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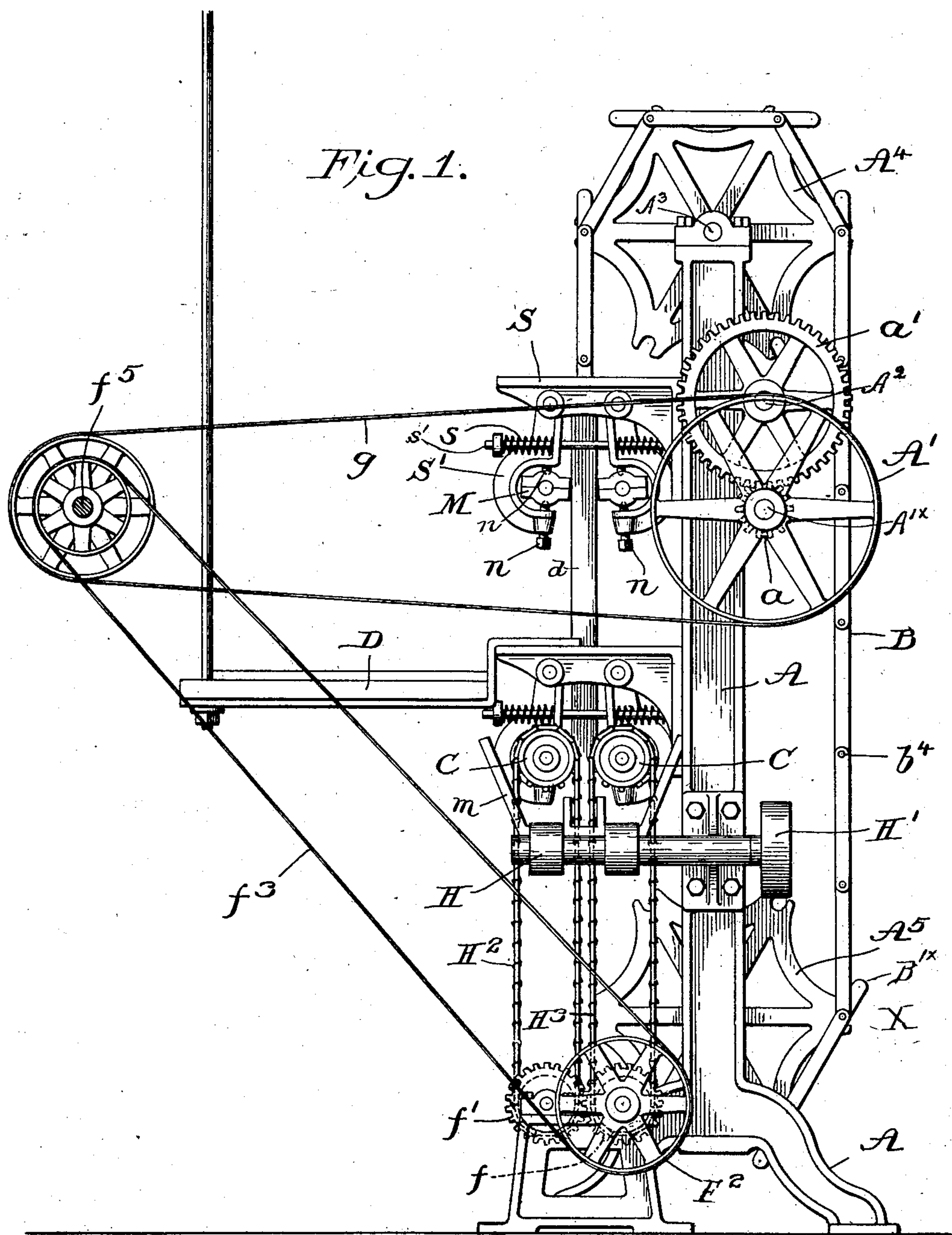
PATENTED APR. 28, 1903.

H. F. DOUGHERTY.  
LEATHER WORKING MACHINE.

APPLICATION FILED AUG. 17, 1901.

NO MODEL.

