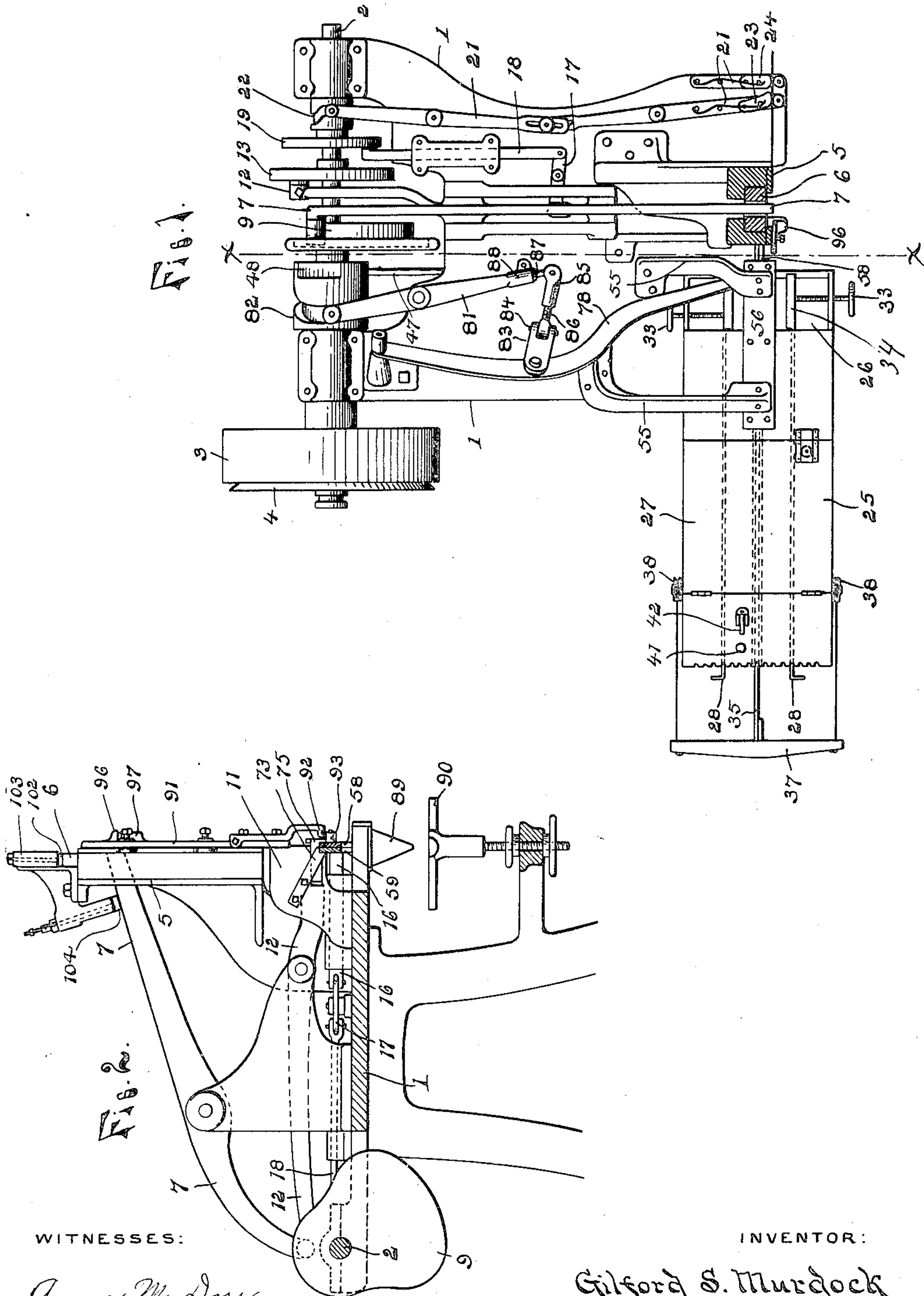


G. S. MURDOCK.
BRUSH MAKING MACHINE.
APPLICATION FILED OCT. 12, 1907.

934,560.

Patented Sept. 21, 1909.

5 SHEETS—SHEET 1.



WITNESSES:

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Anna M. Mayer

INVENTOR:

