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Funck

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[54] LAST FOR THE MANUFACTURE OF SHOES

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[57] ABSTRACT

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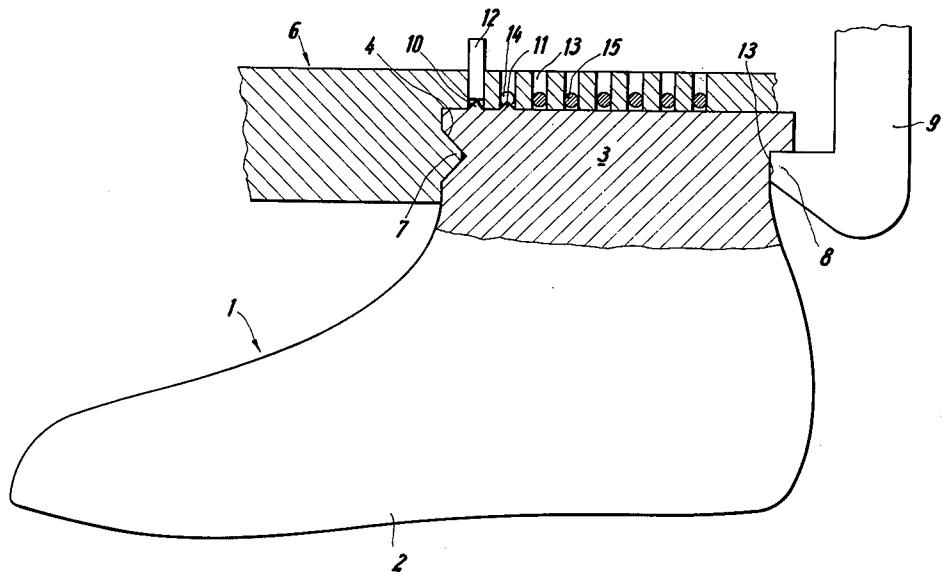
A last for producing shoes has retaining elements on its neck. These elements serve to clamp the last in a shoe making machine. Marks on the last cause automatic setting up of processing and conveying devices.

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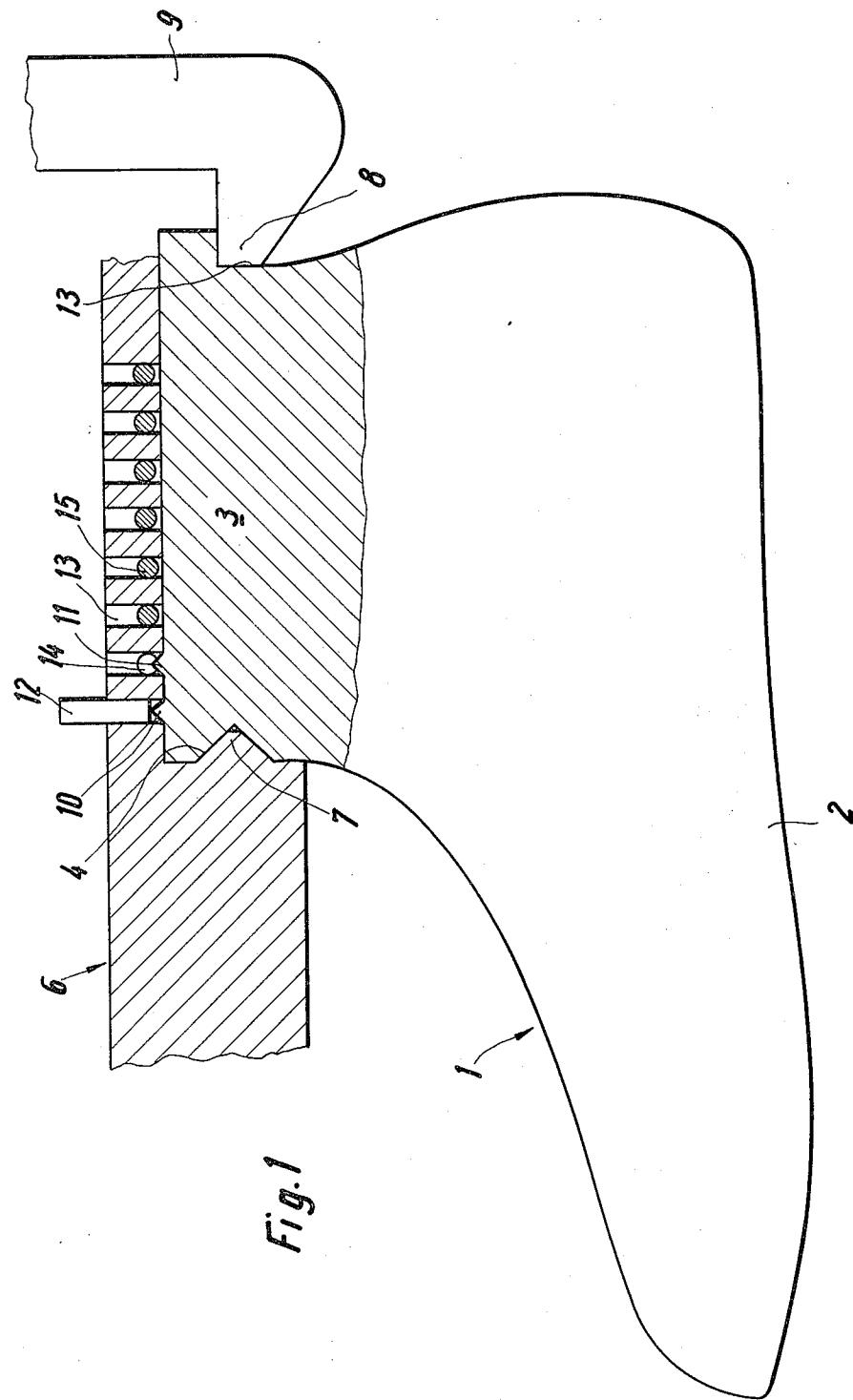
10 Claims, 4 Drawing Figures



