No. 860,377. PATENTED JULY 16, 1907.

J. J. HEYS.

STITCH IMPRESSION FINISHING MACHINE.

APPLICATION FILED OCT. 13, 1905.

3 SHEETS—SHEET 1.

Fig. 2.

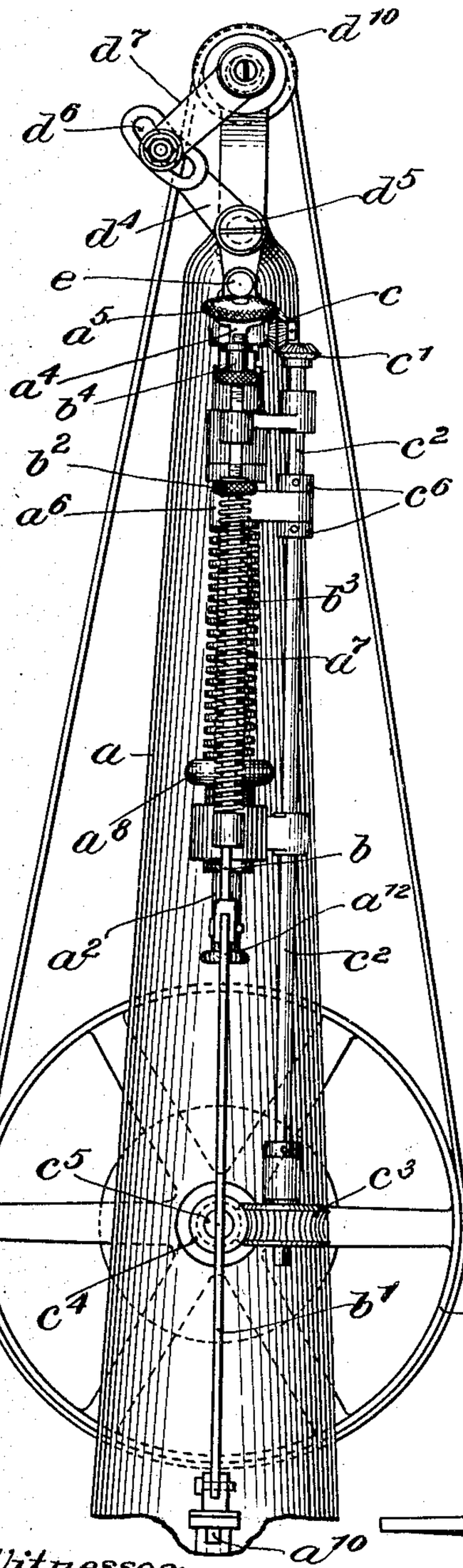
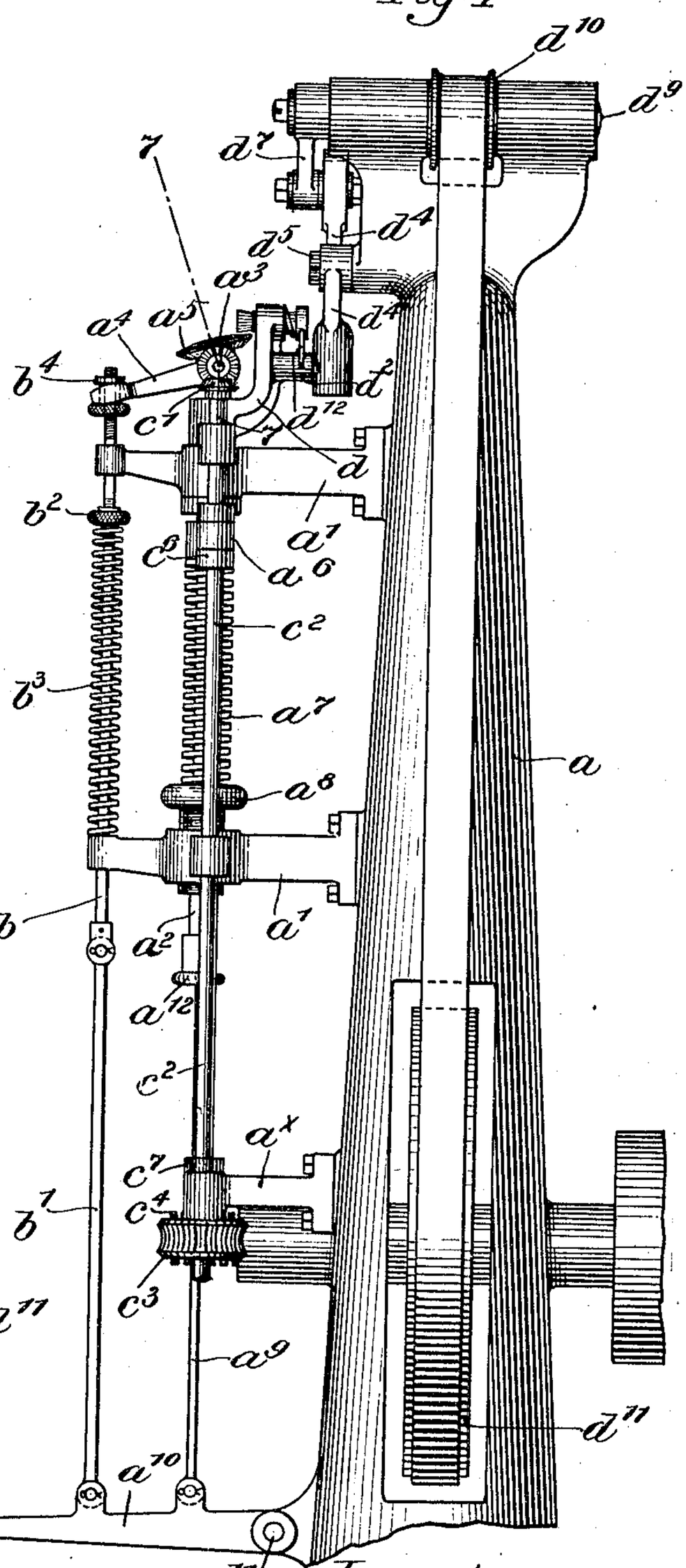