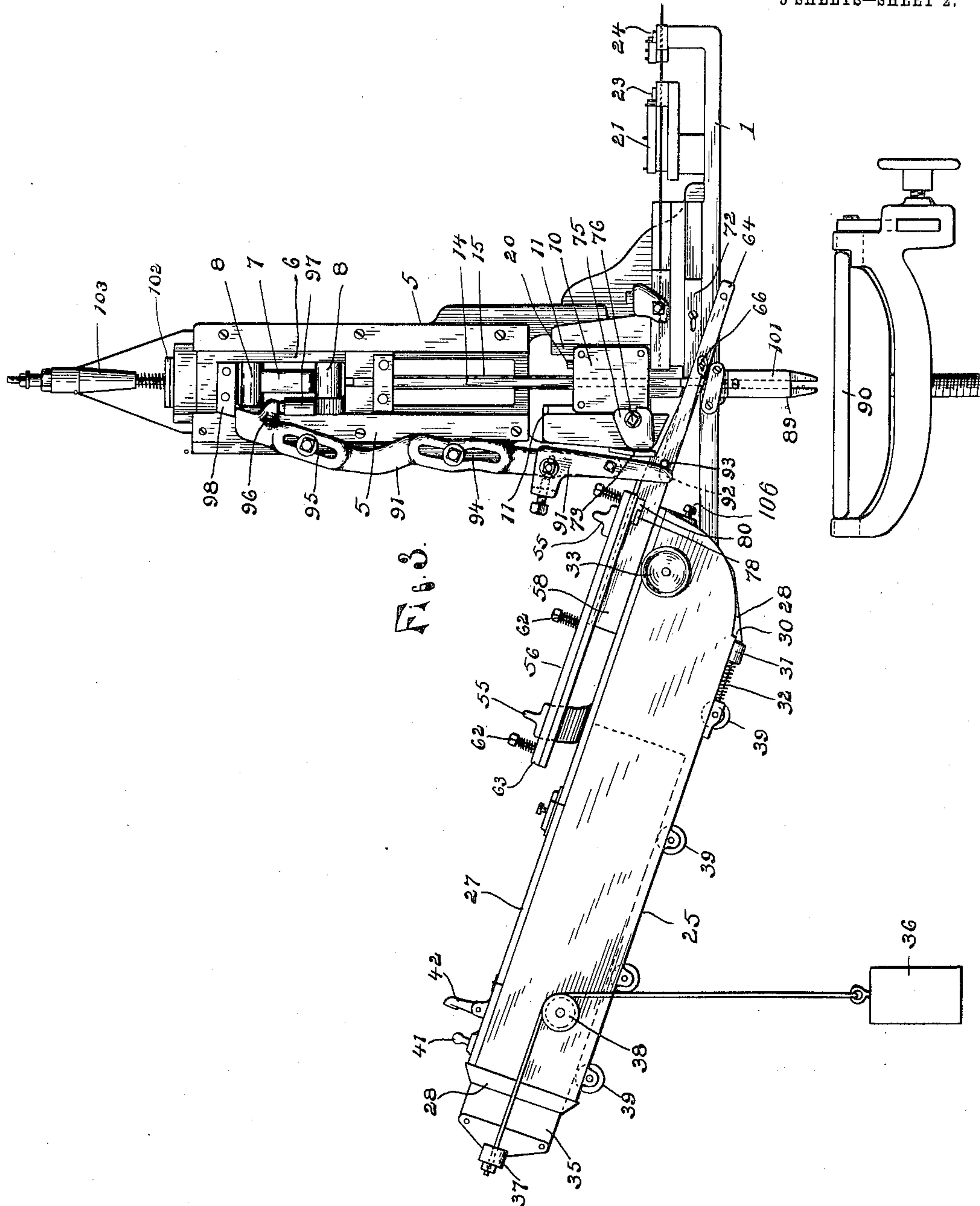
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5 SHEETS—SHEET 2.



