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(54) Machine for gluing and folding edges of materials in sheet form and the like, particularly of shoe upper parts made of leather or the like, with automated actuation

(57) A machine for folding and gluing edges of materials in sheet form, particularly leather parts of shoe uppers, comprising a working surface and mechanical elements such as a foot (6) for folding the edge of the part being treated, a guide (8) for the abutment of the part to be treated, a folding element (13) and a cutting blade (15), a main motor for the actuation of the machine and a microcomputer for storing parameters related to the operation of the machine being further provided, the particularity of the machine being that it is equipped with independent actuations for the blade (15) which are synchronized with the main motor of the machine.

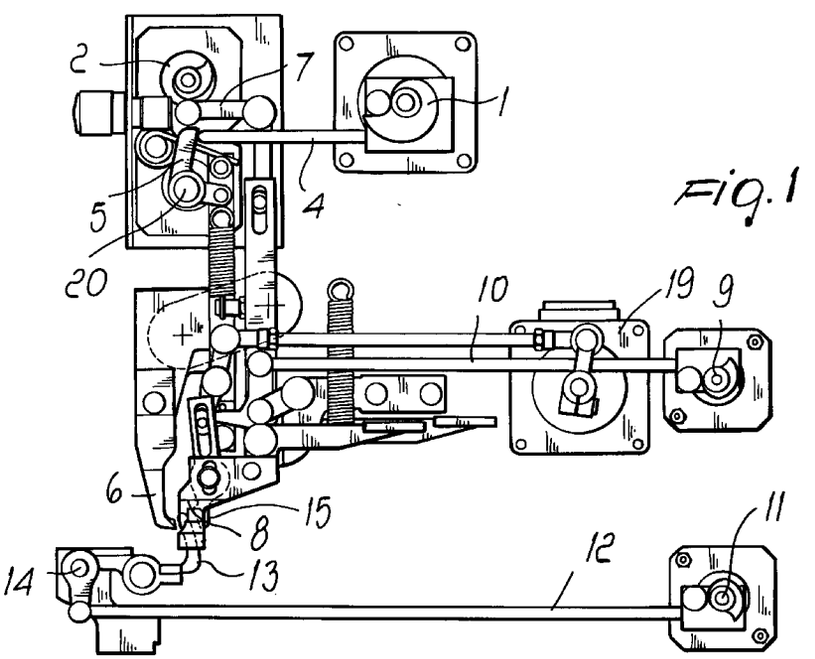

Fig. 1

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Description

[0001] The present invention relates to a machine for gluing and folding edges of flat parts in sheet form, particularly shoe upper parts made of leather or the like, with automated actuation.

[0002] More particularly, the present invention relates to a machine for gluing and folding uppers which is capable of automatically performing any folding and gluing operation along curved and straight edges of uppers.

[0003] Different machines for folding and gluing edges of shoe uppers, both of the manually-actuated type and of the semiautomatically-actuated type, are already known.

[0004] From a general point of view, a folding machine is constituted by a surface, whereon the part whose edge is to be treated is made to slide, and by a driving shaft which is connected to a variable-speed motor, usually by means of a clutch which can be actuated by the operator. The driving shaft drives various elements for conveying, with a reciprocating motion, the part to be treated with movement steps whose lengths are preset mechanically by moving stop elements or by means of step motors.

[0005] The elements for folding a portion of the peripheral edge of the part being treated comprise a folding foot, which cooperates with a fixed abutment, and an oscillating finger for folding the edge of the part against the folding foot.

[0006] Presser means are also provided for retaining the folded part and moving it forward.

[0007] The folding foot is usually axially hollow and the glue is fed through it onto the part of the edge to be folded; the glue is fed by means of a gear pump which is actuated mechanically in some cases and by means of servomechanisms with a DC motor or a step motor in other cases.

[0008] The glue is spread at the lower end of the foot in a preadjusted manner and proportionally to the rotation rate of the machine and to the length of the advancement step.

[0009] The machine also has a cutting blade which is actuated when the edge to be folded has an internal or concave curve in order to cut into the border of the part in order to facilitate its folding.

[0010] Photocells for recognizing the part being treated, dosage devices for the adhesive and other conventional complementary elements are also provided.

[0011] Said folding and gluing machines are provided with a main motor, various servomechanisms and a microcomputer which supervises the operation of the machine, allowing to set operating parameters chosen by the user.

