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(54) Operating head for automatic, continuous ironing of the toe, heel and sides of uppers fitted on lasts.

(57) This invention concerns a mechanical device for pressing shoe vamps, capable of operating in an automatic cycle in continuous and rapid succession, at the front where the toe is, at the rear where the heel is, and also laterally, along the sides of the vamp.

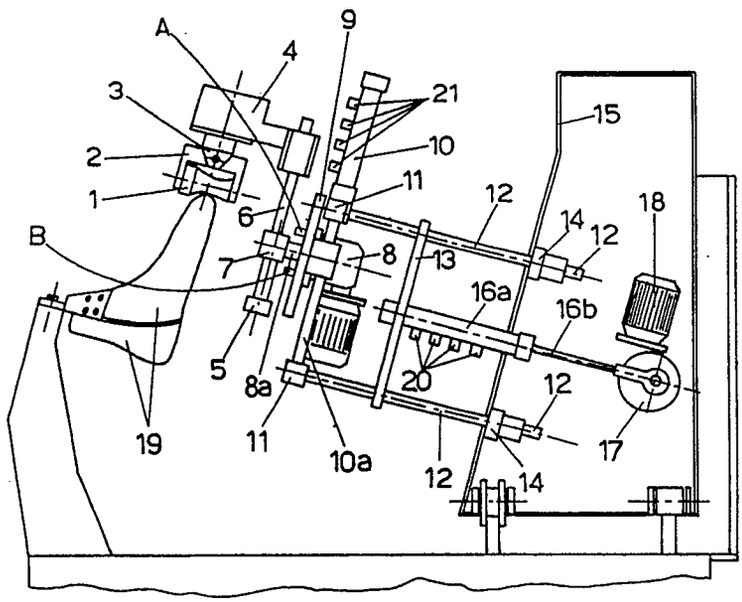

FIG.1

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The subject of this industrial patent application is a mechanical device for the pressing of shoe vamps capable of operating in an automatic cycle in continuous and rapid succession at the front where the toe is, at the rear where the heel is and also laterally, along the sides of the vamp.

The pressing procedure necessary for the flattening and elimination of creases formed in the skin near and along the seams is currently performed by automatic machines with one or more work stations whereby the vamp, fitted over a special pre-heated aluminium last, is subjected to the hammering and rolling action of a shaped roller that rotates freely around its longitudinal axis, pinned between the prongs of an oscillating fork to which a vibrating motion is conveyed, thus enabling the roller to flatten out the creases in the skin.

The fork that supports the roller is anchored to articulated supports that enable the roller to be pressed against the last and to rotate so that the roller itself can move back and forth around the entire front tip of the vamp.

While the shaped roller rotates over and around the front part of the vamp it is constantly struck by a pneumatic hammer and made to run from top to bottom and vice versa along the side of the vamp in such a way as to flatten and evenly iron out the creases in the skin, thus re sulting in a true and proper pressing of the latter.

Despite the fact that pressing is often also necessary at the sides and rear of the vamp, in other words the part that cradles the heel of the foot, situated above the shoe heel, none of the automatic machines currently produced for pressing vamps fitted over lasts are capable of carrying out this procedure which can only be effected by special machines provided for the purpose and limited to the heel of the vamp. This means that when a model of footwear requires double pressing, at both the toe and heel, it is necessary to transfer the vamps from one machine to another, wasting a considerable amount of time and labour.

If one bears in mind the fact that not all footwear factories possess these specific machines for pressing the rear of the vamp and therefore have to resort to external labour for this operation, it immediately becomes obvious how production costs are increased by expenses incurred for the transportation of the vamp from the factory to an external workshop and vice versa.

The aim of this invention is to improve upon the currently existing operating heads for the automatic pressing of shoe vamps in order to enable processing to take place in continuous and rapid succession over the whole of the vamp, both at the front and rear and also along the sides.

The solution according to the invention basically relies upon the principle of making the support of the abovementioned roller,which actually carries out the pressing process, effect a course around the whole of the outer edge of the vamp fitted over the last, in that the work cycle includes two phases of operation during which the roller assumes a rotating motion at the heel and the toe, and two phases of operation during which the roller assumes a translating motion at the sides of the vamp.

