Oct. 4, 1955 F. E. STRATTON ET AL 2,719,310

GRIPPERS FOR MACHINES FOR SHAPING UPPERS OVER LASTS

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Fig.1

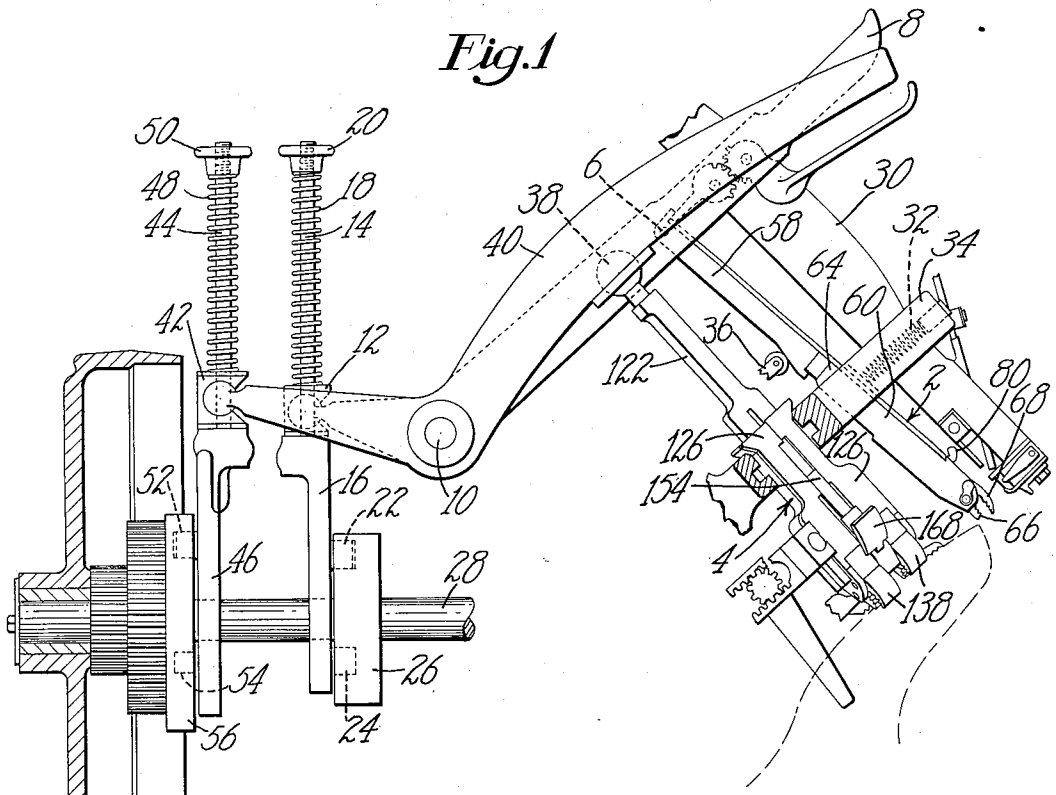


Fig.10

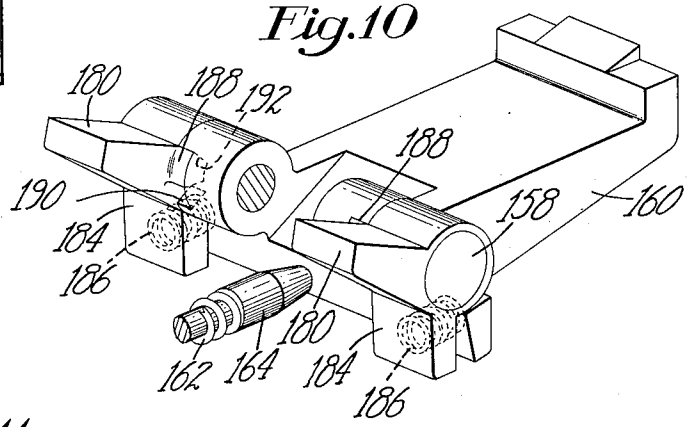
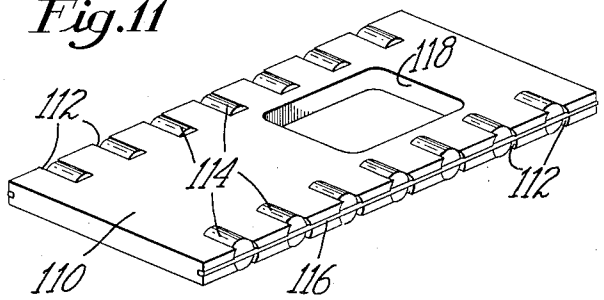


