No. 712,706. Patented Nov. 4, 1902.

T. MURDOCK.

APPARATUS FOR STRETCHING LEATHER.

(Application filed Feb. 28, 1898.)

(No Model.) 3 Sheets—Sheet 1.

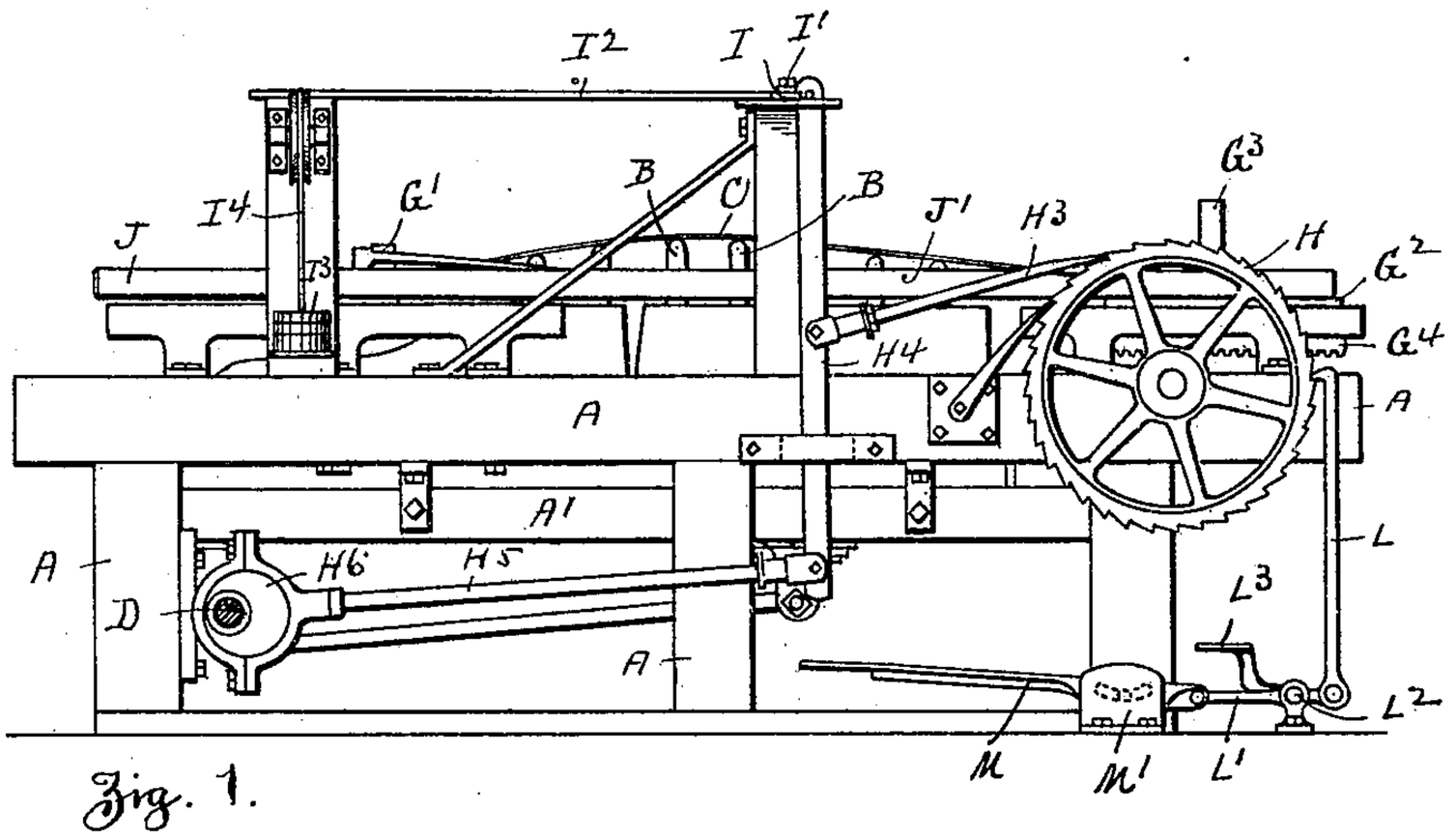

Fig. 1.

