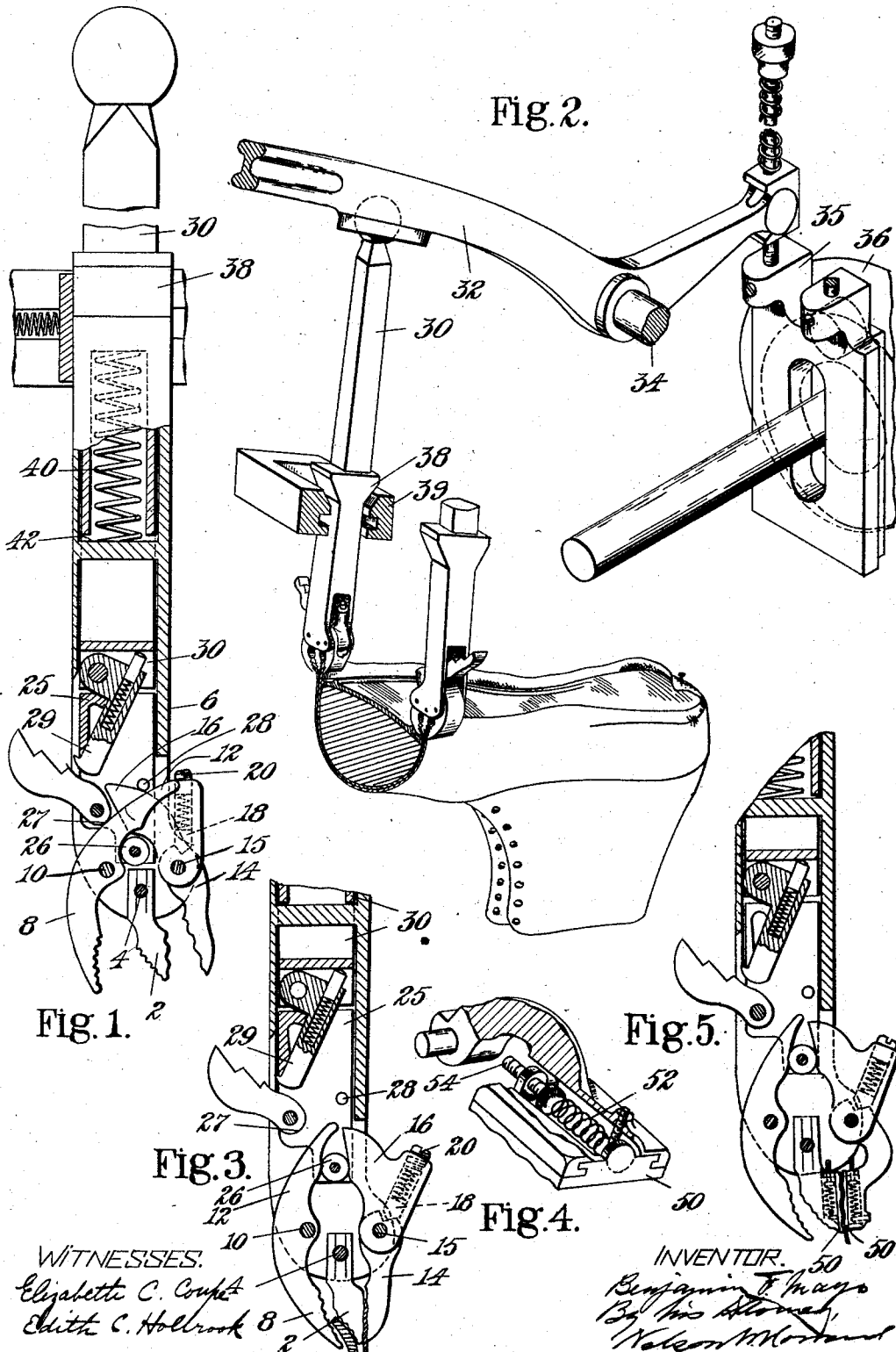


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GRIPPER.

