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H. M. CHITTENDEN.

MACHINE FOR FELTING HAT BODIES.

No. 344,166. Patented June 22, 1886.

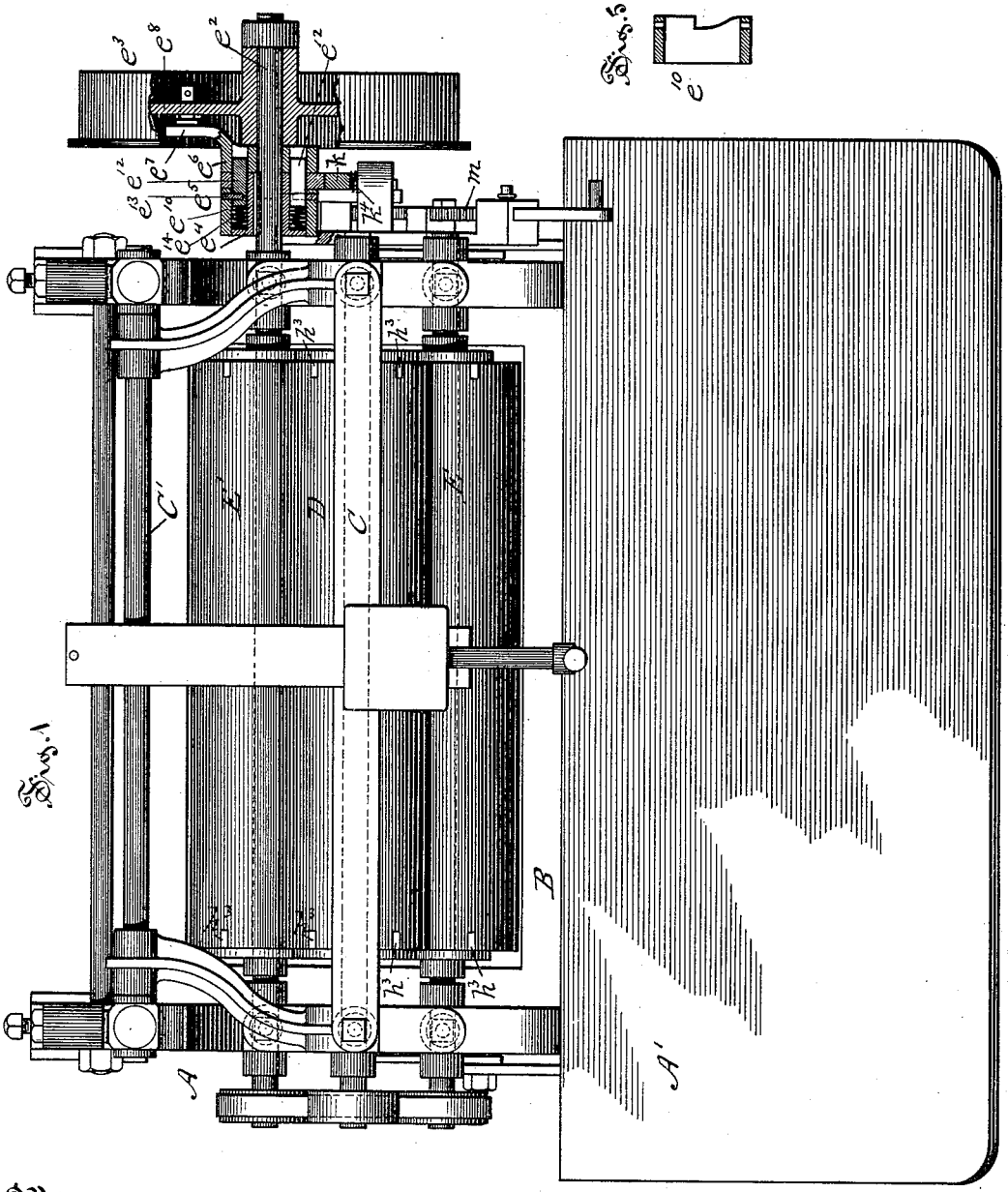

Fig. 1.

Fig. 5.