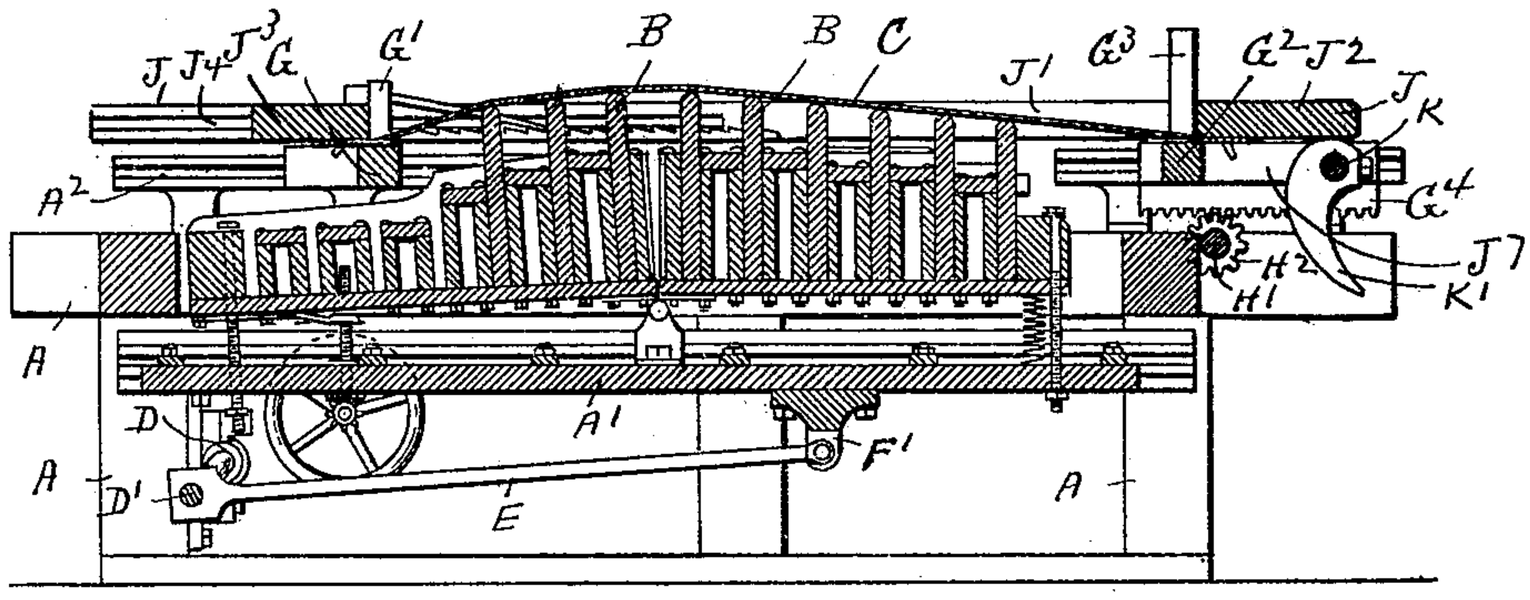

Fig. 2.

Witnesses
S. A. Wiseley
H. C. Price

Inventor
Tracy Murdock.
By his Attorney
Rufus B. Fowler

No. 712,706. Patented Nov. 4, 1902.

T. MURDOCK.

APPARATUS FOR STRETCHING LEATHER.

(Application filed Feb. 28, 1898.)

(No Model.) 3 Sheets—Sheet 2.