Fig.11



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Fig. 2

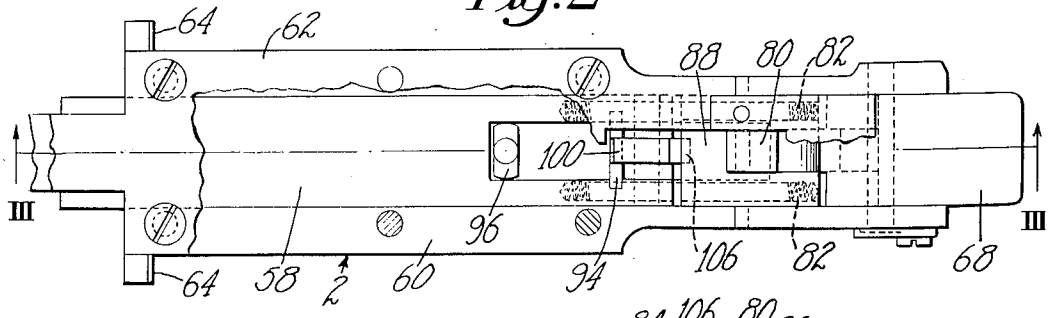


Fig. 3

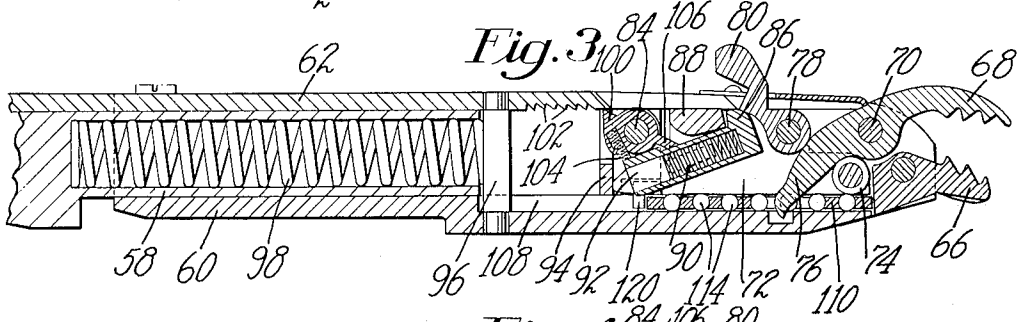


Fig. 4

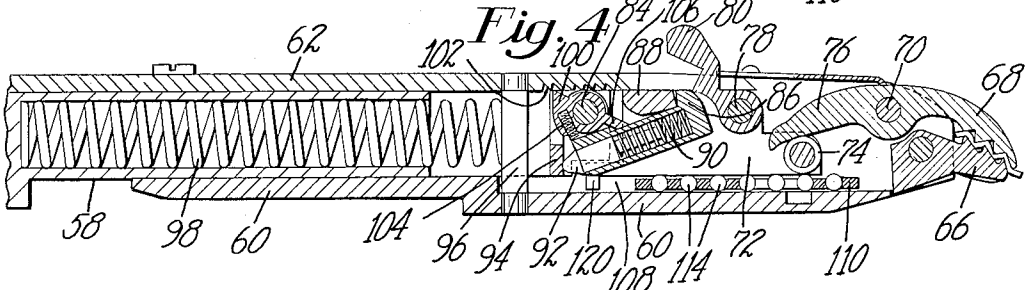
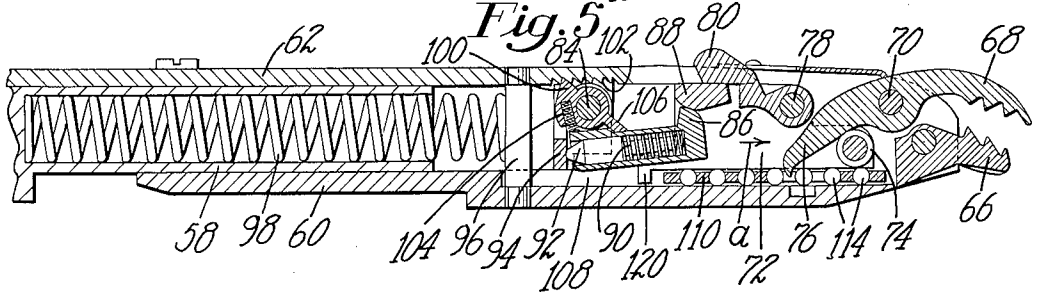


Fig. 5



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GRIPPERS FOR MACHINES FOR SHAPING UPPERS OVER LASTS

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Fig. 6

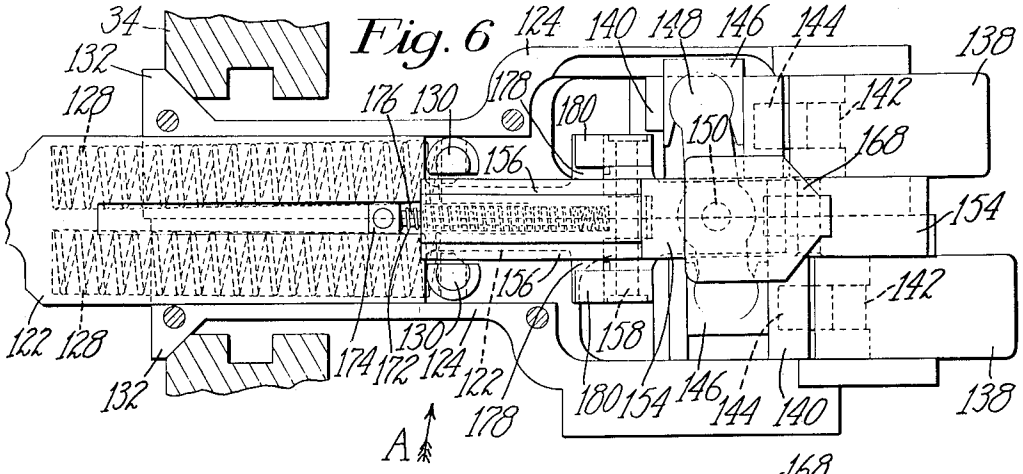


Fig. 7

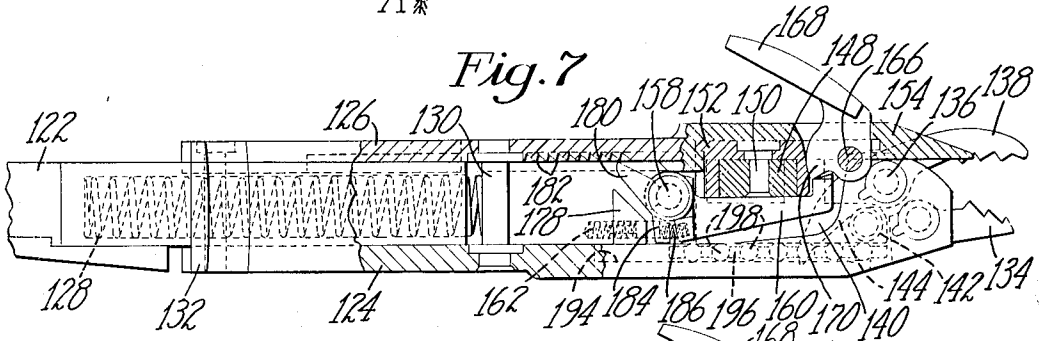


Fig. 8

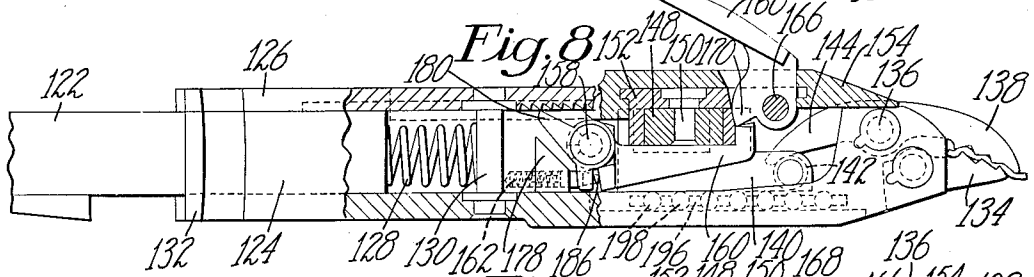
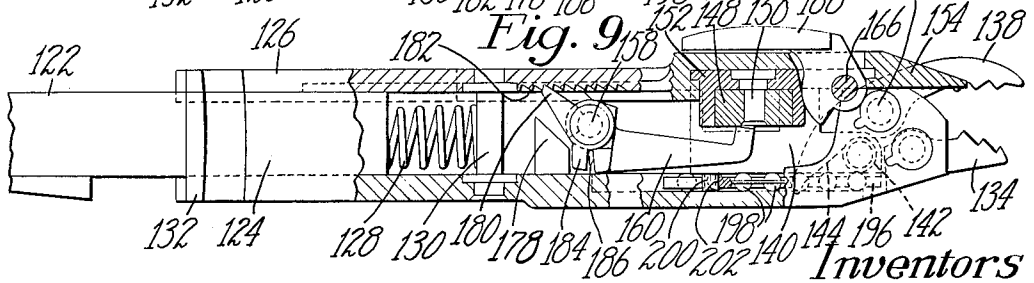


Fig. 9



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GRIPPERS FOR MACHINES FOR SHAPING UPPERS OVER LASTS

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Application January 11, 1952, Serial No. 265,962

12 Claims. (Cl. 12—14.5)

This invention relates to machines for use in the manufacture of shoes for shaping uppers over lasts, and more particularly to means used in some machines of that class for pulling the uppers. An immediate object of the invention is to provide improvements in upper-pulling grippers such as are commonly used in pulling-over machines of the type disclosed in United States Letters Patent No. 1,029,387, granted on June 11, 1912, on an application of R. F. McFeely. The invention is accordingly herein described as applied to such well-known grippers, but it should be understood that it is not limited to details of this illustrative embodiment.

