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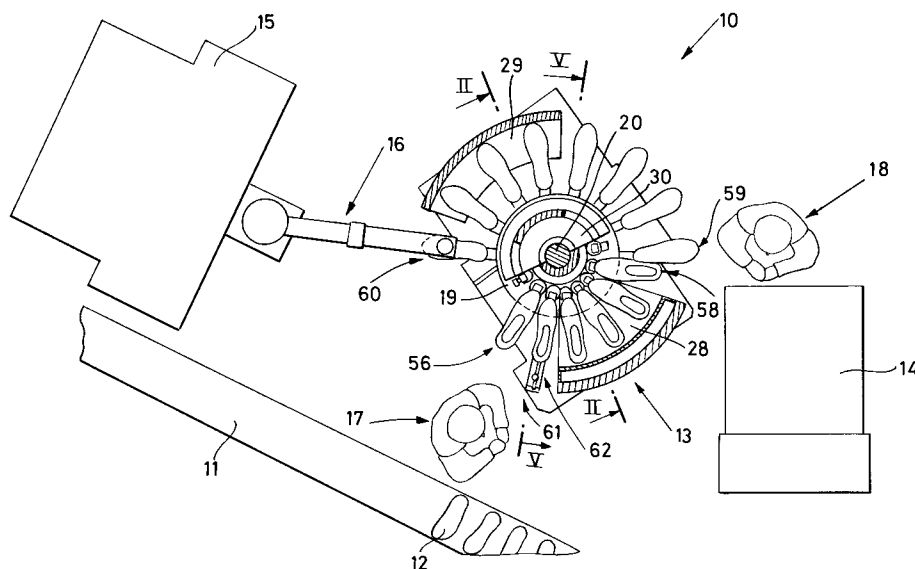
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I-20123 Milano(IT)**(54) **Vamp handling and processing machine.**

(57) A machine (13) adapted to handle and process vamps and lasts (12) for manufacturing shoes comprises a plurality of grippers (21), each of them grasping a vamp edge close to the vamp tip portion. Grippers are supported by movement means (19) carrying out displacement between a (12) loading position of a vamp and associated last (12) and an unloading position of the same. Vamp heating and moistening means (28) is also present between the

loading and unloading positions.

Advantageously the machine (13) comprises a plurality of posts (25) supporting the lasts in a reverse position. Posts (23) are supported by movement means (19) carrying out displacement between a loading position (59) close to the grippers unloading position and a final discharge position (60) from the posts themselves.

**Fig.1****EP 0 524 690 A1**

In shoe production lines, one of the first operations to be carried out is the so-called "prestretching" in which an operator picks up the shoe last coupled to the vamp, heats and moistens the vamp tip and performs a tip stretching operation in an appropriate implement located sideways of the preassembling-assembling machine. Afterwards he adjusts the preassembling-assembling machine depending on the shoe size to be processed, puts the last and associated vamp in place on the machine and secures the vamp tip. As can be easily understood, the above sequence of operations involves an important waste of time by the operator bringing about a slowing down in all the following operations on the line which are normally faster.

In addition, the operator must continuously divert his attention away from the assembling machine for carrying out the picking up, heating and prestretching of the vamps. This fact reduces his degree of attention in the true assembling operation which is very important because it is exactly on this operation that the quality of all following operations and the final result depend.

The general object of the present invention is to obviate the above mentioned drawbacks by providing a handling and processing machine capable of presenting to the operator of the assembling machine the coupled vamps and lasts already heated and moistened, in a position ready for stretching, so that the processing thereof is facilitated and speeded up.

Another object of the present invention is to provide a device for automatically prearranging the shoe size both for the preassembling and first-processing machine, so that said machines may become self-adjusting.

A still further object of the present invention is to supply means for evacuating the vamps being worked after submitting them to the preassembling-assembling operation and processes for preparing them to the following operations.

The above objects have been achieved, in accordance with the invention, by a machine adapted to handle and process vamps coupled to the respective lasts for manufacturing shoes, characterized in that it comprises a plurality of grippers each grasping a vamp edge close to the vamp tip portion, said grippers being supported by movement means enabling shifting between a position in which a vamp and respective last are loaded in each of said grippers and a position in which the vamp and respective last are unloaded therefrom, heating and moistening means being provided between said loading and unloading positions.

In addition, the above machine can also comprise a plurality of posts, each of them supporting a last and a vamp coupled thereto in a reverse

position, said posts being supported by movement means for displacement between a loading position close to the gripper unloading position and a final discharge position from the posts themselves.

For better explaining the innovative principles on which the present invention is based and the advantages of the same as compared to the known art, a possible embodiment of the machine will be given hereinafter, by way of non-limiting example, with reference to the accompanying drawings, in which:

- Fig. 1 is a diagrammatic partly sectional plan view taken along line I-I of Fig. 2 of a machine in accordance with the invention fitted in a processing line;
- Fig. 2 is an elevation side view of the invention sectioned along line II-II of Fig. 1;
- Fig. 3 is an elevation side view to an enlarged scale of a stretching member present in the station of Fig. 1;
- Fig. 4 is a rear elevation view to an enlarged scale and partly in section of a support member present in the machine shown in Fig. 1;
- Fig. 5 is a diagrammatic partly sectional view taken along line V-V in Fig. 1;
- Fig. 6 is a partial and diagrammatic side view of one possible alternative version of the machine as shown in Fig. 4;
- Fig. 7 is a view similar to the one shown in Fig. 2, representing a possible alternative version of the machine.