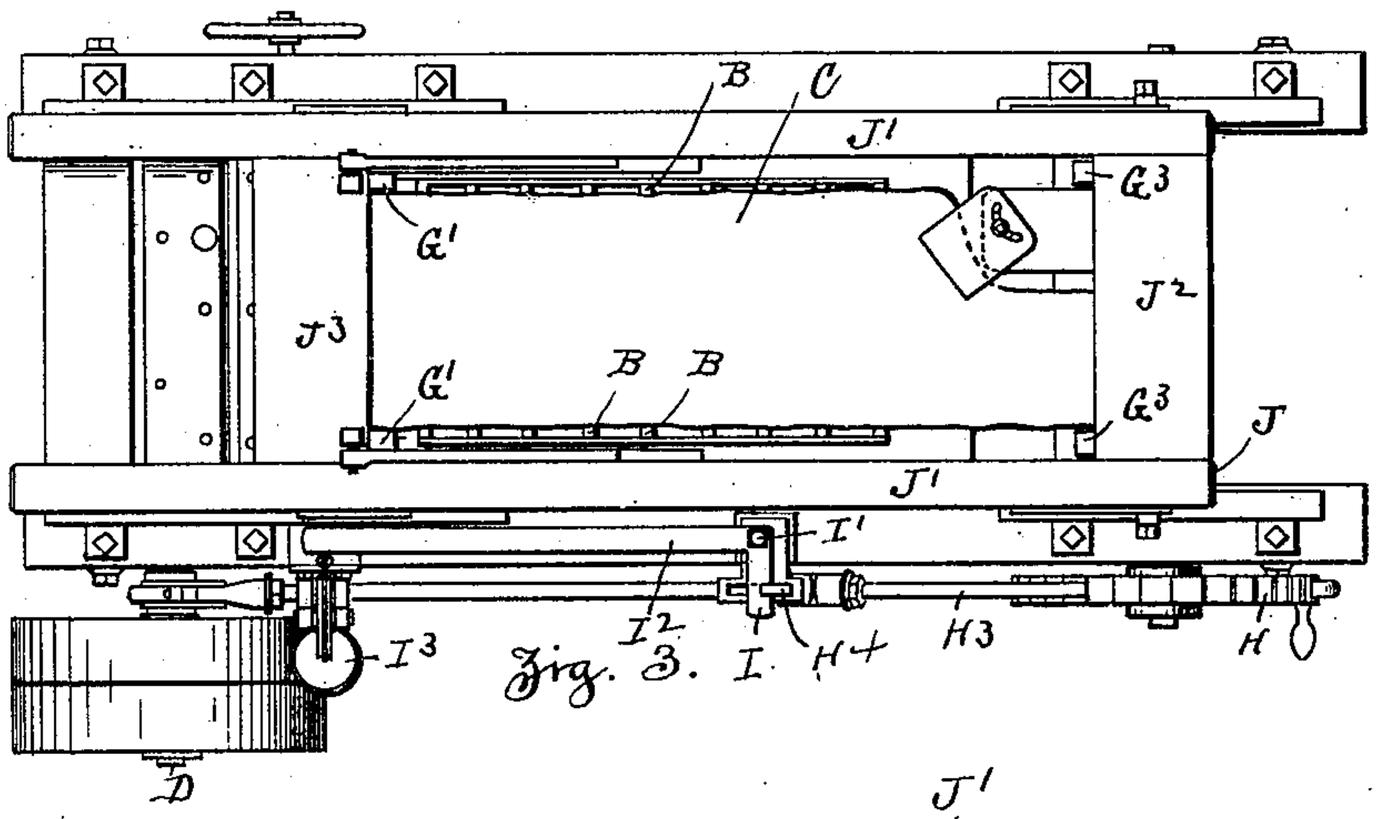

Fig. 3.

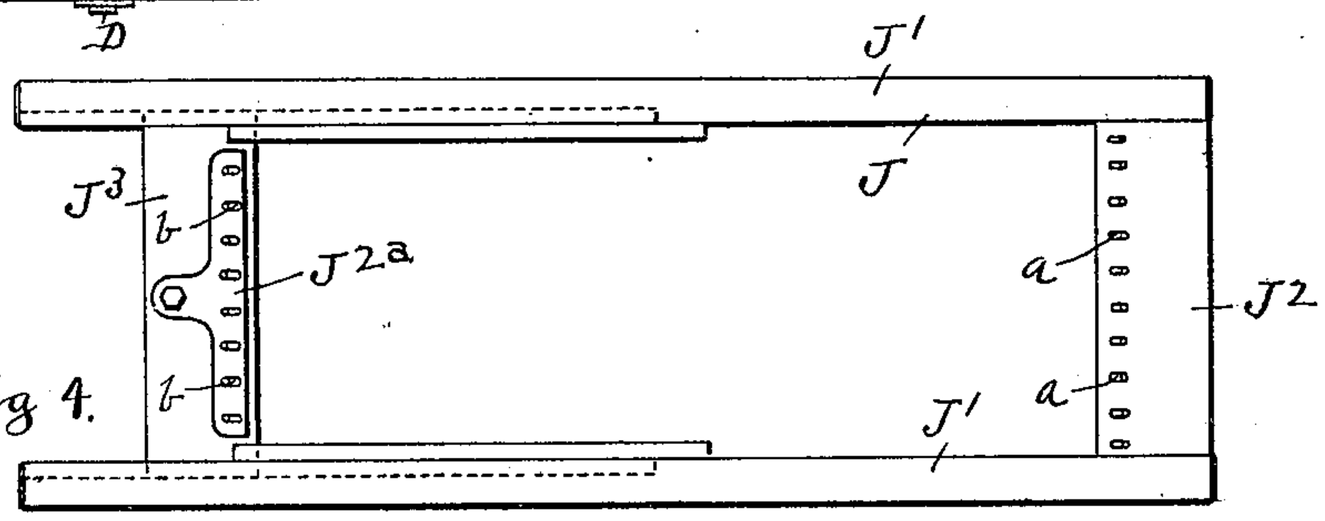

Fig 4.

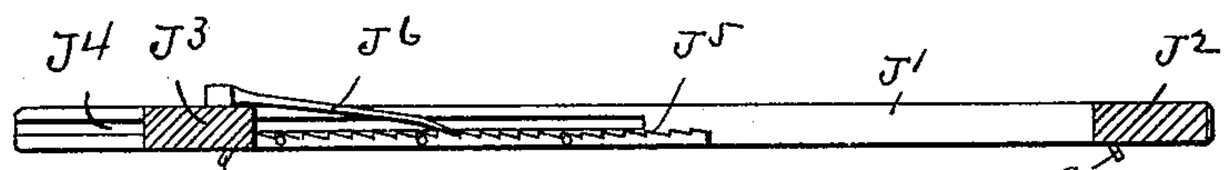

Fig. 5.