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(No Model.) 4 Sheets—Sheet 2.

H. M. CHITTENDEN.

MACHINE FOR FELTING HAT BODIES.

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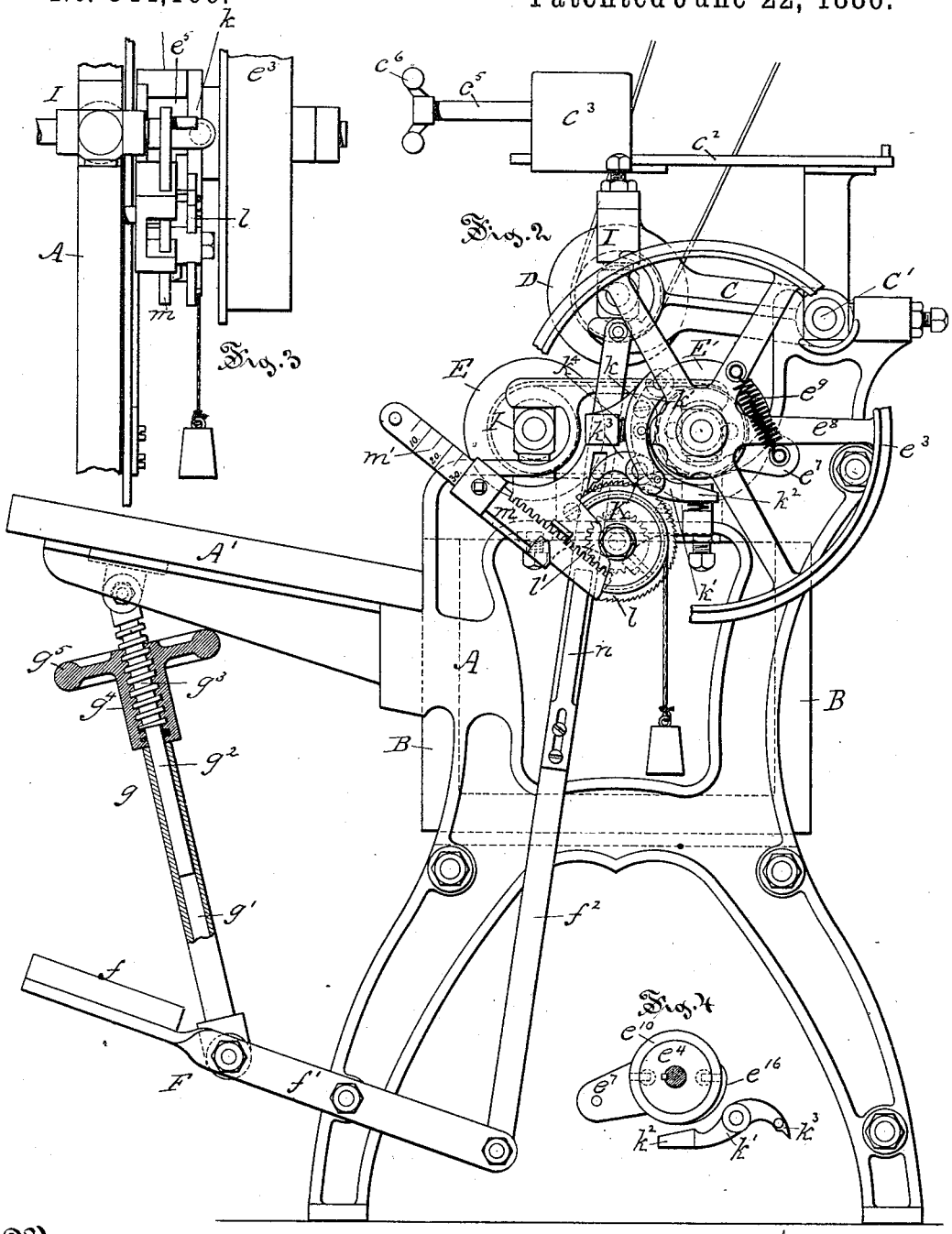

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MACHINE FOR FELTING HAT BODIES.

