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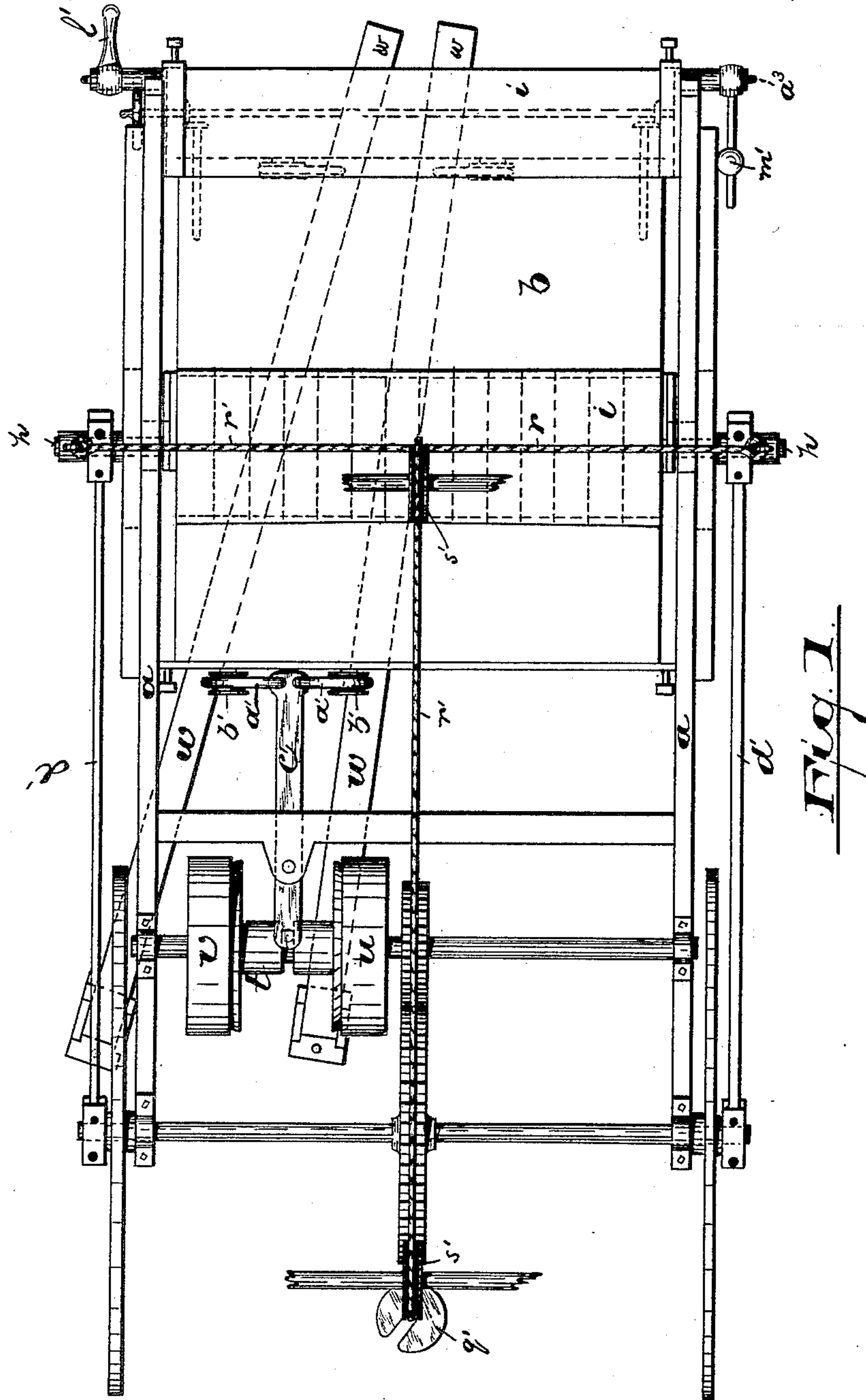
4 Sheets—Sheet 1.

M. M. SCOTT.

LEATHER GRAINING AND SOFTENING MACHINE.

No. 462,825.

Patented Nov. 10, 1891.



*Fig. 1.*

—Witnesses—

—Inventor—

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By Drake & Co. Atty's.

(No Model.,

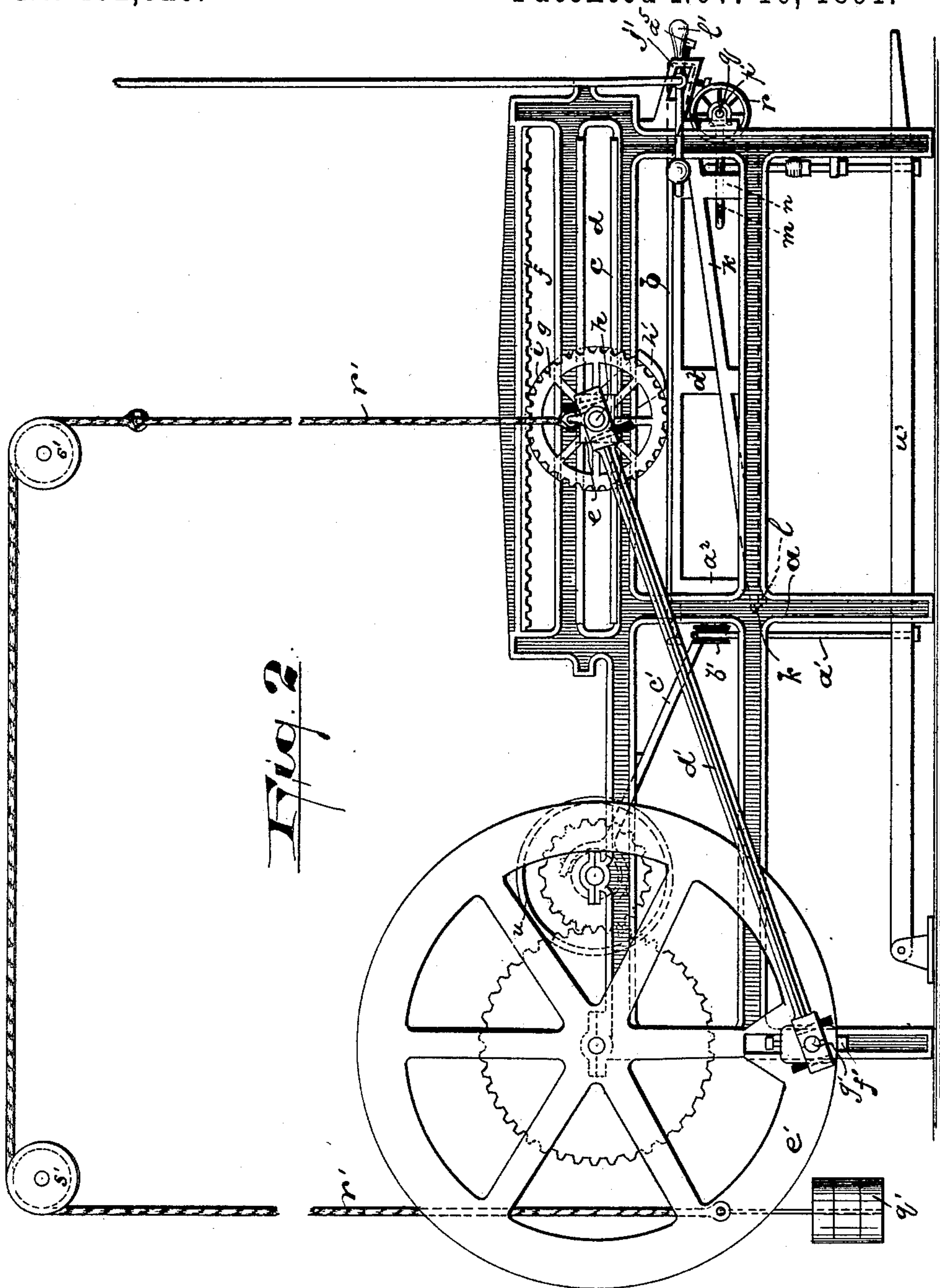
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LEATHER GRAINING AND SOFTENING MACHINE.

