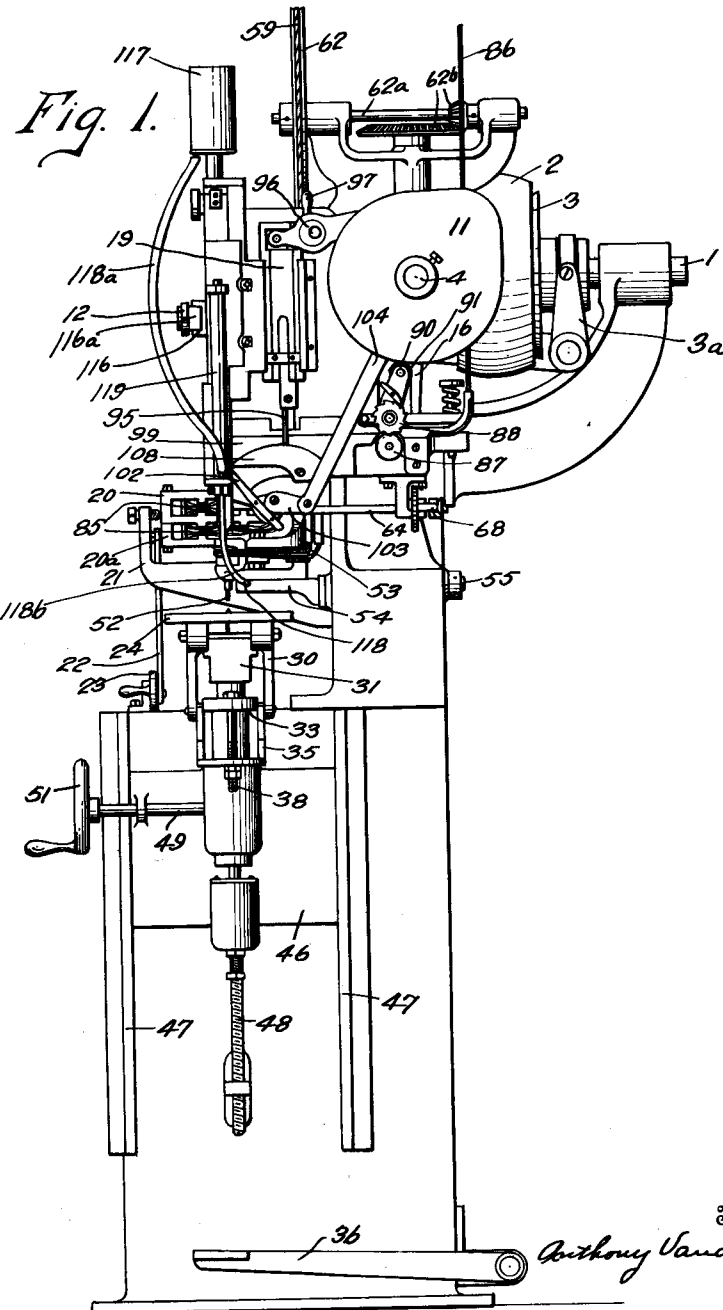


A. VANDERVELD.
BRUSH MAKING MACHINE.
APPLICATION FILED JAN. 13, 1913.

Patented Apr. 8, 1913.

7 SHEETS-SHEET 1.

1,058,499.