Referring to the drawings, as shown in Fig. 1, a processing station generally identified by reference numeral 10 comprises a feed line consisting of a conveyor 11 sequentially supplying vamps 12 coupled to respective lasts, according to the known art. Located along the conveyor 11 is an innovative machine 13 on the sides of which a preassembling-assembling machine 14 and another machine 15 (a first-processing machine for example) are disposed, the machine 15 being optionally served by a robotized arm, as explained in detail in the following.

The machines 14 and 15 are machines of the known art and therefore are not herein further shown or described, as they can be easily envisaged by a person of skill.

One operator 17 is located between the conveyor 11 and the machine 13 and a second operator sets the preassembling-assembling machine 14 in operation.

As clearly viewed from Fig. 2, the machine 13 comprises a platform 19 rotating about a vertical shaft 20 by means of a motor 24, a reduction gear 25 and a pinion 26 meshing with a gear 27 integral with the platform. The platform 19 supports, at the upper part thereof, a plurality of gripping members or grippers 21 disposed radially and equally

spaced apart from each other. Advantageously, on its periphery the platform 19 also supports, through attachment elements 22, a plurality of supporting members or posts 22 radially and equally spaced apart from each other.

As diagrammatically shown in Fig. 1, provided on the periphery of platform 19 is a first heating and moistening gallery 28 and a second heating and moistening gallery 29. In addition, a third heating gallery 30 is present over the platform close to the gallery 29.

As clearly shown in Fig. 2, the gallery 28 is heated by a stream of treated, heated and/or umidified air coming from ducts 33 and 34 and admitted therein through a plurality of spray nozzles 31, 32, being then discharged through a duct 35.

As the platform 19 rotates, the grippers 21 travel through the heating gallery 28.

The gallery 29 is heated by a hot air stream coming from a duct 36 and admitted therein through a plurality of spray nozzles 37, 38 to be then discharged through a duct 39. During the platform rotation the posts 23 travel within the heating gallery 29.

Finally, gallery 30 is heated by hot air still coming from duct 36 and admitted therein through a plurality of spray nozzles 40. Grippers 21 travel through said gallery 30.

As shown in Fig. 2 and in more detail in Fig. 3, grippers 21 have a fixed jaw 41 to which a movable jaw 42 is articulated which has an operating lever 44 extending at the front. A spring 45 normally keeps jaws 41, 43 to the open position. In use, a tip border of a vamp 46 is put between the jaws, and the last portion 47 placed inside the vamp of a vamp-last assembly 12 is laid on the lever 44 so that the last weight keeps the gripper closed, holding the vamp fast against the action of spring 45.

As shown in Fig. 2 and in more detail in Fig. 4, posts 23 have an upper pin 48 to be fitted in a hole 49 on the neck portion 52 of the last whereas fingers 50, 51 laterally grasp the neck portion being elastically thrust towards said portion by plugs 53, 54 and a thrust spring 55.

At position 61 a measuring device 62 for the shoe size is advantageously present.

As better shown in Fig. 5, the measuring device comprises an actuator 63 enabling the sliding of a sensor 64 radially to the rotating platform 19, said sensor being designed to detect the shoe heel portion present at position 61. The sensor can be of any known type, such as for example a photoelectric, microswitch or capacitive sensor.

By way of example, in Fig. 5 a reflex sensor 64 is shown, whereas sensor 64 shown in Fig. 6 is formed with a microswitch 65 operated by the movement of a plate 66 hinged at 67, to be moved

by contact with the shoe heel.

The actuator too can be of any known type, as easily envisaged by a person skilled in the art. For example a rodless piston can be used associated with a position detector of the type provided with a linear slide potentiometer for detecting the sensor position during the shifting.

When the station is operating, the operator sequentially picks up a vamp associated with the respective last from a conveyor 11 and places it in the closest gripper 21 with its neck portion directed upwardly, that is in the loading position 56 so that the tip border may be grasped by the gripper as above described.

The platform rotation takes the loaded vamps 12 to the following position 61 where the actuator is set in motion for moving the sensor from a maximum far away position towards the axis 20. The sensor movement stops when it detects the rear shoe edge and the position detector of the actuator sends the information of the shoe length, and therefore the shoe size, to the preassembling machine which is consequently in a position to automatically adjust itself to the right size in due time.

Then shoes move to oven 28 as shown in Fig. 2. As can be seen from said figure, vamps can be shaped so as to make shoes or boots. In case of boots (the outline of which is generally shown in dotted line), gallery 28 has at the upper part thereof a door 57 to be opened in order to enable the boot tops to pass therethrough. By suitably adjusting the rotational speed of the platform it is possible to achieve a perfect and uniform heating of the whole vamp.

As the platform rotates it sequentially brings the heated and moistened vamps to the picking up position 58. The operator 18 pushes downwardly the shoe heel portion brought to position 58 in order to fit it onto the lever 44 end subsequently drawing the vamp into the gripper; then he takes the assembly away for working it in known manner in the preassembling machine 14. When the assembling operation is over, the operator 18 brings the last and associated vamp back to the machine 13 and fits it in a reverse position on a post 23 in the reloading position 59.