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*Fig. 2*

—Witnesses—

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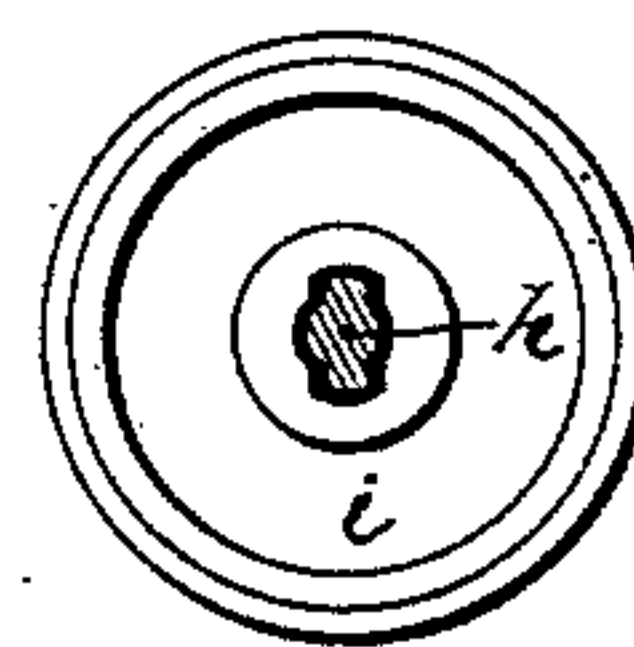
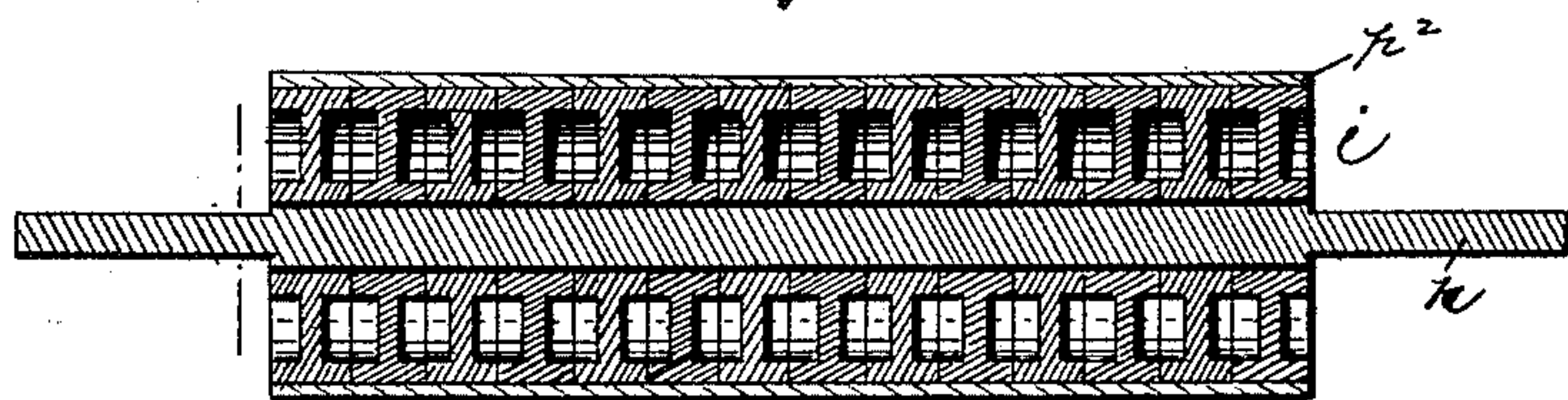
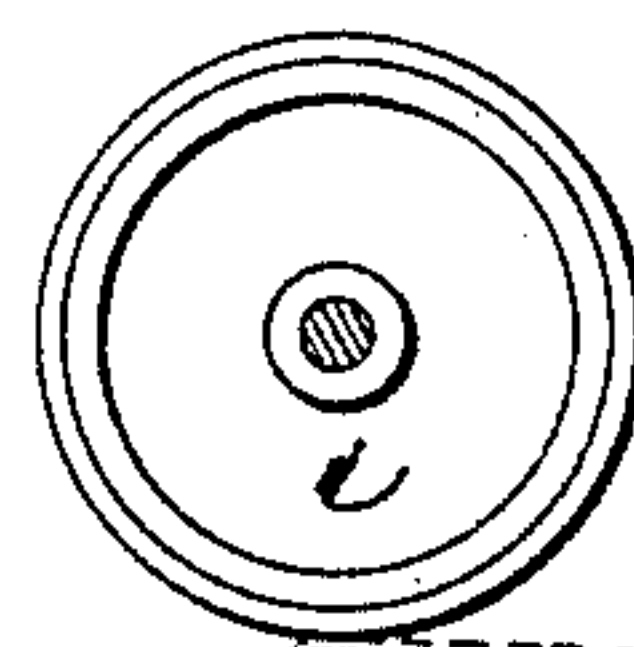
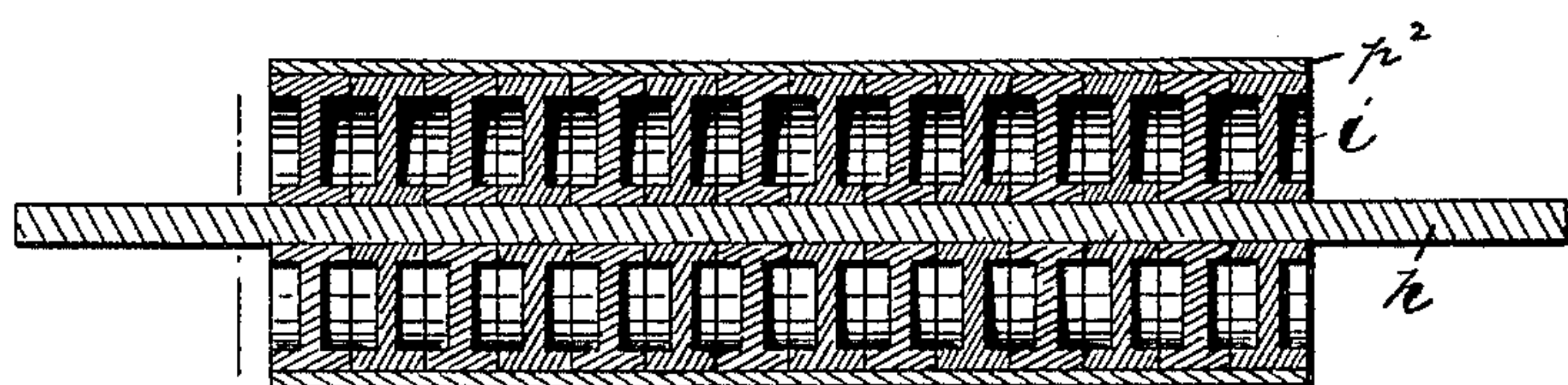
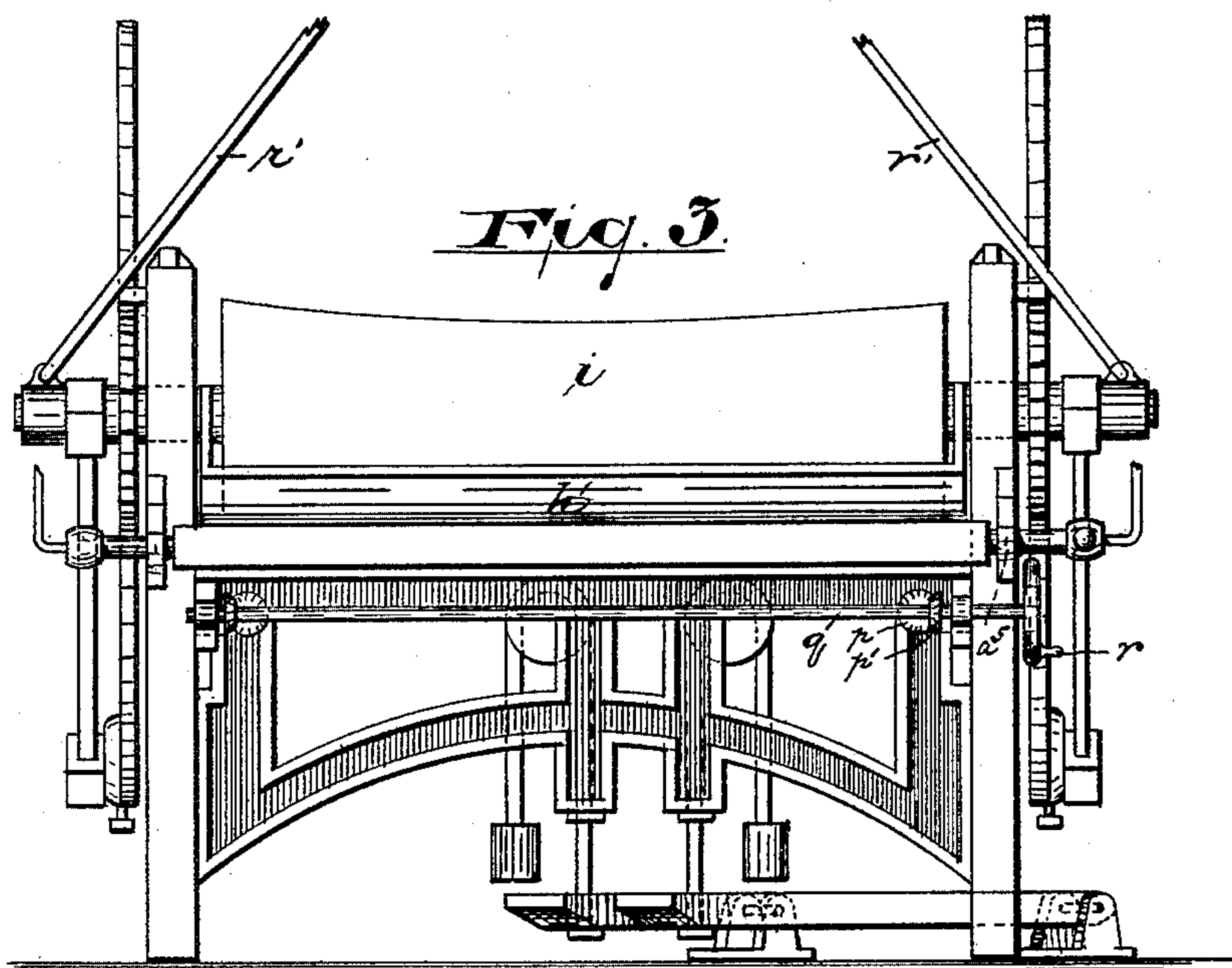
By *Drake & Co.* Attys.



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## LEATHER GRAINING AND SOFTENING MACHINE.

Patented Nov. 10, 1891.



Witnesses

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(No Model.)

4 Sheets—Sheet 4.

M. M. SCOTT.

LEATHER GRAINING AND SOFTENING MACHINE.

No. 462,825.

Patented Nov. 10, 1891.

