

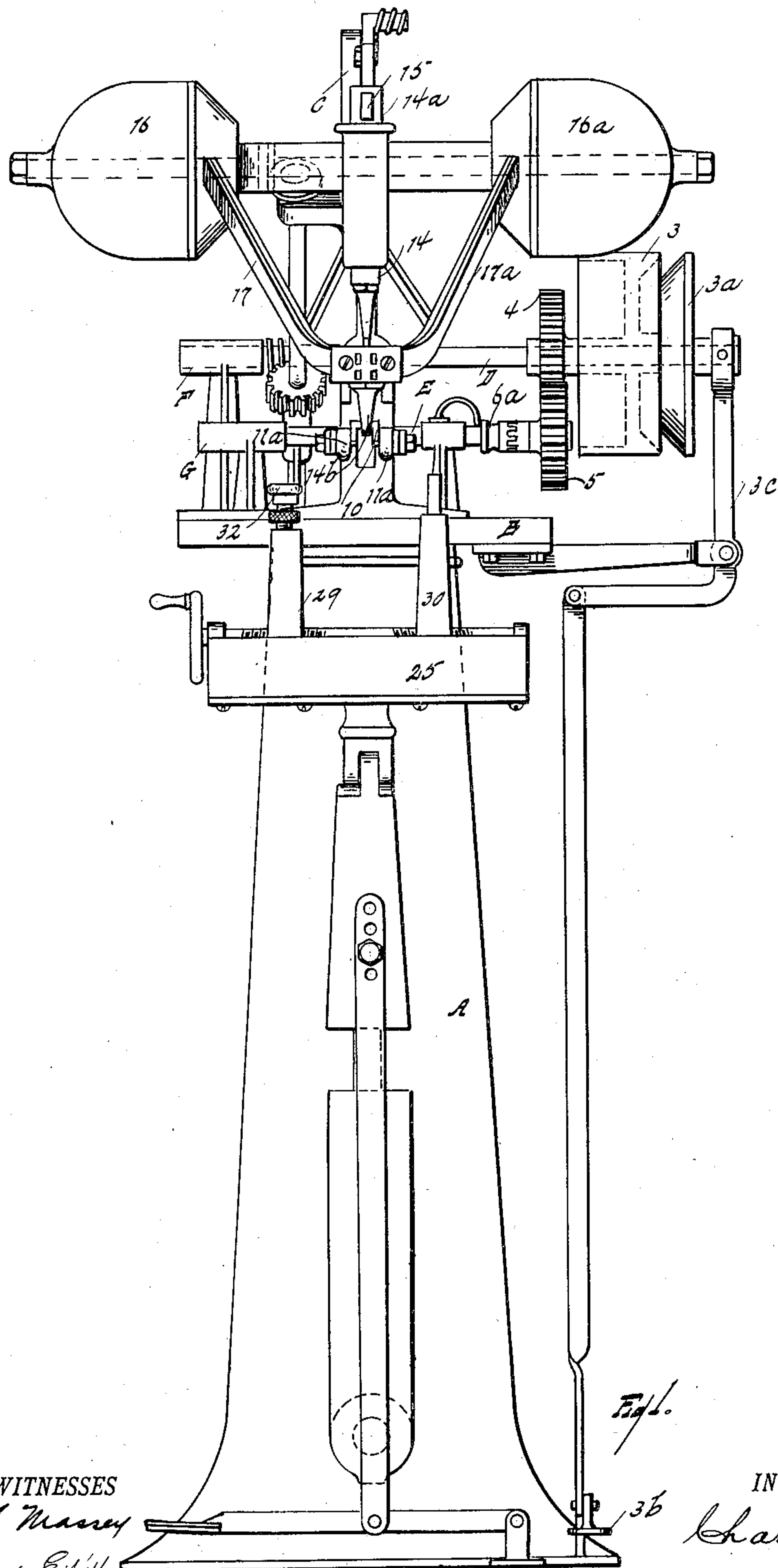
No. 880,401.

PATENTED FEB. 25, 1908.

C. F. PYM.
LASTING MACHINE.

APPLICATION FILED JUNE 11, 1902.

