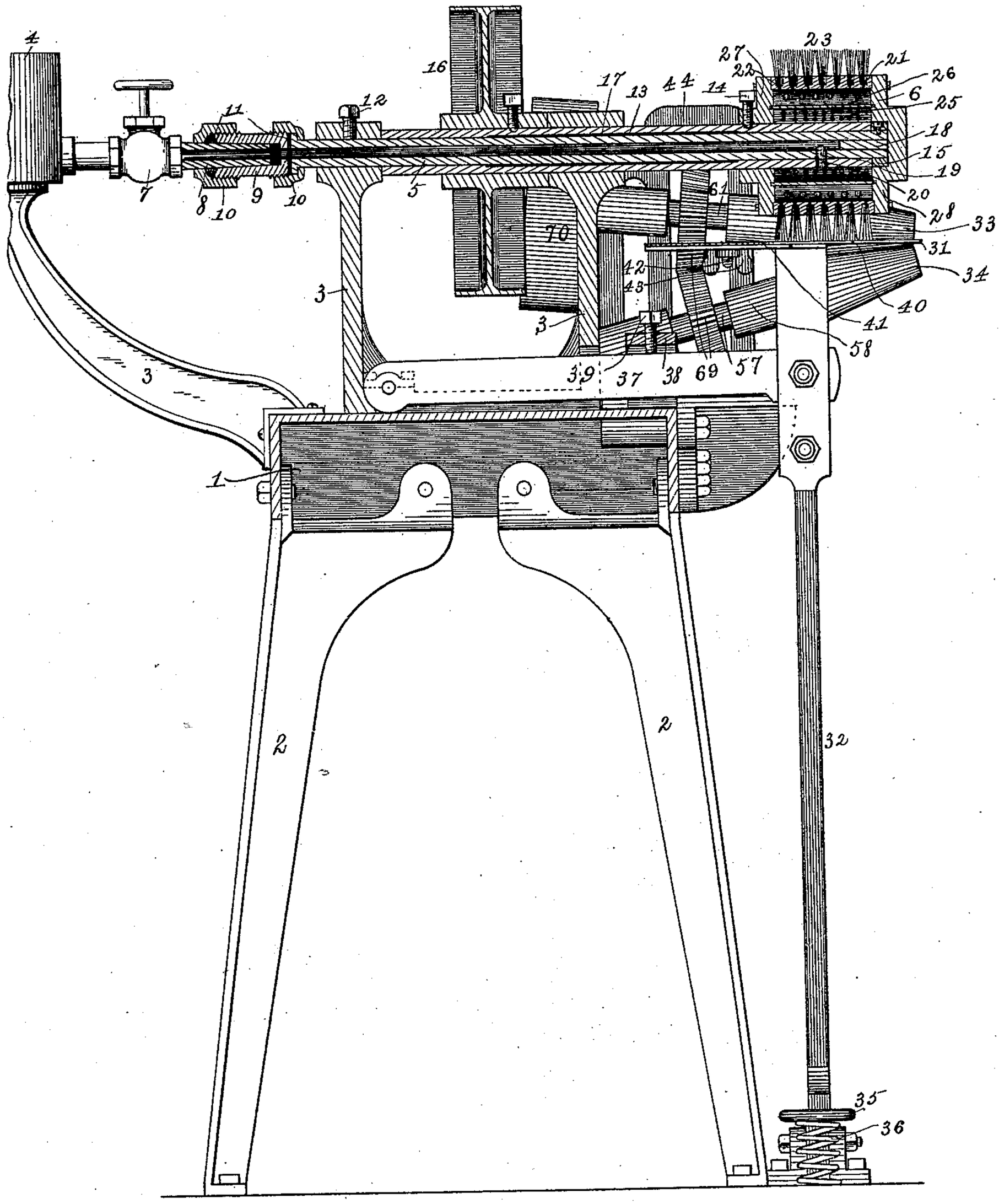
(No Model.) 3 Sheets—Sheet 1.

F. J. MURPHY & A. M. RUNDLE.

MACHINE FOR STIFFENING HATS.

No. 361,073. Patented Apr. 12, 1887.

Fig. 1.



Witnesses.
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(No Model.) 3 Sheets—Sheet 2.

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Fig. 2.