In other words, the roller is first pulled along a semicircular trajectory during which the toe is pressed; then , without stopping, the roller embarks upon a rectilinear course during which the side of the vamp is pressed, following which the same roller effects another semi-circular trajectory around the heel, and then a final rectilinear course along the other side of the vamp until it draws to a halt at the point where its journey began and from whence the work cycle can be repeated.

A further aim of the invention is to provide a self-adjusting device for the aforementioned pressing head so that the translations effected on the sides of each last can be automatically varied each time, depending on the size of the vamp being pressed at that moment, thus eliminating any calibration procedures and, above all, enabling the pressing station to be loaded with a series of different sized vamps fitted over a series of lasts arranged in any order, with no kind of limitation whatsoever.

The self-adjusting device in question consists of a pair of optical sensors aligned one above the other on the mobile support carriage of the pressing tool, lying on a vertical plane that passes along the longitudinal axis of the last. Said sensors function in such a manner that the downward movement of the carriage is automatically halted when the lower sensor, as it is moved downwards, passes beyond the heel of the last, while during the upward movement of the carriage the tool is automatically moved away from the vamp when the upper sensor passes upwards beyond the toe of the last, the latter event occurring exactly when the pressing tool returns to the point at which its journey around the last began.

Furthermore, the upper sensor also controls the halting of the downward movement of the pressing tool when when it initially moves towards the last, stopping in the position from which its course around the vamp will begin.

For greater clarity of explanation, the description of the invention continues with reference to the enclosed drawings, provided for illustrative and not limitative purposes, wherein:

- Fig.1 is a schematic illustration of a side view of the pressing head in question, equipped with the two optical sensors, with the pressing tool

operating at the toe of the vamp.

- Fig.2 is an orthographic projection, from left to right, or fig.1.

With reference to the abovementioned drawings, according to a conventional structural composition, the pressing roller (1) is free to rotate around its longitudinal axis, sustained between the prongs of a fork (2) in turn free to oscillate around a pin (3) positioned at right-angles to the longitudinal axis of the roller (1); said pin (3) links the fork (2) to a supporting head (4), which, activated by means of a pneumatic cylinder (5) is able to run along the two cylindrical guides (6) protruding parallel to one another from a strong transversal bar (7).

Normally, on the supporting head (4) any mechanical or pneumatic device can be installed that is capable of conveying to the roller (1), through the fork (2), the oscillations and vibrations necessary to carry out the required pressing operation.

As part of the innovative solution according to the invention, anchored at the rear of the bar (7), in the centre, there is the shaft (8a) of a ratio motor (8) installed at the back of a carriage (9) which can be made to move by means of a hydraulic cylinder (10) along two subvertical cylindrical guides (10a) which run parallel between two supporting crosspieces (11), to the uppermost of which, in the centre, the aforesaid cylinder (10) is attached.

From the ends of the crosspieces (11) four cylindrical bars (12) project rearwards through a rectangular supporting platfrom (13) to which they are fixed, and through four supporting and guiding bushes (14) which are securely anchored to a carrying frame (15).

Projecting from the rear of said supporting platform (13), in the centre, is the liner (16a) of a hydraulic cylinder, the rod (16b) of which is eccentrically hinged to a disk (17) made to rotate by a ratio motor (18) anchored to the carrying frame (15).

With reference to the description given and the enclosed drawings, the work cycle that can be achieved using the pressing head as per the invention will now be considered.

When the last upon which the vamp is fitted arrives at the pressing station, the roller (1) is immobile in a withdrawn position since the rod (16b) is retracted inside the liner (16a) and, with the aid of the cylindrical bars (12) joined thereto, the platform (13) has pulled back the supporting frame consisting of the guides (10a) and crosspieces (11) of the carriage (9).

The work cycle begins with the expulsion of the rod (16b) from the liner (16a) which causes the roller (1) to move to a position above and to the side with respect to the last (19).

At this point, the cylinder (10) comes into action, lowering the carriage (9) which stops automatically when optical sensor (A) intercepts the toe of the last (19).

Consequently, the roller (1) finds itself beside the last (19) exactly at the point in which it has to begin its course around the last against which it abuts and is pressed as a result of the activation of cylinder (5) which controls the running of the head (4) along the guides (6) until the roller (1) is flush against the vamp.

At this point the ratio motors (8) and (18) come into play, the roller (1) can therefore begin its semicircular trajectory around the toe of the last (19), said roller being endowed with an oscillating motion due to the eccentric connection of the rod (16b) to the disk (17) which rotates, driven by the ratio motor (18).

