F. J. NASH.

MACHINE FOR ROUGHING SHOE SOLES, &c.

APPLICATION FILED MAY 31, 1906.

978,777.

Patented Dec. 13, 1910.

4 SHEETS—SHEET 1.

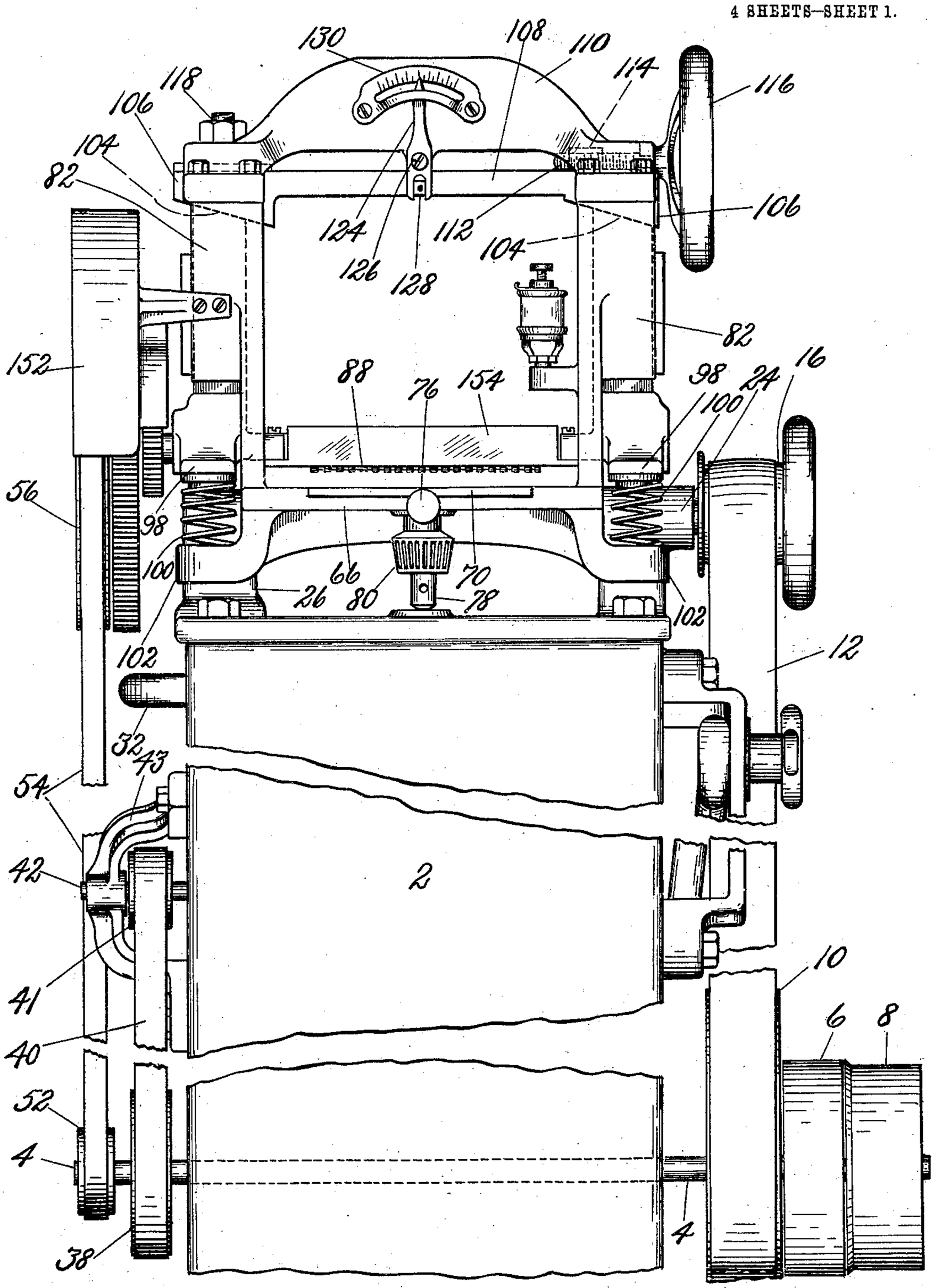

Fig. 1

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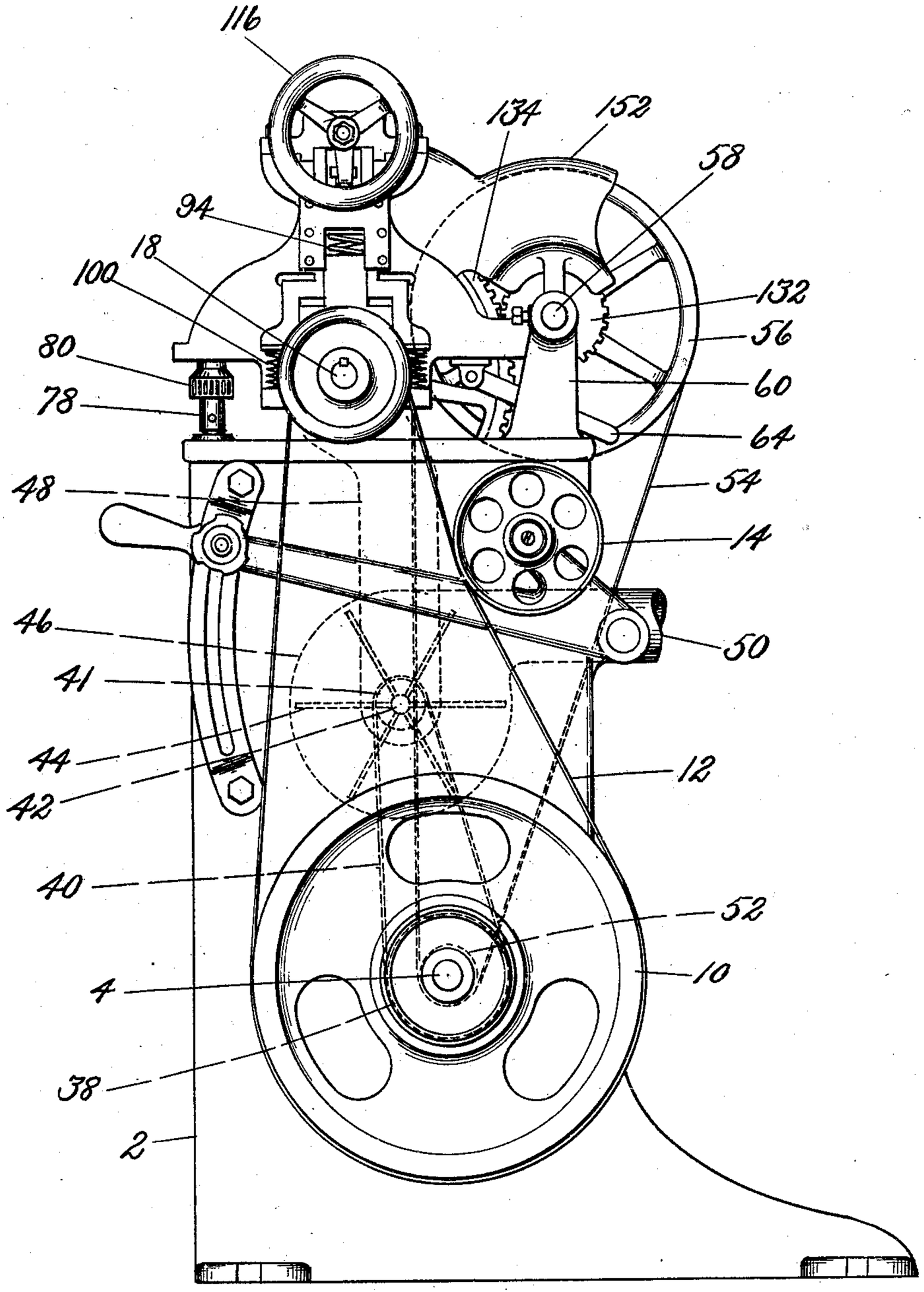

Fig. 2.

