Nov. 23, 1954 A. E. DIESSEL 2,694,819

APPARATUS FOR FORMING SHOE QUARTERS

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Fig. 1.

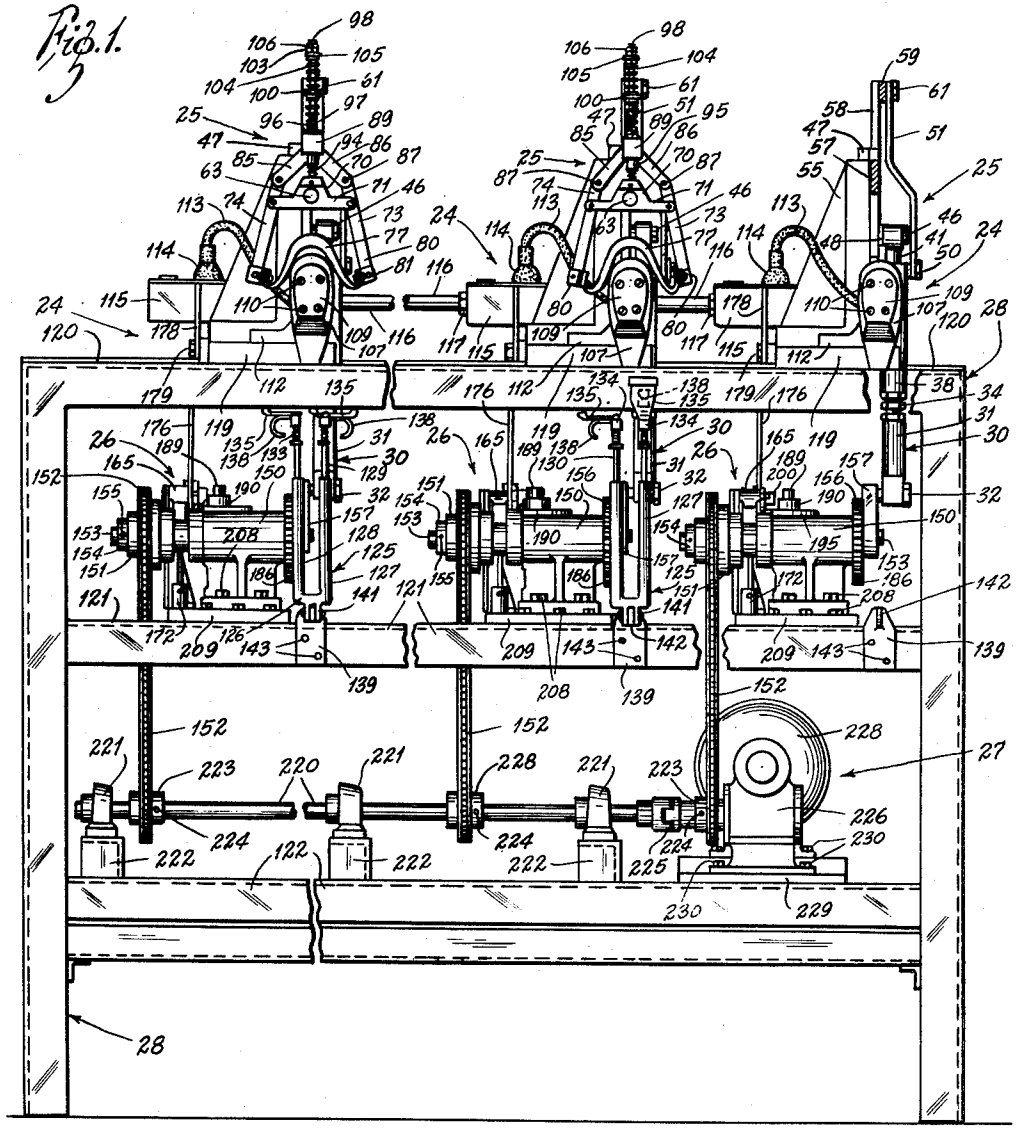


Fig. 9.

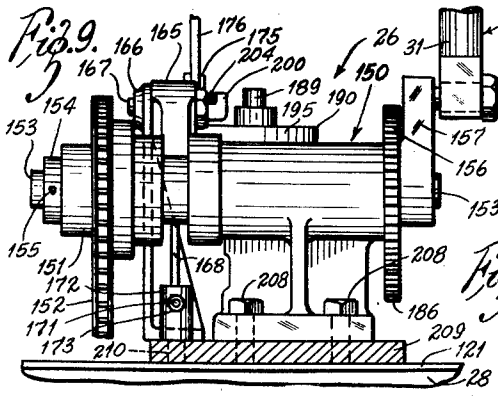


Fig. 14.

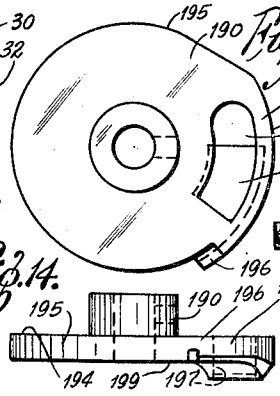
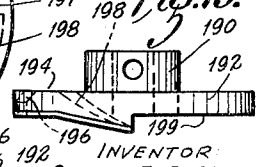


Fig. 13.

Fig. 15.



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Fig. 2.