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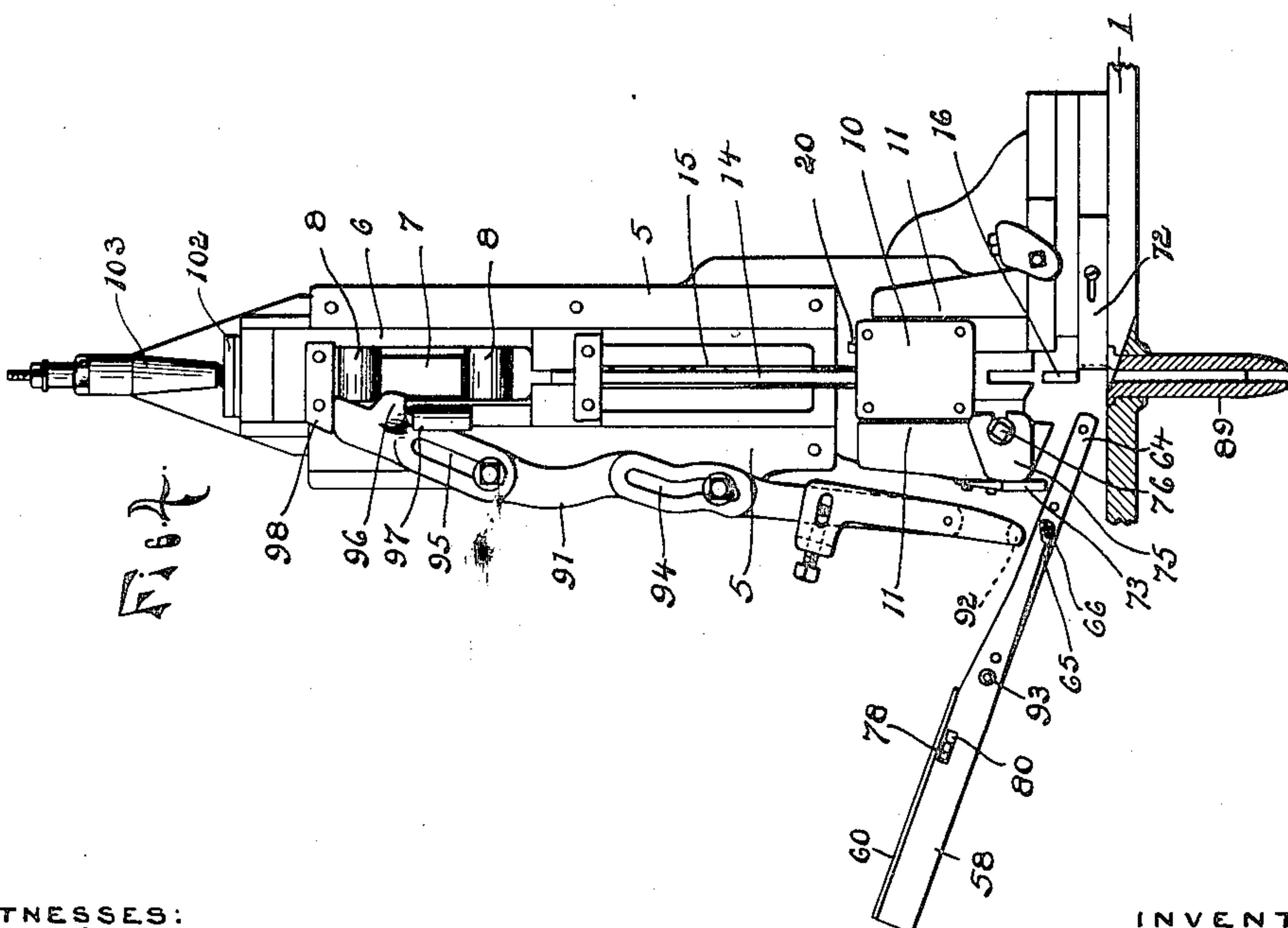
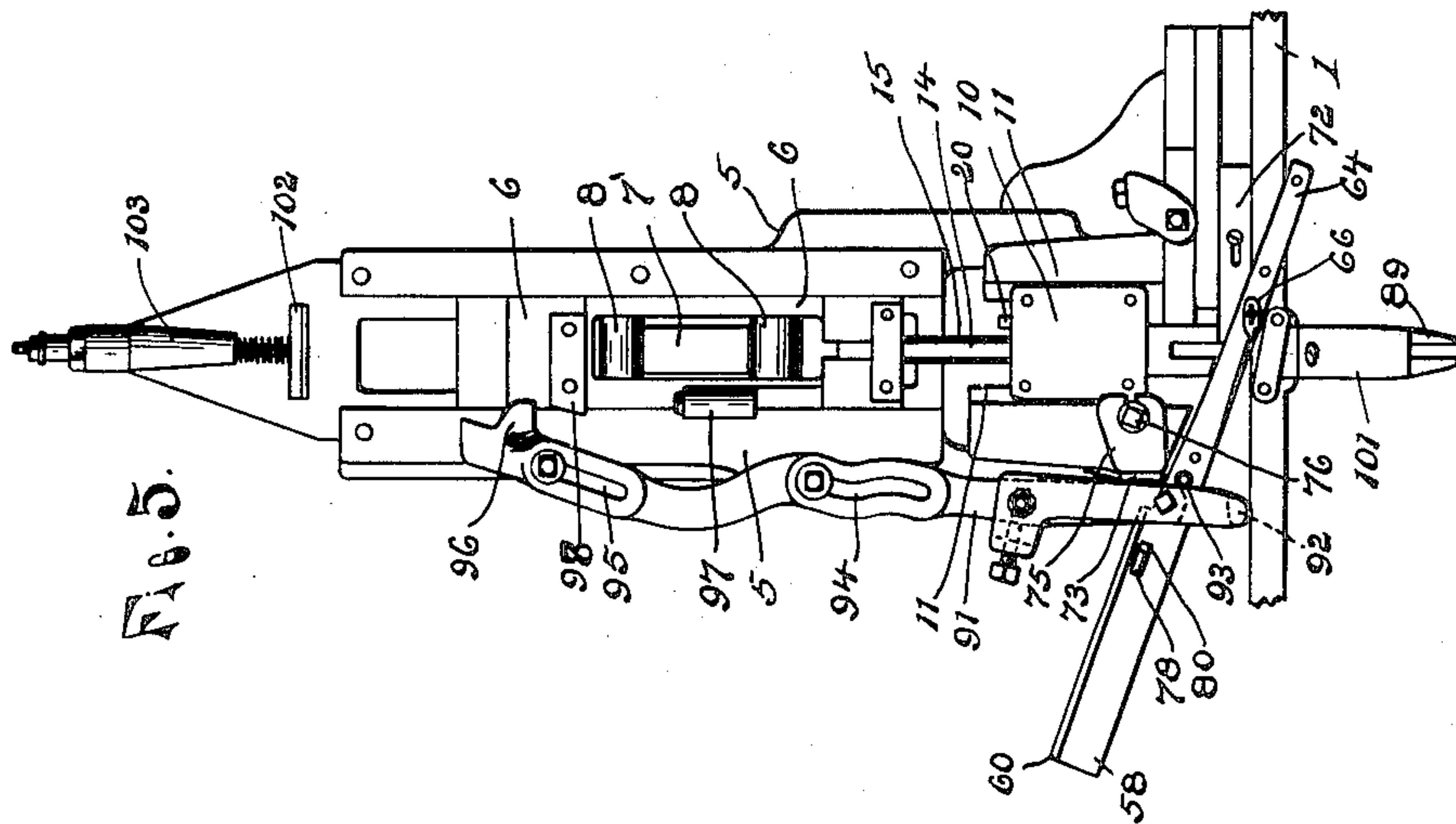
Attorneys.

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5 SHEETS—SHEET 3.

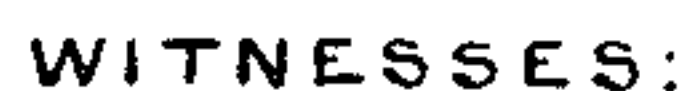


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934,560.

