Feb. 13, 1973 A. MUHLBACH ET AL 3,715,767

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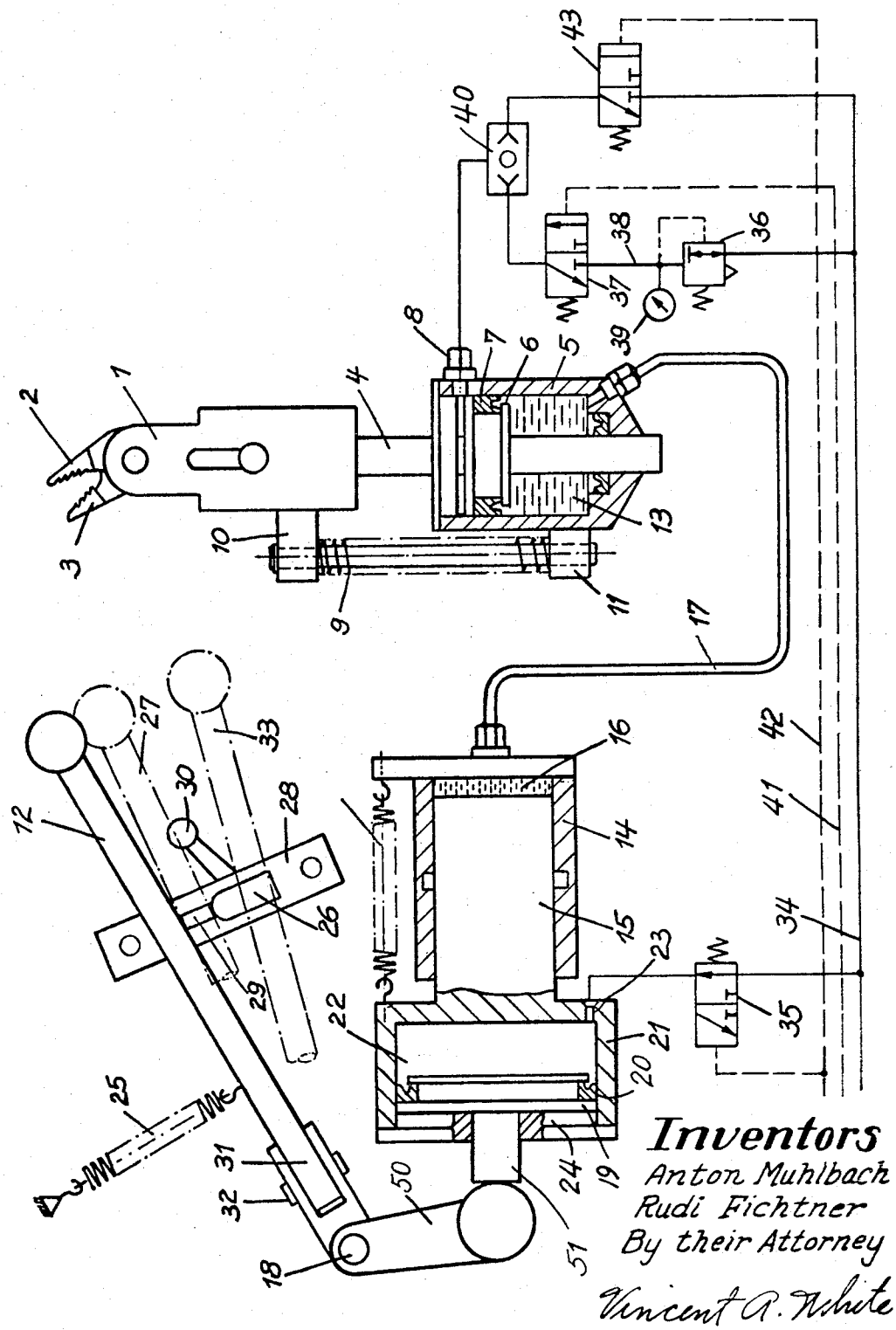
Filed April 29, 1971




Inventors
Anton Muhlbach
Rudi Fichtner
By their Attorney
Vincent A. White

United States Patent Office 3,715,767
Patented Feb. 13, 1973



3,715,767

# CONTROL MECHANISM FOR SHOE LASTING PINCERS

Anton Muhlbach, Frankfurt am Main-Sossenheim, and Rudi Fichtner, Ober Horgern, Germany, assignors to USM Corporation, Flemington, N.J.