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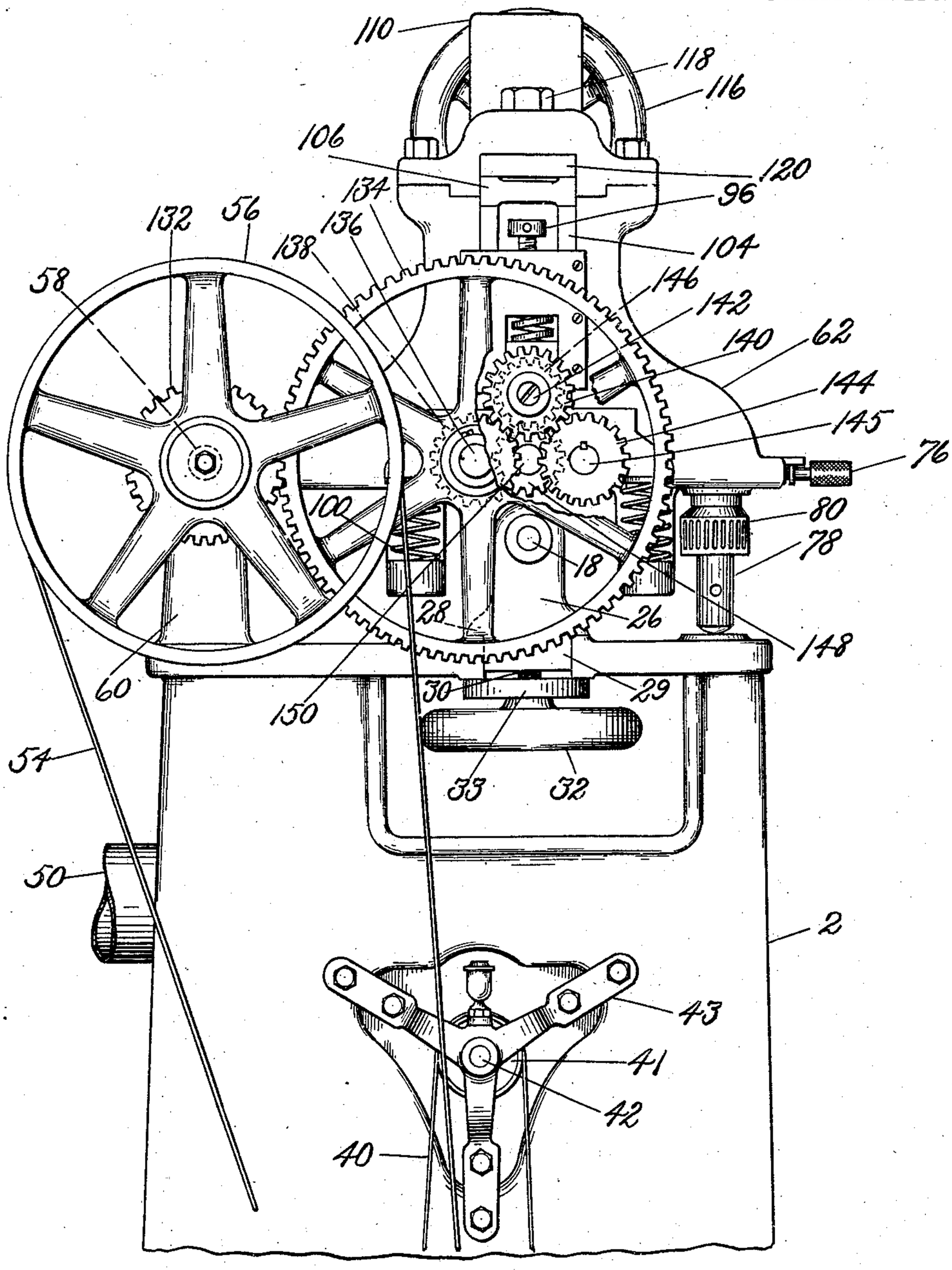

Fig. 3.