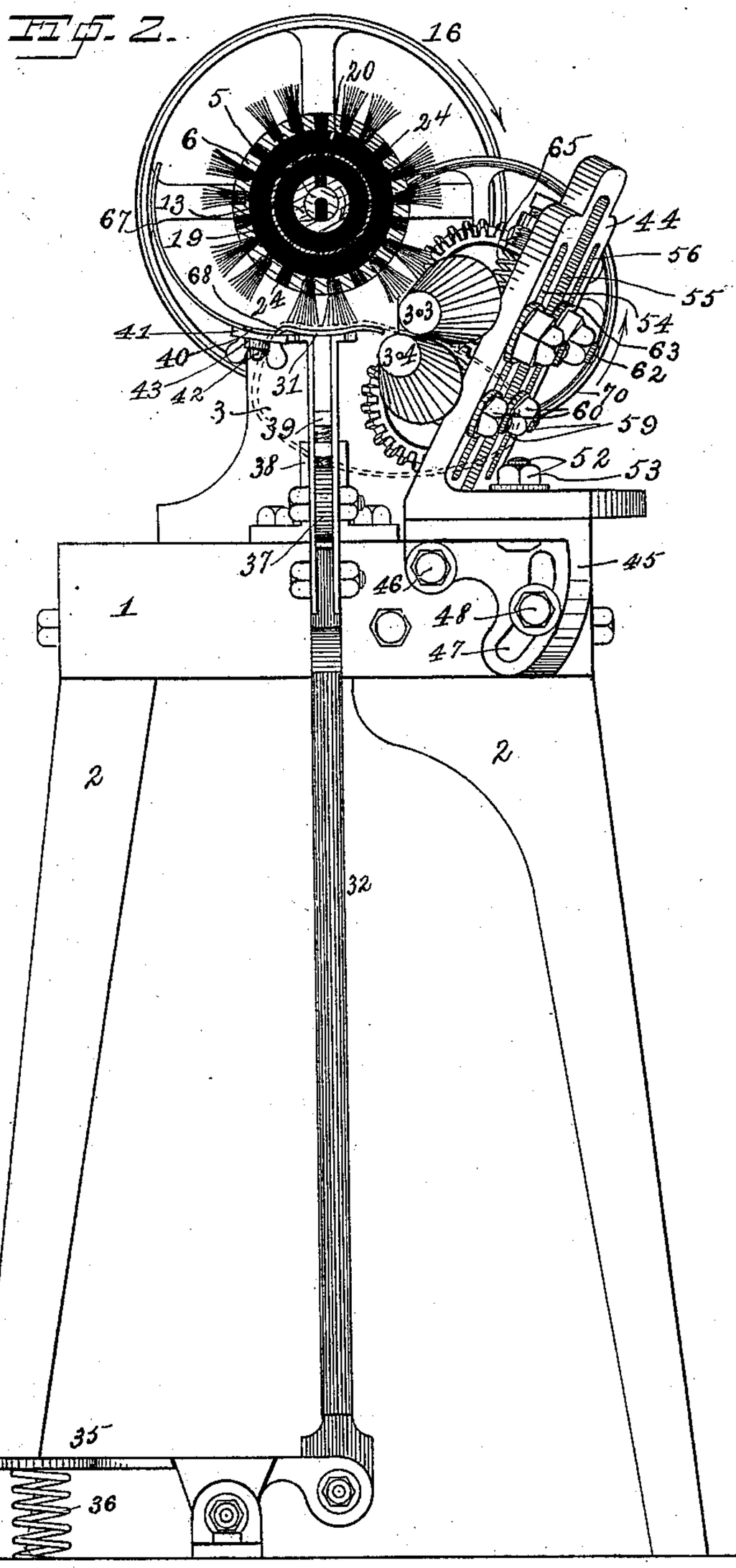

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Fig. 3.

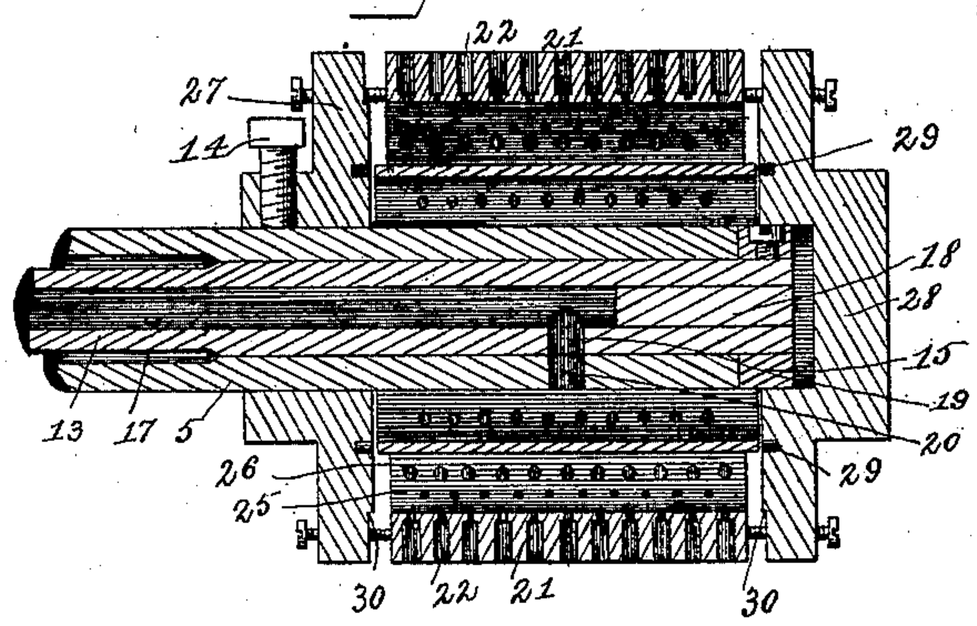


Fig. 4.

