Nov. 25, 1930. I. A. EICHENBAUM 1,783,112

HAT MAKING MACHINE

Filed Aug. 7, 1929 6 Sheets-Sheet 1

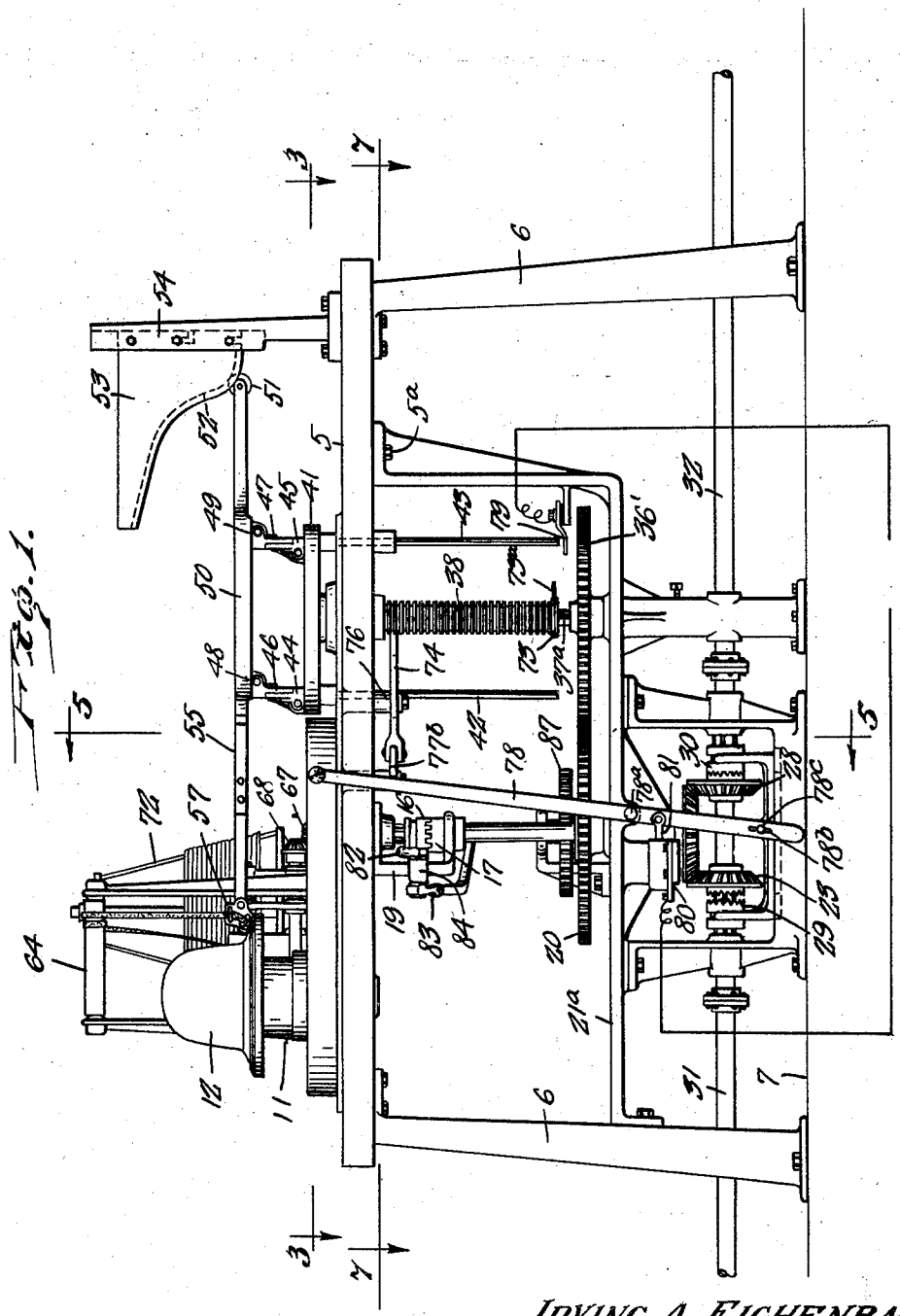


Fig. 1.

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Nov. 25, 1930. I. A. EICHENBAUM 1,783,112

HAT MAKING MACHINE

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Fig. 2.

