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Braun

[11] **3,780,390**

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[54] **SHOE TREATMENT**

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[52] **U.S. Cl.** ..... **12/1 R**

[51] **Int. Cl.** **A43d**

[58] **Field of Search** ..... 12/1 R, 1 A, 70, 12/77, 78, 79.3, 79.5, 86, 87, 17 R

[56] **References Cited**

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Primary Examiner—Patrick D. Lawson

Attorney—Walter Becker

[57] **ABSTRACT**

A shoe treatment machine in which a tool is provided which operates on the edge of the sole portion which is turned over the top of a last. The tool moves longitudinally of the last and which last pivots about a longitudinal axis so that the tool operates on the upper material near the periphery of the sole portion of the last. A control arrangement is provided operated by potentiometers which are adjustable in conformity with the size of the shoe last and with the longitudinal position of the tool to control the pivotal movement of the last during a work cycle.

41 Claims, 6 Drawing Figures

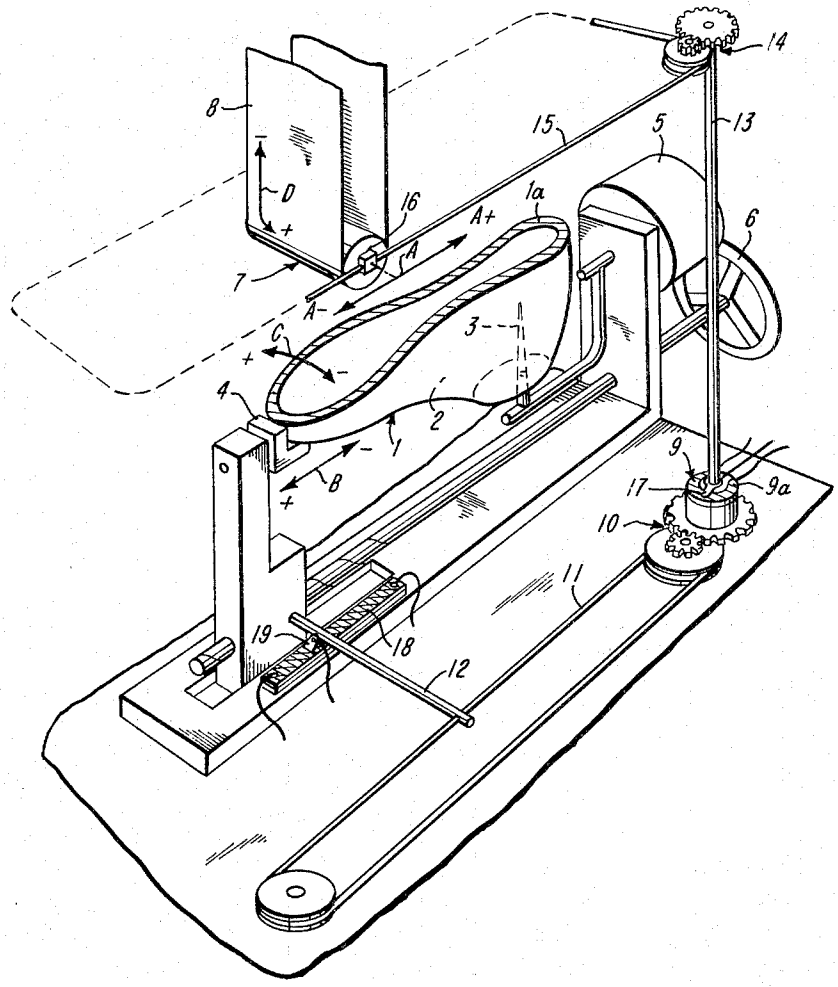


FIG-1

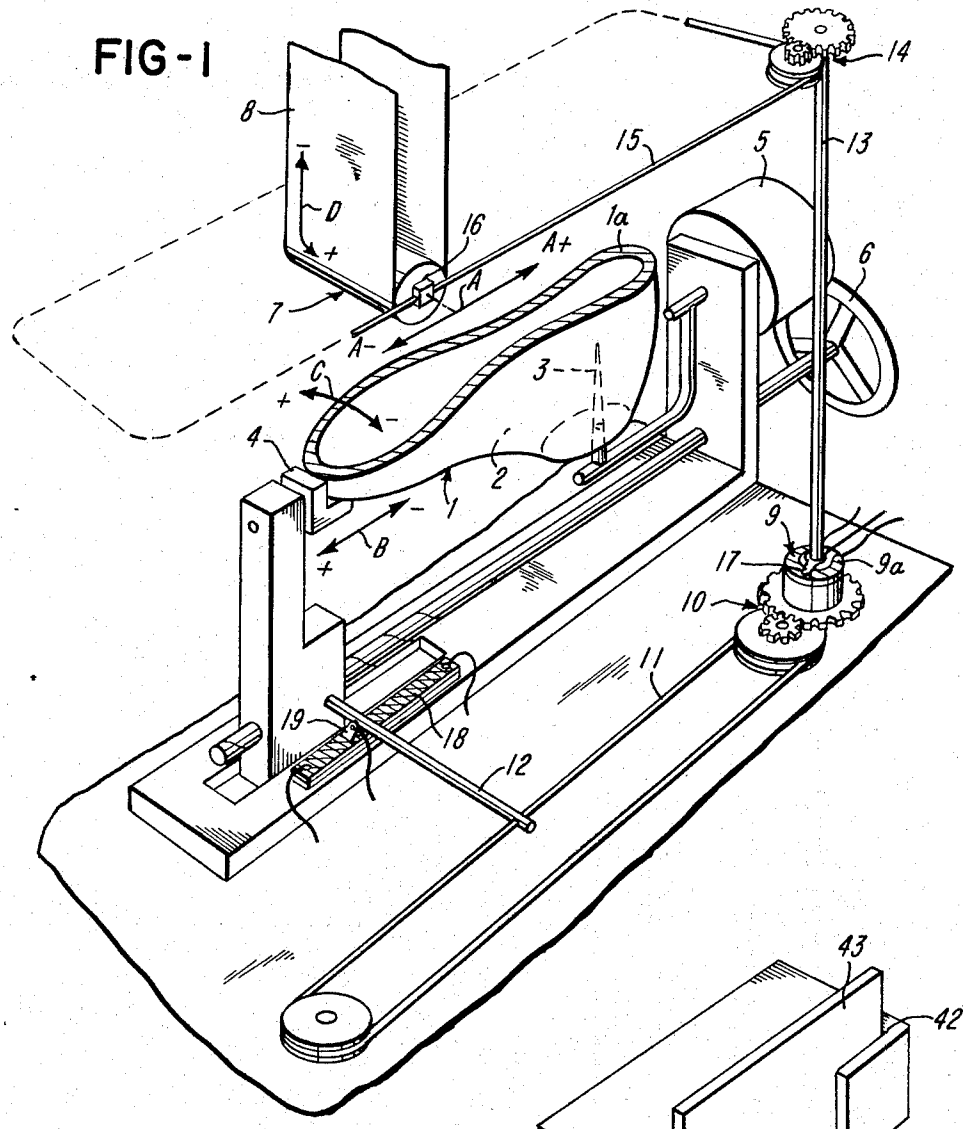
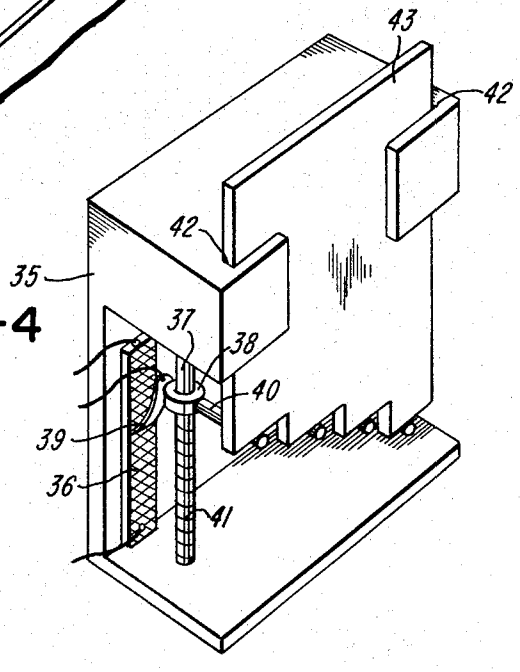