No. 344,166. Patented June 22, 1886.

Fig. 6

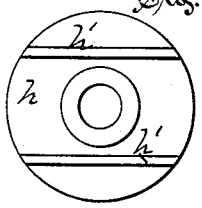


Fig. 7

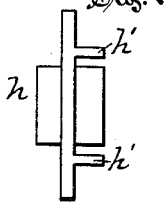


Fig. 8

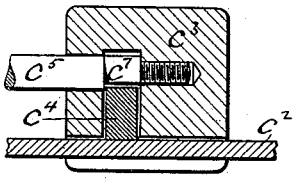


Fig. 9

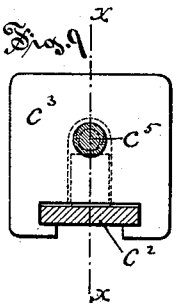


Fig. 10

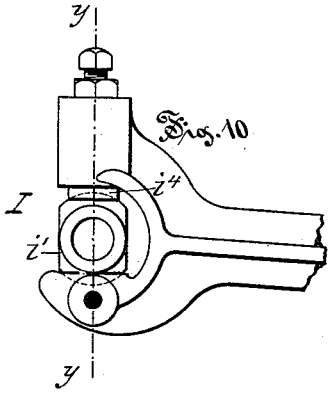


Fig. 11

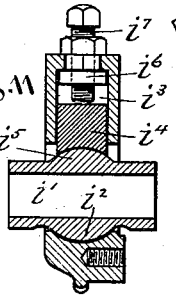


Fig. 12

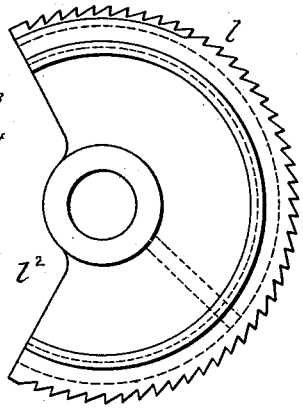


Fig. 13

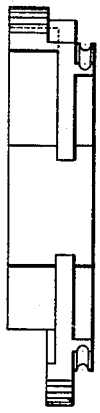


Fig. 14

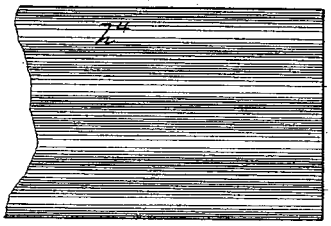


Fig. 15

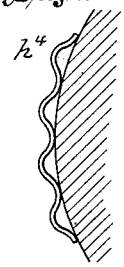


Fig. 16

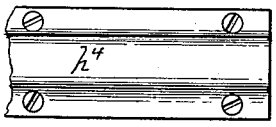
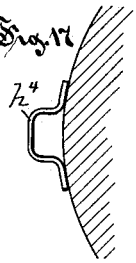


Fig. 17



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(No Model.) 4 Sheets—Sheet 4.

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MACHINE FOR FELTING HAT BODIES.

No. 344,166. Patented June 22, 1886.

