(No Model.)

4 Sheets—Sheet 1.

C. F. STACKPOLE.

LEATHER STRETCHING AND SOFTENING MACHINE.

No. 501,593. Patented July 18, 1893.

Fig. 1.

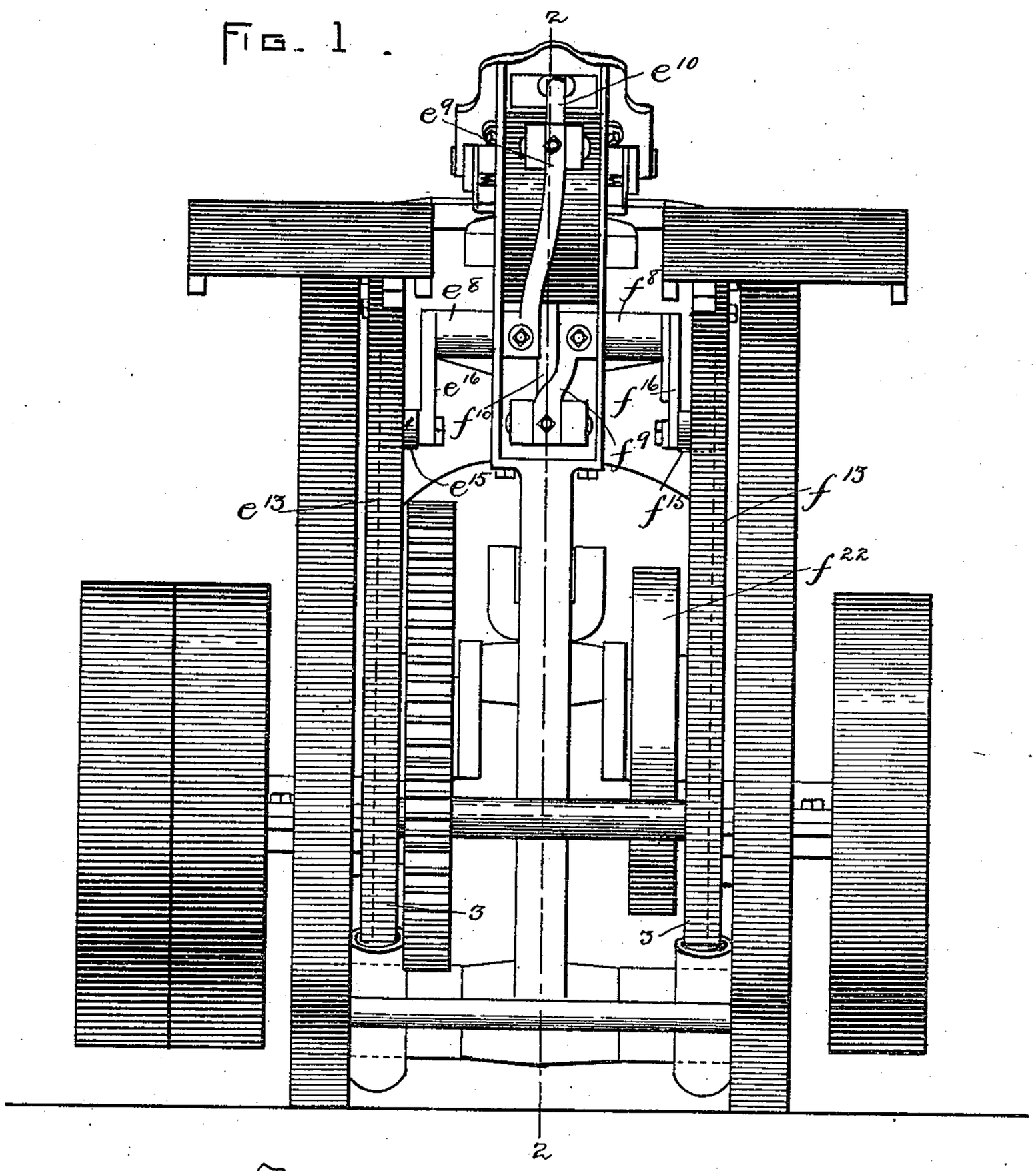
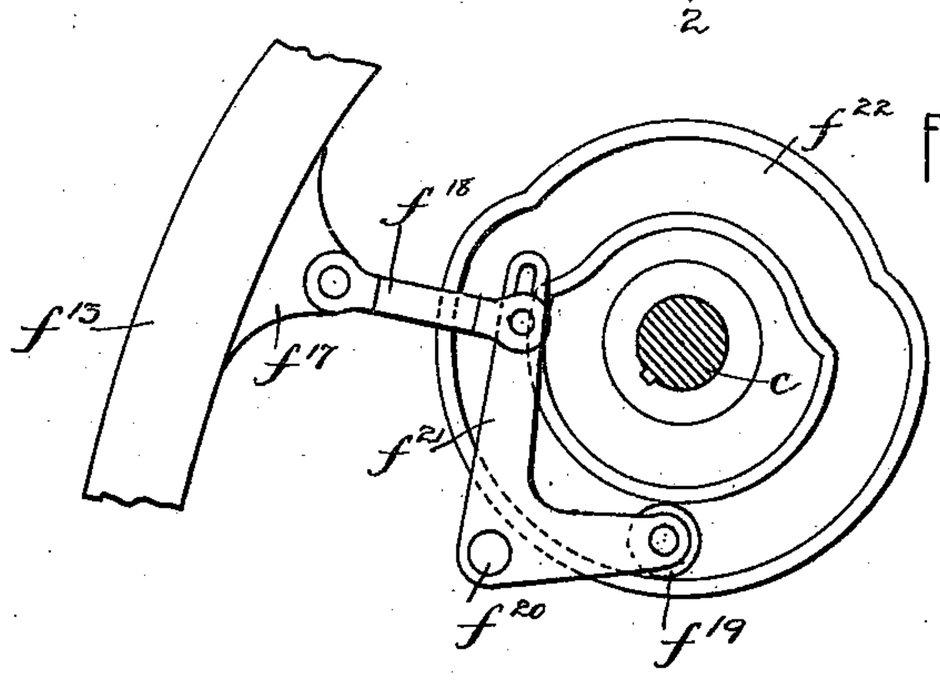


Fig. 1a.