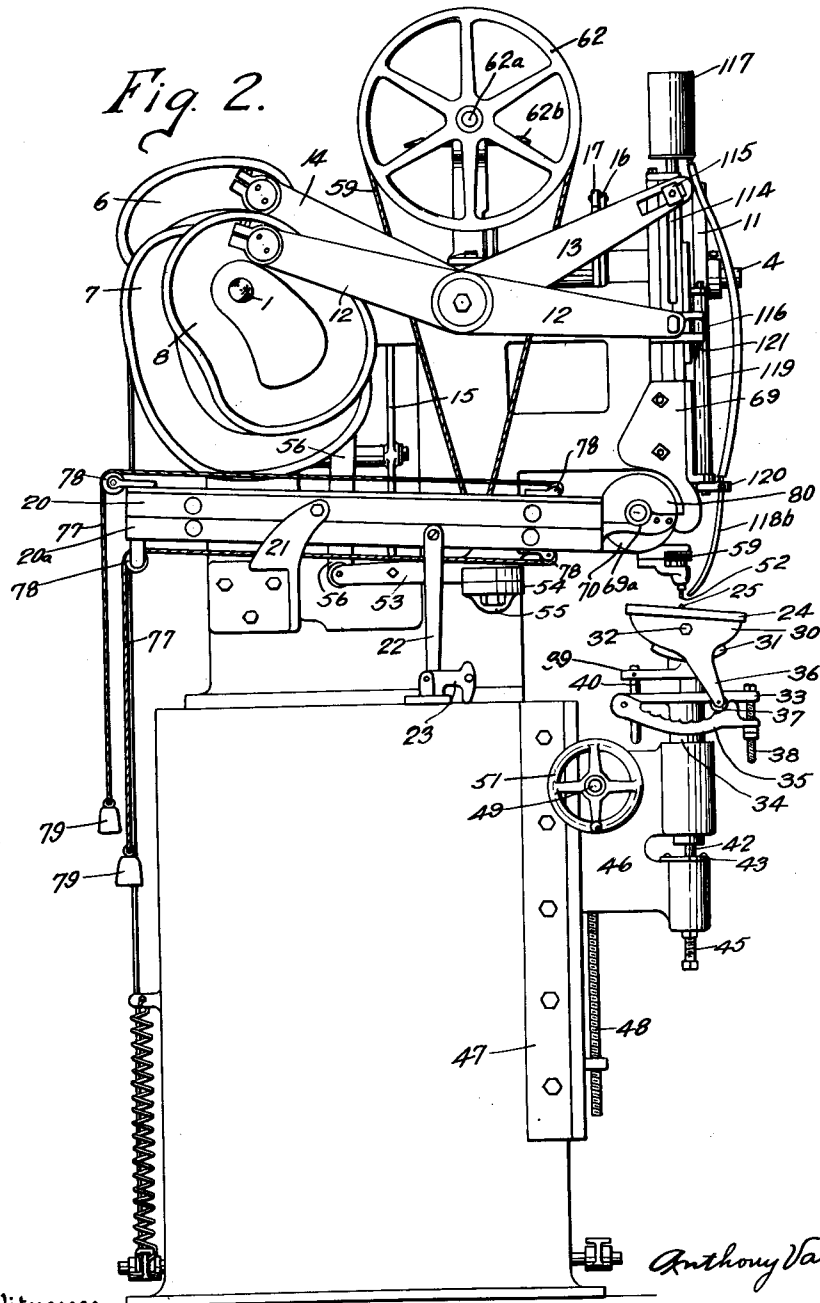


Witnesses
J. E. Linsane
E. Carroll

By

Inventor
Anthony Vanderveld
Frank E. Linsane, Jr.
Attorney

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Witnesses
J. E. Liverance
L. E. Carroll

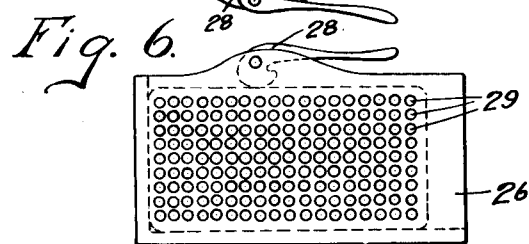
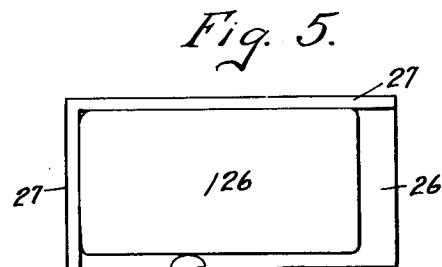
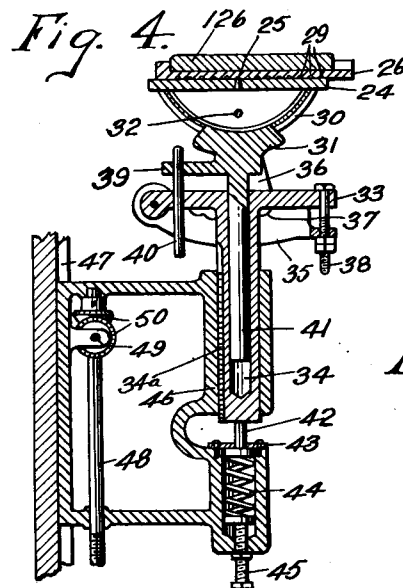
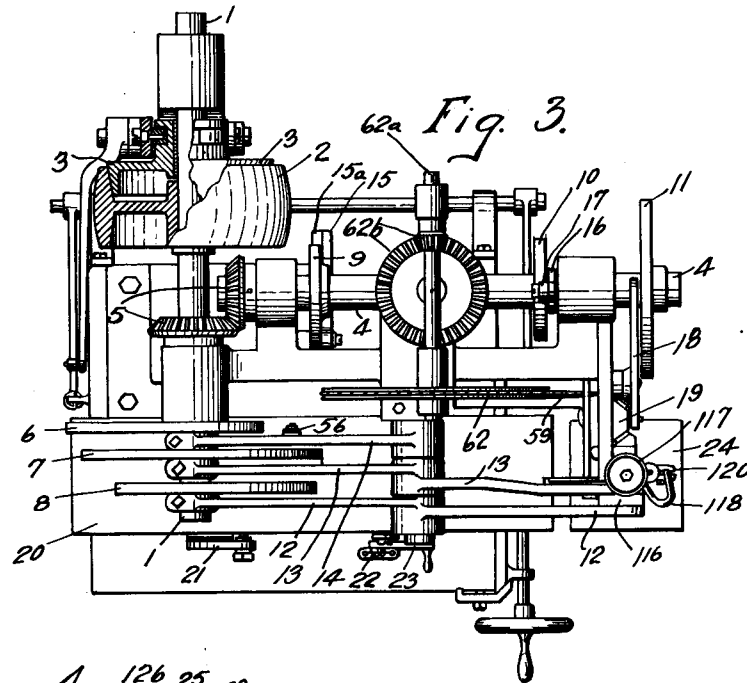
Inventor
Anthony Vanderveld
By Frank E. Liverance, Jr.
Attorney

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7 SHEETS—SHEET 3.



