

[54] **WIPER STOP FOR SHOE LASTING MACHINE**

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 [58] **Field of Search**.....12/8.8, 12.4, 12.5, 10.1, 10.5

[56] **References Cited**
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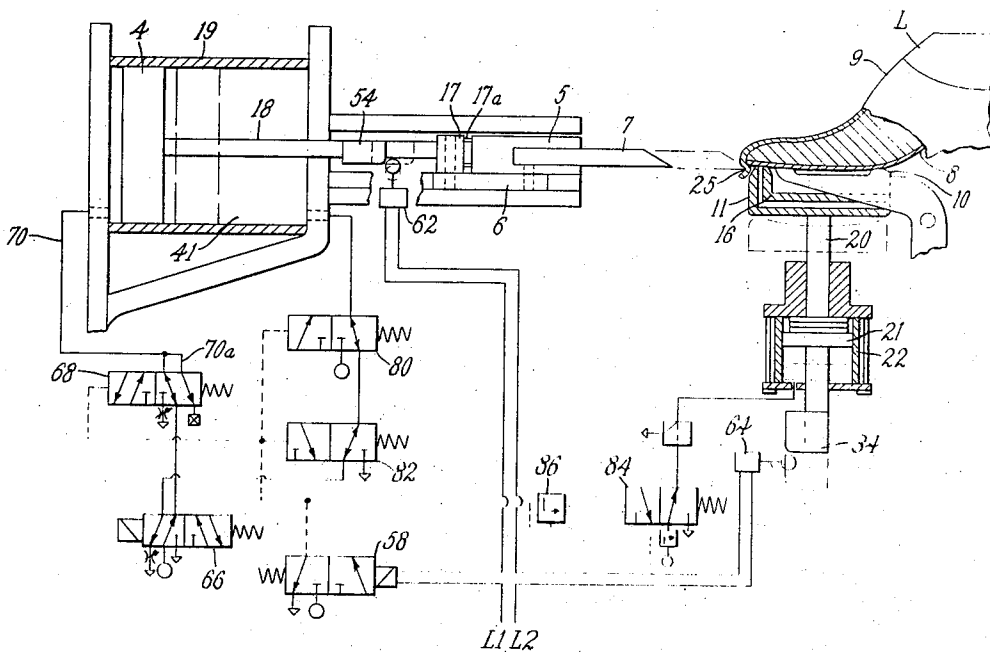
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[57] **ABSTRACT**

A shoe lasting machine having pneumatically operated wipers, in which a piston operatively connected to the wipers is automatically stopped by pneumatic circuitry at a predetermined intermediate position in its wiper operating movement so that the upper has been wiped over a shoe bottom only enough to hold an insole against the last bottom, after which an insole plate which previously held the insole is retracted and controls continued operation of the piston and movement of the wipers.

