

M. BROCK.
LASTING MACHINE.

APPLICATION FILED JAN. 10, 1898. RENEWED NOV. 4, 1911.

1,019,125.

Patented Mar. 5, 1912.

4 SHEETS—SHEET 1.

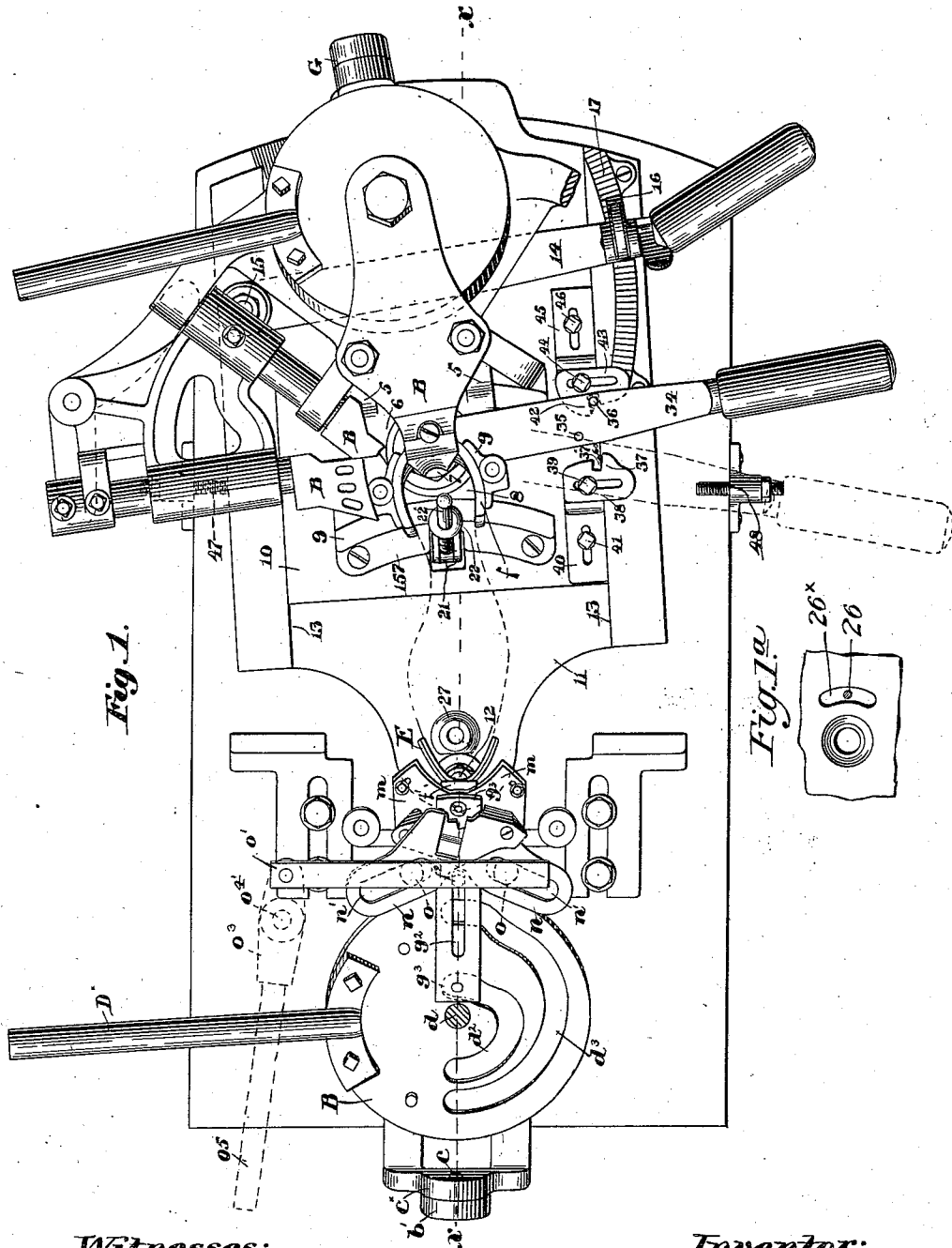


Fig. 1.

Fig. 1a.

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Inventor:

Matthias Brock,
by Crosby Gregory,
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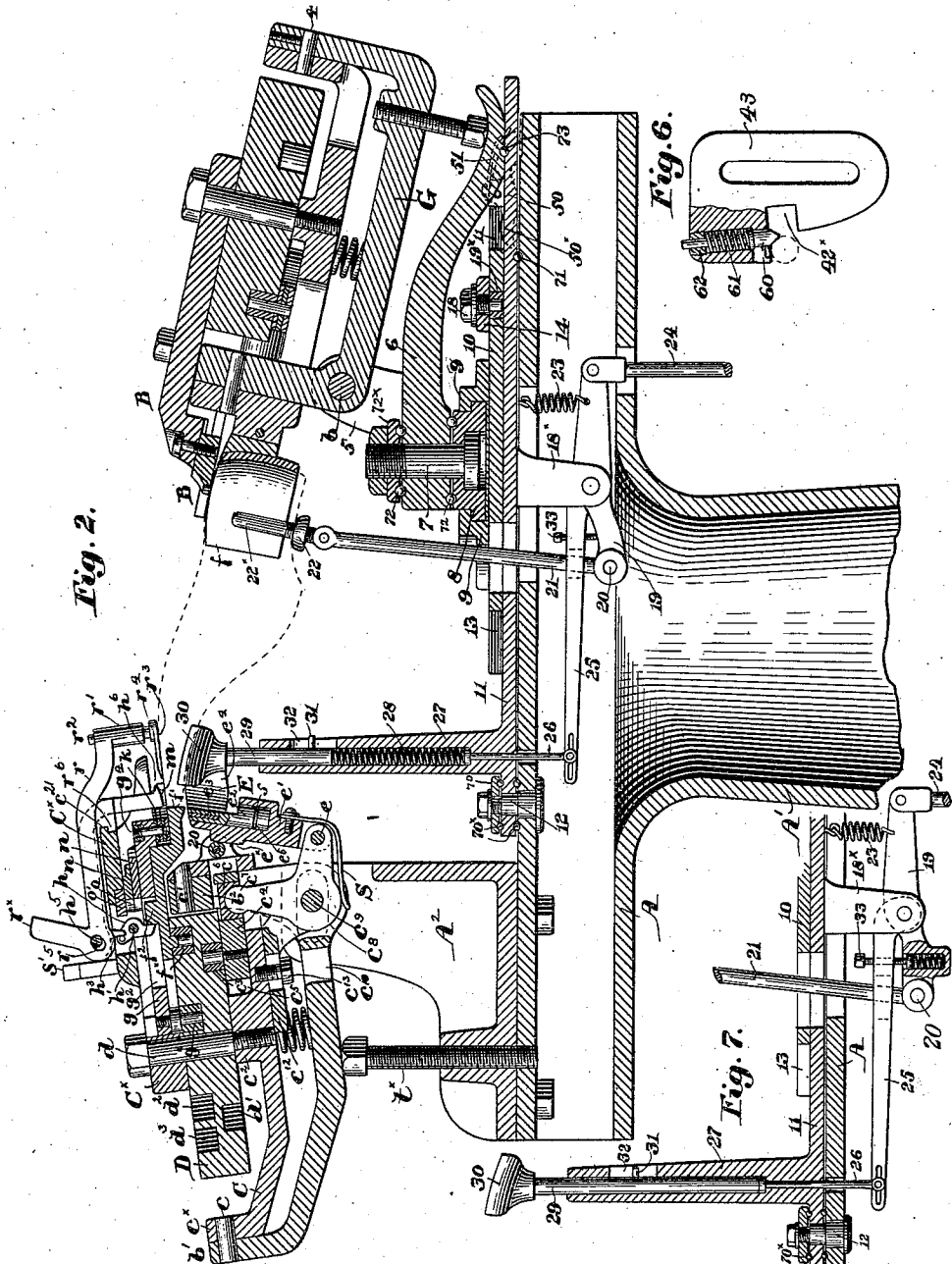
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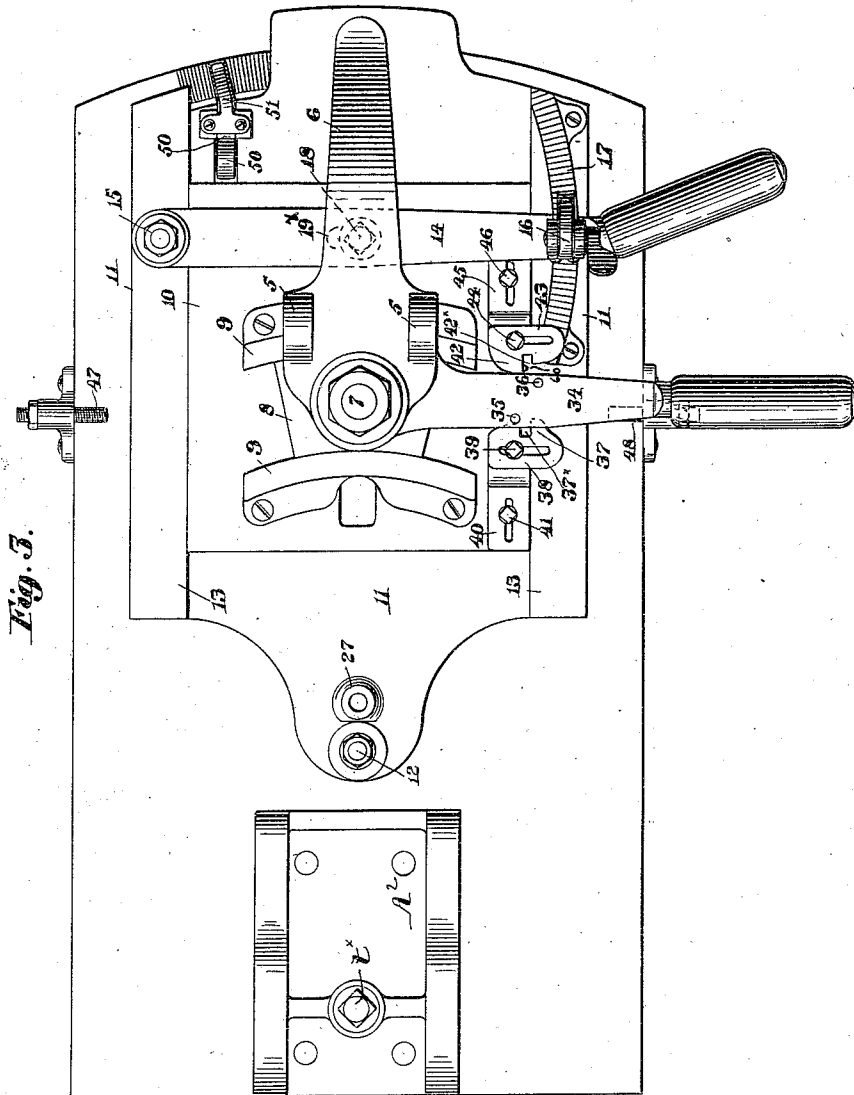
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4 SHEETS—SHEET 4.

Fig. 4.