Witnesses
J. E. Linsance
L. E. Currier

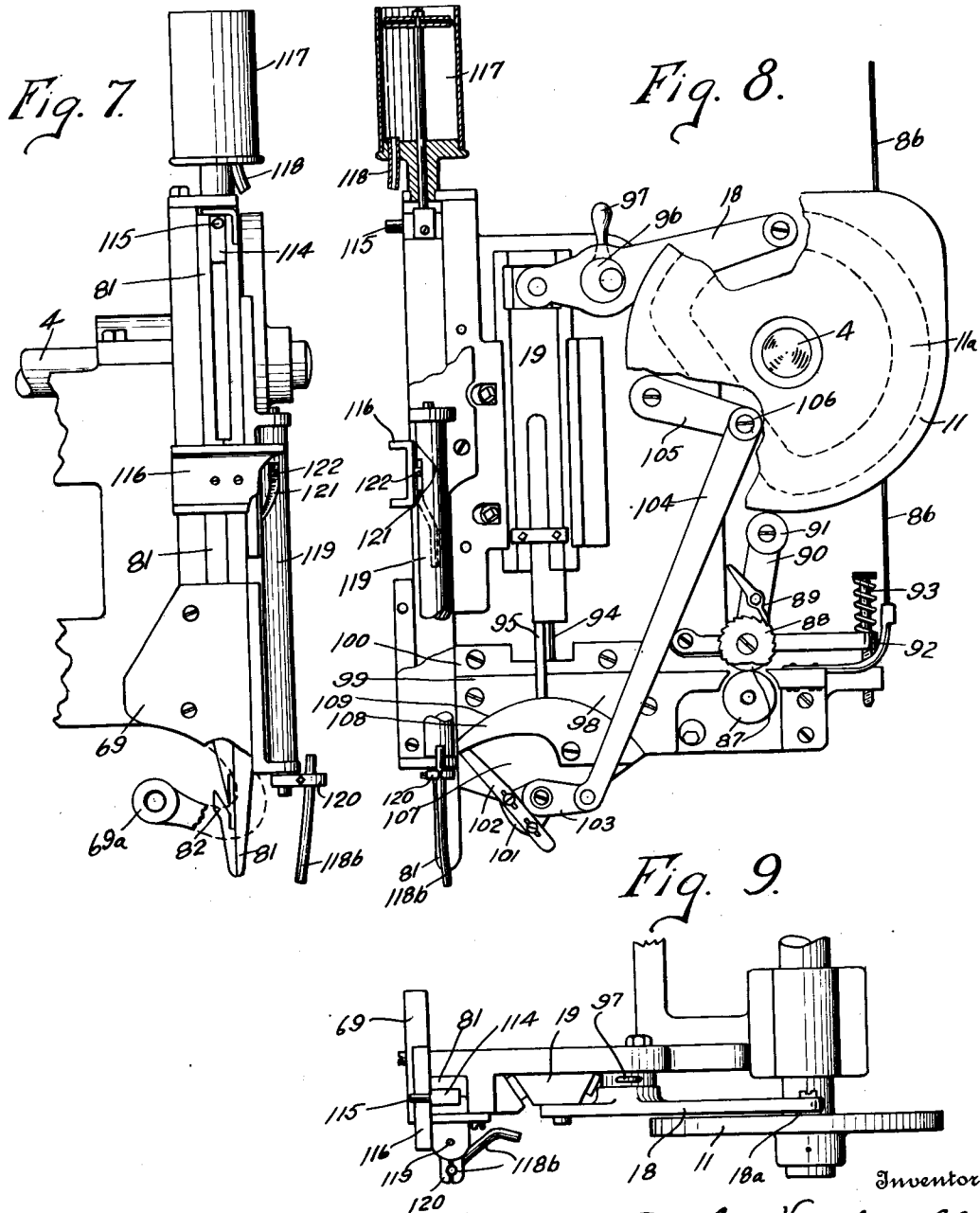
Inventor
Anthony Vanderveld
By Frank E. Linsance, Jr.
Attorney

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7 SHEETS—SHEET 4.

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Witnesses
J. E. Linnance
L. E. Curran

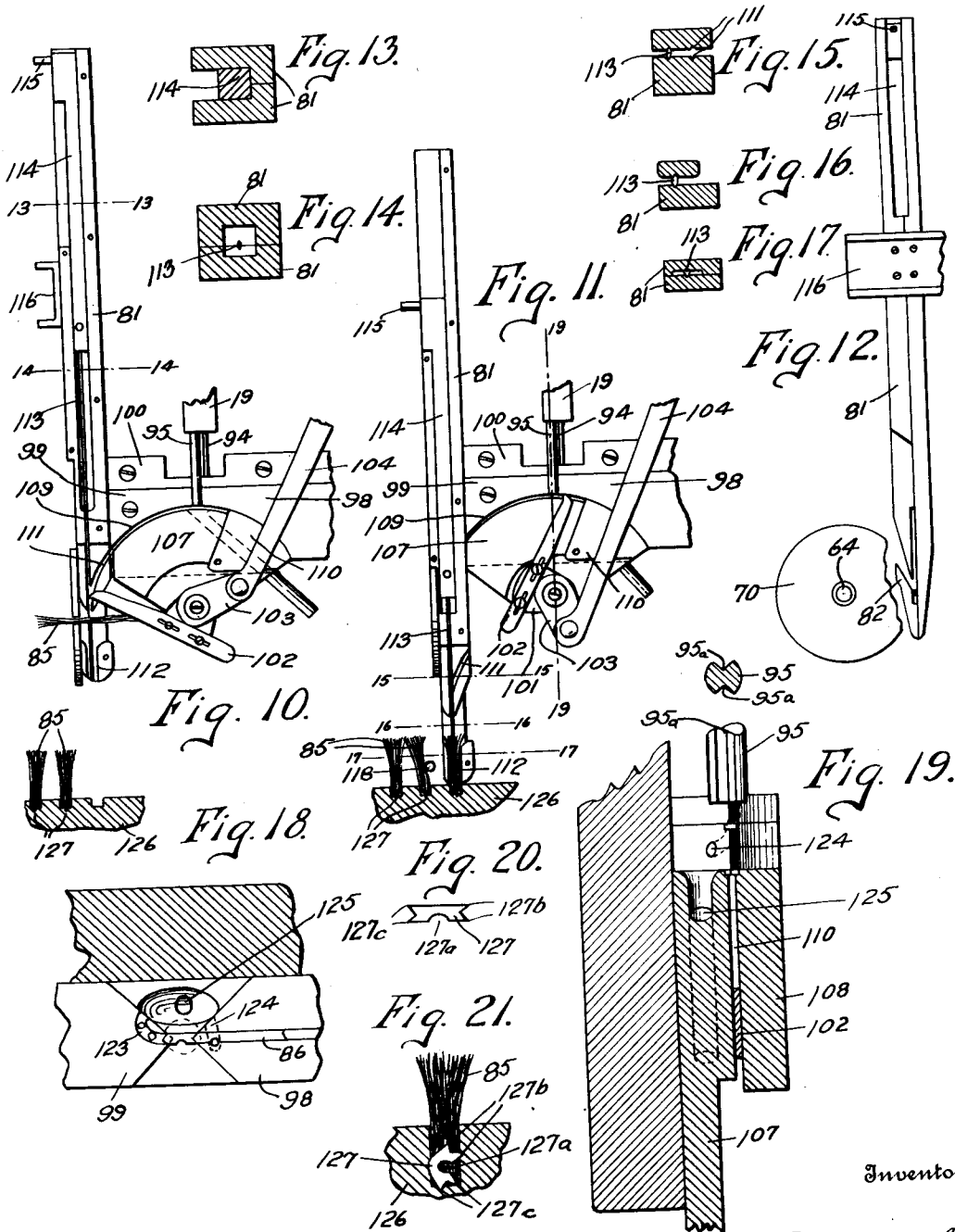
Inventor
Anthony Vanderweld
By Frank E. Linnance, Jr.
Attorney

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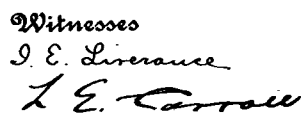
7 SHEETS—SHEET 5.