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UNITED STATES PATENT OFFICE.

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GRIPPER.

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To all whom it may concern:

Be it known that I, BENJAMIN F. MAYO, a citizen of the United States, residing at Salem, in the county of Essex and Commonwealth of Massachusetts, have invented certain Improvements in Grippers, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to grippers mechanisms and particularly to mechanisms employed in working an upper over a last.

The upper material of a shoe usually comprises a plurality of thicknesses of stock including an upper and a lining. The lining which is usually of cloth, although sometimes a thin leather lining is used, requires very little or no straining, but merely needs to be pulled sufficiently to remove possible wrinkles and cause it to fit snugly to the last. The upper, however, often needs to be pulled sufficiently to stretch it more or less and particularly at certain portions of the shoe it is necessary to pull the upper severely to cause it to conform to the contour of the last. If the lining is pulled with the same force as the upper there is danger that the lining will be torn. Moreover, if the upper and lining are gripped and pulled alike the relatively inelastic cloth lining frequently used in shoes offers so much resistance that it is necessary to actuate the grippers with great force in order to pull the upper into its proper place.

Important objects of this invention are to avoid tearing or excessively straining the shoe lining and to obviate the need for using so much power in actuating the grippers to pull the upper. To this end the present invention contemplates the use of grippers which hold the upper and lining separately and, preferably, permit the lining to slip between the jaws while the upper is being pulled to a greater extent than the lining.

An important feature of this invention consists in a grippers mechanism having provision for gripping one thickness of stock, as a shoe upper, with less force than another thickness of stock, such as a shoe lining. The lining is thus enabled to slip in the grippers while the upper continues to be held and pulled. In the preferred embodiment of the inven-

tion the means for gripping the lining is yielding with relation to the means for gripping the upper, whereby the upper is more securely held than the lining.

In accordance with another feature of the invention the means for gripping the lining is adjustable with relation to the means for gripping the upper so that the relative forces with which the upper and lining are held and pulled may be varied according to the requirements of different conditions. As shown, the means for actuating the jaws for gripping the lining includes a yielding element and provision for adjusting the pressure applied by the yielding element. The gripping faces engaging the upper and those engaging the lining may be formed relatively as desired, but preferably the faces engaging the lining will be designed to allow the lining to slip between them more or less freely.

A further feature of the invention consists in the combination with a pair of movable jaws and an intermediate jaw, of a single operating device for actuating both the outer jaws toward the intermediate jaw. As shown, the intermediate jaw is rigidly mounted and the outer jaws are formed with arms engaging the operating device by which they are moved together in opposite directions toward the fixed intermediate jaw. The arm of one of the jaws is secured thereto by the yielding connection above referred to which comprises a spring-pressed plunger having a wedge-shaped end carried by the arm and seated between inclined walls of the jaw. An adjusting screw provides means for varying the tension of the spring and the force required to produce relative movement of the arm and jaw by causing the plunger to ride up an inclined face of the jaw. The yielding connection has also the advantage that it permits materials of different thicknesses to be gripped at one side of the grippers without affecting the hold which the other gripping faces obtain upon the stock interposed between them.

A further feature of the invention in a grippers mechanism which is intended to apply different pulling forces to different thicknesses of the stock held consists in arranging the means for engaging one thickness of stock so that it can move in the direction of the pulling strain relatively to the means for engaging another thickness

of the stock. In the illustrated embodiment of the invention in which one thickness of stock, as the upper is gripped between one outer jaw and the intermediate jaw and another thickness of stock is gripped between the intermediate jaw and the other outer jaw, one or both of the gripping faces engaging the lining are formed on blocks which are arranged to yield in the direction of the pulling strain. This yielding movement takes place against the tension of springs which are arranged to offer an increasing resistance as the movement progresses. By this arrangement the lining and the yielding mounted blocks may pull downwardly while the upper is being strained, but the blocks will remain in engagement with the lining so that it will not slip entirely out of the grippers and the pull upon it be wholly lost.