Filed Apr. 29, 1971, Ser. No. 138,544
Claims priority, application Germany, Apr. 30, 1970, P 20 21 352.9
Int. Cl. A43d 23/00
U.S. Cl. 12—14.5 5 Claims

## ABSTRACT OF THE DISCLOSURE

A gripper actuating mechanism for shoe lasting machines including grippers movable to tension a shoe upper about a last, an adjusting lever connected through fluid means to follow the movement of the grippers and engageable with a stop to limit the gripper movement, said lever being disengageable from the stop so that movement of the lever causes an adjusting movement of the gripper.

## BACKGROUND OF THE INVENTION

In the production of shoes, for example, by means of a pulling and lasting machine, the shoe upper on the last is tensioned by pincers which grip the lasting margin of the upper and tension the upper over a form. In order that the upper material is not over-stretched in being pulled in this way over the last, stops have been provided in the path of the pincers to limit their movement. In this way the elongation of the upper produced by the pincers does not exceed a prescribed dimension. However, extensibility of upper materials, especially of leather, is not always the same from shoe to shoe, and it has proved desirable to compensate for this by varying the extent of pincer movement. This desirable compensation is, however, hindered by the stops mentioned above.

It is a general object of the invention to avoid, with a high degree of certainty, any over-stretching of upper material while retaining the ability to compensate for varying stretch of the materials from shoe to shoe. According to the invention, this is achieved by the provision of means by which the pincer movement is transferred to an adjusting lever and back again while the stop piece is arranged in the path of the lever during the initial pull of the pincers. The lever is disengagable from the stop for the purpose of aligning the shoe upper on the last. By these measures the effect of the stop to prevent over-stretching of the upper is retained without losing the effectiveness of the adjusting lever to compensate for varying stretch. Since the pincer movement and the adjusting lever are coupled and a stop is arranged in the path of movement of the lever, the lever is adapted to be disengaged from the stop to carry out the desirable compensation with the adjusting lever in an operator's hand.

It is expedient to design the stop piece as a stud that is adjustable as desired to different height positions. From this stud the adjusting lever can easily be disengaged in an advantageous and simple manner, i.e., by providing the lever with an articulation which makes possible a deflection of the compensator lever diagonally to its direction of movement during the pulling operation of the pincers. The means of transfer of pincer movement to the adjusting lever is advantageously provided by fluid pressure means so that it is a simple operation to provide for a further movement of the pincers independently of the lever and stop such as becomes necessary when the pincers, after releasing the lasting margin of the upper, retract to provide the necessary space for the wiping-in of the upper by lasting wipers. This is brought about by the



fact that the fluid pressure transfer means includes a piston carrying another cylinder with a second piston connected to the lever. The second piston is normally under pressure for the motion transfer action and by exhausting the pressure this second piston is free to move in the cylinder so that when the lever is against the stop the pincer can execute a further retracting movement in the direction of the pull.

The drawing represents a schematic example of a typical pincer actuating mechanism illustrative of the invention.

The drawing shows only those parts essential to an understanding of the invention which may be embodied in a combined pulling-over and lasting machine with only the parts required for the control of the pincers being shown. The pincer **1** is shown in the initial working phase before gripping a lasting margin of a shoe upper with both jaws **2** and **3** open. In this working phase the pincers are usually in their uppermost position. There is no need to discuss in this connection the activation of the pincer jaws **2** and **3** since it concerns a known technique and, moreover, the method of activating the pincer jaws plays no part in the invention. The pincer **1** is fixed on a piston rod **4** which extends into a cylinder **5**. Inside cylinder **5**, on piston rod **4**, a piston **6** with a seal **7** is secured. The downward movement of pincer **1** with piston rod **4** is brought about by supplying fluid under pressure, for example, air pressure, via an inlet **8** with pressure being exerted upon the upper face of the piston **6**. The downward movement of pincer **1** is executed against the action of a spring **9** which is supported at one end against a bracket **10** attached to pincer **1**, and at the other end against a boss **11** attached to cylinder **5**. The spring **9** will cause the pincer **1** to move upward to resume initial position whenever the air pressure is cut off from inlet **8**.

The movement of pincer **1** is transferred in the following way to an adjusting lever **12**. Pincer **1** and lever **12** are connected with each other through a fluid pressure means such as an hydraulic transfer. The transfer means consists of the cylinder **5** and the lower side of piston **6** whereby the cylinder and piston enclose a pressure chamber **13** filled with pressure fluid such as oil. A cylinder **14** and piston **15** are provided and form a pressure chamber **16**. Pressure chamber **13** and pressure chamber **16** are connected through a pipe **17**. Thus, when the pincer **1** moves down, the pressure oil in pressure chamber **13** is forced through the pipe **17** into the pressure chamber **16** and thereby moves the piston **15** to the left. In this displacement of piston **15**, a push rod **51** moves with it, pressing against an arm **50**, swinging the arm about a fixed axis **18**. The adjusting lever **12** is fixed to the arm **50** and thus is moved into one of the positions shown by dotted lines according to the displacement of pincer **1**.