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by Wright & Brown Crosby
Attys.

(No Model.) 4 Sheets—Sheet 2.

C. F. STACKPOLE.

LEATHER STRETCHING AND SOFTENING MACHINE.

No. 501,593. Patented July 18, 1893.

FIG. 2.

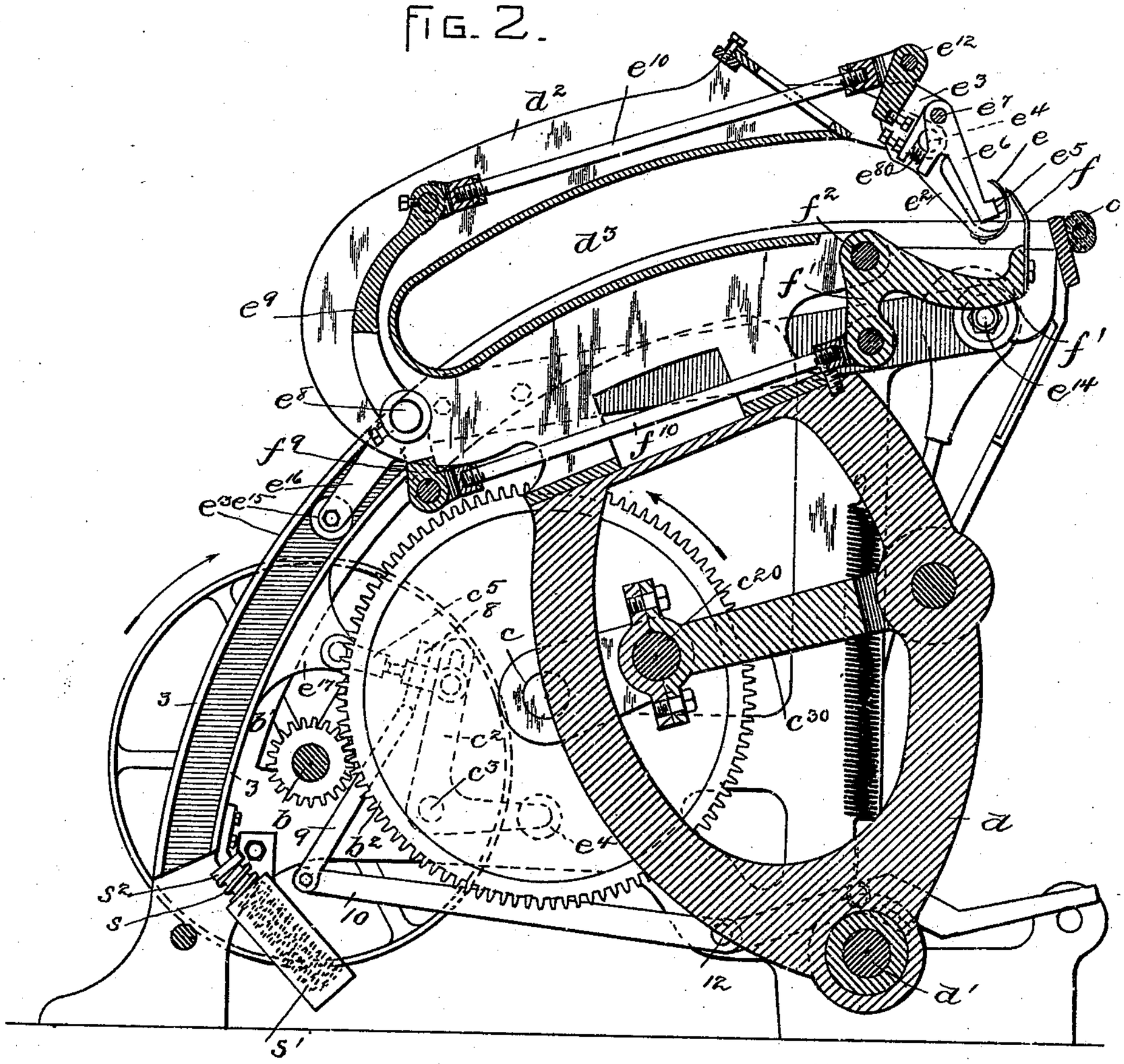
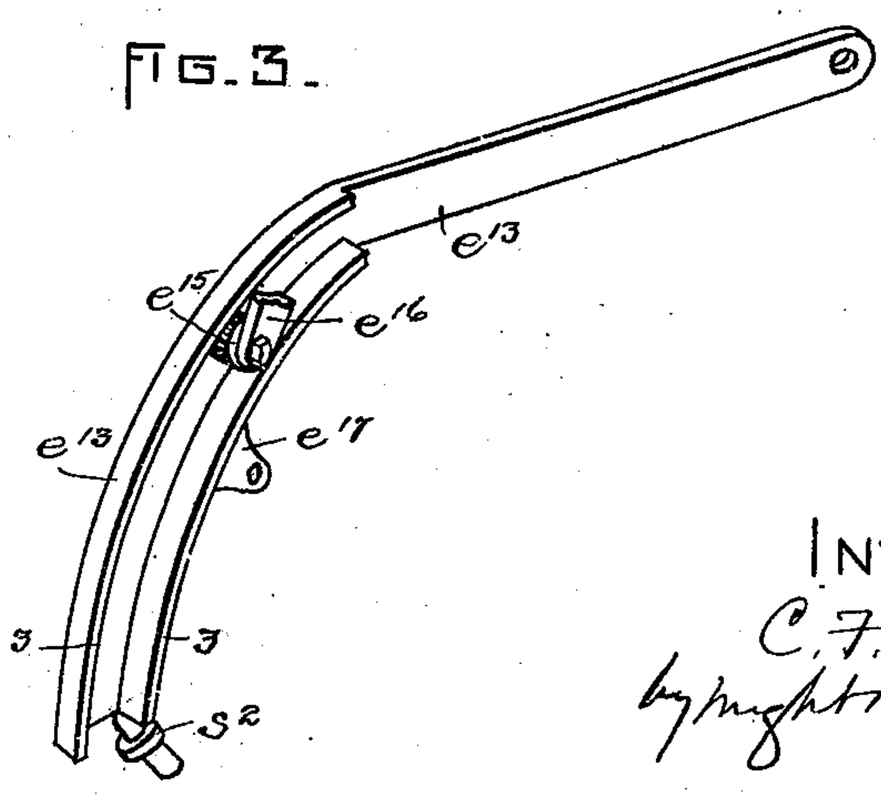