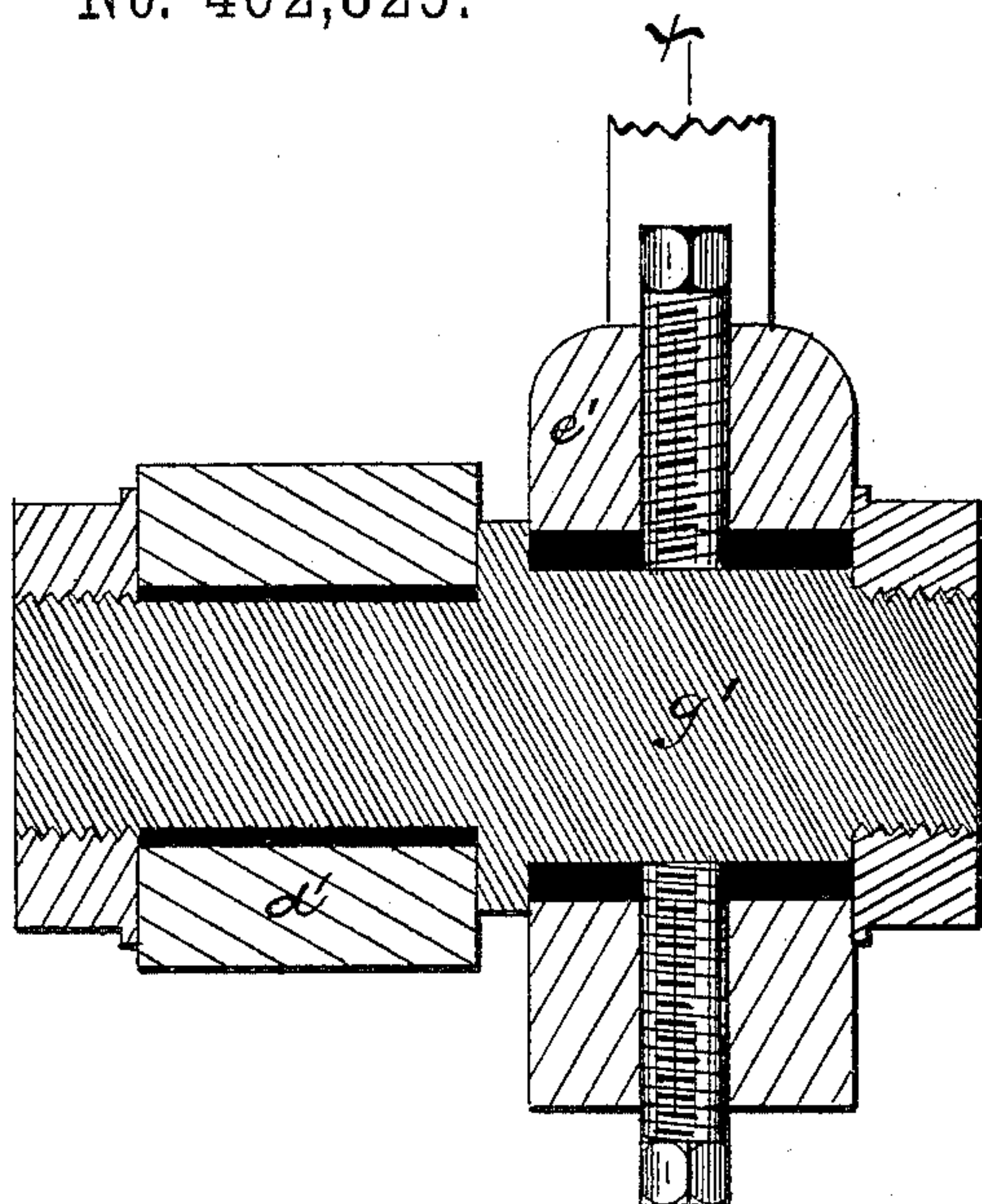


Fig. 8.

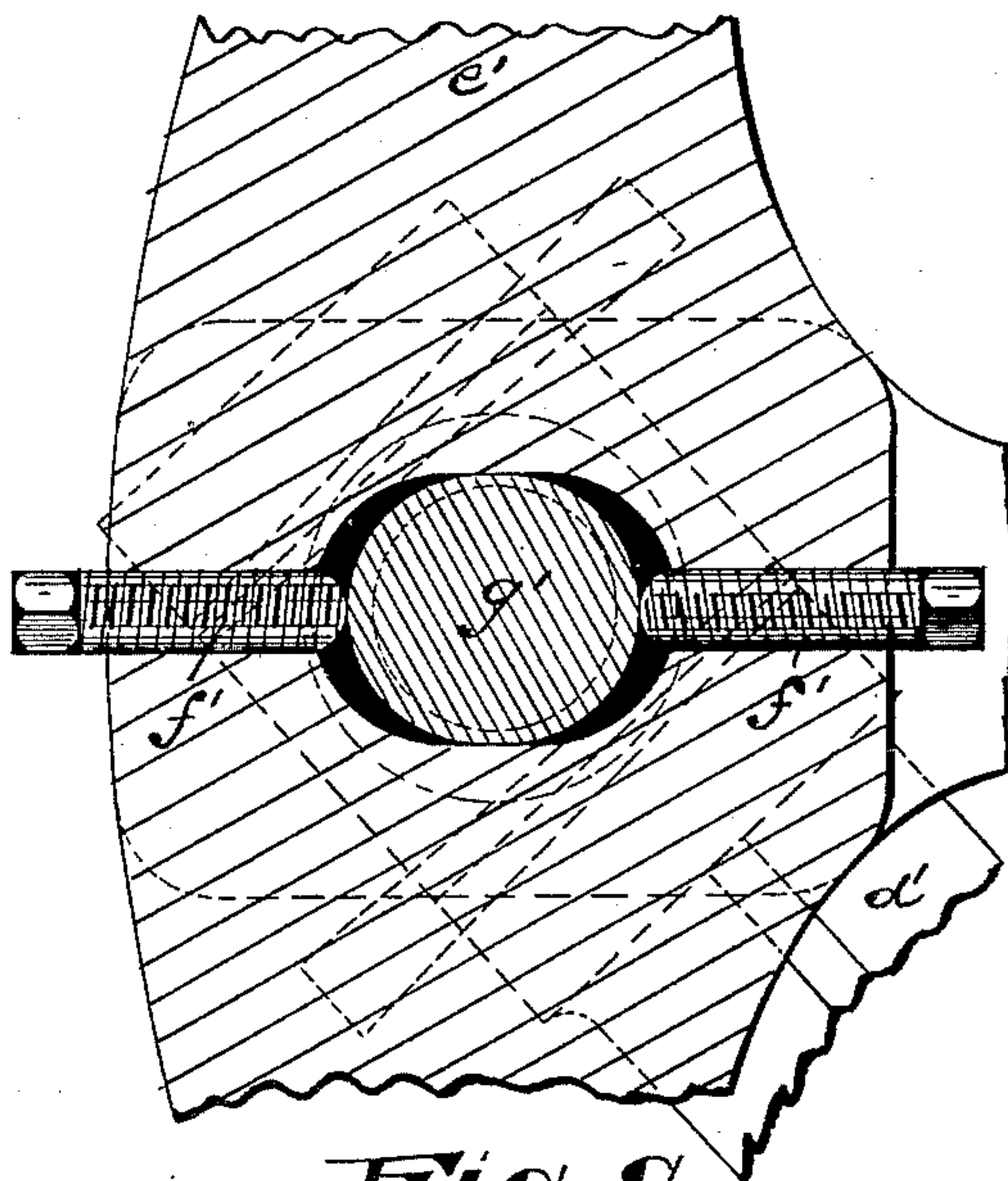


Fig. 9.