Fig. 18

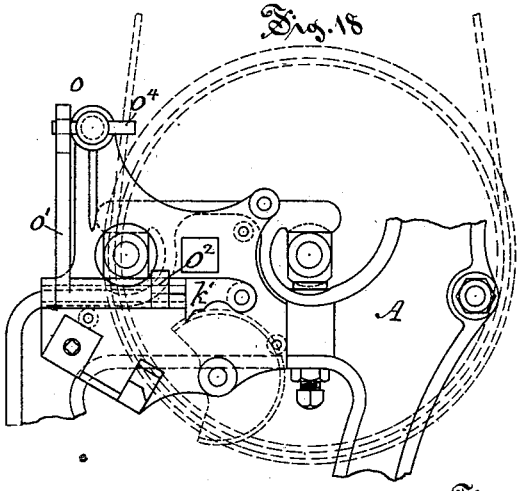


Fig. 19

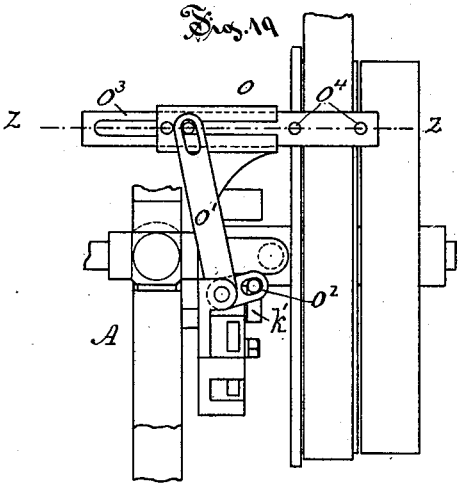


Fig. 20

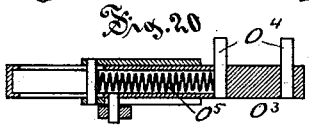


Fig. 21

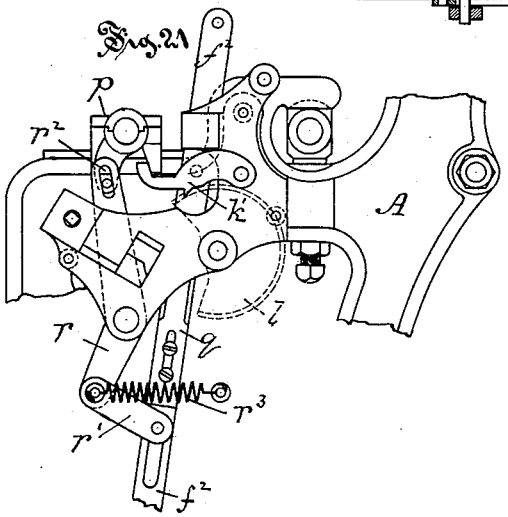
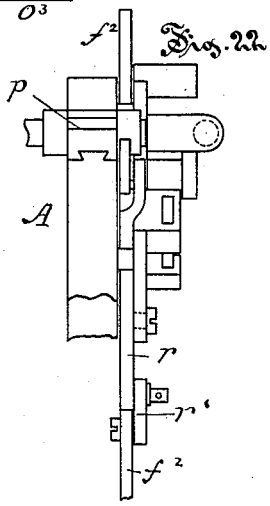


Fig. 22



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UNITED STATES PATENT OFFICE.

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MACHINE FOR FELTING HAT-BODIES.

SPECIFICATION forming part of Letters Patent No. 344,166, dated June 22, 1886.

Application filed October 19, 1885. Serial No. 180,282. (No model.)

To all whom it may concern:

Be it known that I, HARVEY M. CHITTENDEN, of Danbury, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Machines for Felting Hat-Bodies and the Like, of which the following is a description, reference being had to the accompanying drawings, where—

Figure 1 is a plan or top view of a machine embodying my invention, with parts cut away to disclose construction. Fig. 2 is an end view of the same machine. Fig. 3 is a detail front view of part of the counting and stop mechanism. Fig. 4 is a detail side view of part of the clutch-releasing mechanism, looking from the left or outward. Fig. 5 is a detail sectional view of the sleeve that forms part of the clutch device. Fig. 6 is a detail end view of the flanged cap for the cylinders. Fig. 7 is a detail edge view of the cap. Fig. 8 is a detail view in longitudinal section of the adjustable weight on plane *x x* of Fig. 9. Fig. 9 is a detail end view of the weight and cross-section of the arm and feed-shaft. Fig. 10 is a detail end view of one of my improved journal-boxes and bearings. Fig. 11 is a detail sectional view of the latter on plane denoted by the line *y y* of Fig. 10. Fig. 12 is a detail side view of the sectional ratchet-wheel of the counting mechanism. Fig. 13 is a detail edge view of the latter wheel. Fig. 14 is a detail front view of a piece of corrugated cylinder-cover. Fig. 15 is a detail view in cross-section of the cover. Fig. 16 is a detail front view of an alternate form of cylinder-cover. Fig. 17 is a detail view in cross-section of the latter. Fig. 18 is a detail diagram view of part of the end of the machine, illustrating an alternate device for stopping it. Fig. 19 is a front view of the latter device. Fig. 20 is a detail view in horizontal section of the belt-shifter and its spring-case on line *z z* of Fig. 19. Fig. 21 is a detail view of part of the end of the machine, showing an alternate device for stopping the felting operation of the cylinders. Fig. 22 is a front view of the latter device.