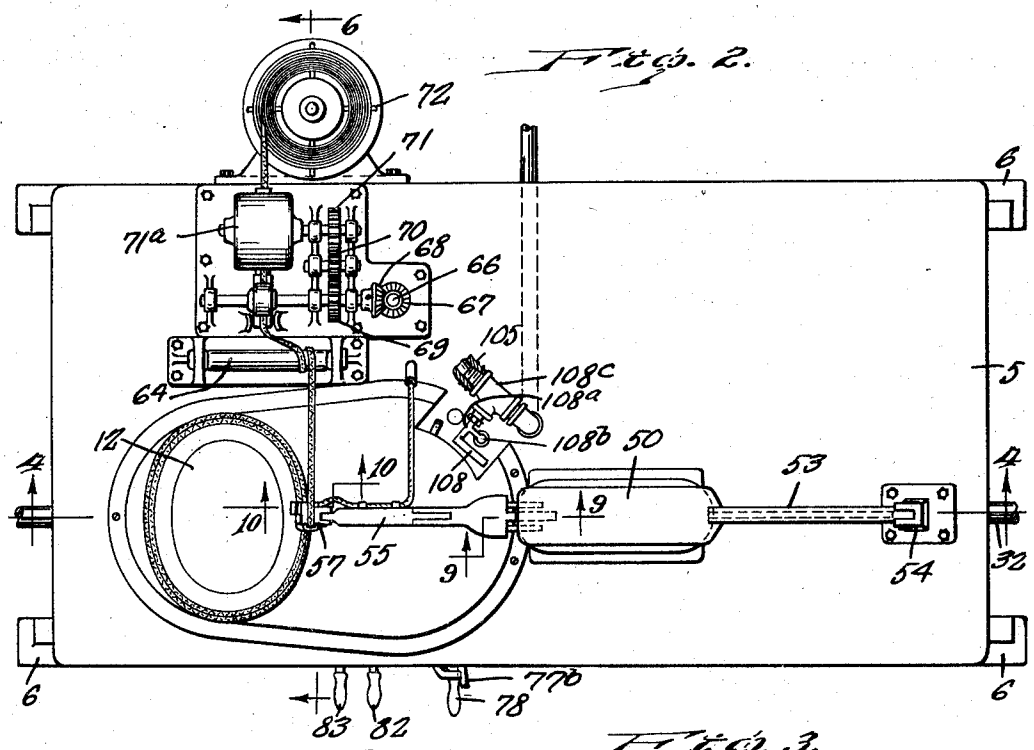
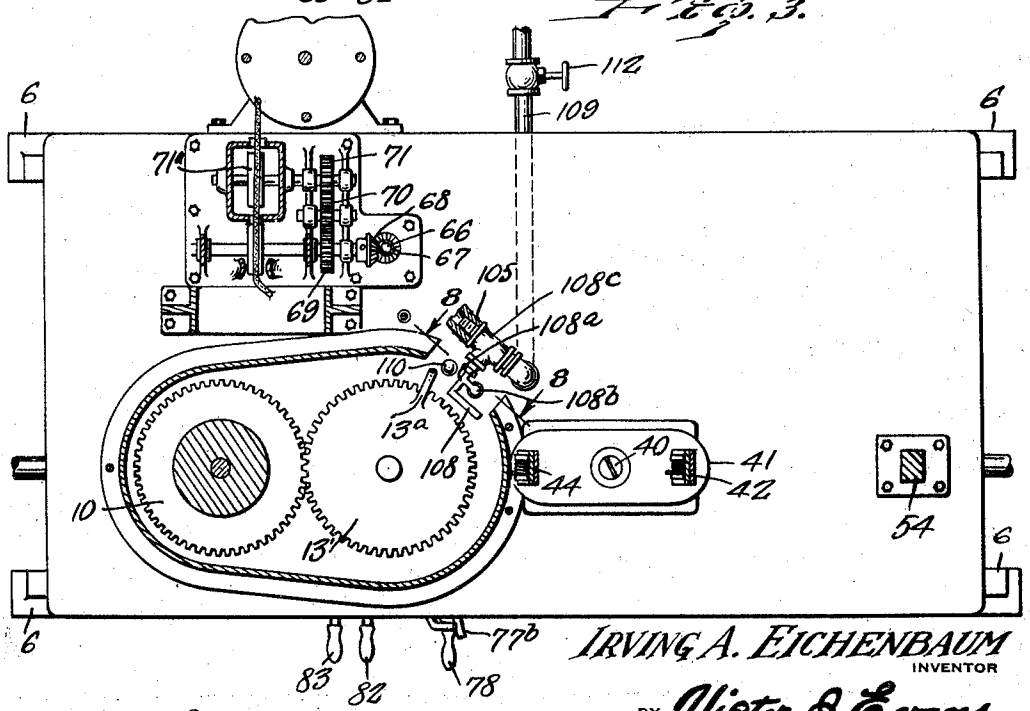


Fig. 3.



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Nov. 25, 1930. I. A. EICHENBAUM 1,783,112

HAT MAKING MACHINE

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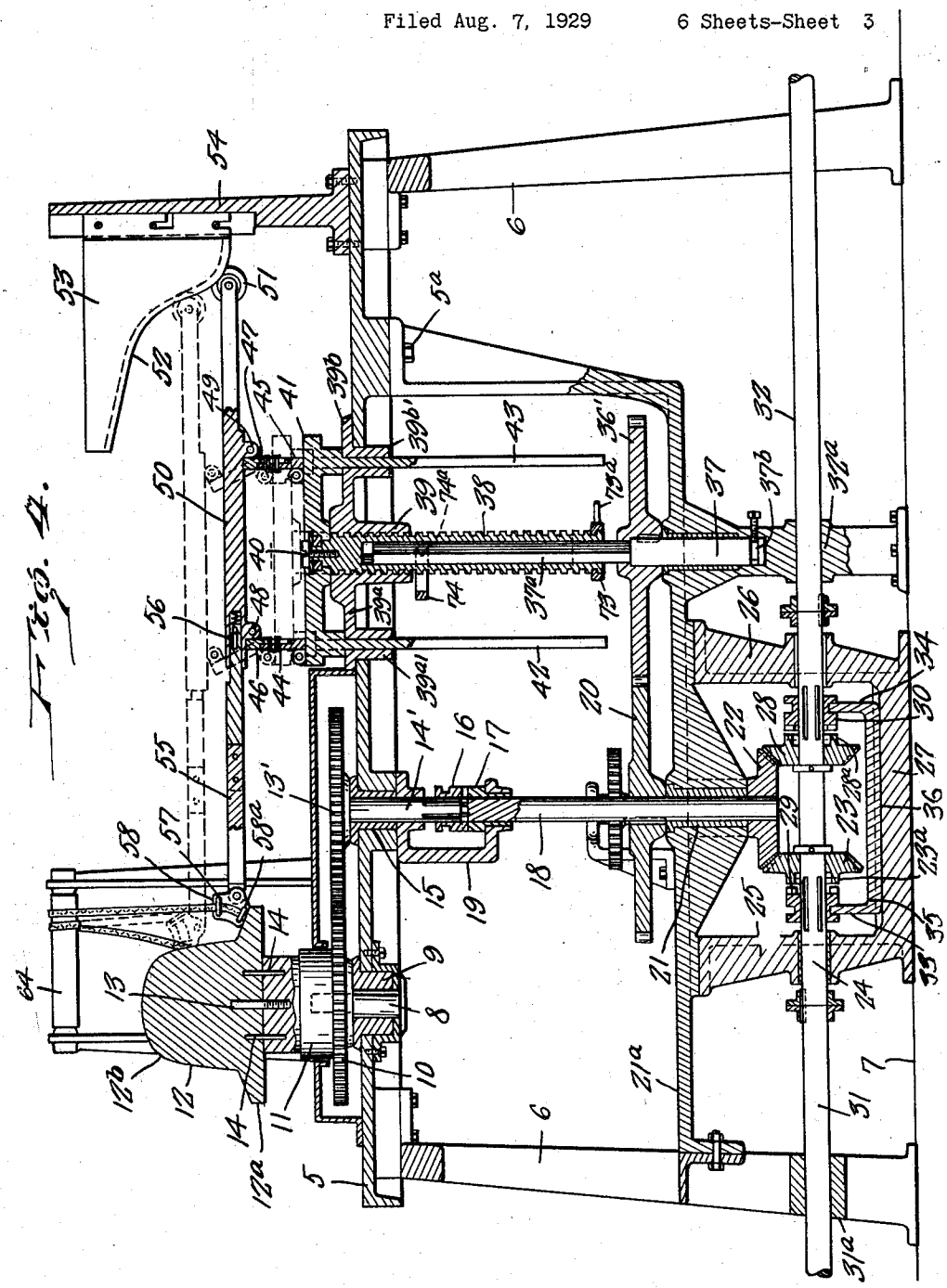