As more fully disclosed in Letters Patent No. 1,030,264, granted on June 18, 1912, on an application of R. F. McFeely, grippers commonly used in machines of the above-mentioned type for pulling the uppers at the ends of the toes, and sometimes also at the sides of the forepparts, have the following characteristics. Each gripper includes a single pair of upper-gripping jaws carried by a casing, one jaw being fixed on the casing and the other pivotally mounted thereon to swing toward and from the fixed jaw. Mounted in the casing to move relatively thereto in directions heightwise of the shoe is a jaw-closing device, sometimes called a closing slide, provided with a roll arranged to engage a tail portion of the pivoted jaw and to swing that jaw toward the fixed jaw to grip the upper in response to movement of the closing slide. Such movement of the closing slide is effected by a gripper bar which extends into the casing and is connected by a latch to the slide. The gripper bar is operated by a lever, commonly known as an updraw lever, which is operated yieldingly through a spring by a power-driven cam. Mounted within the gripper casing and within a recess in the gripper bar is a spring which is under compression and acts oppositely on the bar and the casing respectively, the purpose of the spring being to hold the casing stationary in a position determined by engagement of lugs thereon with a bracket on the frame until the upper has been gripped by the jaws through the movement of the closing slide, whereupon the gripper bar, acting through the closing slide, begins to move the casing with it to cause the jaws to pull the upper by reason of the resistance of the upper to further closing movement of the pivoted jaw. After the pulling of the upper a tacker arm provided with wiping and tacking means is swung inwardly to cause the wiping means thereon to wipe the margin of the upper over the insole into position to be tacked. By its inward movement this arm acts through a tripping member mounted on the closing slide to swing the above-mentioned latch into position to disconnect the closing slide from the gripper bar, whereupon the jaws release the upper and the gripper is withdrawn from the shoe heightwise thereof by the spring which acts on the updraw lever, the gripper also being swung inwardly over the bottom of the shoe as the tacker arm is swung farther inwardly.

The disconnection of the closing slide from the gripper bar as above described frees the spring in the gripper casing for further expansion, as a result of which the

casing is moved relatively to the gripper bar in a direction toward the shoe while the gripper is being moved away from the shoe by the spring which acts on the updraw lever. The extent of such reverse movement of the casing varies somewhat in accordance with the thickness of the upper materials previously gripped between the gripper jaws and is limited by engagement of portions of the bar and the casing with each other. While the movement is comparatively short, its tendency, of course, is to retard the withdrawal of the gripper jaws from the shoe heightwise thereof after they release the upper. Under most operating conditions the jaws are, nevertheless, withdrawn promptly enough to avoid any unfavorable result. It has been found, however, that under some conditions, because of the tendency of the spring in the gripper thus to retard the withdrawal of the jaws, they may not clear the edge of the insole as the gripper is swung inwardly over the shoe bottom after release of the upper. Such conditions may arise, for example, if the upper pattern allows for only a scant lasting margin and the gripper terminates its upper-pulling movement short of the position which it usually occupies at the end of such movement.

In view of the above and other considerations, the present invention, in one aspect, provides a construction such as to avoid any tendency for the gripper spring to retard the withdrawal of the gripper jaws from the shoe after their release of the upper. For the purpose in view the construction shown comprises a pawl carried by the gripper bar and arranged to engage teeth on the gripper casing to lock the bar and the casing together against relative movement by the spring in the casing after the pulling of the upper. More particularly, the pawl is moved into operative position in response to the movement of the above-mentioned latch to disconnect the closing slide from the gripper bar and thus to cause the gripper to release the upper, and in response to reverse movement of the latch in the return of the parts to starting positions the pawl is withdrawn from the teeth to permit the gripper bar to move relatively to the casing in closing the gripper on the upper of the next shoe.

When the closing slide is moved relatively to the gripper casing to close the pivoted jaw on the upper through the action of the roll carried by the slide on the tail portion of the jaw, this portion of the jaw exerts a thrust on the slide toward one side of the casing. It has sometimes happened heretofore that because of the resulting friction between the slide and the casing the latter would start to move with the gripper bar before the slide had moved far enough relatively to the casing to cause the jaws to grip the upper with the desired amount of force, in consequence of which the upper might slip in the gripper jaws and possibly escape from between the jaws. In the construction shown, a small plate is movably mounted between the closing slide and that side of the gripper casing toward which the thrust is exerted by the tail portion of the pivoted jaw, the casing being provided with a recess to receive the plate and the plate having inserted in recesses therein a plurality of rolls engaging both the slide and the casing. As the closing slide is moved relatively to the casing the thrust exerted thereon by the pivoted jaw is taken by the rolls, the plate in which the rolls are positioned moving with the slide but a shorter distance than the slide. Accordingly there is no danger that friction between the slide and the casing may cause the jaws to start prematurely their upper-pulling movement, substantially all the force applied to the casing by the gripper bar for moving the casing in the direction to pull the upper being that applied thereto through the pivoted gripper jaw.