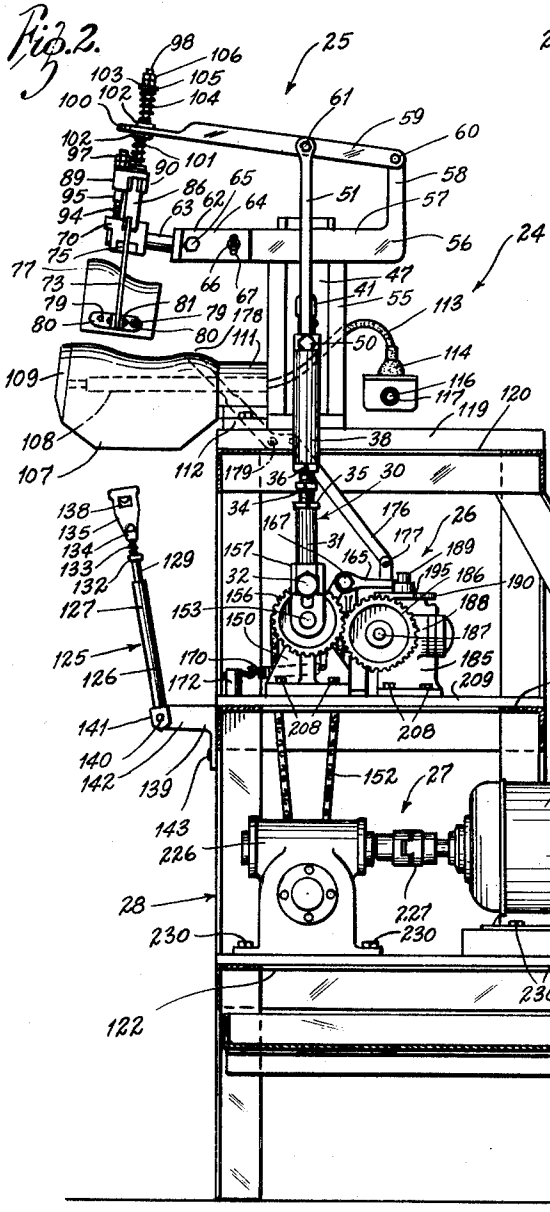


Fig. 4.

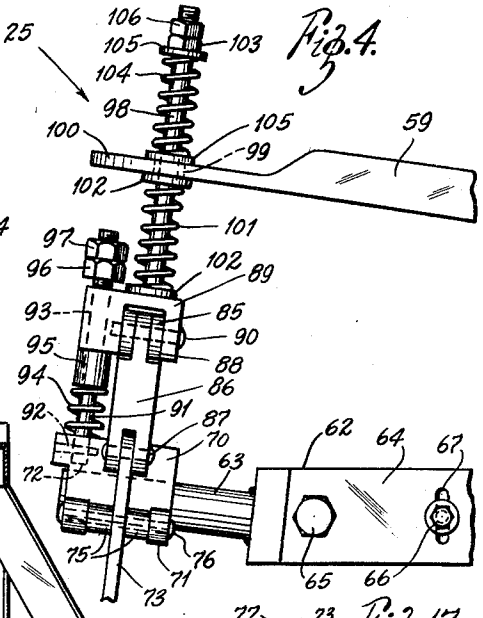


Fig. 17.

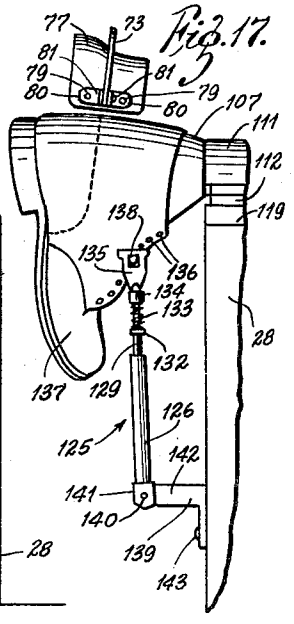


Fig. 16.

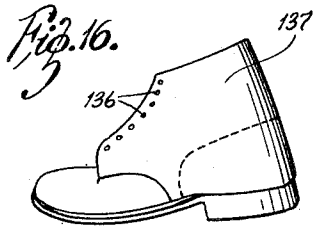
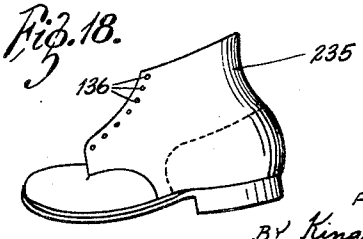


Fig. 18.



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Fig. 3.