Fig. 4.

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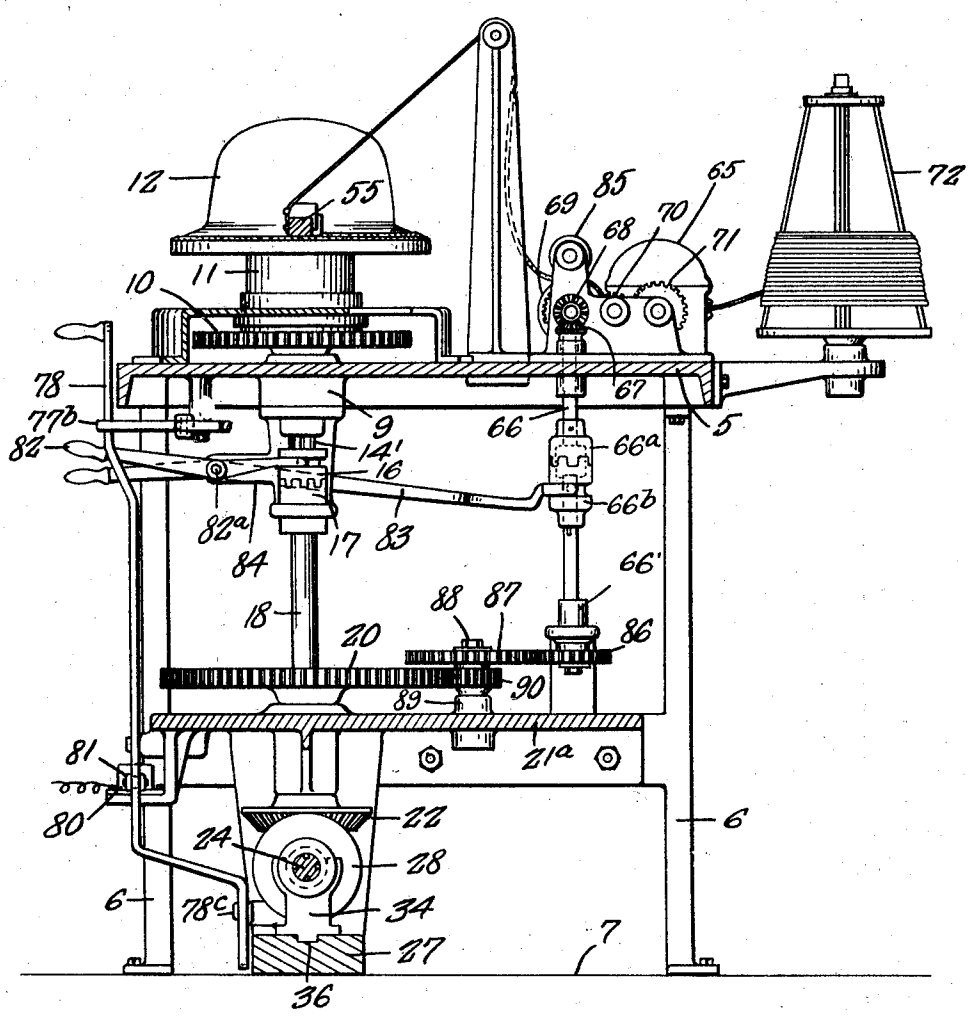
WITNESSES Emanuel Landau
W. Martin

Nov. 25, 1930. I. A. EICHENBAUM 1,783,112

HAT MAKING MACHINE

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Fig. 5.



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Nov. 25, 1930. I. A. EICHENBAUM 1,783,112

HAT MAKING MACHINE

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Fig. 6.