For pulling the upper at opposite sides of the forepart machines of the above-mentioned type are usually pro-

vided with double side grippers as distinguished from the gripper with a single pair of jaws used at the end of the toe. That is, each side gripper includes two pairs of upper-gripping jaws, the two pairs of jaws being carried respectively by separate gripper casings mounted for relative movements heightwise of the shoe and associated with a single gripper bar operated by a side updraw lever. Mounted within each casing is a spring arranged to act oppositely on that casing and on the gripper bar to control the casing in the same manner as the spring hereinabove referred to as part of the gripper having a single pair of jaws. Mounted in the two casings are closing slides connected together for relative movements heightwise of the shoe by a lever pivotally mounted between its ends on a block which is normally connected by a latch to the gripper bar to cause the bar to close both pairs of jaws on the upper and to operate them to pull the upper. A tripping member pivoted on the block is operated by the inward movement of the corresponding side tacker arm to move the latch into position to disconnect the gripper bar from the closing slides and thus to cause the pairs of jaws to release the upper, whereupon the gripper is withdrawn from the shoe heightwise thereof by a spring acting on its updraw lever as it is swung inwardly over the shoe bottom. The construction thus outlined is substantially as disclosed in Letters Patent No. 1,030,522, granted on June 25, 1912, on an application of R. F. McFeely, and the above-described features of the present invention are herein shown as applied also to such a double gripper. More particularly, each of the two gripper casings has therein a pawl carried by the gripper bar and arranged to engage teeth on that casing, the two pawls being controlled by the single latch and when moved by the latch into positions to engage the teeth locking the casings and the gripper bar against relative movements by the springs in the casings when the jaws release the upper, regardless of the relative positions assumed by the two casings in the pulling of the upper. This avoids, in the same manner as hereinbefore explained with reference to the gripper having a single pair of jaws, any tendency for the gripper springs to retard the withdrawal of the jaws from the shoe upon their release of the upper. To insure, moreover, that neither of the two pairs of jaws will start to pull the upper before the upper has been gripped with the requisite amount of force, there is mounted in each gripper casing a plate provided with a plurality of rolls arranged to act in the same manner as the plate and rolls hereinbefore described as associated with the closing slide of the gripper having a single pair of jaws.

The novel features of the invention, including various novel details of construction and combinations of parts, will now be more particularly described with reference to the accompanying drawings and thereafter pointed out in the claims.

In the drawings,

Fig. 1 is a view partly in left-hand side elevation and partly in section showing generally the arrangement of the grippers and their operating means in a machine of the type to which the invention is shown as applied;

Fig. 2 is a view from the front, with parts broken away, showing the greater portion of the toe-end gripper detached and differently oriented than in the machine, the parts being shown in their initial positions;

Fig. 3 is a section on the line III—III of Fig. 2, with the parts in the same positions as in Fig. 2;

Fig. 4 is a view similar to Fig. 3, with the parts in the positions which they occupy in the pulling of the upper;

Fig. 5 is a view also similar to Fig. 3, showing the parts as they appear after release of the upper by the gripper but before the jaw-closing slide has fully returned to its initial position;

Fig. 6 shows one of two double side grippers included in the machine, as viewed from its outer side but with parts broken away, this gripper also being differently

oriented than in the machine and the parts being shown in their initial positions;

Fig. 7 shows the double side gripper as viewed in the direction of the arrow A in Fig. 6, with parts broken away, the parts being shown in the same positions as in Fig. 6;

Fig. 8 is a view similar to Fig. 7, showing the parts in the positions which they occupy in the pulling of the upper;

Fig. 9 is a view also similar to Fig. 7, with the parts as they appear after release of the upper by the gripper;

Fig. 10 is a perspective view of a portion of the structure included in the double side gripper; and

Fig. 11 is a perspective view showing detached a device included in the toe gripper.

A machine of the type to which the invention is shown as applied includes a toe gripper **2** for pulling the upper at the end of the toe and opposite side grippers **4** which, as herein illustrated, are commonly double grippers, only one of the two side grippers being visible in Fig. 1. The toe gripper is pivotally connected at its upper end by a pin **6** for swinging movements lengthwise of the shoe to an updraw lever **8** fulcrumed between its opposite ends on a rod **10** and connected at its rear end to a block **12** movably mounted on a vertical rod **14**. This rod extends upwardly from a cam-operated slide **16** and is surrounded by a compression spring **18**, commonly referred to as an updraw spring, located between the block **12** and a nut **20** on the upper end of the rod. The slide **16** carries a roll **22** mounted in a cam groove **24** formed in a cam member **26** which is fast on a cam shaft **28**. It will be understood that the toe gripper is operated to pull the upper by downward movement of the slide **16**, the spring **18** yielding more or less in response to resistance of the upper to the force of the pull applied thereto. Upon release of the upper by the gripper the spring expands to withdraw the gripper from the shoe heightwise thereof as wiping means carried by a swinging toe tacker arm **30** is moved rearwardly to wipe the margin of the upper over the insole into position to be fastened by a tack. As the tacker arm is thus swung rearwardly the toe gripper is swung in the same direction relatively to the updraw lever **8** to make way for the tacker arm by so-called overdraw springs **32**, the gripper being guided in its swinging movement by a bracket **34** on the frame. Such swinging movement of the gripper is permitted by retractive movement of gripper-spreading mechanism a portion of which is shown at **36** in Fig. 1 and which serves to impart forward return movement to the gripper in the return of the parts to starting positions.

Each of the opposite side grippers **4** is connected at its upper end by a ball joint **38** to a side updraw lever **40** also fulcrumed on the rod **10**, only one of these levers being visible in the drawings. Each side updraw lever is connected at its rear end, similarly to the toe gripper updraw lever, to a block **42** mounted on a vertical rod **44** extending upwardly from a second cam slide **46**, each rod being surrounded by an updraw spring **48** under compression between the block **42** and a nut **50** on the upper end of the rod. The slide **46** carries a roll **52** mounted in a cam groove **54** formed in a cam member **56** fast on the cam shaft **28**. It will be understood that in the operation of the side grippers to pull the upper the springs **48** are more or less compressed and upon release of the upper by these grippers move the latter farther upwardly away from the shoe simultaneously with inward swinging movements thereof effected by overdraw springs (not shown). The inward movements of the side grippers are accompanied by inward swinging movements of side tacker arms (also not shown), the inward movements of these grippers being permitted by retractive movements of portions of the same gripper-spreading mechanism **36** which controls the toe gripper. The construction thus far described may be better understood by reference to Letters Patent No. 1,029,387.

The part of the toe gripper **2** which is pivotally mounted on the pin **6** consists of a gripper bar **58** (Figs. 1 and 2) arranged to extend toward the shoe into a gripper casing **60** including a detachable front cover plate **62**. The casing **60** is guided in the bracket **34**, and its initial position heightwise of the shoe is determined by engagement of lugs **64** on opposite sides thereof with the bracket. Secured in fixed relation to the casing **60** is a gripper jaw **66**, and arranged to cooperate with this jaw in gripping the margin of the upper is a jaw **68** pivotally mounted on a pin **70** in the casing. The pivoted jaw is controlled by a jaw-closing device **72**, which may be termed a closing slide, movably mounted in the casing and carrying a roll **74** arranged to engage a tail portion **76** of the pivoted jaw to swing this jaw toward the fixed jaw **66** for gripping the margin of the upper. Pivotally mounted on a pin **78** on the closing slide is a finger **80** the purpose of which will be hereinafter explained, and when the closing slide is in its initial position a hub portion of this finger engages the tail portion **76** of the jaw **68** and thereby holds the jaw in open position, as illustrated in Fig. 3. In the construction herein shown the closing slide is held initially in the position in which it is shown in Fig. 3 by a pair of springs **82** (Fig. 2) which extend into sockets formed in the closing slide and the gripper bar **58**.

