

(No Model.)

3 Sheets—Sheet 1.

F. J. MURPHY.

MACHINE FOR STIFFENING HAT CROWNS.

No. 519,195.

Patented May 1, 1894.

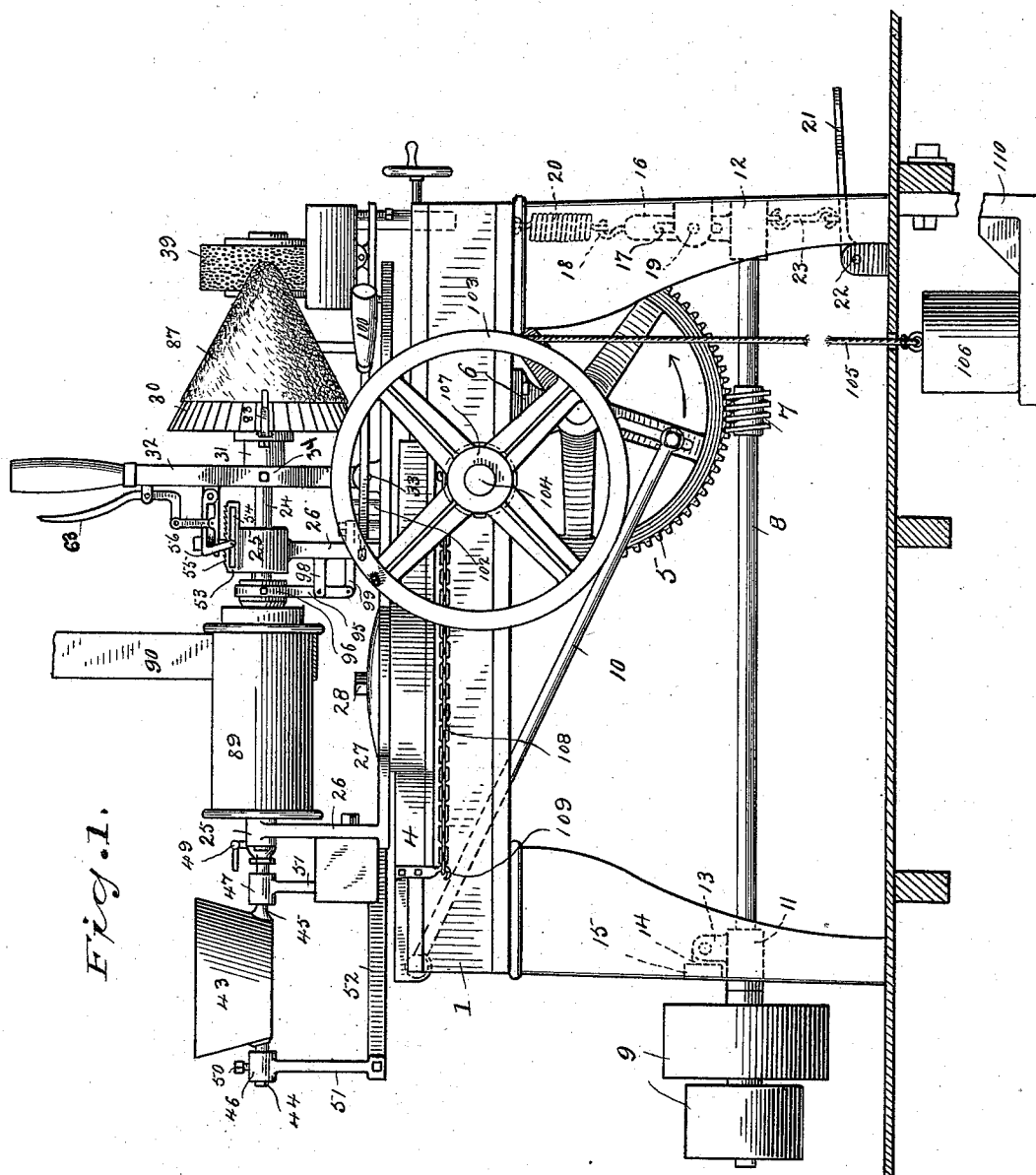


Fig. 1.

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Pearl Reynolds

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att'y.

(No Model.)