4 SHEETS—SHEET 1.



WITNESSES:

*A. V. Group*  
*C. E. Parker*

INVENTOR

*Hugh F. Dougherty*  
BY *H. V. Henton*  
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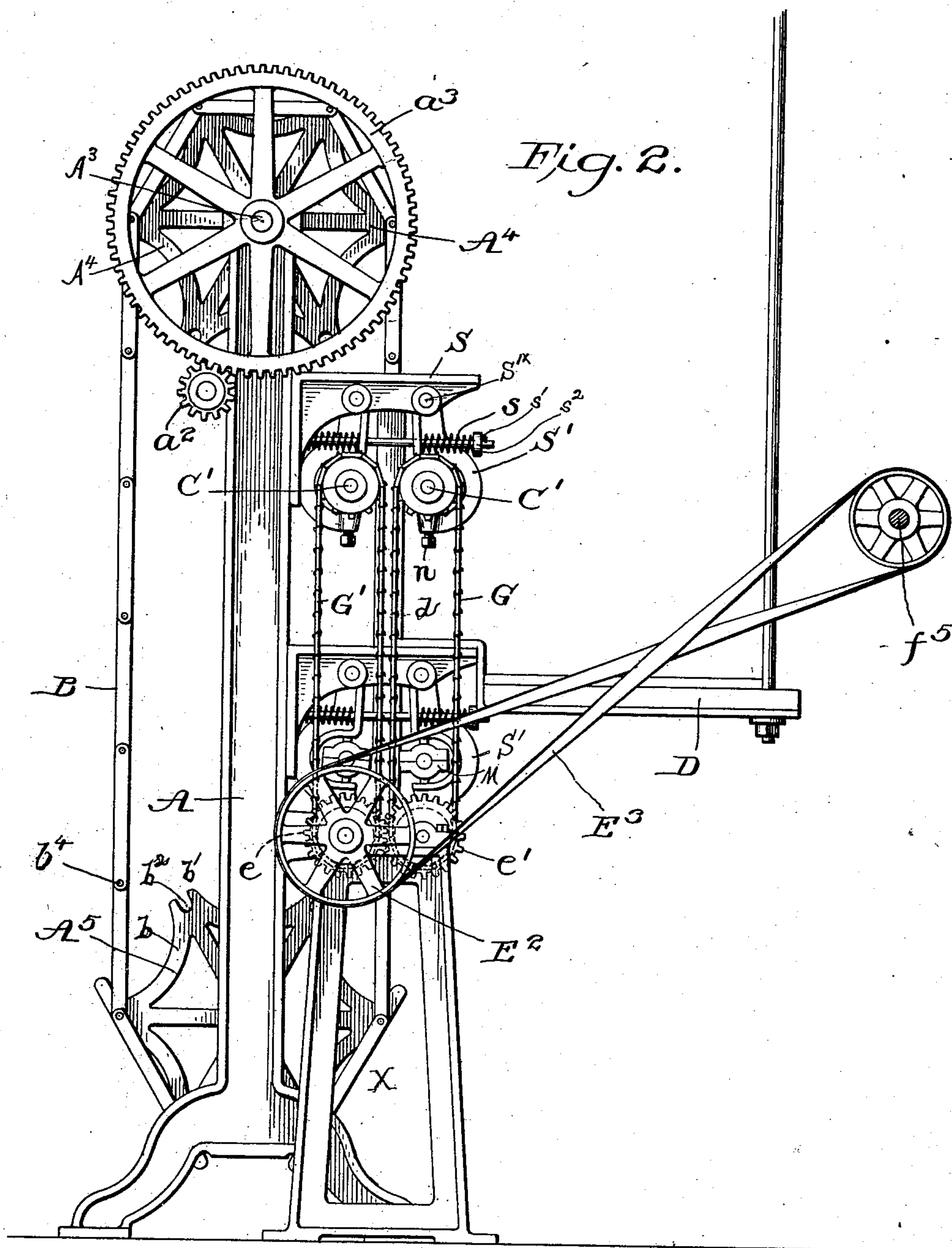
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4 SHEETS—SHEET 2.