5 SHEETS—SHEET 4.



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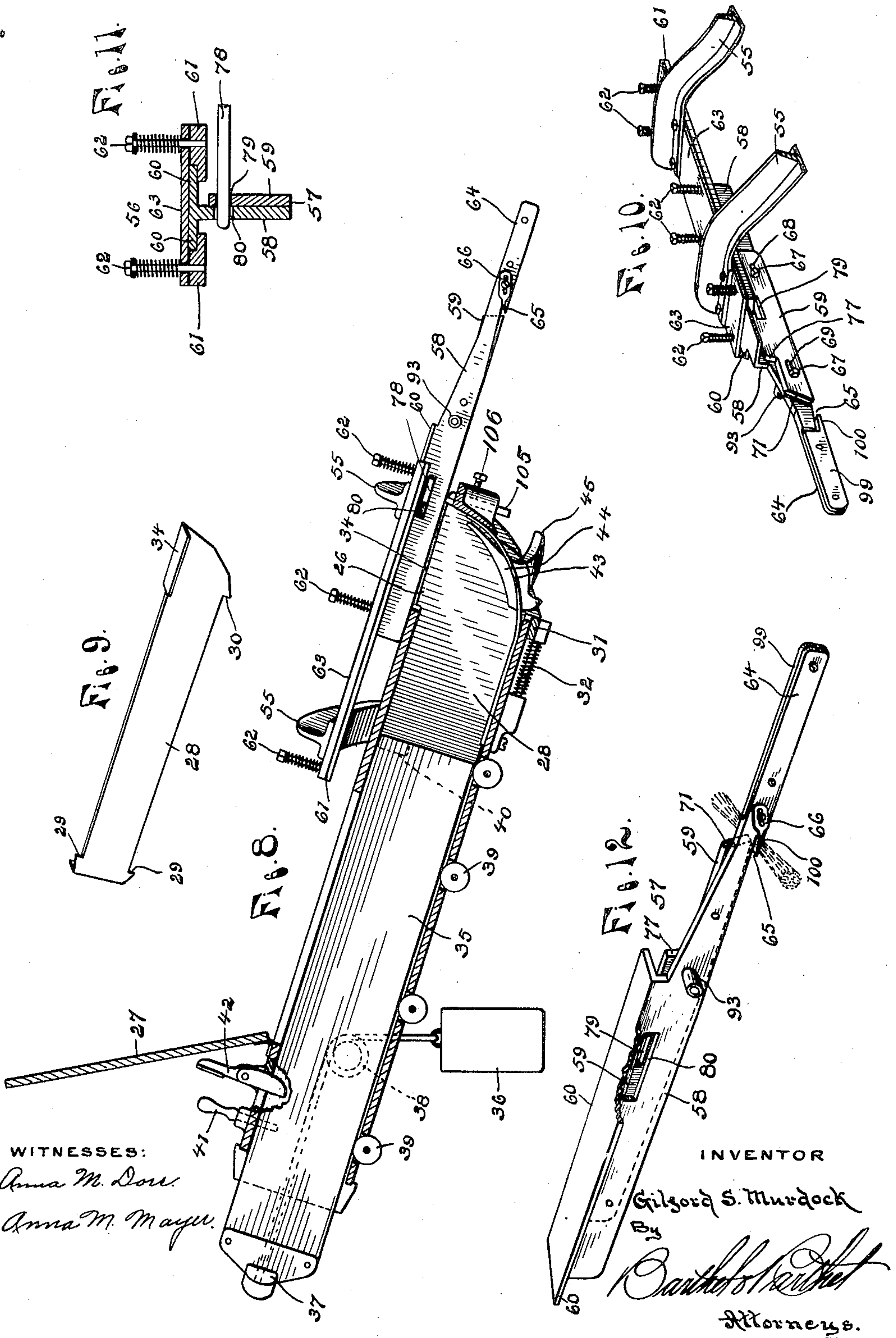
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6 SHEETS—SHEET 5.



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UNITED STATES PATENT OFFICE.

GILFORD S. MURDOCK, OF DETROIT, MICHIGAN.

BRUSH-MAKING MACHINE.

934,560.

Specification of Letters Patent. Patented Sept. 21, 1909.

Application filed October 12, 1907. Serial No. 397,040.

To all whom it may concern:

Be it known that I, GILFORD S. MURDOCK, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, having invented certain new and useful Improvements in Brush-Making Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to improvements in brush making machines of that class in which the fibrous material is automatically fed in bunches to stapling mechanism which also embodies means for making and driving the
15 staples; and the object of the invention is to provide a feeding mechanism which will gather from a suitable hopper a bunch of material of the desired size, and firmly hold the fibers straight and even as it feeds the
20 bunch to the stapling mechanism.

A further object is to provide a hopper so constructed and arranged that the fibrous material is firmly held straight and even therein and fed to the delivery slide in such
25 a manner as to insure the delivery of a full even bunch each time, and also to provide a machine embodying certain other new and useful features in its construction, combination and arrangement of parts, all as hereinafter more fully described reference being
30 had to the accompanying drawing, in which:—

Figure 1 is a plan view of a device embodying the invention, with parts broken
35 away to show the construction; Fig. 2 a vertical section of the same substantially on the line $x-x$ of Fig. 1; Fig. 3 is an enlarged detail showing a front elevation of the hopper, stapling, and feeding mechanisms; Figs.
40 4 and 5 are similar details showing the operation of the bunch releasing lever; Fig. 6 is an enlarged detail showing the closing plate of the feed slide and the adjustable stop therefor with the adjacent parts of the
45 machine; Fig. 7 is an enlarged detail showing the hopper in end elevation with its presser foot and mechanism for operating the same; Fig. 8 is a longitudinal section of the hopper on the line $y-y$ of Fig. 7; Fig.
50 9 is a perspective view of one of the adjustable hopper partitions detached; Fig. 10 is a perspective view of the feed slide and its supporting guide; Fig. 11 is an enlarged cross-section of the same; and Fig. 12 is a

perspective view of the slide detached and
55 showing its side opposite to that shown in Fig. 10.

1 is a suitable bed or table upon which is mounted at its rear edge a shaft 2 provided at one end with a driving pulley 3 which is
60 loose on the shaft and is attached thereto to turn the same, by a suitable clutch 4.

5 is a bracket secured to the table 1 at its forward edge and provided with vertical guide ways for the reciprocating slide or
65 head 6 which is actuated by a rocking lever 7 pivoted intermediate its ends with its forward end projecting between friction rolls 8 on the slide and its rear end engaging a
70 cam wheel 9 on the shaft 2 for actuating the slide in both directions.

