

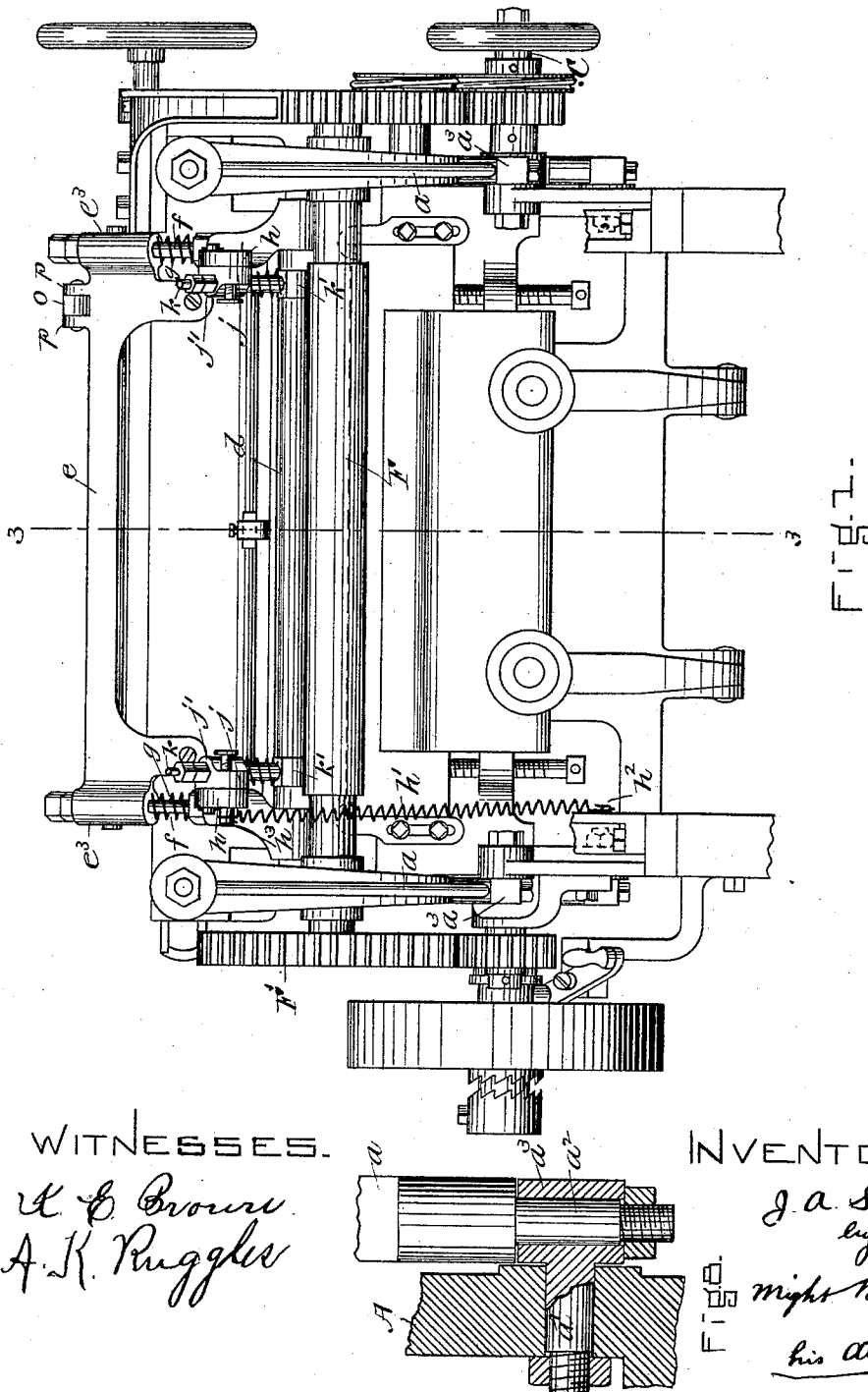
(No Model.)

5 Sheets—Sheet 1.

J. A. SAFFORD.
LEATHER SPLITTING MACHINE.

No. 465,145.