The displacement of piston **15**, described above, does not operate directly on the push rod **51** since the rod is fixed on a piston **19** with a seal **20** which can move in a cylinder **21** formed on one end of piston **15**. In order that the displacement of piston **15** will carry with it piston **19**, the pressure chamber **22**, enclosed by piston **19** and cylinder **21**, is normally under fluid pressure, such as compressed air, which is supplied through an inlet **23**. As long as pressure is supplied to the pressure chamber **22**, the piston **19** and with it also the push rod **51** will move in conjunction with the displacement of piston **15**. In this way, piston **15** and push rod **51** move through the same distance, since piston **19** is held against a collar **24** of cylinder **21** under the effect of the air pressure supplied to pressure chamber **22**.

If the air pressure operating through inlet **8** on the piston **6** is cut off, the pincer **1** moves up under the effect of pressure spring **9**. In this, a return flow of oil takes place from the pressure chamber **16**, through the pipe **17**, into the pressure chamber **13**, whereby the piston **15**

will move to the right. During such movement, the arm **50** remains in contact with the push rod **51** through the action of a draw-spring **25** attached to the lever **12** so that arm **50** is held against the push rod. The above description thus shows that the movement of the pincer **1** is transferred completely, by means of the hydraulic transfer, to the correction lever **12**. Conversely, any movement of correction lever **12** must also be transferred to pincer **1** since any change in the position of correction lever **12** affects the pressure chamber **16** and makes the pincer **1** follow correspondingly. A prerequisite of this is, of course, that the air pressure fed into the pressure chamber **22** in cylinder **21** is sufficient to hold piston **19** against collar **24**. To this extent, therefore, as far as the movement of pincer **1** and correction lever **12** is concerned, the connection between them is a rigid one.

Within the path of movement of the adjusting lever **12**, a stop piece is provided in the form of the protruding boss **26** against which the lever **12** comes to rest. This stop position of the lever is shown by dotted lines with the reference **27**. The boss **26** is seated on a plate **28** which is secured to the frame of the machine (not shown). The plate **28** has a slot **29** in which the boss **26** can be adjusted in any particular position by means of a nut handle **30**. Depending upon the selected height position of stop piece **26** the lever engages the stop piece **26** to determine the stop position of the pincer **1** due to the rigid hydraulic transfer between the pincer and lever. Thus, according to the type of shoe that is being produced, an operator can select a particular adjustment of stop piece **26** and thereby select a particular tensioning of the upper on the last.

If it is necessary to make a correction of the position of the upper on the last, for example, due to some irregularity in the upper material, although the correction lever **12** has engaged the stop piece **26** and the position of pincer **1** for normal cases has been reached, the correction lever **12** may be disengaged from the stop piece **26**. For this purpose, lever **12** has an articulation **31** about an axis **32** so the lever can be swung away from the stop piece **26**. The lever can be held firm by the operator, at the heightwise position relative to the stop piece **26**, so that despite this disengagement of the correction lever **12** no change occurs in the height position of pincer **1**. It is only by such disengagement of the correction lever **12** that the lever can be moved down beyond the stop piece **26** into the position shown, for example, by dotted lines at position **33**, to produce a corresponding downward movement of pincer **1**. The operator can move the correction lever **12** past the stop piece in such a way that an additional pull is exerted on the gripped upper by means of pincer **1**, and the pincer follows the movement of the lever **12**. In this, the prerequisite is that the air pressure supplied through inlet **8** to the piston **6** is high enough that the pincer **1** can continue to overcome the tension of the gripped upper. In principle, however, this is always guaranteed since normally the adjusting lever **12** runs up against stop piece **26**. If the case should arise, one can produce a pincer movement in the opposite direction with an adjusting lever that activates a pincer on the other side of the shoe whereby the lever in question, not shown here, would thus be moved up, away from the relevant stop piece, whereby the pincer in question would then execute an upward movement. From the above it can be seen that the stop piece **26** in the path of lever **12** stops the movement of pincer **1** at the correct position in normal cases while at the same time it does not present any hindrance for a subsequent correction of the upper that an operator chooses to carry out by hand.

