

[54] MACHINE FOR WORKING SHOE SOLE CONTOURS

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[57] **ABSTRACT**

Machine, adapted for working the sole contours of shoes of any size or number whatever, including a copying roller, disposed at the end of a rod, journalled hingedly to an arm, whilst over said rod slides a sleeve, connected to a movable carriage, sustained by a support, fixedly secured to the tool holding arm, the sleeve displacing on the rod via a worm gear, acting on the carriage, displacing it axially relative to its support, whilst the support arm of said rod is connected to an oscillating arm, sustained by specially provided levers, journalled into one upper cross beam of the machine, the same oscillating arm being balanced by a pair of big springs and may describe a linkage motion, delivered thereto by the particular rotation of an oblong box, driven by a roller, pressing on a portion of its inner wall, said roller being keyed on a helical gear, which is controlled by a worm gear, driven in turn by a self-braking motor via a belt, two presser means being connected to the aforesaid oscillating arm, which fasten the sole to be worked and the basic template, which imparts suitable displacements to the copying roller.

**8 Claims, 2 Drawing Figures**

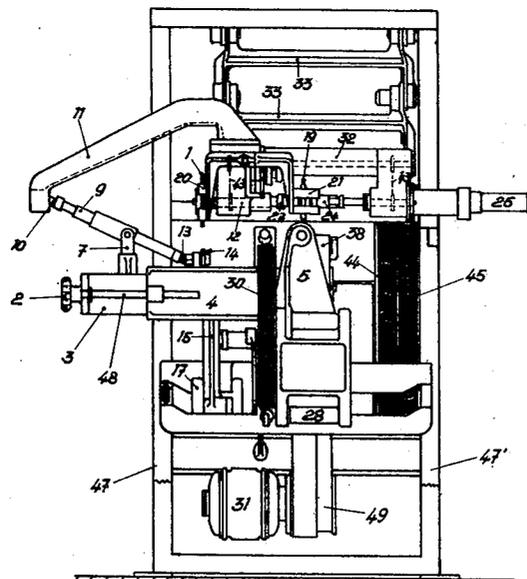
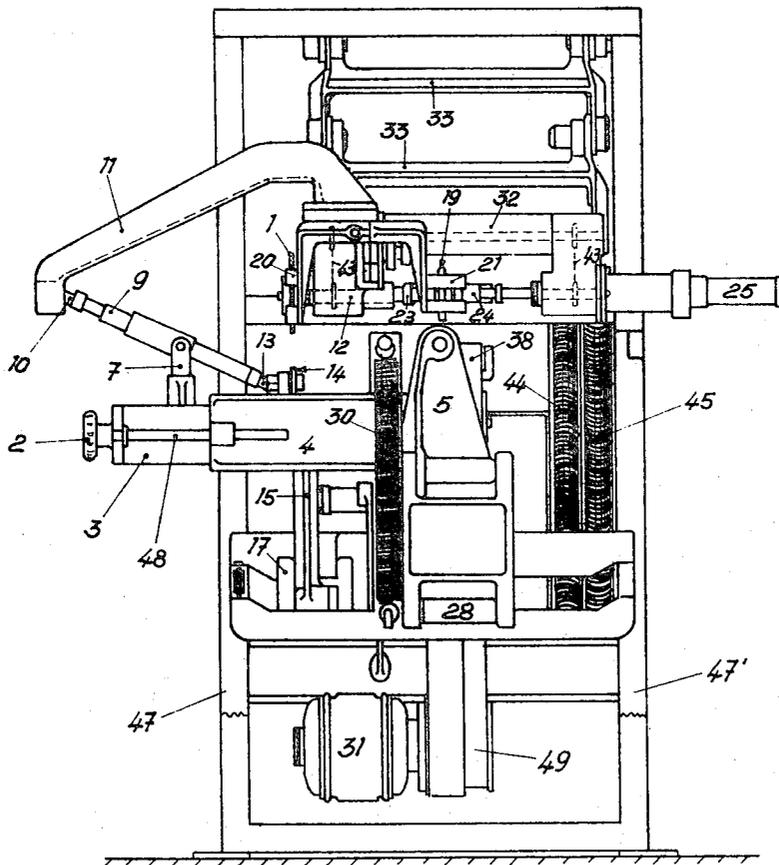
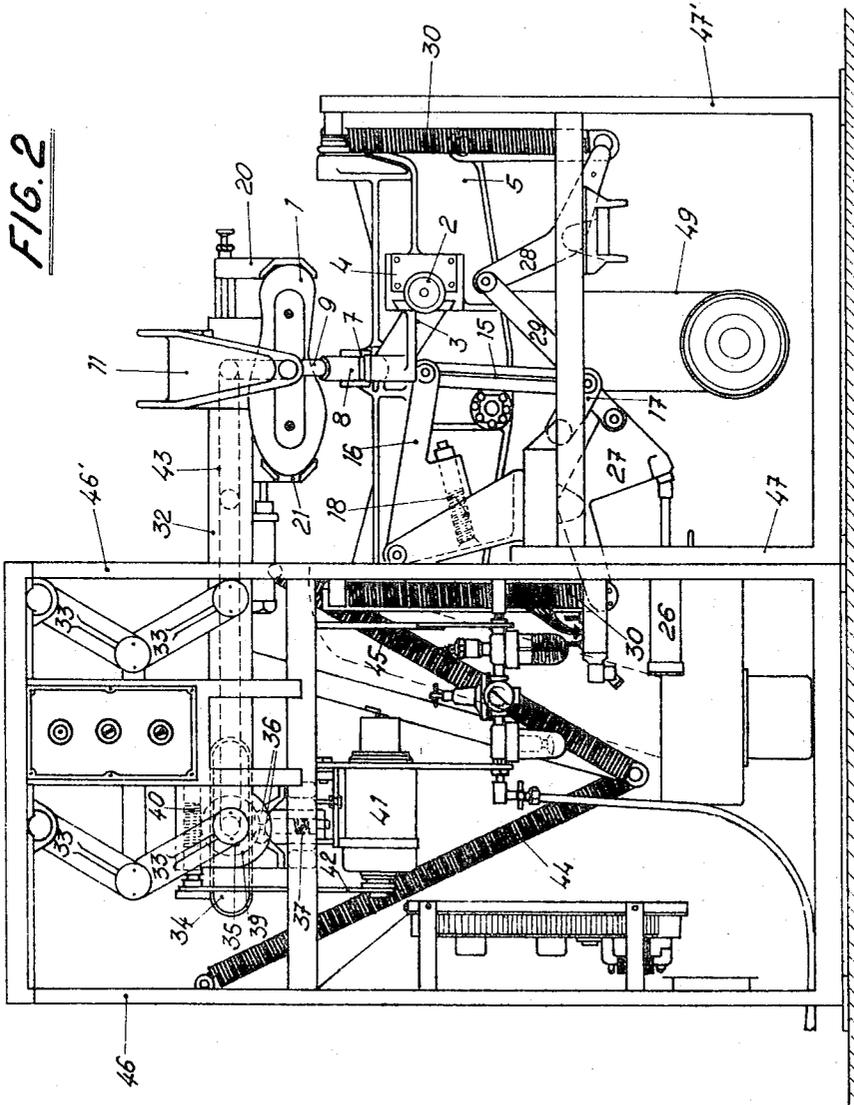