Patented Dec. 15, 1891



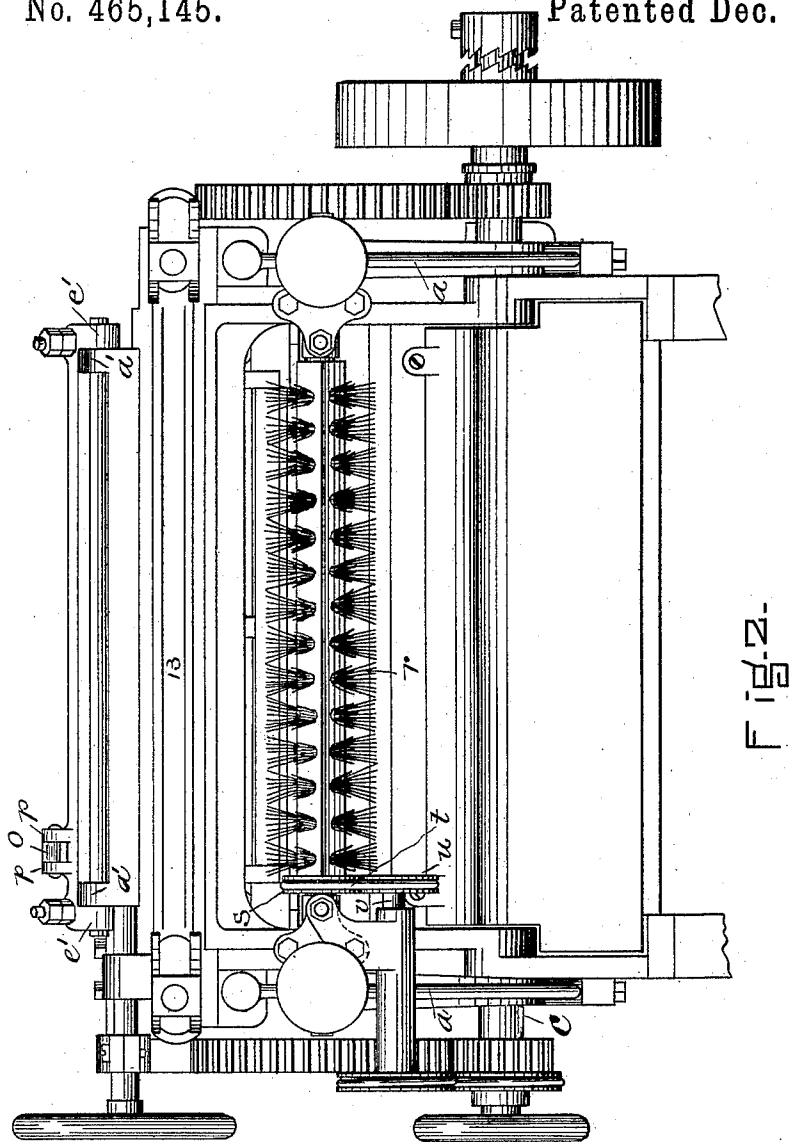
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WITNESSES.

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A. K. Ruggles

INVENTOR.

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his Attorneys.

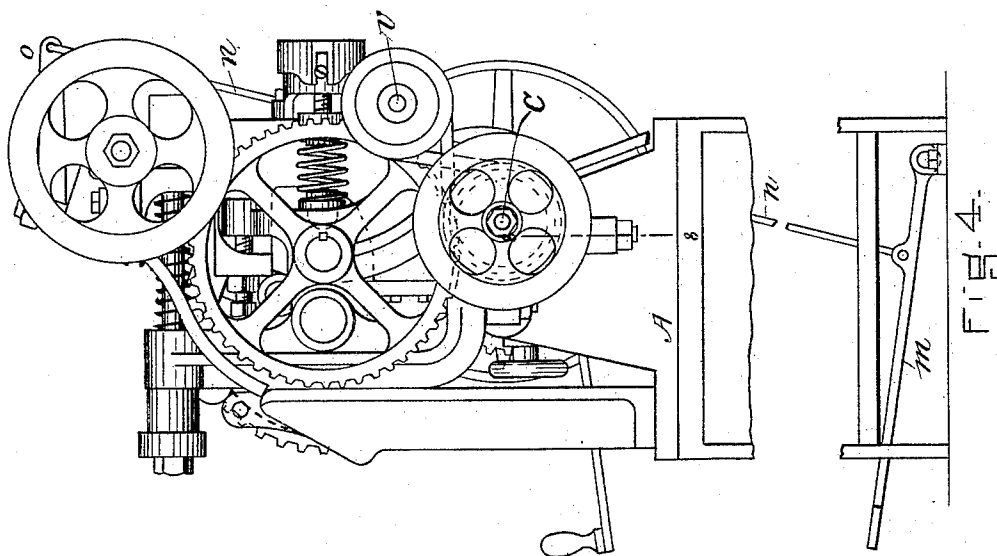
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5 Sheets—Sheet 3.