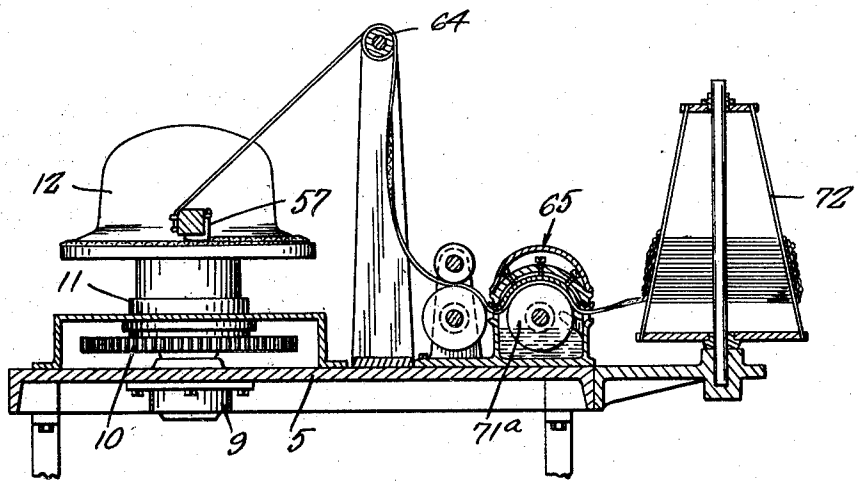
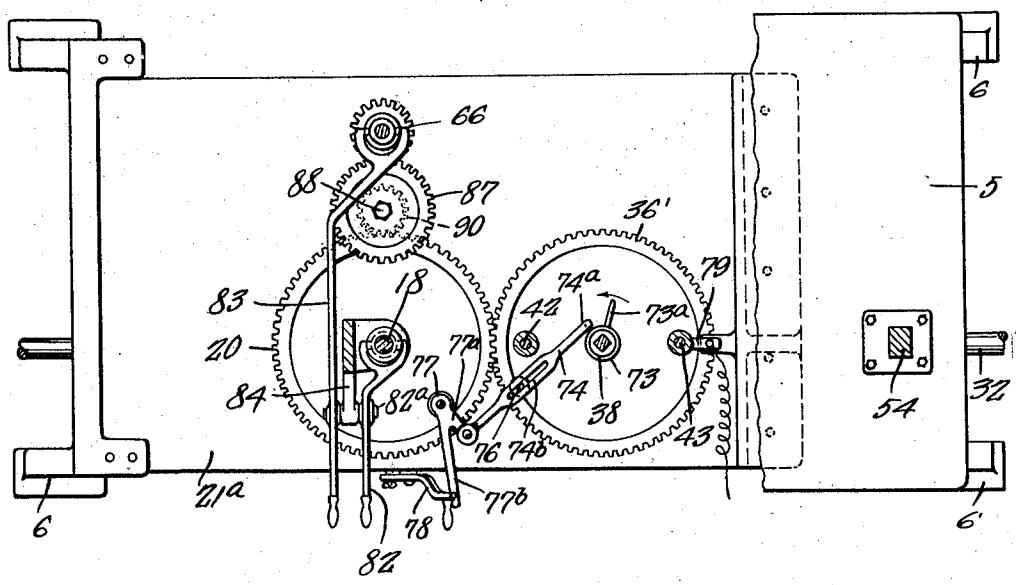


Fig. 7.



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HAT MAKING MACHINE

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Fig. 8.

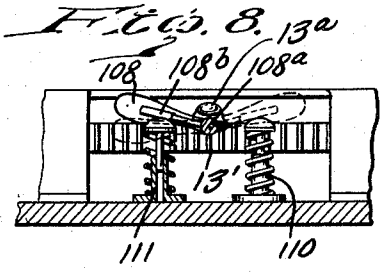


Fig. 9.

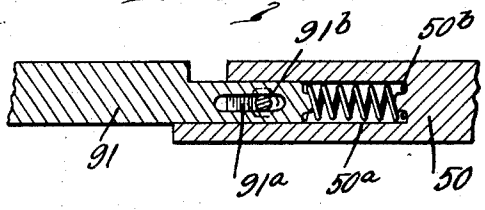


Fig. 11.

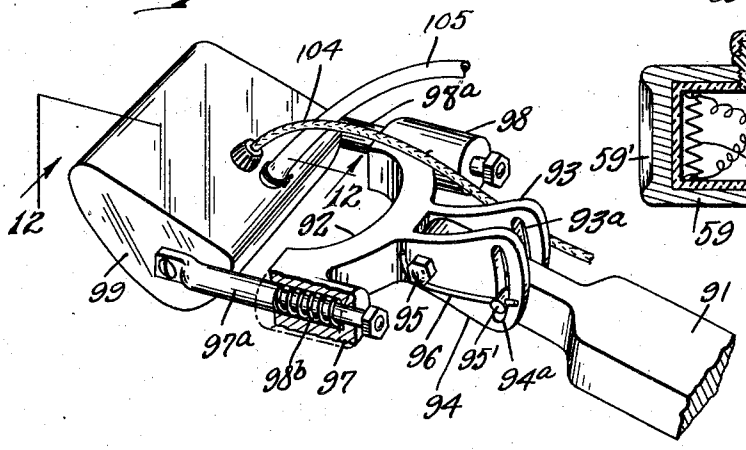


Fig. 10.

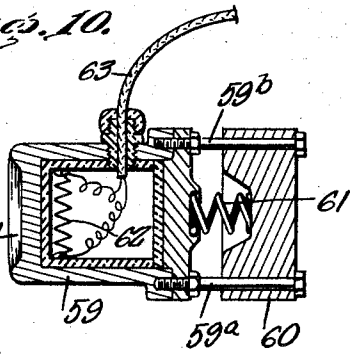


Fig. 12.