6 Claims, 2 Drawing Figures



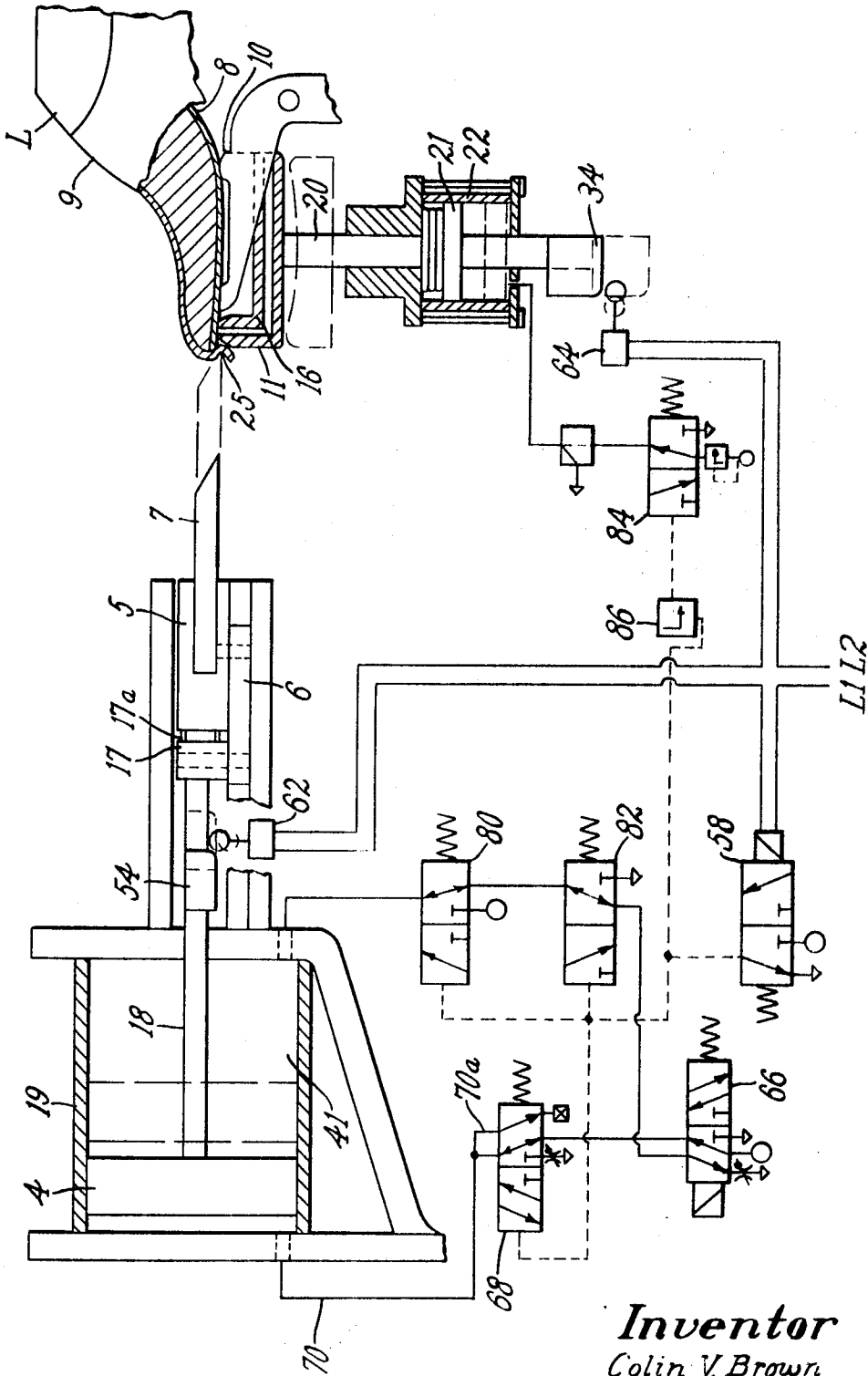
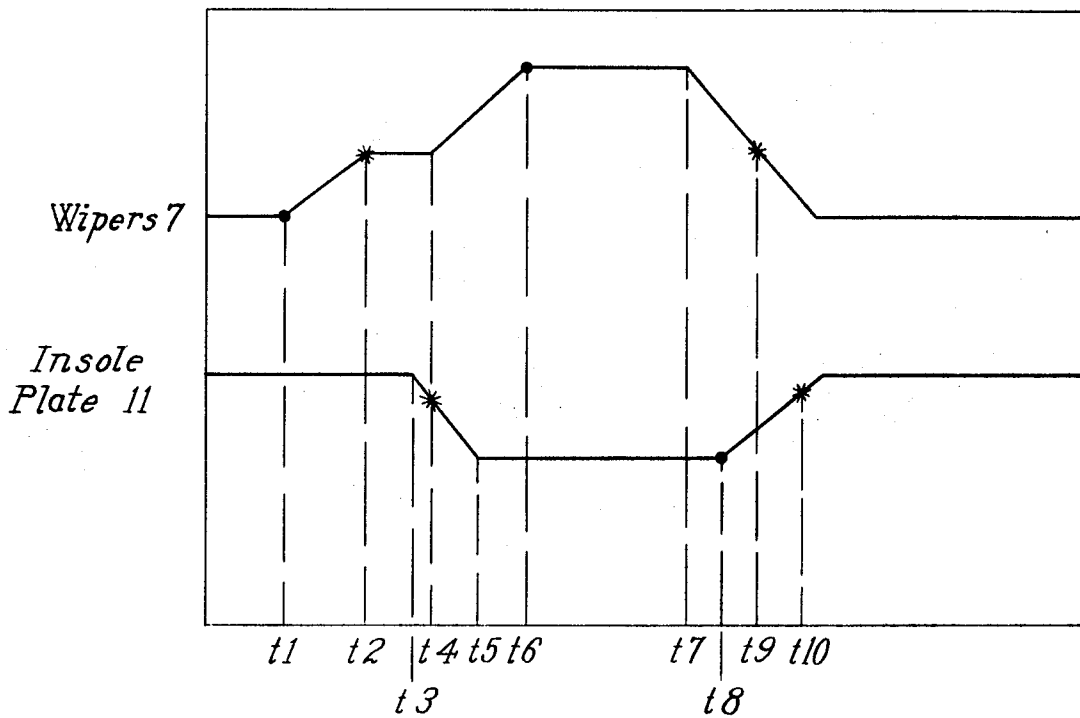