For imparting to the closing slide **72** movement to close the jaw **68** on the upper there is pivotally mounted on a pin **84** on a forked end portion of the gripper bar **58** a latch **86** arranged to engage an abutment **88** formed on the closing slide. The latch is held in the position to act on the closing slide by a spring **90** mounted in a bore in the latch and pressing against a movable pin **92** which is held by the spring in engagement with a crosspiece **94** inserted in grooves in the gripper bar. Fixed in the gripper casing **60**, within the forked portion of the gripper bar, is a member **96** engaged by one end of a spring **98** which extends into a bore in the gripper bar and is seated at its other end against the bar. This spring is under compression and applies force in opposite directions respectively to the gripper bar and the gripper casing. Initially the parts are in the positions in which they are shown in Figs. 1, 2 and 3, and as the cam slide **16** begins to move downward it acts through the spring **18** to swing the lever **8** and thus to move the gripper bar **58** in a direction away from the shoe. At first, however, the spring **98** holds the gripper casing **60** stationary in the position determined by engagement of its lugs **64** with the bracket **34**, and accordingly the gripper bar moves relatively to the casing, causing the latch **86** to move the closing slide **72** from the position shown in Fig. 3 to that shown in Fig. 4, the roll **74** on the slide acting on the tail **76** of the jaw **68** to close that jaw on the margin of the upper. When the resistance of the upper to the closing movement of the jaw becomes great enough to prevent further expansion of the spring **98**, the gripper bar starts to move the casing **60** with it to cause the jaws to pull the upper, the bar thus acting on the casing through the closing slide and the pivoted jaw. Before the completion of the upper-pulling movement of the gripper the spring **18** through which movement is transmitted from the slide **16** to the lever **8** is more or less compressed, as hereinbefore explained.

It will be noted that a portion of the finger **80** is arranged to engage the latch **86**, and when the tacker arm **30** is swung inwardly after the upper-pulling operation, as hereinbefore described, it acts on the finger **80** and causes the latter to swing the latch **86** out of position to act on the abutment **88**. In this manner the gripper bar **58** is disconnected from the closing slide **72** to cause the gripper jaws to release the upper, permitting the springs **82** to impart return movement to the closing slide as indicated by the arrow *a* in Fig. 5. Upon release of the upper the spring **18** expands and thereby moves the gripper farther away from the shoe heightwise thereof while it is being swung inwardly over the shoe bottom. In the return of the parts thereafter to starting positions the gripper is moved reversely heightwise of the shoe by the lever **8** until the lugs **64** on the gripper casing **60** engage the bracket **34** and thereby stop the movement of the casing. Continued movement of the gripper bar thereafter against the resistance of the spring **98** returns the latch **86** into position to be swung by its spring **90** into operative relation to the abutment **88** of the closing slide **72**, as shown in Fig. 3, ready to operate the slide and close the jaw **68** on the upper of the next shoe.

The construction of the toe gripper as thus far described, except for the provision of the springs **82** for returning the closing slide, is essentially the same as disclosed in Letters Patent No. 1,030,264. It will be evident that when the gripper bar is disconnected by the latch **86** from the closing slide the spring **98** is freed for further expansion in the absence of anything to prevent relative movement of the gripper bar and the gripper casing under the influence of the spring. This has resulted heretofore in a sudden short movement of the casing, with the gripper jaws thereon, reversely in a direction toward the shoe relatively to the gripper bar, such movement of the casing being limited by engagement of the crosspiece **94** on the gripper bar with the member **96** in the casing. It will be evident that the tendency of such movement of the casing is to retard the withdrawal of the gripper jaws from the shoe by the spring **18** after their release of the upper, and under some conditions it has happened that the jaws have not been withdrawn quickly enough to prevent them from engaging and displacing the edge of the insole in their swinging movements inwardly over the shoe bottom. The invention accordingly provides means for preventing the casing **60** from being moved relatively to the gripper bar by the spring **98** when the gripper releases the upper. This means comprises a pawl **100** pivotally mounted on the same pin **84** as the latch **86**, this pawl being arranged to engage teeth **102** formed on the cover plate **62** of the gripper casing. Mounted in the pawl and abutting against a portion of the latch **86** is a spring **104** which tends to move the pawl in a clockwise direction as the parts are viewed in Fig. 3 and holds it normally in a relation to the latch determined by engagement of a projection **106** on the pawl with the latch. When the latch is in the operative position in which it is shown in Figs. 3 and 4 the pawl is held by the latch in a position where it will just clear the teeth **102** during the closing of the gripper and the pulling of the upper regardless of the movement of the closing slide **72** in the gripper casing. When the latch **86**, however, is moved by the finger **80** into position to disconnect it from the closing slide, this movement of the latch carries the pawl into position to engage the teeth **102**, the pawl arriving in position to cooperate with the teeth before the latch actually releases the closing slide. The result is that the gripper bar **58** and the gripper casing **60** are locked together against any relative movement under the influence of the spring **98**, as illustrated in Fig. 5, thus preventing any further expansion of the spring upon release of the upper by the gripper. Accordingly, the expansion of the updraw spring **18** is immediately effective to retract the gripper jaws heightwise of the shoe without any tendency for such retractive movement of the jaws to be retarded by reverse movement of the gripper casing relatively to the gripping bar. It will be understood that as the gripper bar is moved relatively to the casing in the return of the parts to starting positions the pawl **100** slips yieldingly over the teeth **102** until the latch **86** is swung to its initial position by the spring **90**, such swinging movement of the latch serving to return the pawl to a position where it will not engage the teeth as the gripper is closed on the upper of the next shoe.

It will be evident that when the closing slide **72** is

moved relatively to the casing **60** to close the pivoted jaw **68** on the upper, the tail portion **76** of the jaw by its engagement with the roll **74** exerts a thrust on the closing slide toward one side of the casing. Because of the resulting friction between the slide and the casing it has sometimes happened heretofore that the casing would start to move with the gripper bar before the upper was gripped with the desired amount of force and under some conditions the upper would slip in the gripper jaws and might slip out from between the jaws. To insure against such a result the casing **60** in the construction herein shown is provided along one side with a recess **108** in which is mounted a small plate **110**. As shown in Fig. 11, this plate has in each of its opposite side margins a series of recesses **112** in which are mounted rolls **114** the diameters of which are slightly greater than the thickness of the plate, the recesses having curved walls providing bearings for the rolls. Each series of rolls is held in the recesses by a wire **116** engaging the outer ends of the rolls and anchored at its opposite ends in the plate. It will thus be seen that the rolls engage at their opposite sides respectively the closing slide **72** and the casing **60** and support the slide against the lateral thrust applied thereto by the tail portion of the jaw **68**. As the closing slide is moved relatively to the casing to close the jaw **68** on the upper the plate **110** moves with it in the same direction but a shorter distance, the rolls turning in rolling engagement with the slide and the casing. Friction between the closing slide and the side of the casing toward which the thrust of the tail portion of the jaw **68** is exerted is thus avoided, and as a result insurance is afforded that the upper will be gripped firmly enough under any conditions to prevent it from slipping in the gripper jaws. Located in the plate **110** is an opening **118** to provide clearance for the tail portion **76** of the jaw **68**. To insure that in the closing of the gripper the plate **110** will be positioned in proper relation to the portion of the closing slide where the roll **74** is located, the plate is confined between the fixed jaw **66** and a lug **120** on the closing slide, this lug being arranged to return the plate to the position in which it is shown in Fig. 3 in the return of the parts of the gripper to their starting positions.