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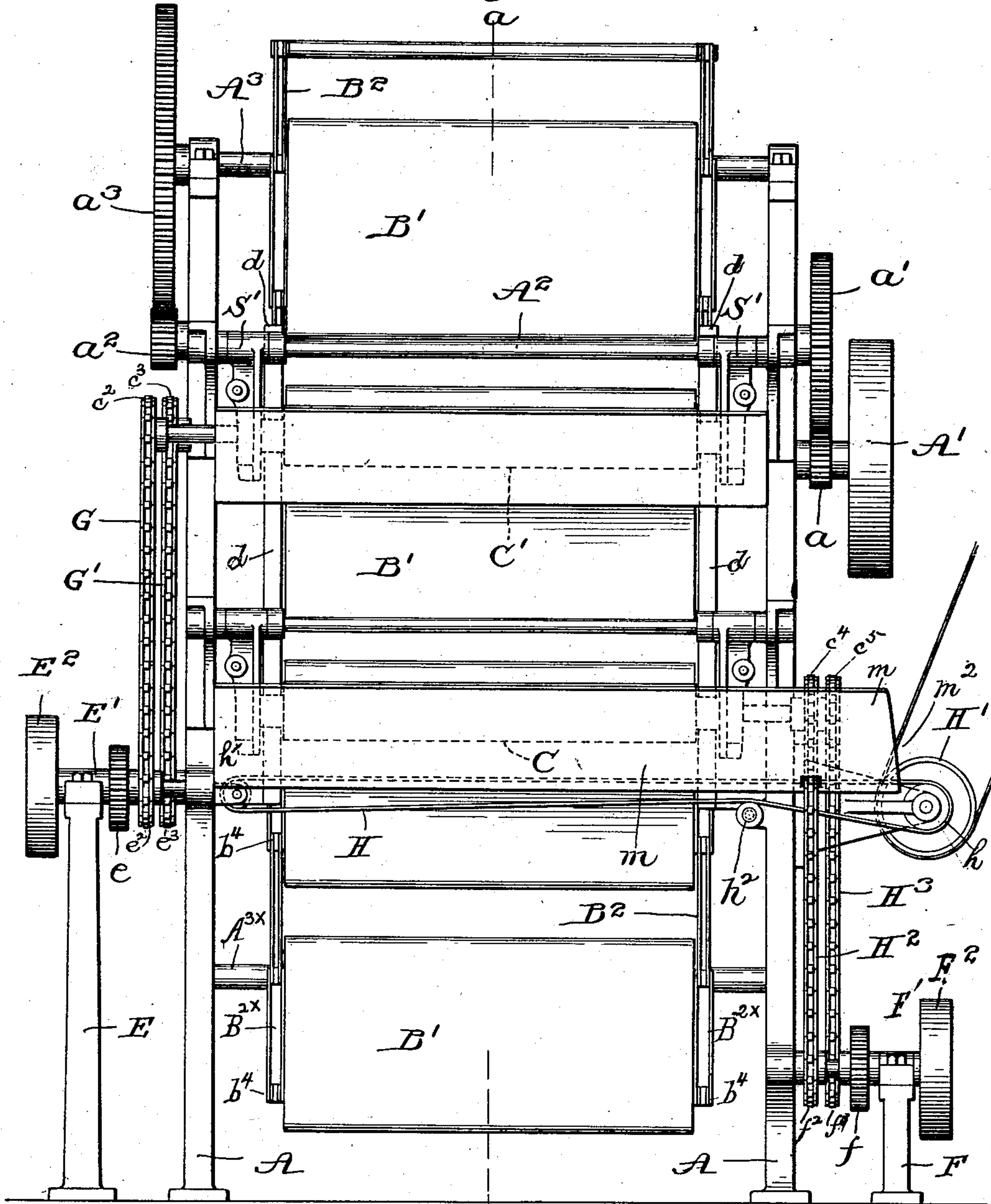
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4 SHEETS—SHEET 3.

Fig. 3.