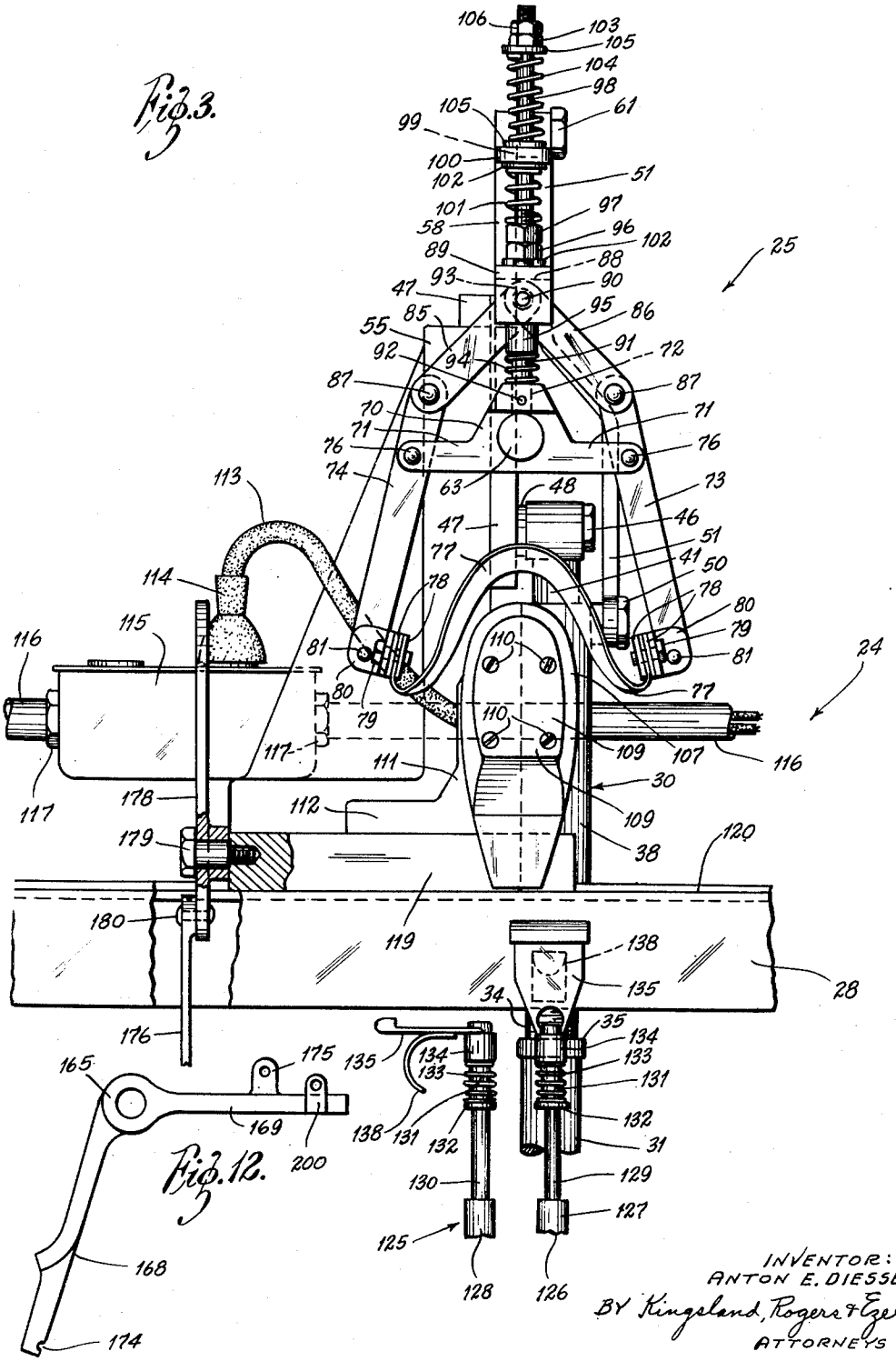


Fig. 12.

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Fig. 5.

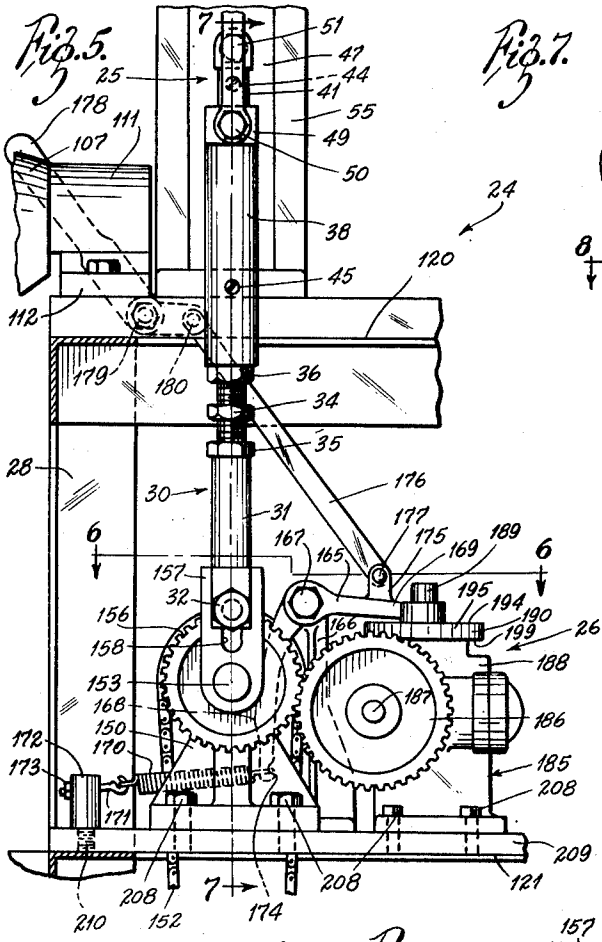


Fig. 7.

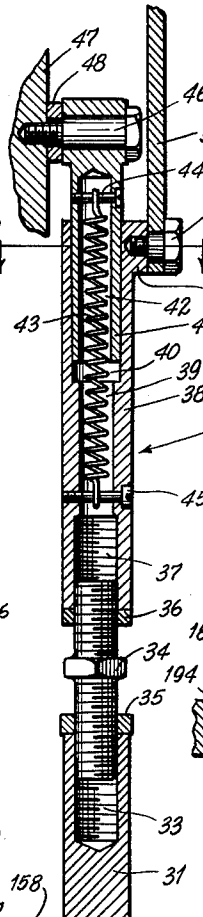


Fig. 8.

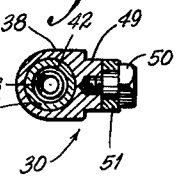


Fig. 11.

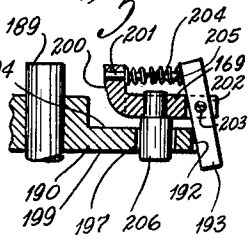


Fig. 6.

