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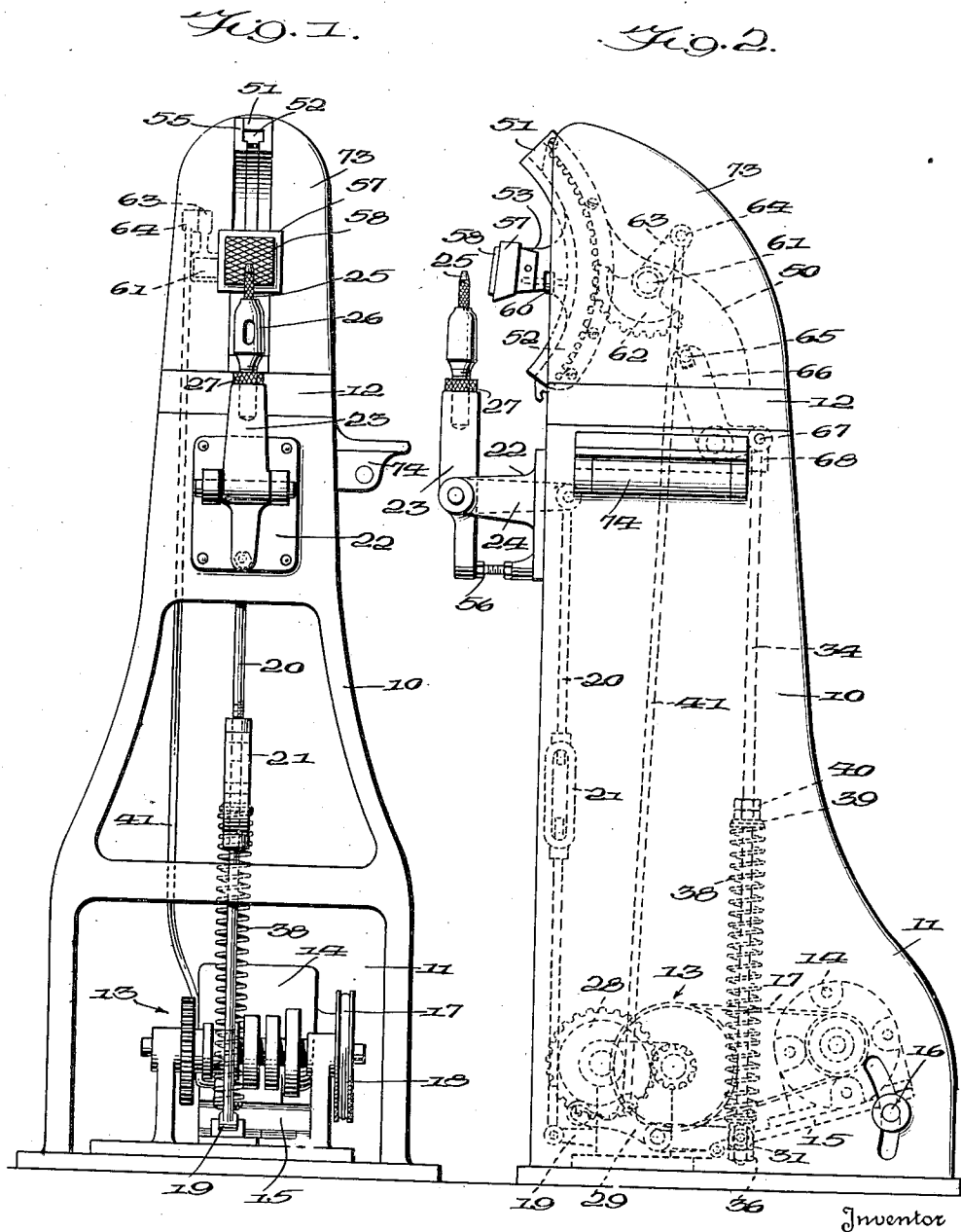
B. W. FREEMAN