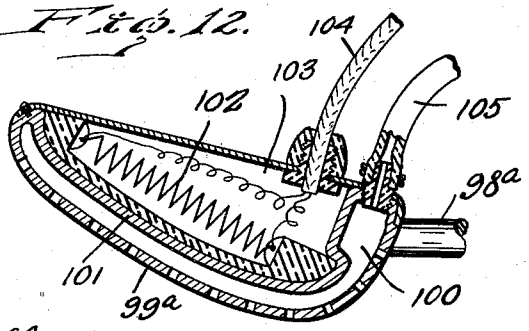
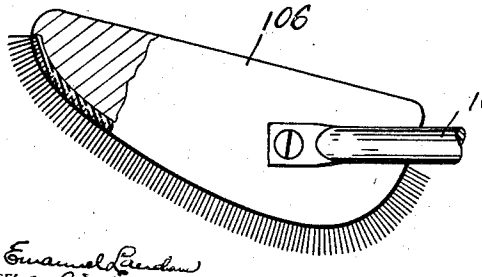


Fig. 13.



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Patented Nov. 25, 1930 1,783,112

UNITED STATES PATENT OFFICE

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HAT-MAKING MACHINE

Application filed August 7, 1929. Serial No. 384,046.

This invention relates to improvements in machines for making hats and also for working upon hats previously made.

One of the objects of the invention is the provision of a hat working machine, by means of which braid or other strip material may be spirally wound to build up a hat crown and rim, by the use of any suitable binding adhesive, and the material ironed and steamed when laid in place.

Another object of the invention is to provide a machine which will revolve a hat form of any selected style or shape, and maintain a material applying tool by a profile tracing motion against the hat material moulding form, so that the inner contour of the hat will closely conform to the shape of the base hat form, and the lines of the outer surface of the laid hat material will correspond therewith.

A still further object of the invention is the provision of a hat working machine with means for automatically revolving a hat form, means for maintaining a laying and ironing tool against the rotating hat form by a profiling motion, and means for raising the level in which the tool works against the hat form a distance equal to the width of the braid or strip material applied on the hat form, which is automatically reversed when it reaches its limit of travel upward, or which may be manually reversed under the immediate observation of a skilled operator.

A still further object of the invention is the provision of means for applying intermittent jets of steam to the work.

Still another object of the invention is the provision of a tool which can be applied to the mechanism, and by means of which any felt or other hat can be steamed and ironed, or otherwise suitably treated.

Other objects and advantages of the invention will be hereinafter specifically pointed out, or will become apparent, as the specification proceeds.

With the above indicated objects in view, the invention resides in certain novel constructions, combinations and arrangements of parts, clearly described in the following specification, and fully illustrated in the accompanying drawings, which latter show only one of many possible embodiments of the invention, as at present preferred.

In the drawings:

Fig. 1 is a side elevation of my improved combined machine, with a wiring diagram included.

Fig. 2 is a plan view thereof.

Fig. 3 is a horizontal sectional view taken on line 3—3 of Fig. 1, looking in the direction of the arrows.

Fig. 4 is a vertical sectional view, showing the profiling mechanism and also showing the reverse mechanism.

Fig. 5 is a vertical sectional view taken on line 5—5 of Fig. 1, looking in the direction of the arrows.

Fig. 6 is a view partly in vertical section, and partly in elevation, showing the revoluble hat form, the braid treating equipment, and the braid supply cone.

Fig. 7 is a horizontal sectional view taken on line 7—7 of Fig. 1, looking in the direction of the arrows.

Fig. 8 is a detail view in vertical section, showing the valves for intermittently supplying steam to the applying tool.

Fig. 9 is a detail view in longitudinal section, of a spring slip joint for the profile tracing and material laying tool.

Fig. 10 is a view in vertical section, showing an electrically heated braid laying tool.

Fig. 11 is a view in perspective, with a part shown in section, of a combined steaming and ironing tool.

Fig. 12 is a view in longitudinal section through this tool.

Fig. 13 is a side elevation, with a portion in longitudinal section, of a brush.

Referring to the accompanying drawings illustrating an embodiment of my invention as at present preferred, 5 designates a table top, which is carried by the machine legs 6, at a suitable elevation from the floor line. These legs are mounted on the base 7, which may be omitted and the lower group of mechanism mounted directly on the floor.

On the table top 5 the vertical shaft 8 is journaled in the bearing 9, and on this shaft the driven gear 10 is mounted. On this gear

the hub 11 is supported to rotate therewith. and to the hub 11 the hat form 12 is detachably mounted, as by means of the connecting or dowel pins 13 and 14, the former being located at the center of the hub and the latter, two being shown, being located outwardly thereof. The number of connecting pins used is a matter of detail. The hat form shown comprises the rim forming portion or base 12^a and the crown 12^b.

The gear 10 is driven by the gear 13′, which is mounted upon the upper end of the pendant vertical shaft 14′, which is journaled on the table top 5 in the bearing 15. The lower end of the shaft 14′ is equipped with a clutch element or sleeve 16, which is keyed thereto for sliding movement and for rotatable movement therewith. This slidable clutch sleeve is designed to engage the fixed clutch element 17, which is mounted on the upper end of a vertical shaft 18. The upper end of shaft 18 is supported in axial alignment with the pendant shaft 14′ by means of a bracket 19, which is mounted against the bottom face of the table top and which has a pendant arm through which the upper end of the shaft 18 and its clutch element rotate.