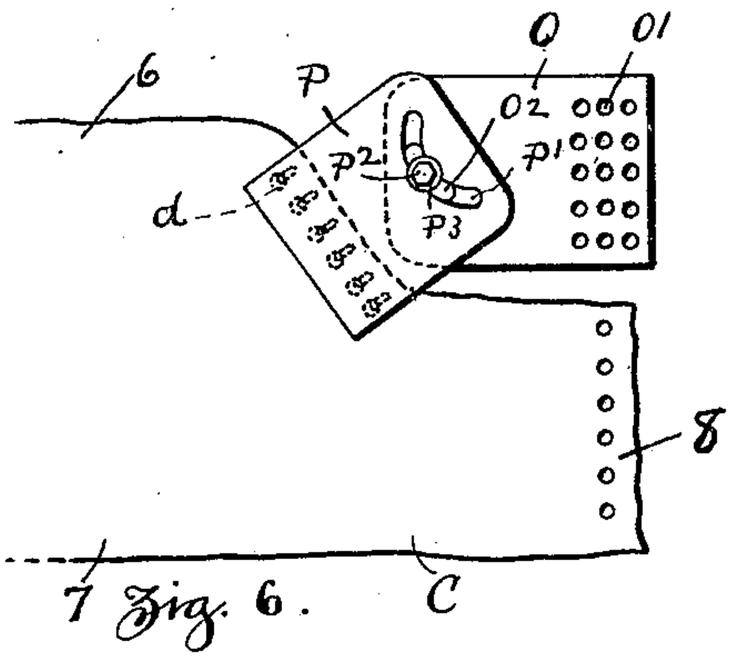

Fig. 6.

Witnesses
J. A. Wisley
W. C. Price

Inventor
Tracy Murdock.
By his Attorney
Rufus B. Fowler

No. 712,706. Patented Nov. 4, 1902.

T. MURDOCK.

APPARATUS FOR STRETCHING LEATHER.

(Application filed Feb. 28, 1898.)

(No Model.) 3 Sheets—Sheet 3.