FIG. 3.



WITNESSES:
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(No Model.)

4 Sheets—Sheet 3.

C. F. STACKPOLE.

LEATHER STRETCHING AND SOFTENING MACHINE.

No. 501,593. Patented July 18, 1893.

FIG. 4.

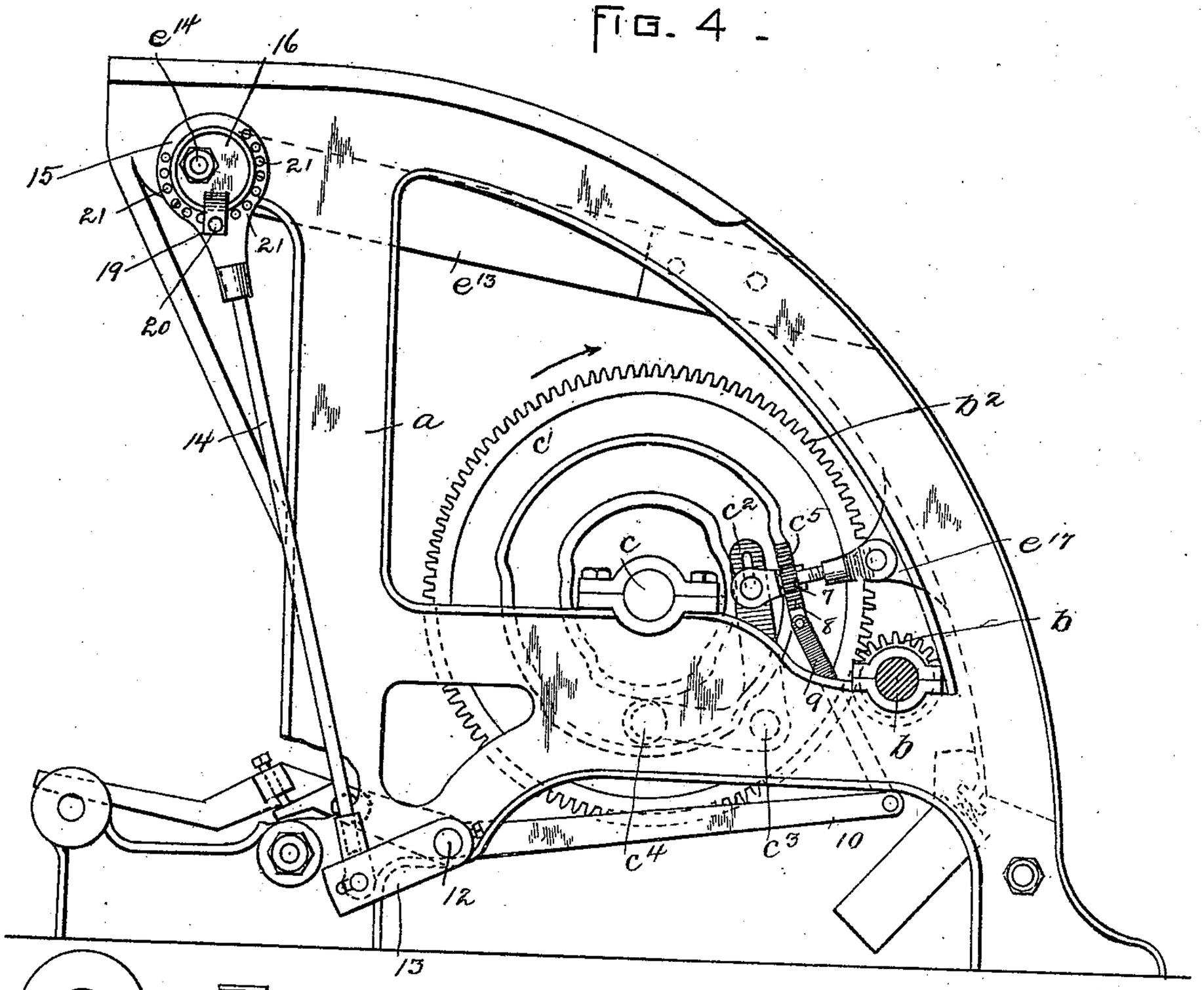


FIG. 5.