In general accordance with the disclosure of Letters Patent No. 1,030,522, each of the two double side grippers **4** comprises a gripper bar **122** connected by the previously mentioned ball joint **38** to the corresponding updraw lever **40** and a pair of gripper casings **124** (Fig. 6) each including on its outer side a detachable cover plate **126**. Open sides of the two casings are adjacent to each other to provide a common chamber into which the gripper bar extends, and by tongue-and-groove connections, not herein shown in detail, between the gripper bar and the casings the latter are guided for relative movements heightwise of the shoe. Mounted in sockets in the gripper bar are two springs **128** which are under compression and are in engagement respectively with members **130** fixed in the different gripper casings, these springs holding the casings initially in positions determined by the engagement of lugs **132** (Fig. 6) thereon with the previously mentioned bracket **34**. Mounted on the lower end of each casing in fixed relation thereto is a gripper jaw **134**, and pivotally, mounted on a pin **136** in each casing for swinging movement toward and from the jaw **134** is a jaw **138**. Movably mounted in each casing is a closing slide **140** which carries a roll **142** arranged to engage a curved tail portion **144** of the pivoted jaw **138** to swing that jaw into position to grip the margin of the upper between it and the fixed jaw **134** in response to upward movement of the closing slide relatively to the casing **124**.

Mounted for sliding movements in directions lengthwise of the shoe in guideways formed in the two closing slides **140** are blocks **146** in which are swiveled the opposite ends of a lever **148** pivotally mounted between its ends on a stud **150** carried by a block **152**. This block is mounted on a slide **154** in fixed relation to the slide, and an upwardly extending portion of the slide **154** has along its opposite side margins grooves **156** (Fig. 6) to receive marginal portions of the two cover plates **126**. The slide **154** is accordingly guided by the cover plates and the gripper bar to move in directions heightwise of the shoe, and it will be understood that it is by movement of this slide and the block **152** in an upward direction that the two closing slides **140** are operated to close the pivoted jaws **138** on the upper, the lever **148** permitting such relative movements of the closing slides as may be necessitated by different thicknesses of upper materials engaged by the different pairs of gripper jaws. For thus moving the slide **154** to close the jaws there is pivotally mounted on a pin **158** on the lower end of the gripper bar **122** a latch **160** arranged to engage and act on the block **152**. The latch is held initially in position thus to act on the block, as shown in Fig. 7, by a spring **162** mounted in a socket in the gripper bar **122** and acting on a pin **164** (Fig. 10) which engages the latch at one side of the pin **158**. The springs **128** hold the gripper casings **124** stationary while the gripper jaws are thus being closed on the upper, after which, in response to resistance of the upper to further closing movements of the jaws, the gripper casings are moved upwardly by further movement of the gripper bar to cause the jaws to pull the upper, as illustrated in Fig. 8. In this operation the lever **148** permits relative movement of the two casings in accordance with such differences as there may be in the resistance of the portions of the upper acted upon respectively by the different pairs of jaws. In the construction herein shown, as sometimes heretofore, the two arms of the lever **148** at the opposite sides respectively of the stud **150** are of different lengths to cause one pair of jaws to apply to the upper a more forcible pull than the other pair of jaws.

Pivotally mounted on a pin **166** carried by the block **152** is a finger **168** on which is formed a lug **170** arranged to engage the latch **160**. Associated with each of the side grippers is a side tacker arm (not shown) which, like the toe tacker arm **30**, carries wiping means for wiping the margin of the upper inwardly over the insole into position to be tacked and which is swung inwardly widthwise of the shoe after the pulling of the upper simultaneously with inward swinging movements of the side grippers. Each side tacker arm in its inward swinging movement acts on the finger **168** of the corresponding side gripper and by swinging movement of the finger about the pin **166** disconnects the latch **160** from the block **152**. In this manner the gripper bar **122** is disconnected from the two closing slides **140**, whereupon the slide **154** and the closing slides are moved reversely in directions toward the gripper jaws by a spring **172** (Fig. 6) which is mounted in a socket in the slide **154** and abuts at one end against a member **174** on the gripper bar **122**. Extending from this member part way through the spring is a rod **176** which helps to hold the spring in place. It will be understood that the disconnection of the gripper bar from the closing slides causes the gripper jaws to release the upper, and upon such release of the upper by the jaws the updraw spring **48** acting on the corresponding updraw lever **40** expands to move the side gripper farther away from the shoe heightwise thereof as it is being swung inwardly over the shoe bottom. In the return of the parts thereafter to starting positions the gripper is moved reversely heightwise of the shoe by the lever **40** until the lugs **132** on the gripper casings engage the bracket **34** and thereby stop the movements of the casings. Continued movement of the gripper bar thereafter against the resistance of the springs **128** returns the latch **160** into position to be swung by the spring **162** into operative relation to the block **152**, as shown in Fig. 7, ready to operate the block and close the jaws **138** on the upper of the next shoe.

It will be evident that when the gripper bar **122** of each side gripper is disconnected, as above described, by the latch **160** from the closing slides **140**, the springs **128**