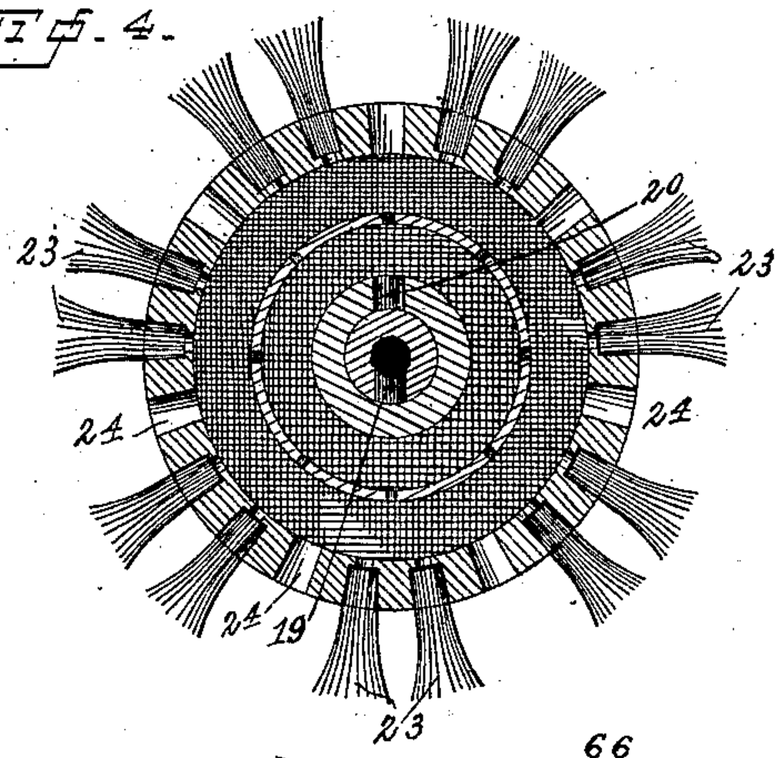


Fig. 8.

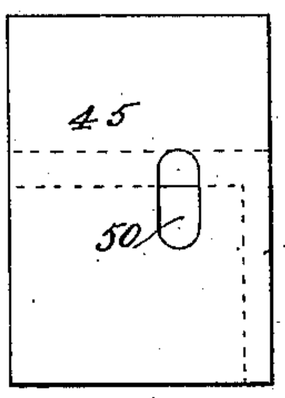


Fig. 5.

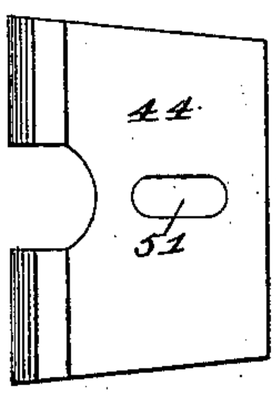


Fig. 6.

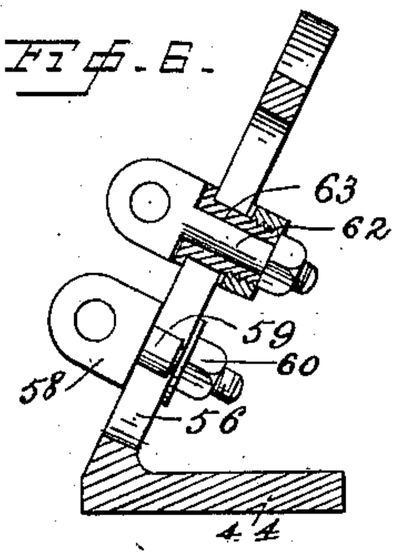


Fig. 7.

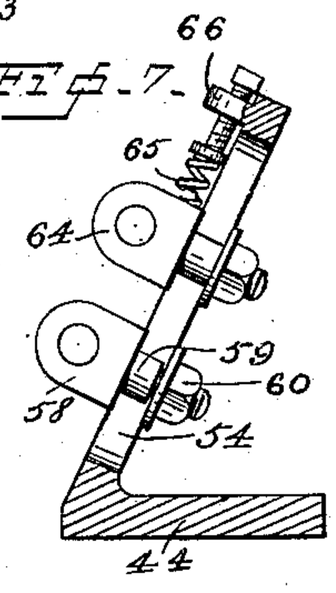


Fig. 10.