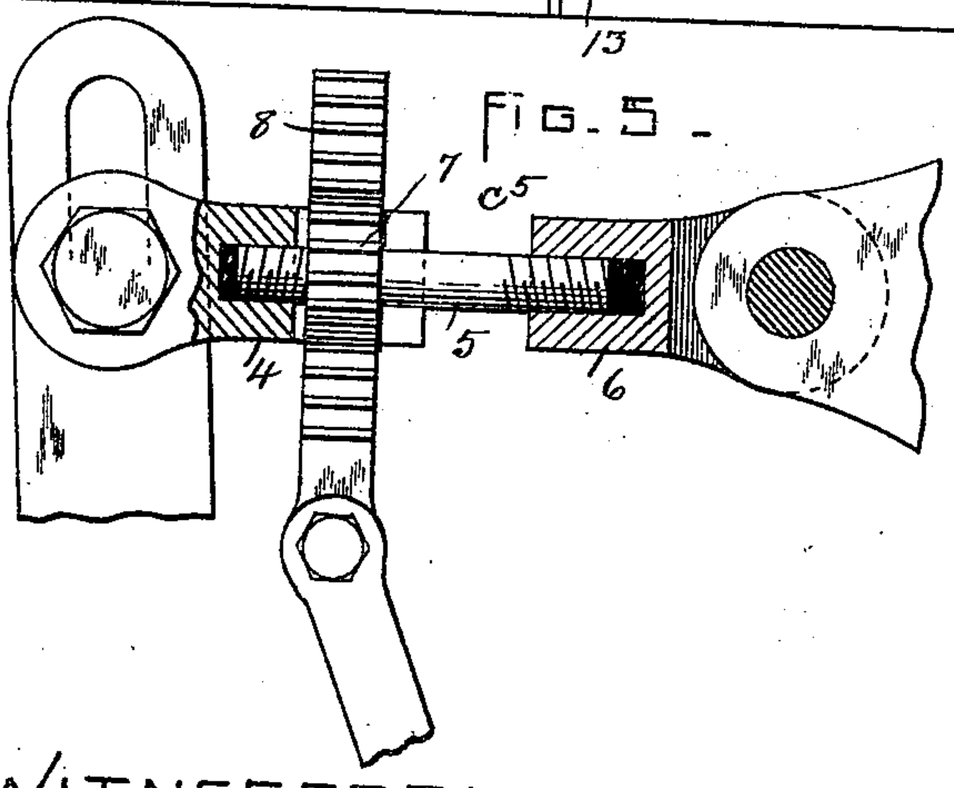
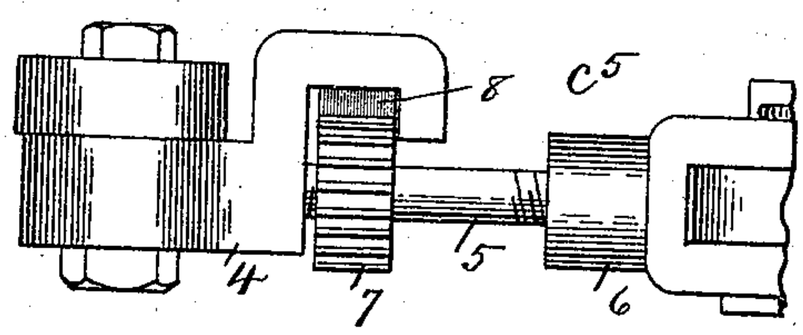


FIG. 6.



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(No Model.) 4 Sheets—Sheet 4.

C. F. STACKPOLE.

LEATHER STRETCHING AND SOFTENING MACHINE.

No. 501,593. Patented July 18, 1893.

FIG. 7.