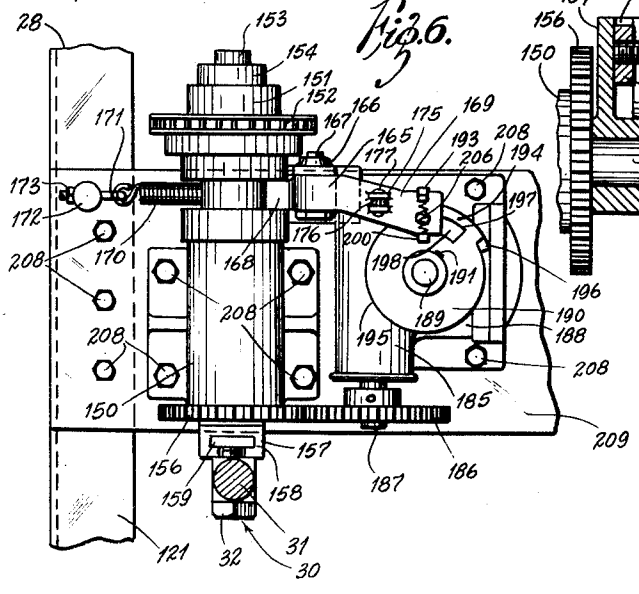
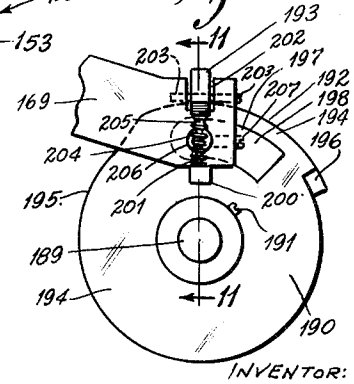


Fig. 10.



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United States Patent Office 2,694,819 Patented Nov. 23, 1954

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APPARATUS FOR FORMING SHOE QUARTERS

Anton E. Diessel, St. Louis County, Mo., assignor to International Shoe Company, St. Louis, Mo., a corporation of Missouri

Application April 17, 1950, Serial No. 156,365

12 Claims. (Cl. 12—51)

The present invention relates to shoe manufacture and machines used therein. More particularly, it relates to a method of forming one-piece or whole rear quarters of assembled shoes by a novel machine capable of employing the principles of said method to form one-piece or whole rear quarters of assembled shoes.

Briefly, the invention teaches a novel method of forming or shaping a one-piece rear quarter as the final manufacturing operation after the shoe has been completely assembled, said forming or shaping operation including essentially a wrapping and patting of the quarter, substantially without rubbing or frictional action, over a thermostatically controlled heated form of appropriate shape. The invention further teaches the construction of a novel machine adapted to form a one-piece rear quarter by the described method and comprising an electrically heated supporting form of appropriate shape, means for holding a shoe in proper position thereon, a molded flexible saddle to make repeated and rapid contact with the outside of the rear quarter in a combined wrapping and patting action, an adjustable linkage arrangement to impart the desired motion to the saddle, and a suitable power drive, including means for starting, timing, and stopping the operation.

The rear quarter of a shoe is that part in the back of the shoe that passes around the heel and, in the case of high shoes, around the ankle. Shoes generally are made with the rear quarter in two parts, the parts being cut in such a way as to form an apropriate shape around the heel and ankle and then stitched together at the back. The seam thus formed is covered by a stay attached thereover, the stay serving both to reinforce the joint and to improve the appearance.

A less common type of shoe is known as the one-piece or whole quarter shoe, which, as the name implies, has the rear quarter made from a single piece of leather. One method of constructing such a quarter has been to form the part by crimping in a machine with special jaws and blade, after which the parts are trimmed or cut over and finally assembled with the rest of the shoe.

Another object of the invention is to provide an apparatus capable of thus forming the rear quarter of a shoe.

Another object is to provide an apparatus capable of thus forming the rear quarter of a shoe without wrinkling, bunching, or creasing the leather.

Another object is to provide an apparatus capable of thus forming the rear quarter of a shoe without making deleterious rubbing or frictional contact with the leather.

Another object is to provide suitable operating controls for such an apparatus including automatic means for stopping the operation upon the elapse of a predetermined interval of time after starting.

The above and numerous other objects and advantages of the present invention will become obvious from the detailed description of construction, application, and operation that follow.

In the drawings:

Fig. 1 is a front elevational view, partially in section, of a plurality of one-piece rear quarter forming machines mounted on a single frame, each machine embodying the teachings of the present invention, but being driven from a single source of mechanical power;

Fig. 2 is a side elevation of the set-up of Fig. 1 with the mounting frame shown in section;

Fig. 3 is an enlarged fragmentary front elevation showing the principal forming elements of the machine;

Fig. 4 is an enlarged fragmentary side elevation showing linkage and spring details;

Fig. 5 is an enlarged fragmentary side elevation showing details of controlling, timing, and driving mechanisms;

Fig. 6 is a horizontal cross-sectional view taken generally along the line 6—6 of Fig. 5;

Fig. 7 is a further enlarged vertical section of a connecting rod construction and arrangement taken on substantially the line 7—7 of Fig. 5;

Fig. 8 is a horizontal section taken along the line 8—8 of Fig. 7;

Fig. 9 is a fragmentary front elevation, partially in section, showing details of a driving mechanism;

Fig. 10 is a view in plan of a timer table forming part of the timing device;

Fig. 11 is a vertical section taken generally along the line 11—11 of Fig. 10;

Fig. 12 is a side elevation of a clutch finger;

Fig. 13 is a plan view of a timer table;

Fig. 14 is a side elevation of the timer table of Fig. 13;

Fig. 15 is a side elevation of the timer table viewed normal to the view of Fig. 14;

Fig. 16 shows an assembled shoe having a one-piece rear quarter prior to the quarter being formed;

Fig. 17 is a fragmentary view showing the shoe of Fig. 16 mounted for forming of the one-piece quarter in accordance with the teachings of the present invention; and

Fig. 18 shows the shoe of Figs. 16 and 17 after the forming operation.