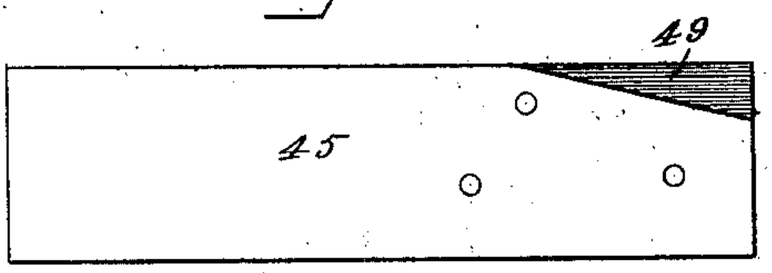


Fig. 9.

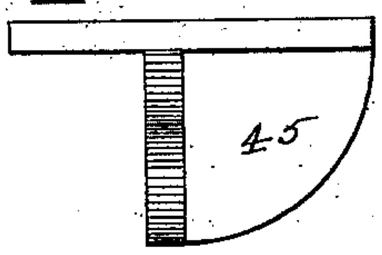
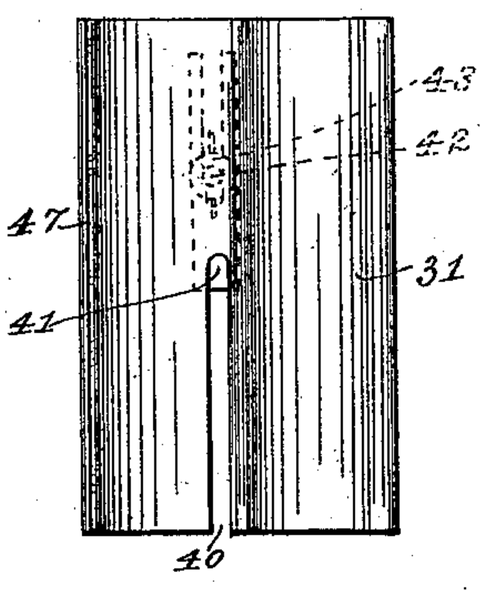


Fig. 11.



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Inventors:
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By A. M. Wooster Atty.

UNITED STATES PATENT OFFICE.

FRANK J. MURPHY AND ANTHONY M. RUNDLE, OF DANBURY, CONN.

MACHINE FOR STIFFENING HATS.

SPECIFICATION forming part of Letters Patent No. 361,073, dated April 12, 1887.

Application filed September 16, 1886. Serial No. 213,648. (No model.)

To all whom it may concern:

Be it known that we, FRANK J. MURPHY and ANTHONY M. RUNDLE, citizens of the United States, residing at Danbury, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Machines for Stiffening Hats; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to the manufacture of hats, and has for its object to produce a machine that will perform the operation of stiffening much more rapidly and evenly than has heretofore been possible. Previous to our invention, so far as we are aware, this operation has been performed by hand. In doing it in this manner much time is required, which of course makes the operation expensive. Another serious objection has been that it was impossible to stiffen the hats quite evenly—that is to say, to get the same quantity of size or stiff into each hat and to distribute it evenly with a brush. It is of course desirable in producing a machine for this purpose that it shall be simple in construction, economical in cost, and, furthermore, that it shall be adapted to stiffen all qualities, shapes, and sizes of hats, to put any desired quantity of size or stiff into each hat, to distribute it evenly just where it is wanted and at no other portion of the hat, and also that it shall be adapted to work equally well with all the various qualities of size or stiff from a "nine stiff" down to the cheapest compound that can be used. These results we accomplish perfectly by the novel machine of which the following description, in connection with the accompanying drawings, is a specification, corresponding numbers being used in all the figures to indicate the same parts of the machine.

Figure 1 is a longitudinal section clearly illustrating the construction of the supply-tube and brush-cylinder, the tank, drawing-rollers, &c., being in elevation; Fig. 2, an end elevation of the machine, the brush-cylinder and supply-tube being in transverse section; Figs. 3 and 4, enlarged sectional views of the brush-cylinder and supply-tube; Figs. 5, 6, and 7, detail views of the angle-plate by which the drawing-rollers are carried, illustrating the construction of said plate and the manner in which the rollers are journaled. Figs. 8 and 9 are respectively a plan and rear elevation of the swinging plate by which the angle-plate is carried and to which it is adjustably secured. Fig. 10 is an end view of the table or bed of the machine, and Fig. 11 is a plan view of the feeding-plate and guard detached.

1 denotes the table or bed of the machine, which is supported by legs 2, of suitable construction.