Fig. 1.



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3 SHEETS—SHEET 2.

Fig. 4.

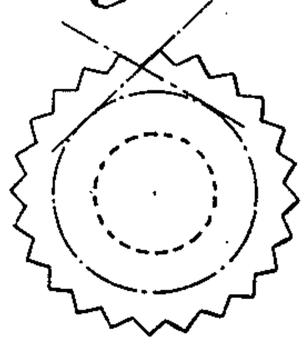


Fig. 5.

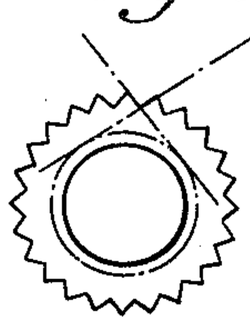
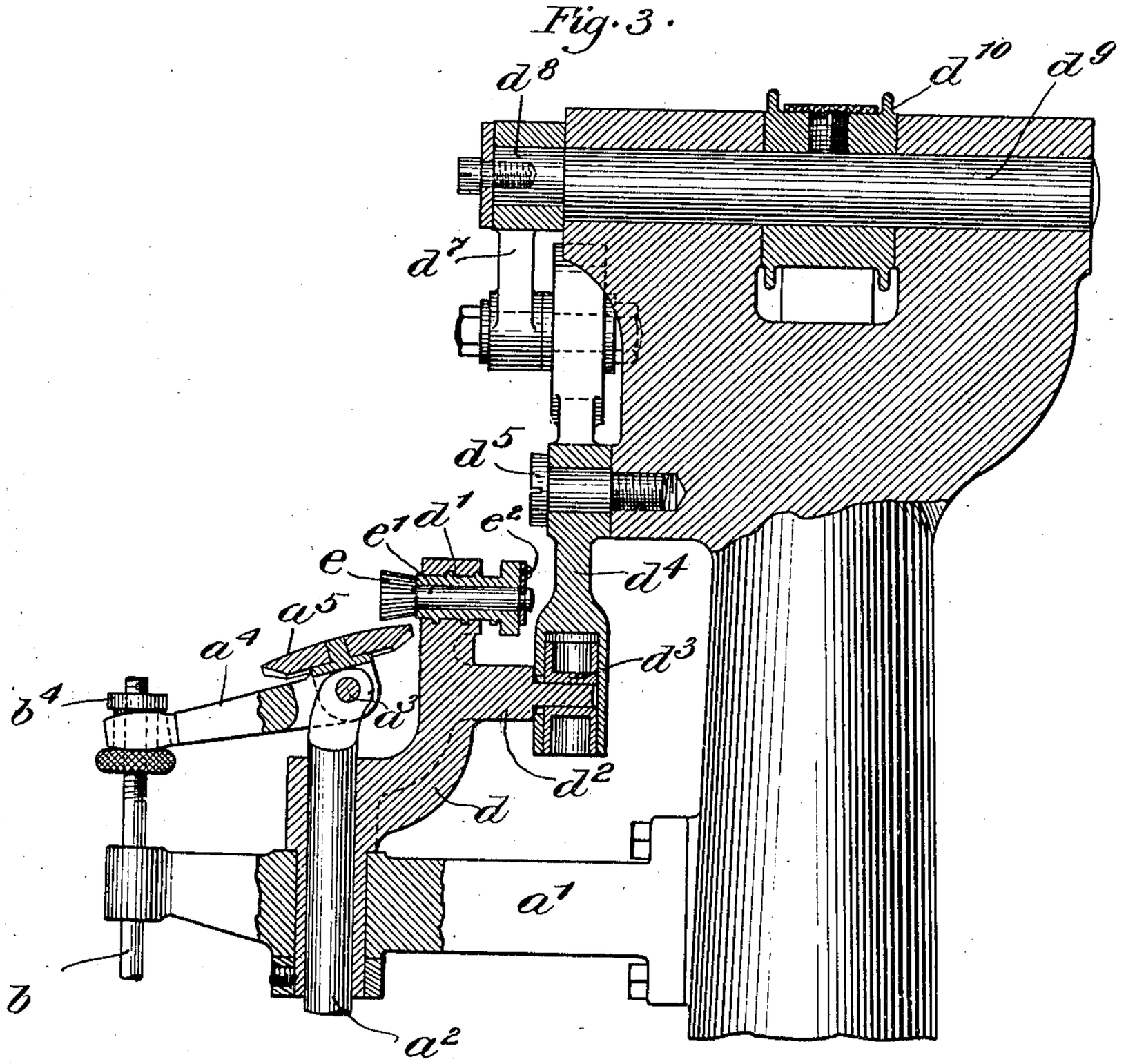