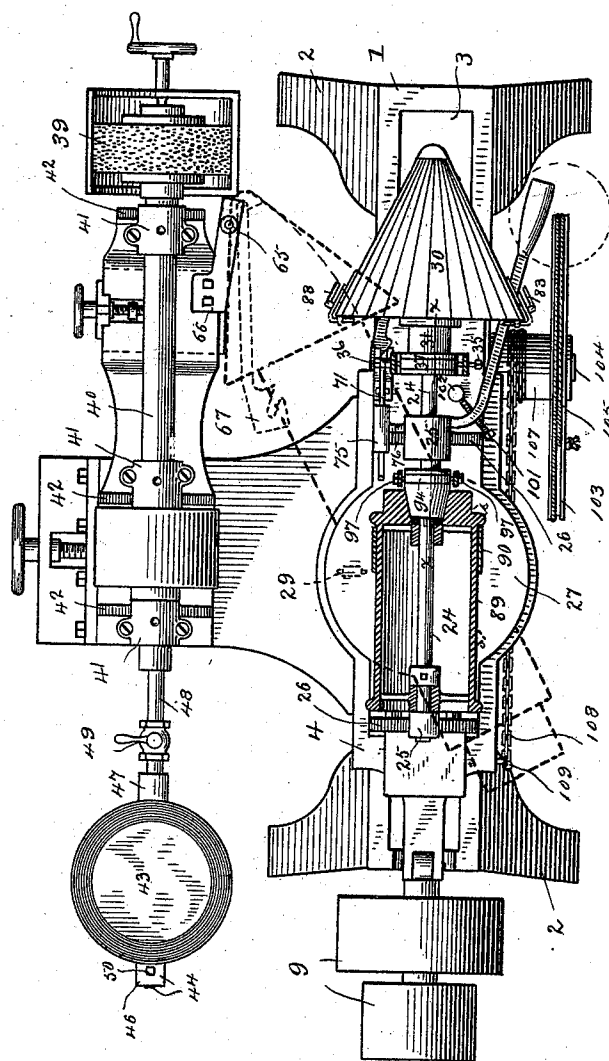
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Fig. 2.



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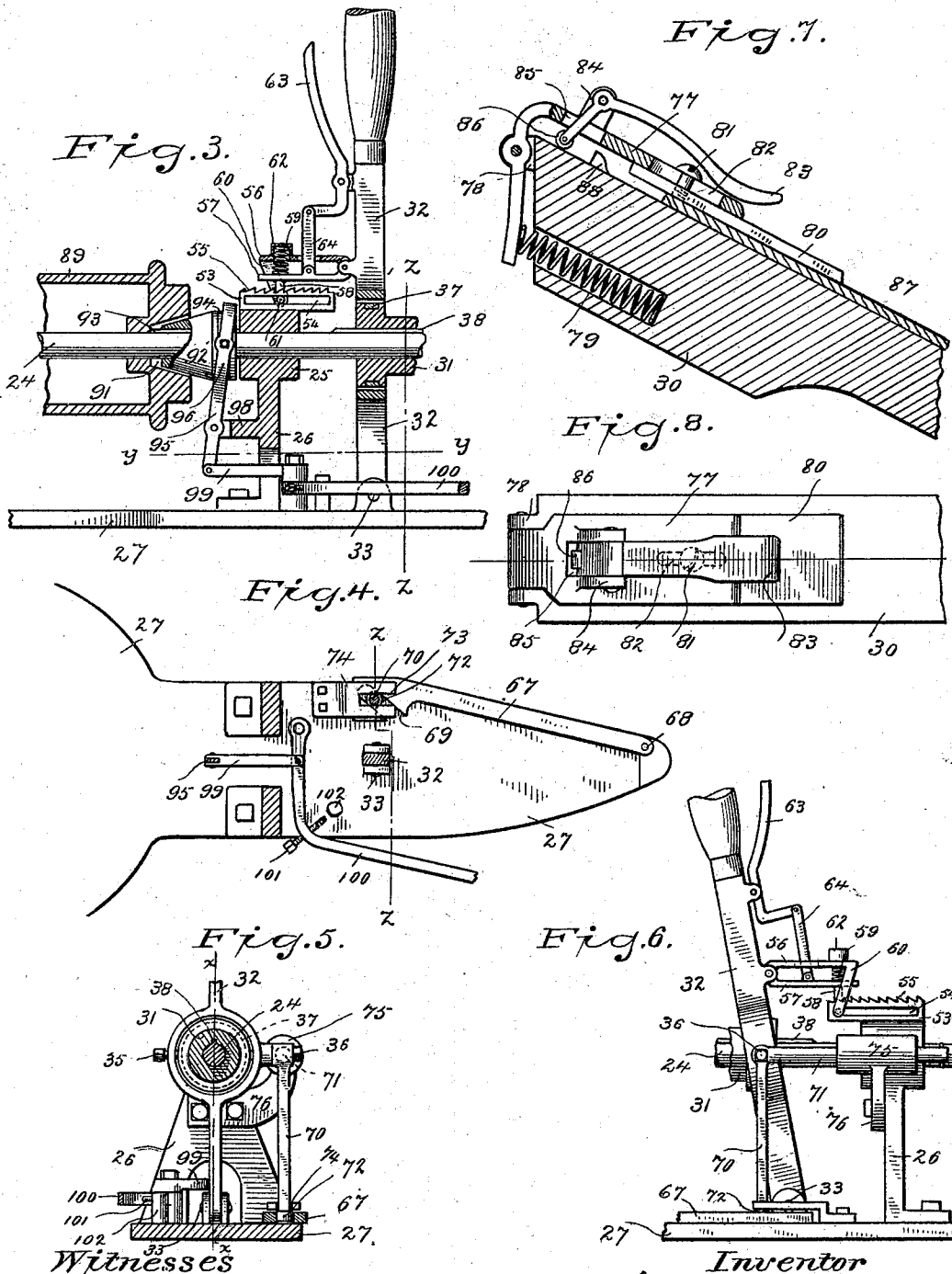
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H. A. Lamb,
Pearl Reynolds