3 denotes brackets secured to the table, by which the tank 4, supply-tube 5, brush-cylinder 6, &c., are supported. It will of course be understood that the details of construction of the tank and supply-tube and the manner in which they are supported may be greatly varied without departing in the slightest from the principle of our invention. In the drawings we have illustrated a simple construction which we have found thoroughly practical and satisfactory in use.

7 is a valve of ordinary construction, by which the flow of size or stiff from the tank into the supply-tube is controlled. We preferably provide the valve with a tapering nozzle, 8, which engages a correspondingly-tapered opening in a connection, 9, at the outer end of the supply-tube.

10 denotes the usual caps, and 11 packing at opposite ends of the connection. This construction enables the tank to be readily removed or disconnected when necessary, and by making the connection detachable, as shown, we enable the tube to be readily cleaned, should it become clogged. The supply-tube is held against rotation by a set-screw, 12, which locks it to one of the brackets through which it passes.

The brush-cylinder is carried at the outer end of a sleeve, 13, journaled on the supply-tube, the brush-cylinder being secured to the sleeve by a set-screw, 14, and the sleeve itself being held upon the tube by a collar, 15, held in place by a set-screw, or in any suitable manner, the inner end of the sleeve bearing against one of the brackets.

16 is a pulley or fly-wheel secured to the sleeve, by which rotation is imparted to the brush-cylinder, a belt (not shown) passing

from this pulley to a main or counter shaft. It will be noticed that the central opening through sleeve 13 is enlarged for a considerable portion of its length, as at 17, leaving only the opposite ends of the sleeve to bear upon the supply-tube. This is in order to prevent the sleeve from becoming stuck to the tube, as might possibly be the case were the sleeve to bear upon the tube its entire length, it being of course impossible to prevent a slight quantity of the size or stiff from working in between the tube and cylinder at the forward end. The opening through the supply-tube is continuous with the opening through nozzle 8, so that when the valve is opened the size or stiff from the tank will flow through the nozzle and through the supply-tube until stopped by plug 18 at the forward end of the tube.

19 is an opening through the supply-tube on the under side which connects with the longitudinal opening, and 20 is an opening through the side of the sleeve which is adapted to register therewith once in each revolution. The relation of these openings to each other is clearly shown in Figs. 1, 3, and 4, likewise the general construction of the brush-cylinder.

In Fig. 3 the parts are shown as disconnected, in order to clearly illustrate a method of constructing the cylinder which we have found perfectly satisfactory in use.

21 indicates an outer cylinder, which may be made of any suitable material, as wood, metal, or hard rubber. This cylinder is provided with sockets or recesses 22, which are adapted to receive tufts or bunches of bristles 23. The recesses are preferably reduced and made to extend through the outer cylinder, so that the inner ends of the tufts may be secured by a cord, (not shown), or in any suitable manner. These tufts are placed in rows, as shown, and between the rows of tufts are rows of perforations 24, through which the size or stiff passes, as will be more fully explained. Within this outer cylinder is an inner or distributing cylinder, 25, which is provided with rows of perforations 26, through which the size or stiff passes into the outer cylinder. These cylinders may of course be supported in any suitable manner. In the drawings we have shown them as supported at their opposite ends by heads 27 and 28. The inner head, 27, is rigidly secured to the sleeve by a set-screw, and the outer head, 28, is secured to the outer cylinder by screws which engage it between the rows of tufts. Both heads are provided with circular grooves 29, in which the ends of the inner cylinder fit, and with shoulders 30, which engage and support the outer cylinder. In use the hats are fed to the machine upon a plate or rest, 31, carried by a treadle-rod, 32, and are carried forward by drawing-rollers 33 and 34, which are preferably made cone-shaped and are journaled in a manner which we will presently describe.

35 is a treadle, to which rod 32 is attached, and 36 a spring, the action of which is to force the treadle-rod down, thus holding plate 31 a slight distance away from the brush-cylinder.

37 is a pivoted guide-lever, to which the treadle-rod is pivoted and by which it is held in position, and 38 is a cross-piece or bridge which passes over lever 37. This cross-piece is provided with a set-screw, 39, which acts as a stop to limit the upward movement of the treadle-rod and feed-plate, so that all the operator has to do is to put his foot upon the treadle and raise the plate, the pressure of the brush-cylinder upon each hat being the same. In feeding, the hats are passed singly up through a slot, 40, in feed-plate 31.

41 is a sliding plate on the under side of the feed-plate, which may be moved forward or backward in a line parallel with the supply-tube, by which the depth of slot 40 is regulated, the outer end of the plate serving as the bottom of the slot, against which the brim of the hats rest in use. If the brims are narrow, it is of course not necessary to stiffen as much of the hat as when they are wide. To lessen the width of the stiffened portion, plate 41 is moved toward the right in Fig. 1, and to increase it it is moved toward the left in Fig. 1.