[0012] However, the adjustment of the foot, of the guide against which the part being treated abuts, and of the folding element that folds the part of the edge that is to be folded and glued is performed manually.

[0013] The actuation of the various mechanical folding elements is performed with mutual coordination and through the actuation imparted by the main motor, with the drawback that it is not possible to adjust one element independently of the others.

[0014] For example, in the case of the cutting blade, the operating speed of the machine determines the actuation speed of the blade, which accordingly slows down considerably in the curved portions of the part being treated (which are generally treated at low machine speeds).

[0015] The aim of the present invention is to provide a machine for gluing and folding the edges of materials in sheet form and the like, particularly of shoe upper parts made of leather or the like, in which some mechanical elements are fully independent of the others in their adjustment.

[0016] Within the scope of this aim, an object of the present invention is to provide a machine for folding and gluing edges of materials in sheet form and the like, particularly of shoe upper parts made of leather or the like, in which the adjustments of the folding foot, of the guide, and of the folding element of the machine are closely correlated to the characteristics of the treatment to be obtained.

[0017] Another object of the present invention is to provide a machine for folding and gluing edges of materials in sheet form and the like, particularly of shoe upper parts made of leather or the like, which allows to retrieve settings of the mechanical elements which have been stored during previous treatments to provide them again in subsequent treatments.

[0018] Another object of the present invention is to provide a machine for folding and gluing edges of materials in sheet form and the like, particularly of shoe upper parts made of leather or the like, which allows to automatically vary the settings of the mechanical elements of the machine even during the process.

[0019] Another object of the present invention is to provide a machine for folding and gluing edges of materials in sheet form and the like, particularly of shoe upper parts made of leather or the like, which is highly reliable, relatively easy to provide and at low costs.

[0020] This aim, these objects and others which will become apparent hereinafter are achieved by a machine for folding and gluing edges of materials in sheet form, particularly of leather parts of shoe uppers, comprising a working surface and mechanical elements such as a foot for folding the edge of the part being treated, a guide for the abutment of the part to be treated, a folding element and a cutting blade, a main motor being provided for the actuation of said machine, a microcomputer storing parameters related to the operation of said machine, characterized in that it has independent actuation means for said blade which are synchronized with said main motor of the machine.

[0021] Further characteristics and advantages of the invention will become apparent from the following

detailed description of a preferred but not exclusive embodiment of the machine according to the invention, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

Figure 1 is a general view of the foot, of the guide, of the folding element, and of the cutting blade of the folding and gluing machine, according to the present invention;
Figure 2 is a detail view of the adjustment of the guiding element of the folding and gluing machine according to the invention;
Figure 3 is a detail view of the adjustment of the folding element of the folding and gluing machine according to the invention;
Figure 4 is a detail view of the actuation of the cutting blade of the folding and gluing machine according to the invention;
Figure 5 is a detail view of the adjustment of the foot of the folding and gluing machine according to the invention.

[0022] The arrangement of a foot, a guide, a folding element and a cutting blade executed according to the present invention is described with reference to the above figures and particularly to Figure 1.

[0023] Each one of the mechanical elements of the folding and gluing machine, meant to position and process the part to be treated, is provided with independent actuation means for separate adjustment of the various mechanical elements.

[0024] A microcomputer (not shown), meant to store and retrieve operating parameters of the folding and gluing machine, controls the adjustment means of the mechanical elements as a function of the previously performed treatments and as a function of the adjustment parameters stored in previous working cycles.

[0025] The adjustments can also be varied automatically during treatment as a function of the shape and characteristics of the part being treated.

[0026] The adjustments of the various mechanical elements performed by the adjustment means are provided independently of each other.

[0027] The adjustment means are advantageously constituted by servomotors which drive eccentric elements which are connected to the mechanical elements to be adjusted by means of levers and traction elements.

[0028] The cutting blade is instead actuated by true actuation means, i.e., by a motor which is independent of the main motor of the machine but is synchronized therewith.

[0029] In Figure 1, the reference numeral 1 designates an eccentric element the rotation of which moves the folding foot 6 in an upward direction or in a downward direction by means of a traction element 4 and a lever 5; an eccentric element 20 instead actuates the rightward or leftward movement of the folding foot 6; the reference numeral 2 designates an eccentric element the rotation of which moves the guide 8 to the left or to the right by means of a traction element 7. The upward and downward movement of the guide is instead entrusted to an additional eccentric element 9 which is connected to a traction element 10.