FIG. 1





## MACHINE FOR WORKING SHOE SOLE CONTOURS

This invention relates to a machine for the shoe making industry, adapted to work the contours of shoe soles in the various size series by using one single template as a guide means for the various tools applied to the machine itself.

As well known, in the shoe making industry there are used several machine-tools, each of which is particularly designed to carry out specific works on the shoe soles or vamps.

It may be considered, however, in principle that the aforementioned machines differ essentially as to the type of tool with which they are provided, and which may be depending on the type of work to be carried out a cutter, or an abrasive band, or a brush and so on.

The motion of said tool for the preparation of the soles in particular is transmitted to the support shaft of the tool itself by means of a template.

The aforesaid template, which is shaped like the sole on which a determined treatment has to be performed, serves practically as a guide means for the displacements of the tool, by causing it to accomplish well-defined cyclic motions. It is likewise well known that the shoe soles, and hence the shoes themselves are being made depending on diversified dimensions, classified by means of a particular "number." From the foregoing it may be inferred that to work and to finish the sole of each shoe size or number, it is necessary to resort to a special template, just accomplished for a determined size or number of the shoes themselves, exclusively. On the other hand, it is easy to understand that the soles of the different sizes, superposed to each other, according to decreasing sizes, define with their contours a conical surface, with the apex disposed on the vertical, conducted from the middle point of the soles themselves.