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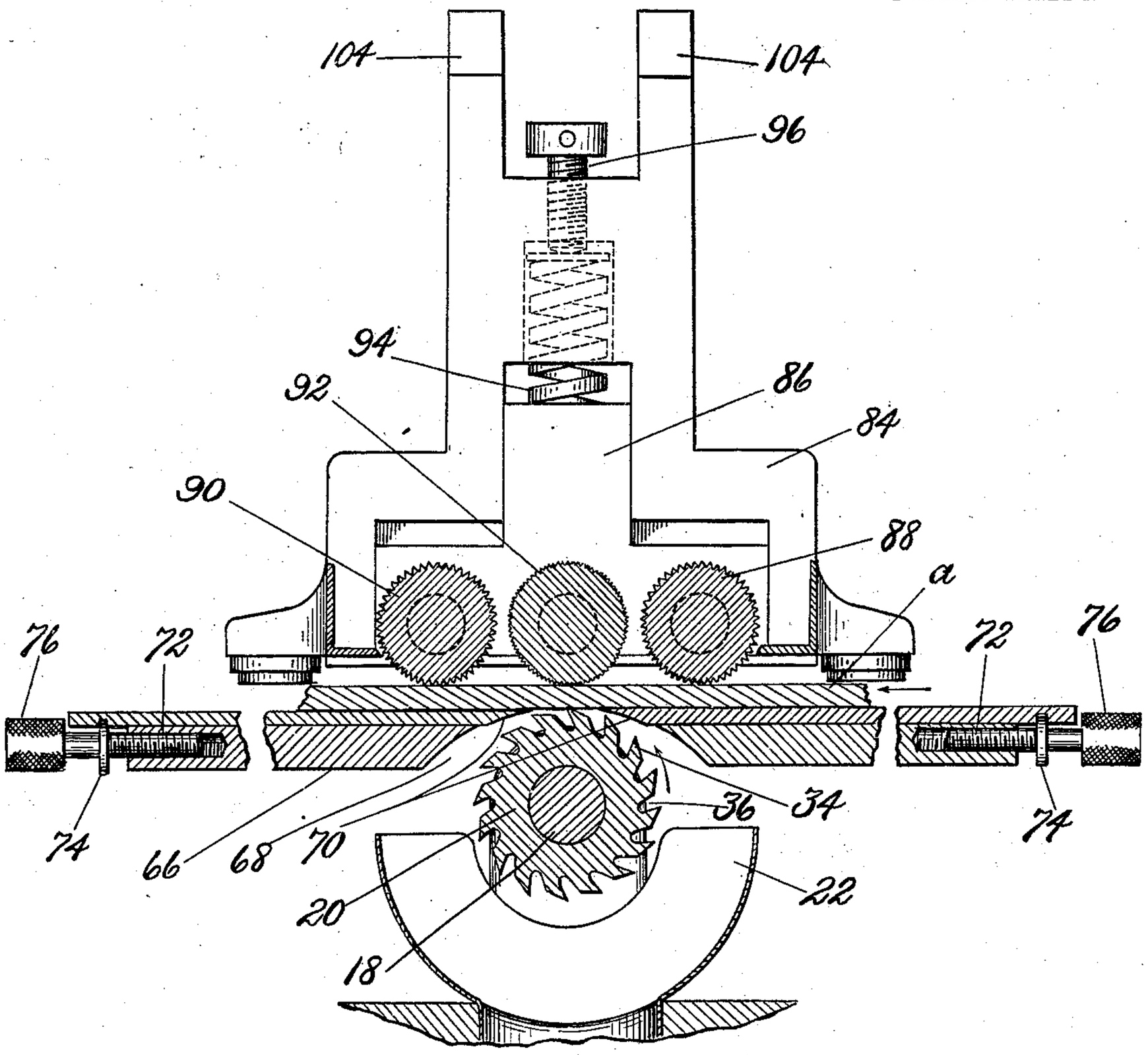

Fig. 4.