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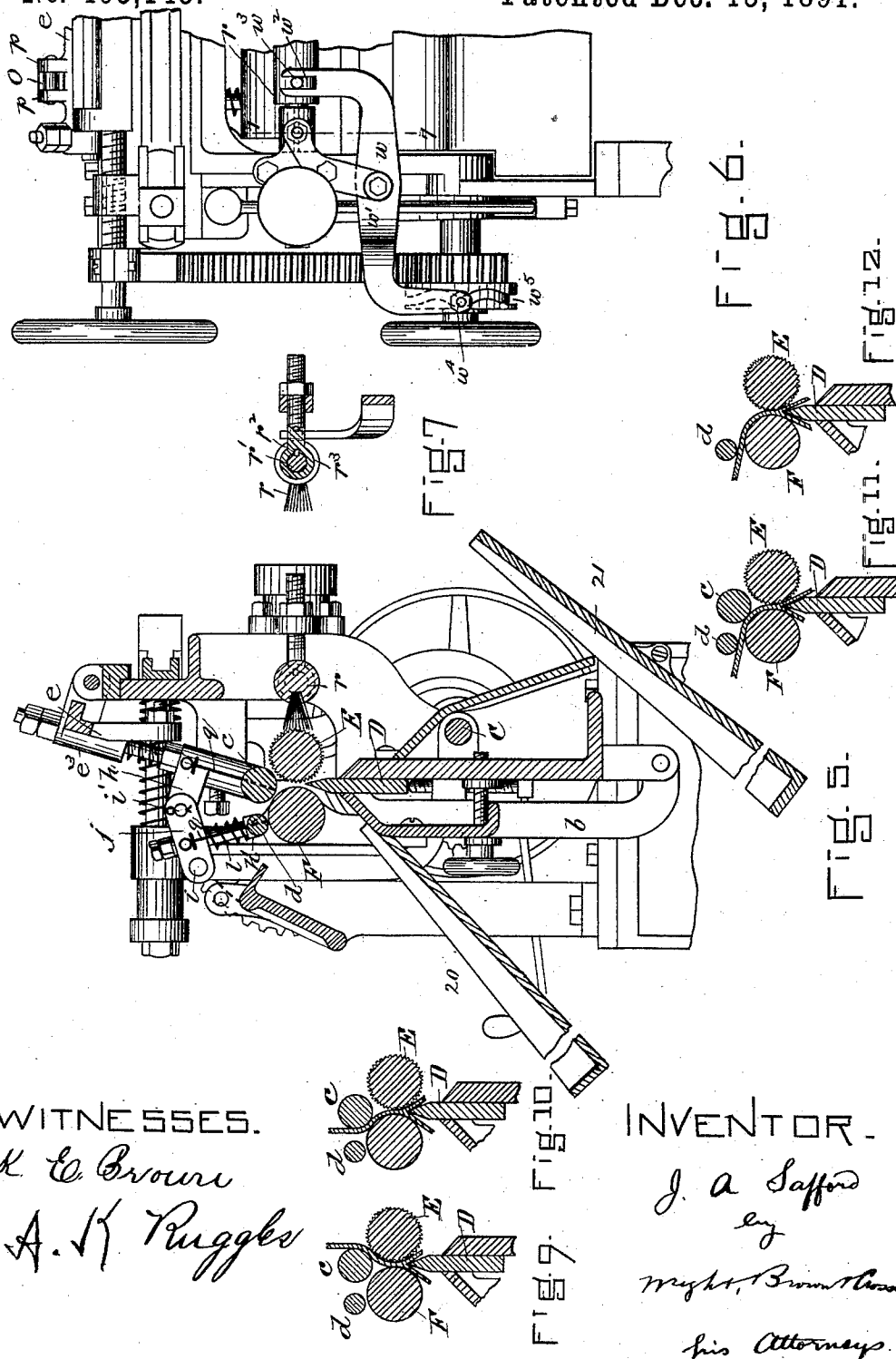
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5 Sheets—Sheet 4.

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Patented Dec. 15, 1891.



WITNESSES.