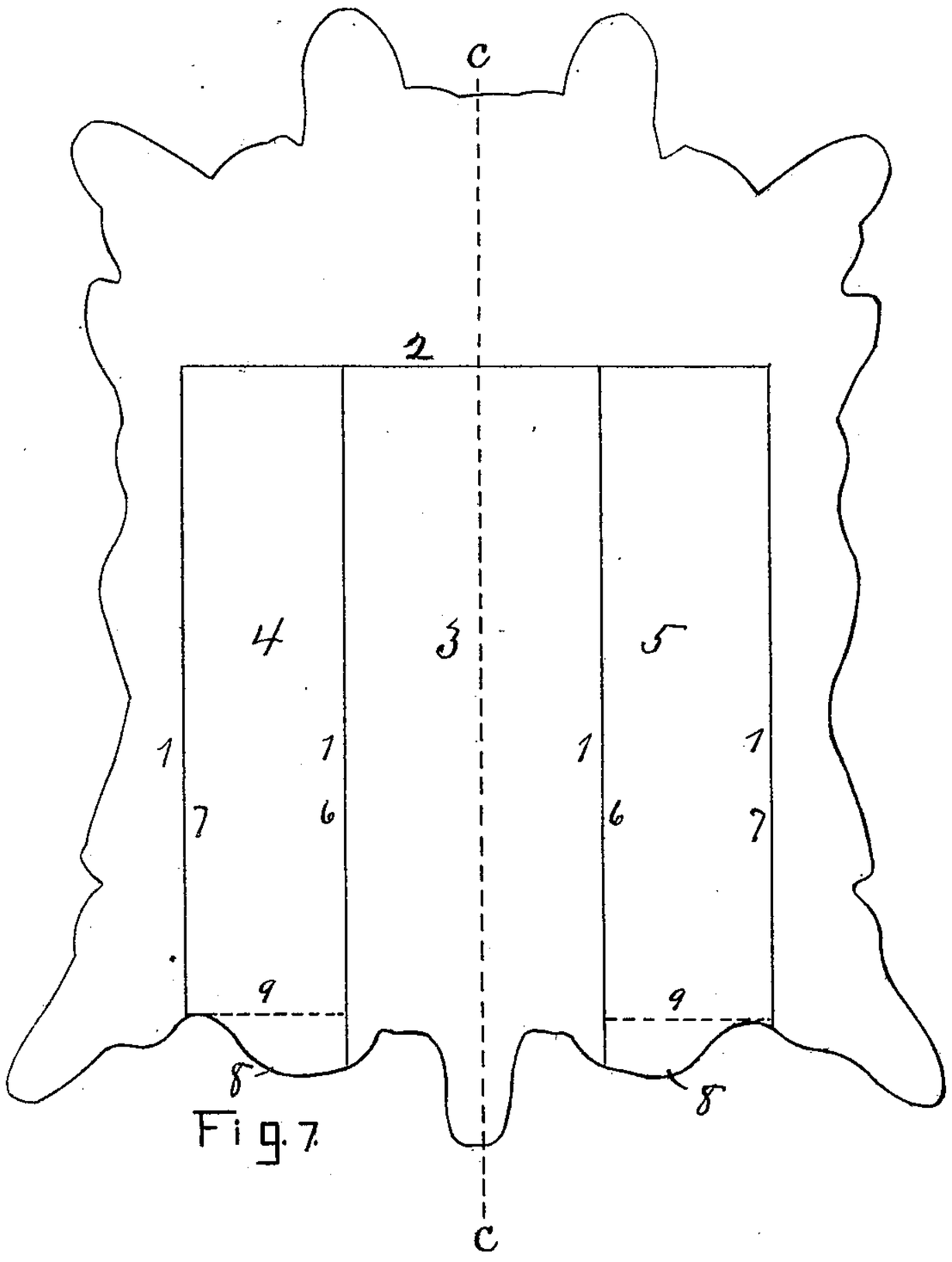

Fig. 7.

Witnesses:
M. L. Price
Henry W. Fowler

Tracy Murdock.
Inventor:
By Rufus B. Fowler
Attorney.

UNITED STATES PATENT OFFICE.

TRACY MURDOCK, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO GRATON AND KNIGHT MANUFACTURING COMPANY, OF WORCESTER, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

APPARATUS FOR STRETCHING LEATHER.

SPECIFICATION forming part of Letters Patent No. 712,706, dated November 4, 1902.

Application filed February 28, 1898. Serial No. 672,045. (No model.)

To all whom it may concern:

Be it known that I, TRACY MURDOCK, a citizen of the United States, and a resident of Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in Apparatus for Stretching Leather, of which the following is a specification, accompanied by drawings forming a part of the same, in which—

Figure 1 represents a side view of a leather-stretching machine embodying my invention. Fig. 2 is a central longitudinal sectional view. Fig. 3 is a plan view. Fig. 4 represents the under side of the leather-holding rack. Fig. 5 is a longitudinal sectional view of the same. Fig. 6 represents, on a larger scale than that shown in Fig. 3, the adjustable device for attaching the leather to the rack; and Fig. 7 represents the outline of a hide, showing the divisions into which it is cut in the manufacture of leather belting and showing those portions of the hide which require unequal stretching.

Similar characters refer to similar parts in the different figures.

My invention relates to that class of leather-stretching machines in which the leather to be stretched is subjected to a rubbing or racking process by means of a reciprocating rubbing-frame adapted to rub longitudinally upon the leather and having an automatic mechanism for taking up the slack in the leather during the process of rubbing.

My improvement consists in providing a removable framework or rack to which the leather to be stretched is attached, said rack being adjustable in size and capable of being automatically enlarged to take up the slack in the leather during the operation of stretching, in providing means for holding said framework against the tension of the leather, in certain features of construction and arrangement of parts, as hereinafter described, and, further, in the method of stretching certain portions of the hide more than other portions, so as to equalize the strain upon the fibers of leather; and the novel features of my invention are pointed out in the annexed claims.

Referring to the drawings, A denotes the supporting-framework of a leather-stretching machine, in which is mounted a reciprocating rubbing-frame A′, carrying a series of upright blades B, having their upper ends rounded and adapted to bear against a strip of leather C, which is attached at its ends to a removable rack, by which the leather is held taut while the blades B are reciprocated back and forth in contact with its under side.

D denotes the main driving-shaft of the machine, provided with a crank D′, which is connected by a rod E with a lug F′, projecting downwardly from the reciprocating frame A′. A bar G extends transversely across the framework and is adjustably held in a fixed position in the ways A^2. The bar G is provided with a pair of vertically-projecting studs G′, and at the opposite end of the machine is a similar transverse bar G^2, capable of sliding in ways in the frame and provided with a pair of vertically-projecting studs G^3 and a rack G^4. The movable bar G^2 is intermittently fed along the frame as the leather is being stretched by means of actuating mechanism, comprising a ratchet-wheel H on a shaft H′, which carries a pinion H^2, engaging the rack G^4. The ratchet-wheel is moved intermittently by an actuating-pawl H^3, carried by a lever H^4, which is operatively connected by a link H^5 with an eccentric H^6 on the main shaft D. The upper end of the lever H^4 bears against the short arm I of a bell-crank lever pivoted at I′ to an upright post, forming part of the fixed framework of the machine and having a long arm I^2, to which a weight I^3 is connected by a cord I^4.