3 SHEETS—SHEET 1.



WITNESSES
J. H. Massey
May E. Roth

By

INVENTOR

Charles F. Pym

Parker & Burton Attorneys.

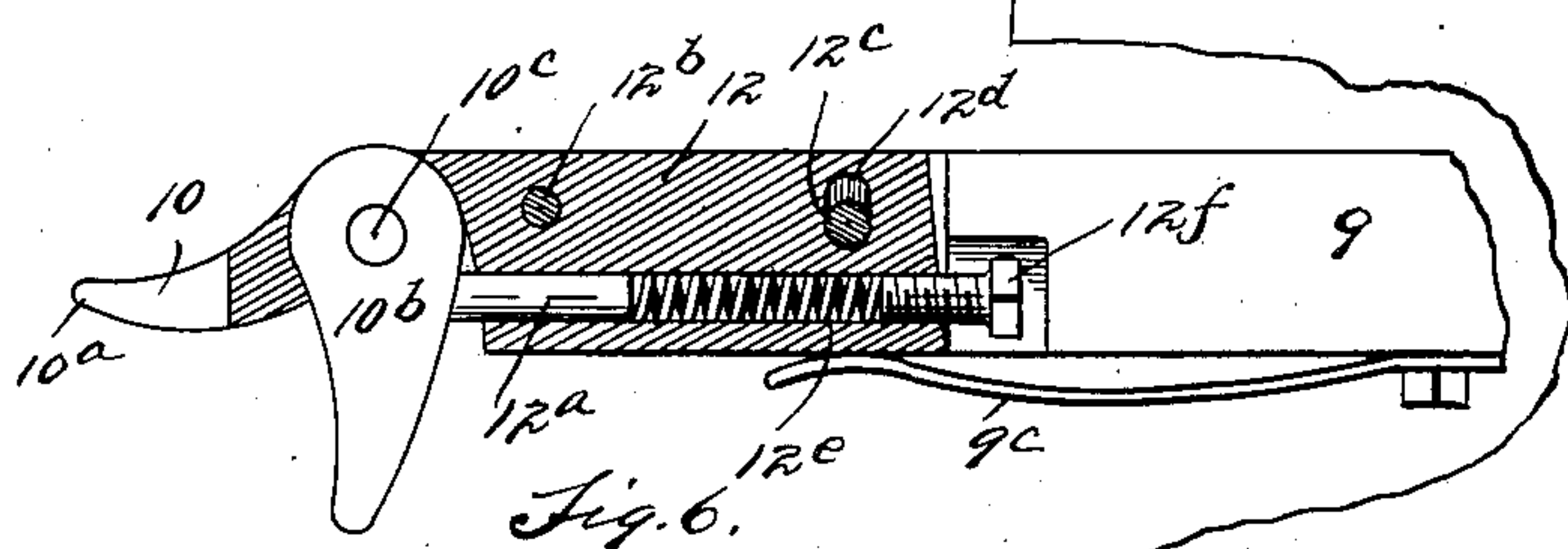
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WITNESSES