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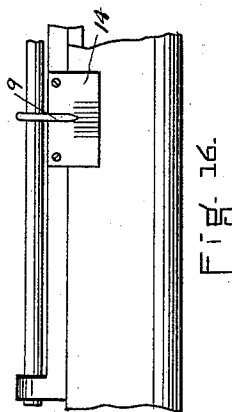
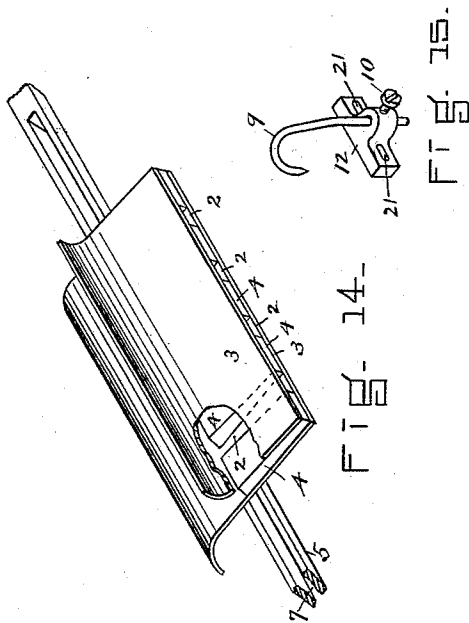
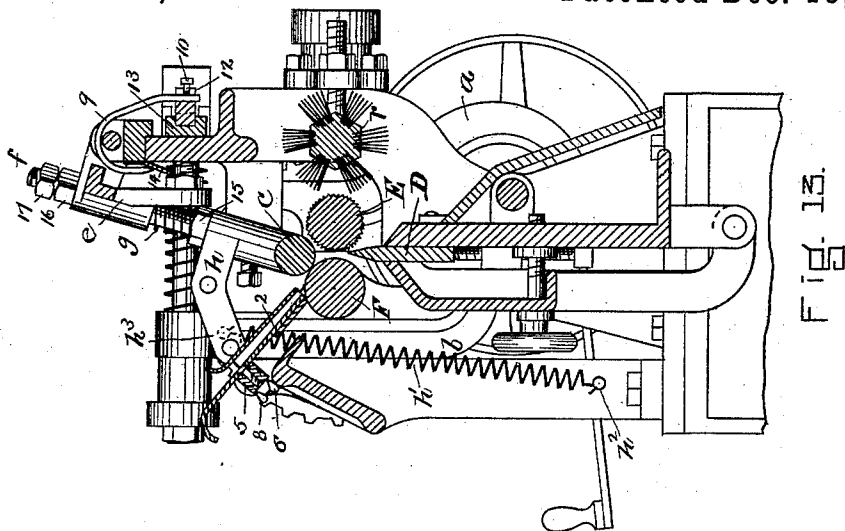
(No Model.)

5 Sheets—Sheet 5.

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LEATHER SPLITTING MACHINE.

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Patented Dec. 15, 1891.



WITNESSES.

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UNITED STATES PATENT OFFICE.

JOSEPH A. SAFFORD, OF MALDEN, MASSACHUSETTS.

LEATHER-SPLITTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 465,145, dated December 15, 1891.

Application filed May 4, 1891. Serial No. 391,508. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH A. SAFFORD, of Malden, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Leather-Splitting Machines, of which the following is a specification.

This invention relates to that class of leather-splitting machines in which a stationary splitting-knife is employed, and in co-operation therewith an adjustable feed-roll and an adjustable gage-roll, said rolls presenting the leather to the splitting-knife, while the gage-roll determines the thickness of the piece of leather by governing the amount cut or split from it by the knife. A type of leather-splitting machine of this class is shown in Letters Patent No. 305,240, granted to me September 16, 1884.

The present invention has for its object to provide certain improvements in machines of this class whereby the machine may be adapted to successfully cut and properly split different kinds and qualities of leather. I have found in my experience that in almost every establishment where leather-splitting machines are used there are several kinds of leather which have to be split by the same machine, each requiring a different treatment from the others, so that machines as usually constructed heretofore, while adapted to operate successfully on one or more kinds of leather are not successful in splitting other kinds, and my aim in inventing the improvements hereinafter described has been to produce an "all-round" machine which will enable the operator to vary the treatment in splitting different kinds of leather as his judgment may dictate.

The invention also has for its object to provide improved means for feeding a series of independent strips or pieces of leather to the splitting devices, and to provide an improved gage or indicator whereby the distance between the feed-roll and gage-roll will be indicated at all times.

To these ends the invention consists in the improvements which I will now proceed to describe and claim.

In the accompanying drawings, forming a part of this specification, Figure 1 represents a front elevation of a leather-splitting ma-

chine provided with my improvements. Fig. 2 represents a rear elevation of the same. Fig. 3 represents a section on line 3 3, Fig. 1. Fig. 4 represents an end elevation. Fig. 5 represents a section similar to Fig. 3, showing certain modifications in the construction and mode of operation of the feed-roll-cleaning brush. Fig. 6 represents an elevation of a portion of the machine constructed as shown in Fig. 5. Fig. 7 represents a section on line 7 7, Fig. 6. Fig. 8, Sheet 1, represents a section on line 8 8, Fig. 4. Fig. 9 represents a sectional view of the feed-roll, gage-roll, and knife, together with the pressure rolls or bars hereinafter referred to. Figs. 10, 11, and 12 represent similar views to Fig. 9. Fig. 13 represents a sectional view of the machine, showing the improved chute or guide for strips of leather and the improved gage or indicating device. Fig. 14 represents a perspective view of said chute or guide. Fig. 15 represents a perspective view of one member of the indicating device; and Fig. 16 represents an elevation of a portion of the machine, showing the stationary member of the indicating device or gage and the finger co-operating therewith.