The bars G and G^2 support a rectangular framework or rack J, (shown in plan view in Fig. 3,) consisting of the side pieces J′ J′, connected by a fixed end piece J^2 and having a movable cross-bar J^3 arranged to slide in grooves J^4 in the side pieces J′ J′. The cross-bar J^2 is provided on its under side with a row of slanting pins *a*, and pivotally connected with the end piece J^3 is a plate J^{2a}, provided with a row of slanting pins *b*. Attached to the inside of the side pieces J′ J′ are metallic bars having ratchet-teeth J^5, engaged by the retaining-pawls J^6, pivoted upon the removable cross-bar J^3. The strip of leather C is attached at its ends to the slanting pins

a and *b*, which enter holes in the leather, and the pivoted plate J^{2a} rocks on its pivot in case the pull of the leather is greater at one end of the lever than at the other, thereby serving as an evener to even the strain exerted upon opposite edges of the strip of leather. The rack J, with the strip of leather attached, is laid upon the bars G and G^2, with the fixed end piece J^2 bearing against the projecting studs G^3 and with the movable cross-bar J^3 bearing against the projecting studs G'. The ends of the leather are engaged by the pins *a* and *b*, with the leather stretched in a curved line over the tips of the rubbing-plates B. The construction and operation of the reciprocating rubbing mechanism and of the mechanism for taking up the slack in the leather as it is being stretched are substantially like that in the leather-stretching machine shown and described in the United States Patent No. 414,283, issued November 5, 1889, to B. P. Bradford, to which reference may be had for a detailed description of the machine. As the operation of rubbing proceeds the ratchet-wheel H is intermittently turned by means of the pawl H^3 and connected actuating mechanism, thereby moving the bar G^2 and studs G^3 away from the bar G and studs G', causing the cross-bar J^3 to slide in the grooves J^4, thereby drawing the leather taut. At each reciprocation of the rubbers B the leather is stretched, and the function of pawl H^3, wheel H, rack G^4, pinion H^2, and connections is to press the posts G^3 against the bar J^2, thereby taking up the slack in the leather and holding it taut, owing to the bar J^3 being held in a fixed position by means of the posts G'. As the cross-bar J^3 is moved in the grooves J^4 the strain upon the leather is maintained by the engagement of the pawls J^6 with the teeth of the bars J^5.

My invention is particularly adapted for stretching those strips of leather which are cut from the central part of a hide and intended for the manufacture of leather belting, for the reason that I am able to vary the amount of stretching imparted to different portions of the leather, so as to apply a uniform strain to the fibers.

In Fig. 7 I have shown in outline a hide which for the purpose of belt manufacture is cut previously to stretching on the lines 1, parallel with the center line *c c* and lengthwise the hide and also upon the line 2, running crosswise the hide, thereby forming the strips 3, 4, and 5. The strip 3 is cut from the center of the hide, or that part taken from the back of the animal, and the strips 4 and 5 from those portions of the hide which pass over the sides of the animal, the edges 6 6 of the strips 4 and 5 covering the sides or convex portions of the body and the edges 7 7 covering the belly of the animal, which is less convex. The varying curvature of that portion of the body from which the strips 4 and 5 are taken requires an unequal amount of stretching in the different parts of the strips. The fibers of the leather in the strips 4 and 5 at the edges next the central strip are also more stretchable than those edges which are taken from the belly of the animal—that is, the edges 6 can be stretched more without an injurious strain upon the fibers than the edges 7, as hereinafter described. The ends 8 8 are irregular in shape, making the edges 6 6 longer than the edges 7 7. It has been customary heretofore to square the ends 8 8 on the broken lines 9 9, thereby wasting a piece of leather at each end. I save this piece by supplementing the shorter edge of the strip by means of the plates O and P, which are hinged together and serve to connect the end 8 of the strip of leather to the rack. The plate O is provided with several rows of holes O' to engage the pins *a*, and the plate P has a row of hooks adapted to enter a row of holes *d* in the strip of leather, as the end of the strip is irregular in outline, and the holes *d* are formed in a row at an oblique angle to the length of the strip. The plate O is provided with a short curved rib O^2, which enters a longer curved slot P', allowing the plate P to turn relatively to the plate O, so as to vary its angle therewith, and the plates O and P are held together by a bolt P^2 and washer P^3. The leather-holding device, comprising the plates O and P, allows the short lengths of the leather to be engaged and also permits by the pivotal connection of the plate P a change in the direction of the tensile strain. In attaching the irregular ends 8 8 of the strips 4 and 5 to the rack by means of the plates O and P the edge 7 of the strip is not only increased in length to compensate for the naturally greater length of the edge 6, but the edge 7, by the addition of the plates O and P, is made slightly greater than the length of the edge 6, so that the pulling strain is first applied to the edge 6, thereby causing these edges 6 to receive more stretching than the edges 7.

