

No. 702,867.

Patented June 17, 1902.

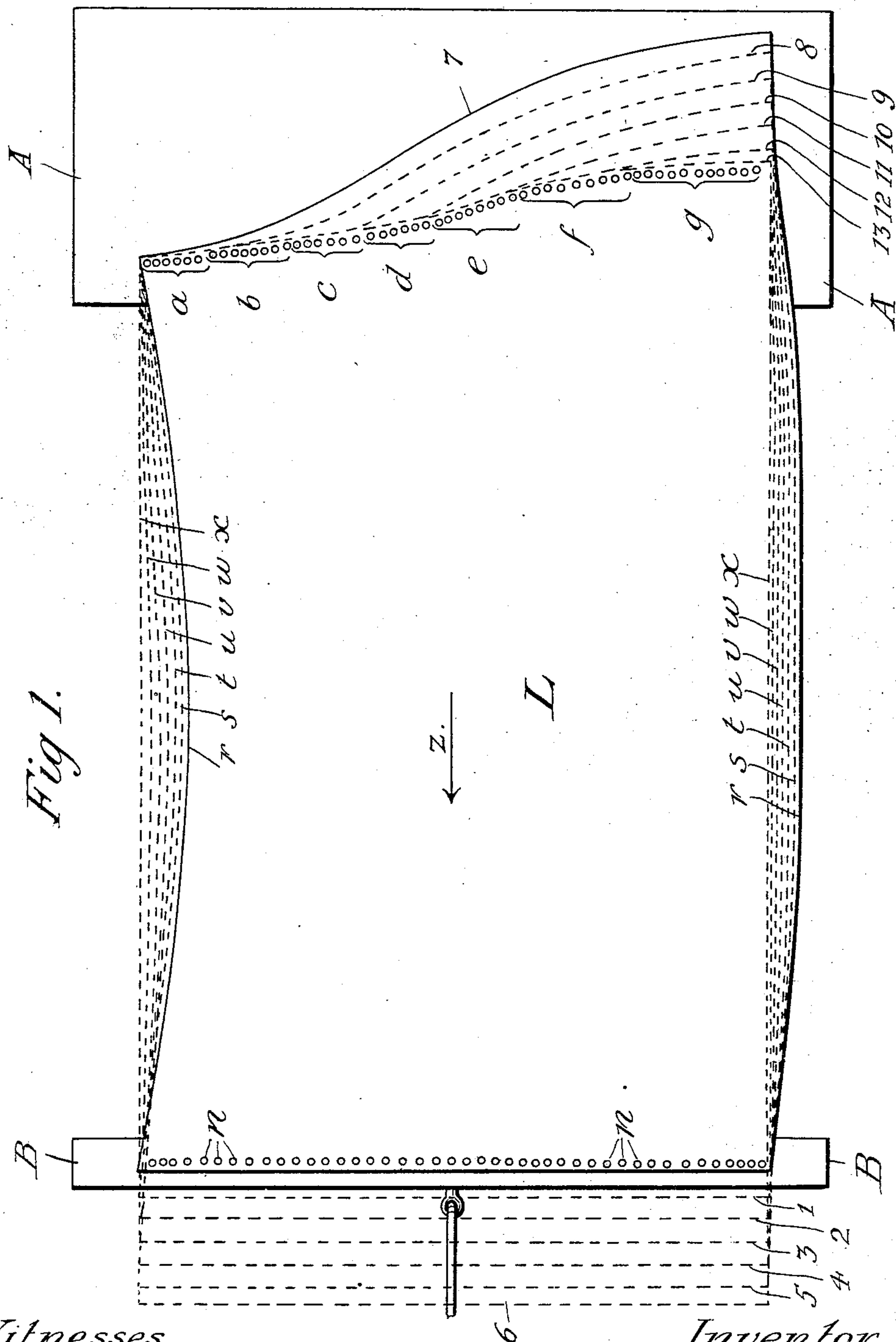
J. CALDWELL.

PROCESS OF STRETCHING LEATHER.

(Application filed Mar. 15, 1901.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses
Theo. Laguard
M. F. Harrison

Inventor
John Caldwell
By P. H. Gunkel
his Attorney.