[0030] An eccentric element 11 is connected to a traction element 12, which is in turn connected to another eccentric element 14; these elements adjust the folding element 13, which interacts with the folding foot 6.

[0031] Finally, an independent motor 19, coordinated by the microcomputer of the machine with respect to the main motor of the machine, actuates the cutting blade 15 with an oscillating motion, allowing the blade to perform a reciprocating motion. An assembly constituted by a lever 17 and a traction element 18 causes the blade 15 to oscillate with respect to an alternating clockwise and counterclockwise rotation of the motor 19, which is independent of the main motor.

[0032] In this manner the oscillation speed of the cutter 15 depends exclusively on the dynamic characteristics of the system and is independent of the rotation rate of the machine imparted by the main motor.

[0033] Accordingly, also when difficult product details are being folded, for example at curves of the part to be treated, when the folding machine necessarily reduces its operating speed, the resulting cuts are always clean and quick and are unaffected by the particular treatment being performed.

[0034] The synchronization of the blade actuation motor with the main motor of the machine can be performed according to chosen parameters: for example, it is possible to make one turn of the driving shaft of the motor of the machine correspond to one oscillation of the blade, or it is possible to reduce the number of oscillations of the blade with respect to the rotation rate of the motor of the machine or viceversa.

[0035] Moreover, the microcomputer allows to set a rotation rate of the main motor of the folding machine which is higher than the rate traditionally used. The maximum speed of the machine is in fact usually set with reference to the maximum advancement step of the part being treated and depends on the mechanical constraints of the elements of the machine: however, when the advancement step is smaller than the maximum one allowed by design (for example at curved portions of the part to be treated), it is possible to exceed the preset maximum speed through an adjustment set by means of the microcomputer.

[0036] In practice it has been observed that the folding and gluing machine according to the invention fully achieves the intended aim, since it allows to provide independent actuation of the blade and to automatically and individually adjust the other mechanical elements of the machine as a function of previous treatments.

[0037] The possibility to vary the adjustments during treatment as a function of the characteristics of the part to be treated extends the versatility of the machine and

allows to make the movement of the mechanical elements independent of their mechanical characteristics, adapting their movements to the characteristics of the folding operation that is required.

[0038] The machine thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the inventive concept; all the details may also be replaced with other technically equivalent elements.

[0039] In practice, the materials employed, so long as they are compatible with the specific use, as well as the dimensions, may be any according to requirements and to the state of the art.

[0040] The disclosures in Italian Patent Application No. MI97A002226 from which this application claims priority are incorporated herein by reference.

[0041] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A machine for folding and gluing edges of materials in sheet form, particularly of leather parts of shoe uppers, comprising a working surface and mechanical elements such as a foot (6) for folding the edge of the part being treated, a guide (8) for the abutment of the part to be treated, a folding element (13) and a cutting blade (15), a main motor being provided for the actuation of said machine, a microcomputer storing parameters related to the operation of said machine, characterized in that it is equipped with independent actuation means (19) for said blade (15) which are synchronized with said main motor of the machine.

2. The folding and gluing machine according to claim 1, characterized in that said microcomputer has at least one program for storing and subsequently retrieving treatment parameters, said microcomputer allowing to adjust said mechanical elements (6,8,13,15) during treatment as a function of said stored parameters and of the characteristics of the part.

3. The folding and gluing machine according to claim 1, characterized in that said independent actuation means of said cutting blade (15) comprise a motor (19) which is connected to a lever (17) for the actuation of said blade (15) with a reciprocating motion, the rotation rate of said motor (19) being independent of the actuation speed of said machine determined by the main motor.