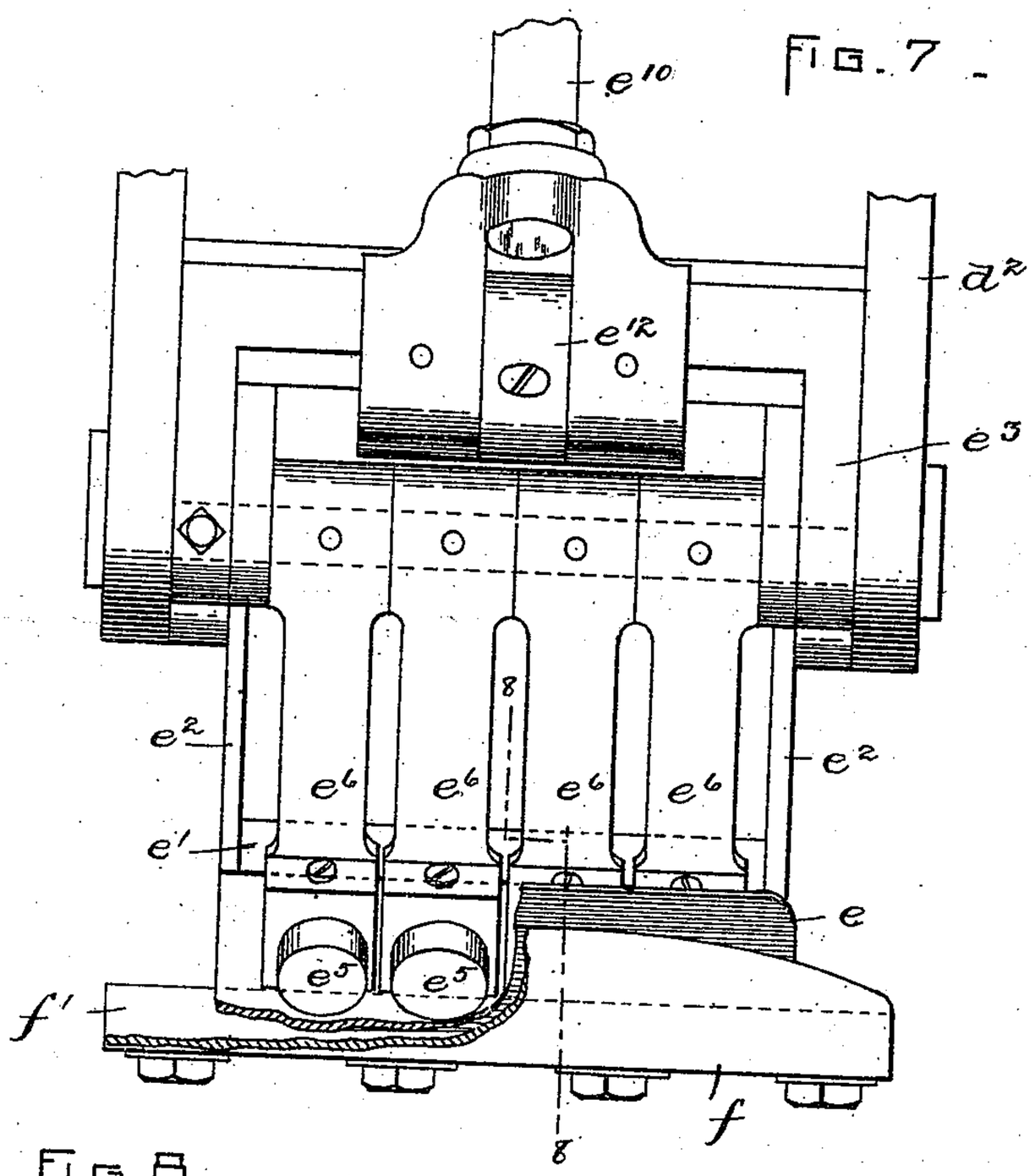


FIG. 8.

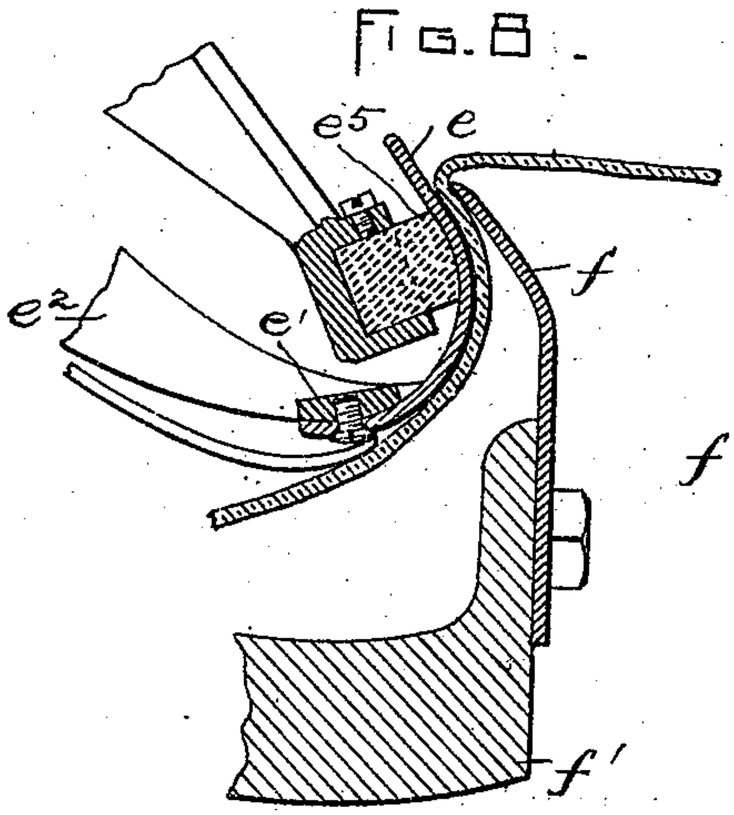
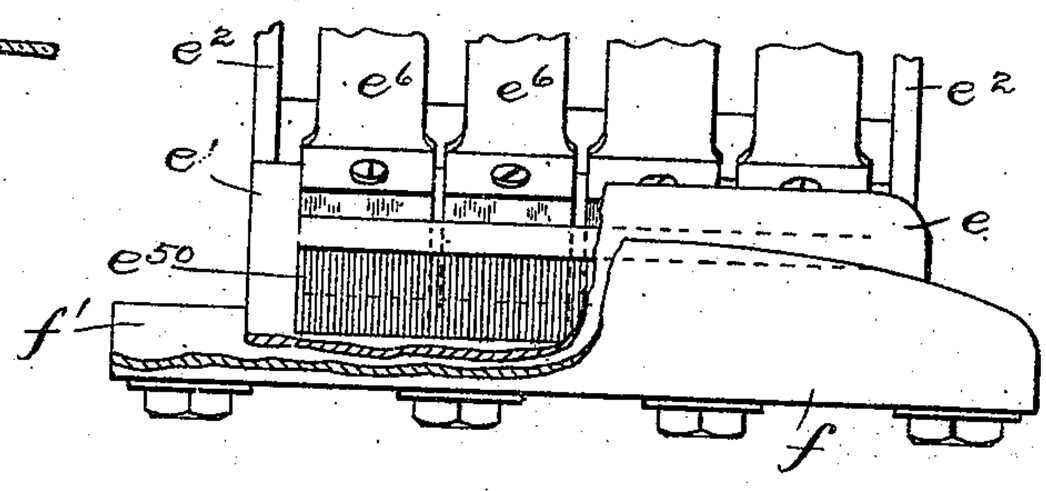


FIG. 9.



WITNESSES:
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C. F. Stackpole
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UNITED STATES PATENT OFFICE.

CHARLES F. STACKPOLE, OF LYNN, ASSIGNOR OF ONE-FOURTH TO JOHN M. SCHOFIELD, OF BOSTON, MASSACHUSETTS.

LEATHER STRETCHING AND SOFTENING MACHINE.