2,092,208

MACHINE FOR REMOVING SHOES FROM LASTS

Filed Aug. 3, 1935

3 Sheets-Sheet 1



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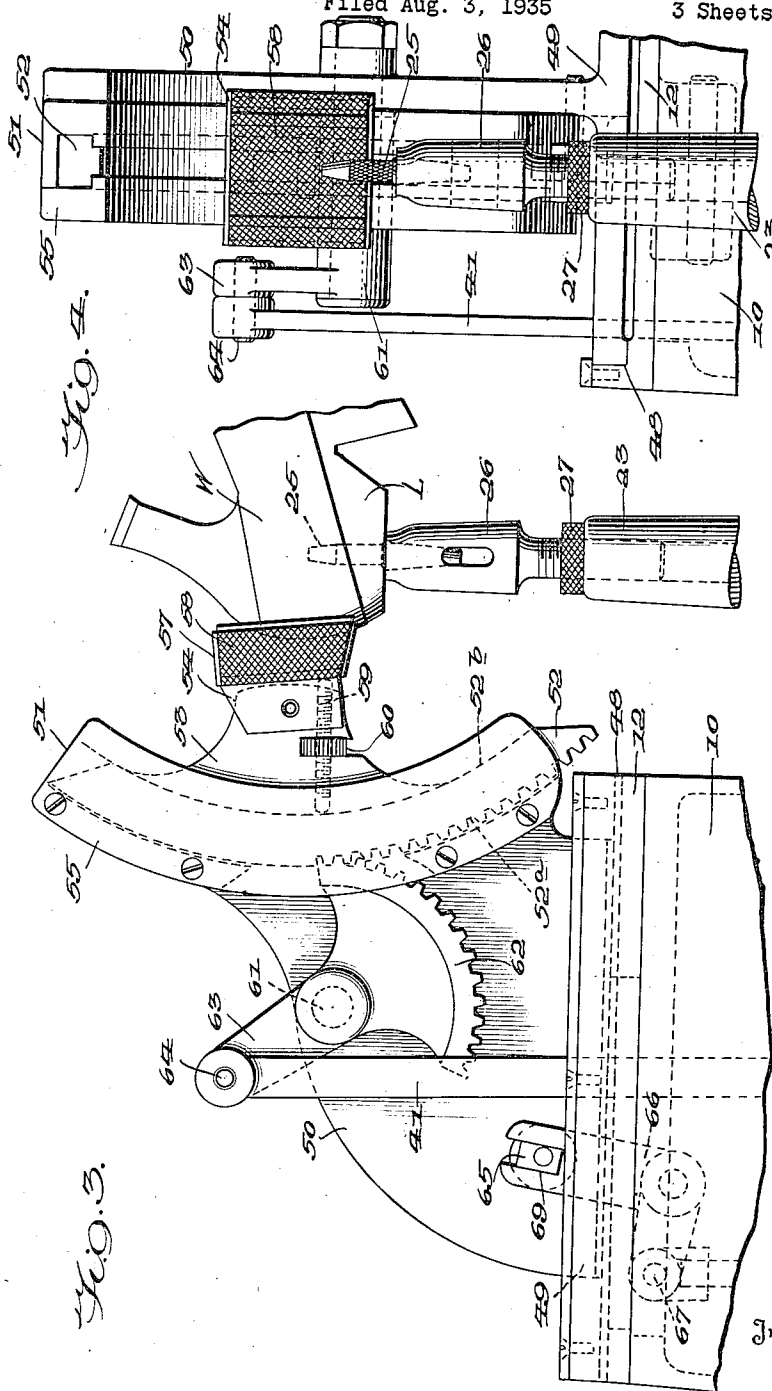
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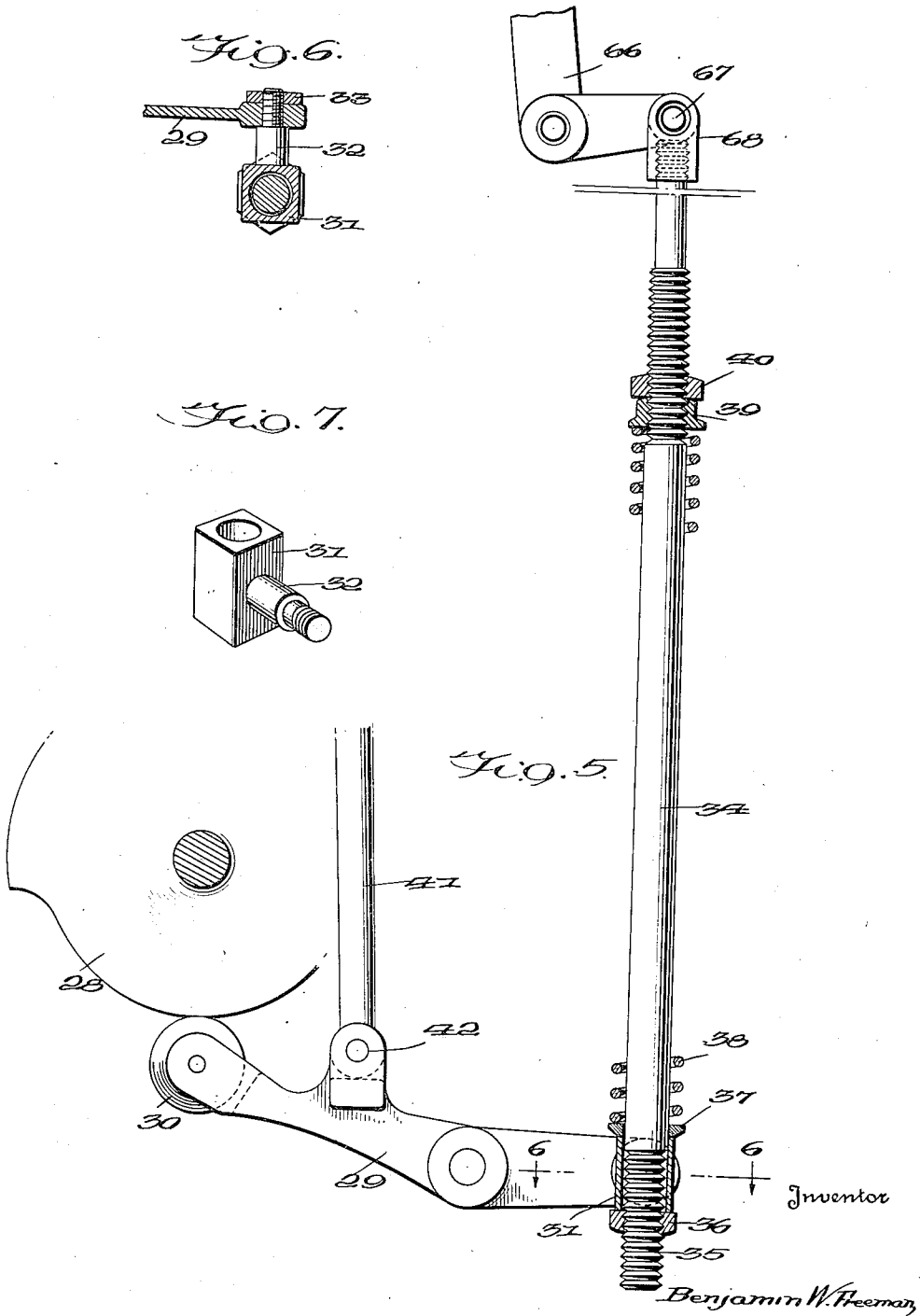
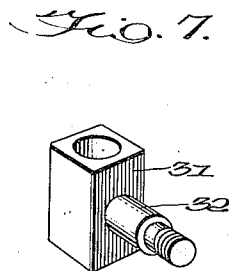
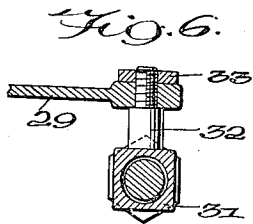
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UNITED STATES PATENT OFFICE

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MACHINE FOR REMOVING SHOES FROM
LASTS

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24 Claims. (Cl. 12—15.1)

This invention relates to shoe machinery, and specifically to an automatic, power actuated device for removing a boot or shoe from the last upon which it is assembled.