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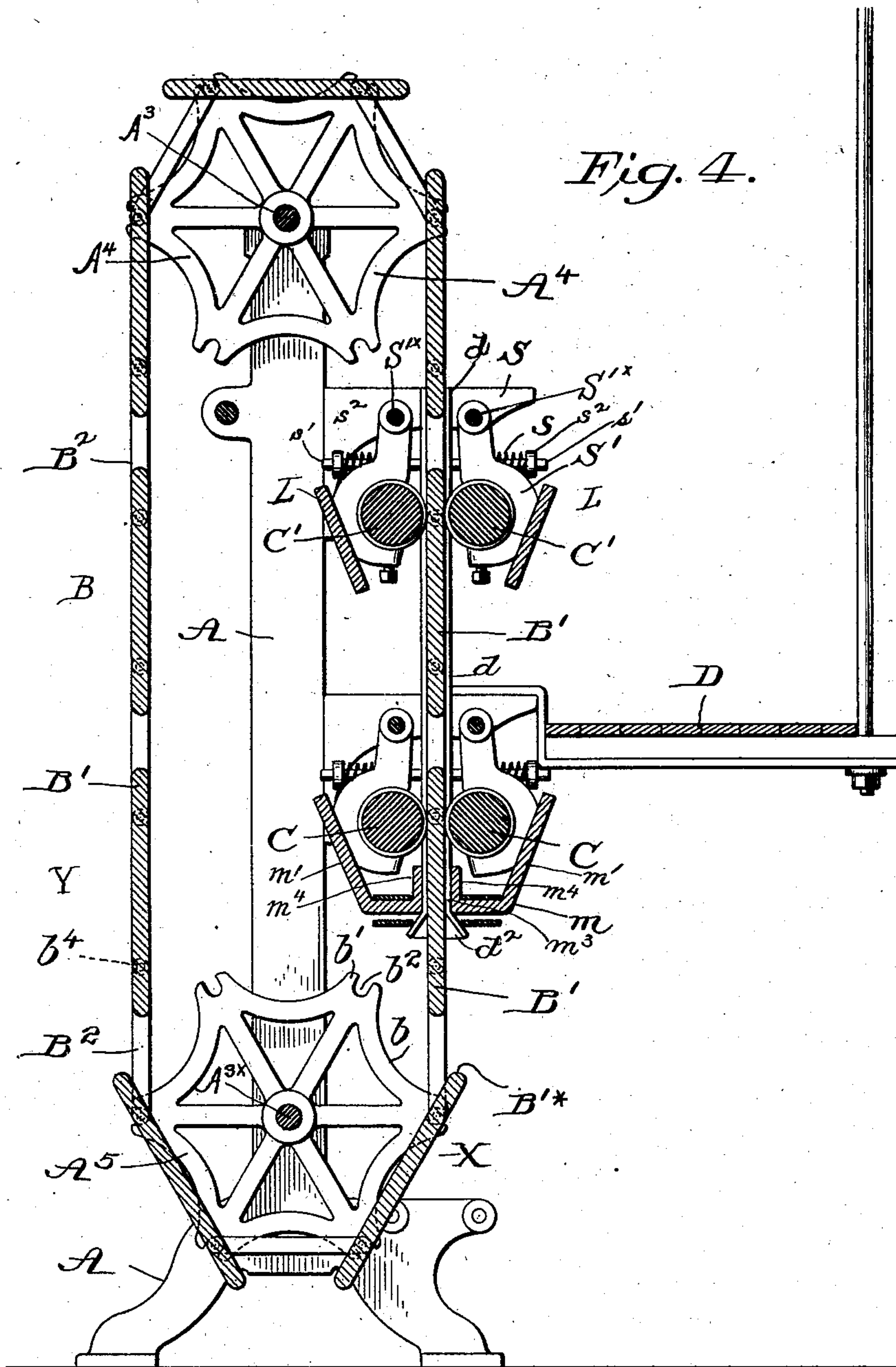
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4 SHEETS—SHEET 4.



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# UNITED STATES PATENT OFFICE.

HUGH F. DOUGHERTY, OF WILMINGTON, DELAWARE, ASSIGNOR OF ONE-HALF TO JAMES I. FORD, OF WILMINGTON, DELAWARE.

## LEATHER-WORKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 726,267, dated April 28, 1903.

Application filed August 17, 1901. Serial No. 72,341. (No model.)

*To all whom it may concern:*

Be it known that I, HUGH F. DOUGHERTY, a citizen of the United States, residing at Wilmington, Delaware, have invented certain new and useful Improvements in Leather-Working Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to that class of machines employed in the manufacture of leather for performing the operations in a tannery of unhairing, "putting out," and "striking out" morocco, calf, and other skins and small hides, to remove the loosened hair therefrom after liming, increase their superficial area, remove the fleshings, strike out the absorbed tanning liquors and water, and otherwise render them smooth and even and more ready for the subsequent operations on the raw skins of tanning and finishing them into leather.

My invention has for its object to increase the material output of such a machine without proportionately increasing its size, to enable the device to thoroughly unhair the skins and more evenly "put them out," as it is technically termed, and to discharge and carry off the stripped hair by convenient means and in a more direct way to avoid clogging of the machine.