The same letters of reference indicate the same parts in all the figures.

In the drawings, A represents the main frame of the machine, having bearings for the driving-shaft C.

E represents a pressure or feed roll, and F represents a gage-roll, said rolls being positively rotated by power communicated from the driving-shaft in any suitable manner and compelled to rotate in unison in opposite directions.

D represents the splitting-knife, which is detachably secured to the frame and is located in the usual relation to the rolls E F, as shown in the patent above referred to. The rolls E and F have their bearings, respectively, in swinging arms or levers *a a* and *b b*, the arms *a a* supporting the roll E and the arms *b b* the roll F. Said arms are pivoted at their lower ends to the supporting-frame, and they constitute pivoted supports which enable the rolls to be adjusted relatively to each other and to the knife with the minimum of friction, as described in Letters Patent No. 305,240, above referred to. The

general construction, so far as the means for supporting, rotating, and adjusting the rolls E and F is concerned, is preferably the same as in said patent.

5 My improvements include means for connecting each of the arms *a a* supporting the feed-roll E with the supporting-frame by means of a double or practically universal joint, the object being to enable the feed-roll
10 to be adjusted parallel with the edge of the knife without binding the journals of the roll in its bearings. It sometimes happens that in grinding the knife the alignment of the cutting-edge is changed, so that said
15 edge extends in a slightly diagonal direction, and as it is of the utmost importance that both the feed-roll and the gage-roll be exactly parallel with the cutting-edge of the knife, it follows that in case the knife is
20 ground, as last indicated, the rolls must be correspondingly adjusted. To this end I provide the lower end of each arm *a* with a vertical trunnion *a*², (see Fig. 8,) which is journaled in a bearing or socket *a*³, formed on
25 a horizontal trunnion *a*⁴, journaled in a horizontal bearing in the supporting-frame A. It will be seen that the trunnions *a*⁴ permit the feed-roll-supporting arms *a a* to swing, as in my above-mentioned patent, to give the feed-
30 roll the desired movements toward and from the knife and gage-roll, while the vertical trunnions *a*², journaled in bearings on said horizontal trunnions *a*⁴, permit the arms to swing in such manner as to keep the bear-
35 ings at the upper ends of said arms always parallel with the axis of the feed-roll, so that when the feed-roll is adjusted to an oblique position, or with one end farther forward than the other, the bearings in the arms *a a* will
40 always be in alignment with the axis of the feed-roll, and therefore will not bind or wear unevenly on the journals of the feed-roll. This construction also enables the bearings of the feed-roll to yield to different degrees
45 at the opposite ends of the roll in case the thickness of the leather varies so as to press one end of the feed-roll farther back than the other end, the described double-joint connection of the feed-roll-supporting arms to
50 the frame of the machine giving the desired elasticity, as it were, to the feed-roll and permitting its bearings to conform to all the requirements of the work without cramping or binding upon the journals of the feed-roll.

55 My improvements also include certain auxiliary devices next described to co-operate with the feed-roll E and guide-roll F in giving all the variations of treatment to the leather that may be required by the varying
60 conditions and qualities of leather to which I have above referred. Said attachments comprise two pressure rolls or bars *c* and *d*, of cylindrical form, supported by a movable frame over the feed-roll and gage-roll, and in
65 substantially the relation thereto shown in Figs. 3 and 5, each of said rolls having an independent yielding movement, so that it will