More particularly, the herein described invention is directed to improvements and modifications in power operated machines of the type disclosed in my copending Patent No. 2,019,300, dated October 29, 1935.

Prior to my developments as set forth in said application, and herein, the operation of removing shoes from lasts has been largely a manual operation, or at most a semi-automatic operation, calling for no little effort and skill on the part of the operator, and entailing expense of time and labor.

As in the case of my aforesaid developments, the present invention removes need for elements of skilled judgment, strength, and effort by the operator, and among the objects of this invention is the provision of a machine which is entirely automatic, and which makes no demands on an operator other than to supply and remove the lasts, the machine being started in operation as the last is supplied thereto.

Another object contemplates a machine by means of which a shoe or shoe element may be removed from its last much more rapidly and efficaciously, than heretofore possible.

Automatic power driven means are utilized in the preferred embodiment described herein, to bring the last upon which a shoe or shoe element is mounted, and a shoe stripping tool into an operative relationship, and to supply the effort necessary to strip or remove the shoe element from the last, thereby eliminating all manual operations involving a relation between a shoe removing tool and the mounted shoe.

Automatic control means are provided to enable the machine to perform its necessary functions through a single cycle of operations, and then stop. The only requirement of the operator is a release of the mechanism to initiate its cycle of operation, and means are provided for initiating operations by a relative movement between the last and the tool which strips the shoe from the last.

The operator will always have a grasp on the shoe so that it will not fall when removed from the last, and advantage is taken of this fact to set the machine in operation, a further object of the invention consisting in the utilization of means for starting the train of mechanism in operation by a slight movement of the last post upon which the last is supported, through the

medium of connections which trip a single cycle clutch, the machine being automatically de-clutched at the end of such cycle.

Still another object contemplates the provision of means for ensuring that the operating tool, when removing the shoe, follows the contour of the back of the last, thereby moving the shoe through the same arc that would be followed in a purely manual operation.

A further object contemplates a tool which, while gripping the heel portion of a shoe with sufficient tenacity to remove same, nevertheless will not burn, mar or scratch the most delicate leathers. In this connection, adjusting means are provided to accommodate different styles of shoe, and types of leather, if adjustment is found desirable.

Another feature resides in the use of a last post which is independent of all operating mechanism in the device, except for a connection to release a spring actuated clutch key in the main clutch.

It has been found that, in the use of semiautomatic machines as known in the prior art, there is a tendency toward slippage between the tool and the shoe, and that such slippage may result in marred work, and accordingly this invention aims to provide a structure in which the operating angle, applied pressures and relation of parts is such as to avoid these possibilities, and in which the angles, pressures and parts may be adjusted quickly, and readily.

Another object is the provision in the machine of a movable tool and tool carriage, which tool automatically "finds" the heel or counter portion of the shoe and then automatically partakes of movement while in engagement with the shoe, effective to raise the heel portion thereof relative to the last, and while the heel portion of the last is held in fixed position on the last post.

To the attainment of the above and other objects, which will appear as the description proceeds, reference may be made to the accompanying drawings, in which:—

Fig. 1 is a front elevation of a complete machine embodying the invention;

Fig. 2 is a side elevation thereof;

Fig. 3 is an enlarged side elevation of the shoe removing mechanism illustrating the operation thereof;

Fig. 4 is a front elevation thereof;

Fig. 5 is an enlarged detail of the driving connections for the shoe removing mechanisms;

Fig. 6 is a detail of an operating mechanism taken on the line 6—6 of Fig. 5; and

Fig. 7 is a perspective of said detail.