8
D
+
16
A+
1a
15
5
13
14
6
7
A
A-
3
C
+
-
4
2
1
B
+
9
9a
17
10
11
19
18
12

FIG-4


43
42
42
35
37
38
40
39
36
41

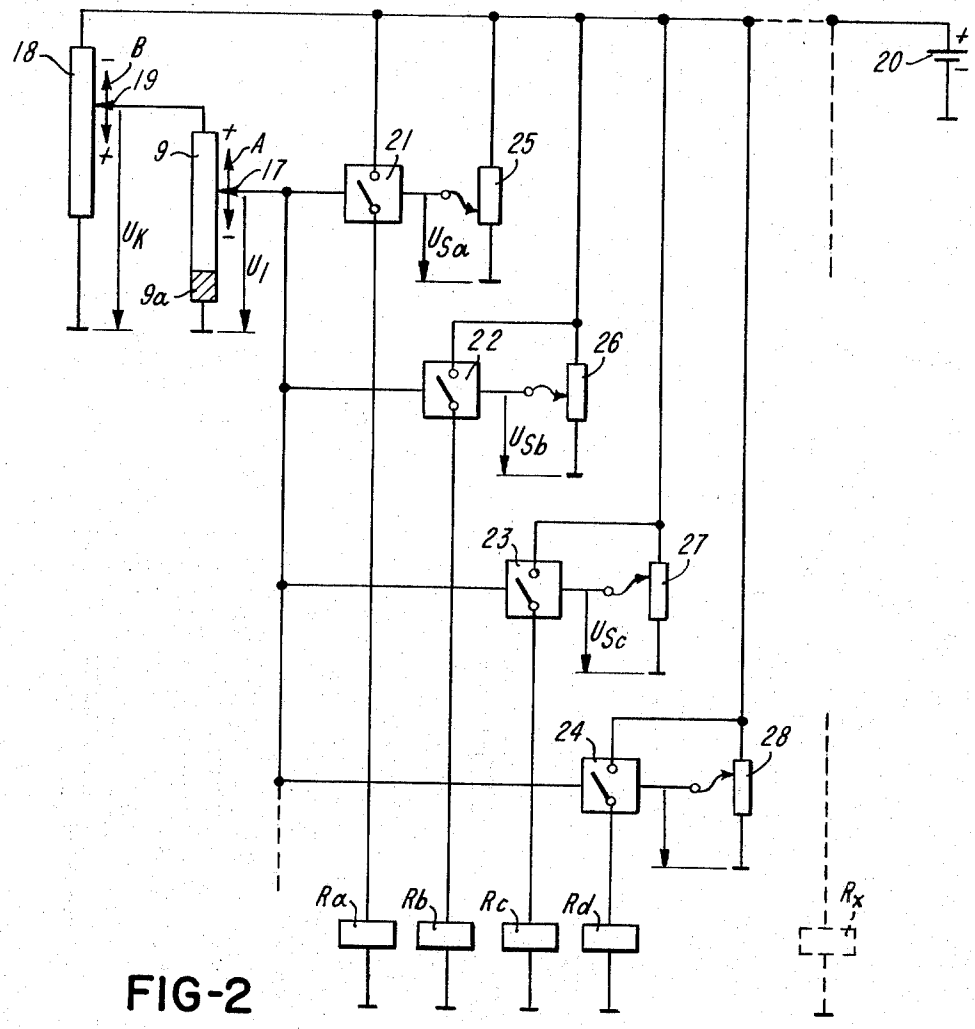

18
B
19
9
A
17
21
25
20
U_K
U_1
9a
U_{Sa}
22
26
U_{Sb}
23
27
U_{Sc}
24
28
Ra
Rb
Rc
Rd
Rx

FIG-2