conform to the variations in the thickness of a piece of leather passed under it, while the two rolls are adapted to be raised and lowered
70 simultaneously by the movable frame *e*, which supports them. Said frame *e* extends lengthwise of the supporting-frame of the machine and is provided with ears *e' e'*, which are connected by pivots *e*² with fixed ears *a' a'* on
75 the supporting-frame. At the ends of the frame *e* are sockets *e*³ *e*³, in which rods *f f* are fitted to slide, said rods being provided at their lower ends with bearings for the roll *c*, and pressed downwardly by springs *g g*, thus
80 giving the roll *c* a yielding movement. To the sliding rods *f f*, below the springs *g*, are affixed arms *h h*, projecting forward toward the front of the machine, and to the outer ends of said arms *h* are pivoted at *i* the outer
85 ends of supplemental arms *j*, the inner ends of which are detachably secured at *i'* to the arms *h*, said arms *j* being adapted to swing vertically on said pivots *i*, and provided with sockets *j' j'*, in which are fitted sliding rods
90 *k k*, the lower ends of which are provided with bearings *k' k'*, in which the roll *d* is journaled. Springs *l l*, arranged between the bearings *k'* and sockets *j'*, give the roll *d* an independent yielding movement, both rolls *c* and *d* being
95 adapted to yield together by the springs *g*. One or more springs *h'* may be employed to exert a downward yielding pressure on both the rolls *c* and *d*, said spring being attached at its lower end, at *h*², to the supporting-frame
100 and at its upper end, at *h*³, to one of the arms *h*. By means of the spring *h'* and the independent springs *g* and *l* a sufficiently forcible pressure is imparted to the rolls *c* and *d* to enable them to co-operate effectively with the
105 feed-roll and gage-roll. It will be seen, particularly by reference to Fig. 13, that the rods *f f*, having bearings in which the pressure roll or bar *c* is mounted, are screw-threaded along their upper portions and are provided
110 with nuts 15, which support the lower ends of the springs *g*, and with nuts 16 and 17 at their upper ends, the nuts 16 constituting stops, which bear on the upper ends of the sockets in which the rods *f* slide and limit
115 the downward movement of the pressure roll or bar *c* toward the feed-roll and gage-roll. Hence by adjusting the nut 16 the normal position of the pressure roll or bar *c* may be adjusted to any desired extent. The nut 15 en-
120 ables the pressure or force of the spring *g* to be varied in a manner which will be readily understood. It will be seen that the roll *c* is located over the throat or space between the feed-roll and gage-roll, while the roll *d* is lo-
125 cated over the gage-roll. Hence the roll *c* is adapted to act as a pressure-roll for either the main feed-roll E or the gage-roll F, the arrangement of the roll *c* being such that the leather can pass behind it and between it and
130 the main feed-roll E, as shown in Fig. 9, or before it, so as to be pressed by it against the periphery of the gage-roll F, as shown in Fig. 10. Some kinds of leather will be best treated

by being passed between the rolls *c* and *E*, as in Fig. 9, while for other kinds the treatment shown in Fig. 10 will be preferable. In cases where the shape of the leather is such that it is liable to be wrinkled in passing between the feed and gage rolls I find that the wrinkles may be taken out and the leather properly stretched and smoothed by passing it under both the rolls *c* and *d*, said rolls co-operating in pressing the leather against the gage-roll *F*, as shown in Fig. 11. The yielding movement of the rolls *c* and *d* enables them to conform to the thickness of the leather and to press the leather closely against the roll or rolls with which they co-operate.

If desired, the roll *d* may be removed from the machine or made inoperative by removing the arms *j j* or by disconnecting each of said arms at one end from the arm *h* that supports it and swinging said arms *j* upwardly, thus raising the roll *d* from its operative position without disconnecting it from the machine.

The frame *e* may be raised to make the rolls *c* and *d* simultaneously inoperative by any suitable means, such as a treadle *m* at the base of the machine, Fig. 4, connected by a rod *n* with an arm or lever *o*, affixed to ears *p p* on the frame *e*, the arrangement being such that a depression of the treadle will raise the frame *e* and thus separate the rolls *c* and *d* from the feed-roll *E* and gage-roll *F*, this displacement of the rolls being necessary to permit the insertion of thick pieces of leather.

If desired, the rolls *c* and *d* may be locked so that they will not rotate, thus causing them to exert a considerable degree of friction and resistance on the leather for the purpose of more perfectly stretching the same before it reaches the point where it is split. To this end locking-pins *q q*, Fig. 5, may be inserted in holes formed in said rolls *c* and *d*, said pins being suitably supported by the parts which support said rolls, the latter in this case being converted into bars.

It will be seen that the improvements thus far described comprise one or more pressure rolls or bars adapted to co-operate with the feed-roll *E*, or both the feed-roll *E* and the gage-roll *F* in the manner shown. When said devices are permitted to rotate as pressure-rolls, they rotate loosely and receive their rotary motion from the leather or material on which they bear, the latter being moved by the gage-roll of the machine. By providing these pressure rolls or bars, one or more, I am enabled to insure the proper splitting of different kinds of leather and adapt the machine to all the requirements which naturally arise in a boot and shoe factory.

I do not limit myself to the conjoint use of the two rolls *c* and *d*, but may use either roll singly, as in some cases the roll *d*, co-operating only with the gage-roll *F*, may be used, the roll *c* being omitted, as shown in Fig. 12. I desire, therefore, to be understood as cover-

ing broadly in the claims following this specification a pressure roll or bar arranged to co-operate with either the feed-roll or the gage-roll of a leather-splitting machine of the class above described, as well as the conjoint use of the two rolls, as here shown, said roll or rolls having a yielding pressure upon the leather.