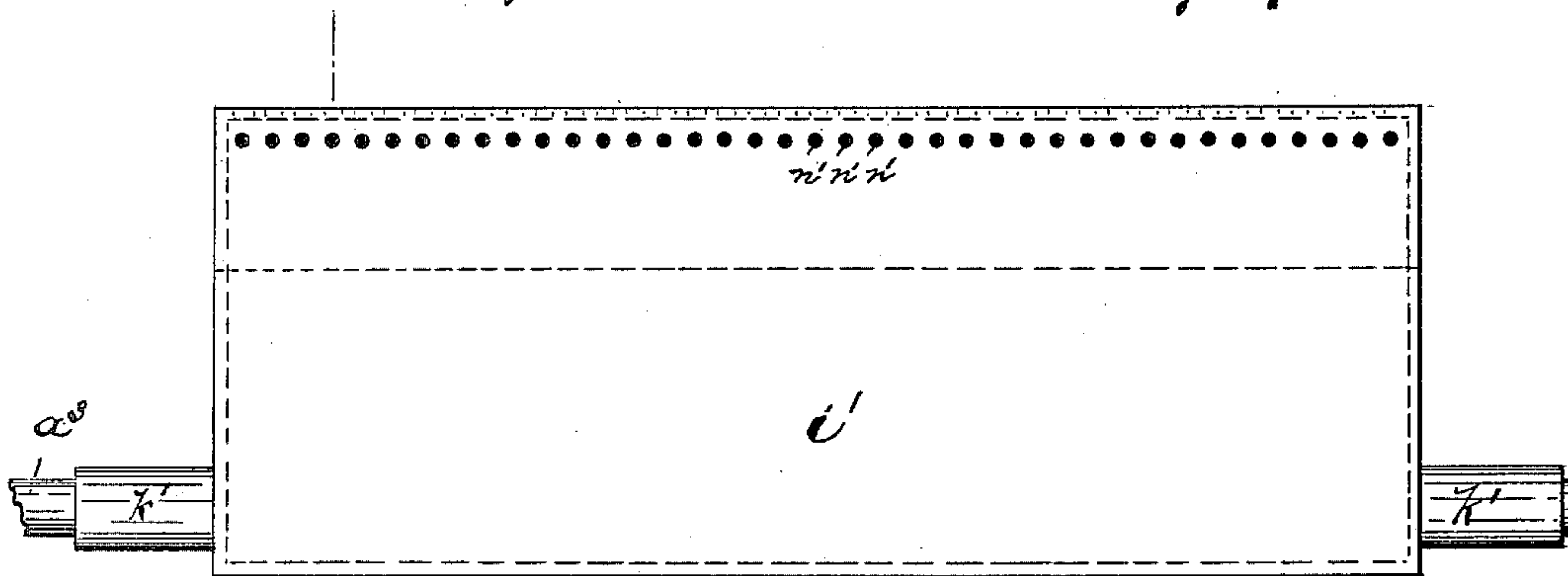


Fig. 10.

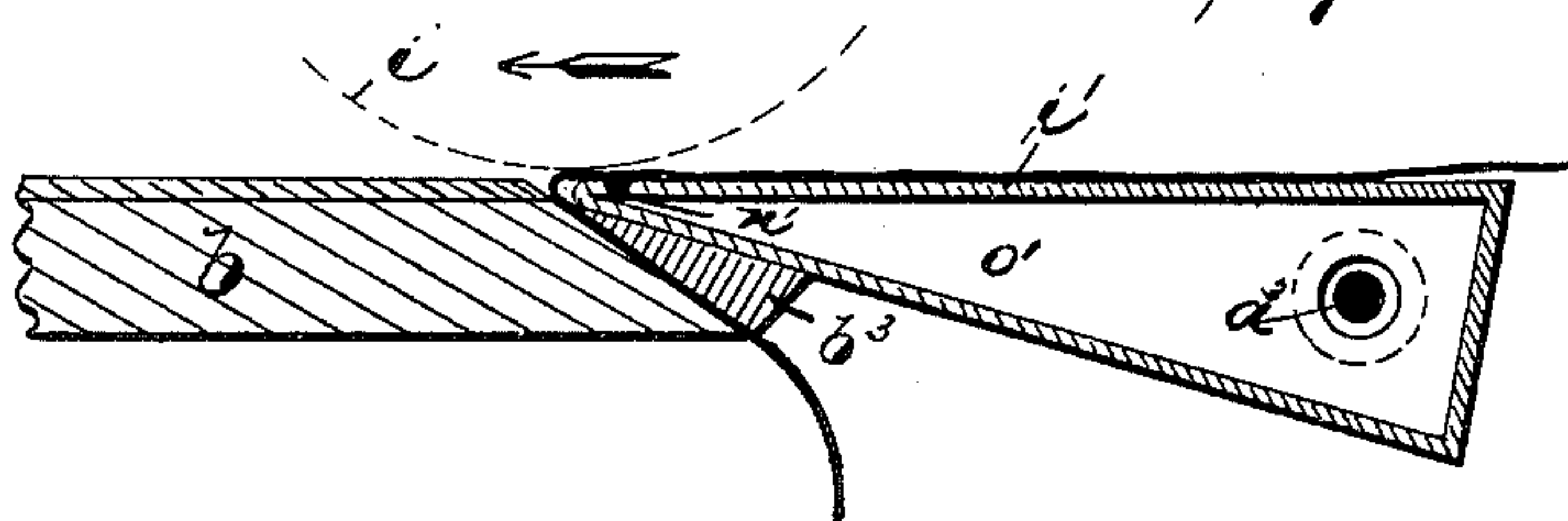


Fig. 11.

Witnesses

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By Drake & Co. Attys.



# UNITED STATES PATENT OFFICE.

MAHLON M. SCOTT, OF NEWARK, NEW JERSEY.

## LEATHER GRAINING AND SOFTENING MACHINE.

SPECIFICATION forming part of Letters Patent No. 462,825, dated November 10, 1891.

Application filed September 30, 1890. Serial No. 366,612. (No model.)

*To all whom it may concern:*

Be it known that I, MAHLON M. SCOTT, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Leather Graining and Softening Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention relates to certain improvements in that class of leather graining and softening machines illustrated in my prior patent, No. 393,486, the object of the invention being to more economically, effectually, and perfectly grain and soften the leather, to reduce the cost and lessen the time of producing the grained and softened leather, to render the machine more convenient for the workman, to enable the operation of grain-  
ing to be performed on pebbled, painted, or enameled leather effectually and well in all conditions of atmosphere, and to secure other advantages and results substantially such as will be hereinafter set forth, and finally be embodied in the clauses of the claim.