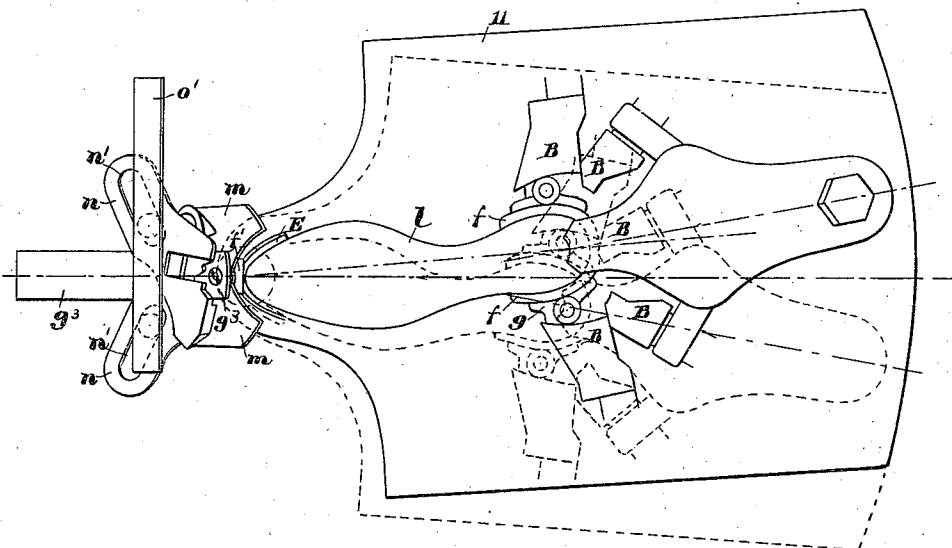
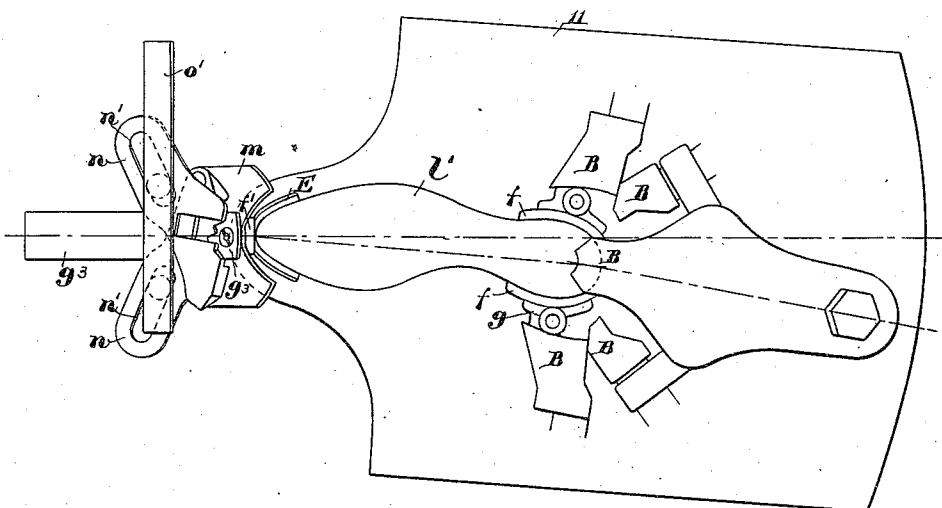


Fig. 5.



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UNITED STATES PATENT OFFICE.

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TO UNITED SHOE MACHINERY COMPANY, A CORPORATION OF NEW JERSEY.

LASTING-MACHINE.

1,019,125.

Specification of Letters Patent.

Patented Mar. 5, 1912.

Application filed January 10, 1898, Serial No. 666,143. Renewed November 4, 1911. Serial No. 658,619.

To all whom it may concern:

Be it known that I, MATTHIAS BROCK, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Lasting-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention has reference to machines for lasting the uppers of boots and shoes, the invention having especial reference to lasting machines wherein the lasting devices at one or both ends of the last are adapted to wipe the edge of the upper inwardly over and upon the innersole, such end lasting devices commonly being in the form of folding or wiping plates.

When machines of this class are employed in lasting shoes (such for instance as the Waukenphast type) having considerable lateral swing between the toe and heel, the swing for a right shoe being in a direction opposite that of a left shoe, it is necessary to make some relative adjustment of the toe lasting devices and the jack or support for the last to enable said toe lasting devices to face in the direction in which the toe end of the shoe or last swings or faces, so that the said toe lasting devices may properly meet and wipe the upper first upwardly about the toe end of the last, and thereafter lay the edge of said upper inwardly and down upon the innersole.

Originally it was customary to maintain the last support or jack and the toe lasting devices in fixed positions one with relation to the other, that is, always in alinement one with the other and employ different sets of lasting plates, one set shaped to face and fit the toe end of a right last and another set shaped to fit and face the toe end of a left last. Later, however, machines were devised wherein the same set of toe lasting devices or plates was employed for lasting the toe end of either rights or lefts without shifting or changing the lasting plates, this having been accomplished by moving or swinging the lasting plates relatively to the toe end of the last into such positions as were required to enable such plates to properly fit and act upon the toe end of the last or shoe in whichever direction it might

swing. Such an arrangement is illustrated in my Patent No. 548862, dated Oct. 29, 1895.

One of the objects of the present invention is to provide for the adjustment of the last and the toe lasting devices, one with relation to the other, in such manner that the median line of the fore part of the last will occupy a position to enable the toe wipers to operate uniformly along both sides of the shoe when they are advanced. In the machine herein selected for illustration of the invention this adjustment is accomplished by arranging the last-supporting jack for movement transversely of the last about a vertical axis located at a suitable point under the last, and preferably at or near the toe. In such illustrated embodiment of the invention, also, the heel lasting devices are arranged to be adjusted transversely, and preferably to a limited extent in unison with the last-supporting jack, so that into whatever position the heel end of the last may be moved for adjustment of the toe end of the last relatively to the toe lasting devices, the heel lasting devices may also be moved substantially to follow the heel end of the last so to be in position for acting uniformly along both sides of the shoe at this end of the last.

For the best results the heel lasting devices, in addition to the main transverse movement, which as stated may be in unison with the jack, will have an added movement, preferably swinging independent of the jack to carry such heel lasting devices into position beyond that into which they would be moved if their only movement was in unison with the jack referred to. Also such heel lasting devices will preferably have yet another movement which may be a swinging or swiveling movement about a vertical axis, which for the best results will be located under the heel end of the last.

The machine in which this invention is herein shown as embodied is adapted for lasting shoes on crooked lasts or lasts in which the median line of the fore part extends at an angle to the median line of the heel part. The machine is constructed to permit the lasting mechanisms to be posi-

tioned so that each will face toward its end of the last and also, in accordance with an important feature of this invention, so that each end lasting mechanism shall be advanced in the direction of the median line of that part of the last upon which it is acting. This provides that the lasting devices after having been positioned uniformly with relation to the two sides of an adjacent end of a crooked last shall advance in the direction of the middle line of that part of the last and so maintain their uniform relation to the two sides of the last. By this provision the end lasting wiper, for example, will, after having been correctly positioned angularly with relation to the end of a last so that they face uniformly toward the last and strike the two sides simultaneously, be advanced on a line midway between the two sides while they are being closed and thus will be caused to override the two sides of the last the same distance.

In the following description taken in connection with the accompanying drawings to which reference may be had, like letters representing like parts, I have disclosed a mechanism illustrating, in one form, my invention above referred to.