As shown in the drawings, (see Fig. 11,) a threaded stud, 42, projecting from the under side of the feed-plate, passes through a slot in the sliding plate, the latter being held in any desired position by a thumb-nut, 43, which engages the stud. The outer edge of feed-plate 31 is curved upward, as clearly shown in Fig. 2, forming a guard, 67, to prevent size from being thrown outward by the brush-cylinder.

68 is a rib or spline on the feed-plate, which prevents the surplus size or stiff from running through slot 40 and turns it into a suitable drip-cup (not shown) beneath. The drawing-rollers are carried by an angle-plate, 44, which is adjustably secured to the swinging plate, as will be more fully explained. The swinging plate is pivoted to the end of the table or bed, as at 46.

47 is an arc-shaped slot in the swinging plate, and 48 a bolt or set screw, which passes through said slot and engages the end of the bed or table, the latter being provided with a cut-away portion, 49, to receive the top of the swinging plate and base of the angle-plate when it is desired to swing the drawing-rollers back out of the way.

In use the drawing-rollers are placed in operative position and are secured by tightening up bolt or set-screw 48. As it is necessary that the drawing-rollers should be capable of adjustment both longitudinally of the brush-cylinder and laterally thereto, we provide the top of the swinging plate with a longitudinal slot, 50, and also provide the base of the angle-plate with a transverse slot, 51, thus permitting the angle-plate to be moved in both directions. 52 is a bolt passing through these slots. Having adjusted the drawing-rollers to the desired longitudinal and lateral position

relatively to the brush-cylinder, they are secured there by tightening nut 53 upon the bolt. The inclined portion of the angle-plate is provided with slots 54, 55, and 56. The shaft 57 of the lower drawing-roller is journaled in bearings 58, which are vertically adjustable in slots 54 and 56. As shown in the drawings, these bearings are provided with threaded shanks 59, which pass through the slots, the bearings being held in any desired position by nuts 60, which engage the shanks. The upper drawing-roller is journaled in such a manner that in use the inner bearing is held against vertical movement, but the roller-shaft 61 is permitted to swing in an arc. In order to accomplish this result, shank 62 of the inner bearing of this shaft is not threaded, but is left free to turn in a block, 63, which is provided with a threaded shank and is locked in the slot by a nut in the same manner as the bearings on the lower roller.

The outer bearing, 64, of the upper roller-shaft is journaled in a bearing substantially like the bearings of the lower roller. This bearing, however, is not locked in slot 54, but is left free to slide therein, being forced down so that the face of the roller is held parallel with the lower roller by a spring, 65, one end of which bears against bearing 64 and the other against a stump, 66, on the angle-plate, thus making the drawing-rollers automatically adjustable to different sizes and thicknesses of hats. In use the lower roller is fixed, and the outer end of the upper roller swings in an arc against the power of the spring, thus enabling the hats to be readily inserted in starting. Both rollers, moreover, are vertically adjustable in the slots in which their bearings are carried.

In order to provide the necessary lateral and longitudinal adjustments of the drawing-rollers relatively to the brush-cylinder, we have provided slots 50 and 51 in plates 44 and 45; and in order to give still another adjustment to these rollers and to provide for swinging them out of the way when necessary, we have pivoted plate 45 to swing in an arc, thus enabling the operator to throw the drawing-rollers back out of the way. The shafts of the drawing-rollers are provided with gears 69, which engage each other, the teeth being long enough to allow for the movement of the upper roller. Motion is imparted to these rollers by a driving-pulley, 70, upon one of the shafts, a belt (not shown) running from said pulley to a main or counter shaft. Slot 55 in the angle-plate is simply for clearance, being provided to receive the gears when the plate is moved close up to the brush-cylinder.

