle beds, a lever to shift the same, a pivoted and reciprocable hook to engage and move the lever; a lever supporting the hook out of engagement with the shifting lever, a rotative drum and one or more projections on the drum to move the supporting lever and permit the hook to engage the first named lever and move the same to shift the bristle beds.

4. A brush making machine comprising superposed bristle beds pivoted to normally feed from one bed and to shift to position to feed from the other bed, a pin on said beds, an arm engaging the pin, a lever to move the arm and shift the beds, a longitudinally movable reciprocating hook to engage and move the lever, a bell crank lever to support the hook out of engagement with the shifting lever, a drum rotative step by step and one or more projections on the drum

to shift the bell crank lever and permit the hook to engage the shifting lever.

5. A brush making machine comprising a bed, means for securing a brush blank to the bed, a frame carrying the bed and movable about two horizontal axes at right angles to each other, a cam drum, cams on the drum, and means operated by the cams to adjust the bed about the respective axes.

6. A brush making machine, comprising a bed, means for securing a brush blank to the bed, a vertically adjustable frame supporting the bed and also movable about two horizontal axes at right angles to each other, a pattern support to vertically adjust the bed, separate cams to adjust the frame about the respective axes, and levers operated by the cams and adapted to adjust the frame.

7. A brush making machine comprising a bed, means for securing a brush blank to the bed, a yoke pivoted on a horizontal axis, a bar horizontally pivoted in the yoke at right angles to the pivot of the latter, a frame supporting the bed and vertically slidable on the yoke, a supporting pin on the frame, a pattern support engaged and traversed by the pin, a rod slidable in the axis of the yoke and connected to the frame, a lever to slide the rod, a cam to move the lever, an arm on the journal of the yoke, a lever to move the arm and a cam to operate the lever.

8. A brush making machine comprising a holder for a brush blank, means for adjusting said holder, tuft setting mechanism adapted to operate at intervals, a cam drum having spirally arranged operating means to adjust the bed, a longitudinally movable shaft on which the drum is fixed, a worm having a pitch corresponding to the pitch of said spiral arrangement, a pawl engaging and traversing the worm to longitudinally move the shaft, and means for releasing the pawl to permit the shaft to return to starting position.

9. A brush making machine comprising a holder for a brush blank, means for adjusting said holder, tuft setting mechanism adapted to operate at intervals, a rotative drum having thereon spirally arranged operating means, a rotative and longitudinally movable shaft on which the drum is fixed, a spring to return the shaft to starting position, a fixed worm surrounding the shaft, a pawl fixed on the shaft and traversing the worm and means for releasing the pawl to permit the shaft to return to starting position.

10. A brush making machine comprising a holder for a brush blank, means for adjusting said holder, tuft setting mechanism adapted to operate at intervals, a rotative drum having thereon spirally arranged operating means, a brake to hold the drum

from accidentally turning, a rotative and longitudinally movable shaft on which the drum is fixed, an arm on the brake, a stop slidably engaging the arm, a spring to return the shaft to starting position, a fixed worm surrounding the shaft, a pawl fixed on the shaft and traversing the worm, a lever to release the pawl from the worm and a movable stop to engage the lever and rotatively adjust the drum to starting position.

11. A brush making machine comprising means for setting bristles in a brush blank, an adjustable bed to carry the brush blank, automatic means for adjusting the bed, a frame carrying the bed, a yoke carrying the frame, a vertically adjustable frame carrying the yoke, a pattern form traversed by a pin on the first named frame, and a slide adjustable on the last named frame and carrying the pattern form.

12. A brush making machine comprising means for setting bristles in a brush blank, a bed carrying the blank and pivotally adjustable, shiftable bristle beds to supply different kinds of bristles, a cam drum rotative step by step, projections extending from the drum to operate means for shifting the bristle beds and cams attached to said drum to operate means for adjusting the bed.

13. A brush making machine comprising means for stopping the machine, means for setting tufts of bristles in a brush blank, a bed to carry the brush blank and vertically and horizontally adjustable, a pattern form traversed by a pin on the bed to vertically adjust the bed, levers to horizontally adjust the bed, a rotative and spirally movable cam drum having spirally arranged

openings therein corresponding to the tufts of bristles to be set in the blank, a pawl and ratchet to move the drum step by step the space between two consecutive openings at a time, means projecting from the drum for shifting the bristle beds and for operating the stopping means, spirally arranged and detachable cams on said drum for operating the means for horizontally adjusting the bed.

14. In a brush making machine, a bed adapted to have a brush blank secured thereto, a frame supporting the bed and mounted for vertical adjustment and also for movement about horizontal axes, a pattern support having a cam surface located below the frame and with which the frame engages whereby said cam surface will serve to vertically adjust the frame as it moves about a horizontal axis.

15. In a brush making machine, a bed adapted to have a brush blank secured thereto, means to support said bed, said means mounted for vertical adjustment and also for pivotal movement about a plurality of axes, and a pattern support having a cam surface located below the bed and with which the bed supporting means engages whereby as the supporting means has pivotal movement about an axis, the variations of the cam surface will serve to adjust said means vertically.

In testimony whereof I have hereunto affixed my signature in the presence of two witnesses.

ANTHONY VANDERVELD.

Witnesses:

L. E. CARROLL,
FRANK E. LIVERANCE, JR.