In the drawings, Figure 1 is a top or plan view of a machine containing one embodiment of my invention, the usual side lasting devices being omitted as unessential to a sufficient disclosure of my invention, it being understood, however, that any usual or suitable side lasting devices may be employed. Fig. 1^a is a detail of part of the table to show a slot therein. Fig. 2 is a vertical longitudinal section taken on the dotted line $x-x$, Fig. 1. Fig. 3, an enlarged detail showing in plan view the table which carries the heads of the two end lasting mechanisms, this figure showing more clearly the several swinging movements provided for the heel lasting mechanism and the jack. Fig. 4 a diagrammatic plan view showing the adjustment of the machine for acting upon a right last, Fig. 5 is a similar view showing the adjustment of the parts for a corresponding left last. Fig. 6 a detail to be referred to, and Fig. 7 a modification to be described.

Referring to the drawings, A is a suitable table or primary support which may be and preferably is carried at the top of a column, as A', said table at one end, for example at the left of Figs. 1 and 2, carrying the head A² for the toe lasting devices.

The toe lasting devices and their actuating parts may be of any suitable or desired construction, so far as concerns my present invention, they being herein shown as substantially like the toe lasting devices and actuating parts illustrated in my said Patent No. 548862, hereinbefore referred to and to

which reference may be had, like letters representing like parts, the operation of such mechanism being substantially as set forth in my said patent. It may be said, however, that the usual rising toe-wiper is indicated at E, and the inwardly closing toe wiper or lasting plates or devices are indicated at m, m , the adjusting screw t^x , by which the vertical angle of the lasting plates is varied, being arranged somewhat differently in the drawings of this present application from the arrangement of the corresponding screw in the drawings of my patent referred to.

The toe lasting mechanism is herein shown as in my said patent with a handle as o^5 by which to effect a transverse adjustment of the toe lasting plates, and while this adjustment may not be necessary in all cases it may be employed where it is found that after the shoe has been jacked the toe portion of the shoe is not presented accurately to the wiper plates, or in the case of a welt shoe because of some irregularity in the formation of the channel lip the upper requires to be forced over the last bottom farther on one side of the shoe than on the other side, under either of which conditions the toe lasting plates may be moved laterally the required distance to position them properly with relation to the toe portion of the particular shoe in the machine.

The heel lasting devices also may be of any suitable or desired construction, they being conveniently shown herein as substantially like the heel lasting devices shown and described in my earlier Patent No. 286898, dated Oct. 16, 1883, to which reference may be had, like letters representing like parts.

It is well, perhaps, here to state that the heel clamp is shown at f and the heel wipers or lasting plates at B, two of the latter being broken away in Fig. 1.

I have shown the heel lasting devices of said patent merely to enable my invention to be understood, and I will again emphasize that my present invention is in no wise restricted to the lasting devices shown, or to any particular kind of lasting devices, any suitable or desired devices being capable of use in so far as my present invention will admit.

Referring now particularly to Fig. 2, the transverse horizontal pivot b , upon which the heel lasting head is mounted to swing to meet the inclination on the bottom of the last, is shown supported in a pair of ears 5, rising from the swinging arm 6, pivoted to swing in a horizontal plane about the vertical pivot pin or post 7 mounted on and carried by the sector 8 arranged to slide in the arc of a circle in suitable overhanging or dove-tail guideways 9 formed on or as a part of the sliding plate 10 to be referred to. The plate 10 is sustained on the swinging

support or carrier 11 for the jack, which is arranged horizontally on the table A and pivoted to swing in a horizontal plane about the pivot or stud 12 on the said table.

5 The axis of the stud 12 is preferably arranged substantially under the center of the toe of the last when in position ready for lasting, as is shown clearly in Figs. 1 and 2, and the axis of the pivot pin 7 is preferably substantially under the center of the heel of the last, as shown most clearly in Fig. 2, and to enable this pivot pin 7 to be maintained with its axis in such position with relation to the heels of lasts of different lengths, the plate 10 is arranged to slide longitudinally, that is, lengthwise of the machine on the swinging support or carrier 11, and in suitable guideways 13 on said support, its longitudinal adjustment being effected by a lever 14, Fig. 3, fulcrumed at 15 and provided with a retaining device or latch 16, which coöperates with a series of locking or adjusting teeth 17 on one of the guides 13 referred to, said lever 14 being 20 connected by means of a pin 18 and slot 19*, see Figs. 2 and 3, with the plate 10 which is to be adjusted by it.

Depending from the swinging support 11 are two ears 18*, see Fig. 2, between which 30 is pivoted the lever 19 forked at one of its ends to receive the stud 20 on the lower end of the jack post 21, which latter rises through suitable openings in the table, the support 11 and the plate 10, and at its upper end has jointed or otherwise suitably attached to it the usual heel support 22, provided with the pin 22* for holding the heel end of the last. That end of the lever 19 which is opposite the connection of the jack 35 post, is shown as connected by a spring 23 with the swinging support 11, and is further provided with a depending rod 24, designed for connection with any suitable foot treadle or knee or hand lever, not shown, whereby 40 the operator, by depressing the said rod 24, may raise the jack post and thereby jack the last in the machine in a manner well understood by those conversant with the art.

The ears 18* previously referred to, depending from the swinging support 11, also have pivoted to them, preferably by the same pivot as the lever 19, a second lever 25, to the free slotted end of which is jointed the lower end of a vertical rod 26 which 55 rises through a curved slot 26*, see Fig. 1^a, in the table and enters the lower end of a socket within the toe post 27 fast on the swinging support 11. This socketed toe post 27 contains a spring 28 resting at its lower end upon the capped upper end of the rod 26, and at its upper end said spring supports the spindle 29 provided at its upper end with the usual toe rest 30, upon which the toe of the last with the upper 65 thereupon may be positioned previous to

jacking. The spindle 29 is shown as provided with a laterally extended pin 31, which during the vertical adjustment of the said pin works in a slot 32 in the post 27 referred to, thereby preventing rotative movement of the toe rest without in anywise interfering with the free vertical movement thereof. For actuating this toe rest to assist in jacking I have provided the lever 25 with an adjusting screw 33 which depends 70 from the said lever and rests upon one end of the lever 19 referred to, so that whenever the said lever 19 is moved to raise the jack post it will, through the screw 33, also and correspondingly raise the lever 25, to thereby through the rod 26 and spring 28 raise 80 the toe rest 30 and press the toe end of the last tightly against the usual hold-down and the underside of the wipers referred to, but it is perfectly clear that the spring 28 instead of being interposed between the spindle 26 and the toe rest, might as well be interposed between the levers 19 and 25, for instance, between the screw 33 and said lever 19, as shown in Fig. 7. 85 90

Referring now particularly to Figs. 1 and 3, the arm 6 referred to as pivoted upon the vertical pivot pin 7, is provided with the laterally extended lever 34, shown as provided with depending pins 35, 36. The pin 95 35 is designed to coöperate with the stop 37 forming a part of a slotted plate 38 clamped by a suitable screw 39 to the block 40, also slotted longitudinally and clamped by means of the screw 41 to the slide plate 10 referred to. The pin 36 coöperates with a similar but oppositely arranged stop 42, forming a part of the slotted plate 43 clamped by a screw 44 to the block 45 also slotted and 100 adjustably attached by means of the screw 46 to the said plate 10. Holding notches 37* and 42* are provided in the plates 38 and 43 respectively, for a purpose to be referred to. 105

The operation of my machine is as follows, reference being had particularly to 110 the diagrammatic views Figs. 4 and 5, in connection with the figures hereinbefore referred to.