When the course of the leather is as indicated in Fig. 9, the advancing end of the sheet or piece of leather is deflected and guided into the throat or space between the bar or roll *c* and the feed-roll *E*, by means of a swinging plate or strip *c'*, which is affixed to arms *c²*, pivoted at *c³* to the arms *h h* and pressed yieldingly by springs *c⁴* toward the roll *c*. The position of the plate or strip *c'* is such that a piece of leather passing over the roll *c*, as shown in Fig. 9, would be turned backwardly and caused to pass between the roll *c* and feed-roll *E*, instead of avoiding the meeting point of said roll *c* and feed-roll *E*, as it would be liable to do if the said guiding or deflecting strip *c'* were not employed.

r represents a brush arranged to act on the fluted periphery of the feed-roll *E* for the purpose of removing from the creases thereof the matter which is liable to be deposited therein by the pressure of the roll against the leather. Such matter eventually fills the creases between the longitudinal teeth or corrugations of the feed-roll, thus depriving the feed-roll of the positive control of the leather which it is desirable said roll should possess, so that the feed is not of the positive character desired. Said brush may be adapted to rotate, as shown in Figs. 2 and 3, its shaft being journaled in suitable bearings and provided at one end with a pulley *s*, which is connected by a belt *t* with a pulley *u* on a short shaft *v*, which is driven by a connection with the driving-shaft *C*.

In Figs. 5, 6, and 7 I show the brush as adapted to reciprocate lengthwise, and in this case the shaft or rod *r'*, to which the brush is affixed, is provided with a feather *r²*, Fig. 7, adapted to slide in a groove in a bearing *r³*, affixed to the supporting-frame, said feather and groove permitting the brush to reciprocate endwise without rotating. For reciprocating the brush I have shown a lever *w*, pivoted at *w'* to an arm affixed to the supporting-frame and having one end extended upwardly and provided with a slot *w²*, receiving a stud *w³* on the back or stock of the brush, its other end being extended downwardly and provided with a stud *w⁴*, which enters a cam-groove *w⁵* in a disk or wheel affixed to the driving-shaft of the machine.

In Figs. 13 and 14 I show an attachment for feeding a series of strips of leather—such as welt-strips—to the point where the leather is grasped and carried forward to the splitting-knife. Said attachment, which is shown in perspective in Fig. 14, comprises a chute or guide having a series of channels *2 2*, each adapted to guide a welt-strip, said channels

being formed between two plates 3 3 and divisions or partitions 4 4 inserted between said plates. The bottom plate 3 is secured to a slotted guide-bar 5 by means of a bolt 6, affixed to said bottom plate and passing through a longitudinal slot 7 in said guide-bar, said bolt having a nut 8, bearing on the under side of the guide-bar, as shown in Fig. 13. By loosening said nut the chute or guide can be adjusted or moved lengthwise along the guide-bar, while by screwing up the nut the guide may be affixed to the bar at any point to which it may be adjusted. This lateral adjustability of the chute or guide enables it to be changed from point to point, so that as fast as a given portion of the knife becomes dull the work may be presented to another portion of the knife. The bar 5 is affixed to the outer portions of the arms *b* on the swinging frame *e*, so that by raising said frame the guide or chute may be elevated above its operative position.

When the guide or chute is employed, the forward roll or bar *d* is removed from the machine to make room for said chute, said roll *d* being unnecessary in the splitting of narrow strips or welts. The guide or chute is arranged to conduct the strips or welts to the upper surface of the gage-roll, so that said strips pass over the gage-roll, under the roll or bar *c*, and between the gage-roll and feed-roll.

It is obvious that the strip guide or chute above described may be used in connection with the feed-roll and gage-roll, the pressure roll or bar *c* being removed.

I have also shown in Fig. 14, and in detail in Figs. 15 and 16, a gage to determine the distance between the gage-roll and feed-roll. Said gage comprises two members, the first of which is a pointer 9, affixed by a set-screw 10 to a socketed block 12, attached to the sliding bar 13, on which are formed the wedges which determine the position of the gage-roll with reference to the feed-roll, as shown in my patent above mentioned, said wedges being adjusted by an endwise movement of the bar 13 on which they are formed, said bar being lettered *i*² in the patent referred to. The other member of said gage is a plate 14, affixed to a fixed part of the frame of the machine and provided with marks or graduations, as shown in Fig. 16. The pointer 9 is curved, as shown in Figs. 13 and 15, and extends from the bar 13 to the plate 14, its outer end being in such proximity to the plate that it co-operates with the marks on the latter in indicating the extent to which the wedge-carrying bar 13 has been moved endwise from its starting position, the latter being the position it occupies when the gage-roll and feed-roll are at their closest approach to each other. It will be seen, therefore, that any movement of the wedge-carrying bar 13 which increases or decreases the distance between the gage-roll and the feed-roll will be indicated by the described