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7 SHEETS—SHEET 6.



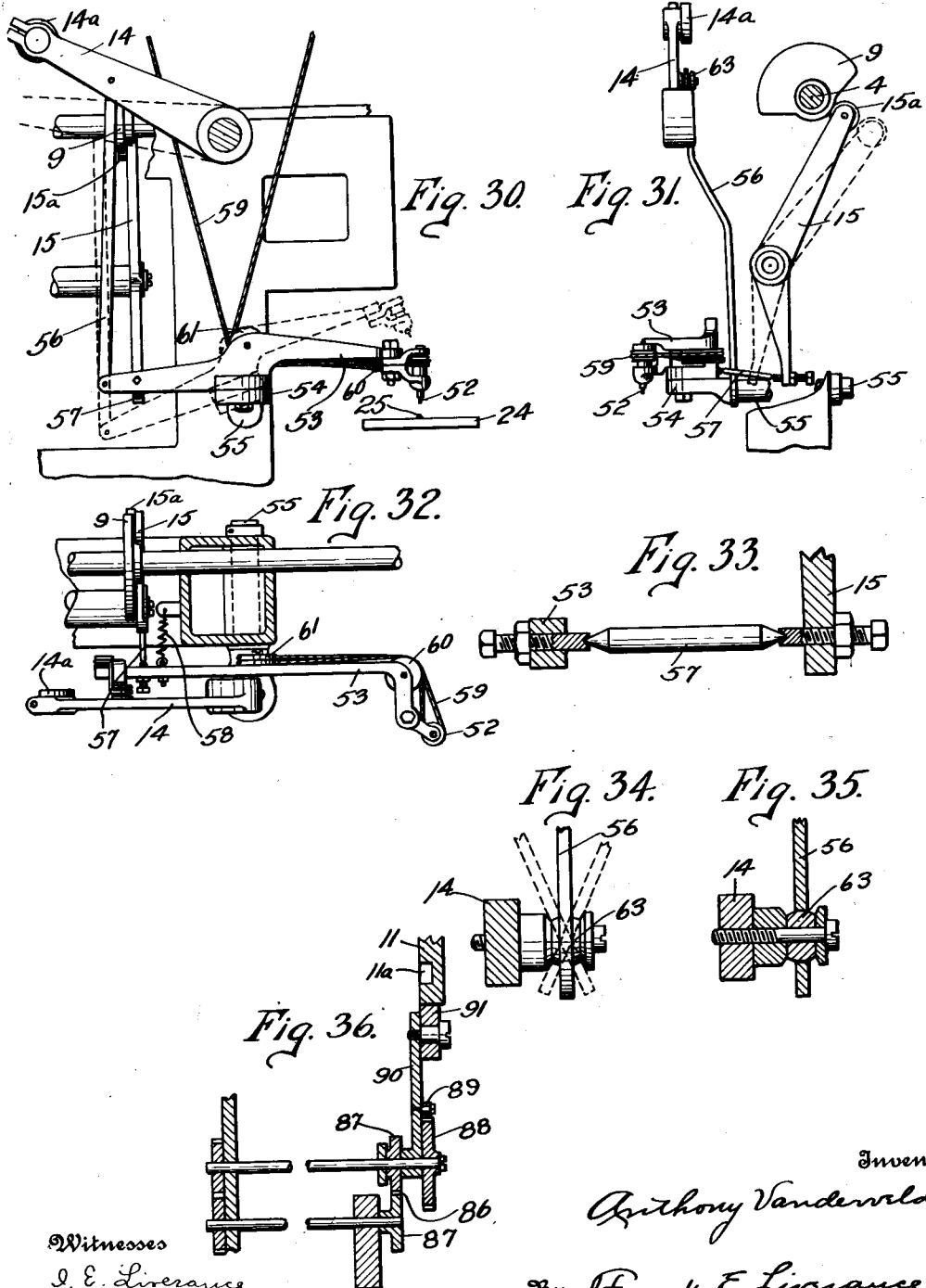
Anthony Vanderveld
 384 Frank E. Livernance, Jr.
 Attorney

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1,058,499.

Patented Apr. 8, 1913.

7 SHEETS—SHEET 7.



Witnesses
J. E. Liverance
L. E. Curran

Inventor
Anthony Vanderveld
By Frank E. Liverance, Jr.
Attorney

UNITED STATES PATENT OFFICE.

ANTHONY VANDERVELD, OF GRAND RAPIDS, MICHIGAN.

BRUSH-MAKING MACHINE.

1,058,499.

Specification of Letters Patent.

Patented Apr. 8, 1913.

Application filed January 13, 1913. Serial No. 741,834.