Once the shaft (8a) has rotated through 180°, the ratio motor (8) momentarily stops and at the same time the pneumatic cylinder (10) comes into action, pushing the carriage (9) downwards until the lower optical sensor (B), positioned on said carriage (9) below the other optical sensor (A), passes beyond the heel of the vamp,the position of said optical sensor (B) on the carriage (9) having been carefully chosen so that when this happens the descending roller (1) is effectively at the point in which it has to begin its semicircular course around the heel.

Thus, when the optical sensor (B) passes beyond the heel of the last, the cylinder (10) is automatically dis-and at the same time the ratio motor (8)is re-activated, enabling the roller (1), driven in a semicircular course around the heel, to press this rear zone of the last.

Once the course around the heel has been completed the ratio motor (8) stops again and at the same time the cylinder (10) is re-activated which, as it now retracts, causes the carriage (9) to move upwards, enabling the roller to press the other side of the vamp.

The cylinder (10) continues to function until the carriage (9) arrives at the upper limit of its course and consequently, during this ascent, the roller (1) passes beyond the point in which its course around the vamp began.

It should be emphasised, however, that when the roller (1) reassumes the start-of-course position, the cylinder (5), controlled by the upper optical sensor (A) causes the supporting head (4) to retract, thus moving the roller (1) away from the vamp; the former, therefore, when the carriage (9) has completed its ascent, finds itself in a position above and to the side with respect to the last (19) upon which the vamp that has just been pressed is fitted.

The optical sensor (A) comes into play when, moving upwards with the carriage (9), it passes

beyond the toe of the last (19) in that the postion of optical sensor(A) on the carriage (9) has been carefully chosen so that when this happens the roller (1) finds itself exactly at the point in which its journey around the last began.

Attention should also be paid to the fact that, by means of a set of microswitches (20) situated on the liner (16a) it is possible, when pressing the two sides of the vamp, to move the carriage(9) back or forth according to a preset value so that the roller (1) can follow the curvilinear form of the longitudinal outline of the last which obviously varies according to the height of the heel chosen for the vamp being processed.

Said microswitches (20) work in combination and are synchronised with a further set of microswitches (21) situated on cylinder (10), so that selected strokes of the cylinder rod correspond to preset backwards and forwards movements of the carriage (9), in that the positions of all microswitches (20 and 21) are fully adjustable, enabling a perfect pressing of the vamp to be obtained on any shape or size of last.

Claims

1) Operating head for the continuous automatic pressing of the toe, heel and sides of vamps fitted onto lasts, of the type composed of a roller (1) free to rotate between the prongs of an oscillating and vibrating fork (2) hinged to a supporting head (4) which, activated by a pneumatic cylinder (5), can slide along a pair of parallel guides (6) which protrude from a robust transversal bar (7), said operating head being characterised by the fact that at the rear of the transversal bar (7), in the centre, the shaft (8a) of a ratio motor is anchored, the latter being installed at the rear of a carriage (9)that can be made to run, by means of a hydraulic cylinder-(10) along the two subvertical cylindrical guides that extend parallel to one another between two supporting crosspieces (11) from the ends of which four cylindrical bars(12) project rearwards and cross a supporting platform (13), to which they are fixed, and then run through four supporting and guiding bushes (14) firmly anchored to a carrying frame (15), it having been provided that in the centre of said supporting platform, at the rear, there projects the liner (16a) of a hydraulic cylinder, the rod (16b) of which is eccentrically hinged to a disk (17) made to rotate by a ratio motor (18) anchored to the carrying frame (15).

2) Operating head for the continuous automatic pressing of the toe, heel and sides of vamps fitted onto lasts, according to claim 1), characterised by the fact that the work cycle effected by the operating head according to the invention includes:

- an initial stroke of the roller (1) following a semicircular trajectory around the toe of the last (19), said roller being driven as a result of the rotation of the shaft (8a) through 180°;
- a second stroke of the roller (1) following a linear trajectory, during which the carriage (9) is made to run downwards by the cylinder (10) so that it causes the roller (1) to move from the toe to the heel of the last (19) along the side thereof;
- a third stroke of the roller (1) following a semicircular trajectory around the heel of the last (19), as the result of a further rotation of the shaft (8a) through 180°;
- a fourth stroke of the roller (1) following a linear trajectory, during which the carriage(9)is called back up by the cylinder (10) so that the roller is brought back to a position close to the toe of the last, exactly where its course around the last started and from where the operational cycle can repeat itself on the next vamp to be pressed.