Referring to Fig. 4, which shows a right last 1 arranged bottom up in the machine, 115 it will be seen that when the toe is properly positioned or alined as shown with reference to the toe lasting plates, the heel end of the last must, by reason of the swing of the last, lie in a position considerably to one side of 120 the median line of the machine, and to put the last into such position, the operator will first place the last with its heel upon the heel pin of the jack, and then position the toe upon the toe rest 30; the operator then 125 grasps the handle lever 34 and swings it first to the right, Fig. 3, until its pin 36 meets the side of the slotted plate 43, after which he pushes the lever bodily forward or away from him in a direction trans- 130

versely of the last and the length of the machine, such movement of the said lever also pushing away from him the arm 6 carrying the heel lasting mechanism, and by means of the pivot 7 also moving with it the segment 8 and by means of the frictional contact of the latter with the swinging support 11 also causing the said support to be swung until the latter meets and is stopped by the adjustable stop screw 47 arranged on the table of the machine. This swinging of the support 11 carries the jack post 21 into such position as to bring the toe end of the last into proper alinement with the toe wipers to be acted upon by the latter, as shown at the left in Fig. 4. By reason of the swing in the last it is necessary to yet further move the heel lasting devices to bring them into proper position to act upon the heel of the last. To accomplish this, after the swinging support 11 has been stopped by contact with the stop screw 47, as shown in Fig. 1, the operator continues to push upon the handle lever 34 and thereby gives to the segment 8 a further transverse swinging movement on and with relation to the now stationary support 11, such further movement of the segment 8 continuing until the pin 36 meets the stop 42, such further movement sufficing to move the heel lasting plates into position with their center substantially in line with the back center of the heel of the last.

To yet more accurately position the heel lasting devices with reference to the heel of the last, the operator now swings the handle 34 to the right into the notch 42* in the plate 43, thereby swinging the arm 6 and the entire heel lasting mechanism about the axis of the pivot 7 into position substantially in alinement with the median line of the heel portion of the last, so that thereafter when the heel lasting mechanism is operated to last the heel, it will properly meet the upper and thereby lay the same evenly and nicely upon the innersole. Having lasted the right shoe upon this right last, if the next happens to be a left shoe 1', Fig. 5, the operator, may with or without first moving the heel mechanism back to a central position, according as he may feel inclined, position this left last upon the jack post and toe rest as before, and then grasp the handle lever 34, and swing it first to the left until its pin 35 meets the edge of the slotted plate 38, after which he pulls the lever toward him, thereby drawing the segment 8 and swinging support 11 also toward him, until said swinging support meets the adjustable stop 48, Fig. 1, at the front side of the machine, thereby positioning the toe of this left last properly with relation to and to be acted upon by the toe wipers or lasting devices. The operator then continues to pull the handle lever toward him

until the said pin 35 meets the stop 37, when he will swing it to the left, carrying the pin 35 into the notch 37*, thereby positioning the heel lasting devices in proper alinement with and to act with reference to the heel end of this left last.

The clamping of the last endwise into position as is customary in lasting, is accomplished by means of the handle lever 14, which moves the sliding plate 10 toward and from the toe lasting mechanism, and this clamping will for the best results be performed after the movements above described for positioning the lasting devices in proper alinement with the ends of the last.

From the foregoing it will be understood that the last supporting jack or last support, together with the last, is given a transverse movement for relatively adjusting the fore part of the last and toe lasting devices, to enable the fore part of lasts, either rights or lefts, having different degrees of swing to be properly presented to the toe lasting mechanism so that said mechanism will operate uniformly along the two sides of the shoe; in other words, the relative adjustment between the fore part of the last and the toe lasting devices of rights and lefts and other lasts having a difference of swing is accomplished by transversely moving or swinging the last and its jack or support bodily with relation to the toe lasting mechanism. In the machine herein selected for illustration of the invention this bodily movement is shown as being effected about a vertical axis which is located substantially under the center of the toe of the last, and while this constitutes a desirable arrangement it will be obvious that the adjustments referred to might be accomplished if such axis were not located precisely at this point, but at some other point under the forward portion of the last suitably adjacent to the toe lasting mechanism, for the purpose stated.

Further, it will be understood that the heel lasting mechanism has an additional movement beyond the position into which the jack is moved, that is, a movement independently of and relatively to the jack for further and more accurately positioning the heel lasting mechanism with reference to the heel end of the last after said last has been moved as described, and that the said heel lasting mechanism for best results has yet also, in addition, a swinging or swiveling movement to cause its alinement to more nearly conform to the alinement of the heel end of the last, whatever be its swing.

It will be noticed that as herein arranged the transverse movement of the heel lasting mechanism beyond and with reference to the swinging support takes place about the same center as that about which said support moves, viz.:—the axis of the pin 12.

The limits of the swinging movement of

the support 11 may be varied by means of the adjustable stops 47, 48; the limit of the further movement of the lasting mechanism with reference to this swinging support 11 may be varied by the adjustment transversely of the machine of the adjustable stop plates 37 and 43, and the final swiveling or swinging movement of the heel lasting mechanism about the heel of the last may be varied by adjustment longitudinally of the machine of the blocks 40 and 45 carrying the slotted stop plates.

In the embodiment of the invention herein shown and described the last support and the heel lasting devices swing or slide in a curved path about a center located near the toe of the last and the heel lasting devices also swing or slide in a curved path about a center located near the heel of the last; but the invention is not limited to constructions in which these parts have movements about the centers indicated, as these parts may move in any desired paths for accomplishing the purposes stated.