To all whom it may concern:

Be it known that I, ANTHONY VANDERVELD, a citizen of the United States, residing at 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 improved means for holding and adjusting the brush blank; to provide improved means for drilling the same; to provide improved means for arranging the bristles in place in the holes made by the drill; to provide improved means for holding the bristles in place, together with means for making said holding means; to provide improved means for inserting the holding means in place, and to provide the device 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 device which embodies my invention; Fig. 2 is a side elevation of the same; Fig. 3 is a plan view, parts being broken away to more clearly disclose the construction; Fig. 4 is a vertical section showing a detail of the adjustable table mechanism; Fig. 5 is a plan view of the platen showing the upper side of the same. Fig. 6 is an inverted plan view of the platen. Fig. 7 shows the blower and operating mechanism therefor, drawn on an enlarged scale. Fig. 8 shows the upper portion of the machine in front elevation corresponding to Fig. 1, drawn to an enlarged scale. Fig. 9 is a plan view of a part of the mechanism shown in Fig. 8. Fig. 10 is a front elevation of the staple forming and transferring mechanism, the staple guide and driver, and a sectional view of a portion of a brush; Fig. 11 is a view similar to Fig. 10 with the parts in different position; Fig. 12 is a view in elevation of the guide. Fig. 13 is an enlarged section of the guide and driver taken on the line 13—13, Fig. 10. Fig. 14 is a similar view on the line 14—14, Fig. 10. Fig. 15 is a section on line 15—15, Fig. 11. Figs. 16 and 17 are similar views taken on lines 16—16, and 17—17, respectively, Fig. 11. Fig. 18 is an enlarged plan view of the dies. Fig. 19 is an enlarged vertical section as taken on line 19—19, Fig. 11. Fig. 20 is

an enlarged plan view of one of the fasteners before driving the same. Fig. 21 is an enlarged sectional detail showing the arrangement of the fasteners and bristles in a brush after the fastener has been driven. Fig. 22 is a vertical sectional detail of the bristle beds and bristle feeding mechanism. Fig. 23 is a similar view with the feed wheel in a different position. Fig. 24 is a sectional view of the bristle bed as taken transversely of Fig. 22. Fig. 25 is a detail in horizontal section of the bristle bed and feeding mechanism. Figs. 26 and 27 are front and side views of the cam and upper end of the rod which operate the bristle feed. Figs. 28 and 29 are corresponding views of the lower end of the rod that operates the bristle feed, and of the parts co-acting therewith. Fig. 30 is a detail of construction in elevation of the drill operating mechanism. Figs. 31 and 32 are front and partial plan views, respectively, of the mechanism shown in Fig. 30. Fig. 33 is a detail in vertical section of a portion of the structure shown in Figs. 31 and 32. Figs. 34 and 35 are views of the universal joint connecting rod 56 and lever 14. Fig. 36 is a detail in vertical section of a portion of the wire feeding mechanism. Fig. 37 is a front elevation of the bristle feed wheel and the parts co-acting therewith.

Throughout the several views, like reference numerals refer to like parts.

The driving shaft 1 of the machine carries a driving pulley 2 loosely thereon which is engaged by the driving clutch 3 to connect the same to the driving shaft upon operation of a bell crank 3^a connected by suitable mechanism to treadle 3^b, whereby the machine will operate as long as the treadle is depressed but will stop when it is released. A counter shaft 4 at right angles to driving shaft 1 is connected to and operated by the driving shaft by means of miter gears 5. A number of cams are located on the driving shaft, cam 6 operating the drill arm in a vertical plane, cam 7 operating the staple driver, and cam 8 the staple guide. Cams 9, 10 and 11 located on the counter shaft 4 operate respectively, the drill lever laterally, the bristle feed mechanism, and the fastener forming and placing mechanism.

The brush blank is adjusted and held in the following manner. The bed plate 24 has a central stud or projection 25 in its upper surface. Any convenient number of platens 26 are provided according to the

different styles and sizes of brushes to be made on the machine, one only being shown in the drawings, and each platen is provided with an end and a side rib 27 on its upper surface against which the brush blank 126 is securely held by a cam clamp 28. Opposite the blank, the platen is provided on the under side with a plurality of recesses 29 each adapted to receive the pin 25, said recesses being directly beneath the places in the brush blank where the different tufts of bristles are to be inserted. Semi-circular brackets 30 support the bed and have segmental tongue and groove engagement with the head 31, the axis of the same being above the plane of the bed and held in adjustment thereon by a bolt 32, which firmly clamps the head between the brackets and thus provides a rigid and substantial support for the bed. This head is mounted on a downwardly projecting stem 41 vertically movable in a socket 34 and having a T-head 33 at the top, this socket being vertically movable in the frame 46 and held firmly from rotation by a spline 34^a, which frame is vertically adjustable in ways 47 by means of a screw 48, operated by a shaft 49, connected thereto by gears 50, and manually rotated by a wheel 51 to raise and lower the frame, thereby providing for brush blanks of varying thickness, and allowing a blank to be quickly and easily placed in position.

Socket 34 is yieldingly supported upon a spring 44 which is adjustable for tension by a screw 45, and to limit the upward movement of the socket, it is provided with a headed stud 42 vertically movable in a cap 43 fixed on the frame and against which cap the head of the stud is forced by the spring. To tilt the table 24 step by step as occasion may require, segmental supports 35 are pivoted at one end to the T-head 33, and adjustably supported at the other end by a bolt 38. These segments are each provided with a series of recesses in its upper side, and arms 36 on the brackets 30 are provided with rollers 37 which engage these recesses step by step and support the table 24 at different angles. To prevent the head 31 from rotating in the socket 34, an arm 39 is provided having a downwardly projecting pin 40 slidable in an opening in the head 33.

A rotating drill 52 is carried on the outer end of an arm 53. This arm 53 is mounted on a universal joint being pivoted on a vertical axis near the middle upon a support 54 which in turn is pivoted on a horizontal axis 55. The drill is driven by a belt 59 running around idlers 60 and 61, thence upward to a driving pulley 62 operated by gears 62^b driven from the counter shaft 4 in any convenient manner (not shown).

To move the drill to operative position while boring the blank, and then move it

out of the way while the other mechanism is inserting and securing the bristles, the arm 53 is held in operative position by a spring 58 and operated about its vertical axis by a push pin 57 which engages the arm 53 at one end and at the other end is engaged by a pivoted lever 15 having a roller 15^a that is engaged by cam 9, whereby the arm is alternately allowed to move to operative position, and swung horizontally on its vertical pivot away from operative position.