My invention relates to the class of machines used for felting hat-bodies, which is usually done after the "hardening" of the bodies; and it consists in improved means for moving the swinging frame and determining its play; in details of the construction of the rollers; in the adjustable weight and means for moving and holding it; in the roller-covers; in the journal boxes and bearings; in the stopping mechanism that determines the amount of rolling a given roll of hat-bodies shall receive; in the counting mechanism that forms part of the stop mechanism, and in details of the construction and combination of the several parts, as more particularly hereinafter described and claimed.

In the accompanying drawings, the letter A denotes the main or stationary frame of the machine; A′, the table, fast to and projecting from the front of the frame, and on which the hat-bodies are prepared for the machine felting; B, the tank, secured to the frame from side to side below the rollers, for holding hot water or other suitable liquid for use in felting; C, the swinging frame, pivoted to the horizontal shaft C′, that is supported in bearings in the upper part of the rear of the frame A; D, the top roller, fast on the shaft *d*′, that is journaled in bearings across the front of the swinging frame parallel to and over the lower rollers, E and E′.

The treadle F is pivoted to the lower part of the frame with a foot-board, *f*, extending from side to side below the table. The inner ends of the side levers, *f*′, of the treadle are united by the rods f^2 to the swinging frame C, the parts being so arranged that by pushing down upon the foot-board *f* the frame C will be raised and the roller D lifted away from the lower rollers. The lower limit of the swinging play of the upper roller, D, is determined by means of the brace *g*. that in the form shown in Fig. 2 is composed of the tubular part *g*′, pivoted to the cross-bar on the treadle-frame and extending upward, the rod g^2, pivoted to the lower side of the table A′ and extending into the tube *g*′. The upper and threaded part, g^3, of the rod bears a nut, g^4, with a hand-wheel, g^5, and the lower surface of this nut rests against the upper end of the tube *g*′. When the treadle is pushed downward, the tube *g*′ slides freely on the rod g^2, and as soon as the pressure is removed the treadle rises again until the upper end of the tube strikes the lower end of the nut.

In addition to the weight of the swinging frame C and the roller D, an arm, c^2, fast to

the frame and projecting from it over the roller D bears the sliding weight c^3. This weight is held upon the arm by a dovetailed groove in its lower face, and has a vertical socket, in which is a loose block, c^4, and this socket is traversed horizontally by the shaft c^5, that bears a handle, c^6, in convenient position within the reach of the operator. The inner end of this shaft is threaded and takes into a threaded socket in the weight, and it bears a cam, c^7, directly over the block c^4, so that by the rotation of the shaft the block may be clamped upon the arm c^2. The pressure upon the roller D may be adjusted by sliding this weight c^3 to any position along the arm c^2.

The rollers D, E, and E′ are borne on shafts that turn in peculiar bearings in the supporting-frame, and they may be of any desired shape as to periphery. Each roller is preferably made up of two semi-cylindrical pieces of wood, grooved out along the center of their flat surfaces and held upon the shaft with these faces in contact by means of a cast metal cap, h, having inward-projecting flanges h', that take into transverse grooves h^3 across the ends of these wooden roller-sections. This method of clamping the roller-sections together prevents them from becoming loose and turning on the shaft. The working-surface of the rollers may be corrugated or fluted either by cutting away the substance of the wood or by nailing on lagging or by being covered with the corrugated face-plates h^4 in the forms shown in Figs. 14 to 17.

Each of the shafts or journals of the main rollers turns at each end in an improved box or bearing, I, that is self-adjusting. In this bearing (see Figs. 10 and 11) the frame or hanger branches or forks, and has on the inner face of one of the branches a shallow socket that is dished or shaped like a segment of a sphere, and in this a correspondingly-curved surface, i^2, of the box i' fits and moves. In the other branch of the frame and opposite this socket is a mortise, i^3, in which a block, i^4, is so fitted as to be movable to and from the box. Its under surface is hollowed and fits upon the rounded surface i^5 on the box.