For the purpose of locking the swinging support 11 in either of the positions into which it is moved for adjustment of the last, I have provided a suitable locking device, herein shown, Fig. 2 dotted lines, in the form of a locking lever 50, pivotally connected to the said swinging support and having its locking end adapted to engage one of a series of notches formed in or on the table of the machine. The opposite or tail end 50* of the locking lever 50 is normally raised by a spring 51 to position in the path of movement of the sliding plate 10, so that as the said plate is moved to the left, Figs. 1 and 2, for final clamping of the last in its adjusted position, it will clear the then depressed tail of the said locking lever and permit the said tail, acted upon by its spring, to be raised, depressing the opposite end into engagement with a locking notch in the table and thereby locking the swinging support and the parts carried thereby in adjusted position.

When the slide plate 10 is returned to release the last after the lasting operation, it rides upon and depresses the tail end of the locking lever and raises its locking end to release the support, and thereby permit the latter to be moved into any other desired or necessary position for the next last.

To retain the lever 34 in proper engagement with the locking notches 37* or 42*, as the case may be, during the lasting operation, it is desirable to use suitable locking or retaining devices which may be of any desired construction; as an example, however, I have herein shown, particularly in Fig. 6, an enlarged view, partly in section, of the plate 43, wherein is arranged a locking device 60, pressed normally into outermost position by a spring 61, seated at its

opposite end on a short screw 62 tapped into the opening provided for the spring. This locking device yields for the entrance of the locking pin 36 and springs out back of said pin holding it frictionally in the notch 42* during the operation of the machine. A similar locking device is provided to lock the pin 35 in the notch 37* of the plate 38.

It will be obvious that the various locking means just described may be changed as desired by the manufacturer or user, and it is obvious that the machine in other respects may be altered to suit different conditions or requirements, or the different ideas of the builders or users, all without departing from the spirit and scope of my invention.

So far as known to me I am the first to provide jacking mechanism or devices for positively jacking the heel end of the last together with jacking devices for yieldingly jacking the toe of the last, said latter jacking devices, however, being actuated by the heel jacking mechanism without modifying the latter.

To facilitate the ready and quick adjustment of the several parts required, I have herein provided anti-friction devices shown as balls 70* introduced between the swinging support 11 and the table A and the nut 70; also balls 72 introduced between the arm 6 and the sector 8 and between said arm and the washer 72*; and balls 71 inserted between the swinging support 11 and the table A; and other balls 73 located between the swinging arm 6 and the upper side of the swinging plate. These roller or anti-friction bearings enable the parts, notwithstanding their size and weight, to be moved readily and to respond as quickly as is necessary for a successful working of the machine, and the ease with which the jack support 11 and arm 6 move enables me in practice to depend upon the sliding friction between the sector 8 and its bearings 9 to carry the swinging support and sector together, as the latter is pushed to one or the other side of the machine, thus simplifying the structure over what would be necessary were special friction devices required.

Having described one embodiment of my invention and without limiting myself as to details, what I claim and desire to secure by Letters Patent, is:—

1. In a lasting machine, toe lasting mechanism, a last supporting jack arranged to turn about a center for positioning a last supported on said jack with relation to said mechanism, heel lasting mechanism, a support therefor arranged to turn with said jack and also to have independent pivotal movement with relation to said jack, means whereby said jack and said support may be moved about their respective centers, and means to lock said parts in operative position.

2. A lasting machine comprising toe lasting mechanism, a last supporting jack arranged to turn about a center for positioning a last supported on said jack with relation to said mechanism, heel lasting mechanism, a support therefor mounted to turn about a vertical axis, means through which the said jack and said support may be moved about their respective centers, and means to move said heel lasting mechanism toward and from the toe lasting mechanism, said machine having provisions for locking said parts in operative position.
3. In a lasting machine, toe lasting mechanism, a jack to sustain a last, heel lasting mechanism mounted to turn about a vertical axis located adjacent to the end of the last, manually controlled means by which the heel lasting mechanism may be turned about said axis, means by which said axis may be shifted, and means for locking the heel lasting mechanism in its adjusted position with relation to its axis.
4. In a lasting machine, the combination with end lasting devices, of a last support movable about a center substantially under one end of the last supported by it, and other end lasting devices movable about a center substantially under the other end of the last on said support.
5. A lasting machine comprising a last support, toe lasting devices, and heel lasting devices, said parts being mounted to permit relative movement of the toe lasting devices and last support about a center located substantially under the fore part of the last sustained on the last support, and to permit relative movement of the heel lasting devices and last support about a center located substantially under the heel of the last sustained on said last support.
6. In a lasting machine, the combination with end lasting devices, of a last support movable about a center located under the last adjacent to said lasting devices, and other lasting devices mounted to move with said last support and connected thereto for independent movement about an axis also located under the last adjacent to said first-mentioned lasting devices.
7. In a lasting machine, the combination with end lasting devices, of a last support mounted to swing about a center under the last adjacent to said lasting devices, and other lasting devices arranged to swing about the same center and also to have a movement about an axis located substantially under the opposite end portion of the last.
8. In a lasting machine, the combination with end lasting devices, of a last support mounted to swing about a vertical axis arranged beneath the center of the last adjacent said end lasting devices, and other end lasting devices for the opposite end of said last having a swinging movement with said last support.
9. In a lasting machine, the combination with end lasting devices, of a last support mounted to swing about a vertical axis arranged beneath the center of the last adjacent said end lasting devices, and other end lasting devices for the opposite end of said last having a swinging movement with said last support, said other end lasting devices having also a transverse movement independent of said swinging last support.
10. In a lasting machine, the combination with end lasting devices, of a last support mounted to swing about a vertical axis arranged beneath the center of the last adjacent said end lasting devices, and other end lasting devices for the opposite end of said last having a swinging movement with said last support, said other end lasting devices having also a transverse swinging movement independent of said swinging last support.
11. In a lasting machine, the combination with end lasting devices, of a last support mounted to swing about a vertical axis arranged beneath the center of the last adjacent said end lasting devices, other end lasting devices for the opposite end of said last arranged to swing with said last support and also independently thereof, said other end lasting devices having a further movement about an axis substantially under the center of the heel of the last.
12. In a lasting machine, the combination with end lasting devices, of a last support mounted to swing about a pivotal axis arranged substantially under the center of the last adjacent to said end lasting devices, and other end lasting devices for the opposite end of the last arranged to swing with said last support and also to swing independently of said last support.
13. In a lasting machine, the combination with end lasting devices, of a transversely movable last support arranged to properly position the end of the last, whatever be its swing with reference to and to be acted on by said end lasting devices, and other end lasting devices for the opposite end of said last, said other end lasting devices having a transverse movement and a swinging movement about an axis substantially under the adjacent end of the last.
14. In a lasting machine, the combination with end lasting devices, of a last support movable transversely for adjustment of the end of the last with reference to said end lasting devices, and other end lasting devices for the opposite end of said last mounted upon and to move with said last support and having a further transverse movement independently of said last support.
15. In a lasting machine, the combination with end lasting devices, of a last support

movable transversely of the length of the last to position said last with relation to the end lasting devices, and other lasting devices adapted to cooperate with the other end of a last on said last support and independently movable transversely of the length of the last for positioning said devices in accordance with the position to which the last has been moved by the support.