Referring to the drawings more particularly by reference numerals, 24 indicates generally a rear quarter forming machine constructed in accordance with the teachings of the present invention which includes a whole quarter forming device 25, a control and drive mechanism, and power mechanism 27. A plurality of machines 24 are illustrated mounted on a single rectangular supporting frame 28, all being driven by one power mechanism 27.

The forming device 25 includes a telescoping connecting rod assembly shown generally as 30 in Fig. 7. This connecting rod assembly 30 includes a lower connecting rod link 31 pivotally attached by means of a bolt 32 to an element of the drive mechanism 26 and having a right-hand threaded longitudinal bore 33 for engagement of a connecting rod adjusting screw 34 secured against inadvertent rotation by a right-hand jamb nut 35 and a left-hand jamb nut 36. The upper end of the screw 34 has left-hand threads and engages a left-hand threaded longitudinal bore 37 in a connecting rod sleeve 38. The sleeve 38 has a spring bore 39 and a counterbore 40, the latter slidably receiving an upper connecting rod link 41 which also has a spring bore 42. A tension spring 43 attached to the link 41 by means of a bolt 44 and to the sleeve 38 by means of a bolt 45 tends to maintain a minimum adjusted length of the connecting rod assembly 30, but does permit elongation under sufficient tensile stress. The connecting rod sleeve 38 has on one side of its upper end a tapped boss 49 to which is pivotally attached by means of a bolt 50 the lower end of an auxiliary connecting rod 51. The upper end of the link 41 is pivotally attached by means of a bolt 46 to a crosshead 47, being spaced therefrom by a washer 48.

The crosshead 47 is wedge-shaped in section, being adapted to slide in reciprocating motion in a similarly shaped slot in a standard 55, as shown in Figs. 2, 3 and 5. A bracket 56 having a main horizontal arm 57 and an auxiliary vertical arm 58 is mounted and secured, as by welding, to the crosshead 47, as shown in Figs. 1 and 2, and is adapted to move in vertical reciprocating motion with the crosshead. An auxiliary cross arm 59 is pivotally attached at one end by means of a bolt 60 to the upper end of the auxiliary vertical arm 58, and is pivotally connected by means of a bolt 61 at a point intermediate the ends to the upper end of the auxiliary connecting rod 51. An angularly adjustable extension arm 62 includes a stub shaft 63 secured, as by welding, to an attachment member 64 which is pivotally attached by means of a bolt 65 to the free end of the horizontal arm 57 of the bracket 56. Angular adjustment of the

extension arm 62 relative to the horizontal arm 57 is accomplished by the clamping action of a bolt and washer assembly 66 acting through a slot 67 in the member 64 as shown in Fig. 4.

A yoke 70 having clevis arms 71 and a drilled socket 72 is slidably supported on the stub shaft 63 of the extension arm 62 and carries in pivotal engagement at the extremities of said clevis arms 71 two saddle links 73 and 74, which are retained, at points intermediate between their respective ends, laterally within the clevises by spacing sleeves 75 and pivotally by rivet pins 76. A molded flexible saddle 77 formed from leather, plastic, canvas and felt, or the like is disposed between the saddle links 73 and 74 and is secured at its side ends by means of plates 78 and bolts 79 to angle brackets 80 attached to the lower ends of the saddle links 73 and 74 by means of rivet pins 81.

A toggle link 85 having two clevis ends and a toggle link 86 having one clevis end and one tongue end pivotally engage at a respective clevis end of each of the upper ends of the saddle links 73 and 74 by means of rivet pins 87, the respective remaining ends of the said toggle links 85 and 86 being brought together in tongue and clevis engagement and pivotally retained in a slot 88 in a shackle 89 by means of drive pin 90 as shown in Fig. 4.

A shackle guide rod 91 secured at its lower end in the socket 72 of the yoke 71 by a drive pin 92 extends upwardly and slidably through a bore 93 of the shackle 89 and has disposed thereon and interposed between said yoke 71 and said shackle 89 a compression spring 94 and a spacing sleeve 95. An adjusting nut 96 and a jamb nut 97 disposed near the upper end of the shackle guide rod 91 provide means for adjusting the maximum vertical separation of the shackle 89 from the yoke 71.

A shackle rod 98 secured, as by welding, to the upper face of the shackle 89 extends upwardly therefrom and slidably through a slot 99 in the swinging free end 100 of the auxiliary crossarm 59 and has disposed thereon and interposed between the shackle 89 and the auxiliary crossarm end 100 a cushion spring 101 and washers 102 and has also disposed thereon and interposed between the auxiliary crossarm end 100 and an adjusting nut 103, a cushion spring 104 and washers 105. The adjusting nut 103 and a jamb nut 106 disposed near the upper end of the shackle rod 98 provide means for adjusting the cushioning action of the springs 101 and 104.

A shoe supporting form 107 of appropriate shape, preferably of cast iron with a nickel plated exterior finish, adapted to be heated by a thermostatically controlled electrical resistance element 108 and having an appropriately shaped pad 109 of fiber or the like attached to its outer end as by screws 110 is disposed in position below the saddle 77, being supported at its inner end by suitable attachment to a mounting base 111 having a mounting pad 112. An electric cord 113 connected to the heating element 108 terminates in an electric plug 114 which is inserted in a conventional electric outlet box 115. A series of such outlet boxes may be interconnected as by conduit 116 and nuts 117 for serving a multiple set-up as shown in Fig. 1.

Both the standard 55 which supports the moving parts of the forming device 25 and the mounting base 111 which supports the form 107 are mounted, as by bolt and nut assemblies, to a base plate 119, attached as by bolting or welding to the top level 120 of the supporting frame 28, which is formed of angle members and also includes an intermediate level 121 and a bottom level 122.