10 is a vertically movable die block traveling in guides 11 secured to the table directly below the slide 6 and 12 in a lever
75 engaging said block to operate the same, which lever is pivoted intermediate its ends and at its rear end engages a slotted or grooved cam 13 on the shaft 2 for operating
said lever in timed relation to the movement of the slide 6 which slide has secured
80 thereto a needle 14 working vertically through the die block in a suitable passage provided therefor having grooves to receive the ribs 15 on the needle. The lower end of
said grooved passage forms a die to receive
85 a wire which is formed, upon the downward movement of the block, over the end of a finger bar 16, into a staple. This finger is projected into the path of the die and retracted therefrom in timed relation to the
90 movement of the other parts by being pivotally attached at its rear end to a rocker 17 pivoted intermediate its ends on the table and attached at its opposite end to the forward end of a reciprocating rod 18 which is
95 moved by an internal slotted or grooved cam 19 on the shaft 2. Carried by the die block is a suitable knife 20 for severing the wire in proper lengths for the staples and the wire is fed in by suitable levers 21 piv-
100 oted on the table and actuated by a cam 22 on the shaft 2, the forward end of the forward lever being provided with a suitable gripping device 23 to engage the wire and a similar gripper 24 being provided to pre-
105 vent the retrograde movement of the wire.

All of the foregoing described parts are arranged and constructed to operate sub-

stantially as shown and described in my application for Letters Patent filed in the United States Patent Office on 2nd day of August 1907, Serial No. 386,722.

5 A long feed hopper 25 for holding bristles or fibrous material, is secured in an inclined position to the supporting frame or table of the machine, with its lower or discharge end adjacent to the guide bracket 5.
 10 The upper side of this hopper at its lower end is open and through this opening 26 is fed the material which is placed in the hopper through an opening in its upper side closed by a cover 27. Adjustable partitions
 15 28 are provided in the hopper to engage the ends of the bristles which are placed transversely between the same and hold the material in the center of the hopper. These partitions extend the length of the hopper
 20 and at their rear ends are provided with shoulders 29 to engage notches in the end of the hopper and at their forward ends, are formed with downwardly extending shoulders 30 at the lower edges to engage a
 25 bar 31 extending across the lower side of the hopper, which bar is strongly pressed and held in engagement with the shoulders by springs 32 so that each partition is forced longitudinally by the springs to
 30 yieldingly hold its shoulders 29 in engagement with their notches. Adjusting screws 33 extend inward through each side of the hopper near its lower end into engagement with the partitions and thus
 35 said partitions are firmly held in place, and at the same time may be quickly and easily adjusted toward or from each other to accommodate the different lengths of material, by turning the screws in or out and against
 40 the action of the springs 32, disengaging the shoulders at the upper ends of the partitions from their notches in the casing and moving them in or out into engagement with other notches. The partitions are also provided
 45 with flanges 34 within the discharge opening 26 of the hopper, which flanges extend over the ends of the material a short distance and hold the same down.

A presser slide 35 is provided in the hopper to feed the bunch of material forward and press it into the lower end of said hopper, said slide being actuated by weights
 50 36 attached to a cross-arm 37 on the outer end of the slide by cables running over pulleys 38 on the sides of the hopper. Friction rolls 39 in the bottom of the hopper casing engaging the slide, insure free movement thereof, and on the inner end of said
 55 slide is a lug 40 to engage a stop pin 41 in the top of the casing and prevent the slide from being pulled entirely out when lifted to fill the hopper, a gravity latch 42 being
 60 also provided adjacent to the stop pin to hold the slide while the hopper is being filled. This latch is pivoted upon upwardly

extending ears on the hopper and hangs downward through a slot therein to engage the lug 40 and when the slide is drawn out, the latch will swing, permitting the lug to pass, but when the slide moves inward the
 70 end of the latch engages said lug and being prevented from swinging in the opposite direction by engagement with the end of its slot, it prevents the inward movement
 75 of the slide until turned out of the path of the lug by the operator.

The lower end of the hopper is rounded at its lower side so that it will take up less space adjacent to the stapling mechanism and also guide the material upward toward
 80 the discharge opening. This rounded end is left open and provided with strips or fingers 43 extending across the open end and secured at their upper ends to the hopper at the upper edge of the open end (see Fig. 7)
 85 to prevent the material from escaping, and between these strips is a presser foot 44 of any suitable form which engages the lower side of the bunch of material and presses the same upward toward the discharge
 90 opening. This foot is carried by a lever 45 extending beneath the table 1 and pivoted intermediate its ends between ears 46 on a second lever 47 which is provided with a
 95 friction roll at one end engaging a cam 48 on the shaft 2 and at its opposite end with a coiled spring 49 interposed between it and the lever 45. The second lever is pivoted
 100 intermediate its ends between ears 50 on a supporting bracket which is secured to any convenient part of the machine-frame beneath the table and which is formed with
 105 laterally extending arms one of which is provided with a guide lug 51 for the roll end of the lever 47 and the other arm with an adjustable stop screw 52 to engage the
 110 lower edge of said lever near the end thereof carrying the spring 49. An adjusting screw 53 is provided for said spring to regulate its tension and the lever 45 is adjusted relative to the lever 47 by a set screw 54 passing
 115 therethrough and engaging the upper edge of the lever 47 between its pivot and its rear end carrying the cam roll. The lever 47 when turned on its ear pivot 50 is guided
 120 in its movement by the lug 51 on the fixed bracket-arm and is limited in its turning in one direction by the stop-screw 52 on the other fixed arm of the bracket and by means
 125 of the spring 49 the lever 45 carrying the presser-foot is permitted to turn under excess pressure relative to the lever 47 and it may be also adjusted relative to said lever by the screw 54 and normally, the lever 45
 130 moves with the lever 47, the cam 48 operating to actuate the presser foot in timed relation to the movement of the mechanism which feeds the material in bunches to the stapling mechanism and the spring 49 yieldingly pressing the foot into contact with the

material, thus putting an even pressure thereon regardless of the varying density of the bunch of material in the hopper.