Fig. 3.



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3 SHEETS—SHEET 3.

Fig. 6.

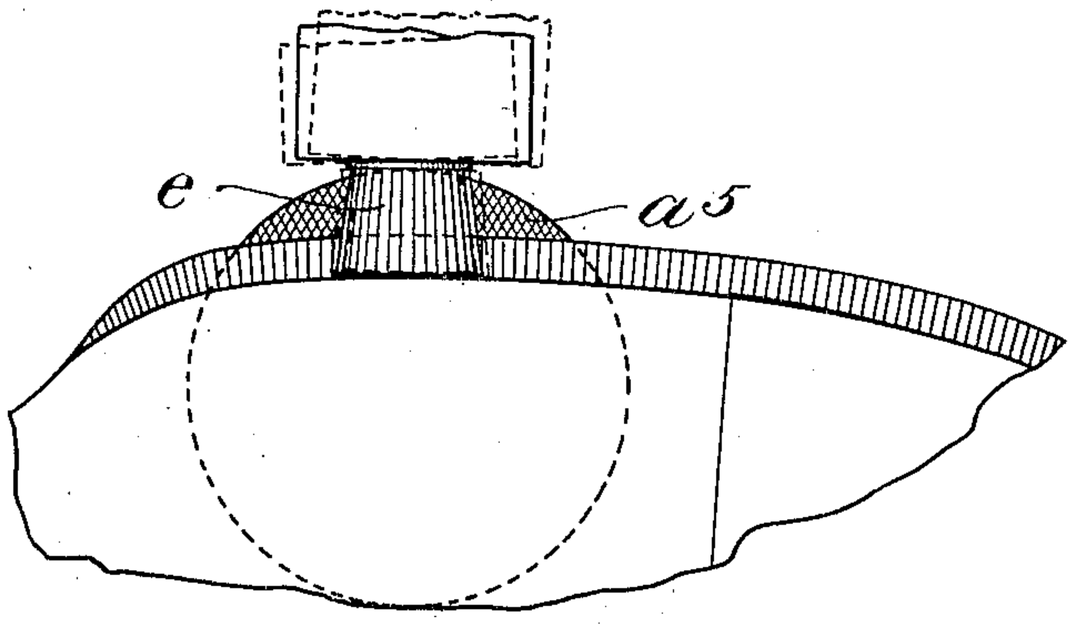
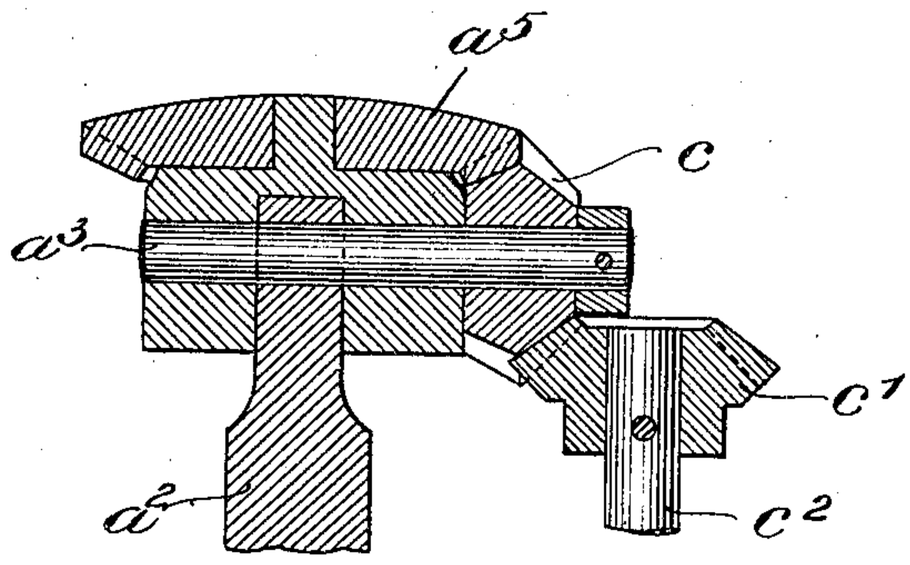