gage or indicating device. It will also be seen that the addition of the said indicating device to the machine involves but little expense, and that said indicating device can be adapted very readily to existing types of machines. The block 12 has longitudinal slots 21 21, Fig. 15, which receive the screws that attach said block to the bar 13. Said screws permit the pointer 9 to be adjusted to the proper initial or starting position on the bar 13. Every grinding of the knife requires a readjustment of the initial or starting position of the pointer if the latter is to be accurate.

In Fig. 5 I show a chute 20, arranged to deflect toward the front of the machine the pieces of leather which pass down the front side of the knife, and another chute 21, arranged to deflect in similar manner the pieces which pass down the rear side of the knife, said chutes being arranged to deliver the pieces at different points, so that each grade or series of pieces will be separated and delivered by itself. In some cases it may be desirable to use only one of said chutes, either the chute 20 or the chute 21 may be used, the other being omitted, according to character of the work.

I claim—

1. In a leather-splitting machine, the combination, with a fixed knife, a gage-roll, a feed-roll journaled in arms *a a*, and a double or universal joint connection between said arms and the supporting-frame, constructed to permit the said arms to turn on two axes at right angles to each other, whereby the bearings of the feed-roll are kept in alignment with the axis thereof under all adjustments of the feed-roll, as set forth.

2. In a leather-splitting machine, the combination of a fixed knife, an adjustable gage-roll, a feed-roll, arms *a a*, having bearings for the journals of said feed-roll, vertical trunnions *a*² on the lower ends of said arms, and vertical bearings *a*³, receiving said trunnions and provided with horizontal trunnions *a*⁴, which are journaled in fixed horizontal bearings in the supporting-frame of the machine, as set forth.

3. In a leather-splitting machine, the combination, with a fixed knife, a feed-roll, and a gage-roll, of a frame pivotally connected to the supporting-frame of the machine, rods, such as *f f*, movable in said frame toward or from the feed and gage rolls, a pressure roll or bar carried by said rods, means for adjusting said rods to determine the initial position of said pressure roll or bar toward the feed and gage rolls, and means for adjusting the pressure of said springs, as set forth.

4. In a leather-splitting machine, the combination, with a fixed knife, a feed-roll, and a gage-roll, of the frame *e*, hinged or pivoted to the supporting-frame of the machine, the pressure roll or bar *c*, journaled in bearings on said rods, the springs *g*, whereby said rods and the pressure roll or bar are depressed,

and means, such as the spring *h'*, for giving the pressure-roll an additional downward yielding pressure, as set forth.

5 In a leather-splitting machine, the combination, with a fixed knife, a feed-roll, and a gage-roll, of the frame *e*, hinged or pivoted to the supporting-frame of the machine, the pressure roll or bar *c*, journaled in bearings on said rods, the springs *g*, whereby said rods
10 and the pressure roll or bar are depressed, the arms *h*, attached to the rods *f*, the plates *j*, detachably or pivotally connected to the arms *h*, the rods *k*, fitted to slide in sockets in the plates *j*, the pressure-roll *d*, journaled
15 in bearings on the lower ends of said rods, and the springs *l*, arranged to give downward pressure to the pressure roll or bar *d*, as set forth.

6. In a leather-splitting machine, the combination, with a fixed knife, a feed-roll, and a
20 gage-roll, of an inclined chute or guide having a series of ways or passages arranged to guide a series of strips to the feed-roll and gage-roll, as set forth.

25 7. In a leather-splitting machine, the combination, with a fixed knife, a feed-roll, and a

gage-roll, of a chute or guide arranged to present a series of strips to said gage-roll and feed-roll, means for laterally adjusting said guide to present the material to different portions of the knife, and means for securing
30 said guide in any position to which it may be adjusted, as set forth.

8. In a leather-splitting machine, the combination, with a fixed knife, a feed-roll, and a
35 gage-roll, of means for adjusting said gage-roll, said means including a longitudinally-movable bar 13, an index-finger adjustably secured to said bar, and a graduated plate
40 affixed to the supporting-frame and arranged to co-operate with said finger in indicating changes of position of the gage-roll, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of
45 two subscribing witnesses, this 28th day of April, A. D. 1891.

JOSEPH A. SAFFORD.

Witnesses:

C. F. BROWN,
A. D. HARRISON.