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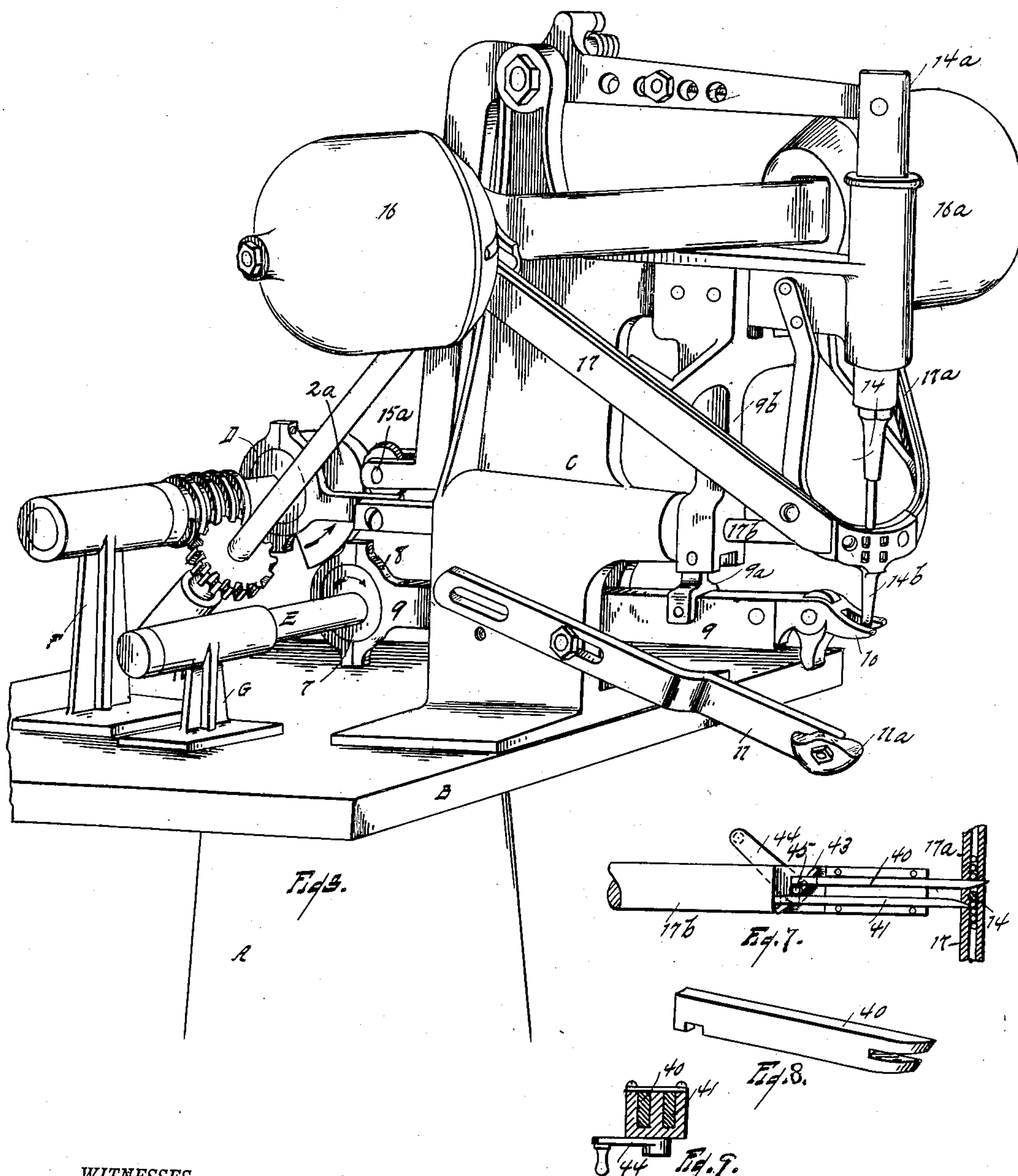
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

CHARLES F. PYM, OF ESSEX, ONTARIO, CANADA, ASSIGNOR OF ONE-HALF TO KRENTLER BROTHERS COMPANY, OF DETROIT, MICHIGAN.

LASTING-MACHINE.

No. 880,401.

Specification of Letters Patent.

Patented Feb. 25, 1908.

Application filed June 11, 1902. Serial No. 111,116.

To all whom it may concern:

Be it known that I, CHARLES F. PYM, a subject of the King of Great Britain, residing at Essex, county of Essex, Province of Ontario, Canada, have invented a certain new and useful Improvement in Lasting-Machines, and declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to lasting machines for shoes, and it has for its object improvements which relate to the lasting of the heel and toe, or arranging of the leather over the last and over the insole, preparatory to the driving of the nail, and to the driving of nails through the leather in its arranged position.

In the drawings:—Figure 1, is a front elevation, that is, an elevation of the machine as seen by one standing in the position of the operator at work with it. Fig. 2, is a side elevation, as seen by one standing at the left-hand of the operator. Fig. 3, is a perspective as seen from a point between the front and the left-hand side. Fig. 4, is a perspective, seen from the left side, of the finger used to arrange the leather. Fig. 5, is a perspective, seen from the right side, of the same finger. Fig. 6, is a longitudinal section of the same finger. Figs. 7, 8 and 9, are details of the shift device in the nailer.