Fig. 7.



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UNITED STATES PATENT OFFICE.

JOHN J. HEYS, OF LYNN, MASSACHUSETTS, ASSIGNOR TO MANUFACTURERS MACHINE COMPANY, OF MONTCLAIR, NEW JERSEY, A CORPORATION OF NEW JERSEY.

STITCH-IMPRESSION FINISHING-MACHINE.

No. 860,377. Specification of Letters Patent. Patented July 16, 1907.

Application filed October 13, 1905. Serial No. 282,591.

To all whom it may concern:

Be it known that I, JOHN J. HEYS, a citizen of the United States, residing at Lynn, in the county of Essex and Commonwealth of Massachusetts, have invented an Improvement in Stitch-Impression Finishing-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

It is now common in the manufacture of boots and shoes to wheel the extension edge of the sole, or otherwise produce thereon a series of closely arranged impressions or corrugations called stitch impressions; and these impressions may or may not be spaced in accordance with the stitches, in fact they may be used where no stitches are located at the exposed edge. It has been found in practice, however, that the passage in usual manner of an impression wheel along a sole edge fails to produce impressions presenting that degree of sharpness in configuration and finish upon their surfaces that is desired for the best grades of shoes.

To improve the quality of impressions produced by wheels of this kind, what are known as "burnishing" or "finishing" machines have been devised which furnished a tool that would follow the previously made impressions as the work was carried beneath the tool, and the tool has been caused to reciprocate endwise at high speed so that it would produce an endwise ironing, burnishing or polishing effect upon the sides of the ridges or impressions calculated to smooth, sharpen and polish the same. Experience, however, has shown that these machines, which under certain conditions are capable of doing excellent work, are not capable of handling all kinds of work under varying conditions and are not capable of producing the very best quality that is desired.

While my invention contemplates a machine that is capable of simultaneously forming and finishing the stitch impressions, yet it finds its greatest value, as I believe, in connection with machines employed solely for finishing after the impressions have been previously initially formed by a separate machine.

My invention comprehends, among other things, the rapid oscillation of the finishing tool in the direction of feed of the work, which I have found to produce a better result than is possible where the finishing action is endwise, as in the machines heretofore devised.

The above, with various other features of my invention, will be best understood from a description of one embodiment thereof which I have illustrated in the accompanying drawings.

Referring to these drawings, Figure 1, in side elevation, shows a machine illustrating my invention, the base of the machine being broken away; Fig. 2 is a front elevation of the machine shown in Fig. 1; Fig. 3, an enlarged vertical front-to-back section of the machine head and work support; Figs. 4 and 5, details respectively showing the front and rear ends of the finishing tool; Fig. 6, a diagrammatic plan view showing the swinging action of the tool in making its oscillations; and Fig. 7, an enlarged sectional detail of the work supporting table.