In the mortise and back of the block i^4 is a plug, i^6, that extends through the end wall of the mortise, and bears a flange within it that prevents it from passing through this wall. A bolt, i^7, passes centrally through a threaded socket in the plug, takes against the back of the block, and bears a jam-nut, by means of which it is held firmly when the requisite grasp upon the bearing that will yet allow of its swinging to conform to the alignment of the shaft has been obtained.

The shafts bearing the several rollers in this machine are driven by belts from a countershaft and by belts or intermeshing gear-wheels, so that the rollers turn in one direction (denoted by the overlying arrows) and a roll of hat-bodies placed between the rollers will be subjected to a felting operation.

After the process termed "hardening" the hat-bodies are still of such delicate texture and the fibers of fur so slightly knitted together that great care in handling is required. A sufficient number of such bodies is rolled up in a cloth, and this roll is placed between the rollers of the machine, and, in order to prevent the opposite sides of any one of the hat-bodies from becoming felted together, they have to be opened out and folded in a different place after a limited amount of rolling. The result of such a felting together of the sides of a body is a streak that ruins it, and such an occurrence is prevented in my machine by the stop mechanism.

The stop mechanism.—The shaft e^2 of the roller E′ extends beyond the side of the frame of the machine, (see Figs. 1 and 2,) and bears a loose pulley, e^3, that is held against endwise play by a collar or nut fast to the outer end of the shaft, and the body e^4 of the clutch e^5 fast to the same shaft on the opposite side of the pulley-hub. Between these latter parts the shaft bears a rotary disk, e^6, with an extended arm or dog, e^7, that projects between the arms of the pulley, and it is held against the arm e^8 by the spring e^9, that breaks the shock of the engaging action of this form of clutch, which is positive. The sleeve e^{10} is fitted outside of the body part e^4 of the clutch, and has a sliding motion on it, bearing the bolts e^{12} by means of pins e^{13}. (See Fig. 1.) The bolts move in sockets in the clutch-body and are projected through openings in its front wall by the springs e^{14}. When these bolts engage in sockets in the dog, the shaft e^2 is turned with the pulley and the parts are disengaged by the inner end of the lever k', that, under certain conditions hereinafter described, is so lifted against a cam on the sleeve by the spring e^{15} as to slide it endwise away from the hub, so as to withdraw the pins and release the pulley. The lever k is pivoted in a vertical position to the frame near the clutch, is pushed toward it by the spring k^4, and it bears a roller in the path of the cam e^{16}, that is formed on the face of the clutch-body, and the lever k' is pivotally suspended from its lower end. The latter hangs in a horizontal position with the arm k^2, extending under the clutch-body, and the arm k^3, curved over the ratchet-wheel l in the opposite direction and adapted to engage the teeth of the wheel. This ratchet-wheel l and a gear-wheel, l', placed next to it, both turn freely on the short shaft that projects from the frame of the machine, but interlocking parts on each wheel limit their relative rotation. The ratchet-wheel is turned toward the pawl by means of a weight suspended from a cord wound about a part of the wheel, (see Fig. 2,) and a segment, l^2, of the wheel is cut away, so that the lever on the presentation of this part will drop inward toward the axis of the wheel. The lever k is swung forward as the cam on the clutch-body strikes it in each rotation of the main shaft, and it causes the pawl to turn the ratchet-wheel over a distance equal to one tooth, and as soon as