16. In a lasting machine, the combination with end lasting devices, of a last support movable transversely for adjustment of the end of the last with reference to said end lasting devices, and other end lasting devices for the opposite end of said last mounted upon and to move with said last support and having a further transverse movement independently of said last support, said other end lasting devices having a further movement about an axis substantially under the adjacent end of the last.

17. In a lasting machine, the combination with end lasting devices, of a last support movable transversely for adjustment of one end of a last with reference to said end lasting devices, and other end lasting devices to act upon the opposite end of said last, said other end lasting devices having a movement both with and independently of said last support, and means through which simultaneous transverse movements of said last support and other end lasting devices may be effected, and a movement of said other end lasting devices with relation to said last support.

18. In a lasting machine, the combination with end lasting devices, of a last support movable transversely of the length of the last for positioning the last with relation to said end lasting devices, and other end lasting devices to act upon the opposite end of said last, said other end lasting devices being movable independently of the last support to position them properly with reference to the position to which the adjacent end of the last has been moved by the last support.

19. In a lasting machine the combination with end lasting devices, of a last support movable transversely to adjust one end of a last to be properly acted upon by said end lasting devices, and other end lasting devices for the opposite end of said last movable transversely with the movement of the adjacent end of said last, and having a further movement independent of the movement of said last, and also a swiveling movement about an axis substantially under the adjacent end of the said last, and means by which said parts may be actuated.

20. In a lasting machine, the combination with end lasting devices, of a transversely movable last support for positioning one end of the last with reference to said end

lasting devices, and other end lasting devices for the opposite end of said last, means for communicating to said other end lasting devices a transverse movement with said last support and also a movement independent of said last support, and clamping means to clamp the last endwise.

21. In a lasting machine, the combination with end lasting devices to act upon one end of a last, of other transversely movable lasting devices for the opposite end of said last, a transversely movable last support, and means whereby said last support and other end lasting devices may be adjusted with reference to the first named end lasting devices to enable lasts having a difference of swing to be properly lasted in the machine without substantial change or adjustment of the first named lasting devices.

22. In a lasting machine, the combination with end lasting devices for one end of a last, of other transversely movable end lasting devices for the opposite end of the last, and a transversely movable last support, of means whereby said last support and other end lasting devices may be moved in unison, a stop to limit the movement of said last support, and means permitting further movement of said other end lasting devices with relation to said last support.

23. In a lasting machine, the combination with end lasting devices for one end of a last, other transversely movable end lasting devices for the opposite end of the last, and a transversely movable last support, of means whereby said last support and movable lasting devices may be actuated, and a stop for arresting the movement of the last support while the lasting devices continue to move.

24. In a lasting machine, the combination with end lasting devices for one end of a last, of other transversely movable end lasting devices for the opposite end of the last, and a transversely movable last support, of means whereby said last support and other end lasting devices may be moved in unison, a stop to limit the movement of said last support, and means permitting further movement of said other end lasting devices with relation to said last support, and means whereby said other end lasting devices may be swung about an axis under the heel of the last, and a stop to limit this latter movement.

25. In a lasting machine, the combination with end lasting devices for one end of a last, of a last support arranged to swing about a center substantially under the toe of a last, a carrier longitudinally adjustable on the said swinging support, other end lasting devices for the opposite end of said last mounted upon the said carrier and to swing with the said last support, and means whereby a further movement may be given to

said other end lasting devices transversely with relation to the said carrier when transverse movement of the latter is stopped.

26. In a lasting machine, the combination with end lasting devices for one end of a last, of a last support arranged to swing about a center substantially under the toe of a last, a carrier longitudinally adjustable on the said swinging support, other end lasting devices for the opposite end of said last mounted upon the said carrier and to swing with the said last support, means whereby a further movement may be given to said other end lasting devices transversely with relation to the said carrier when transverse movement of the latter is stopped, and means to swivel said other end lasting devices also with reference to said carrier and about an axis substantially under the adjacent end of the last.

27. In a lasting machine, the combination with end lasting devices, of a last support arranged to move transversely of the length of the last sustained thereon, a carrier movable on said last support, and end lasting devices mounted on said carrier to move with the last support and also to have a positioning movement independently of the said last support.

28. In a lasting machine, the combination with end lasting devices, of a last support arranged to move transversely of the length of the last sustained thereon, a carrier movable on said last support longitudinally of the last, and end lasting devices transversely movable on the carrier whereby said last-mentioned lasting devices may move longitudinally of the last and may also move transversely thereof both with the last support and independently of the last support.

29. In a lasting machine, the combination with end lasting devices for one end of a last, of a transversely movable last support arranged to swing about a center substantially under the toe of the last, heel lasting devices also transversely movable about said center, means to clamp the said last endwise in position, and locking means to lock the said transversely movable parts against movement after they have been adjusted.

30. In a lasting machine, the combination of means positively to jack the heel of a last, and means actuated thereby for yieldingly jacking the toe of a last.

31. In a lasting machine, the combination with heel and toe jacking devices, of a single operating member positively connected with and to operate the heel jacking devices, and yieldingly connected with and to actuate the toe jacking devices.

32. In a lasting machine, a primary support, a swinging support, a pivot uniting said supports, a last support and end lasting devices carried by and movable laterally with said swinging support, combined with

a washer on said pivot, a series of balls contacting with the upper and under sides of said swinging support about said pivot, and additional balls interposed between said swinging support and said primary support.