In the particular embodiment of my invention selected for illustration herein and shown in the drawings, referring first to Figs. 1 and 2, the supporting column a of suitable or desired shape and construction and mounted upon any suitable tripod or base, is provided at its front side with a pair of arms or brackets a', in which is mounted the vertically movable work supporting rod a^2, to the upper end of which, see Fig. 3, is pivoted at a^3 a table lever a^4. This table lever carries at its end immediately over its supporting pivot a^3, a work supporting table a^5. Below the topmost bracket a', said work supporting rod a^2, see Figs. 1 and 2, has fast upon it an arm a^6, which rests upon a supporting spring a^7, seated at its lower end upon a spring adjusting nut a^8, tapped into the lower bracket a'. This spring tends to press the work supporting table constantly upward to hold the work against the tool, its upward movement being limited by contact of the said arm a^6 with the topmost bracket a'.

At its lower end the table rod a^2 is connected by a treadle rod a^9, with a foot treadle a^{10} fulcrumed at a^{11} upon the column or its base, whereby the work supporting table may be depressed as required for introduction or removal of the work. The table rod is preferably provided with a turn buckle a^{12} for purposes of adjustment.

The table lever a^4 that carries the work supporting table, see Fig. 1, is connected at its free end with a drop rod b, which passes loosely through the extended brackets a', and is also connected by a treadle rod b' with the said treadle a^{10}. Seated at its lower end upon the lower bracket a' and at its upper end against an adjusting nut b^2 threaded upon the drop rod b, is a spring b^3, which tends to relieve the table supporting lever a^4 of the weight of its drop rod and treadle connection and otherwise to balance and add to the effectiveness of the main table supporting spring a^7. At its upper end the said drop rod b is connected with the said table lever a^4 adjustably as by the nut b^4 threaded upon the drop rod b and grooved circumferentially to receive the end of the table lever which is forked to engage it.

It will be clear from Fig. 1 that depression of the treadle a^{10} will not only lower the work supporting table, but by reason of the table lever a^4 being connected as described with the table at a more remote distance from the treadle fulcrum, will also cause said table to be tipped more or less according to the extent

of depression of the treadle. The purpose of this will be better understood after a description of the mode of operation of the machine.

The work supporting table a^5, see Figs. 1, 2 and 7, is provided at its under side with bevel-gear teeth that are in mesh with and driven by a double bevel wheel c, which in turn is in mesh with and driven by a bevel pinion c' on the upper end of the upright shaft c^2. This shaft is journaled in suitable bearings forming a part of or secured to the brackets a', and at its lower end said shaft has also a bearing in an independent bracket $a^\times$ projected from the machine column. At its lower end said upright shaft is provided with a worm wheel c^3, driven by a worm c^4, fast on the main or pulley shaft c^5 of the machine. It is of course necessary to maintain constant driving engagement of the upright shaft c^2 with the work table to enable the latter to be rotated for the purpose of feeding the work in any vertical position in which it may be for the time being. For this purpose the arm a^6, stated as fast upon the table rod a^2, is extended laterally to embrace said upright shaft c^2, which latter, at opposite sides of said arm, is provided with collars c^6, whereby any vertical movement of the table rod and its table will cause corresponding movement of said upright shaft and thereby maintain driving engagement with the said table for rotating the latter at all times. This vertical movement of the upright shaft c^2 relative to the worm wheel c^3, is permitted by splining said worm wheel upon said shaft and providing the worm wheel with a hub extending through to the top of the bearing bracket $a^\times$, where it is fitted with a collar c^7; or, said worm wheel may be supported against endwise movement in a forked bearing. or by other suitable means if desired.

Not only is the driving engagement with and to rotate the table maintained in all vertical positions of the table, but, because the said table is tipped about the axis of the double bevel-gear c, see Figs. 2 and 3, it is possible to tip the table into any desired angular or oblique position, at any level, without in any manner disturbing the driving connections for rotating it.