A preferred embodiment for carrying out the objects of this invention is illustrated in Figs. 1 and 2, and comprises generally, a frame, an upper assembly on the frame and a lower assembly within the base of the frame, and operatively connected to the upper assembly; the upper assembly being the mechanism for removing the shoe from the last, and including the shoe removing tool, while the lower assembly is the driving and actuating mechanism for the upper assembly, and includes a source of power.

Referring more specifically to the drawings, in which like reference numerals designate like parts, and particularly to Figs. 1 and 2, there will be seen a hollow frame 10 having an enlarged base portion 11 and a top portion 12. The enlarged base portion 11 encloses the driving unit indicated generally at 13, and a source of power such as the motor 14, mounted upon an adjustable base 15. A pin and slot connection 16 between the motor base 15 and the base portion 11 of the housing serves to maintain the motor in any desired adjusted position necessary to tension the driving belt 17 from the motor to a pulley 18 in the unit 13.

The unit 13 is substantially the same as that described in detail in the aforesaid copending application, and hence requires no detailed description here.

A single revolution clutch under control of a rocker arm 19 serves to clutch and declutch the pulley 18 with respect to the mechanism of the unit 13. The rocker arm 19 is connected with its outer end to an adjustable link 20 provided with a turn-buckle 21 for lengthening or shortening the link. Mounted on the front or operator's side of the frame 10 is a bearing plate 22 for pivotally mounting the last post support 23. A crank arm 24, rigid with the last support 23 is connected to the upper end of the link 20, whereupon rocking of the last post support 23 will actuate the rocker arm 19 to throw in the single revolution clutch. The last post 25 is removably carried by a block 26 which is adjustably threaded into the last support 23, a knurled screw 27 serving to adjust and lock the parts in proper relation to each other.

A threaded adjusting screw 56 is located at the base of the bracket plate 24 in abutting relation to the lower end of the last post support 23, below the pivotal mounting thereof, and serves as a means for varying the angle and path of oscillation of the last post, and support.

The driving unit 13 also includes a cam 28, cooperative with a pivoted rocker arm 29 having a cam roll 30 at one end, for engagement with the cam 28. The other end of the rocker 29 carries an oscillatable sleeve 31, formed with an integral stud 32, which extends through an opening in the end of the arm 29, and secured against removal by a nut 33. The stud 32 functions as a trunnion to support the sleeve 31 for oscillatory movement in the arm 29.

A connecting rod or link 34 from the upper assembly, extends through the sleeve 32, and is threaded at its lower end, at 35 to receive a nut 36, this connection serving to adjust the position of the link relative to the sleeve 31, and thereby vary the effective operating length of the link.

A washer 37, resting on the sleeve 31 forms an abutment against which a compression spring 38 may rest, the other end of the spring 38 abutting a threaded washer 39. The link 34 is threaded intermediate its length to receive the washer

39 and a lock nut 40, thereby providing a means of adjusting the compression of the spring 38 and varying the pressure exerted thereby against the washer 39.

A connecting rod or link 41 is pivoted at 42 to the rocker arm 29 between the fulcrum of the rocker arm 29 and the cam roll 30, i. e., on the opposite side of the fulcrum or pivot from the link 34.

The top portion 12 of the frame is formed with a pair of guides or track 48 upon which a carriage 49 in the upper assembly is slidably mounted. This carriage is the direct support for the tool and mechanism for stripping a shoe element from its last, and carries an upstanding web 50 to which is secured an arcuate track or guide member 51. Slidably mounted within the track or guide 51 is a gear segment 52 having a tooth edge 52a and a bearing edge 52b. A web or flange 53 extends from the bearing edge 52b, to pivotally support the body of a shoe removing tool 54. A removable plate 55, secured over and completing the track 51, furnishes a means of ready access to the segment 52, to permit adjustment and re-positioning thereof with respect to its actuating means.