By taking the above fact into account, namely the proportionality of the sole dimensions for the different shoe sizes, the corresponding templates, adapted to ensure the subsequent works, are obtained starting from a basic template, reproduced in other sizes by means of a pantograph.

It should be noted here, however, that the construction of the different templates requires a considerable time waste, this being an important work which should be carried out with the utmost accuracy.

By the machine of this invention instead, thanks to the particular arrangements adopted it will suffice to dispose of one single template, corresponding to any size or number whatsoever of the sole of the shoe type to be accomplished. More accurately, the motion is in principle transmitted by the guide template to the tool through a frame sliding parallel to itself, along a rod, pivoted with one of its ends at fixed point and provided at the opposite end with a feeler of copying roller.

The aforementioned rod describes obviously a conical surface of constant geometrical characteristics, its fulcrum pin (apex of the conical surface) being fixed and its directrix, consisting of the guide or basic template, remaining unchanged. There is instead proportionally a variation in the motion of an end of the frame, sliding with the other end over said rod, acting as generatrix of the aforesaid conical surface. It is, therefore, apparent that as a function of the disposition of an end of the frame, sliding along said rod, the other

end of the frame will describe a figure similar to that of the basic template, with dimensions proportional thereto.

Practically speaking, the machine according to the present invention is provided with a suitably oscillating arm, to which there are connected the supports for the basic template and the sole to be finished.

At the end of said arm there is integral therewith a hinge, which is connected on the same line with the middle point of the template and sole.

To the said hinge there is connected a rod, at the other end of which there is journaled by means of a hinge a copying roller, which may come in contact with the contour of the basic template.

Over said rod furthermore may slide a sleeve, which is connected via suitable intermediate organs the tool holding arm, which during operation comes in contact with the contour of the sole to be finished.

The motion of the tool holding arm is, therefore, controlled by the copying roller through the sleeve fitted over the rod. Depending on the position of the sleeve relative to the end of the rod, the tool holding arm will accomplish more or less amplified motions than those transmitted by the copying roller to the rod itself.

By said arrangement, by suitably varying the position of said sleeve it is possible to work soles of any size or number whatever by using one single template.

These and further characteristic features of a functional and constructional nature of the machine of this invention, adapted to work the contours of soles of any size or number whatever by means of one single basic template, could be better understood from the following detailed description, taken in conjunction with the various figures on the accompanying drawings, in which:

FIG. 1 shows the machine of this invention in front view; and

FIG. 2 represents the same machine as above, but in side view.

Referring now particularly to the numeral symbols of the various figures on the accompanying drawings, the machine according to this invention consists of a double frame, made up of pairs of columns 46 and 46', 47 and 47', suitably connected by cross beams.

To the upper cross beams of the columns 46, 46' there are journaled the levers 33, which sustain an oscillating arm 32, balanced in its motion by the big springs 44 and 45.

The oscillation of said arm is controlled by a box 34, driven by the rotation of a roller 35, maintained in contact with its inner wall.

The same box rests on two rollers 36, pushed against the wall thereof by a spring 37.

The roller 35 is keyed on a helical gear 39, which is controlled by the worm gear 40, being rotated by the self-braking motor 41 via the belt 42.

The linear rotary motion of said box 34 serves to suitably adjust the forward motion of the sole onto the tool, depending on the radius of curvature of the contour portion of the sole in contact with the tool itself.

To the oscillating arm 32 there is fastened a group, consisting of the sole pressers 23 and 24, controlled by a pneumatic cylinder 25 and the basic template 1.

Said pressers clamp the sole 19 to be finished after prior centering thereof by means of two centering devices, controlled by the pneumatic cylinder 22.

The variable angular speed rotary motion is transmitted by the box 34 to the presser group and then to the sole 19 via the chains 43.

To the oscillating arm 32 there is further fastened the arm 11 which is provided at its end with a hinge 10.

It should be noted here that said hinge is located on a line with the middle points of the template 1 and the sole (10) being worked.

To the aforesaid hinge there is journalled the rod 9 the other end of which connects by a second hinge 13 to the pin of a copying roller 14.

Over the rod 9 may slide the sleeve 8, which is connected via two small pins to a fork 7, integral with a carriage 3, provided with a suitable graduated indicator.