Referring now to Figs. 1 and 3, loosely surrounding the upper end of the table rod a^2 and mounted to swing freely in the upper bracket a' is the wheel carrier or arm d, in the upper end of which is threaded the wheel carrying sleeve d', the threads being for the purpose of adjusting said sleeve endwise for a purpose to be described. In this sleeve is journaled the stem e' of the wheel or tool e. This wheel is of general frusto-conical shape with its largest diameter outermost, and is provided at its conical surface with properly spaced and shaped ribs, corrugations or depressions, best shown in Figs. 4 and 5. These corrugations or ridges are not tapering in depth toward the apex of the pitch cone as is usually the case with tools of this sort, but are made tapered from their base toward said apex as compared with the true cone surface, I having obtained the best results so far, with said ridges of uniform depth from end to end. This of course causes the rib faces to assume more abrupt angles at and near the smaller end of the wheel than at and near the larger end thereof, and this difference in angularity of the faces is of distinct advantage, as will be hereinafter shown. I do not herein claim broadly a wheel having the ridges or depressions of this character since I have made claims to this feature in a copending application Serial No. 282,590, filed Oct. 13, 1905; but I do claim the same herein in connection with the means for imparting a finishing motion to the wheel apart from the simple wheeling motion by which impressions are ordinarily made.

The wheel stem e' is retained in its position within the threaded sleeve by a swinging retaining plate e^2, which enters a retaining groove in the said stem, said plate being preferably made slightly cupped or like a spring to retain it frictionally in position without, however, retarding the free rotation of the stem in its bearing.

To oscillate the wheel carrier d about the table rod a^2 as its center, I have provided said carrier with a rearwardly extended arm d^2, upon the end of which is horizontally pivoted a cylindrical and partially tubular block d^3, which in turn is mounted to slide axially in the tubular end of an actuating lever d^4, pivoted at d^5 upon the machine head. Referring to Fig. 2, said lever d^4 is extended obliquely beyond its pivot and is slotted at its end d^6 to receive adjustably the end of the connecting rod d^7, driven by a crank pin d^8 in the end of the crank shaft d^9, journaled horizontally in the machine head. Between its bearings, said crank shaft is provided with a pulley d^{10}, belted to and driven by a larger wheel d^{11}, see Figs. 1 and 2, on the main shaft of the machine. Rotation of said main shaft not only operates as described, to rotate the work supporting table slowly in the direction of feed, but also operates to impart rapid oscillation to the wheel carrier d about its vertical axis which intersects the center of rotation of the work supporting wheel, causing the tool or impression finishing wheel e to vibrate or reciprocate rapidly in a curved path that is always about the center of the work supporting wheel or in a plane substantially parallel to the work being treated. These rapid vibrations of the wheel carrier and wheel cause the wheel to roll or oscillate back and forth so as to act repeatedly in or upon the same depressions or impressions in the work as the work is gradually fed beneath it by the combined action of the tool and the work supporting table. By turning the threaded bearing sleeve d', said sleeve may be screwed in or out relative to the wheel carrier d, to cause the impression finishing wheel e to be placed in position further from or nearer to the center of rotation of the work supporting table. This has the effect of varying the curvature of the arc of reciprocation of the finishing wheel enabling it to be made of long radius for traveling along straight or approximately straight lines, or of very short radius, if desired, to assist in turning the pointed toe of a shoe. The extent of vibration of the tool as a whole may be varied at will in any position of the carrying sleeve by adjustment of the connecting rod d^7, Fig. 2, in the slotted end of the actuating lever d^4. This adjustment or variation in the length of reciprocation of the wheel as a whole is important because where the depressions or corrugations in the wheel are relatively coarse, the extent of vibration of the wheel should be increased in order that the wheel may exert its burnishing or finishing action from depression to depression in the work, as compared with the length of vibration necessary to produce the same effect where the depressions or corrugations in the wheel are relatively small and close together. It is desirable for the

best results that the oscillations of the wheel cause it to roll beyond a single depression or impression and into one or more at either side thereof. This of course will be varied according to the differences in effect desired, and also according to the shape of the sole upon which the machine is employed.

It is convenient to give to the screw threads of the wheel carrying sleeve d' a high pitch so that a partial rotation of the sleeve, say through 180° will produce a complete adjustment from one to the other of its extreme positions, and by thus providing a short rotative movement for the maximum adjustment, or in fact, for any determined adjustment of the impression finishing wheel, it is possible to make the adjustment quickly so as to enable the operator to make a quick change when approaching or leaving a pointed toe. To facilitate this adjustment, see Fig. 1, I have provided the inner end of said sleeve with a radially extended arm d^{12}, which the operator may strike quickly from one to the other side to cause quick shift of the said sleeve and its pulley.