The operation of the entire machine is as follows: The drawing-rollers are placed in the desired position relatively to the brush-cylinder and secured there. The size or stiff to be used is placed in the tank and the valve opened, which permits it to flow along the supply-tube. During each revolution of the brush-cylinder, when the opening in the supply-tube and sleeve register with each other, a certain quantity of size or stiff is permitted to pass through these openings and into the inner or distributing cylinder. As this cylinder is provided with numerous small perforations, the size or stiff is caused to distribute itself in said cylinder and to pass in small quantities through all portions of its periphery into the outer cylinder. By the time the size or stiff reaches the outer cylinder it has become thoroughly and evenly distributed, and passes through the openings between the rows of bristles and onto the bristles themselves. The hat-bodies are opened out and a single thickness passed up through the slot in the feed-plate, so that this thickness of the hat rests between the feed-plate and the bristles of the brush-cylinder. In starting, a portion of the hat-body is placed between the drawing-rollers, and is drawn forward by them. The operator then places his foot on the treadle and raises the feed-plate until the guide-lever is in contact with the stop. This brings the hat body into contact with the bristles of the brush-cylinder, which of course rotates in the opposite direction from the drawing-rollers, as indicated by the arrows in Fig. 2. The position which the hat-body occupies in passing through the machine is indicated by dotted lines in Fig. 2. It will be seen that the amount of size or stiff that can pass into the brush-cylinder at each revolution is accurately regulated by the openings through the supply-tube and sleeve, and that the portion of the hat-body that comes in contact with the brush-cylinder is regulated by the adjustment of the sliding plate under the feed-plate. It will be apparent, therefore, that the amount of size or stiff placed in each hat will depend upon the length of time it remains in the machine. It will furthermore be apparent that while each hat-body is in the machine it will be caused to roll over and over—that is, to rotate on an imaginary longitudinal axis.

It is the practice of operators to place a chalk mark at the portion of the hat-body first coming in contact with the brush-cylinder and to permit the hat-body to make a certain number of revolutions, three revolutions being ordinarily found quite sufficient, unless the brims are to be very stiff.

It will of course be understood that the general details of construction of the machine may be varied to an almost unlimited extent without departing from the spirit of our invention.

We claim—

1. A machine for stiffening hats, consisting, essentially, of a rotating brush-cylinder, means, as a tube, for supplying size or stiff to the interior thereof, a movable feed-plate, and means—for example, drawing-rollers—whereby the hats are carried forward.

2. The perforated brush-cylinder and the supply-tube for conveying size or stiff to the interior thereof, in combination with a feed plate or rest and a pair of drawing-rollers.

3. The drawing-rollers, feed-plate, and supply-tube, in combination with a rotating sleeve journaled on said tube and a perforated brush-cylinder secured to said sleeve.

4. In a hat-stiffening machine, a supply-tube closed at its outer end and having an opening, 19, communicating with the longitudinal opening, in combination with a rotating sleeve journaled on said tube and having an opening, 20, communicating with opening 19 once in each revolution, and a perforated brush-cylinder into which the size or stiff passes from openings 19 and 20.

5. The supply-tube closed at its outer end and having an opening, 19, and a sleeve journaled on said tube and having a recess, 20, adapted to register with recess 19 once in each revolution, in combination with a perforated brush-cylinder which receives the size or stiff passing said openings, a pair of drawing-rollers, and a movable feed plate or rest.

6. The combination, with the drawing-rollers, feed-plate, and brush-cylinder, of a rotating sleeve by which the cylinder is carried, the recess of which is enlarged, as shown, except at the ends, for the purpose set forth, and a supply-tube upon which said sleeve is journaled.

7. The supply-tube having opening 19 and plug 18, and sleeve 13, having internal enlargement, 17, and opening 20, in combination with a perforated brush-cylinder secured to said sleeve and a collar, 15, whereby the sleeve is held upon the tube.

8. The drawing-rollers, feed-plate, and supply-tube, in combination with a sleeve, 13, a perforated brush-cylinder carried by said sleeve, and means—for example, a belt-pulley—whereby rotation is imparted to the sleeve and cylinder.

9. The combination, with the feed-plate, rotating brush-cylinder, and supply-tube, of a movable size or stiff tank provided with a valve and tapering nozzle, and a connection, 9, at the end of the tube, with which said nozzle engages.

10. In a hat-stiffening machine, a rotating perforated brush-cylinder and a removable tank having a valve and nozzle, in combination with a supply-tube for conveying size or stiff to the cylinder and a detachable connection at the end of the tube, with which said nozzle engages.

11. The supply-tube having an opening, 19, and a rotating sleeve having opening 20, adapted to register therewith, in combination with a perforated inner cylinder by which the size or stiff is received and distributed as it leaves the supply-tube, substantially as described.

12. The combination, with the supply-tube and sleeve, of the brush-cylinder consisting of a perforated inner cylinder which receives and distributes the size or stiff and a perforated outer cylinder through which it passes to the bristles.

13. The sleeve having an opening, 20, in combination with heads 27 and 28, having circular grooves 29 and shoulders 30, a perforated inner cylinder engaging said grooves, and a perforated outer cylinder supported by said shoulders and having tufts of bristles and screws or their equivalents, whereby the parts are secured together and to the sleeve.

14. A brush-cylinder for hat-stiffening machines, consisting, essentially, of a perforated outer cylinder provided with tufts of bristles, a perforated inner cylinder which receives the size or stiff and distributes it before passing to the outer cylinder, and suitable heads whereby said cylinders are supported.