A holder or head 57, on the body 54, secures a block of rubber or equivalent resilient, friction material 58 in the tool, to function as the shoe engagement medium. This block of rubber may have its operating face suitably contoured to fit the heel portion of the shoe. The web or flange 53 carries a threaded stud 59, one end of which abuts the bearing edge 52b of the segment 52, and the other end of which abuts the head 54 of the tool. The web is slotted to receive a knurled nut 60 threaded on the stud 59, the purposes of the stud and nut being to adjust the operating angle of the pivoted tool 54, as can be seen from Fig. 3.

A shaft 61 is rotatably mounted in the supporting web or flange 50, and carries a gear segment 62 arranged to mesh with the gear segment 52, as the actuating medium therefor. An arm 63 extending from the shaft 61 is pivoted at 64 to the link 41 which, being connected at 42 to the rocker arm 29, and the elements 62-63 being rigid with shaft 61, movement of the rocker arm 29 will actuate the gear segment 52.

The web 50 also serves to mount a pivoted block 65. A bell crank 66 pivoted in the frame 10 has one arm connected at 67 to the end of a link 34 by means of a threaded sleeve 68 and its other end slotted at 69 for sliding engagement with the pivoted block 65.

The entire mechanism of the head may be enclosed in a canopy 73 to avoid any question of danger to an operator.

A table or rack 74 may be secured to the side of the frame 10.

Having thus described the invention, the operation thereof will be readily apparent.

A last L upon which is mounted the shoe or shoe element W is placed on the last post 25. A slight movement thereof will move the last post support 23 to actuate the link 20 which throws in the single revolution clutch to connect the pulley 18 to the driving mechanism. Thereafter the cam 28 will depress the roll 30 at one end of the rocker 29, the other end of which will raise the sleeve 31, tending to compress the spring 38. The spring, acting through washer 39 will raise the link 34 to slide the carriage 49 toward the operator until the surface 58 of the tool 54 engages the heel portion of the shoe, in a

sense "finding" the work, without help from the operator.

During the forward motion of the carriage, the link 41 will be drawn downwardly by the rocker 29 and connection 42, and through the segments 62 and 52 will assist in positioning the tool in its adjusted operating position, adjacent the edge of the heel portion of the shoe. As the movement continues, the segment 52 and tool 54 will travel through an arcuate path conforming generally to the line of curvature of the heel of the last and by frictional engagement between the resilient material 58 and the shoe element W will strip same from the last L.

Inasmuch as the link 34 is actuated through a flexible connection to the rocker 29, and this connection is adjusted to maintain the spring 38 under some compression, it will be obvious that the carriage 49 will be positioned to hold the tool against the shoe element continuously, regardless of other movements of the tool.

Again it should be observed that all movement of the tool, whether under influence of the carriage or under influence of the gear segments is in the same general direction, that is the tool moves to the shoe, and except for its upward movement which is not directly vertical, continues in that general direction through the arc which follows the general contour of the heel of the last.

It is important that the last be retained against slippage on the last post, as that would interfere with the removal of the shoe, and in the machine as described herein, the tool in effect creates a pressure between the last and last post, because the movement of the tool follows the back line of the last. The last post may be loosened as indicated to assist in retention of the last thereon.

As pointed out above, the angle of engagement between the tool and the shoe can be adjusted through the medium of the stud 59, the height of the last post can be adjusted by the thumb nut 27, the angle, and path of oscillation of the last post can be varied through the adjusting screw 56, to bring the last post closer to or farther from the tool, and at the same time the turn buckle 21 can be adjusted to regulate the proper length of the link 20.