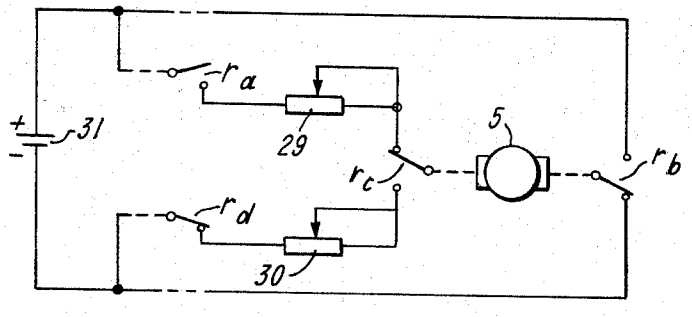
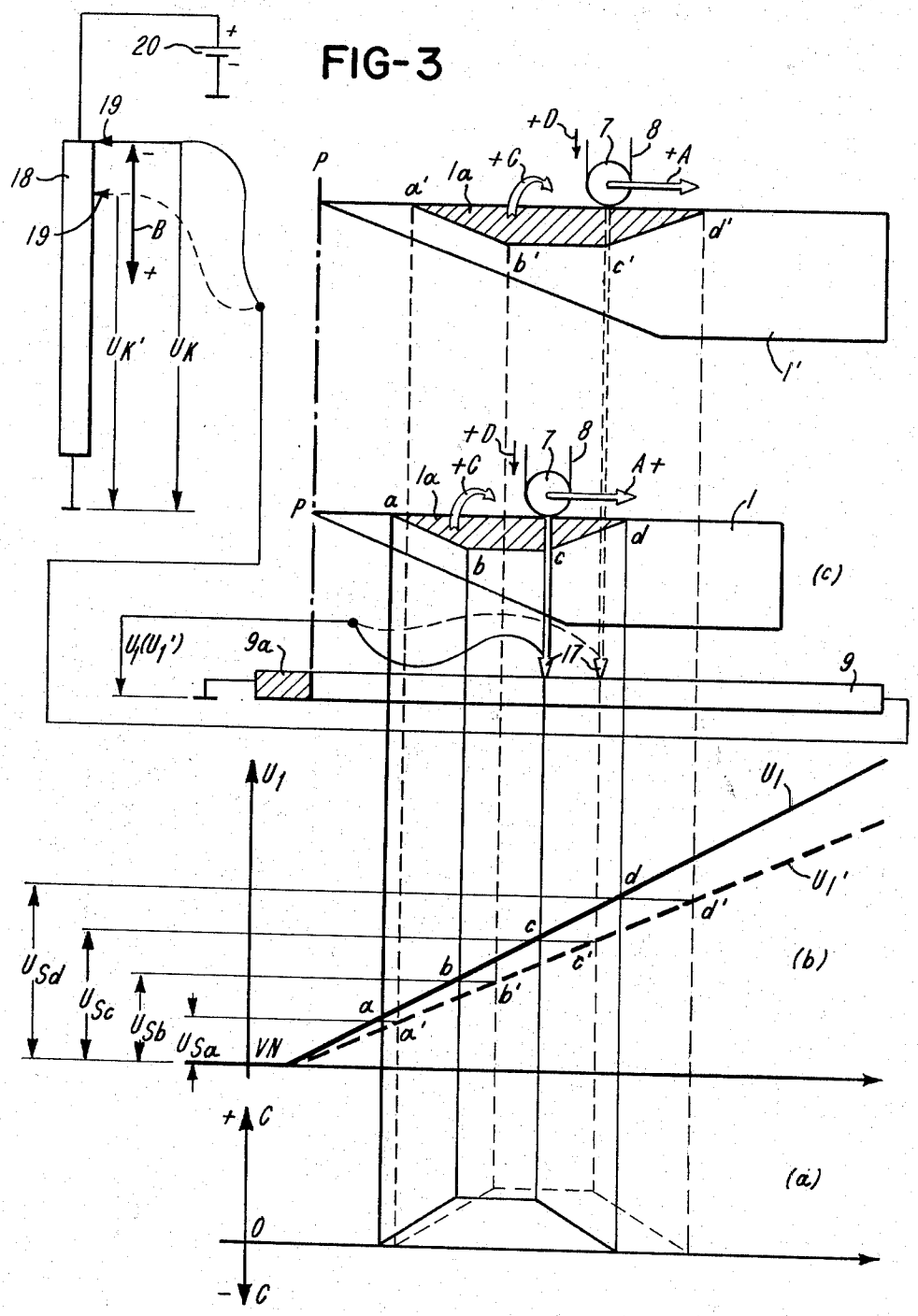

31
r_a
29
r_c
5
r_b
r_d
30

FIG-3


20
19
18
19
B
$U_{K'}$
U_K
P
a'
1a
+C
+D
7
8
+A
b'
c'
d'
1'
(c)
a
b
c
d
1
9a
$U_1(U_1')$
17
9
U_1
$U_{1'}$
(b)
U_{Sd}
U_{Sc}
U_{Sb}
U_{Sa}
VN
(a)
+C
0
-C