Suspended over the hopper in the central vertical plane thereof, by bracket arms 55 secured to the table, is a guide 56 for the feed slide 57 which slide consists of two relatively movable members or plates 58 and 59, the member 58 being formed with laterally extending flanges 60 at its upper edge which are adapted to slide within the grooves formed in the inner edges of the side bars 61 of the guide. Bolts or pins 62 are secured to these bars and pass loosely through openings in the top plate 63, and on these pins between their heads and the said top plate are sleeved coiled springs which exert a force to draw the bars toward said plate and frictionally clamp the flanges of the slide between. The member or plate 58 of the slide is formed with an extended portion or finger 64 at one end having a deep notch or cut 65 in its lower edge at a distance from its end, extending inward toward said end at an angle, a corresponding plate 99 having a finger 100 is secured thereto to form a hook to engage the material in the opening in the hopper and to form a pocket to receive the desired size of bunch, the size or depth of said notch or pocket being determined by a slide 66 adjustably secured to the finger and having a tongue projecting into said notch. The closing plate 59 is attached to one side of the member 58 by tap screws 67 extending through slotted openings 68 and 69 in said plate, the forward opening 69 being formed with a notch 70 at one end so that the forward end of said plate is free to rise when the plate is moved relatively to the member 58 with said screws in the forward ends of their slots. When the plate is moved forward relative to the member 58, its forward end lies beyond the point of the hook, thus closing the opening into the slot and firmly holding the bunch of material therein, and said end is also cut at an angle and provided with a groove 71 so that when the feed slide is at the forward end of its stroke, said end forms one side of a guide for the staple which in the operation of the machine has just been formed over the finger, the opposite side of the guide being formed by the grooved end of an adjustable plate 72.

To cause the closing plate 59 to stop in its forward movement in exactly the desired position to receive and guide the staple, a stop plate 73 is secured to one side of the bracket forming the ways for the die block, and within a suitable undercut groove in the side of said bracket is a tapered wedge 74 having an inclined edge to engage the undercut side of the groove. An ear 75 is provided on the outer end of the wedge and a screw 76 having a head to engage the ear, passes through

a slot in said ear and engages a screw-threaded opening in the bracket. A shoulder 77 on the closing plate engages the stop plate when the feed slide is in its forward position and by turning the screw 76 the wedge is forced beneath the stop plate to adjust the same, so that it will stop the closing plate at the desired point.

To reciprocate the feed slide, a lever 78 is pivoted at one end on the machine table and its opposite or forward end fits into and projects through an opening 79 in the closing plate 59 and on through a slot 80 in the finger plate 58. A rocker bar 81, pivoted intermediate its ends on the table, is provided with a roll at its rear end to engage a cam slot in a cam wheel 82 on the cam shaft 2 and at its forward end is connected by a link 83 to the lever 78. Said link is provided with a joint 84 to permit of annular movement of the lever and with a socket member 85 having an internally screw-threaded bore to receive a screw-threaded eye bolt 86, the socket member being detachably pivoted to an eye bolt 87 on the end of the rocker bar, so that it may be detached from said bar and turned on its eye bolt to adjust the length of the link and thus change the throw of the lever. A further adjustment is secured by providing a clamping socket 88 on the end of the rocker bar to receive a sleeve in which the end of the eye bolt 87 is free to turn, said sleeve may be moved in or out of said socket by loosening the clamping screw and the length of the rocker thus changed. When the feed slide is at the rear end of its movement, the first forward movement of the lever 78 moves the closing plate 59 without moving the finger plate 58, said finger plate being frictionally held by the clamping guide 56 and the elongated slot 80 in said plate providing such movement before the lever engages the end of the slot to move the finger plate. This moving of the closing plate relative to the finger plate, closes the hook which on the up movement of the slide has been filled with material and clamps the same therein, firmly holding the bunch as the slide is moved downward and forward to bring said bunch beneath the needle and directly over the opening in the chute 89. The lower end of the chute is above and adjacent to a suitable supporting table 90 adjustably secured in any desired manner to the machine frame and upon which table the brush block to be filled with tufts is placed. When the slide is stopped by the engagement of the shoulder 77 with the stop plate 73, the bunch lies between the end of the closing plate of the slide and the end of the plate 72 in position to be embraced by the staple as it is forced downward by the needle. To release the bunch from the hook in timed relation to the movement of the needle, the finger plate of the feed slide is

moved independently of the closing plate after the latter has engaged its stop, by a bar 91 having an inwardly extending lug 92 on its lower end to engage a roller stud 93 on the side of said finger plate. This releasing bar is attached to one side of the vertically extending bracket forming the guide way for the head 6, by tap screws passing through longitudinal slots 94 and 95 in said bar, and on the side of said bar near its upper end is a laterally projecting lug 96 adapted to be engaged by an outwardly projecting stud 97 on the reciprocating head to raise the bar. A finger plate 98 is also provided on the head to engage the upper end of the bar and move the same downward as the head moves down. The stroke or movement of the bar is much less than that of the head and therefore to disengage the finger plate from the end of the bar and permit the head to pass on, in its downward movement, the slots 94 and 95 are inclined relative to the vertical path of the head so that as the bar is moved downward, it moves laterally away from the head. The lug 96 is of such length that it projects into the path of the stud 97 at all times and so upon the upstroke of the head, said stud engages beneath the lug and raises the bar.

The cam operating the feed slide, and the cam for the head are so constructed and set that the movement of the head relative to the slide is such that the slide is moved into position to deliver the bunch before the delivery bar moves down to engage its lug with the stud on the finger plate and said slide is stationarily held in that position while the bunch is being released. When the bar has moved downward sufficiently to bring its lug opposite the stud, its lower end carrying said lug is swung laterally to move the finger plate, by providing an offset or crook in the slot 94. Further downward movement of the bar carries its lug out of the path of the stud so that the feed slide may be retracted to again pick up a bunch from the hopper, the closing plate of said slide being free to rise slightly at its forward end during such movement by reason of the notch 70 at the end of the slot to give the material in the hopper free access to the hook. This construction of feed slide insures the picking up of a full bunch each time and holding the same firmly and evenly, and taking the material from the upper side of the hopper, permits locating the hook at the lower side of the slide so that when said hook is opened the bunch is entirely free from said slide and its entry into the forming opening is not hindered thereby.