Referring to the accompanying drawings, in which like letters indicate corresponding parts in each of the several figures, Figure 1 is a plan of the improved machine. Fig. 2 is a side elevation of the same. Fig. 3 is an end view; Fig. 4, a central longitudinal section, showing the construction of the graining-roll more clearly. Fig. 5 is an end view of the same. Figs. 6 and 7 are views similar to Figs. 4 and 5, showing a preferred construction. Fig. 8 is an enlarged sectional detail showing more clearly the connection of a driving or crank wheel with a crank or connecting rod and means for adjusting the same in their relations to one another. Fig. 9 is another section taken at line  $x$ , Fig. 8. Fig. 10 is a detail plan of a certain supplemental table, and Fig. 11 is a section of the same on line  $y$ .

In said drawings,  $a$  indicates a suitable frame, in which is formed or arranged a substantial and capacious horizontal metallic or wooden table  $b$ , which presents to the recip-

rocating graining-roll moving thereover a perfect or substantially perfect plane surface. This said table may be made in one integral piece or in sections and is preferably covered on the upper side with rubber sheeting or other materials which will present a frictional surface to the leather.

At the sides of the table the frame is extended upward and is provided with ways or bearings  $c$ , on which certain journal-boxes  $e$  for the graining and softening roll slide, the said boxes  $e$  working in horizontal slots  $d$  above said bearings. The bearings  $c$  for the sliding boxes are parallel with the plane of the table to hold the roller in a uniform relation to said table in its movements from one end of the same to the other, as will be understood upon reference to Fig. 2. Above the said slots  $d$  the said frame is provided with racks  $f$ , the teeth of which are engaged by or mesh with the gear-wheels  $g$ , arranged on the shaft or journal  $h$  of the graining-roll  $i$  at opposite ends thereof. The gear-wheels  $g$  are keyed or otherwise fixed to said shaft or journal, and thus as the journal and roller and said gear-wheels are drawn horizontally over said table, inasmuch as the said gear-wheel engages the rack, the said roller is given a movement the reverse of what it would have were it free to revolve on said table, because of a frictional contact therewith. At the under side of the roller, or the side next adjacent to the table, the pivotal movement of the roll is equal in speed to its horizontal movement, so that after the roll engages the looped edge of the leather and begins its operative stroke and draws the leather forward the looped edge will remain constantly beneath the center of the roll and will not be forced ahead, as it would be were the rotary speed increased. The table is vertically adjustable in its relation to the roll and can be raised and lowered by any suitable mechanisms; but the preferred means are shown in Fig. 2, where a wedge or incline  $a^2$  is shown to be arranged or formed on the under side of the table, which is engaged by or works in connection with horizontally-movable wedges  $k$ , arranged on bearings  $l$ , formed on or secured to the frame of the machine. The said wedges engage the said inclined or wedge-like surfaces, as above



described, and are simultaneously movable backward or forward on said bearings  $l$ , and thus the table is raised or lowered bodily without being tilted or changed in its horizontal relation to the roll. The means I prefer to employ are screws  $m$ , arranged in bearings in the frame and engaging threaded lugs  $n$  on the wedges. The screws have threads of uniform pitch and are each provided with angle gear-wheels  $p$ , which mesh with corresponding gear-wheels  $p'$  on a crank-shaft  $q$ . When the said crank-shaft is turned by means of the hand-wheel or crank  $r$  in any ordinary manner, the angle gear-wheels co-operate to turn the screws simultaneously and together, and the two wedges are forced horizontally on their bearings, and thus the table is raised without tilting or losing its horizontal relation to the roll.

The table may be moved longitudinally or in the direction of movement of the roll and, because of the inclines on the under side thereof, be raised or lowered in its relation to the roll; but the said table is movable longitudinally more particularly for the purpose of regulating the disposition of the roll in its relation to the looped leather at the beginning of the operative stroke, as will be hereinafter more fully described.

To enable the roll  $i$  to more perfectly and uniformly engage the looped leather and maintain an even pressure on the leather throughout its operative stroke, I have made the said roll in sections  $i^2$ , and in Figs. 4 and 6 mark the pulley-like sections  $i^2$ , as indicated in Figs. 1, 4, and 6, where the said roll is shown to consist of a covered series of pulley-like parts strung on the journal-shaft  $h$ , the edges of which engage at the periphery of the roll, making a continuous jointed surface. Said parts or sections  $i^2$  are allowed a certain freedom of movement or play on said shaft  $h$ , as indicated in Fig. 7, equal to about one-sixteenth of an inch, more or less, in every direction, and thus, should the leather be thicker at one part of the loop than at another, the roll will be free to adjust itself vertically to the inequalities and maintain a substantially uniform pressure on all parts of the leather, and as a result the leather will be evenly or uniformly finished.

To allow for a certain curve or spring in the shaft  $h$ , owing to the weight of the sections, I have reduced the diameters of the center sections, so that on the lower side of the roll, where the latter bears on the loop, the working surfaces of the said roll will be in a straight line parallel with the horizontal table.

The table is preferably covered with a surface covering of rubber or other frictional material to prevent the leather from slipping thereon, and the roll is likewise covered or jacketed, the jacket  $p^2$  presenting a frictional surface to the leather, which prevents the leather from sliding on the roll (or the roll from sliding on the leather) and holds said

leather on the upper side of the loop. When the roll is in sections, the jacket is continuous, covering the joints and preventing the irregularity of movement of the said sections from working to the injury of the leather. Thus the looped leather held on the upper and lower sides thereof and turned on itself, as shown in Fig. 5, will be caused by the revolving and traveling roll to slide on itself on the inner engaging surfaces thereof, maintaining the loop as it is carried along by the roll, and thus all parts of the leather are brought under the softening influence of the roll, as will be understood.

To prevent excessive pressure or to counterbalance the weight or pressure of the roll on the loop to a sufficient extent, and yet allow a vertical movement or give play to the roller, should the leather be improperly disposed on the bed or table and become wrinkled or improperly folded, I have provided weights  $q'$ , Fig. 2, which are connected by means of ropes  $r'$  or other suitable connections arranged over rolls or pulleys  $s'$  and connected with the ends of the roller shaft or journal. These connections tend to raise said roll in its bearings, which are to a limited degree vertically movable or allow of the limited vertical movement of the journal. Thus in case of the accidental wrinkling or folding of the leather, such as would interfere with the normal folding thereof, the face of the leather will not be marred or injured because of excessive pressure due to a number of plies passing beneath the roll. As intimated, the journal-bearings and the rack  $e$  and cog-wheel  $g$  are suitably formed to allow such bodily movement of the softening-roll. By adding to the number of weights the pressure may be regulated at will.