The finger detailed in Figs. 4, 5 and 6, pushes the leather over, and down, and presses it upon the support that is held on the jack, and which comprises the last, and the insole over the last. This finger, which is the important feature of the machine, is in rapid vibration when the machine is in use, vibrating so rapidly, that the leather which has been pushed over by it, is again engaged by it, after a back stroke, before the leather can right itself, and while the finger does not stop to hold the leather against the last under pressure, its effective action is similar to that of pressure, but is modified by its vibrating action, by which it constantly pushes the leather inward toward the central point of the last, thus in effect producing a pushing and pressing action, and at the same time tending to crimp or crease the leather in radial lines from the center of the last, or from the center of the curvature of the last

around which the leather is being folded, and its rapid vibratory motion tends to cause these creases to assume a condition of uniformity on such radial lines. As the work progresses, and the leather is folded and crimped around the curved last, the nailing part of the machine is actuated from time to time, and at the proper times, and a nail is driven through the leather and through the insole, clenched by being driven against the last, (which is either of metal, or faced with metal, if the nail is to be clenched, but if as sometimes happens, the nail is to be pulled, a wooden last may be used), and the finished work is smooth and regular. By finished work, here, is not meant a completely finished shoe, but the work finished so far as this part of the construction of the shoe is concerned, in reality, the finished shoe is even and regular to a greater extent than a shoe which is similarly crimped and fastened by hand work.

A indicates the pillar upon the summit of which, the crimping and nailing machinery is mounted. The base B mounted on the top of pillar A, sustains a bearing frame C, in which are journaled most of the operative parts of the machine, which are, however, actuated by driving shafts D and E, whose bearings are supported on posts F and G, that are bolted or otherwise secured to the base B. The post F sustains the main driving shaft D, which is provided with a belt wheel 3, to which is connected a belt from any convenient source of power. On the same shaft D is a spur gear 4, that meshes with a spur gear 5 on counter shaft E. The counter shaft E carries an eccentric 7, around which engages an eccentric strap 8 that actuates the arm 9 of the crimping finger 10. The arm 9 is supported at its rear end by its engagement with the eccentric shaft; it is supported intermediate its rear and its front ends, by a swinging hanger 9^a that swings from a fixed hanger 9^b that is itself secured to the support C.

At each side of the arm 9 is an adjustable bar 11, held adjustably by bolts to the support C, the bolts passing through slots to enable it to be adjusted. These arms 11 are provided at the front end with pivotally supported bearing plates 11^a, against which the workman pushes the shoe. These bearing plates 11^a are preferably separated sufficiently to permit them to come against the

sides of the counter when this portion of the shoe is brought into engagement with them, said arrangement being especially serviceable in connection with heel-seating, as it permits a free and firm movement and support to the shoe. The crimping finger or pressure delivering and blow delivering mechanism operate between these plates, reciprocating outward beyond them and back again, and the crimping finger is in a plane above the bottom portions of these plates, so as to permit the latter to be used in the manner above described. At the front end of the crimping arm is a crimping finger, the action and operation of which will be best understood by referring to Figs. 4, 5 and 6, which engages the work at the edge-line of the bottom of the last and remains hard pressed upon the work until the finger reaches or passes the tacking line. The arm 9 at its front end has substantially a vibratory back and forth motion; it has a slight vertical oscillation, because the support is not exactly at the front end; during the revolution of the shaft E the front end of the arm travels in an elliptical orbit whose diameter is determined by the throw of the eccentric and the relative length of the parts of the arm on each side of the hanger. The motion of the front end of the arm is supplemented by an independent motion of the finger, which is due to the resistance that the finger encounters, and to the strength of the spring 9^c that is secured to the under side of the arm 9, and the free end of which lies to the front. At the front end of the arm 9 is pivotally secured on pin 12^b a finger 12, the rear part of which is provided with an oval slot 12^d that engages over a pin 12^c, which pin 12^c extends from the arm 9 through the oval slot. The front end 10 of the finger is forked to enable the nail to be driven between the prongs 10^a of the fork; the yielding finger through the prongs of which the nozzle of the tacker engages enables me to drive the nail completely down, or by adjustment the nail may stop before being driven completely down. A spur 10^b is pivoted to the finger end 10 by a pin 10^c and the rear face of the spur engages against a plug 12^a, that is inserted in a cavity in the finger 12, and is held under tension of spring 12^e against the rear face of the spur; the tension of the spring 12^e can be regulated by adjusting screw 12^f. The rear end of the finger 12 is normally held up, to the limit of the throw which is permitted to it, and this upward tension is produced by a leaf spring 9^c that is secured to the arm 9 and extends forward under the finger 12. The compound structure, thus produced, tends to close the front end 10 of the finger 12 and the spur together, but gives to each part a facility to yield when an obstruction is met with, in the forward stroke of the arm 9 and the annular relation of the pressure-delivering parts 10,