Fig.1

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Fig. 2



WIPER STOP FOR SHOE LASTING MACHINE

BACKGROUND OF THE INVENTION

This invention relates to improvements in machines for lasting the ends of shoes in which an upper and an insole are loosely assembled on a last. An end of the insole is held by a pressure plate against the bottom of the last adjacent its periphery and wipers last the upper about the adjacent end of the last and lay the margin inwardly over the insole, the pressure plate being automatically retracted out of interfering relationship with the wipers.

DESCRIPTION OF THE PRIOR ART

In application Ser. No. 3,912, filed Jan. 19, 1970 in the names of Rudi Fichtner et al., now U.S. Pat. No. 3,579,691, there is disclosed a shoe lasting machine having pneumatically operated wipers and an insole pressure plate engageable with the marginal portions of an insole around the toe end of the shoe to hold the insole in place until the wipers reach a position in which they press the marginal portion of the upper against the insole, to which adhesive may have been previously applied through the insole pressure plate.

To prevent damage to the machine, movement of the wipers is temporarily arrested to permit the pressure plate to be retracted before being struck by the wipers, but with the wipers in position to hold the insole against the last. Stopping of the wipers in the intermediate position is effected in the aforementioned application by providing a mechanical stop which is adjustable, and temporarily impedes the motion of the pneumatically operated piston. The rapid deceleration of the piston and associated mechanism with which it is in driving connection, causes the piston to "bounce" and some form of clamping device may be necessary to avoid this.

It is also known to employ a hydraulic means for temporarily arresting the stroke of the piston. For this purpose, a secondary piston and cylinder arrangement which is filled with hydraulic, and therefore incompressible fluid is provided for stopping movement of the pneumatic piston, valve means being provided for preventing the normal flow of hydraulic fluid from one side of the piston to the other as it moves in the cylinder, thereby immobilizing both said pistons. However, where the remainder of the cylinders on this or any other machine is actuated pneumatically, the need for a source of hydraulic fluid as well is often not convenient.

SUMMARY OF THE INVENTION

It is an object of the invention to provide a pneumatically operated shoe lasting machine having improved and simplified means for temporarily interrupting movement of the wipers in the lasting operation to permit the insole pressure plate to retract while the wipers hold the margin of the upper against the edge of the insole and hold the insole against the last bottom in the proper position.

To this end, and in accordance with a feature of the invention, air under line pressure is supplied to a first chamber of the cylinder of the pneumatic wiper operating motor remote from the face on which the piston rod is mounted, to move the wipers toward the shoe. At a predetermined point in the movement of the wipers, air under line pressure is supplied to the chamber of the cylinder at the side of the piston on which the piston rod is mounted. To compensate for the different effective areas of the opposite sides of the piston, due to the presence of the piston rod, air bleed means is provided to cause a slight reduction of pressure in the first chamber, so that the forces acting on opposite sides of the piston are equalized, and the movement of the wipers is rapidly and precisely arrested without any tendency to rebound.

The above and other objects and features of the invention, together with novel details of construction and combinations of parts will now be described with reference to the drawings and pointed out in the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic arrangement of a shoe lasting machine embodying the invention; and

FIG. 2 is a timing sequence diagram of the machine.

DESCRIPTION OF THE INVENTION

Referring to FIG. 1, there is shown a last L having an insole 8 and an upper 9 assembled thereon for a forepart lasting operation in the machine. The upper/insole/last assembly is carried by a support which is not shown completely but which includes a shoe rest 10 which contacts the underside of the insole 8 in a central portion of the forepart region and is of sufficiently small size so that it will not interfere with operation of the wipers of the machine even when in fully closed condition. The wipers 7 (only one shown) are each mounted in a wiper holder 5 which is slidable relative to a cam plate 6, forming part of a wiper head of the machine, it being understood that cam rolls carried by the wiper holders are guided by cam slots in the cam plate, to guide the wipers in their advancing and closing, inwiping movements. The wiper head (and wiper advancing and closing mechanism associated therewith) is movable between a retracted, inoperative, position remote from the shoe to an operative position adjacent the shoe prior to the advancing and closing movements of the wipers.