The vertical shaft 18 carries the gear 20, and said shaft extends through the bearing 21, which is supported by the frame bracket 21^a, one end of which is secured to the underside of the table leg, and the other end of which extends upwardly and is bolted at 5^a to the table top. The extreme lower end of the vertical shaft 18 carries the intermediate bevel gear 22, which is in mesh with the bevel gear 23, loosely mounted on the horizontal shaft 24, which extends through the vertical and upstanding arms 25 and 26 of the U-shaped bracket 27. This shaft also carries the second bevel gear 28, which is in mesh with the bevel gear 22 of the vertical shaft 18 and said gear 28 is also loosely mounted.

A clutch sleeve 29 is mounted on the shaft 24, and splined thereto for limited sliding movement, to engage the clutch teeth 23^a of the gear 23, while a similar clutch sleeve 30 is splined to the same shaft for limited sliding movement to engage the opposite bevel gear 28, which is provided with clutch teeth 28^a. A shaft 31 is coupled at one end to the shaft 24 and another shaft 32 is coupled at the opposite end of said shaft 24, the former working in the bearing 31^a, and the latter working in the bearing 32^a. The arm 33 of the spanner 35 engages the sliding clutch sleeve 29, and the second arm 34 of said spanner engages the clutch sleeve 30. The horizontal bar of this spanner works in a guideway or track 36 provided on the bracket 27.

The gear 20 meshes with a gear 36′ which is carried by the vertical shaft 37, the lower end of which is round and the upper end portion of which is squared at 37^a. The extreme lower end of the vertical shaft is swiveled as at 37^b to the vertical bearing 32^a, which extends downwardly from the cast frame bracket 21^a.

On the squared upper portion of the shaft 37 the tubular screw 38 is mounted, the upper end of which has threaded engagement with the nut 39, which is mounted on the table top 5. The nut 39 is formed integral with the right and left wings 39^a and 39^b, which carry tubular guides $39^{a\prime}$ and $39^{b\prime}$. The extreme upper end of the screw is connected by the small coupling screw 40 with the cross head 41, one end of which carries the depending guide rod 42 and the other end of which carries the depending guide rod 43, the former working through the tubular guide $39^{a\prime}$, and the latter working through the tubular guide $39^{b\prime}$.

On the cross head 41 a pair of link members 44 and 45 are mounted in spaced relation to each other, and to these link members the companion link members 46 and 47 are pivoted. Pivot pins 48 and 49 are provided upon the underside of the profile tracing bar 50, and one end of the latter is equipped with a small follower or tracing wheel, which is designed to work along the track or profile groove 52 formed in the form profile block 53, which is supported on the upright post 54, for easy detachable mounting. Coil springs, like those shown in Fig. 3 above the cross head 41, encircle the pivot pins 48 and 49 and engage the links 46 and 47 whereby the wheel 51 will be yieldingly retained in the groove 52.

One end of the profile tracing bar 50 is equipped with a sectional rod 55, and has a spring slip joint connection at 56 therewith. so that local terminal pressure will always be maintained upon the hat to be built or worked upon.

The outer end of the arm or bar 55 is equipped with the combined ironing and smooth tool and the hat braid laying tool 57, shown in detail in Fig. 10. This tool consists of the case 58, which is pivoted to the arm or bar 55, and in which the detachable working tool 59 is mounted. The tool head 59 is shown to be formed with a working face 59′ adapted to snugly lay the braid or other material against the curved outer surface of the hat form 12, and the heel part 60, which is secured in the case 58. The tool head 59 carries the guide rods 59^a and 59^b which extend through the heel part 60 and are equipped with suitable terminal stops. A coil spring 61 is located between the tool head and the heel part for maintaining terminal pressure upon the tool head at the point of application. The tool head is heated electrically by means of the heating unit 62, which is energized through the feed wires 63.

The hat braid or strip material is fed under the working face of the tool head, through eyes 58^a provided on the case 58, as

shown in Fig. 4. The braid passes over the roller 64, supported above the hat form 12, which serves to temper the adhesive applied to the braid by means of the drum coating device 65, which is driven by power from the vertical shaft 66, the upper end of which carries the small bevel gear 67 to engage with the similar gear 68 on the end of the feed gear 69. This gear is in driving engagement with the intermediate gear 70, which meshes with the gear 71 of the adhesive coating drum 71^a. The braid or hat material is supplied by the revolving cone 72.

The lifting screw 38 carries on its lower end a collar 73, which is equipped with a pin 73^a, and when the screw reaches its upper limit of travel the pin 73^a will strike against the small terminal arm 74^a on the lever 74. This lever is formed with a longitudinal slot 74^b, which is engaged by the pendant pin or rod 76, carried by the table top 5. The outer end of the said lever 74 is bifurcated and pivotally connected with the short arm 77^a of the bell crank lever 77, while the long arm 77^b of said bell crank lever projects outwardly of the table top in an approximate horizontal plane to bear against the upstanding control lever 78, which is pivoted at 78^a to the bracket 21^a. The extreme lower end portion of this lever is provided with a slot 78^b which is connected by the pin 78^c to the central base arm or bar 35 of the spanner, which throws the split power line shaft made up of the sections 31 and 32 into driving engagement with the central vertical shaft 18, for rotation of the latter in either direction.

When the elevating screw, which moves the profile shifting tool bar in a vertical plane reaches the limit of its upward travel, the pin 73^a will engage the terminal arm or projection 74^a on the sliding lever 74 and the motion will be transferred to the upstanding lever 78, and the drive of the vertical shaft 18, and its gear train, will be reversed, so that the direction of rotation of the screw 38 will be changed and the tracing bar 50 will be progressively lowered.