Said carriage is sustained by the support 4, fixedly secured to the tool holding arm 5, and may displace axially to the support itself because of the action of a worm gear 48, rotating via the handwheel 2. The copying roller 14 is in turn sustained by the arm 15, oscillating on the levers 16 and 17, and is maintained in contact with the template 1 by the thrust of a big spring 18.

The copying roller-tool holding arm group is brought close to and away from the template 1 and the sole 19, respectively, by the action of the two big springs 30.

Said big springs are fastened, on the lower portion, to two levers 27 and 28, connected therebetween by a rod 29, said levers being controlled by a pneumatic cylinder 26.

From a functional standpoint, it should be pointed out that with the sole 19 in clamped condition, the centering devices 20 and 21 leave the sole itself and the pneumatic cylinder 26 releases the levers 27 and 28, permitting the big springs 30 to bring the copying roller 14 into contact with the edge of the sole 19 to be finished.

The aforesaid tool, set in rotation by the motor 31, via the belt 49, may be replaced by a cutter, or an abrasive band or a brush, the specific functions of the machine according to the present invention being accordingly diversified.

From the foregoing and from perusal of the various figures on the accompanying drawings, it becomes apparent that a greater functional character and more practical application are afforded by the machine of this invention for working soles of any size or number whatever.

Obviously, said machine for the shoe making industry has been formerly described and represented by way of non-limiting embodiment example and in order to demonstrate the practical embodiment and general features of the present invention.

What I claim is:

1. Machine, adapted for working the sole contours of shoes of any size or number whatever, including a copying roller, disposed at the end of a rod, journalled hingedly to an arm, whilst over said rod slides a sleeve, connected to a movable carriage, sustained by a support, fixedly secured to the tool holding arm, the sleeve displacing on the rod via a worm gear, acting on the carriage, displacing it axially relative to its support,

whilst the support arm of said rod is connected to an oscillating arm, sustained by specially provided levers, journalled into one upper cross beam of the machine, the same oscillating arm being balanced by a pair of big springs and may describe a linkage motion, delivered thereto by the particular rotation of an oblong box, driven by a roller, pressing on a portion of its inner wall, said roller being keyed on a helical gear, which is controlled by a worm gear, driven in turn by a self-braking motor via a belt, two presser means being connected to the aforesaid oscillating arm, which fasten the sole to be worked and the basic template, which imparts suitable displacements to the copying roller.

2. Machine as defined in claim 1, wherein there is provided a double frame, consisting of cross beams, whilst to two of said cross beams, placed on the upper part of the machine, there are journalled levers, which sustain an oscillating arm, balanced in its motion by two big springs, the oscillation of said arm being controlled by an oblong box, driven by the rotation of a roller, which presses on its inner wall, said box resting on two rollers, pushed against its outer wall by a spring.

3. Machine as defined in claim 1, wherein the said roller internal to the box is keyed on a helical gear, which is controlled by a worm gear, driven via a belt by a self-braking motor.

4. Machine as defined in claim 1, wherein to the said oscillating arm there are fastened a group of pressers, for the clamping of the sole to be finished and the basic template, said pressers clamping the sole after its centering, which is performed by two centering devices, controlled by a pneumatic cylinder.

5. Machine as defined in claim 1, wherein the oscillating arm has fastened thereto another arm, which is provided at its end with a hinge, lying over the same line with the middle points of the basic template and sole to be finished, to said hinge being journalled a rod the other end of which connects via a second hinge to the pin of a copying roller, over said rod a sleeve may slide, which is connected via two small pins to a fork, integral with a carriage, provided with a suitable graduated indicator.

6. Machine as defined in claim 1, wherein the said carriage is sustained by the support, fixedly secured to the tool holding arm, said carriage being capable of displacing axially relative to the support itself due to the action of a worm gear, rotated via a handwheel, whilst the aforesaid copying roller is sustained by the arm, oscillating on two levers, and is maintained in contact with the basic template of a big spring.

7. Machine as defined in claim 1, wherein the copying roller-tool holding arm assembly is sustained and driven by two big springs, which are fastened on the lower part to two levers, connected therebetween by a rod, which levers are controlled by pneumatic cylinder.

8. Machine as defined in claim 1, wherein the tool applied to the specially provided arm may consist of a cutter, or an abrasive band or a brush, the motion being transmitted to said tool by a motor via a belt.

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