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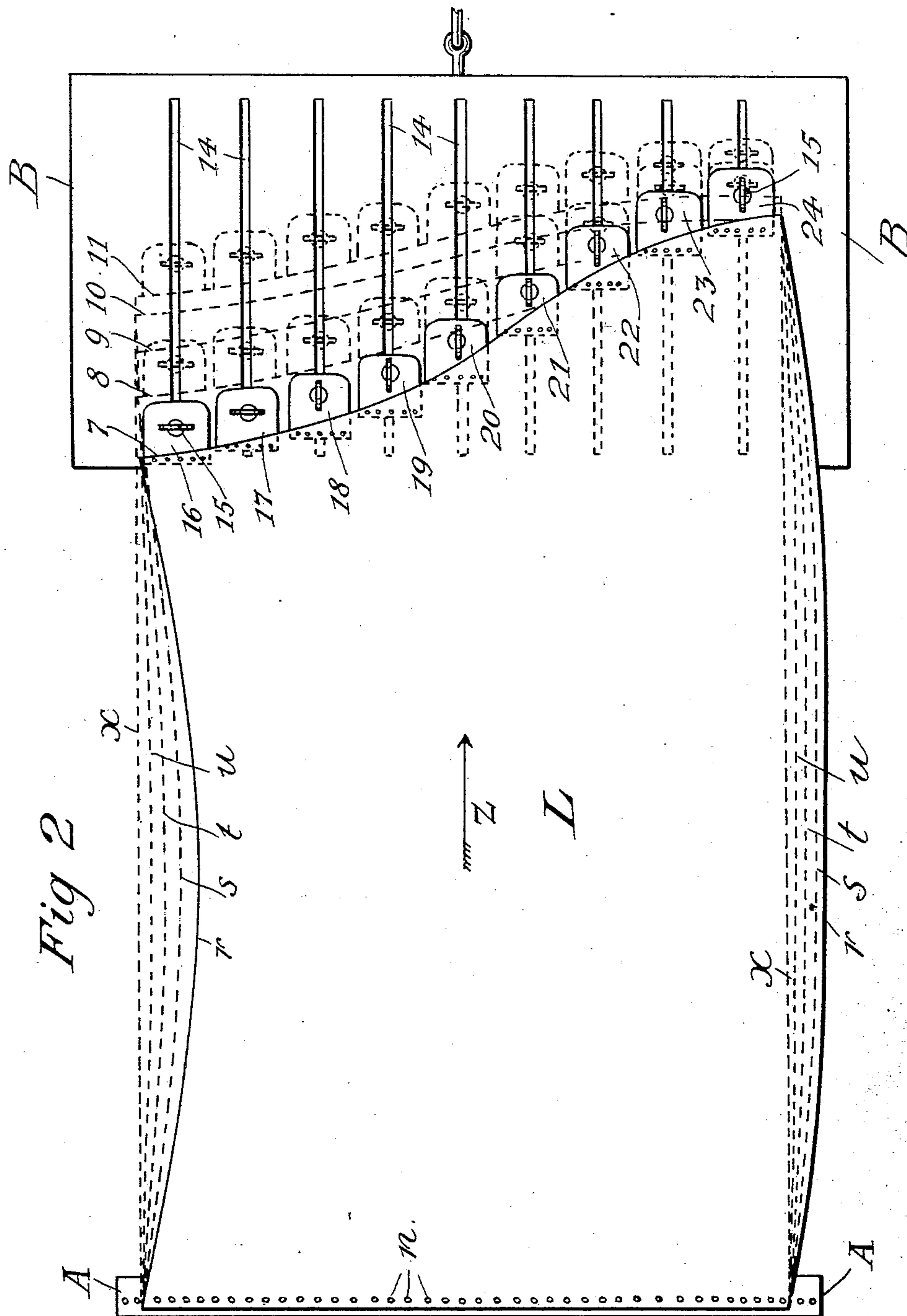
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Witnesses
Geo. Lagard
M. F. Hamlin

Inventor
John Caldwell
By P. H. Gunkel
his Attorney

UNITED STATES PATENT OFFICE.

JOHN CALDWELL, OF MINNEAPOLIS, MINNESOTA.

PROCESS OF STRETCHING LEATHER.

SPECIFICATION forming part of Letters Patent No. 702,867, dated June 17, 1902.

Application filed March 15, 1901. Serial No. 51,296. (No specimens.)

To all whom it may concern:

Be it known that I, JOHN CALDWELL, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented a certain new and useful Improvement in the Art of Preparing Leather for Belting, of which the following is a specification.

My invention relates to the art or process of preparing butts, sides, centers, backs, or other divisions of hides for use in the manufacture of belting; and its principal objects are to eliminate as far as practicable the twist or warp or bow of the leather, to render the softer and more yielding portions equal to the harder and less yielding portions in capability of withstanding tension without stretching when in use in belting, and to save material by unequally stretching the different portions of the body of leather to straighten its sides and lengthen its shorter portions.