10^b, and arrangement of their springs 12^e, 9^c, causes the pressure or resistance of each of said parts 10, 10^b, to modify or increase the pressure of the other. The arm is reciprocated rapidly by the shaft E and its eccentric connection therewith, and it is used to press forward and downward and crimp the leather properly, preparatory to driving a nail and at the same time that the finger is pressing the leather forward over the last and downward upon it, the spur 10^b, acts somewhat like the hammer of a hand workman to strike against the leather at the side and edge of the last, engage and hold it tightly against the last, and in doing this it comes into engagement and action before the finger 10 has completed its full forward stroke, and remains in engagement during all the remainder of the forward stroke of the finger 10, and during part of its retreat and simulates the action of a workman using a hammer in crimping a shoe.

The hammer which drives the nail, is a vertical plunger 14, driven or forced downward positively by a spring 14¹ from which it is lifted by a bent lever 15 that is pivotally secured to the top of the support C, and pivotally connected with provision for lost motion to the stem 14^a of the hammer. The end 15^a, of the bent lever 15 engages with a cam 2^a on the shaft D, and makes a stroke to lift the hammer with each revolution of the shaft D, provided, the shaft D has been clutched to the pulley wheel 3. This clutch engagement between the pulley wheel 3 and the clutch 3^a is produced by actuating the treadle 3^b which is linked to a clutch lever 3^c, all the parts being properly supported by the main framework. Normally, and while not in clutch, the pulley 3 and the spur gear 4, which are both on the same sleeve, run loose on the shaft D and transmit motion to the shaft E without actuating the shaft D. The spur wheel 5, is loose on the shaft E, but is clutched thereto by clutch 6^a arranged to be held in engagement normally, by any proper holding means, but to be thrown out of engagement when desired. This permits the independent operation at will of the tacking means and the crimping and pressing means. This enables the operator to rub the leather little or much, or, if desired, not at all, while yet driving tacks as may be required.

The nails are fed under the hammer and into the nozzle 14^b from either one of two receptacles 16 or 16^a, as may be desired; the two receptacles holding nails of different sizes. The means of delivering nails from the receptacles 16 and 16^a into the chutes 17 and 17^a is well known and forms no part of the present invention. I have, however, placed two of these nail receptacles on the machine, in place of the one ordinarily used, and have brought two nail chutes to feed

into the nail nozzle 14^b, and have arranged a switch by which the workman may select the size or style of nail he desires to use. The switch on arm 17^b is arranged to bring either
5 of the nail chutes into action, and the other nail chute out of action.

In connection with the nailing device, there are a pair of shift fingers 40 and 41, supported on a reciprocating arm 17^b; the
10 fingers are pivotally engaged to a cross bar 43, which is itself pivoted to the arm 17^b; the cross bar 43 is provided with a lever handle 44 by means of which it can be turned on its pivot 45; shifting the lever
15 handle 44, retracts one of the fingers 40 and projects the other, and in its projected position, the finger 40 engages through a hole in the nail chute 17^a, in the path of the advancing nails and prevents the nails from
20 advancing along the path to the spout 14^b. At the time the finger 40 is advanced, the finger 41 is retracted and the nail chute in the race 17 is open; by shifting the handle 44, and retracting the finger 40 and projecting
25 the finger 41, the nail chute 17 is closed and the nail chute 17^a is opened. Both the fingers 40 and 41 are reciprocated by the arm 17^b, but one of them is advanced so far through the chute that it does not act as an
30 isolating finger, and the other is retracted to proper position to so act.