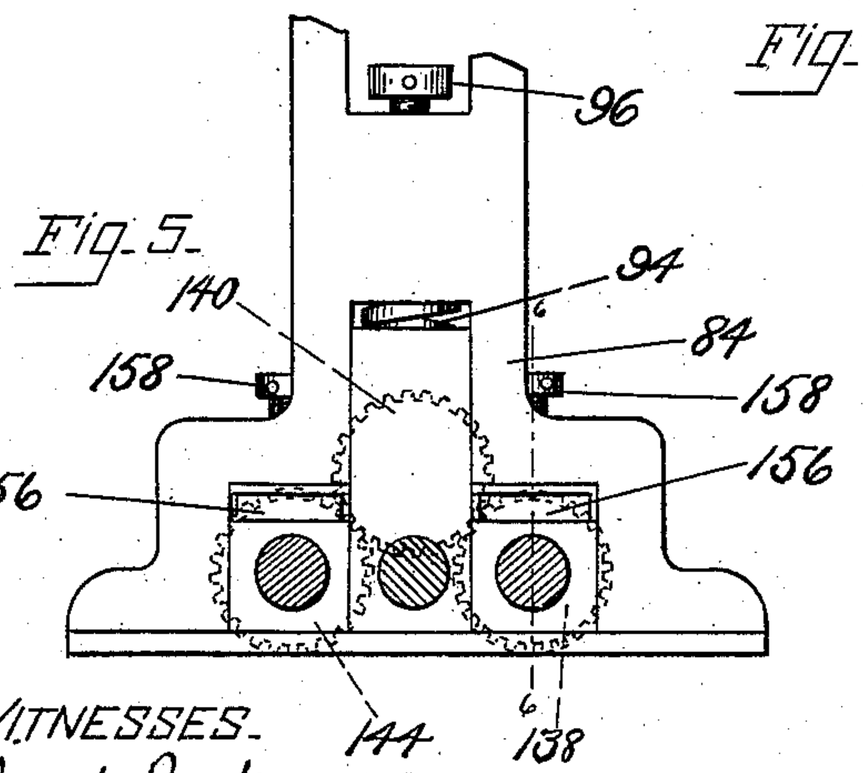

Fig. 5.

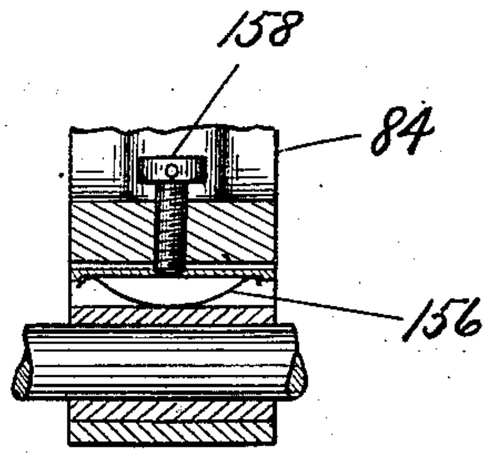

Fig. 6.

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UNITED STATES PATENT OFFICE.

FREDERICK J. NASH, OF SOMERVILLE, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY COMPANY, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

MACHINE FOR ROUGHING SHOE-SOLES, &c.

978,777. Specification of Letters Patent. **Patented Dec. 13, 1910.**

Application filed May 31, 1906. Serial No. 319,617.

To all whom it may concern:

Be it known that I, FREDERICK J. NASH, a citizen of the United States, residing at Somerville, in the county of Middlesex and Commonwealth of Massachusetts, have invented certain Improvements in Machines for Roughing Shoe-Soles, &c., of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to machines for roughing the surface of leather, particularly the grain surface of soles for boots and shoes.

The object of the invention is to provide a machine which will cut away the smooth shiny surface on the grain side of soles, etc., and leave a surface which is slightly rough. By this treatment, a suitable surface is provided to which cement may be applied in order that the soles may be cemented to the insoles or filling in shoes. When the material operated upon is an insole, a different advantage results from the removal of the smooth shiny surface. The surface contains tannic acid which is drawn from the leather by the heat and perspiration from the foot causing cracking of the leather and giving a burning sensation to the foot. By removing this surface from insoles, these disadvantages are avoided. In addition to the above mentioned advantages, the leather is rendered more flexible.

This invention is embodied in a machine which has a rotary cutter for removing the smooth surface from the stock and means to feed the stock and hold it in contact with the periphery of said cutter. The cutter is provided with a plurality of cutting edges extending lengthwise or parallel to the axis of rotation, and at right angles to the direction of travel of the stock. The cutter is rotated with a peripheral speed much greater than the speed at which the stock is fed. In this manner the surface of the stock is removed in the form of very minute chips, and the stock is left with a uniform velvety appearance with the fibers slightly raised.

In the preferred form of construction of the machine, a table is supported over the cutter, and this table has an opening for the periphery of the cutter and adjustable plates for changing the width of the opening. The surface of the table along which the stock is fed is substantially tangential to the periphery of the cutter, and the stock is thus supported in position to have its surface subjected to the action of said cutter without cutting into the body of the stock. The table is preferably carried by a head which is pivoted to the frame so that it may be swung back to expose the cutter.