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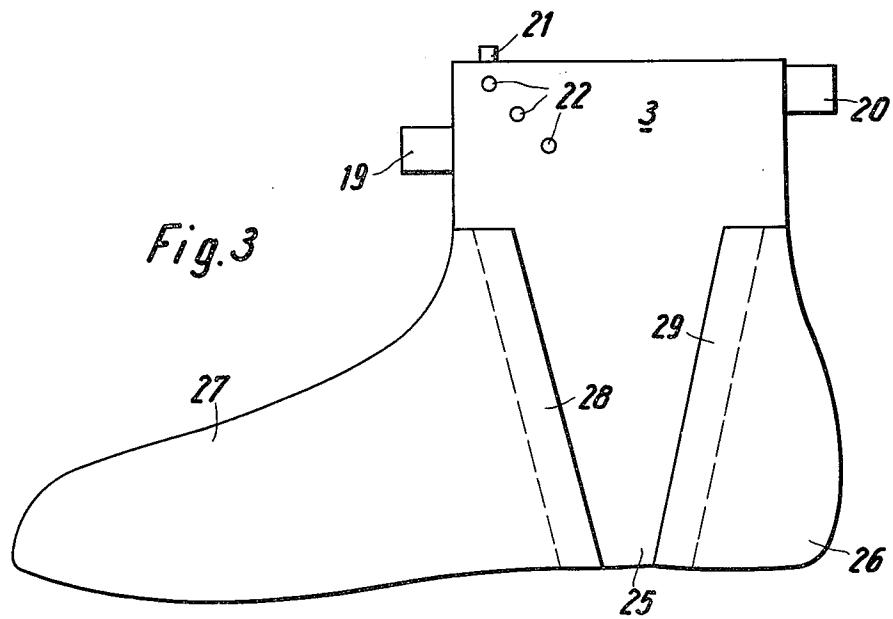
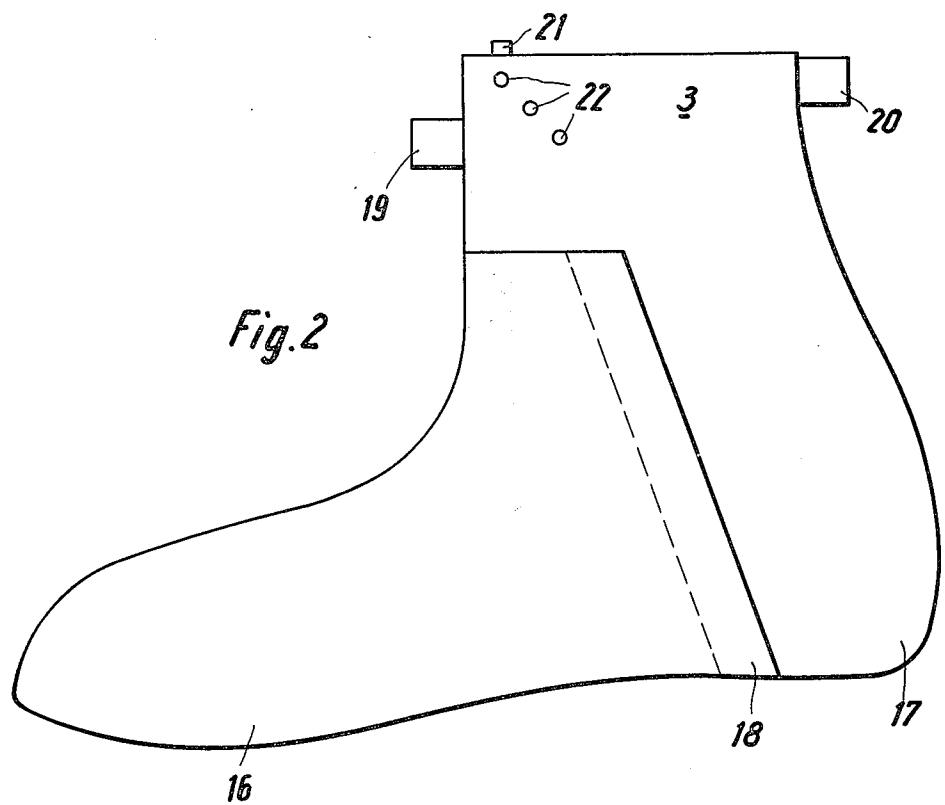