By giving to the wheel a reciprocation in a curvilinear instead of a rectilinear path about a center adjacent the larger end of the wheel, I equalize more or less completely the difference of travel at opposite ends of the wheel which would otherwise result from the difference of diameter at such ends. For example, if the wheel e were reciprocated rectilinearly or were permitted, as in prior machines, to remain fixed, the smallest circumference of the wheel at its smaller end and which would be next the outer or finishing edge of the sole, as compared with the largest circumference at the outer end of the wheel next the shoe, would cause a mutilation of the impressions at one or both ends and particularly next the smaller end and outer edge of the sole because the larger end of the wheel would naturally control or predominate. By swinging the said wheel however about an axis that is nearer the outer or larger end of the tool, the smaller end of the tool is given a longer travel than the larger end which, particularly in connection with the relatively deepened depressions or ridges thereon, has the effect of producing impressions that to the eye appear to be smaller at the outer edge of the sole when compared with those at the inner edge thereof made by the larger end of the wheel. For the best results, the travel should exceed that at the larger end of the wheel and inner edge of the extension because of the larger circumference of the wheel upon its outer edge. When used as an initial impressioning machine this movement produces impressions that are substantially straight from end to end and of uniform depth thereat as compared with the impressions made by the prevailing wheels which are more or less distorted or sinuous from end to end, and, when used solely as a finishing machine, it has the effect of straightening the sinuousities produced by the usual initial impressing machine.

Whether used as an initial impressing machine or as a finishing machine, the oscillations of the tool produced by the rapid reciprocations thereof, cause the tool, by rolling repeatedly back and forth in each and every impression that has been made by or for it, to act to polish or burnish the impression surfaces and to mold or fashion the configurations thereof to a degree that has heretofore been quite impossible in the art.

The burnishing or finishing alone is superior to that produced by the endwise reciprocating tool or wheel because of the direction and manner of approach of the tool to the work, which tends to iron or smooth out irregularities or roughness instead of cutting endwise into or through the same and adding to the roughness as is likely to be the case, particularly upon certain grades of work, where an endwise reciprocating wheel or tool is used.

The wheel may be heated, if desired, by any of the well-known means or appliances.

I will now explain why I have provided the means for varying the pitch of the work supporting table simultaneously with depression of the same.

In feeding a shoe through my improved machine, and particularly when rounding the toe of the shoe, it is desirable to throw the heel end downward so as to tip the shoe to a sharper angle for presentation to the finishing wheel. This is also desirable when working upon those parts of the sole extension which underlie a pronounced overhang of the last or upper as, for example, along the inner side of the sole in the vicinity of the ball thereof, and where it is desired to tip the shoe away from contact with the oscillating wheel. To tip the shoe as stated, and at the same time to maintain the extension for its entire width in operative contact with the wheel, it becomes necessary also to depress the work table as a whole, and the parts are proportioned as shown, so that a single depression of the treadle operates simultaneously to tip the work table and at the same time drop it in such a manner and always in such ratio as will maintain the upper side of the work invariably in proper engagement with the wheel. The ratio of drop and tip thus given to the table by a single depression of the treadle may be varied at will by the adjusting means provided.

Claims

1. In a machine of the class described, the combination with a working tool, of a work table for moving the work with relation to the table and the tool, means to raise and lower the table, means also to tip it, and means to feed the work in any elevated or tipped position of the table.

2. In a machine of the class described, the combination with a working tool, of a work table for moving the work with relation to the table and the tool, means to raise and lower the table, means to tip it, and means to rotate it in any elevated or tipped position.

3. In a machine of the class described the combination with a working tool for acting upon the sole of a shoe, of a work table for supporting the work for the action of said tool, a treadle and connections between said treadle and table for simultaneously changing the elevation and pitch of the table.

4. In a machine of the class described the combination with a tool for acting upon the sole of a shoe, of a work table for supporting the work for the action of said tool, yieldingly sustained means for varying both the elevation and the pitch of said table, and means to control the table elevation and pitch.

5. In a machine of the class described the combination with a tool for acting upon the sole of a shoe, of a rotatable work table for supporting and moving the work with relation to itself and the tool, a treadle, a connection between said treadle and table for simultaneously changing the elevation and pitch of the table and means to rotate said table in any of its positions.