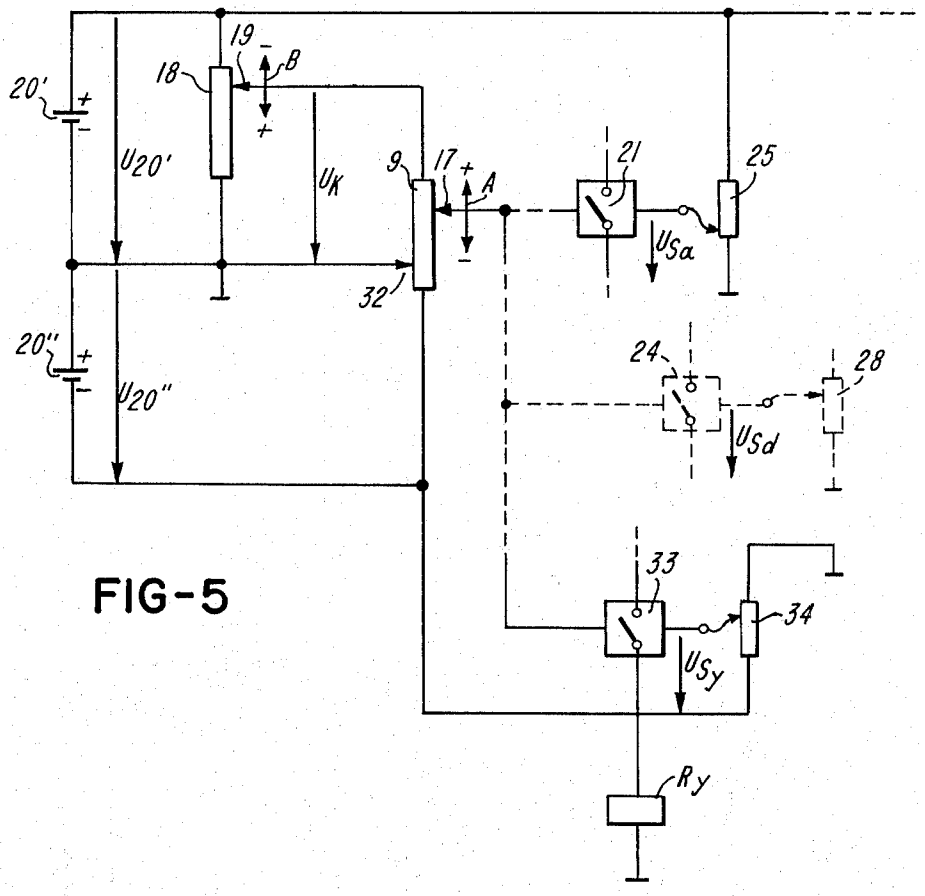
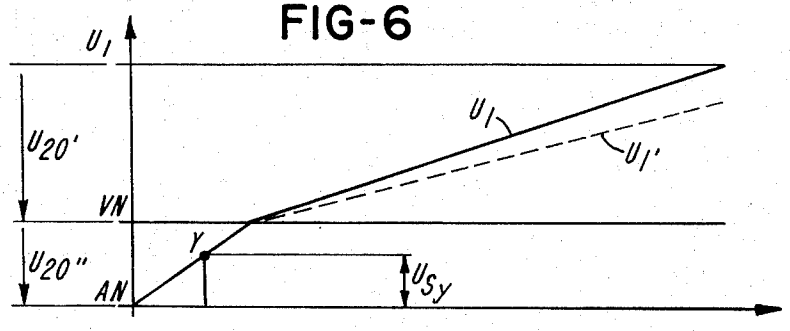

20'
18
19
B
U20'
UK
9
17
A
21
25
USa
32
20''
U20''
24
28
USd
33
34
USy
Ry

FIG-5

FIG-6


U1
U20'
U1
U1'
VN
U20''
AN
Y
USy

SHOE TREATMENT

The present invention relates to a control device for a shoe treatment machine for the knocking on, in particular roughening, of the listing margin on shoe uppers, in which machine a shoe to be treated is processed during a feed movement thereof relative to a tool in such a way that at least one operating dimension of the treatment procedure is influenced by the control device.

According to a known method of the aforementioned kind, control of the pivoting movement taking place relatively between the shoe and the tool is effected by use of a curved template and a sensing pin. The relative movement between the curved template and the sensing pin is synchronized with the advancing movement, and deflection of the sensing pin as it follows the shape of the curved template is used directly to control the pivoting movement. With this method the pivoting movement is adapted theoretically exactly relatively between the tool and the shoe at each individual place of the roughened surface.

Practically, deviations result which are due to the fact that the lasting margin is not always accurately even and fixed in the same thickness on the last.

One drawback of this known method of treatment, therefore, consists in that the relatively complicated course of the pivoting movement requires a complicated and, therefore, expensive control, although the useful effect due to the unavoidable tolerences is greatly reduced.

A further substantial drawback consists in the fact that for each model of shoe a separate curved template must be made. This means also that even for a single small series of models a curved template must first of all be specially made. Further, if corrections have to be effected to a tamplate, these must be developed in time consuming work, re-treated and again built in so frequently until their shape corresponds sufficiently accurately to the expected course.

It is, therefore, an object of the present invention to provide a method of treating, especially roughening, the lasting margin on the shoe uppers and to develop a control device for use in connection with a shoe treating machine, which will overcome the above mentioned drawbacks.

These and other objects and advantages of the invention will appear more clearly from the following specification in connection with the accompanying drawings, in which:

FIG. 1 is a diagrammatic isometric view of a shoe treating machine.

FIG. 2 shows a circuit diagram of one form of a control device according to the invention for use with the machine of FIG. 1.

FIG. 3 illustrates a diagrammatic representation of the manner of operation of the control device according to FIG. 2.

FIG. 4 shows an arrangement according to the invention.

FIG. 5 is a circuit diagram of an alternative form of control device according to the invention.

FIG. 6 is a diagram illustrative of the manner of operation of the device of FIG. 5.