102 is a spring pressed bumper traveling in a guide 103 and adapted to receive the shock of the head 6 on the return movement of the head and 104 is a similar bumper for the lever 7.

Within a socket formed on the lower end of the hopper directly below the feed slide, is an adjustable pin 105 held therein by a set screw 106. This pin is adjusted so that its upper end engages the lower edge of the feed slide and as the slide moves forward carrying the bunch of material in its holding notch, the pin will catch or scrape away any fibers that are not wholly embraced by the notch but are partially held by the notch or bunch and carried forward thereby. The pin also forms a rigid support for the slide.

What I claim as my invention is:—

1. In a brush-making machine, the combination with vertically reciprocating stapling mechanism, of a hopper having a flat upper side provided with a delivery opening near one end, a reciprocating feed slide supported with its lower edge adjacent to the upper side of the hopper and provided with a slot in said edge forming a hook adapted to take up material from said opening during one movement of the slide, means for imparting a reciprocating rectilinear motion to said slide and means for holding the material in said slot and releasing same.

2. In a brush-making machine, the combination with a staple-driving mechanism, of a hopper having a flat upper side provided with a delivery opening, a feed slide supported adjacent to the upper side of the hopper along the longitudinal center line thereof and extending across said opening and provided with means for engaging the material in said opening intermediate the ends thereof, means for imparting a rectilinear reciprocating motion to said slide, and means for pressing the material upward against said slide through the opening, and means extending across said opening over the material therein near its ends to hold said material within the hopper until taken up by the slide.

3. In a brush-making machine, the combination with a vertically reciprocating staple-driving mechanism, of a chute beneath said mechanism and a table beneath the chute, a hopper supported at an inclination to the table and having a flat top provided with a delivery opening at its lower end and said hopper being rounded at its lower side at said end adjacent to the table to guide the material therein toward said opening and permit free access to said table, a feed slide extending along the longitudinal center line of the hopper and over said opening, means on the slide for receiving a quantity of material from the opening in the hopper and holding the same, and means for imparting a rectilinear reciprocating motion to said slide.

4. In a brush making machine, the combination with stapling mechanism and means for feeding bunches of material to said mechanism, of a hopper to contain the ma-

terial having a delivery opening in its upper side near one end, adjustable partitions in said hopper to engage the ends of the material, flanges on said partitions extending over the ends of the material within the opening, and a presser foot in the hopper opposite the opening and midway between the partitions to press upwardly on the material.

5. In a brush-making machine, the combination with a staple-driving mechanism and means having a rectilinear reciprocating motion for feeding bunches of material to said mechanism, of an inclined hopper over which the feeding means reciprocates in the longitudinal center of the hopper, said hopper having a delivery opening in its upper side at its lower end and rounded at its lower side at said end to guide the material therein upward toward said opening, and a presser slide in said hopper to force the material toward the lower end thereof.

6. In a brush-making machine, the combination with a staple-driving mechanism and means for feeding bunches of material to said mechanism, of a hopper having a delivery opening at one end and a series of notches at its opposite end, adjustable partitions in said hopper to engage the ends of the material, lugs on said partitions to engage said notches, and means for yieldingly holding said partitions with their lugs engaging the notches.

7. In a brush-making machine, the combination with a staple-driving mechanism, and means for feeding bunches of material to said mechanism, of a hopper having a delivery opening at one end, adjustable partitions in the said hopper to engage said material at its ends, means for adjustably holding the partitions at one end, and adjusting screws extending through the sides of the hopper to engage and adjust the other ends of the partitions.

8. In a brush making machine, the combination with staple driving mechanism and means for feeding bunches of material to said mechanism, of a hopper having a delivery opening in its top at one end and an opening in its bottom at said end, partitions in said hopper, lugs on one end of said partitions engaging notches in the end of the hopper and lugs at the opposite end extending through the opening in the bottom of the hopper, and a spring pressed member engaging said last named lugs to hold the other lugs in engagement with their notches.

9. In a brush making machine, the combination with staple driving mechanism and means for feeding bunches of material to said mechanism, of a hopper having a delivery opening at one end, partitions in said hopper extending the length thereof, shoulders at one end of said partitions engaging notches in the end of the hopper, means for

yieldingly holding the partitions with the shoulders engaged with their notches, screws extending through the sides of the hopper at the opposite end and engaging the sides of the partitions, and a presser slide in the hopper to force the material therein toward the delivery opening.

10. In a brush making machine, the combination with staple driving mechanism, of a feed slide to deliver bunches of material to said mechanism, consisting of two relatively movable members one of which is provided with a slot to receive material and the other provided with an end adapted to project across and close the entrance to said slot to hold material therein and each of said members being provided with an opening, the opening in one member being longer than that in the other member, and a lever to actuate said slide having an end fitting within the smaller of the openings and projecting through the other opening.

11. In a brush making machine, the combination with staple driving mechanism, of a guide way, a feed slide having a rectilinear reciprocating movement consisting of two relatively movable members one of which is provided with a slot to receive material and the other having an end to close the opening into said slot and hold the material therein, flanges on one of said members frictionally held by and sliding in said way, and means for moving the slide adapted to permit a limited relative movement of said members.

12. In a brush making machine, the combination with staple driving mechanism, of a feed slide having a rectilinear reciprocating movement and consisting of two members provided with means for receiving a bunch of material and adapted to be moved relatively to secure the bunch within said means and release the same therefrom, a guide way, means for moving the slide, and separate means for moving one of said members to release the bunch.