Then the last carrying the preassembled vamp travels through the gallery 29 to be heated again above all at the heel base, in order to make it ready for further workings. Simultaneously the discharged gripper travels through the gallery 30 so that it is kept to the right temperature for the following reloading at position 56.

The preassembled last reaches the final discharge position 60 where another operator or a robotized arm of the known art picks it up and sends it to the next working, by loading it for example in another machine, such as a first-pro-

cessing machine, for further operations.

At this point it is apparent that the intended purposes of speeding up the initial assembling operations in a shoe production line have been achieved. The operator of the preassembling-assembling machine must only attend to the positioning and working in said machine of shoes that have already been disposed to the correct prestretching position and have already been heated and moistened, so that his work does not undergo delays and inattentions.

Consequently the line productivity is greatly increased which brings about clear economic advantages. In addition, the automatic adjustment of the preassembling-assembling machine and the first-processing machine to the exact shoe size to be worked is possible. The operator of the preassembling machine need not stop working even when the incoming shoes change of size.

The following heat treatment of the shoes laid down by the operator after the preassembling process further speeds up the next working.

Obviously the above description of one embodiment applying the innovative principles of the present invention is given by way of example only and is not to be considered as a limitation of the scope of the invention as hereinafter claimed.

For example, the unloading of shoes reaching position 60 need not take place by means of a robotized arm but can be carried out manually by the same operator 17 executing the loading operation who will put them on a conveyor for net workings.

It is understood that the conformation of station 10 and the arrangement of the parts can be altered depending on the particular requirements. For example, a rectilinear conveyor travelling through the ovens disposed in alignment and carrying out the movement of the grippers and posts can replace the rotating platform, so that the machine will have an elongated extension.

In addition, the movement means for the posts carrying the shoes in the reverse position can be made separated from the gripper movement means.

Finally, it is not necessary for the heating and/or moistening means to provide a closed gallery. For example nozzles similar to nozzles 31, 32, 37, 38, 40 can be provided in a partly open gallery or even in the open air without boundary galleries.

A possible alternative embodiment of the heating and moistening means as illustrated in Fig. 2 is diagrammatically shown in Fig. 7 by way of example. Elements similar to those shown in Fig. 2 are identified by the same reference numerals with the addition of one hundred.

There is therefore a platform 119 rotating about a vertical shaft 120 by means of a powered pinion

126 meshing with a gear 127 integral with the platform. The platform 119 carries a plurality of gripper members 121 and shoes supporting members or posts 123 disposed radially and equally spaced apart as above described.

Jets of treated air mixed with steam 131, 132, 137, 138, 140 are emitted by respective heating means 170, 171, 172 made in the form of vaporizers containing respective electric heating resistors 173, 174, 175. Each vaporizer 170, 171 and 172 is supplied with water and compressed air through corresponding pipes 176, 177. In this way, water vaporizes at once and steam is pushed to the outside through suitable holes in the form of jets due to the pressure of the compressed air. This long insulated ducts for steam transportation are avoided, which are on the contrary necessary in the embodiment shown in Fig. 2.

It has been found also advantageous to provide the vaporizer walls directly with jets emitting treated air.

The vaporizers can be supported in a manner enabling position adjustment, so that they can be adapted to the different sizes of the shoes to be processed. In this way vaporizers can be moved close to the vamp surface so as to heat and moisten the vamps at best even in the absence of a steam holding gallery.

For example, in Fig. 2 horizontal-adjustment means 178 for vaporizer 170 are shown, as well as horizontal-adjustment means 179 for vaporizer 171 and horizontal-adjustment means 180 and vertical-adjustment means for vaporizer 172.

Such adjustment means can be achieved by means of slides 182 associated by internal thread with a screw 183 to be rotated by means of a drive handle 184, as diagrammatically shown in connection with the adjustment device 179.

While the heating means has been shown completely hollow for the sake of simplicity, obviously also tortuous labyrinths can be provided in order to improve the air and water overheating before emission to the outside.

Claims

1. A machine adapted to handle and process vamps coupled to the respective lasts for manufacturing shoes, characterized in that it comprises a plurality of grippers each grasping a vamp edge close to the vamp tip portion, said grippers being supported by movement means enabling shifting between a position in which a vamp and respective last are loaded in each of said grippers and a position in which the vamp and respective last are unloaded therefrom, vamp heating and/or moistening means being provided between said loading and unloading

positions.