33. In a lasting machine, toe lasting devices, a last supporting jack composed of a bottom plate pivoted substantially in vertical alinement with the center of the toe of the last on the jack, a toe-support, and a heel-support combined with heel lasting devices carried by said plate, and means whereby said plate may be moved about said pivot to adapt the swing of the last to the toe lasting devices.

34. In a lasting machine, toe lasting devices, and a swinging last support having heel lasting devices, and free to be turned to accommodate the swing of the last, the heel lasting devices being adjustable with relation to the support to adapt them to the heel of the last carried by the support.

35. A lasting machine comprising toe lasting devices, having a movement longitudinal of the last, a last support, and heel lasting devices movable across the line of movement of the toe lasting devices whereby the toe of the last on the support may be positioned properly with relation to the toe lasting devices, and manually controlled means by which said heel lasting devices may be positioned independently of the movement of the last support to adapt them to cooperate with the heel end of the last.

36. In a machine for lasting shoes, the combination with a last support and toe lasting devices, of heel lasting devices mounted for movement about a center substantially under the toe of the shoe and also for movement about a second center substantially under the heel end of the shoe for the purpose described.

37. In a machine for lasting shoes, the combination with a last support and devices for lasting the toe end of the shoe, of a carrier, a guideway in said carrier curved about a center located near the toe of the shoe, a block movable in said guideway, and heel lasting devices pivotally connected to said block at a point located near the heel of the shoe.

38. In a lasting machine, the combination with end lasting devices, of a last support mounted to swing about a vertical axis located beneath the center of the end of the last adjacent said end lasting devices, and other end lasting devices for the opposite end of said last having a swinging movement with said last support, said other end lasting devices having also a transverse swinging movement and a longitudinal horizontal movement independent of said swinging last support.

39. In a lasting machine, toe lasting mechanism, last sustaining means, a pivoted sup-

port therefor having its center of movement substantially in vertical alinement with the toe of a last mounted on said last sustaining means, heel lasting mechanism mounted on said support, and means by which said support and its last sustaining means may be moved about the pivot of said support, means to move the heel lasting mechanism toward and from the toe lasting mechanism, and devices to lock said parts in their operative position.

40. A lasting machine having, in combination, toe lasting mechanism, heel lasting mechanism, and shoe supporting means, said machine having provision for lateral curvilinear adjustment of the heel lasting mechanism and the last supporting means to different relative extents with relation to the toe lasting mechanism.

41. A lasting machine having, in combination, toe lasting mechanism, heel lasting mechanism, and shoe supporting means, said machine having provision for angular adjustment laterally of the heel lasting mechanism and the last supporting means about different centers with relation to the toe lasting mechanism.

42. A lasting machine having, in combination, a shoe support, heel lasting mechanism, toe lasting mechanism, and means for actuating the said two mechanisms, said parts of the machine being arranged for relative angular lateral movement about centers at the two ends of the shoe to position them so that each lasting mechanism can be actuated in the direction of the median line of the adjacent part of either a right or a left crooked last and caused to act uniformly along the sides of said last.

43. In a lasting machine, toe lasting mechanism, a pivoted support provided with a jack to sustain the toe and heel of a last, heel lasting mechanism carried by said support, manually controlled means for moving said support and said heel lasting mechanism about the center of movement for the support, means by which the position of the heel lasting mechanism on said support may be shifted, and devices for locking the heel lasting mechanism in its operative position with relation to the center of movement of said support.

44. A lasting machine having, in combination, toe and heel lasting mechanisms and a support upon the head of which the toe lasting mechanism is mounted and the heel lasting mechanism is guided for lateral curvilinear bodily movement about a center located under the toe of a shoe presented to the toe lasting mechanism.

45. A lasting machine having, in combination, toe and heel lasting mechanisms and a support upon the head of which the toe lasting mechanism is mounted, and a carrier guided for lateral curvilinear move-

ment about a center under the toe of a shoe presented to the toe lasting mechanism and in which the heel lasting mechanism can slide toward and from the toe lasting mechanism.

46. A lasting machine having, in combination, toe and heel lasting mechanisms and a support upon the head of which the toe lasting mechanism is mounted, and a carrier guided for lateral curvilinear movement about a center under the toe of a shoe presented to the toe lasting mechanism and in which the heel lasting mechanism can slide toward and from the toe lasting mechanism and can have independent lateral turning movements about a center under the heel of the shoe.

47. A lasting machine having, in combination, toe and heel lasting mechanisms and a support upon the head of which the toe lasting mechanism is mounted, a carrier guided for lateral curvilinear movement about a center under the toe of a shoe presented to the toe lasting mechanism and in which the heel lasting mechanism can slide toward and from the toe lasting mechanism and can have independent lateral turning movements about a center under the heel of the shoe, and a lock which adjustably limits the movement of the heel lasting mechanism and secures it against displacement therefrom during the lasting operation.

48. A lasting machine having, in combination, toe and heel lasting mechanisms and a support upon the head of which the toe lasting mechanism is mounted, a carrier guided for lateral curvilinear movement about a center under the toe of a shoe presented to the toe lasting mechanism and in which the heel lasting mechanism can slide toward and from the toe lasting mechanism and can have independent lateral turning movements about a center under the heel of the shoe, levers by which the sliding movements of the heel lasting mechanism and also its angular movements may be effected, and adjustable devices coöperating with the lever for limiting respectively the movements in opposite directions.

49. A lasting machine having, in combination, toe and heel lasting mechanisms and a support upon the head of which the toe lasting mechanism is mounted and the heel lasting mechanism can swing laterally in a curvilinear path and can slide forwardly and backwardly, and a lock which is operated automatically upon forward movement of said heel lasting mechanism to secure it against lateral displacement while in its advanced position.

50. A lasting machine having, in combination, toe and heel lasting mechanisms and a support upon the head of which the toe lasting mechanism is mounted for transverse adjustment and the heel lasting mech-

anism is guided for lateral curvilinear bodily movement about a center located under the toe of a shoe presented to the toe lasting mechanism.

- 5 51. A lasting machine having, in combination, toe and heel lasting mechanisms and a support upon the head of which the toe lasting mechanism is mounted for transverse adjustment and a jack post is guided for
10 lateral curvilinear movement about a center

under the toe of a shoe presented to the toe lasting mechanism.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

MATTHIAS BROCK.

Witnesses:

JOHN C. EDWARDS,
LAURA MAURX.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."