Inventor

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UNITED STATES PATENT OFFICE.

FRANK J. MURPHY, OF DANBURY, CONNECTICUT, ASSIGNOR OF ONE-HALF
TO ANTHONY M. RUNDLE, OF SAME PLACE.

MACHINE FOR STIFFENING HAT-CROWNS.

SPECIFICATION forming part of Letters Patent No. 519,195, dated May 1, 1894.

Application filed September 29, 1893. Serial No. 486,780. (No model.)

To all whom it may concern:

Be it known that I, FRANK J. MURPHY, a citizen 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 Hat-Crowns; and I 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.

My invention relates to the general class of machines illustrated and described in Letters Patent to Murphy and Rundle, No. 361,073, April 12, 1887; No. 396,829, January 29, 1889, and No. 426,135, April 22, 1890, and patent to F. J. Murphy, No. 465,721, December 22, 1891. My improved construction most closely resembles the construction illustrated and described in Patent No. 426,135, dated April 22, 1890, and has for its object to simplify and improve the construction and operation of the machine, the special purpose being by improvements in the details of construction to increase the product of the machine, the work being done just as well as heretofore, but the construction being such as to enable the operator to handle the hats more rapidly and to avoid loss of time between the finishing of the operation upon one hat and the commencement of the operation upon the next hat.

With these ends in view I have devised the improved crown stiffening machine of which the following description in connection with the accompanying drawings is a specification, numbers being used to designate the several parts.

Figure 1 is a side elevation of the entire machine; Fig. 2 a plan view partly in horizontal section; Fig. 3 a section on an enlarged scale taken on the line $x x$ in Figs. 2 and 5 illustrating the clutch mechanism and also the mechanism for operating the expansible cone; Fig. 4 a section on the line $y y$ in Fig. 3 looking down; Fig. 5 a section on the line $z z$ in Figs. 3 and 4; Fig. 6 an elevation corresponding with Figs. 3 and 5 the point of view being opposed to that in Fig. 3 and from the right in Fig. 5; Fig. 7 an enlarged sectional view of one of the parts or arms of the expansible cone showing the mechanism for

clamping the hat body on the cone, and Fig. 8 is a plan view corresponding with Fig. 7.

1 denotes the bed of the machine which is supported by suitable legs 2, and is provided with a longitudinal opening 3 extending through it vertically.