A shoe holding assembly indicated generally by 125 is disposed below and cooperates with the form 107, and includes a yoke 126 having twin parallel extensions 127 and 128 from the ends of which extend retractile plungers 129 and 130, said plungers 129 and 130 being retained and spring loaded within the extensions 127 and 128 so as to exert a tensile force when partially withdrawn from the extensions (Figs. 1, 3 and 18). At the upper end of each plunger 129 and 130 is attached, as by threaded engagement, a spring retainer 131 having a flange 132 at its lower end and having a lateral notch forming a hook at its upper end. A compression spring 133 and a sleeve 134 are slidably mounted on the retainer 131 being retained thereon by a clip 135 adapted to hook onto lacing hooks 136 of a shoe 137 as shown in Fig. 17. The clip 135 pivotally engages by means of a stirrup the aforementioned notch at the upper end of the retainer 131 and has a handle 138 secured thereto as by riveting or welding.

The holding assembly 125 is hinged to a bracket 139 by means of a rivet pin 140 through a clevis 141 of the yoke 126 and a tongue 142 of the bracket 139. The bracket 139, disposed in appropriate position below the form 107, is mounted on the frame 28 by means of bolts 143.

The forming device 25 is, as aforementioned, controlled and driven from a drive mechanism 26. This drive mechanism 26 includes a standard clutch assembly 150 adapted to control the operation of the forming device 25. The clutch assembly 150 has a sprocket 151 driven by a sprocket chain 152, said sprocket 151 being rotatable on a clutch shaft 153 and retained thereon by a collar 154 secured to the shaft by a set screw 155. Engagement of the clutch, however, enables the sprocket 151 to rotate the shaft 153 which rotative motion is extended also to a gear 156 and to a crank 157 both of which are secured, as by keying, to the shaft 153. A T slot 158 in the crank 157 permits adjustable engagement of said crank with the lower connecting rod link 31 by means of the bolt 32 and a plate 159 (Fig. 7).

Engagement and disengagement of the clutch assembly 150 is controlled by a clutch finger 165 pivotally mounted on a clutch finger bracket 166 by means of a bolt 167, said clutch finger being formed generally as a bell-crank and having a clutch arm 168 and a control arm 169 (Figs. 5, 6, 9 and 13). A tension spring 170 anchored at one end by a hook 171 adjustably retained in an anchor post 172 by a nut 173, is attached at its active end to a notch 174 in the clutch arm 168 and tends continuously to cause the clutch to disengage. The control arm 169 has appropriately secured thereto a clevis 175 which pivotally engages the lower end of a clutch link 176 by means of a rivet pin 177. A bell crank clutch lever 178 pivotally attached to the base plate 119 by means of a bolt 179 is pivotally connected to the upper end of the clutch link 176 by means of a rivet pin 180 and is adapted by virtue of its bell-crank form to translate a forward and downward pull thereon into movement of the clutch arm 168 so as to cause the clutch to engage (Fig. 5).

The control and drive mechanism 26 also includes a timing device 185 driven by engagement of the gear 156 with a gear 186, the latter being appropriately secured, as by keying, to an input shaft 187 of a conventional speed reducer 188 (Figs. 5 and 6). On an output shaft 189 of the speed reducer 188 is mounted a timer table 190 secured to said shaft by a setscrew 191 and having a cam sector 192 adapted to move one end of a pivoted cam finger 193 in a direction away from the shaft 189 and subsequently to support the end of said cam finger 193 on an upper plane 194 of said timer table. The cam sector 192 is faired at one end into a main circular sector 195 of the table 190 and terminates at the other end in a ramp 196 which is downwardly sloping in tangential direction from the plane 194. Additionally, the timer table 190 contains a slot 197 disposed as an arc concentric with the center of rotation of said timer table 190. The slot 197 at one of its ends extends clear through the timer table 190 and at its other end terminates in a ramp 198, said ramp beginning at a radial line intermediate between the ends of said slot and below a lower plane 199 of the table 190 and sloping upwardly along the centerline of the slot to the upper plane 194, as shown in Figs. 14–16.

On one side of the clutch finger control arm 169 and extending upwardly therefrom is a lug 200 into which is secured, as by pressing, a spring pin 201. On the opposite side of the clutch finger control arm 169 is a slot 202 which pivotally engages the cam finger 193 at a point intermediate the ends thereof by means of a screw 203. A compression spring 204 disposed to act between the lug 200 and the upper end of the cam finger 193 is retained by the spring pin 201 and a spring pin 205 secured, as by pressing, to the upper end of the cam finger 193. By virtue of the disposition of the cam finger 193 with respect to the timer table 190, the spring 204 causes the lower end of the cam finger 193 to be continuously urged toward the center of rotation of the timer table 190, the extent of such motion being limited however by eventual abutment of the cam finger 193 against the back end of the slot 202. A clutch finger

dowel **206** is also mounted to the clutch finger control arm **169** and secured by a set screw **207**. The dowel **206** depends from the lower face of the arm **169** so as to be engageable with the slot **197** as shown in Fig. 11.

The clutch assembly **150**, the time device **185**, and the clutch finger bracket **166** are all mounted, as by bolt and nut assemblies **208**, on a base plate **209**, the latter being supported on the intermediate level **121** of the frame **28**. The anchor post **172** is also secured to the base plate **209**, as by threaded attachment **210**.

Mechanical power for operating the drive mechanism **26** of one or more machines **24** is supplied by the power mechanism **27** which includes a lineshaft **220** rotatably supported by bearings **221** on bearing brackets **222**, the latter being secured, as by welding to the frame **28**. A sprocket **223** for each mechanism **26**, mounted on the shaft **220** and secured thereto by set screws **224**, drives the sprocket chains **152**. The shaft **220** is driven through a coupling **225** by the output shaft of a speed reducer **226**. The speed reducer **226** is in turn coupled by means of a coupling **227** to an electric motor **228**. The speed reducer **226** and the motor **228** are both mounted on a base plate **229** by means of bolts **230**, the base plate **229** being supported on the bottom level **122** of the frame **28**.