will, in the absence of anything to prevent, further expand and move the casings **126** suddenly short distances toward the shoe relatively to the gripper bar. Such movements of the casings, limited by engagement of the members **130** therein with lugs **178** on opposite sides of the gripper bar, have had the same tendency heretofore to retard the withdrawal of the side gripper jaws from the shoe by the updraw spring **48** that the similar movement of the toe gripper casing has had to retard the withdrawal of the toe gripper jaws. To prevent this there are pivotally mounted on the same pin **158** as the latch **160** two pawls **180** (Fig. 10) at opposite sides of the latch respectively, these pawls being arranged to engage teeth **182** formed on the cover plates **126** of the different gripper casings **124**. Mounted in sockets formed in laterally extending lugs on the latch and in tail portions **184** of the pawls are springs **186** which tend to swing the pawls relatively to the latch toward the teeth **182**. To limit such swinging movements of the pawls each pawl has thereon a lug **188** extending laterally therefrom into a recess **190** in an adjacent hub portion of the latch **160**, as shown in Fig. 10. Normally this lug, under the influence of the spring **186**, is held in engagement with a shoulder **192** on the hub of the latch, and when the latch is in position to act on the block **152** the pawl is thus held in a position where it will not engage the teeth **182** during the closing of the gripper jaws and the pulling of the upper, as illustrated in Figs. 7 and 8. When the latch, however, is moved by the finger **168** into position to disconnect the closing slides **140** from the gripper bar **122**, this movement of the latch carries the two pawls **180** into engagement with the teeth **182** on the respective cover plates **126**. Accordingly the gripper bar and the two gripper casings are locked together against relative movements by the springs **128** before the latch actually releases the closing slides, thus preventing any further expansion of the springs upon release of the upper by the gripper. The expansion of the updraw spring **48** associated with each side gripper updraw lever **40** is therefore immediately effective to withdraw the side gripper jaws from the shoe heightwise thereof without any tendency for such movements of the jaws to be retarded by reverse movements of the gripper casings relatively to the gripper bar. When the gripper bar of each gripper is moved relatively to the casings in the return of the parts to starting positions the pawls **180** slip yieldingly over the teeth **182** until the latch **160** is swung by its spring **162** into position again to act on the block **152**, this swinging movement of the latch serving to return the pawls to positions where they will not engage the teeth as the gripper jaws are closed on the upper of the next shoe and during the pulling of that upper.

Each of the two casings **124** of each double side gripper has therein a recess **194** (Fig. 7) in which is movably mounted a plate **196** generally similar to the plate **110** (Fig. 11) of the toe gripper and similarly provided with a plurality of rolls **198** arranged to support the corresponding closing slide **140** against the lateral thrust applied thereto by the tail portion **144** of the gripper jaw **138** in the closing of the jaw on the upper. As hereinbefore explained with reference to the toe gripper, this avoids friction between the closing slide and the side of the casing toward which the thrust of the tail portion of the jaw is exerted and thereby insures that the upper will be gripped firmly enough to prevent it from slipping in the gripper jaws before the gripper begins to pull it. Each plate **196** is confined in its movement between the fixed gripper jaw **134** and a lug **200** (Fig. 9) on the closing slide **140**, this lug extending into a slot **202** in the plate and serving to return the plate to its initial position when the closing slide is returned.

Having described our invention, what we claim as new and desire to secure by Letters Patent of the United States is:

1. In a machine for shaping uppers over lasts, a gripper for pulling an upper over a last, said gripper comprising a movable casing, a pair of upper-gripping jaws carried by said casing, jaw-closing means in the casing, a gripper bar connected to said jaw-closing means for moving said means relatively to the casing to effect relative closing movement of the jaws and for thereafter moving the casing to cause the jaws to pull the upper in response to resistance of the upper to further relative movement of the jaws, a spring arranged to apply force in opposite directions respectively to the gripper bar and the casing and to hold the casing against movement until after the relative closing movement of the jaws, means for disconnecting the gripper bar from said jaw-closing means after the pulling of the upper to cause the jaws to release the upper, and a device for automatically preventing the casing from being moved by said spring relatively to the gripper bar in a direction toward the shoe when the jaws release the upper.

2. In a machine for shaping uppers over lasts, a gripper for pulling an upper over a last, said gripper comprising a movable casing, a pair of upper-gripping jaws carried by said casing, jaw-closing means in the casing, a gripper bar connected to said jaw-closing means for moving said means relatively to the casing to effect relative closing movement of the jaws and for thereafter moving the casing to cause the jaws to pull the upper in response to resistance of the upper to further relative movement of the jaws, a spring arranged to apply force in opposite directions respectively to the gripper bar and the casing and to hold the casing against movement until after the relative closing movement of the jaws, means for disconnecting the gripper bar from said jaw-closing means after the pulling of the upper to cause the jaws to release the upper, and means constructed and arranged to lock said gripper bar and casing together against relative movement by said spring after the gripping of the upper but prior to its release by the gripper jaws to prevent the casing from being moved by said spring relatively to the gripper bar in a direction toward the shoe upon such release of the upper.

3. In a machine for shaping uppers over lasts, a gripper for pulling an upper over a last, said gripper comprising a movable casing, a pair of upper-gripping jaws carried by said casing, jaw-closing means in the casing, a gripper bar connected to said jaw-closing means for moving said means relatively to the casing to effect relative closing movement of the jaws and for thereafter moving the casing to cause the jaws to pull the upper in response to resistance of the upper to further relative movement of the jaws, a spring arranged to apply force in opposite directions respectively to the gripper bar and the casing and to hold the casing against movement until after the relative closing movement of the jaws, means for disconnecting the gripper bar from said jaw-closing means after the pulling of the upper to cause the jaws to release the upper, a plurality of teeth on said casing, a pawl carried by the gripper bar for engaging said teeth to lock the bar and the casing together against relative movement by said spring, and means for moving said pawl into engagement with the teeth after the pulling of the upper to prevent such relative movement of the bar and the casing when the jaws release the upper.

4. In a machine for shaping uppers over lasts, a gripper for pulling an upper over a last, said gripper comprising a movable casing, a pair of upper-gripping jaws carried by said casing, jaw-closing means in the casing, a gripper bar, a member arranged to connect said gripper bar to the jaw-closing means for moving said means by the bar relatively to the casing to effect relative closing movement of the jaws and for thereafter moving the casing to cause the jaws to pull the upper in response to resistance of the upper to further relative movement of the jaws, a spring arranged to apply force in opposite directions respectively to the gripper bar and the casing and to hold the casing against movement until after the relative closing movement of the jaws, means for mov-

ing said member to disconnect the gripper bar from the jaw-closing means after the pulling of the upper to cause the jaws to release the upper, and a device arranged to be moved by said member into position to prevent the casing from being moved by said spring relatively to the gripper bar in a direction toward the shoe when the jaws release the upper.

5. In a machine for shaping uppers over lasts, a gripper for pulling an upper over a last, said gripper comprising a movable casing, a pair of upper-gripping jaws carried by said casing, jaw-closing means in the casing, a gripper bar, a member arranged to connect said gripper bar to the jaw-closing means for moving said means by the bar relatively to the casing to effect relative closing movement of the jaws and for thereafter moving the casing to cause the jaws to pull the upper in response to resistance of the upper to further relative movement of the jaws, a spring arranged to apply force in opposite directions respectively to the gripper bar and the casing and to hold the casing against movement until after the relative closing movement of the jaws, means for moving said member to disconnect the gripper bar from the jaw-closing means after the pulling of the upper to cause the jaws to release the upper, and means responsive to that movement of said member for locking the gripper bar and the casing against relative movement by said spring when the jaws release the upper.