the cam has passed, the lever and the pawl are forced back by the spring k^4, the lever swinging clear of the ratchet-wheel, while the arm k^3 of the lever, which rests on the wider part of the face of the ratchet-wheel, prevents the latter from turning back. This operation is repeated at each rotation of the main shaft until all of the wider part of the face of the ratchet-wheel (which part ends at l^5) has been carried past the end of the arm k^3. When this point is reached, the spring forces up the end k^2 of the lever and unlocks the clutch. The sliding rack m is borne in supports on the frame, and its teeth are in mesh with those of the gear-wheel l', in such position with relation to the engaging-lugs on the gear-wheel and ratchet-wheel that the scale m' on the side of the rack in connection with an index will indicate the number of teeth the lever will engage before it drops off the wheel and operates the clutch to release the driving-pulley as described. As soon as this pulley is released the rollers stop turning, and, by means of the treadle, the swinging frame and upper roller are lifted so that the roll of hat-bodies may be removed and refolded or another roll inserted. The rod f^2 bears the lifter n, that is adjustable along the rod, and a lug, k^5, projects from the side of the arm k^3 in the path of the upper end of this lifter, so that it is struck by it as the rod is raised in lifting the swinging frame. The pawl is thus tilted and the ratchet-wheel returned to its starting position by the weight and cord.

In Figs. 14 and 15 the ratchet-wheel is shown on an enlarged scale in side and edge view. The wider part of the edge denoted by 1, on which the end of the arm k^3 rests, does not extend so far as that part of the ratchet marked 2, upon which the operating-pawl K works, while the upper part of the section 2 is cut away to the point 3. The result is that when the device is set to make the maximum number of revolutions given on the rack, the operating-pawl K strikes on the first tooth beyond the said depression; but if the rack is set farther out than the maximum number, the operating-pawl will strike idly on the section of the ratchet-wheel where there are no teeth and the motion of the rollers will be continuous.

An alternate device for stopping the rollers of the machine is illustrated in Figs. 18, 19, and 20, and in this latter form I use a fast and loose pulley and a belt-shifter, o, that is operated by the movement of the lever k'. This belt-shifting device is substituted for the clutch, which is not used in this form. The other parts and their operation are substantially the same as in the form already described. In the latter form the bent lever o' is pivoted to the frame of the machine with the shorter arm, o^2, slotted to receive a projecting pin on the outer end of the lever k', and the longer arm extending upward and slotted to receive a pin projecting from the sliding shifter-rod o^3. This latter is supported in a socket in a bracket fast to the frame of the machine, and bears the ordinary pins, o^4, adapted to engage the opposite sides of the belt. The spring o^5, seated in a recess in the shifter-rod, is arranged to hold the latter, so that the belt will be thrown over onto the loose pulley as soon as the lever k' is freed from the ratchet and its outer end lowered.

An equivalent means of preventing the rollers from acting on a roll of hat-bodies is shown in Figs. 21 and 22, and the object of this device is to slide one of the lower rolls away from the others at the end of a predetermined number of revolutions, and thus let the roll of hat-bodies drop between the rollers. The clutch is not used in this latter form, but the ratchet-wheel, pawls, and counting mechanism remain substantially the same. The bearing p of one of the lower rollers (as the front) is supported on a slide that moves horizontally on the frame, and this bearing is held with the roller in position to operate on the hat-bodies by the hook on the upper side of the lever k', that engages a lug on the bearing-block. This block is also connected to the rod f^2 by the lever r and toggle r', the lever being pivoted to the frame of the machine and connected to the block by a pin on the latter, that takes into a slot, r^2, in the upper end of the lever. The spring r^3 is connected to the frame and to the lower end of the lever r in such position that as soon as the dropping of the lever k' releases the bearing-block it is slid outward by the lever and spring. This movement of the block separates the rollers and allows the roll of hat-bodies to drop through onto a shelf or into a receptacle. The block and roller are returned by an upward movement of the rod, as before. This automatic separation of the rollers may evidently be accomplished by swinging instead of sliding the roller, and it is not material whether one or both of the rollers are moved so long as a sufficient opening between their peripheries is made for the passage of the roll of hat-bodies.

I claim as my invention—

1. In combination, a central shaft, a sectional roller with grooved or indented ends, and a cap-plate with projections or flanges taking into said grooves or indentations, all substantially as described.

2. In combination with a central shaft and a wooden roller made in sections with grooved ends, a cap fast to the shaft and bearing-flanges projecting into the grooves, and whereby the sections are clamped together, all substantially as described.