These and other features of the invention, including certain details of construction and combinations of parts, will be explained in the following description and pointed out in the claims.

In the drawings:—Figure 1 is a front view partly in section of a grippers mechanism embodying the invention; Fig. 2 is a perspective view showing the operating mechanism for the grippers and a modification in the formation of the jaws; Fig. 3 is a view similar to Fig. 1 but showing the grippers partly closed and Figs. 4 and 5 show a modification.

The rigid gripper jaw 2 is firmly secured by the bolt 4 to the support or casing 6. The pivoted jaw 8 on one side of the rigid jaw is fulcrumed on the pin 10 and has an upwardly extending arm 12. The pivoted jaw 14 is fulcrumed on the pin 15 and has an upwardly extending arm 16. The jaw 14 and arm 16 are formed separately, the hub of the jaw fitting into the bifurcated hub of the arm and being provided with a V-shaped recess into which fits the tapered head of a spring-pressed plunger 18. The tension of the spring may be adjusted by a screw 20 to vary the resistance to relative movement of the jaw and arm. The jaws 8 and 14 are actuated toward the fixed jaw to grip the stock by a slide 25, herein called the "operating device," which carries a roll 26, a hub 27, and a pin 28 for engagement with the arms 12 and 16. The roll 26 is located between the arms, which overlap as shown, and in the upward movement of the operating device wedges between the arms to force the jaws together. The hub and the pin engage respectively with the arms 12 and 16 to open the jaws when the operating device is moved downwardly. The device slides in the casing and is connected by a hook 29 with an endwise movable bar 30, the upper end of which is connected to a lever 32. The lever rocks on a fixed fulcrum

34 and at its rear end is connected by a slide 35 with a cam 36 by which the lever and bar are moved upwardly and downwardly. The casing 6 has shoulders at 38 to engage a fixed support at 39 and limit the downward movement of the casing and the gripper jaws. A spring 40 is interposed between the operating bar and a cross piece 42 of the casing. This spring is compressed when the bar is moved downwardly to force the operating device into position to open the jaws and the spring holds the casing and the jaws down until the bar and operating device have risen far enough to close the jaws firmly upon the stock after which the jaws are lifted to pull the stock.

In grippers intended for working an upper over a last the pivoted jaw 8 and the intermediate rigid jaw 2 are formed on their adjacent sides with gripping faces formed by roughening or corrugating them, to hold the upper leather securely while it is being pulled. The other pivoted jaw 14 and the adjacent side of the intermediate jaw have gripping faces which are preferably formed to engage the lining less securely than the upper is engaged. The smoother formation of the faces gripping the lining and the yielding connection between the jaw 14 and its arm 16 are both designed to facilitate the slipping of the lining after it has been pulled to the desired extent and while the upper continues to be strained by pulling it through a greater distance. By adjusting the screw 20 the extent to which the lining will be pulled before it slips may be changed to vary relatively the degree of strain applied to the upper and the lining. It will also be observed that the yielding connection or element between the jaw 14 and the operating device permits a firm grip to be obtained by this jaw upon stock varying in thickness without affecting the grip obtained by the jaw 8, notwithstanding both jaws are actuated by the same operating device. To this end the jaw 14 will preferably be arranged to close upon a minimum thickness of stock while the jaw 8 is gripping a thick portion of upper material. The jaw 14 will then yield with relation to its arm 16 when a thicker lining is gripped or when a thinner upper stock is seized by the jaw 8.

In addition to the provision made by the yielding connection 18 for the lining to slip or instead of that provision the gripping faces that engage the lining may be formed on sliding blocks 50, as shown in Fig. 5, that are arranged to move relatively to the body portion of the jaws in the direction of the pulling strain. The sliding blocks 50 are held in normal position by springs 52 against the tension of which they may move during the pulling operation. Adjusting devices 54 regulate the tension of the springs

according to the strain to which it is desired to subject the lining.