My invention as shown in the drawings is embodied in an unhairing-machine as its primary function; but it is very readily adapted by slight changes known to those skilled in the art to enable it to perform any other and all of the functions before recited.

It consists in the several novel mechanical elements and in their several combinations, as hereinafter fully set forth and as will be pointed out in the claims.

In the accompanying drawings, illustrating an embodiment of my invention, Figure 1 is an end elevation from the rear or hair-delivery end of the machine. Fig. 2 is an end elevation from the opposite or what might be called the "front" end of the machine. Fig. 3 is a side elevation of the device, the driving mechanism and the platform of Fig. 1 being omitted in order to bring out more fully the device for receiving and carrying off and delivering the skins and the stripped hair

from the skins; and Fig. 4 is a vertical section through the center of the machine on the line *a b* of Fig. 3.

Like reference-letters refer to like parts in the several views.

Mounted upon a suitable supporting-frame A and preferably at the upper portion thereof is a shaft  $A^3$ , carrying sprocket or star-shaped wheels  $A^4$   $A^4$  and driven from any usual source of power through connecting-gearing, shown in the present embodiment of my invention as a pulley  $A'$ , mounted on shaft  $A'^x$ , carrying a small pinion  $a$ , gearing with a larger pinion  $a'$  on shaft  $A^2$ , which at its opposite end portion has mounted thereon a pinion  $a^2$  in mesh with a larger pinion  $a^3$  on the shaft  $A^3$ . The pulley  $A'$  receives motion from a belt  $g$ , driven from the shafting  $f^5$ . Likewise mounted in the frame A in vertical alinement with shaft  $A^3$  is a corresponding shaft  $A^{3x}$ , carrying sprocket or star-shaped wheels  $A^5$   $A^5$ , similar to the like wheels on shaft  $A^3$ . Each of the sprocket or star-shaped wheels referred to and of which there are two on each shaft  $A^3$  and  $A^{3x}$ , properly spaced apart, is formed with segmental sides  $b$ , which at their juncture  $b'$  are provided with slots  $b^2$ , adapted to properly engage suitable link-pins  $b^4$  of an endless chain of supporting-tables B to impart thereto a positive movement in an endless path around said wheels, as will be obvious.

The endless chain of supporting-tables B is composed of a series of supporting-tables  $B'$ , having their sides joined by links  $B^2$ , secured by suitable link-pins  $b^4$  at points within the contiguous edges, as more clearly shown in Figs. 3 and 4, and as a preferred form of construction in order to give desired strength and rigidity to the parts I have duplicated the links  $B^2$  along the side edges of the supporting-tables, as shown at  $B^{2x}$ , the distance between the link-pins  $b^4$  throughout the length of the endless chain of supporting-tables being equal to the distance between the slots  $b^2$  in sprocket or star wheels  $A^4$  and  $A^5$ , so that as the endless chain of supporting-tables is caused to travel around the sprocket or star-shaped wheels through the actuation thereof from the main shaft  $A'^x$  the link-pins  $b^4$  will successively enter the slots  $b^2$  in said wheels.



In the treatment of hides and skins in the manner contemplated it is desirable that the hides or skins be placed upon the supporting-tables, over the edges thereof, with a portion  
 5 of the hides or skins on each side of the table and in as smooth a condition as possible, a result readily effected in the present instance by reason of the connection of the supporting-tables by links which are jointed thereto  
 10 at points within the supporting edges of the tables rather than at the extreme edges thereof. From this construction it will be obvious that as the endless chain of supporting-tables is moved in its path the edges of the  
 15 tables passing around the sprocket or star-shaped wheels  $A^4$  and  $A^5$ , as indicated in Fig. 4, will project beyond the vertical line of tables extending between said wheels and provide a clearance-space between the edges  
 20 of adjacent tables, and as the hides or skins are placed over the edge of the tables as the latter on their upward run pass around the wheels  $A^5$  it is evident that the supporting edge of the tables will be presented in a most  
 25 advantageous position clear of the remaining tables for the proper placement thereon of the hide or skin to be treated.