SPECIFICATION forming part of Letters Patent No. 501,593, dated July 18, 1893.

Application filed June 6, 1892. Renewed May 31, 1893. Serial No. 476,147. (No model.)

To all whom it may concern:

Be it known that I, CHARLES F. STACKPOLE, of Lynn, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Leather Stretching and Softening Machines, of which the following is a specification.

This invention relates to machines for stretching and softening leather by the action of jaws, which are reciprocated and alternately opened and closed, the jaws being closed upon a skin or piece of leather while moving in one direction, and opened while moving in the opposite direction. The piece of leather is held by the operator, and the jaws, when closed upon the leather, move away from the point where the operator is holding it, so that they exert a scraping action upon the leather, in a manner fully set forth in Letters Patent granted to me August 4, 1891, No. 457,136, for improvement in leather working or staking machines.

The present invention has for its objects, first, to provide an improved construction of the jaws, and particularly of the yielding jaw which supports the upper or grain side of the leather during the operation; and, secondly, to provide certain improvements in the construction of the machine, including the mechanism for oscillating and opening and closing the jaws, whereby the jaws may be adapted to act on leather of any desired thickness, and the general efficiency of the machine improved.

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

Of the accompanying drawings, forming part of this specification: Figure 1 represents a rear elevation of a leather-working machine embodying my present improvements. Fig. 1ª represents a side view of one of the cams shown in Fig. 1. Fig. 2 represents a section on line 2—2, Fig. 1. Fig. 3 represents a perspective view of a part shown in Figs. 1 and 2. Fig. 4 represents a side elevation of the machine. Figs. 5 and 6 represent views of details hereinafter referred to, relating to the mechanism for varying the tension of the jaws. Fig. 7 represents a top view of the jaws and portions of their supporting and carrying devices. Fig. 8 represents a section on line 8—8, Fig. 7. Fig. 9 represents a view similar to a portion of Fig. 7, showing a modification hereinafter referred to.

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

In the drawings: *a* represents the supporting-frame, having bearings in which are journaled the driving-shaft *b* and the shaft *c* supporting a cam *c'*, which actuates the jaw-closing and opening mechanism, as hereinafter described.

d represents a rocking frame, which supports or carries the jaws and their operative connections as hereinafter described, and which is mounted to oscillate upon a stud *d'* near the base of the supporting-frame, and receives an oscillating motion from a crank c^{20} on the shaft *c* and a connecting-rod or pitman c^{30} which connects the wrist-pin of the crank c^{20} with the frame *d*. The upper portion of the frame *d* has a U-shaped extension d^2, containing a deep slot or recess d^3, which is substantially concentric with the center or pivot *d'* on which the yoke *d* oscillates, the upper portion of the frame *a* being also concentric with said center.

e represents the upper jaw, which supports the grain side of the skin or piece of leather to be treated; and *f* represents the lower or scraping jaw, which co-operates with the jaw *e* in stretching and softening a skin. The construction of the jaw *e* and its supporting or backing devices, constitutes an important part of my invention. Said jaw is preferably composed of a continuous piece of material, which, while being comparatively flexible, is yet sufficiently firm and unyielding to prevent it from being abruptly or sharply bent at any point, the object of said jaw being to support the grain side of the leather so firmly that the co-operating jaw or blade *f* will have the desired effect upon the leather without, however, exerting injurious pressure, and without exerting extreme pressure on thicker portions of the leather and insufficient pressure on thinner portions, the jaw *e* constituting a bed, which supports the leather with sufficient firmness to enable the jaw *f* to have the desired effect and at the same time is adapted to yield locally at different points to

conform to variations in the thickness of the piece. The best material of which I am aware for the supporting jaw or surface *e* is vulcanized fiber. This material is very close-textured and dense; and, while possessing sufficient flexibility for my purpose, is not capable of being abruptly bent at any point. I do not limit myself to this material, however, but may use any other material which may be found to answer the purpose.

The jaw *e* is preferably substantially straight from end to end, and curved in cross section or from its upper to its lower edge, as best shown in Fig. 8. The lower edge of the said jaw is affixed to a support *e'*, which is here shown as a cross-bar, formed on or affixed to arms e^2, which are suitably attached to a head or holder e^3, which is pivoted at e^4 to the forward end of the extension d^2 of the rocking frame, said holder e^3 being adapted to be oscillated, as hereinafter described, so as to carry the jaw *e* toward and from the jaw *f*. Between the attachment of the lower edge of the jaw *e* and the free upper edge thereof, is arranged a series of elastic bearings or supports e^5, which are in contact with the rear surface of the jaw *e* at a point somewhat below its free upper edge. Said supports e^5 are preferably blocks or independent pieces of rubber, attached to the swinging ends of arms e^6, which are pivoted at e^7 to the holder e^3, and are normally supported by springs e^{80}, which act to force the rubber blocks e^5 outwardly against the jaw *e*. Each arm e^6 is adapted to swing independently of the others, so that the supports e^5 are independently yielding, and enable the jaw *e* to conform to all possible variations in the thickness of a piece of leather interposed between it and the jaw *f*. The jaw *f* is affixed to one arm of a lever or holder *f'*, which is pivoted at f^2 to the supporting-frame, and is adapted to oscillate so as to approach and recede from the jaw *e*. Mechanism is employed for simultaneously oscillating the holders of the jaws *e* and *f*, to move said jaws simultaneously toward and from each other, and thus cause them to grasp and release a skin or piece of leather placed between them. Said mechanism, as here shown, includes two rock-shafts e^8 f^8, which are mounted to oscillate in bearings on the extension d^2 of the rocking frame *d*. To the rock-shaft e^8 is attached an arm e^9, the outer end of which is connected by a connecting-rod e^{10} with an ear e^{12} affixed to the jaw-holder e^3. To the shaft f^8 is affixed an arm f^9, the outer end of which is connected by a connecting-rod f^{10} with the jaw-holder *f'*.