The cutter is mounted in a movable bearing at one end so that it may be withdrawn endwise from the machine in order to remove it for sharpening or replacing with a new cutter. The head carries a plurality of rolls suitably spaced from the table. As disclosed in this particular embodiment, there are three of these rolls, the middle one being located directly over the cutter and acting to hold the stock in operative relation to the cutter, and the other two rolls acting as feed rolls. The two outer rolls are positively driven while the middle roll may be positively driven so as to act as a feed roll also or it may be mounted so as to act as a presser roll only and be turned merely by contact with the stock which is being fed along the table. The feed rolls and the presser roll are adjustably mounted in the head so that they may be adjusted with respect to the table and the cutter, and means is provided for putting the rolls into parallelism relatively to the cutter. The head is adjustably supported in order to vary the position of the table with respect to the cutter. In this way the distance which the cutter projects through the opening in the table may be varied, and the amount of material removed from the face of the stock controlled. This adjustment also provides for compensating for the wear and the grinding away of the cutting edges of the rotary cutter.

These and other features of the invention, including certain details of construction and combination of parts, will be set forth in the following description and pointed out in the claims.

Figure 1 is a front elevation of the machine; Fig. 2 is a side elevation of the right-hand side; Fig. 3 is a side elevation of the left-hand side; Fig. 4 is a vertical transverse section; Figs. 5 and 6 are detail views illustrating a modification.

The frame 2 is provided with bearings to

support a driving shaft 4 on which are mounted fast and loose pulleys 6 and 8 operated from any suitable source of power, The shaft 4 carries a large pulley 10 connected by a belt 12 to a small pulley 16 on the cutter shaft 18 carrying the cutter 20 at the upper part of the frame. The frame carries a casing 22 which partly surrounds the cutter; also a fixed bearing 24 and a movable bearing 26 for supporting the cutter shaft. The movable bearing has a flange 28 resting upon the frame and a portion 29 extending through a slot in the frame, which portion is screw-threaded to receive a screw-threaded rod 30 operated by a hand wheel 32. By turning this hand wheel in the proper direction, the bearing may be clamped in place by the engagement of the enlarged portion 33 with the top portion of the frame, or loosened so as to permit the cutter to be drawn endwise from the machine. The cutter is provided with a plurality of longitudinally extending cutting edges 34 separated from each other by the grooves 36. The shaft 4 carries a pulley 38 connected by a belt 40 to a pulley 41 on a shaft 42 supported in brackets 43 secured to the frame. The shaft 42 carries a fan 44 which rotates in a casing 46 located below the cutter to which the air flue 48 leads, while the flue 50 leads from the rear of the casing for the discharge of material cut from the stock. A small pulley 52 is mounted on the shaft 4 and connected by a belt 54 to a large pulley 56 on a shaft 58 mounted in projections 60 extending upwardly from the frame.

The numeral 62 designates a supporting structure herein referred to as a head, and which is mounted on the shaft 58 so as to turn thereon, so that the head may be swung back out of operative position. It may be supported in this position by a bar 64 pivoted to the lower portion of the head. The bar 64 is longer than the normal distance between its pivot and the top of the frame and when the machine is in operation occupies an inclined position as shown in Fig. 2. When the head 62 is turned upon the shaft 58, which constitutes a pivot, the bar 64 swings into a vertical position and serves as a stop to hold the head in elevated position. When the bar is moved out of vertical position, the head may be returned into operative position.

The head carries a table 66 having an opening 68 through which the periphery of the cutter projects slightly when the head is in operative position. At each side of this opening are plates 70 movable toward and from the cutter by means of screws 72 which engage screw-threads in the table and which are provided with disk portions 74 fitting in grooves in the plates, said screws being turned by means of the milled heads 76, in order to regulate the size of the opening. The head is supported in operative position by a short adjusting rod 78 screw-threaded at one end into the front lower side of the table, the other end of the rod resting upon the top portion of the frame. The rod is provided with a milled portion 80, by means of which said rod may be turned for raising or lowering the front end of the table.