4 denotes the carriage which reciprocates longitudinally of the bed, and 5 a gear wheel journaled in brackets 6 bolted on the under side of the bed. This gear wheel is adapted to mesh with a worm 7 on a longitudinal shaft 8 to which power is applied by a belt, not shown—passing over a pulley 9. The shaft is shown as provided with two belt pulleys so as to provide for different speeds for different classes of work. Motion is imparted to the carriage by means of a connecting rod 10 one end of which is pivoted to the carriage the other being adjustably connected to gear wheel 5 so that the extent of movement of the carriage may be regulated at will.

11 and 12 denote respectively rear and front boxes in which shaft 8 is journaled. The rear box is provided with an arm 13 which is pivoted to a bracket 14 on a cross piece 15 between the rear legs. Box 12 is provided with an arm 16 having a slot 17 and at its upper end a hook 18. A bolt 19 passes through slot 17 and through a bracket attached to a cross piece between the legs the same as at the other end of the machine.

20 is a spring one end of which is connected to the under side of the bed the other being connected to hook 18 upon box 12.

21 is a foot lever pivoted to a bracket 22, and 23 is a link connecting the foot lever to box 12.

The parts just described all appear in Fig. 1 in dotted lines and are fully described in the said Patent No. 426,135.

The operation is precisely as in the former patent. Spring 20 acts to hold the worm in engagement with gear wheel 5 so that the carriage is caused to reciprocate continuously until its movement is stopped by the operator pressing down upon the foot lever and disconnecting the worm from the gear wheel.

24 denotes a spindle which is mounted in boxes 25 on standards 26 extending upward from turning plate 27 which is secured to the carriage by a bolt 28.

29, see dotted lines Fig. 2, denotes anti-friction rollers upon which plate 27 rests and turns freely.

The cone used in my present machine is practically identical with the cone which forms the subject of my said former patent, No. 465,721, dated December 22, 1891, and consists of a number of pieces or arms 30 which are hinged at the forward end of the spindle. The arms of the cone are moved inward and outward by means of a slide 31 which is itself moved longitudinally on the spindle by means of an operating lever 32 the lower end of which is pivoted to the turning plate as at 33. This lever is provided with an enlargement 34 having an opening through which the slide passes, the connection of the lever to the slide being by means of screws 35 and 36 which engage a ring 37 lying in an annular recess in the slide. This slide is secured to the spindle so as to turn with it by means of a spline 38, see Fig. 3, upon which it moves longitudinally.

39 denotes a rotating stiffening brush which is constructed in substantially the same manner as in my said former patents, the essential principle being a hollow shaft 40 which carries the brush and through which it is supplied with stiffening material.

41 denotes boxes upon standards 42 in which the shaft is journaled, and 43 a tank for the stiffening material. This tank is provided with a solid trunnion 44 and a hollow trunnion 45, the former engaging a box 46 and the latter engaging a box 47 which also receives a pipe 48 which is in line with the hollow trunnion, and the other end of which passes into hollow shaft 40 which turns freely thereon.

49 denotes a stop cock in pipe 48 for the purpose of cutting off the flow of stiffening material to the brush.

The tank is retained in upright position by means of a set screw 50 in box 46 which engages solid trunnion 44. Should it be desired at any time to empty the tank of its contents, as for example for cleaning or for changing the quality of the stiffening material, this set screw is loosened which permits the tank to be turned on its trunnions and the contents emptied out. Boxes 46 and 47 are carried by standards 51 which are themselves supported by an extension 52 from the bed of the machine. The operating lever is locked in any required position after the cone has been expanded within a hat body by means of a special form of catch which I have devised for this machine, it being essential that the cone be locked rigidly in the expanded position and at the same time that the locking mechanism be so constructed that it will work smoothly and easily, and all danger of slipping in use shall be avoided.

53 denotes a plate which is secured to one of the standards 25 and is provided with a slot 54 and a rack 55.

56 and 57 denote upper and lower arms

which are pivoted to the lever. The lower arm is provided with a lug or tooth 58 which engages the rack, the lug being held in engagement with the rack by means of a spring 59 which lies in a socket 62 in the upper arm and bears against the lower arm.

60 denotes arms which extend downward from arm 56 passing on opposite sides of arm 57 and the rack and between which is pivoted a roller 61 which engages slot 54.

63 is a hand piece which is pivoted to operating lever 32. A link 64 connects one arm of this lever with lower arm 57. In the present instance I have shown the link as passing through a slot in the upper arm.