6. In a machine of the class described the combination with a tool for acting upon the sole of a shoe, of a work table for supporting and moving the work with relation to itself and the tool, means to raise and lower it, means to tip it, and worm and worm wheel connections geared to and to rotate said table in any of its positions.

7. A machine of the class described containing in combination a movable work support, a stitch impression wheel and means to oscillate said wheel in a curved path extending about said support.

8. A machine of the class described containing in combination a work support, a freely rotatable stitch impression wheel, and means to impart relative oscillatory movements thereto in a curved path extending about said support.

9. A machine of the class described containing in combination a work support, a stitch impression wheel and means to oscillate the same, in a curved path the plane of which intersects the axis of the work support.

10. A machine of the class described containing in combination a rotatable work supporting table, a finishing wheel and means to oscillate the latter in a curved path about the center of said table as an axis.

11. A machine of the class described containing in combination a work table, a finishing wheel, means to oscillate the latter in a curved path about the center of said table as an axis, and means to vary the radius of said curved path of oscillation.

12. A machine of the class described containing in combination a work table, a finishing wheel, means to oscillate the latter in a curved path about the center of said table as an axis, means to vary the radius of said curved path of oscillation, and means to vary the length of said path of oscillation.

13. A machine of the class described containing in combination a work support, a finishing wheel, means to impart relative oscillation thereto in a curved path extending about the work support and means to vary the extent of oscillation.

14. A machine of the class described containing in combination a work table, means to vary its elevation and pitch, means to rotate it in any of its positions of elevation or pitch, a finishing wheel to coöperate with said table and means to oscillate it relative to said table.

15. A machine of the class described containing in combination a work table, means to vary its elevation, means to rotate it in any of its elevated positions, a finishing wheel to coöperate with said table and means to oscillate it in a curved path relative to said table.

16. A machine of the class described containing in combination a work table, means to vary its elevation, means to rotate it in any of its elevated positions, a finishing wheel to coöperate with said table, means to oscillate it in a curved path relative to said table, and means to vary the radius of said curved path of oscillation.

17. A machine of the class described containing in combination a work support, a finishing wheel of frusto-conical shape and provided with depressions or corrugations of increasing depth from the base of said wheel toward the apex thereof as compared with the true conical surface, and means to oscillate said wheel.

18. A machine of the class described containing in combination a work support, a finishing wheel of frusto-conical shape and provided with depressions or corrugations of increasing depth from the base of said wheel toward the apex thereof as compared with the true conical wheel surface, and means to oscillate said wheel in a curved path.

19. A machine of the class described containing in combination a work support, an opposed frusto-conical finishing wheel provided with longitudinal ribs or projections, means relatively to oscillate said wheel and work support and to cause the relative oscillations at the smaller end of said wheel to traverse substantially as long a distance as those at the larger end of the wheel.

20. A machine of the class described containing in combination a work supporting table, an upright table rod about the axis of which said table is rotatable, a finishing wheel, a carrier therefor mounted to swing also about the axis of said table rod, and means to impart reciprocatory or swinging movement to said wheel carrier.

21. In a machine for operating upon the soles of boots and shoes, the combination of a work support, a frusto-conical tool, and means to oscillate said tool about an axis nearer to the larger end of said tool than the smaller end.

22. In a machine for operating upon the soles of boots and shoes, the combination of a work support, a stitch impression wheel consisting of a conical tool, and means to impart to said tool oscillatory movements in a curved path extending about said work support.

23. In a machine for acting upon the soles of boots and shoes, the combination of a work support, a rotatable operating wheel, and means relatively to oscillate the said wheel and work support about an axis at an angle to the axis of the operating wheel and in a plane substantially parallel to the surface of the work.

24. A machine for making impression or imitation stitches having, in combination, a rotatable work support, an indenting wheel, and means to oscillate said wheel in a curved path substantially parallel to the general plane of the surface of the work being treated.

25. A machine for making impression or imitation stitches having, in combination, a work support a^5, an indenting wheel c, an arm d carrying said indenting wheel, and means for oscillating said arm d and the indenting wheel in a curved path extending about the work support.

26. A machine for making impression or imitation stitches having, in combination, a work support a^5, a lever a^4 controlling the angular tilt of the support, a rod b connected to the lever a^4, a tool e, an arm d carrying said tool, and means for oscillating said arm d and the tool e in a curved path extending about the work support.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

JOHN J. HEYS.

Witnesses:
HONORAH J. BRESNAHAN,
EVERETT S. EMERY.