According to the present invention there is provided a control device for operating a shoe treating machine which comprises an actual value transmitter for producing an actual electric signal associated with the position of the tool relative to a reference place of a shoe to be treated, and also includes switch means responsive to predetermined values of the actual signal for influencing at least one working dimension of the treatment procedure.

With a control device according to the invention, as opposed to the use of a template, a rapid and very simple conversion from one shoe model to another can be effected.

According to two advantageous embodiments of the invention the actual signal of the position of the tool relative to a place of reference of the shoe to be treated is either arranged analogously or digitally.

In this connection the technology offers various possibilities.

As the most common means for the analogous representations of paths covered, a potentiometer may be provided the movable tap of which is coupled mechanically to the part of the treatment machine carrying out the movement of adavnce, and at its end connections a direct voltage source is connected. Between one of the end connections and the movable tap, the actual signal is then developed.

On the other hand there may be used opto-electronic devices (similar to light barriers) which are more expensive but which have the advantage that parts rubbing mechanically on one another are obviated.

More detailed information regarding such known devices may for example be obtained from the Swiss Journal "Der Elektroniker," 7th year, No. 2/68, pages 47–49. In particular the terms "digital incremental" and "digital absolute" are clearly explained.

According to a preferred arrangement of the invention, the toe of the shoe to be treated is provided as a place of reference. This yields the advantage that this place of reference can be coupled by means of the toe support of the supporting device for the shoe in a simple manner to the control device.

It is particularly recommended to design the actual value transmitter in such a way that the actual signal corresponds to a comparison value zero when the toe of the shoe and the tool seen perpendicularly to the direction of advance are over one another whereby the direction of advance agrees approximately with the longitudinal axis of the shoe and that the actual signal with a relative movement of the tool in the direction of the heel of the shoe has an ascending course.

Preferably with the control device according to the invention, threshold value switches are provided as switch means the switch conditions of which are determined by the proportion of the supplied actual and reference signals. Threshold value switches are, for example, known from the Swedish Publication "Radio and Television" No. 12, 1968 page 24 FIG. 17.

It is recommended to associate with each switch means a reference value transmitter for the production of an adjustable reference signal.

As safety measures, end switches may be provided additionally to the switch means. In this way in particular the change of direction of the advancing movement can be determined. This is above all of advantage with a defect of a switch means because thereby damage to the drive for the movement of advance can be avoided. A reversing of the direction of rotation of the tool is, in this way, also possible for safety.

According to a further advantageous arrangement of the invention, a characteristic value transmitter for the production of a reference signal is to be provided which is associated with a characteristic shoe dimension.

If the course of the actual signal is influenced by a measurement factor determined by the characteristic signal, and if the characteristic value transmitter is coupled mechanically to the supporting device for the shoe, it will be appreciated that with a conversion from one shoe size to another within a model series, no new adjustment by the operator is necessary, which represents a considerable advantage.

The same applies of course also when the characteristic value transmitter is connected at least to a reference value transmitter.

Referring now to the drawings in detail, there will in connection with FIG. 1 first be described the basic manner of operation of a shoe treating machine.

A shoe **1** (or the leather uppers to be treated) is clamped onto the last **2.** This last is located by means of a clamping pin **3** and a toe support **4.** The last can be pivoted from side to side, as indicated by the arrow C, by means of a driving motor **5.** The driving motor **5** may have associated therewith further components (not shown) for example, an electrically operable clutch.

The toe support **4** may be adjusted by a hand wheel **6** in the direction of the arrow B to enable different sizes of shoe to be accomodated. During the treatment procedure, a tool **7** is moved by a driving device (not shown) in the direction indicated by the arrow A, +A representing forwards and −A representing backwards advancing movement of the tool **7** relative to the shoe **1.** If desired, the tool **7** may be fixed whilst the shoe **1** carries out the advancing movement.

A working part **8** of the tool is moved to effect the treating procedure either in the direction +D or −D. As the working part **8** of the tool, particularly for roughening treatment, an abrasive band may be provided. For a knocking on treatment procedure, the tool **7** is suitably otherwise formed.

During the forwards and backwards advance movement in the direction of arrow A, the shoe is pivoted in the direction C so that the working part **8** of the tool follows the rough hatched surface **1***a*. If desired, the tool **7** may be movable pivotably instead of the shoe.

The procedure so far described is generally in accordance with the prior art.

The treating procedure according to the present invention may be realized by means of a template control but the advantages with the use of a control device according to the invention are particularly evident.

The remaining components in FIG. **1** are a constituent part of one form of the control device according to the present invention.

Thus, in this example, a potentiometer **9** is provided as an actual value transmitter. The resistance body of the potentiometer **9** has in an end area a low ohmic covering **9a** and is coupled through a gear **10,** a cable **11** and a rod **12** to the toe support **4** adjustable in the direction B.

The advancing movement A is transmitted to the movable tap **17** of the potentiometer **9** by means of a coupling rod **13,** a further gear **14** and a cable **15** which is connected on a bearing **16** to the tool **7.**

A potentiometer **18,** which is in the form of a straight potentiometer, acts as a characteristic value transmitter. The movable tap **19** of this potentiometer **18** is fixed insulated to the rod **12.**

As will be seen from FIG. **2,** a source of direct voltage **20** is connected to the end connections of the potentiometer **18.** The measurable voltage on the movable tap **19** represents a characteristic signal UK. This characteristic signal UK is directly related to the position of the toe support **4** with regard to the clamping pin **3** and thereby characterizes a characteristic shoe dimension.

To one pole (for example the negative pole) of the source of direct voltage **20** on the one hand and to the movable tap **19** on the other hand there are connected the end connections of the potentiometer **9.**

On the movable tap **17** there is developed a voltage representing an actual signal U_I. The value of the actual signal U_I is thereby a function of the characteristic signal U_K.