2. A machine according to claim 1, characterized in that it comprises a plurality of posts, each of them supporting a last and a vamp coupled thereto in a reverse position, said posts being supported by movement means for displacement between a loading position close to the gripper unloading position and a final discharge position from the posts themselves. 5 10
3. A machine according to claim 2, characterized in that further vamp heating and/or moistening means is provided between said loading and unloading positions of the posts. 15
4. A machine according to claim 1, characterized in that at least at the gripper unloading position a fulcrum is present for rotation of the last by thrust of the heel portion thereof, in such a way as to stretch the vamp into the gripper. 20
5. A machine according to claim 1, characterized in that the grippers have each one fixed jaw and a second movable jaw articulated to the first jaw and having a closing lever extending substantially at the front of the gripper opening so as to constitute a lower rest for a last associated with the respective vamp held in the gripper, the last weight on the closing lever pushing the lever itself so that the jaws move close to each other and are closed against the action of a spring. 25 30
6. A machine according to claims 4 and 5, characterized in that the rotation fulcrum consists of the free end of the lever for closing the gripper. 35
7. A machine according to claim 2, characterized in that the posts supporting the lasts in a reverse position comprise, at the upper part thereof, a pin to be fitted in a hole present in the neck portion of the last and opposite gripping jaws laterally spring-locking the neck portion of the last. 40 45
8. A machine according to claim 1, characterized in that the gripper movement means comprises a powered platform rotating about a vertical axis and radially supporting the grippers. 50
9. A machine according to claim 2, characterized in that the post movement means comprises a powered platform rotating about a vertical axis and radially supporting the posts. 55
10. A machine according to claims 8 and 9, characterized in that the grippers are located over the rotating platform close to the rotational axis thereof and the posts are located on the platform itself at a lower position which is radially farther from the axis.
11. A machine according to claim 1, characterized in that between the gripper unloading and loading positions provision is made for means heating the grippers before they reach the loading position again.
12. A machine according to claim 1, characterized in that between the gripper loading and unloading positions provision is made for means detecting the shoe size of the vamps in the grippers so as to emit prearrangement signals.
13. A machine according to claim 1, characterized in that said detecting means comprises an actuator driving a sensor in motion in a longitudinal direction with respect to a last exhibited by the grippers in a measuring position, the sensor during its displacement detecting the heel portion edge of the last with the associated vamp and emitting the corresponding information of the shoe size depending on the distance between the predetermined position of the tip portion in the gripper and the detected position of the heel portion.
14. A machine according to claim 1, characterized in that the vamp heating and/or moistening means comprises spray nozzles emitting treated air.
15. A machine according to claim 14, characterized in that the air spray nozzles are contained in a gallery travelled along by the grippers.
16. A machine according to claim 3, characterized in that the further vamp heating and/or moistening means comprises further nozzles emitting treated air.
17. A machine according to claim 16, characterized in that the further air-emitting nozzles are contained in a gallery travelled along by the posts.
18. A machine according to claim 11, characterized in that the gripper heating means, before reaching the loading position again, comprises hot air emitting jets.
19. A machine according to claim 18, characterized in that the hot air emitting jets are con-

tained in a gallery travelled along by the grippers.

20. A machine according to claim 14, characterized in that the gallery is provided at the upper part thereof with an openable cover enabling the passage therethrough of part of the top vamp of boots. 5
21. A machine according to anyone of the preceding claims, characterized in that alongside it there is a vamp-and-last conveyor passing close to said gripper loading position so that it enables the vamps and lasts to be transferred from the conveyor to the grippers, as well as a preassembling machine located close to said gripper unloading position in order to enable the vamps and lasts to be transferred from the grippers to the preassembling machine for the vamp working. 10 15 20
22. A machine according to claim 2, characterized in that close to the final discharge position there is a robotized arm picking up the lasts and vamps at that position. 25
23. A machine according to claim 22, characterized in that alongside it there is a first-processing machine, so that the robotized arm unloads lasts and vamps thereto. 30
24. A machine according to claims 12 and 21, characterized in that the prearrangement signals are sent to the preassembling machine for adjusting the operation thereof depending on the detected shoe size. 35
25. A machine according to claims 12 and 23, characterized in that the prearrangement signals are sent to the first-processing machine for adjusting the operation thereof depending on the detected shoe size. 40
26. A machine according to claims 14, 16 or 17, characterized in that the jets emitting treated air are fed by vaporizers connected to a water source and a compressed air source, each vaporizer containing an electric resistor therein for vaporizing the water coming from said water source so that, under the pressure of the compressed air, steam and heated air are emitted from said jets. 45 50
27. A machine according to claims 1, 3 or 11, characterized in that the heating and/or moistening means is supported by position adjusting means, enabling said means to be moved close to the handled vamps. 55

28. A machine according to claim 27, characterized in that the position adjusting means comprises at least one support slide having an internal thread coupled to a screw connected for rotation to a drive handle.

29. A machine according to claim 13, characterized in that the sensor comprises a micro-switch operated by the movement of a hinged plate to be moved by contact with the heel portion.

