CONTROL MECHANISM FOR SHOE LASTING PINCERS

Inventors
Anton Muhlbach
Rudi Fichtner
By their Attorney

Vincent A. White
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
Inf. Cl. A43d 23/00

5 Claims

ABSTRACT OF THE DISCLOSURE

A gripping actuating mechanism for shoe lasting machines including grippers movable to tension a shoe upper about a last, an adjusting lever connected through fluid high degree to follow the movement of the grippers and engageable with a stop to limit the grip, the 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 last marginal part of the upper and tension the upper over a form. In order that the upper material is not over-stretched in being pulled over the upper 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 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 disengageable 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 study 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 transferring 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 last marginal part 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 pincher 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 pinchers 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 pinchers are usually in their uppermost position. To detail is needed 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 and 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 pincher 1 is executed against the action of a spring 9 which is supported at one end and at 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 piston 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 58. 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 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 53 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 pressure lever 12 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 correspondingly protrude or retract from this. 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 traction being produced, an operator can select a particular adjustment of stop piece 26 and therefore 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 moves 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 the collar 24 in the case that the air pressure supplied 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. Air is supplied from 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 on 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 lastling 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 draw-spring 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. When the pincer 1 has thereby reached its lowest retracted position, in which the lastling 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 pincer 19 with it since the piston 19 moves freely in cylinder 21. After operation of the lastling 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 draw-spring 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 in the case that the air pressure supplied 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 engageable 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.

References Cited

UNITED STATES PATENTS

3,157,897 11/1964 Morrill ----------- 12—14.5

PATRICK D. LAWSON, Primary Examiner