The operation of the catch as a whole will be clearly understood from Fig. 3 in connection with Fig. 1. The operator moves lever 32 forward as far as may be necessary to expand the cone to the required size. As the lever is moved forward lug 50 will move over the ratchet and will lock the lever against backward movement in any position in which it may be placed. To contract or collapse the cone the operator lifts the lug from the rack by means of the hand piece which leaves the operating lever free to be moved backward.

In order to insure that each hat body while upon the cone shall be operated upon evenly by the stiffening brush so that the bodies will be stiffened uniformly without regard to their size and the consequent expansion of the cone, I provide a stop 65, in the present instance a roller carried by plate 66 which is itself bolted to any suitable portion of the machine, said stop being adapted to be engaged by an adjustable guide plate 67 each time the turning plate, spindle, cone, &c., are swung toward the sizing brush. This guide plate is pivoted to the forward end of the turning plate as at 68, see Fig. 4, and is provided at its rear end with an oblique slot 69. This slot is engaged by the lower end of a stud 70 which has formed integral with it a guide rod 71. The stud is provided with an anti-friction roller 72 which lies in the slot in the guide plate, the stud itself moving in a slot 73 in a plate 74 one end of which is bolted to the turning plate, the other end extending upward and over the end of the guide plate. Stud 70 is pivoted to enlargement 34 of the operating lever by means of screw 36, see Fig. 5, which passes through the stud and through the enlargement of the operating lever, and the inner end of which engages ring 37. Guide rod 71 moves in a suitable support or guide 75 carried by a bracket 76 which is bolted to one of the standards 26. It will be seen that the guide plate is adjusted simultaneously with the cone so that each time the turning plate, cone, &c., are swung into operative position the cone must necessarily assume the proper position relative to the stiffening brush to insure that the entire length of the body be operated upon.

The hat bodies are retained upon the cone

by a special form of clamp which I have devised for this machine. Any number of these clamps may be used, although I find in practice that two which I place directly opposite each other on the cone are quite sufficient.

77 denotes the clamping arm which is in shape an angle arm and is pivoted in ears 78 at the end of the piece or arm 30 of the cone to which it is attached, see Figs. 7 and 8. A spring 79 recessed in the end of the piece or arm of the cone acts against the inner side of the clamping arm to hold it in operative position. In order that the clamp may be adapted to all sizes of hat bodies I provide a clamping plate 80 which is adjustably secured to the clamping arm by means of a screw 81 which passes through a slot 82 in the arm. The clamp is operated by means of an angle lever 83 which is pivoted between ears 84 upon the back of the clamping arm. One arm of this lever passes through a slot 85 in the clamping arm and is provided at its lower end with a roller 86 which bears upon the piece or arm of the cone. The construction of the clamp will be clearly understood from Fig. 7. It will be seen that in the normal position of the parts the angle lever is inactive and spring 79 acts to press the clamping plate down upon the brim of the hat which is indicated by 87. To release the hat brim the operator lifts the long arm of lever 83 which moves the short arm carrying roller 86 inward and lifts the clamping plate against the power of the spring. A stop 88 is provided to limit the movement of the short arm of the angle lever in lifting the clamping plate. The stop is placed in the exact position required to retain the clamping arm and clamping plate in the raised position—that is to say the short arm of the angle lever will have just passed the center. It will be seen therefore that but a slight touch is required upon the long arm of the angle lever to throw the short arm back past the center which will permit the spring to act to press the clamping plate down upon the hat brim.

Spindle 24 and the cone are driven by means of a belt 90, see Fig. 2, which passes over a drum 89 which is itself loose upon the spindle. One end of the drum is provided with a tapering socket 91 adapted to receive a sliding cone 92 which is held against rotation on the spindle by means of a spline 93, but is free to move longitudinally thereon. Back of the incline of the cone, see Fig. 3, is an annular groove in which lies a ring 94.