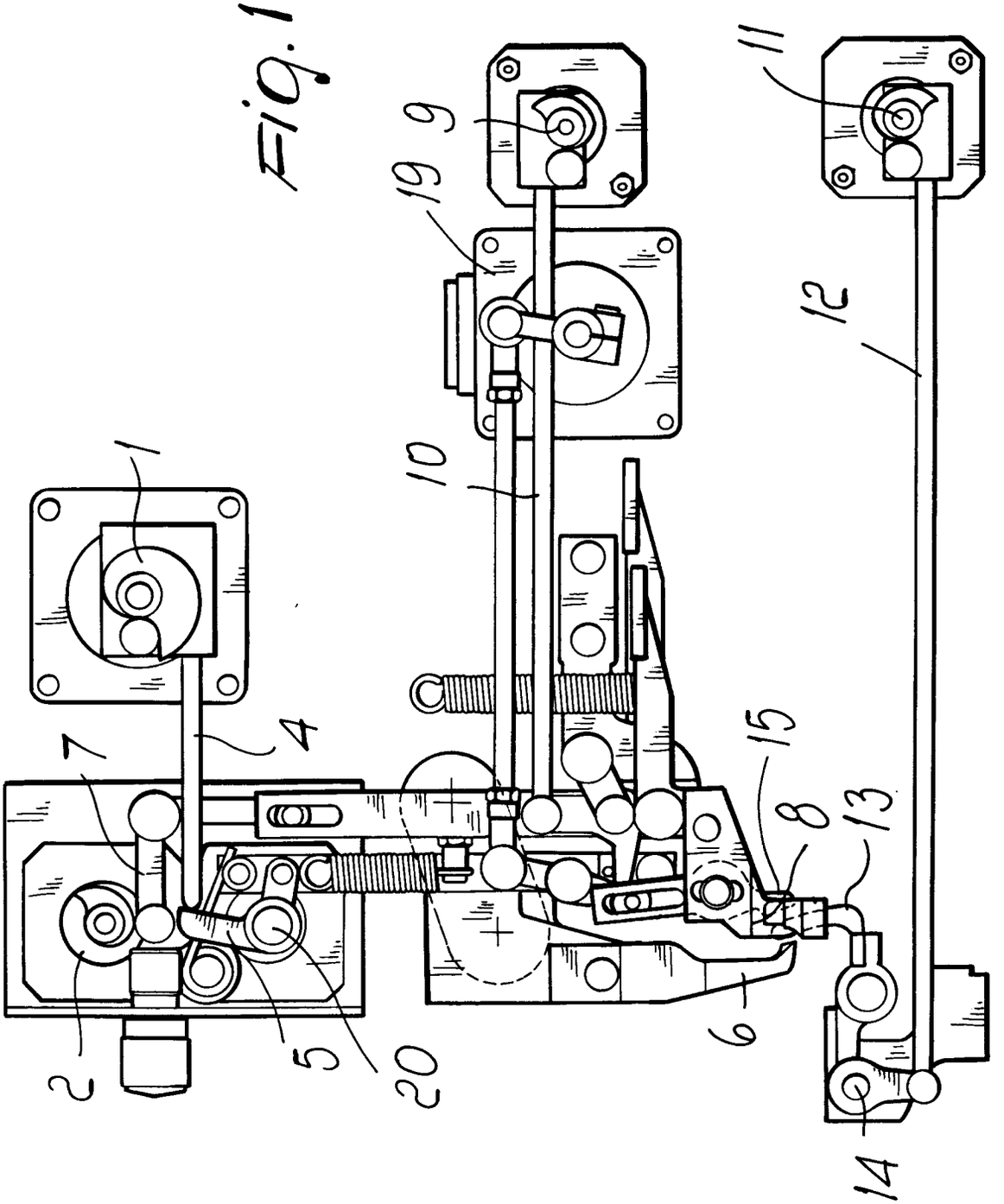
4. The folding and gluing machine according to claim 3, characterized in that the oscillation frequency of said blade (15) is correlated, as a submultiple or multiple, to the rotation rate of said main motor of the machine.

5. The machine for folding and gluing edges of materials in sheet form, particularly leather parts of shoe uppers, comprising a working surface and mechanical elements such as foot (6) for folding the edge of the part being treated, a guide (8) for the abutment of the part to be treated, and a folding element (13), a main motor being provided for the actuation of said machine and a microcomputer storing parameters related to the operation of said machine, characterized in that each one of said mechanical elements (6,8,13) is equipped with independent actuation means which allow the independent adjustment of each mechanical element of said machine, as a function of the treatment to be performed on said part and of the characteristics of said part.

6. The folding and gluing machine according to claim 5, characterized in that each one of said independent actuation means comprises a servomotor which is connected to eccentric means which are connected to a corresponding mechanical element to be actuated.