The rock-shafts e^8 f^8 are simultaneously oscillated to impart the described simultaneous movements in opposite directions to the jaws *e* and *f*, by the following means: e^{13} f^{13} represent levers, which are pivoted at their forward ends to the supporting-frame, the pivot of the lever e^{13} being shown at e^{14} (Fig. 2), while the pivot of the other lever is not shown, but is located at a corresponding point at the opposite side of the supporting-frame. Each of said levers is provided with a pair of curved wings or guides 3 3, said guides being best shown in Figs. 2 and 3. Into the spaces between said guides project trundle-rolls e^{15} f^{15}, the former mounted on the outer end of an arm e^{16}, affixed to the rock-shaft e^8; while the latter (roll f^{15}) is mounted on the outer end of an arm f^{16}, affixed to the rock-shaft f^8.

The levers e^{13} f^{13} are oscillated by means of cams affixed to the shaft *c* and devices communicating an oscillating motion from said cams to the levers. The lever e^{13} is oscillated by means of the cam *c'* already described, a bell-crank lever c^2, pivoted at c^3 to the supporting-frame, and having at one end a trundle-roll c^4, engaged with said cam, and a connecting-rod c^5, connecting the other end of the lever c^2 with an ear e^{17} formed on the lever e^{13}. The lever f^{13} is oscillated by means of a cam f^{22}, affixed to the shaft *c*, a bell-crank lever f^{21}, pivoted at f^{20} to the supporting-frame and having at one end a trundle-roll f^{19} engaged with the cam f^{22}, and a connecting-rod f^{18} connecting the lever f^{21} with an ear f^{17} on the lever f^{13}. The cams *c'* and f^{22} are so formed as to impart the desired movements to the jaws *e* and *f* through the described intermediate mechanism, the oscillating movements imparted to the levers e^{13} f^{13} by said cams causing the rock-shafts e^8 f^8 to oscillate in their bearings and thus impart motion to the jaw-holders and jaws in a manner which will be readily understood, the arrangement being such that, when the oscillating frame *d* is at the forward end of its movement, the jaws *e* and *f* are caused to approach each other and grasp a skin interposed between them, the jaws being held in contact with the skin during their movement away from the front of the machine. When the jaws have reached the end of the last-mentioned movement, they are separated and remain separated until they again return to the forward part of the machine. Hence the jaws act on the skin only when moving in one direction, and release the skin and permit the manipulation thereof by the operator when moving in the opposite direction.

The pressure exerted by the jaws upon the skin may be varied by changing the length of the connecting-rod c^5 which communicates motion to the lever e^{13}, so that the throw of said lever and the approach of the jaw *e* to the jaw *f* may be varied to adapt the jaws to the thickness of the leather, or to vary the tension imparted to the leather by the jaws when they are closed upon it. The means here shown for accomplishing this result are as follows: The connecting-rod c^5 is made in three sections, 4, 5 and 6, as best shown in Fig. 5, the end sections 4 and 6 having internally threaded sockets, while the intermediate section 5 has its ends screw-threaded to engage said sockets, the thread at one end of the section 5 being right-handed, and the thread at the other end left-handed, so that

a rotation of the section 5 will increase or decrease the length of the connecting-rod, as the case may be. The result of altering the length of the connecting rod is that the lever e^{13}, while always vibrating to the extent caused by its cam, will begin and end its vibrations at different distances from the axis of the shaft *c*, thus causing the trundle roll e^{15} to oscillate in a different path (although always to the same extent) and, through the connections described, cause the jaw *e* to be adjusted in its extremes of movement relatively to the jaw *f*. The section 5 is provided with a pinion 7, with which is engaged a rack 8, which is connected by a link 9 with a lever 10. Said lever is affixed to a rock-shaft 12, mounted in bearings on the supporting-frame. To said rock-shaft is affixed an arm 13, connected by a link 14, having an eccentric strap 15, with an eccentric head or disk 16, mounted to turn upon the pivot e^{14} which connects the lever e^{13} to the supporting-frame. The eccentric 16 is adjustable by swinging it on the pivot e^{14}. By lowering the eccentric or swinging it so that its center will be depressed, the rack 8 will be correspondingly raised and thus caused to rotate the section 5 of the connecting-rod c^5 in the direction required to shorten the said connecting-rod and thus cause it to adjust the jaw *e* toward the jaw *f*, and increase the tension of the jaws upon the material interposed between them. An opposite or upward movement of the eccentric will allow depression of the rack 8, and cause the lengthening of the connecting-rod c^5 and the movement of the jaw *e* away from the jaw *f*, thus diminishing the tension exerted upon the interposed material. The eccentric is provided with a lug 19, having a pin 20, adapted to engage either of a series of holes 21 in the strap 15. The operator, by removing the pin 20, is enabled to turn the eccentric 16 to any desired position, and secure it by the insertion of the pin into one of the holes 21.

The operation of the machine is as follows: Power applied to the shaft *b* is communicated to the shaft *c* by means of the pinion *b'* and gear b^2, the cams *c'*, f^{22} being thus rotated and caused to operate the jaw opening and closing mechanism. The rotation of the shaft *c* also causes the crank on said shaft to oscillate the jaw-carrying frame, so that the jaws are oscillated and alternately opened and closed, as above described. The operator holds the skin to be treated against a rail or bar *o*, affixed to the front of the frame, said bar being preferably covered with yielding material such as rubber. The skin is placed between the jaws *e f* while they are separated; and the operator, holding the skin against the bar *o*, resists the effort of the jaws to pull the skin with them when they are moving away from the bar *o*, the jaws being at this time closed, so that they exert a stretching and softening action upon the skin. During the opposite movement of the jaws, they are open and permit any desired adjustment of the skin by the operator, or its removal, if desired.