To feed the drill vertically into the blank and to remove the same after drilling a hole therein, the arm is swung upon the horizontal axis 55. In the position indicated in full lines in Fig. 30, the drill may drill the hole in the blank, and the dotted line position indicates the position taken when the drill is removed from the work. The vertical movement of the arm 53 is accomplished by a lever 14 having a roller 14^a that engages a groove in cam 6, said lever being connected to the inner end of the arm 53 by a rod 56, which rod is connected by a universal joint 63 to the lever 14 thus permitting the horizontal movement of arm 53 about its vertical pivot as well as the vertical movement about horizontal pivot 55.

I prefer to provide for placing two grades of bristles for which purpose, I have shown two superposed bristle beds or ways 20 and 20^a, pivoted upon brackets 21, to alternately shift to opposite the feed wheel at the discharge end of the bristle beds. These beds are provided with ribs 75 enabling the bristles to slide easily toward the feed wheel and to properly enter the slot therein, as hereafter described, and at each end of the bristles are parallel plates 74 adjustable toward and from each other to conform to the various lengths of bristles as occasion may require in making different brushes, and properly adjust them in the wheel and guide. The bristles are forced toward the discharge ends of the beds by followers 76, which are placed behind the bristles and which are operated by weights 79 connected to the followers by the cords 77, the cords being extended over and guided by pulleys 78 as shown. Opposite the discharge end of the beds is a feed wheel 70 having a radial slot 72 in its periphery to receive the bristles, the quantity received being determined by an adjustable stop 73 in the slot. Wheel 70 is mounted on a shaft 64 and is rotated a half a revolution and back again at each cycle of the machine by means of a longitudinally movable rod 16 having a link 16^a surrounding the counter shaft 4 and vertically movable thereon. This rod is moved by rollers 17 thereon engaging the cam 10. The lower end of this rod is provided with a rack 65^a which engages a pinion 65 loose on the shaft 64. Fixed on this pinion are arms

66 and 66^a spaced apart and in one of which is an adjustable screw 67. An arm 68 is fixed on the shaft 64 and extends between the arms 66 and 66^a. By this connection the rotary movement of the wheel 70 may be exactly adjusted by adjusting the clearance between the screw 67 and the arm 66, which screw and arm alternately engage the arm 68 and rotate the shaft 64 in opposite directions as the rack is reciprocated by the cam 10.

To retain the bristles in the slot 72 as the wheel rotates, a hood 80 is provided above the wheel, and to shift the bristle bed with either the upper or lower portion opposite the feed wheel, a manually operated shifting lever 23 is provided and connected to the bed by a rod 22, pivoted to the bed at one end and eccentrically pivoted to the lever 23 at the other end, whereby turning the lever half a revolution, raises or lowers the bed. The hood 80 prevents the escape of the bristles from the upper bed when the lower bed is feeding, and when the upper bed is feeding, the bristles are held in the lower bed by stops 71 attached to an arm 69, which arm is also provided with a bearing 69^a for the shaft 64. To receive the tuft of bristles thus formed in the slot of the feed wheel, a staple guide 81 is provided having a lateral opening adjacent the wheel 70 and a projecting incline 82 beneath said opening and extending alongside the wheel to remove the bristles from the slot therein and guide the same into a transverse opening 83 in the guide. This guide is also provided with an upwardly extended opening 84 to receive the fastener or staple as hereafter described, and also with a discharge opening 112 at the lower end through which the bristles are driven in the operation of setting the same. This guide periodically moves up and down being lowered in contact with the brush blank during the operation of inserting the tuft therein, and vertically moved to permit the blank to be shifted and to receive the tuft and fastener and to permit the drill to operate, by means of the lever 12, provided with a roller traversing a groove in the cam 8, and having a slide 116^a at its opposite end engaging a way 116 attached to the staple guide 81. In this guide is a staple driver 113 attached to a slide 114, independently movable in the guide 81, and provided with a pin 115 having a block thereon slidable in a slot in the lever 18, which lever is operated by the cam 7 having a cam groove to receive the roller 13^a on the lever.

The fasteners for holding the bristles in place are formed from a continuous strip of metal or flat wire 86 fed forward by means of the feed rollers 87 oppositely engaging the same, one of which rollers is mounted on a lever 92 and pressed toward the other by a spring 93. A ratchet wheel 88 is con-

nected to one of the rollers and engaged by a pawl 89 mounted on an arm 90, pivoted on the shaft carrying the roller, and having on its movable end a roller 91 which is engaged by the cam 11 whereby the lever 90 is periodically moved and shifts the ratchet wheel and rollers feeding the strip 88 forward a sufficient distance to supply material for one of the fasteners. One of these fasteners is shown at 127 in Fig. 20, somewhat enlarged, and it consists of a short piece of this metallic strip with a semi-circular recess 127^a in the middle of one side and acute angular spurs 127^b and 127^c at its respective ends, forming a recess at each end. The fastener 127 is formed by means of the dies 98 and 99 having opposing acute angles spaced apart, as shown in Fig. 18 in plan view.

The die 98 has a channel in which the strip 86 slides, and is provided with a round opening, partially within the channel and midway between the dies to receive a punch 94. The die 99 has a curved channel 123 for the escape of the waste material cut from the stock. Co-acting with these dies is a round punch 94 which enters the hole in the die 98 and cuts out the semi-circular recess 127^a. A punch 95 co-acts with both dies to sever the strip at each end of the fastener and form the spurs 127^b and 127^c at its respective ends. The waste material escapes through openings 124 and 125. This punch is preferably round and also provided with grooves 95^a at opposite sides to receive the angles of the dies. Above the dies are caps 100 to hold the material from rising off the dies. Beneath the dies and contacting the same is a segmental bed plate 107 between which and the concave under surface of the dies is a way 109 concentric with the axis of the oscillating arm 101. On this arm is a finger 102, the end of which traverses in the way 109 and into the staple guide to a point beneath the staple driver 113. In the staple guide is a continuation 111 of this way to receive the fastener, which continuation when the staple guide is raised, forms a continuation of the way between the bed plate 107 and the die 99. This curved way and continuation extends through substantially 90 degrees, whereby the fastener turns from horizontal to vertical position, as it is moved from beneath the punches into the guide.