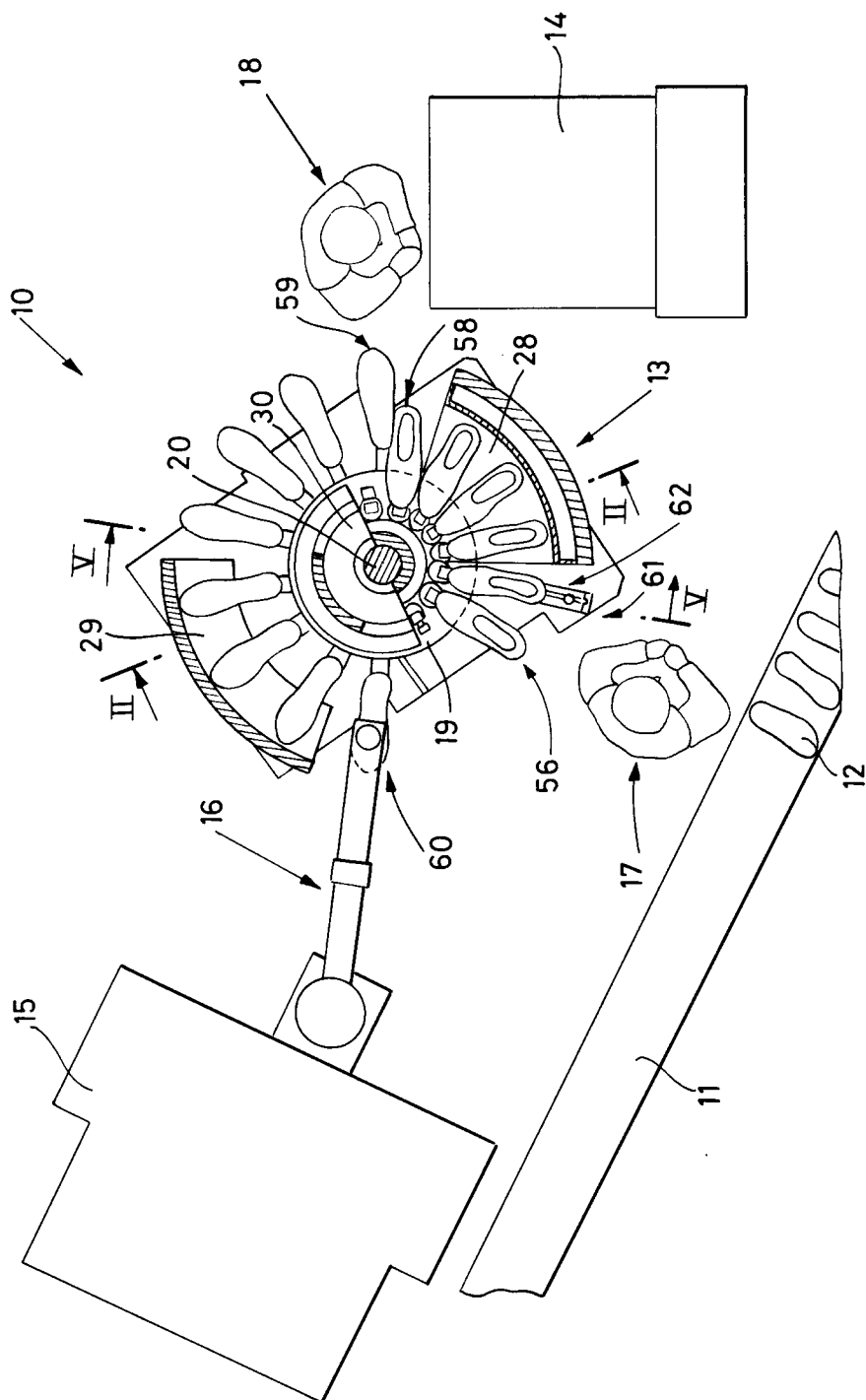
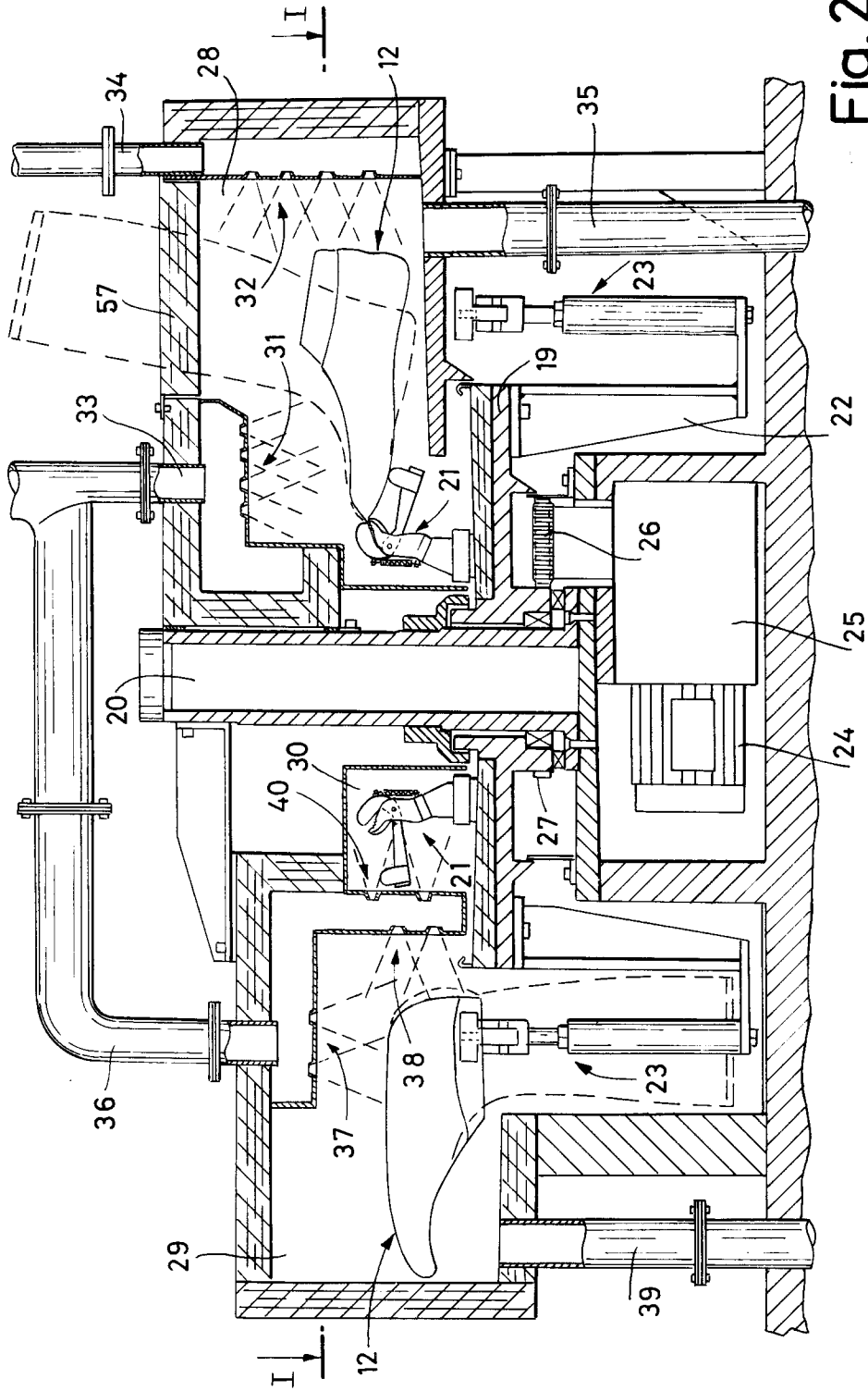