For advancing and closing the wipers, there is mounted for sliding movement relative to the cam plate 6 a block 17 secured to the outer end portion of a piston rod 18 of a pneumatic motor comprising a piston 4 and a cylinder 19. The block 17 is connected to the wiper holders 5 by a pair of double links 17a, (only one pair being shown). The piston rod 18 also carries a cam 54 projecting therefrom at a location between the cylinder 19 and the wipers.

The shoe rest 10 is partially surrounded by an insole pressure plate 11 which is arranged to press against marginal portions of the insole to ensure that the portions conform exactly to the curvature of the last bottom and is arranged to retract out of the path of the advancing wiping means, during operation of the machine, to avoid collision therebetween. The plate 11 may be provided with channels 16 through which adhesive may be supplied for application to the lasting margin of the insole. The insole plate 11 is therefore mounted on an upper end portion of a piston rod 20 of a pneumatic motor comprising a piston 21 movable in a cylinder 22, the piston rod 20 extending through both ends of the cylinder 22. The piston 21 is spring biased towards a lower position in the cylinder. The lower end portion of the rod 20 remote from the insole plate 11 is provided with a projecting cam 34.

In FIG. 1 the piston 4, the wiper 7, the insole plate 11 and the piston 21 are shown in full lines in the positions which they are in just prior to the start of a wiping operation of the machine. When such operation is started, the piston 4 is moved towards the right as shown in FIG. 1, carrying with it the piston rod 18 to advance and close the wipers.

When the cam 54 contacts a microswitch 62, contacts of the switch are closed to cause a solenoid valve 58 to operate, as described below, whereupon the piston 4 is arrested in the position shown in broken lines and the wipers 7 reach the position shown in broken lines. In this position the leading edges of the wipers have advanced to trap marginal portions 25 of the upper 9 against the outer area of the marginal portions of the insole which extend beyond the insole plate 11, i.e., the wiper movement is arrested just short of collision with the insole plate. Adhesive having been applied to the remaining area of the marginal portions of the insole 8 which is contacted by the insole plate 11, the insole plate is withdrawn, as explained below, to a position shown in broken lines. Withdrawal of the insole plate causes the cam 34 to operate a microswitch 64 which opens the previously closed circuit through the solenoid of the valve 58. As a consequence of this, the wipers are permitted to complete their inwiping stroke to wipe inwardly and press the marginal portions 25 of the upper 9 against the corresponding marginal portions of the insole 8.

The manner in which this sequence of operations is brought about is as follows. A circuit through a solenoid operated valve 66 is closed by the operator whereupon the valve assumes the position shown in FIG. 1 to permit compressed air from a main line to flow through a valve 68 and a line 70 leading to the cylinder 19 on the left side of the piston 4 as viewed in FIG. 1. A branch line 70a leads to a blank port in the valve 68 so that in the position shown air cannot escape therethrough. The piston 4 moves towards the position shown in broken lines and the cam 54 approaches the microswitch 62 and then contacts the switch to close it, thus completing an electrical circuit from lines L₁, L₂ which includes the normally closed microswitch 64 to energize the solenoid valve 58 thus directing pilot air to valves 68, 80, 82 and 84 to reverse these valves. Air thus passes to the right-hand chamber of cylinder 19 at line pressure from a source controlled by the valve 80. The valve 68, upon its reversal, directs compressed air at line pressure through the branch line 70a leading to the line 70 and the left-hand chamber of the cylinder 19, but with the valve 68 in this position air is permitted to bleed off through a restricted exhaust port of valve 68. The restriction on this exhaust port is adjusted to compensate for the smaller effective area of the piston face exposed in the right-hand chamber of the cylinder 19 because of the area of the piston surface on which the piston rod is mounted. Thus the piston 4 is held in the position shown in broken lines. Pilot air to the valve 84 passes through a pressure regulator device 86 which ensures a slight delay before the valve 84 reverses to exhaust air from the cylinder 22 so that the insole plate 11 drops under spring pressure. The delay ensures that the wipers have reached and been halted at the position shown in broken lines, before the insole plate is withdrawn. As the insole plate and the piston 21 descend, the cam 34 contacts the normally closed microswitch 64 to open it, thus breaking the circuit which has been maintaining energization of the solenoid of the valve 58 whereupon the valve returns to the position illustrated to cut off pilot air from the valves 68, 80, 82 and 84, to return line air without a bleed off to the left-hand chamber of the cylinder 19 and to open the right-hand chamber to exhaust, thus causing the resumption of travel to the piston 4 and of the inwiping and closing movement of the wipers 7. A pressure regulator device prevents the immediate supply of air through valve 84 to raise the insole plate.