3) Operating head for the continuous automatic pressing of the toe, heel and sides of vamps fitted onto lasts according to the previous claims, characterised by the fact that on the liner (16a) and the hydraulic cylinder (10) there are two series of microswitches (20 and 21 respectively) that work together, in combination, allowing the carriage (9) to be moved forwards or backwards over a preset distance when said carriage passes beyond set points during its linear journeys along the sides of the last (19).

4) Self-adjusting device for an operating head for the automatic pressing of the toe, heel and sides of vamps fitted onto lasts, as per the previous claims, characterised by the fact that it includes two optical sensors(A and B) positioned on the carriage (9), aligned one above the other, on a vertical plane that passes through the longitudinal axis of the last (19) upon which the vamp to be pressed is fitted, said sensors functioning in such a manner that:

- the downwards journey of the carriage (9),during which one of the two sides of the vamp is pressed, is automatically halted, disactivating cylinder (10) when the lower sensor (B) passes beyond the heel of the last (19);
- the pressing roller (1) is automatically distanced from the vamp due to the activation of cylinder (5) when, during the upwards return journey of the carriage (9), the roller (1) passes through the point at which it started its course around the last (19);
- the downwards motion of the carriage (9), by means of which the roller (1) is brought close to the last (19) before commencing the actual pressing operation, is automatically halted, disactivating cylinder (10) when the upper sensor (A) passes beyond the toe of the last;

5) Self-adjusting device according to claim 4)

characterised by the fact that the upper optical sensor (A) is positioned on the carriage (9) in such a way that whenever said sensor intercepts the toe of the last (19), whether the carriage is moving upwards or downwards,the roller (1) always finds itself at the point of departure from whence it has to begin its course around the last.

6) Self-adjusting device according to claims 4)- and 5), characterised by the fact that the lower optical sensor (B) is positioned on the carriage (9) in such a manner that when said sensor (B) intercepts the heel of the last (19) the roller (1) finds itself at the point of departure from which it has to start its semicircular course around the heel of the last.