Extending upwardly from the table are the posts 82 which carry the yokes 84 in which are mounted the bearings 86 for the feed rolls 88 and 90 and the presser roll 92. The bearings 86 are held down upon the stock yieldingly by the springs 94 the tension of which may be regulated by the screws 96 as shown in Fig. 4. The yokes are provided with lugs 98 which rest upon springs 100 held between said lugs and lugs 102 on the table. The upper ends of the yokes are made in the shape of wedges 104 which engage similarly shaped wedges 106 formed on the ends of the bar 108 as shown in Fig. 1. This bar is arranged to be moved longitudinally between the yokes and a cap plate 110 which spans the space between the posts 82 and which is securely bolted to the same. The bar is moved longitudinally by a screw bolt 112 mounted to rotate without longitudinal movement in a flange of the cap plate 110, said screw bolt having threaded engagement with a lug 114 on the bar. A hand wheel 116 is secured to the screw bolt for turning it in one direction or the other whereby the bar 108 is moved to the right or to the left for forcing the yokes 84 down or permitting them to be raised by the springs 100. The left-hand end of the sliding bar may be adjusted vertically for the purpose of bringing the feed rolls and the presser roll into parallel relation with respect to the cutter. This is accomplished by means of the set screw 118 mounted in the cap plate and bearing on a plate 120 which rests on the left-hand end of the sliding bar. By turning this set screw in one direction or the other, this end of the bar may be depressed or permitted to rise under the influence of the springs 100.

For the purpose of adjusting the feed rolls and presser roll according to the thickness of the stock which it is desired to operate upon, a pointer 124 is pivoted to the cap plate at 126 and the lower end is forked to engage a block 128 pivoted to the bar 108. The upper end of the pointer moves over a scale 130 to indicate the proper adjustment for different thicknesses of stock.

The shaft 58 previously referred to is provided with a pinion 132 meshing with a large gear 134 on the shaft 136 of the rear feed roller. This shaft is provided with a gear 138 which meshes with an intermediate gear 140 on a short shaft 142. The gear 140 meshes with a gear 144 on the shaft 145 of

the front feed roller, while a gear 146 on the shaft 142 meshes with a gear 148 on the shaft 150 of the middle or presser roll 92. It will thus be seen that the feed rolls and the presser roll are all turned in the same direction by means of this train of gearing operated from the shaft 58. In this form of the invention the presser roll is positively driven and acts as a feed roll also. The three rolls are roughened in any suitable manner in order to feed the stock without slipping. A gear guard 152 extending over the train of gearing is secured to the post 82, while a guard 154 extends across the table in front of the feed roll 88 to prevent the hands of the operator being drawn thereunder.

In the form of invention illustrated in Figs. 5 and 6 the presser roll 92 instead of being positively driven is turned merely by contact with the stock passing beneath it. For this purpose the gears 146 and 148 are dispensed with and the feed rolls turned by means of the gears 138 and 144 and intermediate gear 140. In this modification the bearings of the three rolls are separate instead of being made in one piece. This permits the three rolls to move vertically independently of each other. The bearings of the feed rolls are held yieldingly by the leaf springs 156 controlled by the adjusting screws 158 while the bearings of the presser roll are held yieldingly by the springs 94. The three rolls are thus yieldingly mounted at each of their ends independently of each other. By mounting the rolls in this manner the stock is held down when it is not uniform in thickness so that the cutter will reach the thin places.

The operation of this machine will be readily understood from the foregoing description.

Upon connecting the shaft 4 with any suitable source of power, the cutter 20 is rotated at a high rate of speed in the direction indicated by the arrow in Fig. 4 while the feed rolls and the presser roll in the main form of the invention are rotated at a much slower speed in the opposite direction. Upon placing the stock *a* upon the table so that it is engaged by the front feed roll, it is carried along the table between the cutter and the presser roll. The smooth shiny surface of the leather which is downward is cut away in the form of very small chips by successive attacks of the cutting edges 34. These chips are drawn into the flue 48 by the fan and discharged through the flue 50. By turning the hand wheel 116, the position of the yokes 84 may be changed, and the feed rolls and presser roll thus adjusted with respect to the cutter, the extent of the adjustment being indicated by the pointer 124 on the scale 130. By turning the set screw 118, the rolls may be brought into parallel relation with respect to the cutter. By turning the screws 72 the plates 70 are moved and the width of the opening 68 changed. By turning the rod 78, the front end of the table may be moved up and down and the extent which the periphery of the cutter projects through the opening regulated. This adjustment also makes provision for compensating for the wear of the cutting edges. Whenever it is desired to remove the rotary cutter, the head is turned back and the movable bearing loosened. This bearing may then be moved toward the left and the cutter removed by pulling it lengthwise in this direction.