At the end of a dwell period during which the wipers press the marginal portions of the upper against the insole until the adhesive has set adequately, the solenoid valve 66 is reversed to return the machine to the condition it was in at the commencement of the cycle of operations above described, air under pressure being directed to the right-hand chamber 41 of the cylinder 19 and the piston 4, whereupon the wipers 7 move to the left as viewed in FIG. 1. As they do so the cam 54 rides off the switch 62 to return it to the open position. Thus both the switches 62 and 64 are now open. By this time the air supply through the valve 84 to the lower chamber of the cylinder 22 has begun to raise the piston 21 and with it the insole plate 11, and the cam 34 now rides off the switch 64 which closes.

In FIG. 2 the above described operations are represented in the form of a timing diagram. At the time t_1 the solenoid valve 66 is operated so that air is supplied through the valve 68 and

the line 70 to cause the piston 4 to move to the right. The consequent movement of the wipers 7 is shown in FIG. 2, where at time t_2 the microswitch 62 is closed to energize the solenoid valve 58 to supply pilot air to reverse the valves 68, 80, 82 and 84 and movement of the wipers is arrested. After the delay caused by the pressure regulator device 86 (from times t_2 to t_3) the insole plate 11 commences its downward movement. At the time t_4 the switch 64 is opened and the solenoid of the valve 58 is de-energized to permit the resumed movement of the wipers 7. At the time t_5 the insole plate is fully retracted and at the time t_6 the wipers are fully closed. A dwell period of sufficient duration to ensure adequate setting of the adhesive takes place between times t_6 and t_7 , the solenoid valve 66 operating at the time t_7 to reverse the movement of the piston 4 and thus of the wipers 7, the cam 54 riding off the switch 62 at the time t_8 . Meanwhile the insole plate 11 has commenced to rise at the time t_8 thus causing the switch 64 to close at the time t_{10} .

Having thus described my invention, what I claim as new and desire by Letters Patent of the United States is:

1. A shoe lasting machine having a member for holding an insole against the bottom of a last and wipers movable along a path for laying the margin of a shoe upper on the last inwardly over the bottom of the insole, an air operated motor for moving the wipers comprising a cylinder and a piston movable therein and operatively connected to the wipers, means for directing air under pressure to said cylinder at one side of said piston for moving the wipers toward the last, and means for directing air under pressure to said cylinder at the opposite side of said piston for arresting movement of the wipers in an intermediate position over the edge of the insole sufficient to hold the insole against the last bottom.

2. A machine according to claim 1 in which the connections between the piston and the wipers include a piston rod, and a cam is carried by the piston rod for initiating operation of the last named air directing means.

3. A machine according to claim 2 in which the cam is adjustable to vary the intermediate position of the wipers.

4. A machine according to claim 1 in which means are provided to retract the member from the insole while the wipers are in their intermediate position, said retracting means operating to exhaust the air from said opposite side of said piston whereupon the wipers complete their wiping movement.

5. A machine according to claim 2 in which means is provided to control the pressure of the air at said one side of said piston to compensate for the reduced effective area of said opposite side of said piston due to the presence of the piston rod.

6. A machine according to claim 2 in which air under main line pressure acts on said one side of said piston to move the wipers toward the last and in which air under the same main line pressure acts on said opposite side of said piston to stop the wipers in the intermediate position, there being means for reducing the pressure at said one side of the piston concomitantly with the application of main line pressure to said opposite side of said piston just sufficiently to compensate for the reduced effective area of said opposite side of said piston due to the presence of the piston rod, whereby the wipers are locked in said intermediate position.

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