Operation

In operating the whole quarter forming machine **24**, an assembled shoe **137**, as shown in Fig. 17, is slipped over the thermostatically controlled electrically heated supporting form **107** and secured thereon by attachment of the clips **138** of the holding assembly **125** to the lacing hooks **136** of said shoe, as shown in Fig. 18. A forward and downward pull on the clutch lever **178** causes the clutch assembly **150** to engage and the crank **157** to turn. As the crank **157** turns from the position shown in Fig. 2, the connecting rod **30** causes the crosshead **47** and all parts supported thereby to descend without relative movement between any of said parts. When the center of the descending saddle **77** makes contact with the back of the shoe **137**, however, the obvious consequent restraint to continued descent of the crosshead **47** causes the connecting rod to extend against the tension of the spring **43**.

As the crank **157** continues to turn toward a position 180° beyond that shown in Fig. 2, the auxiliary connecting rod **51**, having its lower pivot point in fixed relation to the crank end of the connecting rod **30**, causes the auxiliary cross arm **59** to pivot downwardly from its original position. The downward movement of the crossarm end **100** acts through the cushion spring **101** to exert a downward force against the shackle **89**, causing it to descend against the action of the spring **94** toward the yoke **70**, the latter being restrained from further descent as above indicated. As the shackle **89** approaches the yoke **70**, the toggle links **85** and **86** act upon the upper ends of the saddle links **73** and **74** so as to cause the lower ends thereof to move toward each other and consequently to wrap the sides of the saddle **77** around the rear quarter of the shoe **137**. As the crank **157** turns beyond the above mentioned 180° position, the above actions are reversed, the various springs causing all members to return to their original positions. The whole sequence of action is continuously and rapidly repeated until the resultant repeated patting and wrapping action of the saddle **77** on the heated rear quarter produces a finished shoe **235** as shown in Fig. 19.

It will be noted that the action of the saddle **77** is such as to accomplish without deleterious rubbing or frictional contact a permanent deformation wherein the leather of a rear shoe quarter is caused to shrink in certain desired areas in a manner to eliminate wrinkling, bunching, or creasing of the leather.

After the forming device **25** has made a predetermined number of strokes, the action is automatically stopped with the saddle **77** in its original raised position by the disengagement of the clutch assembly **150**. This automatic control is effected by the timing device **185** which, driven through the gears **156** and **186**, continues to run as long as the clutch assembly **150** is in its engaged position. The speed reducer **188**, in combination with the gears **156** and **186**, produces one revolution of the timer table **190** for the predetermined number of strokes required to complete the forming operation. It will be noted that the number of strokes of the forming device

25 per revolution of the timer table **190** is susceptible to adjustment by rearrangement of, or substitution for, the gears **156** and **186**.

As the timer table **190** rotates (counterclockwise as shown in Fig. 10), the clutch finger dowel **206** rests upon the upper plane **194**, thereby maintaining the clutch finger **165** in a position to permit continued engagement of the clutch assembly **150**. At the same time, the lower end of the cam finger **193**, being at the aforementioned limit of its motion as urged by the spring **204** extends downward alongside, but not touching, the periphery of the main circular sector **195**. Continued rotation of the timer table **190** brings the periphery of the cam sector **192** into contact with the cam finger **193** causing the lower end of said cam finger **193** to move outward in opposition to the spring **204**. When the timer table **190** has rotated to a position where the open end of the slot **197** is directly under and in a position to receive the clutch finger dowel **206**, the clutch finger **165** is urged by the tension spring **170** into a position causing the clutch assembly **150** to disengage, whereupon the sprocket **151** rotates freely on the shaft **153** and all other elements of the drive mechanism **26**, as well as the forming device **25**, come to rest. The forming device **25** may be caused to stop in its lifted position by appropriate adjustment of the timer table **190** on the shaft **189**.

When it is desired again to operate the forming device, a forward and downward pull on the handle of the clutch lever **178** acts through the clutch link **176** to rotate the clutch finger **165** so as again to cause engagement of the clutch assembly **150**, whereupon the lower end of the cam finger **193** is lifted above the upper plane **194** and is urged by the spring **204** to the limit of its motion toward the center of rotation of the timer table **190**. Upon release of the pull on the clutch lever **178**, the lower end of the cam finger **193** comes to rest upon, and is supported by, the upper plane **194** of the cam sector **192**, thus maintaining the clutch finger **165** in position for clutch engagement. As the timer table **190** continues to rotate, the slot **197** passes from beneath the clutch finger dowel **206** after which the lower end of the cam finger **193** rides down the ramp **196** and the clutch finger dowel **206** again rests upon the plane **194**, thus setting the stage for the eventual stopping action described above.

It will be noted that the power source **27**, including the motor **228**, the speed reducer **226**, the shafts **220**, the sprockets **223**, the sprocket chains **152**, and the sprockets **151** rotate continuously, thus permitting independent operation of each unit of the multiple set-up shown in Fig. 1.

It is to be understood that the foregoing description and the accompanying drawings have been given by way of illustration and example. It is also to be understood that changes in form of the several parts, substitution of equivalent elements or steps, and rearrangement of parts or steps, which will be readily apparent to one skilled in the art, are contemplated as within the scope of the present invention, which is limited only by the claims which follow.

What is claimed is:

1. An apparatus for forming the rear quarter of an assembled shoe comprising, in combination, a supported heated form, means for holding an assembled shoe thereon, a movable flexible form cooperative with said heated form, means for imparting both a reciprocating and a wrapping motion thereto, means for driving and controlling said means for imparting motion, and means for delivering mechanical power to said means for driving and controlling.