6. In a machine for shaping uppers over lasts, a gripper for pulling an upper over a last, said gripper comprising a movable casing, a pair of upper-gripping jaws carried by said casing, jaw-closing means in the casing, a gripper bar, a latch arranged to connect the gripper bar to said jaw-closing means for moving said means by the bar relatively to the casing to effect relative closing movement of the jaws and for thereafter moving the casing to cause the jaws to pull the upper in response to resistance of the upper to further relative movement of the jaws, a spring arranged to apply force in opposite directions respectively to the gripper bar and the casing and to hold the casing against movement until after the relative closing movement of the jaws, means for moving said latch to disconnect the gripper bar from the jaw-closing means after the pulling of the upper to cause the jaws to release the upper, a plurality of teeth on said casing, and a pawl carried by the gripper bar for engaging said teeth to lock the gripper bar and the casing against relative movement by said spring, said pawl being arranged to be moved into engagement with the teeth in response to the movement of said latch when the latch is moved to disconnect the gripper bar from the jaw-closing means.

7. In a machine for shaping uppers over lasts, a gripper for pulling an upper over a last, said gripper comprising a pair of casings mounted to move together and also relatively heightwise of the last, a pair of upper-gripping jaws carried by each of said casings, jaw-closing means in each casing, a gripper bar common to both casings and connected to the jaw-closing means in each casing for moving said means relatively to the casing to effect relative closing movement of the jaws and for thereafter moving the casing to cause the jaws to pull the upper in response to resistance of the upper to further relative movement of the jaws, springs arranged to apply force in one direction to the gripper bar and in the opposite direction respectively to the different casings and to hold the casings against movement until after the relative closing movements of the jaws, means for disconnecting the gripper bar from the jaw-closing means in both casings after the pulling of the upper to cause the jaws to release the upper, and means for automatically preventing the casings from being moved by said springs relatively to the gripper bar in a direction toward the shoe when the jaws release the upper.

8. In a machine for shaping uppers over lasts, a gripper for pulling an upper over a last, said gripper comprising a pair of casings mounted to move together and also relatively heightwise of the last, a pair of upper-gripping jaws carried by each of said casings, jaw-closing means in each casing, a gripper bar common to both casings and connected to the jaw-closing means in each casing for moving said means relatively to the casing to effect relative closing movement of the jaws and for thereafter moving the casing to cause the jaws to pull the upper in response to resistance of the upper to further relative movement of the jaws, springs arranged to apply force in one direction to the gripper bar and in the opposite direction respectively to the different casings and to hold the casings against movement until after the relative closing movements of the jaws, means for disconnecting the gripper bar from the jaw-closing means in both casings after the pulling of the upper to cause the jaws to release the upper, and mechanism constructed and arranged to lock said gripper bar and the casings against relative movement by said springs after the pulling of the upper and thereby to prevent such relative movement when the jaws release the upper.

9. In a machine for shaping uppers over lasts, a gripper for pulling an upper over a last, said gripper comprising a pair of casings mounted to move together and also relatively heightwise of the last, a pair of upper-gripping jaws carried by each of said casings, jaw-closing means in each casing, a gripper bar common to both casings and connected to the jaw-closing means in each casing for moving said means relatively to the casing to effect relative closing movement of the jaws and for thereafter moving the casing to cause the jaws to pull the upper in response to resistance of the upper to further relative movement of the jaws, springs arranged to apply force in one direction to the gripper bar and in the opposite direction respectively to the different casings and to hold the casings against movement until after the relative closing movements of the jaws, means for disconnecting the gripper bar from the jaw-closing means in both casings after the pulling of the upper to cause the jaws to release the upper, each of said casings having a plurality of teeth thereon, pawls carried by the gripper bar and arranged respectively to engage the teeth on the different casings to lock the bar and the casings together against relative movement by said springs, and means for moving said pawls into engagement with the teeth after the pulling of the upper to prevent such relative movement of the bar and the casings when the jaws release the upper.

10. In a machine for shaping uppers over lasts, a gripper for pulling an upper over a last, said gripper comprising a pair of casings mounted to move together and also relatively heightwise of the last, a pair of upper-gripping jaws carried by each of said casings, jaw-closing means in each casing, a gripper bar common to both casings, mechanism including a releasing member arranged to connect said gripper bar to the jaw-closing means in both casings for moving said means relatively to the casings to effect relative closing movements of the jaws and for thereafter moving the casings to cause the jaws to pull the upper in response to resistance of the upper to further relative movements of the jaws, springs arranged to apply force in one direction to the gripper bar and in the opposite direction respectively to the different casings and to hold the casings against movement until after the relative closing movements of the jaws, means for moving said releasing member to disconnect the gripper bar from the jaw-closing means in both casings after the pulling of the upper to cause the jaws to release the upper, and devices arranged to be moved by said releasing member into positions to prevent the casings from being moved by said springs relatively to the gripper bar in a direction toward the shoe when the jaws release the upper.

11. In a machine for shaping uppers over lasts, a gripper for pulling an upper over a last, said gripper comprising a pair of casings mounted to move together

and also relatively heightwise of the last, a pair of upper-gripping jaws carried by each of said casings, jaw-closing means in each casing, a gripper bar common to both casings, mechanism including a releasing member arranged to connect said gripper bar to the jaw-closing means in both casings for moving said means relatively to the casings to effect relative closing movements of the jaws and for thereafter moving the casings to cause the jaws to pull the upper in response to resistance of the upper to further relative movements of the jaws, springs arranged to apply force in one direction to the gripper bar and in the opposite direction respectively to the different casings and to hold the casings against movement until after the relative closing movements of the jaws, means for moving said releasing member to disconnect the gripper bar from the jaw-closing means in both casings after the pulling of the upper to cause the jaws to release the upper, and means responsive to that movement of said releasing member for locking the gripper bar and the casings against relative movement by said springs when the jaws release the upper.

12. In a machine for shaping uppers over lasts, a gripper for pulling an upper over a last, said gripper comprising a pair of casings mounted to move together and also relatively heightwise of the last, a pair of upper-gripping jaws carried by each of said casings, jaw-closing means in each casing, a gripper bar common to both casings, mechanism including a latch arranged to connect said gripper bar to the jaw-closing means in both casings for moving said means relatively to the casings

to effect relative closing movements of the jaws and for thereafter moving the casings to cause the jaws to pull the upper in response to resistance of the upper to further relative movements of the jaws, springs arranged to apply force in one direction to the gripper bar and in the opposite direction respectively to the different casings and to hold the casings against movement until after the relative closing movements of the jaws, means for moving said latch to disconnect the gripper bar from the jaw-closing means in both casings after the pulling of the upper to cause the jaws to release the upper, each of said casings having a plurality of teeth thereon, and pawls carried by the gripper bar and arranged respectively to engage the teeth on the different casings to lock the bar and the casings together against relative movement by said springs, said pawls being arranged to be moved by said latch into engagement with the teeth when the latch is moved to disconnect the gripper bar from the jaw-closing means.

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