It is the common practice in the preparation of a hide for belting to cut off the front portion on a straight line just back of the shoulder and trim off the belly portions as far up as the flanks. The remainder is usually either split down the middle into two parts, commonly called "backs," or it is cut lengthwise into three portions—a middle portion (usually about eighteen inches wide) called a "center" and two outer strips called "sides." These divisions of leather are afterward soaked in water, and when partly dry are greased and afterward subjected to tension in a stretching-machine. It is well known that the wetting, greasing, and partial drying of the leather causes the side portions, which are comparatively soft and spongy, to contract relatively more than the portions near the middle of the hide, which are firmer and less porous; that the effect of such contraction upon the backs is to cause their inner edge to bow outward and their outer edges to bow inward, and that the effect upon centers is to cause their middle portions to buckle. While in this contracted condition, the leather is obviously unfit for use in belting, because of its twisted or warped condition and the unequal capability of stretching in its softer and harder portions, which would result in allowing one longitudinal portion of a belt made of such material

to stretch under less strain than other portions. It is therefore necessary and it is the practice to stretch such warped, twisted, and contracted bodies of leather before they are converted into belting. The customary practice is to subject the leather to the operation of a stretching-machine, where all of its portions are simultaneously subjected to equal tension by securing the body of leather to the heads of a stretcher-frame by means of clamps or equivalent devices that operatively engage the end portions from side to side. When tension is applied to the heads, the pull upon the different parts of the leather is uniform, and all are stretched at the same time and to the same extent; but as different portions of the leather are capable of being stretched to varying degrees without detriment to its fiber and strength, the softer portions being generally capable of being stretched from five to seven inches while the harder portions, especially the parts near the middle of the hide, can be stretched only about four inches without injury, it is found impossible by such operation to remove from the leather or prevent warp, or twist, or buckle, or to straighten the edges, or to subject the softer and harder portions to the proper relative degrees of tension necessary to bring them to approximately equal consistency or capability of resisting tension without stretching. It follows as a consequence that belting made from leather thus prepared is imperfect and is liable to stretch or twist in parts and not run true on the pulleys.

I overcome the objections referred to and accomplish the objects set forth in the following manner: The strips or divisions of leather (backs, sides, centers, &c.) I soak in water for about twelve hours, scour the dirt from them, and then remove them and shave their under sides to remove flesh and irregularities. When partially dried, they are saturated with grease at a temperature of about 130°, after which they are piled one piece upon another and left for from twenty-four to thirty-six hours to thoroughly absorb and distribute the grease. Then after hanging in the air for about twelve hours they are flattened out by a machine known as a "jack" and then worked with a stone to give them a smooth finish and are then ready to be stretched. After the pre-

liminary preparation of the leather just described and while it is comparatively soft and pliable I successively stretch different longitudinal sections of the body of leather to an unequal extent, subjecting each portion to the degree or extent of tension relative to other portions that is necessary to remove whatever warp or bow or twist the body may have and to take the "stretch" out of its different portions—that is, make its different longitudinal portions equally capable, when constituting a part of the belt, of withstanding stress or tension without stretching or of stretching only under like degrees of stress. The leather when thus prepared and stretched is secured in place and allowed to dry and become set. In conducting this stretching process I preferably employ a stationary and a movable body or head for supporting and operatively connecting the ends of the strips of leather to be stretched. On these heads I place the ends of the center or side or other division of leather that is to be stretched, and after securing the straight end to one of the heads I then secure to the other head the soft spongy side portion only of the leather, leaving the other portions unattached to the head. I then apply tension to the leather by causing the movable head to move slowly and steadily away from the fixed head, and when the engaged portion has been stretched to make it of about the consistency of the less soft and spongy portion adjoining it I secure the ends of the latter to the heads and apply tension to both of the engaged portions of leather, and when the first and second sectional portions have been thus stretched until they are of about the consistency of the adjacent third portion that portion is in turn secured and stretched along with the first and second, and so on in succession until each longitudinal portion that may differ in fiber or consistency or ability to resist tension from the portion next to it has been stretched, when all in common may be stretched as much more as the nature of the body of leather as a whole may require.

In the accompanying drawings, Figure 1 shows a plan view of two stretcher-heads, a body of leather, and the means for connecting the leather to the heads; and Fig. 2 is a similar view, but shows a variation of the means for connecting the leather to the heads.

In illustration of my method of stretching leather Fig. 1 of the accompanying drawings shows a fixed body or head A and a free body or head B, movable in the direction of the arrow *z*. The body of leather L is assumed to be a back with its shoulder portion straight and secured to the head B by tines or nails *n* or any other suitable means and having its edges bowed, its shorter margin relatively soft and spongy, its longer margin relatively hard and firm, and the intermediate portions varying between the extremes of the margins in firmness and fiber and in the condition following the preliminary treatment explained. The irregular end is laid upon the head A,