In connection with the driving mechanism of the machine I have provided suitable clutch mechanisms  $t$ , of any ordinary construction, adapted to engage co-operating mechanisms connected with a straight or direct belt-pulley  $u$  and a cross belt-pulley  $v$ , the said clutch being operative by foot-levers  $w$ , connected by ropes, chains, or some such means  $a'$ , working on pulleys  $b'$ , with a clutch-operating lever  $c'$ . By means of the clutch and co-operating mechanisms the horizontal progress of the roll can be arrested and reversed at any point of the stroke at the will of the operator, and, if desired, a short reciprocating movement of the roll may be obtained.

To regulate or control the length of stroke, the crank-rods  $d'$  of the machine may be made adjustable in their relation to the driving-wheels  $e'$ , set-screws  $f'$  being employed in connection with the sliding bearing  $g'$  for that purpose. In front of the roll or at the side thereof toward the operator I have provided what I have termed a "straightener." This consists of a traveling bar  $h'$ , secured to the journal-box at the opposite ends of the roll and arranged to engage the leather be-



fore it enters beneath the roll, thus straightening out or leveling the leather on the table before engaging with the roll. Thus should the leather have any upwardly-projecting ends, such as would be forced down by the roll, so as to overlap the body of the leather in a manner that would interfere with or prevent a proper softening operation, the said ends will be forced down to a level with the body-leather and be looped and softened or grained with said body-leather, and all tears, wrinkles, or other blemishes will be avoided. The said bar  $h'$  is arranged, preferably, in an inclined position, as indicated in Fig. 2, and the lower edge thereof is elevated about one-sixteenth of an inch above the level of the bottom of the roll, so as not to press hard on the leather.

At the front edge of the machine-table is arranged a supplemental table  $i'$ , which is preferably pivoted at its ends near the front edge thereof on brackets  $j'$ , secured to the frame of the machine. The inner edge of the said supplemental table is wedge-shaped to engage a correspondingly wedge-shaped or inclined edge of the body or main table  $b$ , so as to allow the edge of the supplemental table to overlap said main or body table and yet, at the upper side, lie substantially flush therewith, as will be understood. By raising the supplemental table on its outwardly-arranged pivots  $k'$  a space is formed between in which the body of leather can be readily arranged for starting the loop or be otherwise conveniently manipulated. The said supplemental table is preferably of iron, and the weight thereof is sufficient or nearly sufficient to hold the lower edge or part of the looped leather while the upper part is being drawn under the roll in the manner hereinafter described. Said supplemental table, being hinged or pivoted on the brackets, as described, may be raised on the pivots from the body-table to release the leather. At one end the said supplemental table may be provided with a lever-like handle  $l'$ , adapted to allow the supplemental table to be raised with greater ease, and at the opposite end the said supplemental table may be provided with an adjustable weight  $m'$ , adapted to increase the pressure of the table onto the leather to enable it to hold the same more securely. By being adjustable on its bearings the power of the weight with reference to the table and leather may be increased or diminished.

To enable painted or enameled leather to be grained or softened at any time, season, or condition of a' atmosphere, I have provided means for raising or lowering the temperature of the leather just before it passes beneath the roll—that is to say, when the atmosphere is unduly warm or humid and the leather is consequently tacky and unfit to slide on itself in the softening and graining operation, as described, I have provided means for forcing cold air against the leather and thus hardening the paint or enamel thereon, so

that there will be no interruption in the looping operation; but should the atmosphere, on the other hand, be cold to such a degree as to render the enamel brittle, so that it will crack when bent, then I force warm air against the leather. I accomplish these ends by making the supplemental table hollow and at the inner edge thereof providing air-passages  $n'$ , leading out from the hollow chamber  $o'$ , and directing the heated or cooled air against the leather, the painted sides of which overlie the edges of the table provided with said passages. A suitable pipe or tube  $a^3$  carries the air to said chamber from suitable heating or refrigerating devices distant from the machine, as will be understood. Where the supplemental table overlaps the main or body table, the same is preferably provided with a rubber or cushion-like and frictional edge-piece  $b^3$ , Fig. 11, adapted to press on the leather and hold it firmly in place without injury thereto, owing to the pressure.

In operating the machine the supplemental table  $i'$  is raised from the main table, and a side of leather is inserted between the rough inner side, being against the said main table, and the painted or finished side, engaging the supplemental table. The lower depending portions of the leather may be protected from the floor or held up therefrom by means of a guarding frame or table arranged at the forward end of the machine below the said supplemental table. The said supplemental table may be then turned down, so that the cushion  $b^3$  bears on the leather, the weight of said supplemental table being increased and regulated by the weight  $m'$  in connection with the peculiar frictional qualities of the cushion  $b^3$ , holding the underlying leather firmly fixed. The upper portion of the leather is then drawn forward over the small edge of the supplemental table, as shown in Fig. 11, forming a sharp lap or turn, which is commonly called the "loop," and which is effective in softening the leather and giving a grain to the surface thereof. After properly smoothing out the leather the roll-driving mechanism is started and the roll forced forward until it enters into engagement with the leather, as shown in dotted line in Fig. 11. The forward movement of the roll toward the operator continues after first engaging the looped edge sufficiently to draw the leather tightly over the edge of the supplemental table, which latter is adjustable to secure the desired degree of such drawing. Thus at the beginning of the operative stroke the loop is straightened out and brought into proper initial relation to the roll, and this is maintained throughout the stroke by means of the straightener. To secure a proper engagement at the beginning of the stroke, the various parts before described may be adjusted. The operative stroke begins at the small edge of the wedge-like supplemental table, and as the roll revolves and travels in the directions shown by the arrows and as the roll is covered



with a friction-jacket, which prevents slipping, the upper leather, which is free to move forward with the roll, is drawn so that a loop is kept constantly beneath the lower side of the roll. This result is obtained by making the speed of the periphery of the roll on its center in the direction indicated by the curved arrow the same as the rate of speed in horizontal direction indicated by the straight arrow in Fig. 11. These uniform speeds may be obtained by making the length of stroke of the crank-rod  $d'$  equal to the periphery of the roll  $i$  when it is desired to make a single revolution of the roll. By making the roll one-half size and doubling the revolution the same result may be secured.

Should I desire to make the short reciprocations and oscillations of the roll, as before described, I prefer to attach weighted cords or ropes to the upper loose ends of the leather, so that in the return movements of the roll, when the said loose upper parts of the leather are forced forward toward the operator, the said parts will be held taut and not be allowed to fold under the roll, as will be understood.

The action of the roller on the upper part of the leather has a tendency to pull and stretch the leather, so that after having been grained or softened it is somewhat larger in dimensions than before, in which the operation of the machine differs from the hand process commonly employed, in which a shrinking of the leather is the incidental result.

For pebbling leather I may remove the rubber-covered roll and substitute an engraved roll and remove the cogged wheel, so that the said engraved roll will have a normal movement on the leather, whereby the engraving on the roll will be impressed into the surface of the leather.