The jack which is used to hold the shoe in position to be treated by the crimping finger, and by the hammer, is capable of a
35 wide range, practically a universal range, of adjustment with reference to the crimping and nailing mechanism described; the head 25, of the jack supports two posts 29, 30, one of which 30 supports the head of the
40 last, and the other 29 has an adjustable terminal 32, which supports the toe of the last.

What I claim is:—

1. In a lasting machine, means constructed and arranged to necessarily engage
45 the upper at the edge of the last and to push the upper forward over the edge of the last when the shoe is in proper lasting position with relation to the machine, and automatic mechanism for rapidly reciprocating said
50 pushing means forwardly over the edge of the last and inwardly from said edge, with a speed causing said pushing movements to follow each other in such quick succession that the leather is prevented from recovering
55 itself and is gradually pulled and pushed to fully lasted position in a succession of stretching increments, said mechanism including means to maintain said pushing means in sliding contact with the upper from
60 the extreme edge of the last to the end of the inward movement and out of contact with the upper upon the backward movement.

2. In a lasting machine, tack driving mechanism combined with automatic recip-

rocatory pushing mechanism constructed 65 and arranged to deliver a rapid series of vibratory pushing movements in contact with the upper at and over the edge of the last, said mechanism including means to deliver
70 said pushing movements in such quick succession that the leather is prevented from fully recovering itself and is gradually pulled and pushed to fully lasted position in a succession of stretching increments, said pushing
75 mechanism including means arranged to maintain the same hard pressure against the upper at the edge of the last and thence inward therefrom to the tacking line in all of its forward leather-stretching movements and
80 substantially out of contact with the upper in its return or backward movement.

3. In a lasting machine, a workrest for positively and firmly supporting and controlling the vertical position of a lasted shoe, means for pushing the upper of said shoe
85 forward over the edge of the last, and automatic mechanism constructed and arranged to vibrate said pushing means with a rapid series of back-and-forth movements following each other in such quick succession that
90 the leather is prevented from recovering itself and is gradually pulled and pushed to fully lasted position in a succession of progressive stretching increments, said mechanism including means to shift said pushing
95 means above the level of said workrest during the backward movement, for causing said pushing means to remain substantially out of contact with the upper during the backward movement, and in sliding contact with
100 the upper during the forward movement, said mechanism including means constructed and arranged to maintain said pushing means in pressing engagement with the upper from approximately the edge of the last to the
105 tacking line, and to maintain the forward movement thereof for said distance in the plane of the upper at the bottom of the last, said workrest being arranged in position to engage the last and upper close to said push-
110 ing means when the upper is engaged by the pushing means.

4. In a lasting machine, tack driving mechanism, combined with means for pushing
115 the upper forward over the edge of the last, and automatic mechanism for operating said pushing means, the pushing means and operating mechanism being constructed and arranged to deliver a rapid series of separate
120 and distinct yielding pushing pressures forwardly at and over the edge of the last and inwardly from said edge to the tacking line, including means maintaining and compelling sliding contact with the upper from the extreme edge of the last throughout said entire
125 distance forward, and out of contact with the upper upon the backward movement, constructed and arranged to permit a plurality

of reciprocations of the pushing means for a single operation of the tack driving mechanism.

5 In a lasting machine, the combination of pressure-delivering and blow-delivering mechanism constructed and arranged to deliver a rapid series of forward pushing pressures adjacent the upper-edge to be tacked and a series of leather-stretching blows on the upper to aid in the stretching of the leather.