Mounted on each side of the upward run of the endless chain of supporting-tables are  
 30 the unhairing, fleshing, or putting-out devices, which in the present embodiment of my invention are shown as rollers  $C$   $C$  and  $C'$   $C'$ , Fig. 4, supplied with any usual form of stripping-knives or fluted surfaces, depending upon the character of work to be per-  
 35 formed. These rollers are each mounted in a hanger  $S'$ , Figs. 1 and 4, suitably pivoted at  $S'^x$  to a supporting-bracket  $S$ , the said hangers  $S'$  being curved, as shown, for the  
 40 accommodation of journal-plates  $M$   $M$ , Fig. 1, held loosely between the opposite supporting-pins  $n$   $n$ , one of which (shown in said Fig. 1 as the lower pin) being preferably formed as a screw-pin to provide for proper adjustment.  
 45 Since each end of each of the rollers  $C$   $C$   $C'$   $C'$  is thus held in what I will term a "swivel-joint" for purposes of identification, it will be obvious that each may yield at either end to compensate for irregularities in the thickness  
 50 of the skin or hide passing between them. In order to cause the rollers  $C$   $C$   $C'$   $C'$  to bear with proper yielding force against the hides or skins as they are carried therebetween by the supporting-tables, I have provided spring-  
 55 pressure devices, shown as pins  $s'$  passing through each pair of hangers  $S'$  and having a head or nut  $s^2$  on each end thereof, a spring  $s$  being interposed between each head or nut  $s^2$  and the adjacent hanger and normally acting to force the hangers and the rollers carried thereby toward each other with the desired yielding pressure.

The rollers  $C$   $C$  and  $C'$   $C'$  are driven in opposite directions against the run of the endless chain of supporting-tables—that is, the  
 65 adjacent surface of each roller in each pair runs in the same direction and opposite to

the movement of the supporting-tables, being driven by any desired or appropriate form of driving instrumentalities, shown in the present instance as shafts  $E'$   $F'$ , mounted on  
 70 standards  $E$   $F$  at opposite ends of the machine, said shafts  $E'$   $F'$  being driven from pulleys  $E^2$   $F^2$  and carrying gears  $e$  and  $f$ , respectively. (See Fig. 3.) The gear  $e$  trans-  
 75 mits motion to gear  $e'$ , and the pulley  $E^2$ , the shaft of which carries the gear  $e$ , is driven by a belt  $e^3$  from a suitable shafting  $f^5$ . (See Fig. 2.) Operatively connected to the gears  
 80  $e$  and  $e'$ , so as to be driven thereby, are the sprocket-wheels  $e^2$  and  $e^3$ , which through suitable sprocket-chains  $G$  and  $G'$  and sprocket-wheels  $c^2$   $c^3$  on the shafts of the rollers  $C'$   $C'$  drive said rollers  $C'$   $C'$  in opposite  
 85 directions, as described.

At the other end of the machine opposite to the driving means for the upper rollers  $C'$   $C'$  and meshing with the gear  $f$  is a gear  $f'$ , each of which gears has operatively connected thereto sprocket-wheels  $f^2$   $f^3$ , which through  
 90 suitable sprocket-chains  $H^2$   $H^3$ , Fig. 3, connect with sprocket-wheels  $c^4$   $c^5$  on the shafts of and to operate the lower pair of rollers  $C$   $C$  in opposite directions, as described, motion being imparted to the pulley  $F^2$  and its train  
 95 of sprocket-gearing by a belt  $f^3$  from the suitable shafting  $f^5$ .

In order that the unhairing and other operations on the hide or skin may be properly carried out, it is desirable that the hide or  
 100 skin shall be supported in an unyielding manner as it passes between the rollers  $C$   $C$  and  $C'$   $C'$ , and to this end I have not only formed the tables  $B'$  to give sufficiently stable support to the skins or hides, but I have also pro-  
 105 vided guides  $d$   $d$  on each side of the machine, which just prior to the entrance of the supporting-tables between the first or lower pair of rollers  $C$   $C$  are engaged by the edges of said tables or the links  $B^2x$ , secured thereto,  
 110 and said guides are extended to a point above the upper pair of rollers  $C'$   $C'$ . From this it follows that as the supporting-tables pass between the rollers  $C$   $C$  and  $C'$   $C'$  the said tables are held from any lateral movement, and the  
 115 skins or hides are thus acted upon by the rollers in a manner similar to what would be the case if they were held upon a substantially rigid support. It will be noticed that the lower ends of the guides  $d$   $d$  are separated  
 120 somewhat to form a wide mouth  $d^2$ , whereby is insured the proper engagement of the edges of the supporting-tables with the guides as they rise toward the first pair of rollers  $C$   $C$ .