The supplemental table is horizontally adjustable, so as to change the relation of the loop to the roll at the commencement of the stroke, and thus I provide for differences in the thickness of the leather in the looping operation. The adjustment of said table is made by means of the set-screws  $a^5$ . Substantially the same result may be obtained by changing the relation of the crank or connecting rod  $a'$  to its driving-wheel. By lengthening the said crank-rod or shortening the same I change the relation of the roll with reference to the edge of the supplemental table and the loop formed thereover. This adjustment of the connecting-rod in its relation to the driving-wheel may be effected by wedges  $b^5$   $b^5$ , Figs. 2 and 9. By loosening one wedge and forcing the other up the center of movement will be changed, as will be understood. Other means than wedges may be employed in lieu thereof.

Having thus described the invention, what I claim as new is—

1. The combination, in a leather-stretching machine, of a horizontal table, a shaft traveling reciprocatingly horizontally parallel therewith, means for reciprocating said

shaft, and a series of pulley-like sections arranged side by side on said shaft and movable therewith and having a vertical play on said shaft, each independent of the other, substantially as set forth.

2. The improved leather-stretching machine herein described, in which is combined a horizontal table, a shaft movable reciprocatingly and horizontally parallel with said table, means for reciprocating said shaft, a series of independent sections arranged on said shaft, with their peripheral edges engaging and forming a continuous roller, and a continuous jacket  $p^2$ , covering the joints in said roll, said parts being arranged and operating substantially as and for the purposes set forth.

3. The combination, in a leather-softening machine, with a horizontal table or bed having the bearing  $c$  and rack  $f$ , of a shaft  $h$ , a horizontally-movable roll  $i$ , arranged on and movable with the shaft and having an independent movement on said shaft, a cog-wheel  $g$ , and sliding box  $e$ , all arranged and adapted to operate substantially as and for the purposes set forth.

4. The improved leather-softening machine in which is combined with a horizontal table having the bearing  $c$  and rack  $f$  a shaft  $h$ , a horizontally-movable sectional roll  $i$ , arranged on and movable with the shaft and having an independent movement on said shaft, a cog-wheel  $g$ , and sliding box  $e$ , all arranged and adapted to operate substantially as and for the purposes set forth.

5. In combination with the frame  $a$ , having bed  $b$ , bearing  $c$  above said bed, and racks  $f$ , cog-wheels engaging said racks and arranged on a shaft  $h$ , and a roll made in independently-movable sections arranged on said shaft and movable pivotally therewith, substantially as and for the purposes set forth.

6. In a leather-softening machine, the combination, with the horizontally-movable roll and horizontal table and means for moving said roll, of a weight  $q$ , to relieve the said roll or counterbalance a part of the weight thereof, substantially as set forth.

7. In combination, in a leather-softening machine, the frame having a horizontal table, horizontal bearings, and a rack, a horizontally-movable roll provided with weights for counterbalancing the same, the bearings for said roll allowing a vertical adjustment, and means for operating said roll, substantially as set forth.

8. The combination, in a leather-looping machine, with the horizontally-movable roll and a table, of a supplemental table having an edge overlapping said table and adapted to have the leather interposed between and turned to form the loop, substantially as herein set forth.

9. In combination, in a leather-looping machine, with a frame having a main table, horizontal bearings, and a rack, a roll movable on said bearings, a cog-wheel engaging said rack



and controlling the movement of said roll, and a supplemental table pivoted in said machine and overlapping the said main table, substantially as and for the purposes set forth.

5 10. In combination, in a leather-looping machine, with a frame having a main table, horizontal bearings, and a rack, a roll movable on said bearings, the journal of which is provided with a cog-wheel which engages said  
10 rack, means for operating said roll, and a supplemental table and means for adjusting the same with reference to said roll, substantially as set forth.

11. The improved looping-machine in  
15 which is combined a table, a horizontally and pivotally movable roll, and means for operating the same, the said roll being in sections covered with a jacket and having its pivotal movement at the point on its periphery next  
20 to the table in the direction of the horizontal movement and at the same rate of speed, substantially as set forth.

12. In combination with the bed and horizontally and pivotally movable roll, a supplemental looping-table, a driving-wheel, and a  
25 connecting-rod adjustable in its relation to said wheel to change the relation of said roll with said supplemental table, substantially as and for the purposes set forth.

30 13. The combination, with the main and supplemental tables, the edges of which are beveled or wedge-shaped and overlap and the edges of which supplemental table are provided with a frictional cushion, of a reciprocating and pivotally-movable looping-roll,  
35 substantially as and for the purposes set forth.

14. In a looping-machine, the combination, with a horizontal table, of a horizontally and pivotally movable shaft and means for operating the same horizontally and pivotally, a  
40 series of sections movable with said shaft and having an independent play thereon, and an elastic jacket covering said sections and the joints therebetween, substantially as and  
45 for the purposes set forth.

15. The combination, with the main and supplemental tables, the edges of which are wedge-shaped and overlap, of a horizontally-reciprocating looping-roll adapted to engage  
50 the leather as it is looped over said supplemental table and operate substantially as set forth.

16. In a leather-looping machine, substan-

tially as described, the combination, with the horizontal table and the pivotally and horizontally movable looping-roll and means for  
55 operating the same, the said roll being in sections smaller toward the center and covered with a jacket, of a looping-table pivoted at one end of the machine, substantially as and  
60 for the purposes set forth.

17. In combination with a table, a looping-roll and a horizontally-movable shaft and means for operating the same, the said roll being in sections smaller at the center and  
65 keyed to the shaft, substantially as set forth.

18. In a leather-looping machine, the combination, with a table and a roll adapted to reciprocate normally from end to end of said table and means for driving said roll, of belt-  
70 pulleys *u v*, clutch *t*, lever *c'*, levers *w w*, and connections *a'*, substantially as set forth.

19. In a leather-looping machine, the combination, with the reciprocating looping-roll and means for operating and a frame for carrying the same, of a table having inclines and  
75 longitudinally-movable wedges, substantially as and for the purposes set forth.

20. In a leather-looping machine, the combination, with the reciprocating looping-roll, of a frame for carrying and means for operating the same, a horizontal and vertically-movable bed or table having inclines and a  
80 longitudinally-movable wedge and adjusting-screws, substantially as set forth.

21. In a leather-looping machine, the combination, with a looping-roll and a bed or table, of a supplemental table provided with perforations and pipes or ducts for conveying  
85 air at an abnormal temperature thereto, substantially as set forth.

22. In a leather-graining machine, the combination, with the looping-roll and table, of a wedge-like supplemental table overlapping said table and provided with perforations at  
90 its inner edge and means for forcing air there-through, substantially as and for the purposes set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 19th day of  
September, 1890.

MAHLON M. SCOTT.

Witnesses:

OLIVER DRAKE,  
OSCAR A. MICHEL.