While in the above description, a complete machine has been described in detail in order to fully set forth the preferred manner of applying the invention, it will be understood that various changes may be made in arrangement and in details without departing from the spirit of the invention.

Having described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:—

1. In a machine of the class described, the combination with a rotary cutter, of a table along which the stock is fed, feed rolls, and a presser roll for holding the stock in operative relation with said cutter together with means for driving the two feed rolls independently of said presser roll.

2. In a machine of the class described, the combination with a rotary cutter, of a table along which the stock is fed, feed rolls, and a presser roll for holding the stock in operative relation with said cutter, the said feed rolls and presser roll being yieldingly mounted at each of their ends independently of each other.

3. In a machine of the class described, the combination with a rotary cutter, of a table along which the stock is fed, feed rolls, a presser roll for holding the stock in operative relation with said cutter, and means under the control of the operator for adjusting said feed rolls and presser roll with respect to said cutter.

4. In a machine of the class described, the combination with a rotary cutter, of a table along which the stock is fed, feed rolls, a presser roll for holding the stock in operative relation with said cutter, and means for adjusting said feed rolls and presser roll into parallel relation with respect to said cutter.

5. In a machine of the class described, the combination with a rotary cutter, of a table along which the stock is fed, feed rolls, a presser roll for holding the stock in operative relation with said cutter, means for putting said feed rolls and presser roll into parallel relation with respect to said cutter, and means for adjusting them while in this position with respect to said cutter.

6. In a machine of the class described, the

combination with a rotary cutter, of a presser roll for holding the stock in operative relation with said cutter, means for moving said presser roll toward and from said cutter, and means for adjusting said presser roll into parallel relation with respect to said cutter.

7. In a machine of the class described, the combination with a rotary cutter, of a table along which the stock is fed, feed rolls, a presser roll for holding the stock in operative relation with said cutter, and means for adjusting toward and from the cutter one end of said feed and presser rolls independently of the other end.

8. In a machine of the class described, the combination with a rotary cutter, of a table along which the stock is fed, feed rolls, a presser roller for holding the stock in operative relation with said cutter, and mechanism under the control of the operator for simultaneously adjusting the ends of said feed and presser rolls toward and from the cutter having provision for visually indicating the proper adjustment for different thicknesses of stock.

9. In a machine of the class described, the combination with a rotary cutter, of a table along which the stock is fed, feed rolls, a presser roll for holding the stock in operative relation with said cutter and means whereby said feed rolls and presser roll may be brought into parallel relation with said cutter by adjustment of a single member.

10. In a machine of the class described, the combination with a rotary cutter having longitudinally extending cutting edges, of a head pivotally mounted whereby it may be swung out of operative relation to said cutter, a table carried by said head along which the stock is fed, feed rolls and a presser roll for holding the stock in operative relation with said cutter, and means carried by the head for yieldingly supporting the said feed rolls and presser roll at each of their ends independently of each other.

11. In a machine of the class described, the combination with a table having an opening in its work supporting surface, of a rotary cutter arranged to project through said opening and mounted upon a shaft extending substantially parallel with said table, a stationary bearing for one end of the shaft and a longitudinally movable bearing for the other end of the shaft whereby the cutter may be removed from operative position, in the direction of its length.

12. A machine of the class described, having in combination, a rotary cutter, a table having an opening intermediate its ends for the periphery of the cutter, plates mounted on said table on opposite sides of said opening having work supporting faces substantially tangential to the periphery of said cutter, the said plates being arranged for adjustment toward and from each other, and means for feeding the stock along said plates.

13. A machine of the class described having, in combination, a rotary cutter, a work-supporting table provided with an opening through which the periphery of the cutter extends, means for feeding the work, and means for varying the area of the work which is exposed to the action of the cutter at any given instant.

14. A machine of the class described having, in combination, a cutting member and means for feeding work thereto, said feeding means comprising a feed roll, a bearing for said roll, a support in which said bearing is slidable, means for adjusting said bearing with respect to said support, springs by which said support is carried, and means for adjusting said support.

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

FREDERICK J. NASH.

Witnesses:
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ARTHUR L. RUSSELL.