One of the great difficulties in the unhair-  
 125 ing of hides and skins is the rapid accumulation of hair and other substances, which, becoming bunched and matted, seriously interfere with the proper and efficient working of the machine, and not only this, but should  
 130 any of the matted hair or bunches lodge upon the supporting-tables and the hide or skin be placed over the same the grain of the skin would be seriously injured by the unhairing



devices. To avoid these and other objections, I have provided means for preventing the detached hair and other substances from falling upon the supporting-tables and to effectually carry away from the working parts of the machine all the detached products resulting from the action of the rollers C C and C' C', as will now be described.

Mounted upon the machine-frame below the lower rollers C C and above the lower sprocket or star-shaped wheels A<sup>5</sup> A<sup>5</sup> is a trough-like frame *m*, the upwardly-extending sides *m'* of which preferably rise to a point sufficient to catch any material thrown around by the rollers C C. The trough-like frame *m* extends transversely of the machine the full length of the rollers C C and has one end *m*<sup>2</sup> preferably extended to provide a conduit or guide for the hair and other material to a point beyond the working parts of the machine. The lower wall of the trough-like frame *m* is slotted, as at *m*<sup>3</sup>, to provide a passage for the endless chain of supporting-tables B, and in order to confine the detached hair and other material within said frame out of contact with the supporting-tables as they pass upward therethrough the inner walls *m*<sup>4</sup> are carried upward a short distance, as shown, thus, in effect, dividing the trough-like frame into two troughs, one under each roller C. It is to be understood, of course, that while I have thus described and shown a construction of trough-like frame as the preferred form now embodying my invention, yet the same may be varied between limits, it being essential only that it shall serve to catch and contain the hair and other material detached from the skins and prevent the same falling upon the supporting-tables B'.

Supported by suitable rollers *h* and *h'* adjacent each end of the trough-like frame are endless belts H H, traveling over the bottom of the trough-like frame *m* at each side of the endless chain of supporting-tables, said belts being operated from the pulley H' to carry hair and other material falling thereon from the trough-like frame and deliver the same over the roller *h*, where it may be removed or fall into suitable receptacles. Beneath the trough-like frame there is provided a guide *h*<sup>2</sup>, over which the belt passes and by which it is held well up under the said frame, inclined as shown.

Adjacent the upper rollers C' C' and carried by the hangers S' S' are the directors and guide-boards L L, which serve to catch any hair or other material thrown outward by the upper rollers C' C' and direct it downward into the trough-like frame *m*. The arrangement of the refuse-delivering belts H H and the trough-like frame *m*, so as to catch the hair and other material detached from the skins or hides and carry the same away from the machine without liability of any such material falling upon the supporting-tables as they pass around the lower sprocket or wheels A<sup>5</sup> A<sup>5</sup>, is an important fea-

ture of my invention, and while I have designated the specific arrangement shown it is to be understood that my invention is not limited thereto.

Suitably connected to the machine-frame between the upper and lower rollers C C and C' C' is a platform D, upon which an attendant may stand to shift the skins upon the supporting-tables as they rise from between the lower rollers to thereby insure that all parts of the skin shall be subjected to the action of at least one pair of said rollers.

The operation is as follows: Motion being imparted to the pulley A' from shaft *f*<sup>5</sup> through the driving-belt *g*, the upper sprocket or star-shaped wheels are caused to turn, thereby moving the endless chain of supporting-tables, as will be apparent, the rollers C C and C' C' being also driven as described from the shaft *f*<sup>5</sup>. Hides or skins are fed to or placed over the edge B'\* of each supporting-table as it travels around the lower sprocket or star-shaped wheels A<sup>5</sup> A<sup>5</sup> and is about to start on the upward movement in position indicated at X, Fig. 4, at which time by reason of the link connection of one supporting-table with the next adjacent table at points between the upper and lower edges of the tables the upper edges of the table assume a projecting position, as indicated at X, out of the line of vertically-moving tables, at which point an attendant places a skin or hide over the upper edge, with a portion lying on either side of the table. As the table, now supplied with a skin or hide, moves upward its edges enter the open mouth *d*<sup>2</sup> of the guides *d d* and is thereafter held from sidewise movement or vibration as the table enters between and the hide or skin is acted on by the lower rollers C C. After passing the rollers C C the attendant on platform D moves the hide or skin a little farther onto one side of the supporting-table in order to bring the part of the hide or skin that was upon the upper edge of the table, and consequently not treated by the lower rollers C C, in position to be acted upon by the upper rollers C' C'. As the refuse, such as hair and the like, is removed by the rollers C C or C' C' it falls into the trough-like frame *m*, from which it is removed by the refuse-belt and delivered beyond the working parts of the machine, the disposition of the parts being such as to prevent any of the refuse from dropping onto the tables beneath, as before described. The skins or hides adhere somewhat to the supporting-tables and are removed therefrom on the downward run of the endless chain of supporting-tables at a point Y, Fig. 4.