The expected displacement of the movable taps **17** and **19** in conformity with the directions of movement A and B is shown.

The actual signal U_I is lead to the inputs of the switch means **21, 22, 23** and **24.** To a second input of each switch means there is connected a reference signal respectively U_{Sa}, U_{Sb}, U_{Sc} and U_{Sd}.

These reference signals are provided by potentiometers **25, 26, 27** and **28** which are connected to the direct voltage source **20.**

As representative of the function of each switch means, the function of the switch means **21** will be described. As long as the actual signal U_I is smaller than the reference signal U_{Sa}, the switch means **21** is held inoperative. As soon as the actual signal U_I is equal to or greater than U_{Sa} the switch means **21** becomes operative.

For the sake of simplicity, the switch means are represented by switch symbols.

It is therefore possible with the aid of the potentiometers **25** to **28** to select independently of one another the switch threshold of each switch means **21** to **24.**

The switch means **21** to **24** are arranged to activate output switch stages R*a*, R*b*, R*c*, R*d* to R*x*.

For the sake of simplicity, the output switch stages are shown as relays, the contacts of said relays in association with the windings R*a* to R*x* being characterized by small letters r_a, r_b −etc.

These contacts, for example by suitable connection to the driving motor **5,** control the pivotal movement C.

A possible manner of connection is shown in FIG. **2.**

If the contacts are actuated in alphabetical sequence (beginning with r_a), the driving motor **5** effects a pivoting through one cycle.

The speed of the engaging and disengaging pivot movement can be determined by adjusting members, for example, adjustable resistances **29** and **30.** The driving energy is supplied by the voltage source **31.**

For a complete shoe treatment, two cycles are necessary, one for each direction of advance. In order to carry out the second cycle, therefore a correspondingly greater number of switch means reference value transmitter and power switch stages are necessary. For the sake of clarity, such arrangement is indicated in FIG. **2** by broken lines only.

FIG. **3** shows a displacement of the switch points *a*, *b*, *c*, *d* dependent on the size of the show. Two different sizes of shoe **1** and **1'** are shown, for this purpose, greatly simplified, in side view (FIG. 3*c*). The rough-

ened surfaces 1*a* and 1*a'* are of course shown exagerated but the necessary pivot direction +C can be satisfactorily seen. For the sake of clarity only the pivot movement over one cycle is shown.

The commencement of the deflecting movement is represented with a (or *a'*); between *b* (or *b'*) and *c* (*c'*) the pivot position is unaltered; and the end of this cycle is marked by *d* (or *d'*).

The resistance path of the potentiometer **9** (actual value transmitter) is shown corresponding to the transmission ratio of the gear **14** rolled on to the distance of advance.

Due to the coupling of the resistance body through the gear **10**, the cable **11**, and the rod **12** to the toe support **4** discussed in conjunction with FIG. **1**, it is ensured that the toe of the shoe P (FIG. **3**) is always in the same position with respect to the resistance path of the potentiometer **9** regardless of the size of the shoe.

Next, the course of the actual signal U_I with the smaller shoe **1** is treated whereby the movable tap **19** is located in the upper drawn out position in FIG. 3*c*.

In order that the shoe **1** may be clamped in the machine at all, the tool **7** must, for example, be located to the left of the toe of the shoe P. The movable tap **17** coupled mechanically to the tool **7** contacts only the low ohmic covering **9***a* so that the actual signal corresponds to the compression value zero VN.

As soon as, however, the tool **7** upon an advancing movement in the direction +A reaches the toe of the shoe P, the movable tap **17** contacts the resistance track. If the potentiometer **9** has a linear resistance track, also the actual signal U_I increases linearly upon an advancing movement of the tool **7** over the heel of the shoe **1** (full line in FIG. 3*b*).

By means of the reference value transmitter, the individual reference signals S_a, S_b — etc. are given and give rise with the predetermined positions of the tool **7** to the release of the appropriate switch means.

The position of the tool **7**, shown in FIG. 3*c*, corresponds to the commencement of the return movement (switchpoint *c*).

The appropriate course of the pivot positions +C over this cycle is to be seen in FIG. 3*a* (full lines).

If now a larger shoe **1'** from the same model series is clamped between the toe support **4** and the clamping pin **3**, the movable tap **19** is moved in the direction +B, and the characteristic signal U_K' is now smaller (FIG. 3c). Accordingly the course of the actual signal U_K' is also flatter as can be seen from the broken lines in FIG. 3*b*.

As the adjusted reference signals remain unaltered, the switch points *a* to *d* are moved locally to the right *a'* to *d'*.

If one now follows the broken lines, it will be seen that the switch points *a'* to *d'* on the shoe **1'** (FIG. 3*c*) are adapted accurately true to scale to the new size of the shoe.

The appropriate course of the pivot position is indicated in broken lines in FIG. 3*a*. The maximum pivot position may amount, for example, to 5 angle degrees.

In order that the true to scale size adaptations may contain no errors, the comparison value zero VN (see especially FIG. 3*b*) must advantageously always be present if the tool **7** is over the toe of the shoe P.

The low ohmic covering **9***a* however may be dispensed with when the tool **7** upon change of shoe cannot be pivoted to the left but sufficiently wide upwards. The toe of the shoe P is then directly to be aligned with the commencement of the resistance path.

With reference to FIG. **5**, for example, a second advantageous form of the control device according to the invention will be described.

Those parts in FIG. **5** which are the same parts as in FIG. **1** are provided with the same reference numerals as in FIG. **1**.

FIG. **5** differs from FIG. **1** primarily in that the potentiometer **9** instead of the low ohmic covering has a second movable tap **32**.

Furthermore the direct voltage source consists of two partial voltage sources **20'** and **20''** connected in series and the connecting place of the part voltage source is connected to the second movable tap **32** of the potentiometer. $U_{20'}$ and $U_{20''}$ are the voltages of the part voltage sources **20'** and **20''**.