95 denotes a lever which is provided with an enlargement 96 having an opening to receive the cone. Screws 97 pass through the enlargement of lever 95 and engage the ring. This lever is pivoted to a bracket 98 extending from one of the standards 26, and is connected by means of a link 99 to an operating lever 100 which is itself pivoted to the turning plate, see Fig. 4. A stop screw 101 is provided in this lever which engages a stump 102 to limit the movement of the operating

lever so that the cone cannot be forced hard into the socket, it being simply necessary that the cone should engage the socket with sufficient friction to carry the spindle and cone. Said lever 100 is the main operating lever by which the operator swings the turning plate, spindle, cone, &c., into operative position and holds the hat body in contact with the stiffening brush and by which he returns the parts to their normal position after each hat body has been operated upon. 103 denotes a wheel journaled on a stud 104 which extends outward from the side of the bed. A rope 105 passes partially around this wheel and has at its lower end a weight 106. On the inner side of this wheel is a hub 107 to which a chain or rope 108 is connected, the other end of said chain being connected to a hook 109 on the carriage. As shown in Figs. 1 and 2 it will be seen that the carriage, spindle, cone, &c., are moving forward, that is toward the right. It is obvious that as this movement of the carriage takes place the weight will act to turn the wheel and consequently to wind the chain upon hub 107. When the parts are in the position shown, the operator by means of lever 100 moves the sliding cone into engagement with the socket in the drum which necessarily imparts rotation to the spindle and the cone carrying the hat body, and by further movement of said lever, stop screw 101 being in contact with the stump, swings the turning plate, spindle and cone to the position shown in dotted lines in Fig. 2. The hat body on the cone is then in position to be operated upon by the stiffening brush, the operator holding the cone and hat body in this position by means of said lever 100, while the cone moves forward in contact with the brush. As soon as the stiffening operation is completed the operator using only said lever 100, moves the turning plate, spindle and cone back to their normal position and also disengages the sliding cone from its socket so that rotation of the spindle and cone ceases instantly. During the backward movement of the carriage, turning plate, &c., the operator removes the hat body that has been stiffened and places another hat body thereon, it being simply necessary to manipulate the two clamps as already described to release one hat body and secure another in position. By the time the backward movement of the carriage and parts carried thereby is finished the new hat body will be ready to be operated upon. It will be apparent from Fig. 1 that while the carriage has been moving backward, that is toward the left, a portion of rope 105 will have been wound upon wheel 103 and the weight will have been lifted. When the parts are in this position, in order to avoid loss of time, and so that the stiffening operation upon a new hat may be commenced instantly the operator presses down upon the foot lever 21 and disengages worm 7 from the gear wheel. This leaves the carriage free to be drawn for-

ward by the weight, which the instant the gear wheel is released winds the chain upon hub 107 and draws the carriage forward so that the hat body upon the cone may be swung into position to be acted upon by the stiffening brush. I thus make a great saving of time, as the carriage, spindle, cone, &c., will move instantly from the extreme retracted position into the position in which they are shown in Figs. 1 and 2. In practice a suitable support, for example a bracket 110 as shown in the drawings, is provided for the weight to rest upon at the extreme of its downward movement, that is to say the rope is given just the required length so that at the instant the weight comes in contact with the support and the forward movement of the carriage is stopped, the carriage, spindle and cone will have been placed in such a position that the cone may be swung inward and will place the tip of the hat body in position to be acted upon by the stiffening brush as the carriage is moved forward by the worm and gear wheel, it being of course understood that the operator removes his foot from foot lever 21 the instant the forward movement of the carriage produced by the weight is completed.

Having thus described my invention, I claim—

1. In a machine of the character described the combination with a sliding carriage, a gear wheel, a connecting rod between said gear wheel and carriage, mechanism for imparting rotation to the gear wheel, and means for disconnecting the driving mechanism and the gear wheel, of wheel 103 having a hub 107, a chain connected to the carriage and to said hub, a weight, a rope connected to said weight and passing partially around the wheel, and a support for the weight whereby the forward movement of the carriage is limited said parts being so arranged that when the carriage is moved backward the rope is wound on the wheel and the weight lifted, and when the driving mechanism is disconnected from the gear wheel the weight will act to draw the carriage forward independently of the gear wheel and connecting rod.