3. In combination with the swinging roller-frame and the arm, a sliding weight borne on the arm and having a recess within it, and a plug fitting the recess and placed between the arm and a cam borne on a rotary shaft in the body of the weight, all substantially as described.

4. In combination with the swinging roller-frame and its arm, the sliding weight borne on the arm, the plug located within the weight, the threaded shaft bearing the cam, in contact

with the plug, and the handle, whereby the shaft may be turned, all substantially as described.

5. In combination with the frame of a felting or sizing machine, a shaft bearing a roller, and an adjustable journal-box secured to said frame and adapted to adjust itself in alignment with the shaft, all substantially as described.

6. In combination, the frame branched to inclose a journal-box, with a sunken surface on one branch adapted to receive the rounded surface of the box, and a mortise in the other branch, the block movable in the mortise, and with its lower surface conforming to the rounded surface of the box, the plug bearing the flange, and the set-screw, all substantially as described.

7. In combination with the main frame of a felting-machine, a swinging frame bearing a roller, a treadle with rods connecting it to said frame, and a brace or like device having sliding sections, and an adjustable stop device, all substantially as described.

8. In combination with the main frame of a felting or like machine, a swinging roller-frame, the treadle and connecting-rods, and the brace composed of the tubular section and the rod-section, the latter attached to a part on the frame and bearing a set-nut, all substantially as described.

9. In a felting or like machine, in combination with the several rollers, the automatic stop device, all substantially as described.

10. In a felting or like machine, in combination with the lower rollers, the upper roller borne in the swinging frame, and the automatic counting and stopping mechanism, all substantially as described.

11. In combination with the main frame of the felting-machine, the swinging frame and the several rollers, the loose pulley on the roller-shaft, the clutch on the same shaft, and the device adapted to automatically operate the clutch, all substantially as described.

12. In combination with the driving-shaft of the within-described machine, the loose pulley, the clutch bearing the cam, the lever, the pawls, and the ratchet-wheel operated at each rotation of the shaft, all substantially as described.

13. In combination with the driving-shaft of the within-described machine, the loose pulley, the clutch bearing the cam, the swinging lever supporting the pawl, the ratchet with the side flange extending partially around it and supporting one end of the lower lever, the other end of which is adapted to operate the clutch, and the several pawl-operating springs, all substantially as described.

14. In combination with the driving-shaft of the within-described machine, the lever and pawls operated by a cam on said shaft, the ratchet-wheel, and the within-described counting mechanism, all substantially as described.

15. In combination, in the within-described stopping mechanism, the ratchet-wheel and gear-wheel supported on a common axis or shaft, and having lateral projections that determine the relative rotary movements of the wheels, all substantially as described.

16. In combination with the shaft e^2, bearing the cam e^{16}, the lever k, and pawls K and k^2, the ratchet-wheel l and the gear-wheel l', borne on a common shaft and having the lateral engaging-lugs, and the weight suspended from the ratchet-wheel and adapted to rotate it toward the pawls, all substantially as described.

17. In combination with the ratchet-wheel l and the mechanism adapted to rotate it, the gear-wheel holding it against continued rotation by a lug that engages a similar lug on the ratchet-wheel, the rack m, with teeth in mesh with the gear-wheel, and a clamp device for securing the rack, all substantially as described.

18. In combination with the lever k' of the within-described stop mechanism, the connecting-rod f^2, bearing a lifter, n, adapted to engage the lever k' on the upward movement of the rod f^2, all substantially as described.

19. In combination, the rollers E E' of the within-described machine, the roller D, borne in the swinging frame, the shaft e^2, the pulley e^3, the clutch e^5, the disk e^6, and dog e^7, the spring e^9, the cam e^{16} on the shaft, the swinging lever k, bearing the pawl K, lever k', and the ratchet-wheel l of the stop mechanism, all substantially as described.

20. In a machine for felting hat-bodies and the like, the upper roller borne on a swinging frame, the laterally-movable lower roller, and the mechanism adapted to automatically separate the lower rollers, all substantially as described.

21. In combination with the roller of a felting-machine, the removable sectional cover or facing of fluted or corrugated sheet metal, all substantially as described.

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