In the use of the invention one thickness of the stock, as, for example, a shoe upper, will be inserted between the jaws 8 and 2 and another thickness, as a shoe lining, between the jaws 2 and 14. When the lever 32 is actuated by the cam 36 the operating device 25 draws the roll 26 up between the arms 12 and 16 to close the jaws firmly upon the stock while the jaws and the casing are held from rising by the spring 40. When the uplifting force of the lever overcomes the tension of the spring the grippers are raised and pull upon the upper and the lining. When the slack has been taken out of the lining and it has been drawn to the last with the desired tension, determined by the adjustment of the yielding element 18, the lining will slip between the jaws 2 and 14 while the upper continues to be held and pulled through a greater distance. If the sliding blocks 50 are employed they will grip the lining and pull it with the upper until the resistance of the lining overcomes the frictional resistance to movement of the blocks in their jaws and also the resistance of the springs 52, after which the blocks will move downwardly in the jaws. One advantage possessed by the grippers having sliding blocks is that the stock does not pull out of the jaws, causing the tension on it to be lost as may sometimes occur when the stock slips between gripping faces that do not slide.

Having explained the nature of my invention and fully described one embodiment thereof, I claim as new and desire to secure by Letters Patent of the United States:—

1. In a grippers mechanism, means for separately gripping and pulling a shoe upper and a shoe lining, said mechanism being constructed and arranged to cause the upper to be gripped with greater force than the lining is gripped.

2. In a grippers mechanism, means for separately gripping and pulling a shoe upper and a shoe lining, combined with actuating mechanism constructed and arranged to cause the upper to be gripped harder than the lining is gripped.

3. In a grippers mechanism, means for separately gripping and pulling a shoe upper and a shoe lining, combined with actuating mechanism having provision for adjustment to vary the relative forces with which the upper and lining are gripped.

4. In a grippers mechanism, means for gripping a shoe upper and means for gripping a shoe lining, combined with a grippers closing device, a connection between the upper gripping means and said device, and a connection including a yielding element between the closing device and the means for gripping the lining.

5. In a grippers mechanism, means for gripping a shoe upper and means for gripping a shoe lining, combined with a grippers closing device, a connection between the upper gripping means and said device, and a connection including a yielding element between the closing device and the means for gripping the lining, said mechanism having provision for adjusting the relative forces with which the upper and lining are gripped.

6. In a grippers mechanism, a pair of movable jaws having operating arms, a single intermediate jaw, said mechanism being constructed and arranged to engage the superposed portions of the upper material of a shoe, combined with a single operating device engaging the two arms to actuate the outer jaws toward the intermediate jaw.

7. In a grippers mechanism, a pair of movable jaws having operating arms, an intermediate jaw, said mechanism being constructed and arranged to engage superposed portions of the upper material of a shoe, combined with means including a member adapted to be wedged between said arms for actuating the two outer jaws in opposite directions toward the intermediate jaw to grip the stock.

8. In a grippers mechanism, a pair of movable jaws, a rigid intermediate jaw, and a single operating device, said mechanism including provision for adjustment to permit the force applied with which one movable jaw is actuated to grip stock to be varied relatively to the force with which the other jaw is actuated.

9. In a grippers mechanism, a pair of movable jaws having operating arms, a rigid intermediate jaw, an operating device for engaging the arms, and a yielding connection between one of the jaws and its arm, said connection including a spring-pressed plunger carried by the arm and engaging the jaw, and means for adjusting the tension of the spring acting on the plunger.

10. In a grippers mechanism, means for separately gripping two superposed portions of stock and pulling the stock, comprising a plurality of gripping members, one of which is arranged to move relatively to another in the direction of the pulling strain while the stock is under tension.

11. In a grippers mechanism, a pair of outer gripper members, and a rigid intermediate gripper member, and means for actuating said members to grip and pull stock, said mechanism having provision for movement of one of the outer gripper members relatively to the other outer gripper member in the direction of the pulling strain while the stock is under tension.