The general operation of the pincer mechanism will now be described in connection with the following system. Line pressure is supplied from a source (not shown) to line **34**. A valve **35** is fed from line **34** and is shown in its initial condition in which compressed air passes through the inlet **23** into the pressure chamber **22** to hold the piston **19** against the collar **24** of cylinder **21**. Line **34** also connects with a pressure regulating valve **36** which keeps its initial pressure virtually constant. Behind the pressure regulating valve **36** is a valve **37**, shown in its initial cut-off condition. On the connection **38** between the pressure regulating valve **36** and the valve **37** a manometer **39** is connected. The pressure of air, regulated by the regulator valve **36**, reaches a double return valve **40** when valve **37** is through connected, and from there it reaches inlet **8** where the air pressure can exert its effect upon piston **6**. The directed activation of valve **37** results from the air supply through a control circuit **41** which, when energized, provides a signal for the pulling-over action by pincer **1**. Thus, when the air pressure, regulated by the regulator valve **36**, passes through the valve **37** and the double return valve **40** and exerts its effect on piston **6**, the latter moves down as described above with its closed pincer jaws **2** and **3** and the shoe upper, and carrying with it also the adjusting lever **12** until the lever engages the stop piece **26**. At this time, the air pressure fed to the pressure chamber **22**, via the through-connected valve **35**, ensures that the piston **19** engages the collar **24**. Correction to the upper may be made by a further movement of the adjustment lever **12** after disengagement from the stop **26**.

The pincers are then opened and retracted to permit passage of the lasting wipers. For this purpose, control air is supplied to a control circuit **42** which produces the cut-off of valve **35** from line **34** and therewith the simultaneous exhaustion of pressure chamber **22**. Under the effect of drawspring **25**, the correction lever **12** can thus move away from the stop piece **26** into a higher position and the piston **19** can slide freely in cylinder **21** independently of the position of cylinder **21**. Any further displacement of piston **15** and of cylinder **21** is not effective to produce an accompanying movement of correction lever **12**. The control air supplied to the control circuit **42** also operates the valve **43**, which is also connected to the line **34**. The valve **43** is shown in its rest cut-off position, in which it has no effect upon the movement of piston **6** under the influence of the air pressure supplied via the pressure regulator valve **36**. When the valve **43** is actuated, the piston **6** receives an increased air pressure via the reversing double return valve **40**, i.e., the full pressure from line **34** so that the pincer **1** is moved further downward until the pressure oil has been completely expelled out of pressure chamber **13**. The pincer **1** has thereby reached its lowest retracted position, in which the lasting wiper can freely move, unhindered by the pincer **1**. The pressure oil expelled out of pressure chamber **13** imparts further movement to piston **15**, which at this time can no longer take the piston **19** with it since the piston **19** moves freely in cylinder **21**. After operation of the lasting wiper, the machine can again be restored to its starting position. To this end, the pressure to control circuits **41** and **42** is cut off and the valves **37** and **43** return to the cut-off position as shown. The pressure chamber above piston **6** is exhausted so that the pincer **1** can return to its upper position under the effect of spring **9**. Under the effect of the hydraulic transfer, the piston **15** moves to the right, assisted by the drawspring **44**. In addition, the cutting off of the control air from the control circuit **42** causes the valve **35** to return into its rest position as shown, in which the pressure chamber **22** is under pressure so that the piston **19** is once again held against the collar **24** and the transfer system between pincer **1** and lever **12** is again returned to the condition in which it ensures the transfer of movement.

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

**1.** A pincer operating mechanism for a shoe lasting machine including pincers for gripping the margin of a shoe upper, means for moving the pincers bodily to tension the upper, an adjusting lever engagable with a stop, fluid means arranged between the pincers and the lever

whereby movement of one controls movement of the other so that engagement of the lever with the stop limits movement of the pincers, the lever being disengagable from the stop to permit adjustment of the pincers by movement of the lever.

2. A mechanism according to claim 1 in which the fluid means includes a first cylinder having a first piston connected to the pincers for movement therewith, a second cylinder having a second piston connected to the lever, and a conduit between the first and second cylinders, said cylinders and conduit being filled with fluid so that the pincers and the lever move simultaneously.

3. A mechanism according to claim 2 in which the second piston carries a third cylinder having a third piston connected to the lever, and means are provided for alternately admitting and exhausting pressure fluid to the third cylinder whereby when the third cylinder is pressurized the lever and the pincer move in unison, and when the pressure fluid is exhausted the pincers may move independently of the lever.



4. A mechanism according to claim 1 in which the stop is adjustable to vary the tensioning movement of the pincers.

5. A mechanism according to claim 2 in which means are provided to admit pressure fluid to the first cylinder at one side of the first piston to cause bodily tensioning movement of the pincers, the other side of the first, piston being associated with the fluid means arranged between the pincers and the lever.

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PATRICK D. LAWSON, Primary Examiner