6. In a lasting machine, the combination of pressure-delivering and blow-delivering mechanism constructed and arranged to deliver a rapid series of forward pushing pressures adjacent the upper-edge to be tacked, and a simultaneous rapid series of leather-stretching blows on the upper at the side of the last immediately behind and following said pushing pressure.

7. In a lasting machine, tack-driving mechanism, combined with upper-stretching mechanism located close to and cooperating with the tack-driving mechanism to position and hold the upper for tacking, consisting solely of yielding reciprocating means constructed and arranged to engage the outer surface of the upper back from its free edge and to maintain pushing contact with the leather from approximately the edge of the last to the tacking line, and constructed and arranged to permit a plurality of rapid reciprocations of said upper-stretching means for a single operation of the tack-driving mechanism.

8. In a lasting machine, tack-driving mechanism, combined with upper-stretching mechanism located close to and cooperating with the tack-driving mechanism to position the upper for tacking, consisting of automatic mechanism constructed and arranged to deliver a rapid series of separate and distinct forward yielding rubs, and to maintain sliding engagement against the leather from adjacent the edge of the last to substantially the tacking line previous to the operation of said tack-driving mechanism.

9. In a lasting machine, tack-driving mechanism, combined with upper-stretching and blow-delivering mechanism constructed and arranged to deliver a rapid series of forward rubs against the leather adjacent the free edge of the leather and to simultaneously hammer the adjacent side of the upper, in the interval between successive operations of said tack-driving mechanism.

10. In a lasting machine, crimping means for wiping the upper forward over the edge of the last, automatically operating means for imparting a rapid four-motion movement thereto, means for maintaining said crimping means hard-pressed yieldingly upon the upper in its forward movement, said mechanism including means for operating said crimping means with a speed causing said

forward wiping movements to follow each other in such quick succession that the leather is prevented from recovering itself and is gradually worked forward to fully lasted position in a succession of stretching increments, and a pressing device for engaging and holding the upper as the crimping means rises therefrom and begins its backward movement.

11. In a lasting machine, two yielding pressing devices, having yielding connection with each other to modify each other's pressure, constructed and arranged to respectively engage the upper at the side and at the bottom of the last at the point being lasted, and means for simultaneously imparting to said two devices a forward wiping or rubbing movement.

12. In a lasting machine, two yielding pressing devices for respectively engaging the upper at the side and at the bottom of the last, and means for simultaneously moving said two devices one behind the other in the same general direction in a curved path transversely to the tacking line of the upper.

13. In a lasting machine, tack-driving mechanism, combined with leather-stretching mechanism, including two pressing and rubbing devices for respectively engaging the upper with a sliding upward pressure at the side of the last and with a sliding forward pressure at the bottom of the last, constructed and arranged to permit a plurality of rapid wiping or rubbing movements of said two devices for stretching the leather up over the edge of the last and inward over the bottom of the last for a single operation of the tack-driving mechanism.

14. In a lasting machine, two pressing devices for respectively engaging the upper at the side and at the bottom of the last, and means for simultaneously imparting to said two devices a forward wiping or rubbing movement, and for continuing said movement with the side device after the bottom device has ceased its said movement.

15. In a lasting machine, two pressing and rubbing devices for respectively engaging the upper at the side and at the bottom of the last, springs permitting said devices to yield at right angles to each other, and means for simultaneously moving said two devices forward transversely to the peripheral edge of the last in sliding contact with the upper, said springs cooperating with said moving means to permit said two devices to follow the curvature of the last in their respective engagements, wiping or rubbing the leather up over the edge of the last and stretching it inward over the bottom of the last.

16. In a lasting machine, means for crimping and pressing the upper over the last, tacking means, a common actuator for said two means, and clutching mechanism under the

control of the operator permitting the independent operation at will of either of said two means.

17. In a lasting machine, a manually controlled stationary tacker, fixed rigid bearing devices for engaging the last, one at each side of said tacker, independent at their forward ends, leaving an unobstructed interval between them, and continuously and rapidly vibrating, crimping and rubbing means operating in a direction transverse to the edge of the upper out and in between said bearing devices and cooperating with the aforesaid mechanism for stretching the upper over the last in position to be tacked.