2. The combination with the bed, a gear wheel pivoted thereto, a sliding carriage and a rod connecting said carriage with the gear wheel, of a shaft provided with a worm adapted to mesh with said gear wheel, oscillating boxes for said shaft whereby the worm and gear wheel may be disconnected, wheel 103 having a hub 107, a chain connected to the carriage and to said hub, a weight and a rope connected to said weight and passing partially around the wheel and a support for the weight at the extreme of its downward movement so that when the carriage is moved backward the rope is wound on the wheel and the weight lifted and when the gear wheel and worm are disconnected the weight acts to rotate the wheel and hub winding the

chain on the latter and drawing the carriage forward.

3. The combination with the sliding carriage, the gear wheel, the connecting rod, mechanism for imparting rotation to the gear wheel, and means for disconnecting the driving mechanism and the gear wheel, of wheel 103 having a hub 107, a chain connected to the carriage and to said hub, a weight, a rope connected to said weight and passing partially around the wheel so that when the carriage is moved backward the rope will be wound on the wheel and when the driving mechanism is disconnected from the gear wheel the weight will wind the chain on the hub and draw the carriage forward, and a suitable stop which receives the weight to limit the forward movement of the carriage.

4. The combination with slide 31, the expansible cone and operating lever 32, of plate 53 having a slot and a rack, arms 56 and 57 pivoted to the lever said arm 57 having a lug 58 which engages the rack, a spring for holding said lug and rack in engagement, and a hand piece and link by which arm 57 is operated to disconnect the lug from the rack.

5. The combination with slide 31 the expansible cone and operating lever 32, of plate 53 having a slot and a rack, arms 56 and 57 pivoted to the lever said arm 57 having a lug 58 which engages the rack and said arm 56 having a socket 62, a spring in said socket which bears against arm 57, arms 60 extending from arm 56 on opposite sides of arm 57, and the rack, a roller 61 carried by said arms and engaging the slot, and suitable means for lifting arm 57 and disengaging the lug from the rack against the power of the spring.

6. The combination with the stiffening brush, carriage, turning plate, spindle, belt drum having socket 91, and the expanding cone, of sliding cone 92 which is adapted to engage the socket to connect the belt drum and shaft, operating lever 100, intermediate mechanism connecting said lever with the sliding cone, stump 102, and a screw in said lever engaging the stump so that after the sliding cone has been placed in engagement with the socket continued movement of said lever will oscillate the turning plate and place the expanding cone in contact with the stiffening brush.

7. The combination with an arm 30 of the expanding cone, and clamping arm 77 pivoted thereto said arm being provided with a slot 85, of angle lever 83 which is pivoted to the clamping arm and the short arm of which extends through the slot and bears upon the cone arm, a spring engaging the clamping arm to hold it in operative position, and a stop to limit the movement of the short arm of the angle lever whereby the clamping arm may be held at the raised position.

8. The combination with an arm 30 of the expanding cone and clamping arm 77 pivoted

thereto said arm being provided with slots 82 and 85, of angle lever 83 which is pivoted to the clamping arm and the short arm of which extends through the slot and carries a roller 5 bearing on the cone arm, a clamping plate secured to the clamping arm by a screw passing through slot 82, a spring engaging the clamping arm to hold the clamping plate in operative position, and a stop to limit the movement of the short arm of the angle lever so that the clamping plate may be held at the raised position.

9. The combination with an arm 30 of the expanding cone and a clamping arm 77 which is itself an angle arm, is provided with a slot 15 85 and is pivoted at the outer end of the cone arm, of angle lever 83 which is pivoted to the clamping arm and the short arm of which passes through the slot and bears upon the cone arm so that the clamping arm will be 20 raised by raising the long arm of the angle lever, a spring engaging the short arm of the clamping arm to hold it in operative position, and a stop adapted to be engaged by the short

arm of the angle lever to limit its movement 25 when swung past the center and to hold the clamping arm at the raised position.

10. The combination with an arm 30 of the expanding cone having ears 78, a clamping arm 77 pivoted to said ears the clamping portion of said arm extending along the back of 30 the cone arm and being provided with an adjustable clamping plate, a slot 85 and ears 84, of clamping lever 83 pivoted to ears 84 and extending through slot 85 the long arm of said 35 angle lever lying above the clamping arm, a spring socketed in the cone arm and bearing against the clamping arm to hold the latter in operative position, and a stop adapted to be engaged by the short arm of the angle lever to retain the clamping arm and clamping 40 plate in the raised position.

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

FRANK J. MURPHY.

Witnesses:

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ANTHONY M. RUNDLE.