The utility of my improved machine is obvious. By it as many as eight hundred dozen skins per day may be unhaired, and if used for putting out the skins are perfectly and evenly stretched, reducing the grain, removing all wrinkles, and delivering the skin free from sloppy tan and water and merely moist. The flutings, blades, or slickers carried by the



rollers are so operated as to do the work of stretching and putting out with a minimum of pressure, and the skins are properly caught up and delivered automatically by the take-up and delivery mechanisms without any undue, or rather uneven, pulling, the comparatively slow moving rollers expressing out the water practically complete, resulting in a proper stretching, and consequently full measurement or superficial area and worked down to give a finer and softer finish.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a machine of the character described, the combination with leather-working mechanism to act upon the skin, of devices to deliver the skin thereto, consisting of a vertically-traveling series of skin-supporting tables arranged in endless chain, said tables in the series being pivotally joined by connecting-links on a line rearward of the forward edge of the table, operating to throw each table in the series out of alinement with the others on the beginning of its upward movement to provide clearance between the edges of adjacent tables, and a pair of oppositely-mounted sprocket-wheels on which the said chain series of tables is operatively mounted, and with actuating devices to rotate said sprocket-wheels; substantially as described.

2. In a machine of the character described, the combination with a pair of yieldingly-mounted rollers carrying leather-working devices, and with means to resiliently press said rollers against an interposed skin, of devices to deliver the skin thereto, consisting of a vertically-moving chain of pivoted links and skin-supporting tables arranged alternately in the series, each link joining adjacent tables being pivoted at its ends to the adjacent tables at points intermediate the edges of said tables, means to guide and support said tables when passing to and between said leather-working devices, a pair of oppositely-mounted sprocket-wheels on which said chain of pivotally-linked tables is operatively mounted, and means for moving said chain of supporting-tables; whereby as the tables pass around the lower sprocket-wheel on their upward movement the forward edge of each table so passing said wheel will project out of alinement with the contiguous forward table in the series to provide clearance between the adjacent edges of the tables.

3. In a leather-working machine, the combination with a supporting-frame and driving

mechanism, of a vertically-moving series of skin-supporting tables adapted to receive and deliver the skins to leather-working devices, of a horizontally-disposed pair of rollers carrying said last-named devices, arranged one on either side of the path of travel of said series of tables, journal-plates supporting the ends of said rollers, a fixed bracket, two oppositely-disposed pivoted bearings for said journal-plates, devices adapted to adjustably hold said journal-plates within their respective pivoted bearings, and resilient means connecting said opposite dependent pivoted roller-bearings.

4. In a machine of the class described, the combination with leather-working devices, a continuously-moving skin-support, with means to bring said skin-support into opposing relation to the leather-working devices, of a refuse-conveyer disposed below said leather-working devices, adapted to receive and discharge the refuse material removed from the skin by said leather-working devices.

5. In a machine of the class described, the combination with a series of skin-supporting tables linked in endless chain, a yieldingly-mounted roll carrying unhairing devices arranged in the path of said series of moving tables, and means to receive and discharge the hair and other material stripped from the skin thereby, consisting of a transversely-moving carrier and guiding devices between the same and the leather-working roll operating to direct said refuse material to the moving carrier.

6. In a machine of the character described, the combination with an endless chain of supporting-tables, means on opposite sides of a run of said tables for acting upon the skins, a trough-like frame situated below said means into which the detached hair and other material are delivered, said trough-like frame having a slotted bottom for the passage of the endless chain of supporting-tables, and refuse-belts with means for operating the same and movable within said trough-like frame for carrying the hair and other materials out of the machine.

In testimony whereof I have hereunto affixed my signature this 13th day of August, A. D. 1901.

HUGH F. DOUGHERTY.

Witnesses:

ANDREW V. GROUPE,  
H. T. FENTON.