When the screw reaches its original starting position it is desirable that the reverse throw lever 78 be moved to neutral, and this is accomplished by means of the circuit closing device 79, shown in Figure 1, and the solenoid 80, in circuit with the same. The movable core of the solenoid carries the rod 81 which is pivoted to the lever 78, and the stroke of this rod is arranged in such manner that when the solenoid is energized by the closing of the circuit, the lever will be shifted to neutral position, with both of the reverse controlling clutches disengaged. The circuit closer is operated by the guide rod 43, which engages the switch lever 79 of said device when the rod reaches its lower limit of travel. Any suitable accessory device may be employed for modifying or controlling the circuit, independently of the closer 79.

The rotation of the hat form shaft 18 is controlled independently by means of the lever 82, which operates the clutch 16; this lever being pivoted at 82^a to operate by hand, upon a downward stroke of the outer end of the lever, which extends forwardly of the machine.

The vertical shaft 66 which transmits motion to the gear train of the adhesive coating device, is equipped with a clutch element 66^a which is engaged by the sliding clutch element 66^b on the same shaft, and this is shifted by means of the lever 83 pivoted upon the arm 84, and arranged to be operated wholly by hand.

The braid or hat making material is held against the feed roller by means of the presser roller 85.

The lower end of the shaft 66 works in the bearing 66′ and is equipped with the gear 86, which is driven by the gear 87, and this gear 87 is carried by a small transfer shaft 88, supported at 89 on the frame bracket 21^a. The shaft 88 also carries a pinion gear 90 which is driven by the gear 20 of the vertical shaft 18.

In Figs. 11 and 12 I show a modified type of working tool, which is adapted to be used in connection with the bar 50, after the standard braid working tool is removed, for working upon old or new felt hats. This modified tool comprises the carrying bar 91, which is adapted to have a spring slip fit with the bar 50, as shown in detail in Fig. 9. On the outer end of the bar 91 the yoke 92 is mounted. This yoke is equipped with a pair of spaced arms 93 and 94 between which the outer end of the bar 91 is pivoted by the bolt 95. The arms 93 and 94 are formed with arcuate slots 93^a and 94^a. Through each slot a stud pin 95′, carried by the bar 91, projects and this pin is engaged by the spring 96 at one end, the opposite end of the spring bearing against the yoke to maintain same in an approximately central position on the bar 91.

The yoke 92 is further equipped with integral sockets 97 and 98, located on the ends thereof. In the socket 97 the rod 97^a works to compress the spring 98^b, while in the socket 98 the rod 98^a works to compress a compression spring. These rods 97^a and 98^a are connected at their forward ends to the case 99. the bottom wall 99^a of which is perforated to allow steam to escape from the chamber 100, between said bottom wall 99^a and the inner wall 101, which is imperforate. An electric heating unit 102 is arranged in the inner chamber 103 of said case, being supplied with current through the wires of the feed cable 104, while steam is independently supplied to the chamber 100 by means of the steam tube 105.

In Fig. 13 a brush head 106 is shown, which is designed for connection by the rods 107, one only being shown, to the yoke 92, in the manner illustrated and described with reference to the equipment shown in Fig. 11.

The gear 13′ is equipped with an arm 13ª which engages the angular arm 108 of the valve handle 108ª, shown in plan in Fig. 3. This handle controls the flow of steam from the steam cock or valve 108ᶜ to the steam tube 105 from the supply pipe 109. The handle 108ª is also provided with a small arm or finger 108ᵇ which is designed to alternately engage the spring pins 110 and 111 shown in detail in Fig. 8. When the gearing is reversed for any reason the pin or arm 13ª of the gear 13′ will reverse the position of the valve handle so that the small finger or arm 108ᵇ will engage a different spring pin. In this way intermittent jets of steam will be delivered to the compound head shown in Figs. 11 and 12, when the same is used. A manual valve 112 is provided for closing the steam supply independently.

Operation

In making a braid hat; the operator locates the braid on the rim of the hat form 12, and then manually throws the main control lever 78 to start the machine. This operation results in the shaft 18 being driven, and motion being transmitted from the gear 13 to the gear 10, thereby rotating the hat form 12. The braid passes through the guides 58ª on the case 58 and under the concave face 59′ of the tool head 59, which is kept at the proper working temperature by the electrical heating unit. As the hat form is rotated, the tool head is gradually elevated until it reaches the center of the crown at the top of the form. The operator closely watches the laying of the braids, and when the crown is finished as above, he then, as by a hand scissors or knife, cuts off the braid, and at this period manually disconnects the feed drive for the braids by means of the lever 83. After the hat is taken from the form it may be stitched and subjected to any finishing operations required. At the instant the tool head 59 reaches a position atop and somewhat above the hat form 12, to permit snipping the braid as already mentioned, the pin 73ª on the screw 38 has reached a point where it engages the adjacent end of the sliding bar 74, thereby rocking the bell-crank lever 77 against the control lever 78 and throws the latter to reverse position; this causing the screw to reverse the direction of its position, thus lowering the bar 50 and the tool head to restore the latter to its initial position offset from the periphery of the brim of the hat form 12, so that the hat may be removed. When the screw reaches the lower limit of its travel the circuit closer 79 is set to close the solenoid circuit and the solenoid shifts the lever 78 to neutral position. Should the operator at any time desire to stop the rotation of the hat form, regardless of the continuing operation of any other of the mechanisms, he accomplishes this by manual operation of lever 82.

In employing the machine for treating felt hats, the tools hereinabove mentioned are substituted as and when required on the tool carrier 50. Assuming any selected one of these tools now to be on such bar 50, the operation of the machine proceeds as above, as affected by the manual and automatic controls as already explained, exactly as has been already described; except that it will be noted that by a proper setting of the lever 83 the braid feeding mechanism is rendered and maintained inoperative.