18. In a lasting machine, separate smooth bearing devices to rest the top side of the work against, a tacker, and upper-rubbing mechanism constructed and arranged to operate on the upper approximately in and above planes of the under sides and front ends of said two bearing surfaces and located to operate between said bearing devices, the latter being arranged to control the position of the work, during said rubbing, to meet the requirements of the tacker.

19. In a lasting machine, a tacker, operable at will, a reciprocating high speed crimper mechanism having an edge-stretcher, constructed and arranged to rapidly engage and rub upwardly on the leather at the side of the last, and bearing devices located apart and both in one and the same horizontal plane for permitting a free sliding movement of the work as it is held against said rapidly reciprocating edge-stretcher and at the same time maintaining the work in proper position.

20. In a lasting machine, a reciprocating high-speed crimper mechanism having an edge stretcher constructed and arranged to rapidly engage the leather adjacent the edge of the last and rub the upper forward, and bearing devices separated from each other at their forward ends, on the opposite sides of said reciprocating crimper mechanism, the latter moving forward beyond the free ends of said bearing devices and retreating to the rear thereof, said bearing devices being in the same horizontal plane, below the plane of crimping movement of said crimping device, and in position to engage at the opposite sides of the counter of the shoe.

21. In a lasting machine, in combination with a vibrating arm, a finger pivoted to said arm, a spring arranged on the arm and bearing against the finger, a spur pivoted to the finger, and a spring carried by the finger and arranged to bear against the spur.

22. In a lasting machine, in combination with a supporting frame, a vibratory arm supported by said frame, means for producing vibrations of the arm, a yielding finger

terminating the arm, and a yielding spur adjacent to the finger, the finger being arranged to engage over the work under treatment, and the spur being arranged to engage at the side of the work under treatment.

23. In a lasting machine, in combination with a frame, and a nail driver carried by said frame, mechanism for actuating the nail driver, a vibratory arm, a forked finger pivoted to the arm and arranged to engage the nozzle of the nailer with a branch of the fork at either side thereof.

24. In a lasting machine, in combination with the frame, a vibratory arm, means for vibrating said arm, a finger terminating the arm at its forward end, guide bars arranged at the sides of said arm, and bearing plates at the forward ends of said guide bars, arranged to engage the work under treatment.

25. In a lasting machine, the combination of reciprocally movable arm, means for actuating the same, a forked finger at the forward end of said arm, pivotally supported bearing plates at the sides of said arm, and means for feeding nails to a position between the branches of the finger and for driving said nails.

26. In a lasting machine, the combination of a reciprocating arm provided with a pivoted finger at its forward end and with a pivoted spur, means for producing the reciprocation of the arm, a nail driving mechanism, and a rest for the shoe under treatment adjacent to the nail driving mechanism and arranged to guide the shoe.

27. In a lasting machine, the combination of a reciprocating crimping finger, a spur arranged to reciprocate with said finger, the spur being pivotally attached to the finger.

28. In a lasting machine, the combination of a rapidly reciprocating crimping finger, a rapidly moving rubbing-device extending downwardly from said crimping finger, a bearing plate, and means for driving nails without interrupting the reciprocation of said finger.

29. In a lasting machine, the combination of a reciprocating crimping finger, a spur pivoted thereto, a bearing plate adjacent to said finger, an adjustable arm, a pivot connection between said arm and said plate, means for driving nails, and means for actuating the nail driver and reciprocating finger contemporaneously.

30. In a lasting machine, intermittently operating tack-driving mechanism, combined with a yieldingly supported reciprocating crimping finger, constructed to yieldingly engage the leather upon a shoe last with an upward and forward over-reaching pressure and then move bodily forward with relation to the last, maintaining engagement with the leather during all of said forward movement,

and automatic means constructed and arranged to impart to said yielding finger a rapid series of upward and forward overreaching positive motions with respect to the last
5 and the leather thereon with such speed as to stretch and maintain the loose leather in position for and during said tacking.

In testimony whereof, I, sign this specification in the presence of two witnesses.

CHARLES F. PYM.

Witnesses:

LOTTA LEE HAYTON,
MAY E. KOTT.