If it is desired to apply more or less tension to the shoe, the washer and lock nut 39—40 can be adjusted, to control the pressures exerted by spring 38; the length of travel of the carriage 49 can be varied by adjusting the connectoins 35—36 at the base of the link 34, to change the effective length of the link; and the stroke or travel of the tool can be readily altered by removing the plate 55 and changing the relative position of teeth on the segment 52 with respect to the teeth on the segment 62.

Although the preferred embodiment of tool illustrated herein includes a concave block of rubber, contoured to frictionally grip the heel portion of the shoe element, it is to be understood that such illustration is not intended as limiting, as the device is susceptible to modification and use of different types of tools. Examples of different tool heads which might be used will be found in the aforesaid copending application.

The structure herein described is primarily designed to remove completed shoes from their lasts, but it is also effective in the treatment of incomplete shoes such as a McKay type shoe prior to the second lasting, or an element of a shoe as such, an example, being a shoe without its out-

sole, and accordingly the term "shoe element" as employed throughout the specification and claims is intended to cover all contingencies.

In fact the various details herein described are intended as illustrative and not as limiting, other than as defined in the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:—

1. A machine for removing shoes from lasts comprising a last support, a shoe removing tool, means to move said tool into and out of proper operating position relative to said support, additional means for thereafter actuating said tool through an operating stroke, and means to adjust the operating angle of the tool relative to the last support.

2. A machine for removing shoes from lasts, comprising a last support, a shoe removing tool, means to move said tool into and out of proper operating position relative to said support, additional means for thereafter actuating said tool through an operating stroke, and means to adjust the angle of the last support relative to said tool.

3. A machine for removing shoes from lasts, comprising a last support, a shoe removing tool, means to move said tool into and out of proper operating position relative to said support, additional means for thereafter actuating said tool through an operating stroke, means to adjust the operating angle of the tool relative to the last support, and means to adjust the angle of the last support relative to said tool.

4. A machine for removing shoes from lasts, comprising a last support, a shoe removing tool, means to move said tool into and out of proper operating position relative to said support, additional means for thereafter actuating said tool through an operating stroke, and means to vary the clearance between the last support and said tool.

5. A machine for removing shoes from lasts, comprising a last support, a shoe removing tool, means to move said tool into and out of proper operating position relative to said support, additional means for thereafter actuating said tool through an operating stroke, means to adjust the operating angle of the tool relative to the last support, and means to vary the clearance between the last support and said tool.

6. A machine for removing shoes from lasts, comprising a last support, a shoe removing tool, means to move said tool into and out of proper operating position relative to said support, additional means for thereafter actuating said tool through an operating stroke, means to adjust the operating angle of the tool relative to the last support, means to adjust the angle of the last support relative to said tool and to vary the clearance between the last support and said tool.

7. A machine for removing shoes from lasts, comprising a shoe removing tool, a movable last support independent of said tool, means to move said tool into and out of proper operating position relative to said support, and means controlled by movement of said last support to initiate operation of said tool moving means.

8. A machine for removing shoes from lasts, comprising a shoe removing tool, a movable last support independent of said tool, means to move said tool into and out of proper operating position relative to said support, additional means for thereafter actuating said tool through an operating stroke, and means controlled by movement

of said last support to initiate operation of said tool moving means.

9. A machine for removing shoes from lasts, comprising a shoe removing tool, a support independent of said tool, for a last with a shoe element thereon, means for moving said tool toward the last and shoe to operatively position the tool, and additional means for thereafter actuating said tool in the general direction of said first movement to remove the shoe from the last.

10. A machine for removing shoes from lasts, comprising a shoe removing tool, a pivotally mounted support independent of said tool for a last with a shoe element thereon, means for moving said tool toward the last and shoe to operatively position the tool, additional means for thereafter actuating said tool in the general direction of said first movement to remove the shoe from the last, and means controlled by movement of said last support to initiate operation of said tool moving means.