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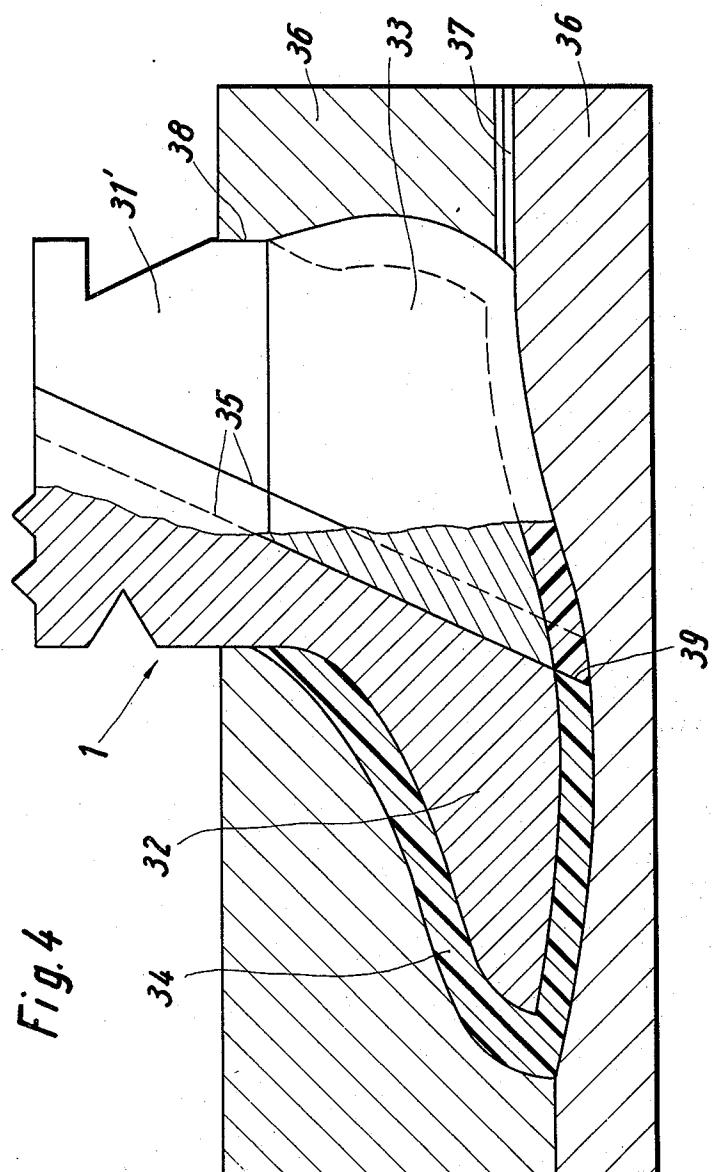
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LAST FOR THE MANUFACTURE OF SHOES