The potentiometer **18** is arranged in parallel with regard to the part voltage source **20'** and provides the potentiometer **9** with a part of the part voltage source **20'**.

The object of this arrangement consists in that the actual signal U_I, upon a relative movement of the tool **7** from the toe of the shoe P opposite to the direction of the shoe heel (therefore −A), has a course declining as far as an absolute value zero AN.

In this connection it is possible to arrange a switch point y in front of the shoe toe P.

The additional switch means **33** receives a reference signal U_{Sy} from the potentiometer **34** acting as the reference value transmitter.

While the reference signals U_{Sa} to U_{Sd} may be the same or greater than the comparison value zero VN, the reference signal U_{Sy} may be adjusted to the values between the absolute value zero AN and the comparison value zero VN.

The switch means **33** actuates the power stage Ry. The contacts (in so far as it concerns relays) of this power switch stage preferably control the advancing movement.

In FIG. **6** the course of the actual signal $U_I(U_{I'})$ is illustrated. Switch point *y* lies in front of the toe of the shoe P. The tool therefore does not always require to pass over the whole path of advance but only so much as it is absolutely necessary with the size of shoe. That means that the path of advance is automatically shortened when a smaller shoe is to be treated, thereby reducing the time of shoe manufacture.

The diagram of FIG. **6** is to be considered analogous to FIG. 3*b*. It is to be noted that U_I and U_I' at the same place always reach the comparison value zero VN. This comparison value zero VN must likewise always be associated with the toe of the shoe P.

In order to facilitate equalization, it is recommended manually to adjust the second movable tap **32** of the potentiometer **9**.

Although in FIG. **2** adjustable resistances **29** and **30** as adjusting members for influencing the speed of the pivoting movement are shown, this is in no way to be understood to be limiting. Likewise the driving motor **5** for the operation may be a. c. operated. The adjusting members may accordingly be thyristor adjusting members or transformers with adjustable transmission ratios. Simplifications in the drawings have only been effected for the sake of clarity.

Thus, for example, in the drawing it is not shown how a device representing the pivoting movement relatively between tool and shoe by means of an electric signal is to be carried out. A suitable device certainly does not

present any difficulties to the expert in this field. It could moreover be carried out similarly to the actual value transmitter described.

It is then recommended to provide at least one switch element which responds to the pre-given values of this signal representing the pivoting position.

This switch element may be constructed like the switch means **21** to **24** and may have several separate reference value transmitters.

Advantageously, for example, by means of the switch means **21** the deflection movement is then released (switch point *a*, FIG. **3**) while the end of the pivot movement (switch point *b*) is to be determined by a correspondingly pre-adjusted switch element.

The pre-adjustment of the switch element may, for example, be realized in that it is connected in conformity with the switch conditions of the switch means (**21, 22,** etc.) to differently adjusted reference value transmitters.

In this sense, also the commencement of the turn pivoting movement (switch point *c*, FIG. **3**), for example, is released by the switch means **33.** The pivoting movement is then automatically stopped when the zero position is reached.

The afore mentioned arrangement of the control device according to the invention yields the advantage that the number of switch means is reduced.

Alternatively to the connecting together of characteristic value transmitters and actual value transmitters shown in FIGS. **2, 3** and **5,** the potentiometers **25** to **28** (reference value transmitters) may of course be connected to the movable tap **19** of the potentiometer **18** while the potentiometer **9** (actual value transmitter) is to be connected directly to the direct voltage source. This does not result in any difference as to the manner of operation. A few advantageous possibilities for a further simplification in the operation may now be mentioned briefly.

If all reference value transmitters and adjusting members are to be made adjustable by hand, the operator with each change of model must effect the corresponding number of adjustments.

It is substantially time saving when all reference value transmitters and adjusting members are combined as insertable constructural group carriers (print plate) and are firmly preadjusted. With a change of model then simply another constructional group carrier is inserted into the plug bar provided therefor. This variation is recommended with frequently recurring models in addition to hand adjustment.

Particularly when the adjusting members or the reference value transmitters are too heavy and large for the pivot plate technique, in particular when transformers are provided as adjusting members, it has been found that the solution indicated diagrammatically in FIG. **4** is very favorable.

On a carrier frame **35** there are fixed-lying next to one another — several flat resistance layers. Of course, the drawing shows only a single resistance layer **36.**

Parallel to layer **36** there is a guide rod **37.** On the guide rod **37** there is slidably arranged a guide sleeve **38** which on the one hand carries a contact spring **39** and on the other hand a pin **40.** A helical spring **41** presses the guide sleeve **38** upwards.

In the guide slit **42** of the carrier frame **35** there may be inserted from above a program card **43.** It thereby presses with its lower edge on the pin **40.**

The position of several pins only is indicated in FIG. **4.** Corresponding to the graduation of the lower edge there result different adjustments of the single contact springs.

Instead of the resistance layer **36** shown, for example, in FIG. **4,** the contact springs (for example **39**) may of course contact also on taps of transformer secondary windings, whereby different transmission ratios according to the program card result.

It is, of course, to be understood that the present invention is, by no means, limited to the specific showing in the drawings but also comprises any modifications within the scope of the appended claims.

What is claimed is:

1. In a control device for controlling the operation of a shoe treating machine, the machine having a frame with a last support member therein and a toe support member longitudinally adjustable therein and a treatment tool support member reciprocable longitudinally along a last mounted on the last support member, signal generating means operable to generate control signals in conformity with the position of the tool support member along the last, switch means adapted to be operated by said signals, and means under the control of said switch means for controlling the relative movement between the tool support member and the last support member.

2. A control device according to claim **1** in which said signals vary in conformity with the position of the tool support member relative to a predetermined reference point on a shoe on a last mounted on said last support member.