Punches 94 and 95 are carried by a slide 10 which is reciprocated by a lever 18 provided with a roller 18^a at one end traversing a cam groove 11^a in the cam 11. At the other end this lever 18 is pivoted to the slide 10, and is intermediately mounted on an eccentric pivot 96 adjustable by a lever 97 whereby the down stroke of the punches can be accurately adjusted to carry the fastener down into the way 109.

The rocker 101 is operated by an arm 103

to which is connected a rod 104 at the lower end, the upper end of the rod being pivoted to the movable end of a pivoted arm 105 having a roller 106, which roller traverses the cam groove 11^a in the cam 11. A retaining plate 108 spaced apart from the bed plate 107 by a spacing plate 110, and having its edge engaging the dies permits the finger 102 to swing therebetween and retain the fastener in the way 109.

As a means of removing the borings and other obstructions, if any, formed by the drill, a blower is provided having the following construction. Air pump 117 is operated by movement of the guide 81. Leading from the pump is a tube 118 the middle portion 118^a being flexible to permit the movement of the lower part thereof. This tube terminates in a curved rigid nozzle 118^b which is carried by an arm 120 on a rock shaft 119, turning on a vertical axis, and mounted near the slide 81, in which shaft is a spiral groove 121 engaged and traversed by a pin 122 fixed in part 116, whereby as the latter reciprocates, the rock shaft is oscillated about its axis, which movement carries the lower end of the nozzle 118 around in contact with the last tuft of bristles set, as shown in Fig. 11. The air escaping the nozzle blows away any borings or obstructions that may be made by operation of the drill. As the slide 81 rises, the nozzle is swung out of the way to permit adjustment of the blank for setting the next tuft, also to allow the drill to operate.

With the above description in mind, the operation of the machine is readily understood.

The blank shown in the drawings at 126 is for a flat brush with the bristles positioned vertically therein. In making this form of brush, the bed 24 may be adjusted to horizontal position and vertically adjusted to conform to the proper thickness of the brush blank, and a platen 26 used having recesses 29 corresponding to the number and location of tufts to be inserted in the blank. This platen carrying the blank may then be placed on the bed and manually shifted step by step to successively position the pin 25 in the various recesses 29 as each tuft is successively inserted in the blank.

The first operation is to bore a hole as the cams 6 and 9 rotate. Cam 9 first permits the arm 53 to swing with the drill above the blank, cam 6 then raises the rear of the lever 14 depressing the arm 53 and forcing the drill into the blank the proper depth. Further movement of cam 6 causes the drill to rise and when it is out of the blank, the cam 9 swings the arm carrying the drill horizontally, the drill being thus moved both vertically and laterally and out of the way of other mechanism. In the meantime cam 10 has depressed the rod 10

which rotates the shaft 34 and feed wheel 70 a half revolution from the position shown in Fig. 23 to the position shown in Fig. 22, carrying the bristles which have entered the slot 72 over into the staple guide, as indicated at 85 in Fig. 22, the incline 82 having removed them from the slot 72 into the staple guide in proper position to be engaged by the fastener as it descends. After the drill has been moved out of the way, the staple guide 81 is moved downward by the cam 8 to a point directly over the hole in the blank and close to the surface of the same. In the meantime the downward movement of the slide 19, operated by the lever 18 and cam 11, cuts out the fastener by means of the punches 94 and 95 and the dies 98 and 99, depositing the fastener in the way 109 beneath these punches. The cam 11 now operates through the rod 104 to turn the rocker 101 carrying the finger 102, which latter engages the fastener and carries it along the way 109 and through the extension 111 of the same in the staple guide, depositing it therein directly above the tuft of bristles, as indicated in Fig. 10. As the finger 102 moves back out of the way, the driver 113 is now moved downward by the cam 7 and lever 13, which driver engages the fastener and carries it together with the tuft of bristles folded over the same down to place in the hole in the blank as indicated in Fig. 21. The driver engages the upper end of the fastener between the spurs 127^b, and the tuft of bristles is folded over the lower end of the fastener between the spurs 127^a. As the fastener strikes the bottom of the hole in the blank, the recess 127^a permits the fastener to yield and fold laterally, which forces two of the spurs opposite the recess against one side of the opening or hole, and the middle of the edge opposite the recess against the other side of the same, securely anchoring the fastener and tuft in place within the hole, as shown in Fig. 21. The driver and guide then recede to place, and the operator manually shifts the blank to the next position with the projection 25 in the next recess of the plate in the series, and the machine may then repeat the operation for the next succeeding bristle tuft.

If it should be desired to set any row of bristles inclined to the vertical, the table 24 is tilted upon the head 31 by shifting the arms 36 in the recess of the supports 35. In the event of any accidental over pressure downward by any obstruction or otherwise, the spring 44 will yield, permitting the table to descend and avoid breaking the machine. At each cycle of the machine, the rock shaft 119 is oscillated and the air pump 117 provides a blast of air through the nozzle 118^b which clears away any chips or other light obstructions that may be in the way.

The drilling mechanism, the staple or fastener, and the stapling mechanism specifically shown and described are not claimed in this application but are reserved for separate applications as separate and distinct inventions.

I have fully disclosed a complete and operative device embodying the invention. Such disclosure is to be taken as illustrative and diagrammatic of the invention, however, and in no sense as limiting to any specific construction, the invention itself covering all modifications that come properly within the scope of the appended claims.

What I claim and desire to secure by Letters Patent of the United States is:—

1. A brush making machine comprising a head, a bed supported by the head, brackets on the bed embracing the head, segmental tongues and grooves in the head and brackets the axis of which is above the bed, and adjustably connecting the same, and a clamping bolt extending through the brackets.