So far as my invention relates to the method of equalizing the strain upon the fibers of the leather I do not confine myself to the use of the hinged plates O and P, my invention consisting in artificially increasing the length of the shorter side of a strip of leather when it is attached to the rack in order to compensate for the natural difference in length of the opposite edges, and also to make the edges of the strips which have been taken from the belly slightly longer in order to vary the amount of stretching imparted to the opposite edges of the strips of leather. As the strips 4 and 5, which are taken from the curved sides of the animal, are being stretched and brought into plane surface by taking out the curvature in the hide due to the curvature of the animal, the strain upon the fibers of the leather is equalized by means of the pivoted plate J^{2a}, which rocks freely upon its pivot as the strain upon one side of the center line of the strip is in excess of that on the opposite side.

Journaled in the frame J^7, which carries the bar G^2, is a shaft K, having its ends squared to receive a wrench and carrying cams K′ beneath the rack J for the purpose of lifting the end of the rack in order to raise the leather from the blades B and allow it to be straightened, and the studs G^3 are considerably higher than the studs G′ to allow the end of the rack J to be raised without disengaging it from the studs. When the leather has been drawn into a straight line by raising the end of the rack and rotating the ratchet-wheel H, the rack J is removed from the machine and the stretched leather is held thereon until the stretching becomes permanent. In order to remove the rack with the stretched leather from the machine, I release it by means of the mechanism shown in Fig. 1 and consisting of a hooked pawl L, connected with a lever L′, which is pivoted at L^2 upon a stand attached to the floor and provided with a footpiece L^3, by which one end of the lever L′ is depressed in order to raise the pawl L and hook it upon one of the teeth of the ratchet-wheel H. The lever L′ is pivotally connected with a foot-lever M, fulcrumed in a stand M′. By applying pressure to the foot-lever M the lever L′ is rocked to depress the pawl L and slightly turn the ratchet-wheel H in order to allow the actuating-pawl H^3 and retaining-pawl to be released. The pawl L is then disengaged and the ratchet-wheel H turned back, thereby sliding the bar G^2 backward to permit the rack to be removed.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a leather-stretching machine, the combination with a reciprocating rubbing-frame, of a removable frame, or rack, means for holding said frame, or rack, in a fixed position relatively to said rubbing-frame, said frame comprising a movable member, means for moving said movable member during the operation of rubbing, and means for retaining said movable member against the tension of the stretched leather, substantially as described.

2. In a leather-stretching machine, the combination with the framework of the machine, of an adjustable transverse bar, a movable transverse bar, studs projecting vertically from said transverse bars, a removable expansible rack supported on said transverse bars and engaged by said studs, a reciprocating rubbing-frame, means for actuating said rubbing-frame and means for moving said movable transverse bar during the operation of rubbing, substantially as described.

3. In a leather-stretching machine, the combination with the supporting-framework of the machine and a reciprocating rubbing-frame, of an expansible rack for holding the leather during the operation of rubbing and supported by said framework, said expansible rack comprising a fixed end piece, a pair of fixed side pieces, a movable cross-piece parallel with said end piece, means for attaching the leather to be stretched to said end and cross pieces, and means for moving said cross-piece during the operation of rubbing, substantially as described.

4. In a leather-stretching machine, the combination with the supporting-framework of the machine and a reciprocating rubbing-frame, of an expansible rack for holding the leather during the operation of rubbing and supported by said framework, said expansible rack comprising a fixed end piece, a pair of fixed side pieces, a movable cross-piece parallel with said end piece, means for attaching the leather to be stretched to said end and cross pieces, means for moving said cross-piece during the operation of rubbing, and means for retaining said cross-piece against the tension of the leather, substantially as described.

5. In a leather-stretching machine, the combination with a supporting-framework and a reciprocating rubbing-frame, of an expansible rack for holding the leather during the operation of rubbing and supported by said framework, said rack consisting of a pair of side pieces provided with grooves, an end piece attached to said side pieces, a cross-piece movable in said grooves, a retaining-pawl held by said cross-piece, toothed racks attached to said side pieces and engaged by said pawls, means for attaching the leather to said end and cross pieces, and means for moving said cross-piece during the operation of rubbing, substantially as described.