The hereinbefore described construction admits of considerable modification without departing from the invention; therefore, I do not wish to be limited to the precise arrangements shown and described, which are, as aforesaid, by way of illustration merely. In other words, the scope of protection contemplated is to be taken solely from the appended claims, interpreted as broadly as is consistent with the prior art.

Having described my invention I claim and desire to secure by Letters Patent:

1. A hat working machine consisting of a hat form, means for rotating the hat form, a tool for applying hat making strip material against the hat form, a profile maintaining element, means engaging said element for causing the tool to follow a vertical path corresponding to the form of the element, and means for raising the tool and said last means as the material is wound upon the hat form.

2. A hat working machine consisting of a hat crown form, means for rotating the same, a tool for applying hat making material against the hat form, a vertically disposed hat profile maintaining guide, a flexible tracing mechanism arranged to engage said guide to cause the tool to describe a vertical path against the hat crown form, means for supplying hat material to the tool, and means for raising the mechanism as the hat form makes a complete turn, so that the material will be evenly laid thereon.

3. A hat working machine consisting of a hat form rotating shaft, a tool carrying bar, a hat profile block, a tracer carried by the bar to engage the block, a hat working tool carried by the bar to work against a hat form carried on and rotating with the shaft, means for allowing the bar to move horizontally and vertically, means for raising the bar, and means for operating the raising means so that the vertical motion imparted to the tool is approximately equal to the width of the hat material laid upon the hat form.

4. A hat working machine consisting of a

rotating form supporting shaft, a tool carrying bar, a profile block, means for imparting a motion to the bar to the correspond to the curvature of the profile block, means for supplying strip hat material to the tool carrying bar, and means for applying adhesive to the material as it is fed to the bar.

5. A hat working machine including a rotary hat form support, a hat form thereon, a body building tool head, means for feeding hat material to the tool head, a profile tracing mechanism, and means for moving the mechanism so that the material is wound around the hat form in an ascending spiral with the successive turns of the hat material in contact with each other.

6. A hat working machine consisting of a rotary hat form, a body building tool head, means for feeding hat making material to the tool head, means for rotating the hat form to wind the material thereon, means for supplying adhesive to the material to cause it to retain its laid position on the hat form, and means for guiding the tool head through a path of movement closely corresponding to the form predetermined for the hat to be made, whereby the material will be wound in an ascending spiral on the hat form.

7. A hat working machine consisting of a rotary hat form, a body building tool head, means for feeding hat making material to the tool head, a stationary profile guide, a bar carrying the tool head and means for holding one end of the bar in contact with the profile guide while the other end is held in work position against the hat form.

8. A hat working machine consisting of a rotary hat form, a body building tool head, means for supplying strip hat making material under the tool head, means for supplying adhesive to the material, a profile block having a groove carrying the curve predetermined for the surface of the hat crown to be made, a bar having a tracer to work in said groove on one end thereof and a spring pressed bar on the other end to hold the tool head, and means for supporting the bar for vertical and horizontal motion.

9. A hat working machine consisting of a rotary hat form, a body building tool head, means for feeding hat making material to the tool head means for rotating the hat form to wind the material thereon, means for supplying adhesive to the material to cause it to retain its laid position on the hat form, means for rendering said last means inoperative, and means for guiding the tool head through a path of movement closely corresponding to the form predetermined for the hat to be made, whereby the material will be wound in an ascending spiral on the hat form.

10. A hat working machine consisting of a rotary hat form, a body building tool head, means for feeding hat making material to the tool head, a stationary profile guide, a bar carrying the tool head, means for holding one end of the bar in contact with the profile guide while the other end is held in work position against the hat form, and means for raising said bar as the material is laid.

11. A hat working machine consisting of a rotary hat form, a body building tool head, means for supplying strip hat making material under the tool head, means for supplying adhesive to the material, a profile block having a groove carrying the curve predetermined for the surface of the hat crown to be made, a bar having a tracer to work in said groove on one end thereof and a spring pressed bar on the other end to hold the tool head, means for supporting the bar for vertical and horizontal motion, and means for raising said bar.

12. A hat working machine including a rotary hat form support, a hat form thereon, a body building tool head, means for feeding hat material to the tool head, a profile tracing mechanism, and means for moving the mechanism so that the material is wound around the hat form in an ascending spiral with the successive turns of the hat material in contact with each other, and means for applying adhesive to said material.

13. A hat working machine consisting of a rotary hat form, a body building tool head, means for feeding hat making material to the tool head, means for rotating the hat form to wind the material thereon, means for supplying adhesive to the material to cause it to retain its laid position on the hat form, and means for guiding the tool head through a path of movement closely corresponding to the form predetermined for the hat to be made, whereby the material will be wound in an ascending spiral on the hat form, and means for rendering the adhesive supplying means inoperative.

14. A hat working machine consisting of a rotary hat form, a body building tool head, means for feeding hat making material to the tool head, a stationary profile guide, a bar carrying the tool head and means for flexibly supporting one end of the bar in contact with the profile guide while the other end is held in work position against the hat form, whereby the tool head will move in a vertical and horizontal direction.

15. A hat working machine consisting of a rotary hat form, a body building tool head, means for supplying strip hat making material under the tool head, means for supplying adhesive to the material, a profile block having a groove carrying the curve predetermined for the surface of the hat crown to be made, a bar having a tracer to work in said groove on one end thereof and a spring pressed bar on the other end to hold the tool head, means for supporting the bar for vertical and horizontal motion, and a screw for raising the bar.

16. The machine defined in claim 1, wherein the tool is provided with electrical heating means to heat the adhesive on the braid as the latter passes over said tool.

In testimony whereof I hereby affix my signature.

IRVING A. EICHENBAUM.