11. A machine for removing shoes from lasts comprising a shoe removing tool, a movable last support independent of said tool, means to move said tool into and out of proper operating position relative to said support, means controlled by movement of said last support to initiate operation of said tool moving means, means to adjust the operating position of said last support, and means to adjust said means controlled by the last support.

12. A machine for removing shoes from lasts comprising a shoe removing tool, a movable last support independent of said tool, means to move said tool into and out of proper operating position relative to said support, and means controlled by movement of said last support to initiate operation of said tool moving means comprising a link connecting said last support to said tool moving means, and means to adjust the length of said link.

13. A machine for removing shoes from lasts comprising a shoe removing tool, a movable last support independent of said tool, means to move said tool into and out of proper operating position relative to said support, means to adjust the operating position of said last support, and means controlled by movement of said last support to initiate operation of said tool moving means comprising a link connecting said last support to said tool moving means, and means to adjust the length of said link.

14. A machine for removing shoes from lasts comprising a last support, a shoe removing tool, resilient means effective to exert a pressure against and move said tool into and out of proper operating position relative to said support, and means to vary the degree of pressure exerted against said tool.

15. A machine for removing shoes from lasts comprising a last support, a shoe removing tool, resilient means effective to exert a pressure against, and move said tool into and out of proper operating position relative to said support, and means to vary the length of movement of said tool.

16. A machine for removing shoes from lasts, comprising a last support, a shoe removing tool, resilient means effective to exert pressure against and move said tool into and out of proper operating position relative to said support, means to vary the degree of pressure exerted against said tool, and means to vary the length of movement of said tool.

17. A machine for removing shoes from lasts

comprising a frame, a shoe removing assembly, including a shoe removing tool, mounted at the upper portion of said frame, a last support independent of said assembly operatively located adjacent said assembly, a driving and actuating unit located within said frame and having operating connections to said assembly, and a connection from said last support to said unit, effective to initiate actuation thereof.

18. A machine for removing shoes from lasts, comprising a frame, a shoe removing assembly, including a shoe removing tool, mounted at the upper portion of said frame, a last support independent of said assembly operatively located adjacent said assembly, a driving and actuating unit located within said frame and having operating connections to said assembly, and a connection from said last support to said unit, effective to initiate actuation thereof, and means to adjust all of said connections.

19. In a machine for removing shoes from lasts, a shoe removing assembly comprising a slidable carriage, a shoe removing tool slidably mounted for arcuate movement on said carriage, means to adjust the operating angle of said tool relative to said carriage, means to apply pressure to said carriage to move same, and means to vary the pressure applied thereto.

20. A machine for removing shoes from lasts, comprising a last support, a shoe removing tool, resilient means to move said tool into and out of proper operating position relative to said support and to press said tool yieldingly toward said support when in proper operating position, and means to adjust the tool whereby to vary its length of movement.

21. A machine for removing shoes from lasts, comprising a last support, a shoe removing tool, resilient means to move said tool into and out of proper operating position relative to said support and to press said tool yieldingly toward said support when in proper operating position, means to vary the degree of pressure applied by said resilient means to said tool and support, and means to adjust the tool whereby to vary its length of movement.

22. A machine for removing shoes from lasts, comprising a last support, a shoe removing tool, means to move said tool into and out of proper operating position relative to said support, means for actuating said tool through an operating stroke, and means to adjust the position of the tool whereby to change the operating angle thereof with respect to the last support.

23. A machine for removing shoes from lasts, comprising a last support, a shoe removing tool, means to move said tool into and out of proper operating position relative to said support, means for actuating said tool through an operating stroke, and means to adjust the position of the last support, whereby to vary the operating angle thereof relative to said tool.

24. A machine for removing shoes from lasts, comprising a last support, a shoe removing tool, means to move said tool into and out of proper operating position relative to said support, means for actuating said tool through an operating stroke, means to adjust the position of the tool whereby to change the operating angle thereof with respect to the last support, and means to adjust the position of the last support whereby to vary the operating angle thereof relative to said tool.

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