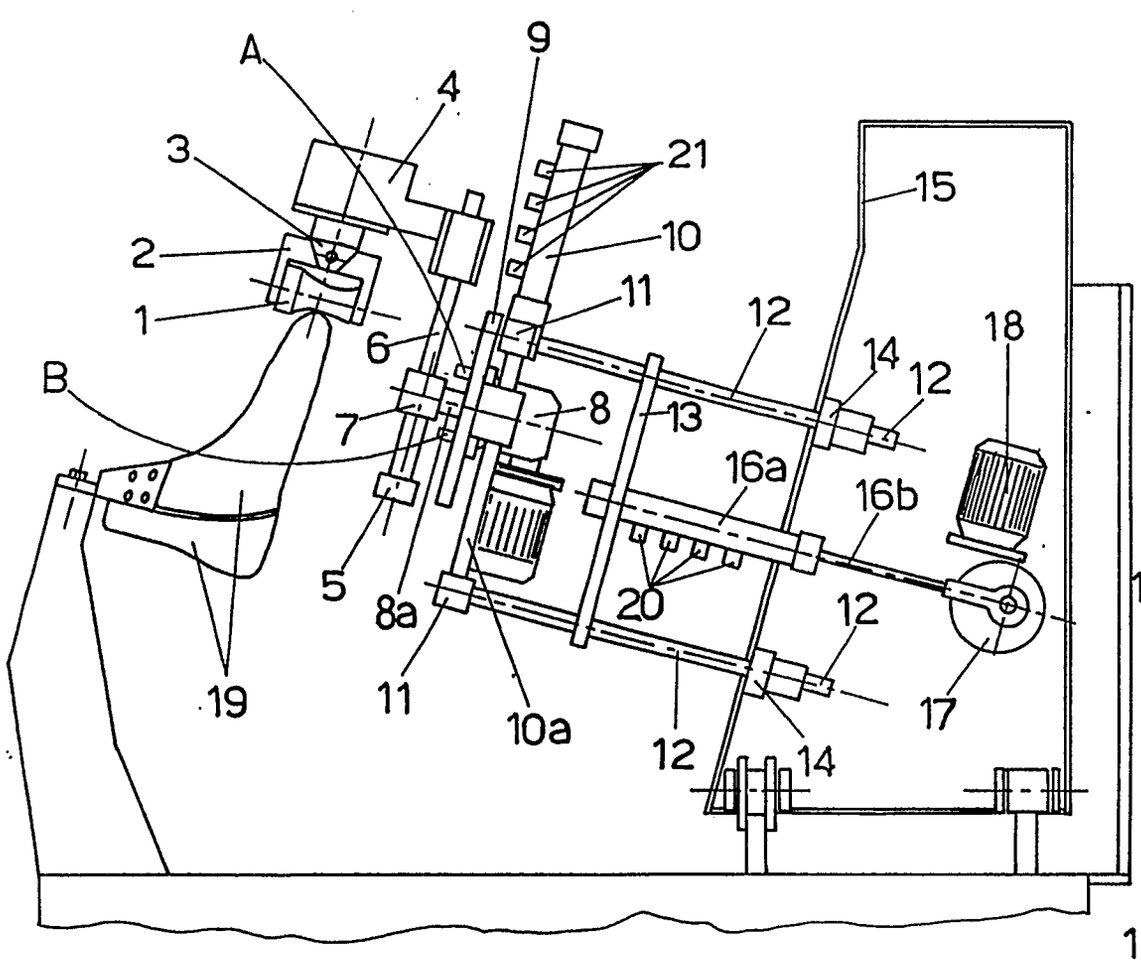

FIG. 1

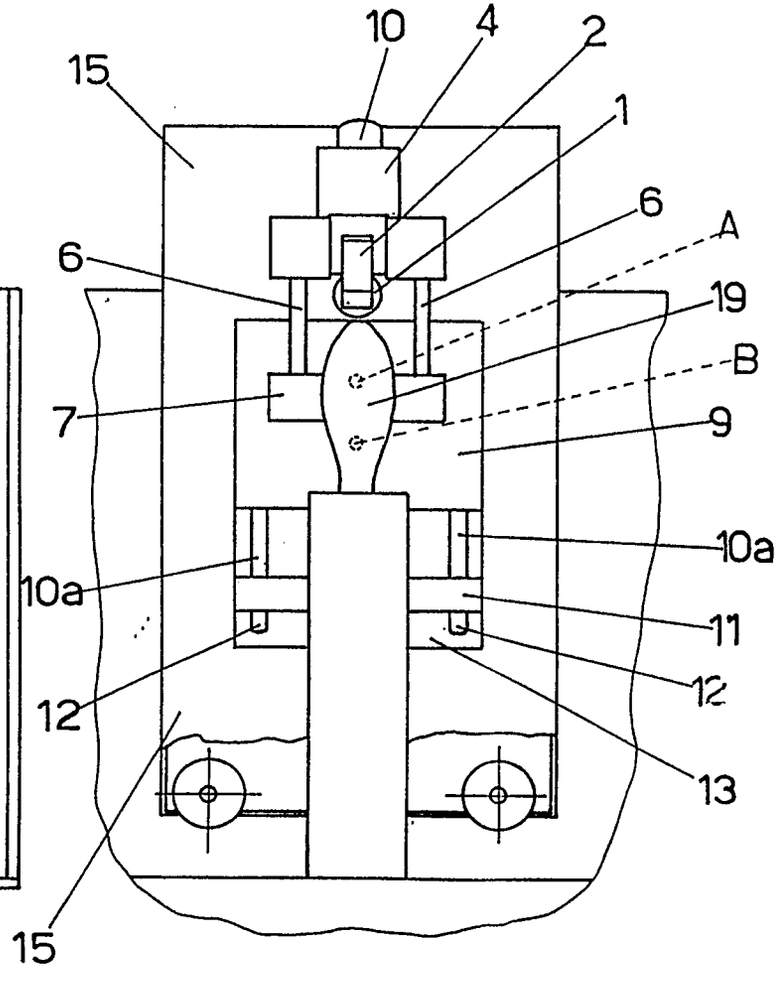

FIG. 2

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EUROPEAN SEARCH REPORT

Application Number

EP 89 83 0286

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	FR-A-2 535 952 (UBALDI, BELLETTI) * Fig 1,2; abstract * -----	1	A 43 D 95/02 A 43 D 113/00

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

A 43 D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	08-02-1990	SUENDERMANN R.O.

CATEGORY OF CITED DOCUMENTS

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