This invention relates to lasts for the manufacture of shoes.

To automate the process of producing shoes of different kinds and sizes it is desirable that the rhythm of the different operating stations is matched to each other so that mechanical conveying means are able to convey the semi-finished shoes automatically and in timed manner from one station to the other and to introduce them into the said stations without any manual labour or with a minimum of such labour. To this end it is necessary that the uppers are fitted on to a last at the beginning of the manufacturing process and then traverse with the last through the succeeding operating stations until the shoe is finally completed. By using appropriately constructed lasts it would be possible to dispense with the awkward lasting and stripping of the shoes, for example on the metal lasts of automatic soling machines, as such an operation can be performed exactly only manually by skilled personnel.

The lasts must satisfy different requirements because of the different loadings and manipulations in or between individual operating stations. They must be provided with retaining elements adapted to co-operate with the gripping or clamping elements of the conveying or operating stations to permit rapid clamping and precise location of the lasts in the operating stations. In order to ensure good sealing between the sole shape and the uppers in the soling machine the lasts must also have sufficient elasticity but only as much as will reliably avoid deformation resulting from the pressures which occur in soling. Marking of the appropriate last sizes or shapes is also appropriate for automatic conveying and automatic operation of the different stations.

It is the object of the invention to provide a last which will satisfy the requirements mentioned hereinabove and which will permit fully automatic production of shoes of different kinds.

The retaining elements which are provided according to the invention on the neck of the last permit the last to be clamped in appropriate gripper elements of conveying devices as well as in retaining means in processing machines. The markings of the particular characteristic values of each individual last are provided for actuating and pre-setting the appropriate elements of the conveying and machining devices, for example the sole shapers. Control device tracers which are actuated by these markings are able to guide the lasts in accordance with the shoes to be produced, for example via branches of the conveying devices and thus supply the shoes to different parallel operating machines.

A last which is particularly advantageous with respect to its manufacture and mechanical properties comprises of a resilient reaction foam with a Shore hardness of 50 to 80. Such a last which may be expanded in a synthetic resin mould taken off an existing last offers the further advantage of dispensing with the need for a last buckling device which is otherwise required for hard lasts to enable the shoe to be lasted and stripped respectively because owing to its intrinsic resilience the aforementioned last can be buckled in the joint zone.

A last which can be very substantially buckled or better still shortened is necessary for different lasting methods in which the uppers are completed with shaft

and insole prior to the lasting operation. A last according to the invention is particularly suitable for such lasting methods, the last comprising a front part and a heel part of soft-resilient material and in which both parts are relatively slidably joined to each other by means of a guideway of dovetail construction which extends at an angle. A last which can be shortened as described above may be produced in simple manner in one of two parts being first cast in a separate part mould and after the said part is cured is inserted into a full mould and the second part is formed thereafter while forming the guideway by filling the remaining mould cavity.

To ensure reliable co-operation of the retaining elements on the neck of the last with the appropriate gripper or clamping elements of the conveying and machining devices it is advantageous if at least the upper part of the neck, in which the markings and the retaining elements are disposed, is constructed of strong plastics or of metal on which the reaction foam is cast or adhesively fixed. It may however also be advantageous to construct the last in three parts, a front part and a heel part being slidingly connected via inclined dovetailed guideways to a wedge-shaped middle part which supports the neck and the markings. The middle part in this case is preferably constructed of a hard resilient material, for example a hard plastics or metal.