15. In a hat-stiffening machine, the combination, with a supply-tube and brush-cylinder, of a slotted feed plate or rest and a treadle or rod whereby said rest is raised into operative position.

16. The supply-tube and brush-cylinder, in combination with the feed plate or rest having a slot, 40, and a sliding plate, 41, whereby the depth of said slot may be regulated to determine the portion of the hat-brim into which size or stiff is placed.

17. The supply-tube and brush-cylinder, in combination with the feed plate or rest having a slot, 40, and stud 42, a sliding plate, 41, through which said stud passes, and a thumb-nut for locking said plate in any desired position.

18. The supply-tube and brush-cylinder, in combination with the feed plate or rest having a guard, 67, and rib or spline 68, as and for the purpose set forth.

19. The supply-tube and brush-cylinder, in combination with a feed plate or rest supported by a treadle-rod, 32, a pivoted guide-lever for supporting said rod, treadle 35, and a spring, 36, engaging said treadle and acting to hold the feed-plate out of operative position.

20. The supply-tube and brush-cylinder, in combination with the feed-plate supported by the treadle-rod, a pivoted guide-lever for supporting said rod, and a cross-piece having a set-screw which engages the guide-lever, whereby the upward movement of the feed-plate is regulated.

21. The slotted feed-plate having guard 67 and adjustable sliding plate 41, a treadle-rod by which the feed-plate is supported, and a pivoted guide-lever which supports the treadle-rod, in combination with the supply-tube and brush-cylinder, a treadle for raising the feed-plate upward, and a cross-piece and set-screw engaged by the guide-lever, whereby the upward movement of the feed-plate is limited.

22. The supply-tube, brush-cylinder, and feed-plate, in combination with cone-shaped adjustable drawing-rollers.

23. The supply-tube, brush-cylinder, and feed-plate, in combination with adjustable drawing-rollers and a longitudinally and laterally adjustable angle-plate by which said rollers are carried.

24. The angle-plate having slots 54 and 56, in combination with the drawing-rollers, bearings therefor which are adjustable in said slots, and a swinging plate by which the angle-plate is carried and which enables the rollers to be thrown back out of the way.

25. The drawing-rollers and angle-plate by which they are carried and which is provided with a transverse slot, 51, in combination with swinging plate 45, having a longitudinal slot, 50, and a bolt, 52, passing through slots 50 and 51, whereby the angle-plate may be adjusted longitudinally and laterally and secured in any desired position.

26. The drawing-rollers and an angle-plate by which they are carried, in combination with a plate, 45, by which the angle-plate is carried and which is provided with an arc-shaped slot, 47, and a bolt passing through said slot, whereby said plate may be locked in operative position or may be allowed to swing backward, throwing the drawing-rollers out of operative position.

27. The pivoted swinging plate having a longitudinal slot, the angle-plate having a transverse slot, and bolt 52, engaging said slots, in combination with vertically-adjustable drawing-rollers carried by the angle-plate.

28. The angle-plate having slots 54 and 56, in combination with drawing-roller 34, whose bearings are adjustably secured in said slots, and drawing-roller 33, whose inner bearing is swiveled in a block, 63, which is adjustable in slot 56 and whose outer bearing slides in slot 54, said roller being held in operative position by a spring, 65, which engages the outer bearing.

29. In a hat-stiffening machine, a drawing-roller journaled in adjustable fixed bearings, in combination with a similar roller whose inner bearing is swiveled in an adjustable block and whose outer bearing slides freely, being held in operative position by a spring engaging said bearing, thus enabling said roller to be raised when a hat is placed in the machine.

30. Plate 45, having an arc-shaped slot, the bed to which said plate is pivoted and which is provided with a cut-away portion, 49, and a bolt, 48, passing through said slot and engaging the bed, in combination with cone-shaped adjustable drawing-rollers and an angle-plate by which said rollers are carried, and which is adjustably secured to plate 45.

31. The cone-shaped drawing-rollers whose shafts are provided with gears and one of them with a belt-pulley, whereby rotation is imparted thereto, in combination with a slotted angle-plate and adjustable bearings for said rollers carried thereby.

32. The drawing-rollers, slotted angle-plate, and bearings for said rollers secured in said slots, in combination with a swinging plate by which the angle-plate is carried, as and for the purpose set forth.

33. Swinging plate 45 and a slotted angle-plate which is adjustably secured thereto, in combination with a pair of drawing-rollers carried by said angle-plate, the bearings of the lower roller being fixed and the inner bearing of the upper roller swiveled in a block, and the outer bearing free to slide and held in position by a spring, as and for the purpose set forth.

In testimony whereof we affix our signatures in presence of two witnesses.

FRANK J. MURPHY.
ANTHONY M. RUNDLE.

Witnesses:
A. M. WOOSTER,
H. S. TAYLOR.