3. A control device according to claim **1** in which said signal is a digital signal and varies in conformity with the position of the tool support member relative to a predetermined reference point on a shoe on a last mounted on said last support member.

4. A control device according to claim **1** which includes opto-electronic means for generating said signals in digital form, said signals varying in conformity with the position of the tool support member relative to a predetermined reference point on a shoe on a last mounted on said last support member.

5. A control device according to claim **3** which includes opto-electronic means for generating said signals in digital form, said signals varying in conformity with the position of the tool support member relative to a predetermined reference point on a shoe on a last mounted on the last support member, said opto-electronic means being responsive to the absolute value which indicates the position of the tool support member along the last.

6. A control device according to claim **2** in which said signal generating means includes potentiometer means having an element in the form of a resistor and an element in the form of a sliding tap on the resistor, one element being stationarily mounted on the machine and the other element being connected to the tool support member, and a direct current source of voltage connected to the ends of the resistor.

7. A control device according to claim **1** in which the toe of a shoe on a last on said last support member forms the said reference point.

8. A control device according to claim **7** which includes an element of said signal generating means coupled to the toe support member.

9. A control device according to claim 7 in which said signals are at a comparison value of zero when the tool on the tool support member is directly opposed to the toe of a shoe on a last on the last support member and which toe is engaged by the toe support member, said signals increasing in value as the tool moves towards the heel of the shoe.

10. A control device according to claim 9 in which movement of the tool support to move the tool from the toe end of the shoe away from the heel maintains the signals at a comparison value of zero.

11. A control device according to claim 6 in which said potentiometer means has a region of low ohmic value at one extreme end.

12. A control device according to cliam 9 in which movement of the tool support to move the tool from the toe end of the shoe away from the heel reduces said signals from a comparison value of zero toward absolute zero.

13. A control device according to claim 1 in which said signal generating means includes a first potentiometer comprising a first resistor stationarily mounted on the machine and having a first slidable tap connected to the toe support member for movement thereby and a second potentiometer comprising a second resistor and a second slidable tap connected to the tool support member for movement thereby, said second resistor being connected to the toe support member for movement thereby whereby said second tap is at the end of said second resistor whenever the tool is adjacent the toe support member, a third movable tap on said second resistor, a voltage source comprising two parts connected in series with the juncture thereof grounded, one of said parts being connected across said first resistor, said first tap being connected to one end of the second resistor, the other said part of said voltage source being connected between said third tap and the other end of said second resistor.

14. A control device according to claim 13 in which said third tap is manually adjustable.

15. A control device according to claim 13 in which said signals are generated across said second tap and the juncture of said two parts of said source of voltage, said switch means being connected to receive said generated signals and also to receive reference signals and operating in conformity with the difference between said signals.

16. A control device according to claim 15 in which said switch means comprises a plurality of switches with each switch being connected to a respective source of reference signals.

17. A control device according to claim 16 in which each said source of reference signals is manually adjustable.

18. A control device according to claim 16 in which each said source of reference signals is adjustable and are adapted for adjustment by a program member.

19. A control device according to claim 16 in which each said source of reference signals is in the form of a presettable unit adapted for connection with the respective switch means.

20. A control device according to claim 16 in which at least one said switch is adjustable to respond to values of a generated signal equal to or greater than the comparison value signal.

21. A control device according to claim 16 in which at least one said switch is adjustable to respond to a generated signal value which lies between absolute zero value and the comparison zero value.

22. A control device according to claim 19 in which each said source of reference signals comprises a potentiometer having a source of direct voltage connected to the terminals and having a moveable tap, the reference signal provided thereby being taken between the tap and one end of the potentiometer.

23. A control device according to claim 1 in which said switch means includes end switches operated in response to the tool on the tool support member reaching the ends of a last on the last support member.

24. A control device according to claim 23 in which said end switches control the change of direction between the tool and the shoe.

25. A control device according to claim 23 in which the tool is reversible and the said end switches control the direction of movement of the tool.

26. A control device according to claim 1 in which said relative movement between the tool support member and the last support member is a pivotal movement on an axis parallel to the length of the last.

27. A control device according to claim 26 which includes electric means energizable for effecting said relative movement.

28. A control device according to claim 27 in which said switch means provide electric signals for actuating said electrical means.

29. A control device according to claim 28 in which one of said switch means initiates said pivotal movement and another of said switch means interrupts the said pivotal movement.

30. A control device according to claim 29 which includes at least one adjustable means in circuit with the electrical means for influencing the speed with which said pivotal movement takes place.

31. A control device according to claim 30 in which said switch means provides for reversal of said electrical means.

32. A control device according to claim 30 in which said adjustable means is manually adjustable.

33. A control device according to claim 30 in which said adjustable means is adapted for adjustment by a program member.

34. A control device according to claim 30 in which said adjustable means comprises a plurality of preadjusted members, and a carrier on which said members are assembled for connection to the control device.

35. A control device according to claim 30 in which said adjustable means is a variable means.

36. A control device according to claim 30 in which said adjustable means is a variable ratio transformer.

37. A control device according to claim 16 which includes a reference voltage source which conforms to a predetermined characterizing dimension of the shoe to be treated.

38. A control device according to claim 37 in which said reference voltage source is connected in circuit with said signal generating means so that the generated signals are influenced by a scale factor determined by said reference voltage source.

39. A control device according to claim 37 which includes means for influencing at least one of said sources of reference signals in conformity with said source of reference voltage.

40. A control device according to claim 37 in which said source of reference voltage is adapted for adjust-

ment in conformity with the adjustment of the position of said toe support member on the machine frame.

41. A control device according to claim **40** in which said reference voltage source comprises a potentiometer, a direct voltage source connected across the ends of the potentiometer, said potentiometer comprising a moveable tap connected to the toe support member and said reference voltage being taken between the said tap and one end of the potentiometer.

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