Fig.1



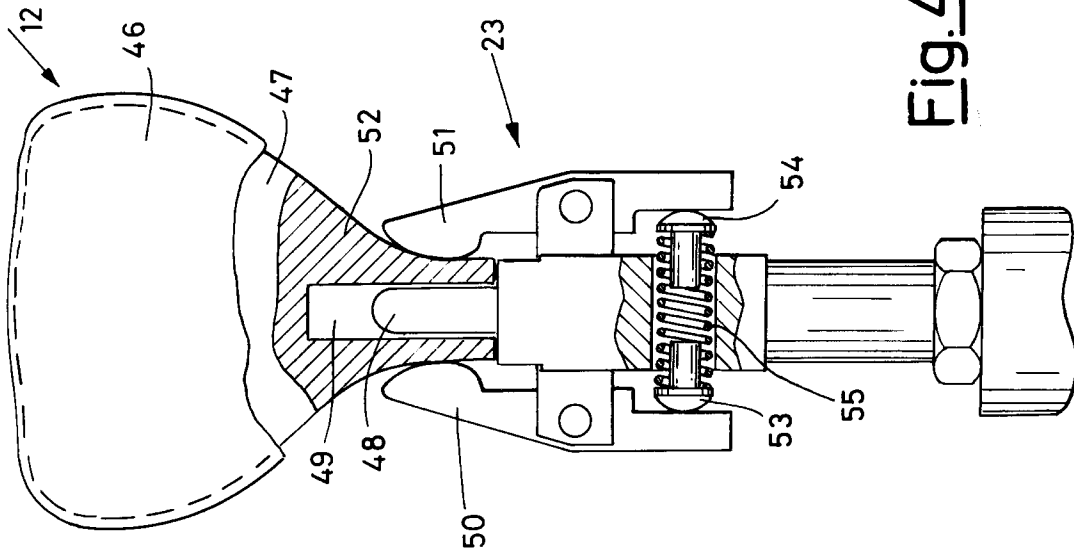


Fig. 4

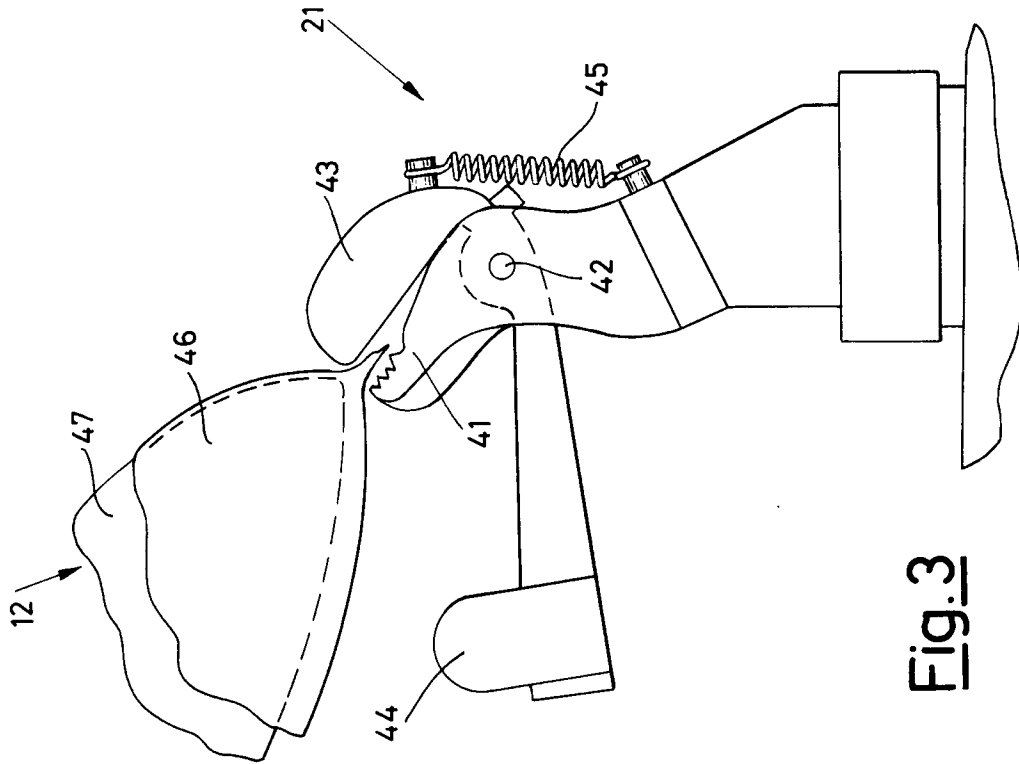


Fig. 3

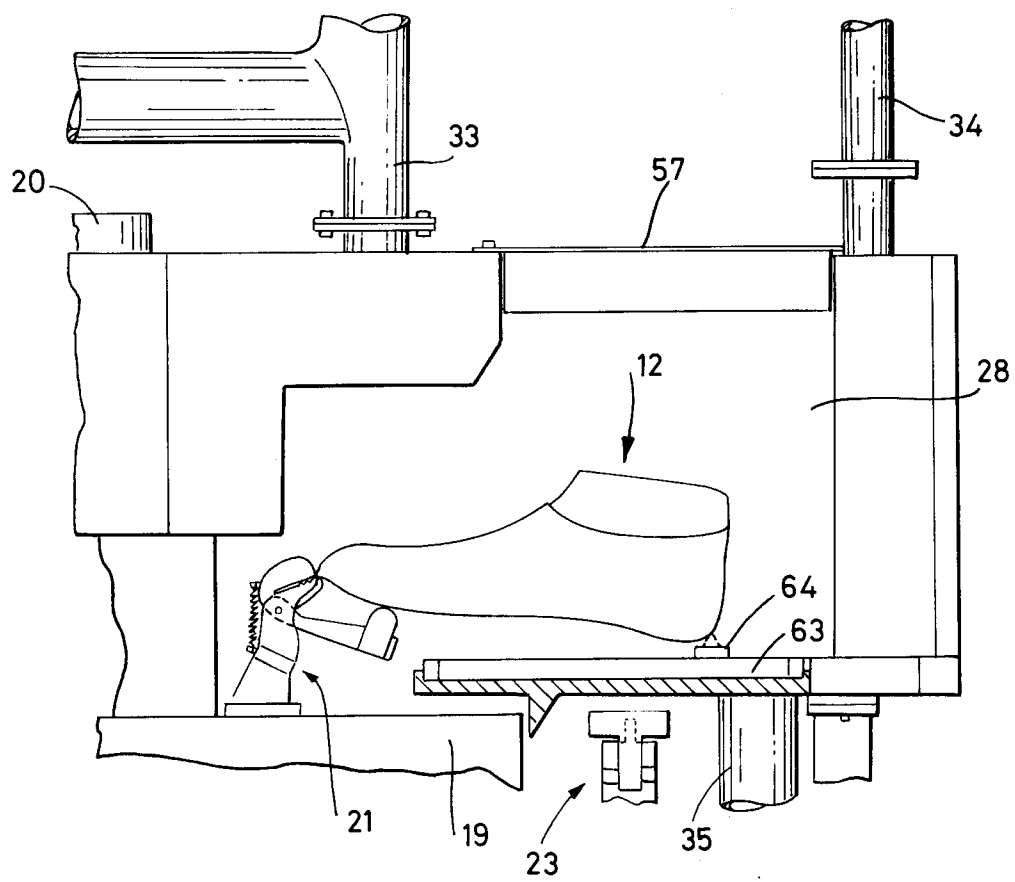


Fig. 5

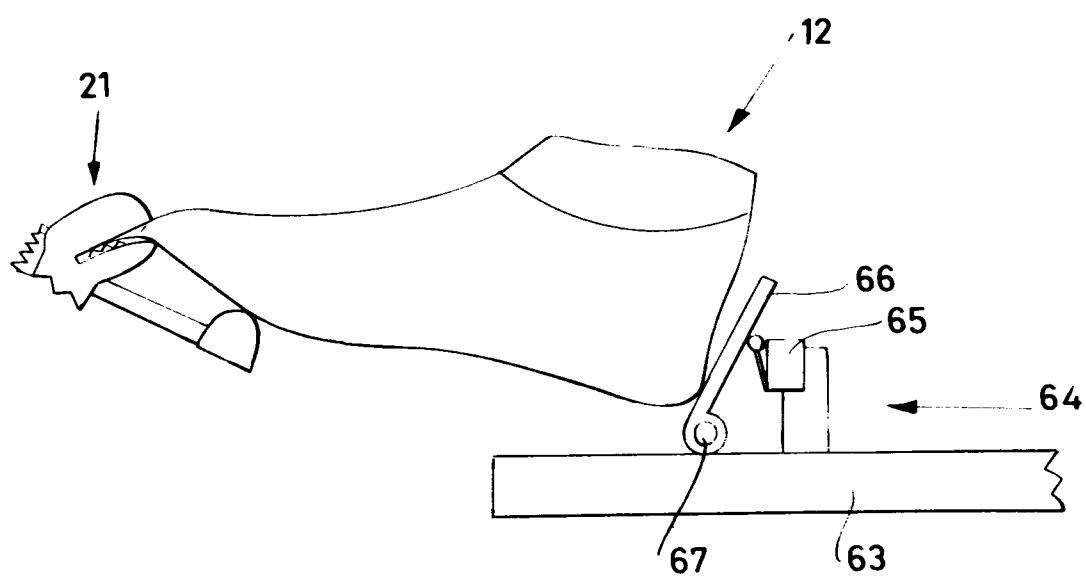
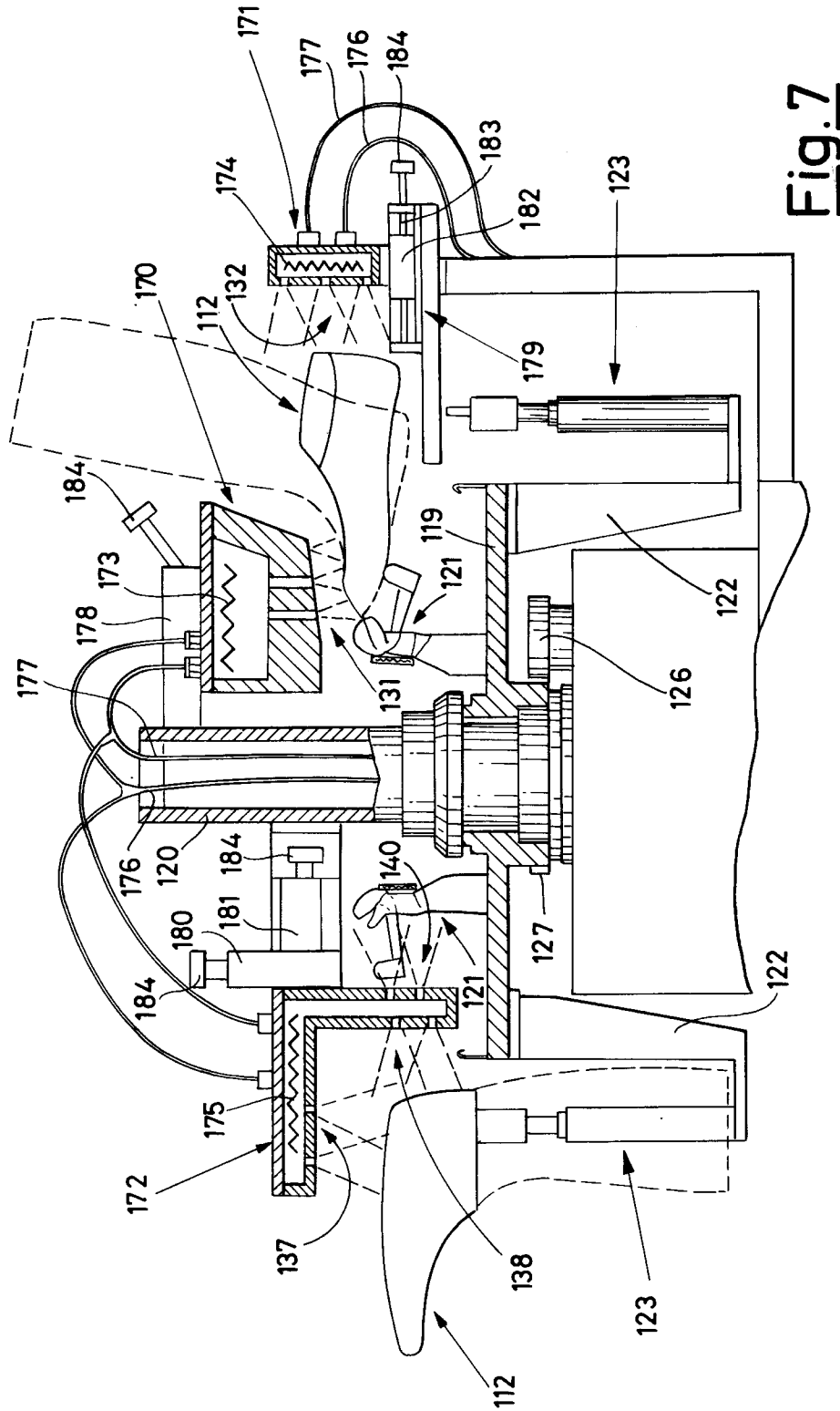


Fig. 6





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EUROPEAN SEARCH REPORT

Application Number

EP 92 20 2180

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)
X	FR-A-2 620 003 (ANVER S.A.) * page 2, line 6 - line 21; claims; figures 1,2 *	1	A43D11/14
A	---	2-29	
A	EP-A-0 213 909 (BUSM CO. LTD.) * abstract; claims; figures *	12,13, 24,25, 28,29	
A	FR-A-2 612 052 (ETABLISSEMENTS ACTIS S.R.L.) * abstract; claims; figures 1,2 *	22,23	
A	US-A-2 460 940 (MAESER, M.) * claims; figures 1,4 *	14-19	
A	GB-A-2 114 868 (THE BRITISH UNITED SHOE MACHINERY COMPANY LTD.) * abstract; figure 2 *	5	
A	EP-A-0 329 007 (PSB GMBH FÖRDERANLAGEN UND LAGERTECHNIK) -----		TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			A43D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 02 OCTOBER 1992	Examiner SOEDERBERG J.E.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			