7. The folding and gluing machine according to claim 5, characterized in that said actuation means adjust the horizontal/vertical position of said foot (6), the horizontal/vertical position of said guide (8) and the horizontal position of said folding element (13).

Fig. 1



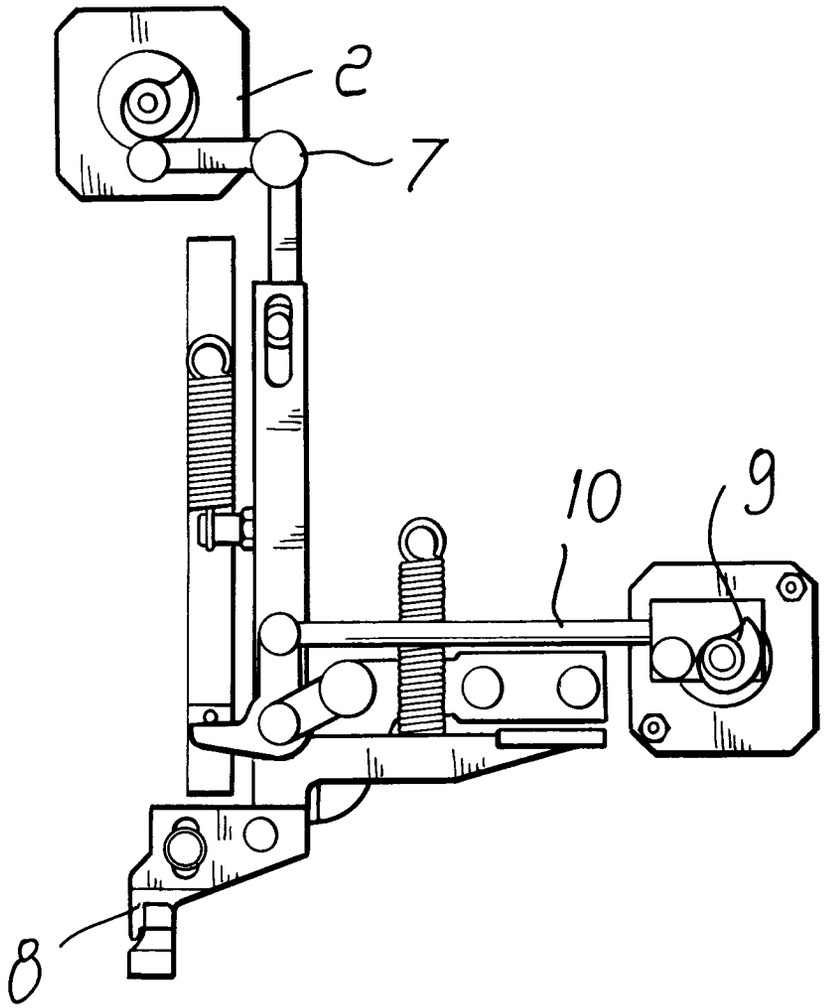


Fig. 2

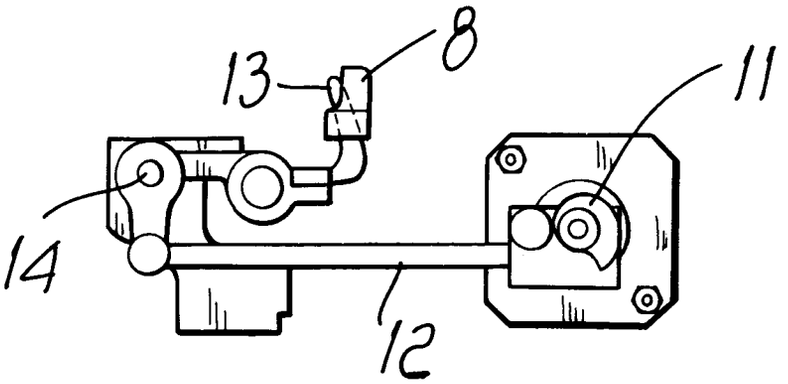


Fig. 3

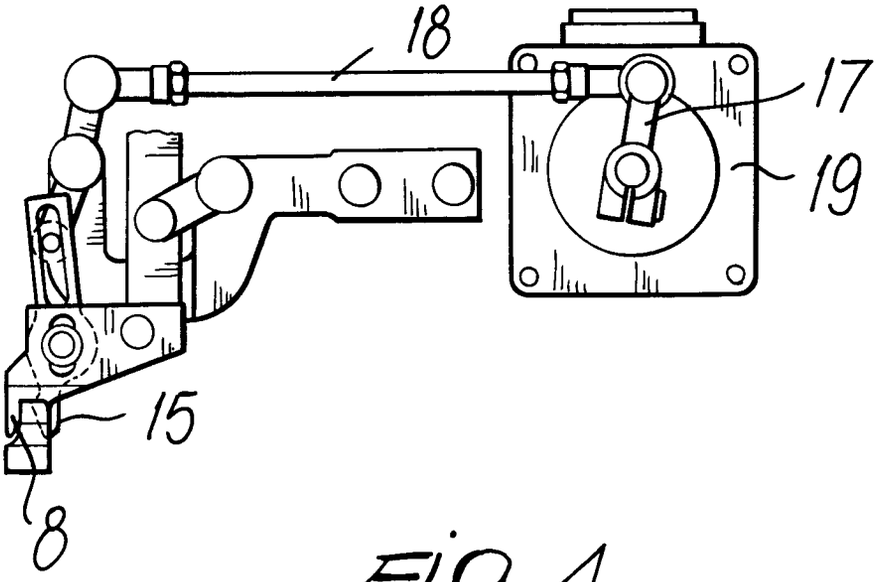


Fig. 4

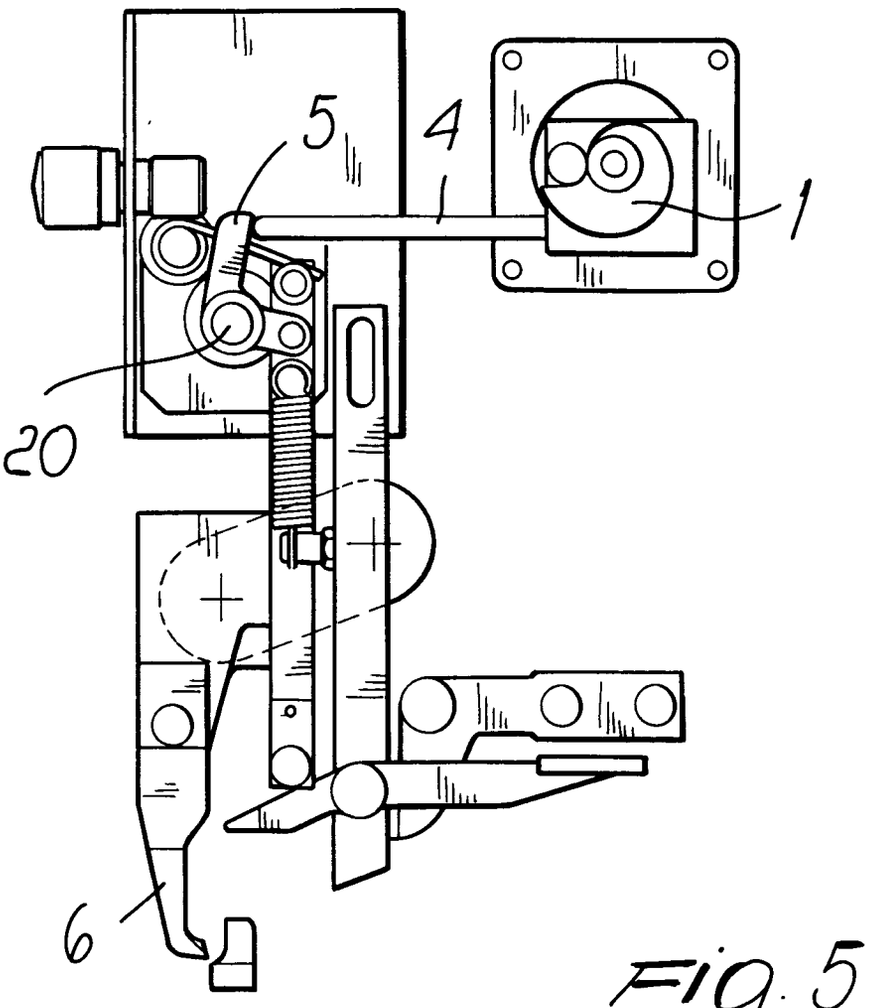


Fig. 5