It has been found in the production of such lasts from a resilient reaction foam that in the interests of form-stable curing of the reaction foam or of the thermoplastic material, the last must remain for a long period in the casting mould because of the large thickness of the material and because of the exceptionally low thermal conductivity of the materials employed. These very long cooling times or curing times respectively lead to a relatively low output or call for a larger quantity of expensive casting moulds.

An embodiment of a last incorporating a resistant last core which is integral with the last neck and is surrounded, at least in the zone of the shoe, on all sides and firmly by a resilient stratum of material is particularly advantageous to reduce the curing times and therefore to accelerate the production process.

By using such a last core, preferably constructed of a hard material, a foam substance or a resilient plastics material, reduces the thickness of the resilient material stratum which is produced when the last is formed thus resulting in substantially improved heat dissipation and as a consequence reduced curing times for the last.

If the last core is constructed of a hard material, it is possible for the required bending capacity of the last to be eliminated. In order to ensure simple handling even in the aforementioned embodiment with a hard core, the said core according to a further advantageous embodiment of the invention comprises two parts which are slidably joined to each other by means of connections which are preferably of dovetail construction and extend at an angle.

A process in which the core of the last is located in the interior of a last mould while forming an all-around space between the wall of the last mould and the external surface of the core, the said open space being then filled with a solidifying compound, is particularly suitable for producing a last of the kind described above.

If a last is to be produced from parts which are slideable relative to each other, the stratum which fills the space between the core and the last mould is cut along the sliding planes of the core parts after the said stra-

tum has solidified and after the last is stripped from the mould.

If the two core parts are also constructed of thermoplastics material, they may be advantageously produced in such a way that one part is inserted into a fixed core mould and the mating part is then produced thereafter by casting a thermoplastics material into the remaining cavity while forming the dovetail-shaped connection.

In order to simplify stock keeping and the production of the lasts it is possible to use cores of the same size for the lasts of different shoe sizes so that the resilient stratum of smaller lasts is thinner and that of larger lasts is thicker.

Embodiments of the last according to the invention are explained hereinbelow by reference to the accompanying drawing in which:

FIG. 1 is a partially sectioned side view of a first embodiment of a last with the clamping device of an operating station;

FIG. 2 is a side view of a two-part last according to the invention;

FIG. 3 is a last according to the invention and comprising a front part, a middle part and a heel part,

FIG. 4 is a further embodiment of a last according to the invention inserted into a casting mould and shown as a partially sectioned side view.

The last 1 shown in FIG. 1 comprises a lower foot part 2 and an upper extension which is constructed as the neck 3. The neck contains retaining elements in the form of a frontal notch 4 and a rear recess 5. Corresponding elements on the diagrammatically illustrated operating station 6 co-operate with the aforementioned retaining elements, a tooth 7 engaging in the frontal notch 4 and a nose of a movable actuating element 9 engaging into the rear recess 5. The retaining elements of the last may however also take the form of pins, bolts, slots or the like which then co-operate with corresponding mating elements of the operating or conveying stations.

Marks 10, 11 which characterise a specific size and shape of last are formed at the upper endface of the last neck 3. The appropriate operating station or conveying device respectively is provided with mating marks, for example in the form of vertical bores 13 with associated transverse bores into which the appropriate marks 10, 11 of the last engage. By inserting transverse pins 15 into the transverse bores, it is possible to block those mating marks in the appropriate operating station which do not correspond to the predetermined last sizes. In the illustrated embodiment only the transverse bore 14 is open for receiving the size mark 11 and all subsequent mating marks are blocked by transverse pins. This convenient and simple device ensures that only the last for whose size the operating station is set up can be gripped and positionally located by the retaining devices or clamping devices of the affected station.

The last according to FIG. 1 is provided with the mark 10 by means of which a pin 12 is raised which slides in a bore so that other characteristic values of the last, for example its width or its expansion can be indicated or traced. The said pin 12 may be constructed as the actuating element of a mechanical or electrical control device which controls either the travel of the last to different operating stations or controls the operating stations in accordance with the characteristic val-

ues of the incoming or clamped last. These marks therefore permit automatic operation of the entire production process of a shoe.