Owing to the jaws and their connections being supported or carried by the rocking frame *d*, as shown and described, the said jaws are caused in their rearward movement to also move downwardly in the arc of a circle of which the stud *d'* is the center; thus the leather, while being held by the operator and drawn by the jaws, is held against and kept in contact with the bar *o* with more uniformity and with better effect than if the said jaws reciprocated in a straight horizontal line.

The construction of the jaw *e* and the provision of means for yieldingly supporting said jaw and permitting it to yield locally or in different degrees at different points, is an important feature of my invention. The jaw *e* is distinguished from the independently yielding fingers employed for the same purpose in the construction shown in my former patent, in that it presents a continuous supporting surface for the skin, instead of a series of independent sections collectively forming a supporting surface, as in my former patent. The advantage of the continuous supporting surface is that there is no opportunity for a skin to be caught and torn between sections of the supporting surface. At the same time, the flexible material of the jaw *e* and the independently yielding supports which are arranged back of the same enable the jaw to conform as readily and satisfactorily to variations in the thickness of the skin as in my former construction.

I do not limit myself to the employment of the independent arms e^6 and the independent blocks or cushions e^5 bearing on the back of the jaw *e*, as, if desired, a continuous rubber block e^{50} may be placed behind the jaw *e*, said block extending practically the entire length of the jaw, as shown in Fig. 9. Said block e^{50} may be supported by a series of independently movable arms e^6, or by a single arm or other support, such as would be produced by bolting together the arms e^6 to prevent them from moving independently of each other, in which case the adaptability of the jaw *e* to yield locally or independently at different points would be due to the rubber cushion e^{50}.

I do not limit myself to the details of mechanism here shown, and may vary the same in several particulars without departing from the spirit of the invention. For example, the described improvements relating to the jaw *e* may be used with any other suitable mechanism for moving said jaw to cause it to cooperate with the other jaw in grasping and releasing a skin. It being new with me to provide means for varying the approach of two jaws operating in the manner described toward and from each other, to adapt them to the thickness of the material, or to enable them to vary the tension exerted on the material, I do not limit myself to the means here described for varying the relative positions of the jaws, but may adjust said jaws to cause

them to come together more or less closely by any other suitable mechanism.

To diminish the jar caused by the downward movement of the levers $e^{13} f^{13}$, I provide at the lower ends of said levers buffer springs s, which enter fixed sockets s' affixed to the supporting-frame, said springs bearing on collars s^2 affixed to the lower ends of the levers $e^{13} f^{13}$.

The jaw-operating mechanism is not limited to means for varying the closeness of the closing of the jaws, as the jaws may be reciprocated and opened and closed in the manner described, without having provision for varying the degree of their pressure on the leather when closed.

For convenience, I hereinafter refer to the levers $e^{13} f^{13}$ as cam levers or sweeps.

The mechanism for swinging the supporting jaw e toward and from the other jaw f may be dispensed with, the holder or support e' for said jaw being rigidly attached to the reciprocating carrier, in which case the movements which cause the jaws to grasp and release the leather will be confined wholly to the jaw f. It is the fact that the jaw e is composed of a flexible and comparatively frictionless material, having a yielding backing, that makes it feasible to dispense with mechanism such as the sweep e^{13}, rock-shaft e^8, levers e^{16} e^9 and connecting-rod e^{10}, and affix said jaw directly to the reciprocating carriage.

I claim—

1. In a leather softening and stretching machine, the combination with a scraping blade or jaw, of a supporting jaw, composed of a continuous plate of elastic material, a separate yielding backing for said jaw or plate, and means for operating said jaw, as set forth.

2. In a leather softening and stretching machine, the combination with a rocking frame of a scraping blade or jaw, a supporting jaw co-operating with the scraping blade, mechanism for imparting a back and forth motion to said jaws, mechanism for opening and closing said jaws, and means for varying the degree of pressure of the jaws on the interposed material when the jaws are closed, as set forth.

3. In a leather softening and stretching machine, the combination of a rocking frame or carriage, jaw-holders pivotally connected to the carriage, operating jaws secured to said holders, cam levers or sweeps pivoted to the supporting frame, mechanism connecting said cam levers with the jaw-holders whereby oscillating movements of the cam levers while the carriage is in motion are caused to alternately open and close the jaws, and mechanism for oscillating said cam levers, as set forth.

4. In a leather softening and stretching machine, the combination of a rocking frame or carriage, jaw-holders pivotally connected to the carriage, operating jaws secured to said holders, cam levers or sweeps pivoted to the supporting frame, mechanism connecting said cam levers with the jaw-holders whereby oscillating movements of the cam levers while the carriage is in motion are caused to alternately open and close the jaws, mechanism for oscillating said cam levers, said means for varying the extent of the oscillating movements of one of the cam levers and thereby varying the degree of pressure of the jaws on the interposed material when the jaws are closed, as set forth.

5. In a leather softening and stretching machine, the combination of a rocking frame or carriage, jaw holders pivotally connected to the carriage, operating jaws secured to said holders, cam levers or sweeps pivoted to the supporting frame, mechanism connecting said cam levers with the jaw-holders whereby oscillating movements of the cam levers while the carriage is in motion are caused to alternately open and close the jaws, mechanism for oscillating said cam levers, said mechanism including an adjustable or telescopic connecting-rod, and means for varying the length of said connecting-rod and thereby varying the degree of pressure of the jaws on the interposed material, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 27th day of April, A. D. 1892.

CHARLES F. STACKPOLE.

Witnesses:

C. F. BROWN,

JOHN M. SCHOFIELD.