6. In a leather-stretching machine, the combination of a supporting-framework and a reciprocating rubbing-frame, of an expansible rack for holding the leather to be stretched and comprising a fixed and a movable member, means for moving said movable member during the operation of stretching, comprising a ratchet-wheel and actuating and retaining pawls, and mechanism for releasing said ratchet-wheel, consisting of a pivoted bell-crank lever having one of its arms provided with a hook to engage said ratchet-wheel and a foot-lever operatively connected with said bell-crank lever by which said ratchet-wheel is moved in order to release its pawls, substantially as described.

7. In a leather-stretching machine, the combination of a supporting-framework and a reciprocating rubbing-frame, of a rack for holding the leather to be stretched, means for attaching the leather to said rack, and means for raising said rack relatively to said rubbing-frame, substantially as described.

8. In a leather-stretching machine, the combination with a reciprocating rubbing-frame, of a rack for holding the leather to be stretched, means for attaching one end of the leather to said rack, a plate pivotally connected with said rack, and means for attaching the opposite end of the leather to said plate, substantially as described.

9. In a leather-stretching machine, the combination with a reciprocating rubbing-frame,

of a rack for holding the leather to be stretched, means whereby the shorter edge of the strip of leather to be stretched is supplemented in length, and means for attaching the strip of leather to said rack, substantially as described.

10. In a leather-stretching machine, the combination with a reciprocating rubbing-frame, of a rack for holding the leather to be stretched, a pair of plates O and P hinged together, means for attaching one of said plates to said rack, and means for attaching the other of said plates to the leather to be stretched, substantially as described.

11. In a leather-stretching machine, the combination of a reciprocating rubbing-frame, clamps holding the strip of leather to be stretched and between which the rubbing-frame is reciprocated, and an auxiliary clamp secured to one of the main clamps and extending toward the opposite clamp to grasp shorter portions of the strip of leather, substantially as described.

12. In a leather-stretching machine, the leather-holding device consisting of a plate provided with hooks for engaging the leather and having in the rear of said hooks a curved slot, and a device adapted to engage in said slot and thereby pivotally connect said plate to a part of the mechanism, substantially as described.

13. In a leather-stretching machine, the leather-holding device comprising, in combination, a plate, a second plate pivotally connected therewith, and having a swinging lateral movement in respect thereto, and having means for engaging the leather to be stretched and means for locking said pivotally-connected plate at any desired angle, substantially as described.

14. In a leather-stretching machine, the combination with a support forming part of the stretching mechanism, of a plate, means for adjustably connecting said plate with said support, a second plate pivotally connected with said adjustable plate and having a swinging lateral movement with respect thereto and provided with means for engaging the leather to be stretched, and means for locking said pivotally-connected plate at any desired angle, substantially as described.

15. A holder for leather-stretching machines, comprising two plates, one plate being provided with means for attachment to the leather and the other with the stretching means, said plates adjustably connected together, the point of adjustable connection being along a curved line.

16. A holder for leather-stretching machines, comprising two plates hinged together, the connecting-point being variable along a curved line, one plate being provided with means for attachment to the leather and the other with the stretching means.

17. A holder for leather-stretching machines, comprising two members hinged together at variable points upon an arc described in one of the members, one plate being provided with means for attachment to the leather and the other with the stretching means.

18. A holder for leather-stretching machines comprising two members, one having a curved slot and the other a pivot having hinged sliding connection along said slot, one plate being provided with means for attachment to the leather and the other with the stretching means.

19. A holder for leather-stretching machines comprising two plates, one provided with means by which it is secured to the leather and the other to the leather-machine, the plates adjustably connected together at a single given point at a time, said point of adjustment capable of change along a curved line.

20. A holder for leather-stretching machines comprising two parts having a hinged connection with each other along a curved way, the outer ends of said parts provided with means constructed and adapted for attachment to the leather to be stretched and to the machine respectively.

21. In a leather-stretching machine, the combination of a pair of plates having a laterally-adjustable pivotal connection with each other, said plates having means at their outer ends for attachment to an object to be stretched and the means for doing the stretching.

22. In a leather-holder for stretching-machines, the combination of a pair of plates having a laterally-adjustable pivotal connection with each other, one plate having pins to engage the object to be stretched and the other provided with holes for attachment to the machine which does the stretching.

23. The combination of two parts having a laterally-adjustable pivotal connection with each other, one part having a slot concaved in one direction and disposed therein transversely and the other a projection which moves in said slot, the outer ends of said parts constructed for attachment to the stretching means and the article to be stretched.

24. The combination of two parts having a laterally-adjustable pivotal connection with each other, one part having a slot concaved in the direction of the other part and the other part having a projection which moves in said slot, said parts both constructed at their outer ends for attachment to the stretching means and the article to be stretched.

Dated this 19th day of February, 1898.

TRACY MURDOCK.

Witnesses:
M. C. PRICE,
RUFUS B. FOWLER.