and a portion of its margin at the shorter and softer side is secured by nails or other means to the head. The section thus first secured is represented by the bracketed row of nails indicated by *a*. The movable head B is then moved a proper distance as to the broken line 1, and carries with it the body of leather, (except the portion held by the nails *a*,) moving the edge 7 of the irregular end to the position indicated by the dotted line 8. A second portion (indicated by the bracketed row of nails *b*) is then secured to the head A, and the head B is then moved to the position indicated by the broken line 2, the irregular end of the leather being thereby moved to the dotted line 9. In the same manner successive portions of the irregular end are secured and the straight end moved, as indicated by the bracketed rows of nails *c*, *d*, *e*, *f*, and *g*, and the head B moved as indicated by the lines 3, 4, 5, and 6, and the irregular end is drawn to the positions indicated by the dotted lines 10, 11, 12, and 13. This operation not only stretches the leather and tends to straighten its irregular end, but also eliminates or reduces whatever lateral bow it may have had, its progressive movements laterally toward the straight lines *x* being indicated by the full lines *r* and the broken lines *s*, *t*, *u*, *v*, and *w*. The operation also tends to free the leather of vertical warp or buckle.

A variation of the means and method of stretching successive portions of a back of leather is illustrated in Fig. 2 of the drawings, in which the straight end of the leather is secured to a fixed head A, and a series of independent holders is employed for connecting successive portions of the irregular end to a slidable head B. The latter head in this instance is provided with a series of slots 14, extending in the direction of movement of the head. The leather-holders may have locking devices that slide in the slots and are adapted to lock the holders to the head by the turning of the thumb-nuts 15. The holders may be provided with pins or tines, as shown, or with clamps or other suitable means for engaging the leather, and any suitable means may be employed for successively connecting them to the head. The holders may all be attached to the leather, as shown, before any of them are connected to the head and the holders 16 and 17 first connected to the head for the initial stretching of the softer margin. The head B being then moved, the irregular end of the leather will be advanced from the position of the full line 7 to the dotted line 8. The holders 18 and 19 may next be connected and the leather end advanced to the dotted line 9, when the holders 20, 21, and 22 may be put in operation, advancing the edge to the dotted line 10, and, lastly, the holders 23 and 24 are secured, and the leather may be given a final stretching to the dotted line 11. When the operation is completed, the heads A and B are secured in place and the leather is allowed to dry and become fixed in its stretched con-

dition, and it is then ready to be cut up for belting. When such independent holders are employed, it is preferable to have all of the series of holders secured to the leather before power is applied, so that the operator can quickly put them to work by merely turning their locking-nuts, and thus securing them to the head, and in this way he can successively connect such of the holders as in his judgment will produce the best results. As the leather of different hides varies considerably in thickness, firmness, and capability of stretching, the width of the sectional portions to be successively engaged and stretched and the extent to which each portion should be stretched before succeeding portions are engaged must be left to the operator to determine by observation and manipulation in the treatment of each body of leather.

In the drawings the direction of tension of the machine is indicated by the arrows *z*, and in Fig. 1 the nails *a b*, &c., being used on the stationary head merely hold the leather, while in Fig. 2, the holders being connected to the movable head, serve to pull the leather; but obviously both forms of devices may be utilized for the same purpose.

The distortion of the leather and the effects of the stretching of successive portions are exaggerated in the drawings for the purpose of more clearly illustrating the method of operation.

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

1. The herein-described method of preparing sides, centers, backs, and similar divisions of leather for belting, consisting in first stretching longitudinally the softer portions of such divisions of leather to a degree sufficient to make them substantially as unyielding as the firmer portions, and then stretching all portions longitudinally to an equal degree.

2. The herein-described method of preparing leather for belting, consisting in successively and unequally stretching in longitudinal direction contiguous portions of a side,

center, back, or similar division of leather that differ in degrees of firmness, beginning with the softest longitudinal portion and stretching that and then each succeeding, together with each preceding, portion until each softer portion is stretched sufficiently to make it substantially equal to the adjacent firmer portion in ability to resist tension, and continuing the operation until all portions are stretched sufficiently to make them substantially equal in ability to withstand tension.

3. The herein-described method of preparing leather for belting, consisting in first stretching longitudinally the softest portion of a side, center, back, or similar division of leather until it is approximately equal to an adjoining firmer portion in ability to resist tension; next stretching said two portions in like manner until they are approximately equal to another adjoining portion in ability to resist tension; and so on with successive portions until all portions are stretched sufficiently to make them substantially equal to the hardest portion in ability to withstand tension.

4. The herein-described method of preparing leather for belting, consisting in cutting hides into backs, centers, and sides, or other suitable divisions, saturating such divisions with water and grease, partially drying them, and then stretching lengthwise the softest longitudinal portion of one of such bodies of leather until its ability to resist tension is approximately equal to a portion contiguous to it; next stretching said two portions until their ability to resist tension is approximately equal to another contiguous portion; and so on until all portions are stretched sufficiently to make them substantially equal to the hardest portion in ability to resist tension.

In testimony whereof I have hereunto set my hand this 9th day of March, 1901.

JOHN CALDWELL.

In presence of—

P. H. GUNCKEL,
A. L. WHELAN.