13. In a brush making machine, the combination with staple driving mechanism, of a feed slide having a rectilinear reciprocating motion and consisting of two members having a limited relative movement and provided with means for receiving a bunch of material, adapted to be closed to hold the material therein by the relative movement of said members, a lever to move the slide, a guide way for one of the members having two separate sides, and means for yieldingly drawing the sides together so as to frictionally engage said member to retard its movement.

14. In a brush making machine, the combination with staple driving mechanism, of a feed slide having a rectilinear reciprocating motion and consisting of two members having a limited relative movement and pro-

vided with means for receiving a bunch of material adapted to be closed to hold the material therein by the relative movement of said members, a guide way, a lever to move the slide, means for retarding the movement of one of said members to close the holding means, and independent means for moving one of said members to release the bunch.

15. In a brush machine, the combination with a staple driving needle and means for actuating the same, of a feed slide having a rectilinear reciprocating motion and consisting of two relatively movable members provided with means for receiving a bunch of material adapted to operate to secure the same therein by a relative movement of said members, a guide way, means for moving the slide, means for retarding the movement of one of said members to close the bunch holding means, an adjustable stop to engage one of the members and limit the movement of the slide, and means for moving the other member to release the bunch.

16. In a brush making machine, the combination with a vertically reciprocating staple-driving needle, of a hopper set at an inclination to said needle and provided with a delivery opening in its upper side at its lower end, a feed slide having a rectilinear reciprocating motion and movable over said hopper and having a vertical groove in its end for said needle to form a guide therefor, means for actuating the slide, and an adjustable stop to limit the movement of said slide and insure the alinement of the groove with the needle.

17. In a brush-making machine, the combination with a staple-driving mechanism and means for actuating the same, of a feed slide having a rectilinear reciprocating movement and consisting of relatively movable members having means for receiving a bunch of material adapted to be closed to retain the bunch by the relative movement of said members and one of said members being provided with an elongated slot, means for frictionally holding the member having the elongated slot, a lever passing through the elongated slot and engaging the other member to reciprocate the feed slide, and means operated by the staple-driving mechanism for moving one member relative to the other member to release the bunch.

18. In a brush making machine, the combination with staple driving mechanism, of a feed slide having a rectilinear reciprocating motion and consisting of a finger member having a slot in its lower edge to receive a bunch of material and a closing member attached to and having a movement relative to the finger member and adapted to extend across the open end of the slot, a guide-way frictionally engaging said finger member to retard its movement and to form a supporting guide for the feed slide, a lever en-

gaging the closing member to move the same relative to the finger member and also to actuate the slide against the frictional resistance of said guide-way, and an independently movable lever to move the finger member relative to the closing member to release the bunch.

19. In a brush making machine, the combination with staple driving mechanism, of a feed slide having a rectilinear reciprocating motion and consisting of a finger member provided with means to receive a bunch of material and a closing member attached to and having a movement relative to said finger member to close the receiving means and hold the material therein, a lever engaging the closing member to actuate the slide, flanges on the finger member, a guide provided with grooves to receive the flanges and having a plate to frictionally engage the same, means for yieldingly holding the plate in frictional engagement with the flanges, and a lever actuated by the movement of the staple driving mechanism to move the finger member relative to the closing member.

20. In a brush making machine, the combination with staple driving mechanism, of a hopper having a delivery opening in its upper side, a feed slide reciprocable over said opening and consisting of a finger member having an inclined slot extending inward from its lower edge toward its forward end to engage the material in the hopper opening during the backward movement of the slide, and a closing member attached to the finger member by bolts passing through longitudinal slots in said closing member, the slot at the forward end of said member having a notch to permit said member to rise when moved to open the slot, and a lever engaging the closing member to actuate the slide.

21. In a brush making machine, the combination with a staple-driving needle, a guide way for the needle, a reciprocable feed slide to deliver bunches of material beneath said needle, and means for reciprocating said slide, of a stop supported in the path of the slide consisting of a stop-plate adapted to be engaged by the slide, and means for adjusting said plate.

22. In a brush-making machine, the combination with a staple-driving needle, a guide-way for said needle, a reciprocable feed slide to deliver bunches of material beneath said needle, and means for reciprocating said feed-slide, of a stop supported in the path of the slide consisting of a stop-plate adapted to be engaged by the slide and a wedge beneath said plate to adjust the same.

23. In a brush-making machine, the combination with a bracket having guides and a staple driving needle reciprocable in said

guides, a feed slide to deliver bunches of material beneath said needle, and means for reciprocating said slide, of a stop consisting of a plate, a tapering wedge beneath said plate slidable in undercut grooves in the bracket, an ear on the outer end of the wedge, and a screw passing through a slot in the ear to move the wedge in its grooves and adjust the plate.

24. In a brush making machine, the combination with staple driving mechanism, of a hopper having a delivery opening in its upper side, a feed slide suspended over said opening to receive material therefrom and deliver the same in bunches to the staple driving mechanism, a lever extending beneath the hopper and having a presser foot on its end engaging the material in the hopper opposite the opening, a spring to yieldingly hold said lever with its foot engaging the material, means for rocking said lever to intermittently press the material upward, and means for regulating the tension of said spring.

25. In a brush making machine, the com-

bination with a bracket and a staple driving needle carried by a head vertically reciprocable on said bracket, of a feed slide consisting of two relatively movable members provided with means for receiving and holding material opened and closed by the relative movement of said members, means wherein the slide is moved, means for longitudinally reciprocating the slide to feed material beneath the needle, a lever adapted to engage at its lower end and move one of said members and to be moved up and down by said head by supporting said lever with its upper end in the path of the head when the head is raised, by bolts passing through slots in said lever which slots are inclined to the vertical path of the head, a lug on the lever, and a stud on the head to engage beneath the lug and raise the lever.

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

GILFORD S. MURDOCK.

Witnesses:

C. R. STICKNEY,

OTTO F. BARTHEL.