12. In a grippers mechanism, means for separately gripping two superposed portions of stock and pulling the stock, comprising

gripping members engaging one portion of the stock which are movable in the direction of the pulling strain relatively to the members engaging the other portion of the stock.

5 13. In a grippers mechanism, opposed jaws having sliding blocks provided with gripping faces and arranged to move relatively to the jaws in the direction of the pulling strain while the gripped stock is held
10 under tension.

14. In a grippers mechanism, opposed jaws having sliding blocks yieldingly mounted in the jaws and provided with gripping faces, said mechanism being constructed and
15 arranged to permit the blocks to yield in the direction of the pulling strain while the gripped stock is held under tension.

15. In a grippers mechanism, opposed jaws, blocks having gripping faces arranged for sliding movement in the jaws in the direction of the pulling strain to be applied by the mechanism, springs for resisting the movement of the blocks, and means for adjusting the springs.

25 16. In a grippers mechanism, opposed jaws, a block having a gripping face arranged for sliding movement in one jaw, and an adjustable spring for resisting the movement of the block.

30 17. In a grippers mechanism, a gripper jaw and an operating arm therefor formed separately and pivotally connected, and a spring pressed plunger mounted in one of said members and arranged to engage the
35 other member for holding the jaw and the arm yieldingly in normal relation to one another.

18. In a grippers mechanism, the combination with a jaw and means for supporting it,
40 of a second jaw having a supporting arm pivotally connected therewith, and yielding means for normally holding the pivoted jaw and arm yieldingly in predetermined relation to one another.

45 19. In a grippers mechanism for a pulling-over machine, a rigid jaw, movable jaws on opposite sides of the rigid jaw and having gripping faces disposed directly opposite to one another, one of said movable jaws being
50 shaped and arranged to extend downwardly between the side of the last and the shoe lining and the other movable jaw having a face to grip the finished outer side of the shoe upper, means for yieldingly actuating
55 one movable jaw toward the fixed jaw, and means acting in a relatively unyielding manner to press the other movable jaw against the fixed jaw.

20. In a grippers mechanism for a pulling-

over machine, a pair of movable jaws having 60 gripping faces disposed opposite to one another and having upwardly extending operating arms extending into proximity to one another, an intermediate jaw, an automatically actuated operating device arranged be- 65 tween said arms to wedge them apart for closing the jaws upon the work, and a yielding connection between one of the jaws and its arm.

21. In a grippers mechanism for a pull- 70 ing-over machine, a rigid jaw, movable jaws on opposite sides of the rigid jaw and having gripping faces disposed directly opposite to one another, one of said movable jaws being shaped and arranged to extend down- 75 wardly between the side of the last and the shoe lining and the other movable jaw having a face to grip the finished outer side of the shoe upper, and means for actuating the two movable jaws with different forces ap- 80 propriate for causing the grip on the upper to be maintained while the lining may slip from between the jaws.

22. In a grippers mechanism for a pull- 85 ing-over machine, a pair of movable jaws having gripping faces disposed opposite to one another and having upwardly extending operating arms extending into proximity to one another, an intermediate jaw, automati- 90 cally actuated operating means for said arms and a connection between one of the movable jaws and its arm arranged to permit the force applied in actuating that jaw to be varied relatively to the force applied in actuat- 95 ing the other jaw.

23. In a grippers mechanism for a pull- 100 ing-over machine, a rigid jaw, movable jaws on opposite sides of the rigid jaw and having gripping faces disposed directly opposite to one another, one of said movable jaws being 105 shaped and arranged to extend downwardly between the side of the last and the shoe lining and the other movable jaw having a face to grip the finished outer side of the shoe upper, and connections between one 110 of the outer members and its actuating means constructed and arranged to permit that member to move relatively to the other outer member in the direction of the pulling strain while the stock is under tension.

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

BENJAMIN F. MAYO.

Witnesses:

ELIZABETH C. COUPE,
ARTHUR L. RUSSELL.