2. A brush machine comprising a bed, brackets supporting the bed and having segmental grooves, a head having segmental tongues in the grooves, a binding bolt in said brackets, means for adjusting the bed at intervals, a yieldable support for the bed, a platen adjustable on the bed, and means for holding a brush blank on the platen.

3. A brush machine comprising a T-head, a spring supporting said head, a relatively vertically movable head supported by the T-head, a bed pivotally mounted on the said head, recessed segments carried by the T-head, arms on the bed having rollers engaging the recesses of the segments, and means for adjustably holding a brush blank on the bed.

4. A brush machine comprising a platen having a series of recesses in one side and a side rib and end rib on the other side, a cam to force a brush blank against said ribs, a bed supporting the platen and having a pin to successively engage said recesses, a vertically movable head supporting said bed, brackets having segmental tongue and groove connection with said head and adjustable thereon, a binding bolt in said brackets, arms on said bed having rollers at their lower ends, recessed segments engaged by the rollers and supporting the bed, means for adjusting said segments, and a vertically yieldable support for said brackets.

5. A brush making machine comprising a bristle bed having longitudinal ribs, parallel plates extending longitudinally of the bed and laterally adjustable, a feed wheel opposite the end of the bed, and means for moving the bristles toward the feed wheel.

6. A brush making machine comprising superposed and pivoted bristle beds, a feed wheel opposite the end of said beds, means

for shifting the beds alternately opposite the axis of the feed wheel, a stop near the feed wheel and opposite the end of the other bed, a feed wheel to receive bristles from the respective beds, and means for moving bristles toward the feed wheel.

7. A brush making machine comprising a feed wheel having a radial slot, means for oscillating said wheel, a staple guide at one side of said wheel to receive bristles from the same, two superposed bristle beds at the other side of said wheel, a hood above the wheel, a stop below the wheel, and means for shifting the bristle beds alternately with the open end of one bed opposite the axis of the wheel, and with the other bed opposite the hood or stop.

8. A brush making machine comprising a feed wheel having a radial slot, an adjustable stop in the slot, a staple guide at one side of the wheel to receive bristles therefrom and having an incline at the side of the wheel, a bristle bed having its open end opposite the wheel, a shaft on which the wheel is mounted, a pinion to rotate the shaft, a reciprocable rack engaging the pinion, and means for periodically reciprocating the rack.

9. A brush machine comprising an oscillating feed wheel having a radial slot, a shaft on which the wheel is mounted, an arm fixed on the shaft, a pinion loose on the shaft, two arms fixed on the pinion and oppositely engaging the arm on the shaft, an adjusting screw in one of the arms, a rack engaging the pinion, and means for reciprocating the rack.

10. A brush making machine comprising a feed wheel having a radial slot, an adjustable stop in the slot, a staple guide at one side of the wheel, an incline on the guide to remove bristles from the slot, superposed bristle beds at the other side of the wheel, means for shifting the ends of the beds alternately opposite the wheel, a hood above the wheel, a stop below the wheel, a shaft on which the wheel is mounted, a pinion on the shaft, a rack engaging the pinion, and means for reciprocating the rack.

11. A brush making machine comprising a feed wheel having a radial slot to receive bristles, a staple guide having a lateral opening opposite said wheel, an incline on said guide extending alongside of said wheel, and a transverse opening below said incline to receive the bristles.

12. A brush making machine comprising a feed wheel having a radial opening to receive bristles, a staple guide having a lateral opening opposite the wheel, an incline on the guide extending alongside the wheel to remove bristles from the slot, a transverse opening below the incline, an upwardly extending opening to receive a fastener, a discharge opening in the lower end of the

guide, and means for driving the fastener and bristles through said opening.

13. In a brush making machine the combination of superposed and movable bristle beds, a feed wheel having a radial slot to receive bristles from the beds, a staple guide having a lateral opening opposite the feed wheel, an incline on the guide below the said opening and alongside of the wheel, means for oscillating the wheel, said guide also having a discharge opening in the end and a side opening to receive fasteners, and means for driving the fasteners and bristles through said discharge opening.

14. A brush making machine comprising an adjustable holder for a brush blank, a drill reciprocated horizontally to and from operative position and reciprocated vertically to bore the blank, vertically reciprocated tuft setting mechanism adapted to set bristles in the holes bored by the drill, means for synchronizing the drill and tuft setting mechanism to operate alternately, and means for operating the drill and tuft setting mechanism.

15. A brush making machine comprising an adjustable holder for a brush blank, a drill movable vertically to bore the blank and movable horizontally out of the way of the tuft setting mechanism, vertically reciprocable tuft setting mechanism above the drill when the latter is in operative position, a blower operated by the tuft setting mechanism, means for synchronizing the drill and tuft setting mechanism to operate alternately, and means for operating the drill and said mechanism.

16. A brush making machine comprising a holder for brush blanks, means for adjusting the holder step by step in conformity with the various positions of the respective tufts set in the blank, a drill adapted to bore holes therein, a tuft setting mechanism adapted to set bristles therein in the same place that the drill bores the holes, means for moving the drill to operative position below the tuft setting mechanism and out of said position, means for reciprocating the tuft setting mechanism, and means for operating the drill.

17. A brush making machine comprising a platen for holding brush blanks, means for supporting and adjusting the platen conformable to the positions of the respective tufts set in the blank, a drill, means for rotating the drill, means for moving the drill vertically to bore the blank, means for moving the drill horizontally away from over the hole bored in the blank, a vertically movable guide above the hole in the blank, means for supplying fasteners and bristles to said guide, means for reciprocating the guide, means for driving the bristles and fasteners out of the guide into the holes bored by the drill, and means for synchronizing the various movements thereof, whereby the drill and the bristle-setting mechanism operate alternately.

In testimony whereof, I have hereunto set my hand in the presence of two witnesses.

ANTHONY VANDERVELD.

Witnesses:

L. E. CARROLL,

FRANK E. LIVERANCE, Jr.