The embodiment illustrated in FIG. 2 relates to a resilient last comprising a front part 16 and a heel part 17. Both parts are connected to each other by means of an inclined slide way 18 through which the last may be shortened by downward pulling of the frontal part. The neck 3 of the last is provided with retaining elements, constructed as bolts 19, 20 which engage in corresponding bores of the last retaining means of the operating station but which are not shown. In the same way as in the embodiment illustrated in FIG. 1, the endface of the neck 3 is provided with marks 21 for marking the size of the last. The other marks 22 for indicating further characteristic sizes of the last, such as width and expansion are provided in this embodiment in the form of pins 22, disposed in an offset configuration on one or both sides of the neck 3 instead of being provided on the endface of the last.

FIG. 3 shows a further embodiment of a last comprising of a wedge-shaped middle part 25 on which a heel part 26 and a front foot part 27 is slidably mounted via two dovetailed slide ways 28, 29. The last can be shortened by sliding the front part and/or the heel part downwardly to facilitate fitting of the uppers. Because of this shortening facility, the last according to the embodiment illustrated in FIGS. 2 and 3 are particularly suitable for use in California or moccasin lasting.

30 The slideable parts 26 and 27 of the embodiment of a last illustrated in FIG. 3 are constructed of a soft resilient reaction foam while the middle part 25 on which the neck 3 with the retaining elements and markings is disposed, is constructed of a hard resilient material.

35 A last of this kind may be produced in simple manner by placing a prefabricated middle part into a solid mould and the remaining cavities are then filled thereafter with resilient material, more particularly a reaction foam.

40 The last 1 illustrated in FIG. 4 is provided with a stable, two-part core 32, 33 the shoe zone of which is surrounded on all sides by a material stratum 34. The two parts 32 and 33 of the core are mounted upon each other by means of a dovetailed keyway connection 35 so as to slide relative to each other at an angle to permit shortening of the last, for example to facilitate fitting of the uppers.

For the manufacturing process, the last is disposed in a last mould 36 comprising a plurality of parts and being provided with a casting aperture 37 for receiving the material which forms the resilient stratum 34. In order to avoid any undesirable escape of the material which is filled into the intermediate cavity between the core and the last mould, the core and/or the mould is provided with a sealing zone 38. In the embodiment of a last illustrated in the drawing and having a two-part core, the last is completely divided into two after forming and solidification of the completely resilient stratum of material by applying a cut 39.

55 The strength of the joint between the resilient outer stratum and the core material may be improved by adhesive means or suitable self-adhesive materials and/or by roughening of the external surfaces of the core.

I claim:

60 1. A last for the production of shoes comprising a core portion, said core portion including a neck extending therefrom, retaining element means on said

neck for rapid detachable clamping of said last in shoe making machines and conveying devices, and at least one marking on said neck, which marking comprises means for transmitting to said shoe making machines a particular characteristic of said last and for causing said shoe making machines to automatically respond to the particular characteristic of said last, said marking comprising elements which cooperate with corresponding tracing elements of said shoe making machines or conveying devices.

2. A last according to claim 1, constructed from a soft resilient reaction foam having a Shore hardness of 50 to 80.

3. A last according to claim 1, having a hard core, constructed integrally with said neck and being surrounded on all sides by a soft resilient material stratum in the zone which contacts a shoe.

4. A last according to claim 3, wherein the core is hollow and contains connections for conducting a cooling medium therethrough.

5. A last according to claim 3 wherein the core com-

prises two core parts which are slidably connected to each other by means of dovetailed connections which extend at an angle.

6. A last according to claim 1 having a frontal, soft resilient part slidably connected via an inclined, dove-tail-shaped slide way to said core.

7. A last according to claim 1 having a frontal part and a heel part slidingly connected via inclined, dove-tail-shaped guideways to a wedge-shaped hard core.

10 8. A last according to claim 7, characterized in that the front part and the heel part are constructed of soft resilient reaction foam and said core is constructed of a hard resilient material.

15 9. The last of claim 1 including at least one marking which comprises means for actuating control device tracers on said conveying devices.

20 10. The last of claim 1 in which said marking comprises means for notifying said shoe making machines of said last's width characteristic.

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