2. An apparatus for forming the rear quarter of an assembled shoe comprising, in combination, a stationary form having an external configuration conforming to a desired shape of a finished rear shoe quarter, thermostatically controlled means for heating said stationary form, means for holding an assembled shoe thereon, a movable flexible form to cooperate with said stationary form so as to effect a permanent change in the shape of a rear shoe quarter mounted upon said stationary form, means for imparting both a reciprocating and a wrapping motion to said flexible form, means for driving and controlling said means for imparting motion, said means for driving and controlling including means for starting and automatically stopping said means for imparting motion, and means for delivering

mechanical power to said means for driving and controlling.

3. In an apparatus for forming the rear quarter of an assembled shoe, a forming device comprising, in combination, a stationary form having having an external configuration conforming to a desired shape of a finished rear shoe quarter, thermostatically controlled means for heating said stationary form, means cooperating with said stationary form for holding an assembled shoe thereon ,and a movable flexible form disposed to cooperate with said stationary form and being movable to alternately compress and release a rear shoe quarter mounted therebetween, thereby to effect a permanent change in the shape of a quarter.

4. In an apparatus for forming the rear quarter of an assembled shoe, a forming device comprising, in combination, a heated stationary form, means for holding an assembled shoe thereon, and a movable flexible form disposed to cooperate with said stationary form to effect a permanent change in the shape of a rear shoe quarter mounted therebetween substantially without rubbing or frictional contact upon the quarter.

5. In an apparatus for forming the rear quarter of an assembled shoe, a forming device comprising, in combination, a heated stationary form, means for holding an assembled shoe thereon, a movable flexible form disposed to cooperate with said stationary form to effect a permanent change in the shape of a rear shoe quarter mounted therebetween, and means for imparting to said flexible form both a reciprocating and a wrapping motion including links pivotally and reciprocatively mounted connected to said flexible form.

6. In an apparatus for forming the rear quarter of an assembled shoe, a forming device comprising, in combination, a heated stationary form, means for holding an assembled shoe thereon, a flexible form to cooperate with said stationary form to effect a permanent change in the shape of a rear shoe quarter mounted therebetwen, and a means to impart both a reciprocating and a wrapping motion to said flexible form.

7. In an apparatus for forming the rear quarter of an assembled shoe, a forming device comprising, in combination, a heated stationary form, means for holding an assembled shoe thereon, a flexible form to cooperate with said stationary form to effect a permanent change in the shape of a rear shoe quarter mounted therebetween, and a mechanism to impart both a reciprocating and a wrapping motion to said flexible form, said mechanism including a system of cooperative links and springs mounted for initial movement as a unit without relative motion between the elements thereof and for subsequent oscillation without translatory motion, said movement and oscillation being automatically reversible and said movement including the reverse thereof being automatically and continuously repeated.

8. In an apparatus for forming the rear quarter of an assembled shoe, a forming device comprising, in combination, a heated stationary form, means for holding an assembled shoe thereon, a flexible form to effect a permanent change in the shape of a rear shoe quarter mounted therebetween, a mechanism to impart both a reciprocating and a wrapping motion to said flexible form, said mechanism including a system of cooperative links and springs subjected alternately to primary transition and to auxiliary oscillation, and means through which said transition and oscillation are repeatedly effected including a cooperatively mounted automatically extendable primary connecting rod assembly and an auxiliary connecting rod.

9. In an apparatus for forming the rear quarter of an assembled shoe, a connecting rod assembly having an extendable portion and a non-extendable portion, said extendable portion including yieldable spring means biasing the same toward a non-extended condition, a flexible form, and a system of links and springs therebetween connected thereto and supported to effect alternately a translatory movement of said system and an oscillatory movement within said system for alternately imparting a reciprocating and a wrapping motion to said flexible form to cause it first to engage a small area of a supported rear shoe quarter and subsequently to engage a larger area of such quarter substantially without rubbing or frictional contact.

10. An apparatus for forming the rear quarter of an assembled shoe comprising, in combination, a stationary form having an external configuration conforming to a desired shape of a finished rear shoe quarter, means for holding an assembled shoe thereon, a movable flexible form to cooperate with said stationary form so as to effect a permanent change in the shape of a rear shoe quarter mounted upon said stationary form, and means for imparting both a reciprocating and a wrapping motion to said flexible form, said means comprising a reciprocable bracket assembly for supporting said flexible form, said bracket assembly including a bracket having a main horizontal arm and an auxiliary vertical arm, an auxiliary crossarm having one end pivotally connected to said vertical arm and extending generally horizontally above said main horizontal arm, a yoke supported by said main horizontal arm and having oppositely horizontally extending arms, a link pivotally mounted to each of said yoke arms, said flexible form being secured to said links, means interconnecting the free end of said auxiliary crossarm with each of said links whereby movement of said auxiliary crossarm relative to said main horizontal arm is effective to oscillate said links so as to impart a wrapping motion to said flexible form.

11. The combination of claim 10 wherein the flexible form is engageable with the stationary form and when so engaged is effective to limit the extent of reciprocable movement of the main horizontal crossarm.

12. The combination of claim 11 with a connecting rod assembly for reciprocating said bracket assembly, said connecting rod assembly comprising a main rigid portion adapted for pivotal connection to a crank arm and a telescoping portion in extendable relation to said main rigid portion, yieldable means biasing said extendable portion toward said main rigid portion, said extendable portion being connected to the main horizontal arm of the bracket assembly, and an auxiliary connecting rod having one end connected to said main rigid portion and the other end connected to the auxiliary crossarm of the bracket assembly.

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