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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**

Vorrichtung zum Falten und Kleben von Rändern blattförmiges Materials, insbesondere für Schuhoberteile aus Leder oder ähnlichem, mit automatischer Betätigung

Machine pour le pliage et le collage des bordures de matériau en forme de feuilles, notamment pour des tiges de chaussure en cuir ou en matière similaire, avec actionnement automatique

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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 fold-

ing 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] US-A-5,295,939 and EP-A-0,340,695 disclose a machine for folding and gluing edges of materials in sheet form, particularly leather parts of shoe uppers, equipped with independent actuation means which are synchronized with the main motor of the machine.

[0016] 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.

[0017] 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.

[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 retrieve settings of the mechanical elements which have been stored during previous treatments to provide them again in subsequent treatments.

[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 allows to automatically vary the settings of the mechanical elements of the machine even during the process.

[0020] 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.

[0021] 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 actu-

ation means for said blade which are synchronized with said main motor of the machine.

[0022] 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.

[0023] 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.

[0024] 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.

[0025] 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.

[0026] The adjustments can also be varied automatically during treatment as a function of the shape and characteristics of the part being treated.

[0027] The adjustments of the various mechanical elements performed by the adjustment means are provided independently of each other.

[0028] 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.

[0029] 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.

[0030] 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.

[0031] 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.

[0032] 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.

[0033] 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.

[0034] 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.

[0035] 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.

[0036] 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.

[0037] 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.

[0038] 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.

[0039] 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.

[0040] 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.

[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 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, and a folding element (13), a main motor being provided for the actuation of said machine and a microcomputer being provided for 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.
2. The folding and gluing machine according to claim 1, **characterized in that** each one of said independent actuation means comprises a servomotor which is connected to eccentric means (1, 2, 11) which are connected to a corresponding mechanical element (6, 8, 13) to be actuated.
3. The folding and gluing machine according to claim 1, **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).
4. The folding and gluing machine according to claim

1, **characterized in that** it further comprises a cutting blade (15) which is equipped with true actuation means synchronized with said main motor, said true actuation means comprising a motor (19) which is connected to a lever (17) for the actuation of said cutting 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.

5. The folding and gluing machine according to claim 4, **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.

Patentansprüche

1. Vorrichtung zum Falten und Kleben von Kanten von Material in Blattform, insbesondere von Lederabschnitten von Oberteilen von Schuhen, umfassend eine Arbeitsfläche und mechanische Elemente wie einen Fuß (6) zum Falten der Kante des Abschnittes, der bearbeitet wird, eine Führung (8) zum Anlegen des Abschnittes, der zu bearbeiten ist, und ein Faltungselement (13), wobei ein Hauptmotor für den Antrieb der Vorrichtung vorgesehen ist und ein Mikrocomputer vorgesehen ist zur Speicherung von Parametern, die mit dem Arbeitsgang der Vorrichtung zusammenhängen, **dadurch gekennzeichnet, daß** jedes der mechanischen Elemente (6, 8, 13) mit unabhängigen Antriebsmitteln ausgestattet ist, die die unabhängige Einstellung eines jeden mechanischen Elementes der Vorrichtung als Funktion von der Bearbeitung, die an dem Abschnitt auszuführen ist und von den Eigenschaften des Abschnittes, erlauben.
2. Falt- und Klebevorrichtung nach Anspruch 1, **dadurch gekennzeichnet, daß** jedes der unabhängigen Antriebsmittel einen Servomotor umfaßt, der mit exzentrischen Mitteln (1, 2, 11) verbunden ist, die mit einem entsprechenden mechanischen Element (6, 8, 13) verbunden sind, das anzutreiben ist.
3. Falt- und Klebevorrichtung nach Anspruch 1, **dadurch gekennzeichnet, daß** die Antriebsmittel die horizontale / vertikale Lage des Fußes (6), die horizontale / vertikale Lage der Führung (8) und die horizontale Lage des Faltungselementes (13) einstellen.
4. Falt- und Klebevorrichtung nach Anspruch 1 **dadurch gekennzeichnet, daß** diese weiter eine

Schneidklinge (15) umfaßt, die mit einem eigenen Antriebsmittel ausgestattet ist, das mit dem Hauptmotor synchronisiert ist, wobei das eigene Antriebsmittel einen Motor (19) umfaßt, der mit einem Hebel (17) zum Antrieb der Schneidklinge (15) mit hin- und herführender Bewegung verbunden ist, wobei die Rotationsrate des Motors (19) unabhängig von der von dem Hauptmotor bestimmten Antriebsgeschwindigkeit der Vorrichtung ist.

5. Falt- und Klebevorrichtung nach Anspruch 4, **dadurch gekennzeichnet, daß** die Oszillationsfrequenz der Klinge (15) als Teil oder Vielfaches mit der Rotationsrate des Hauptmotors der Vorrichtung korreliert ist.

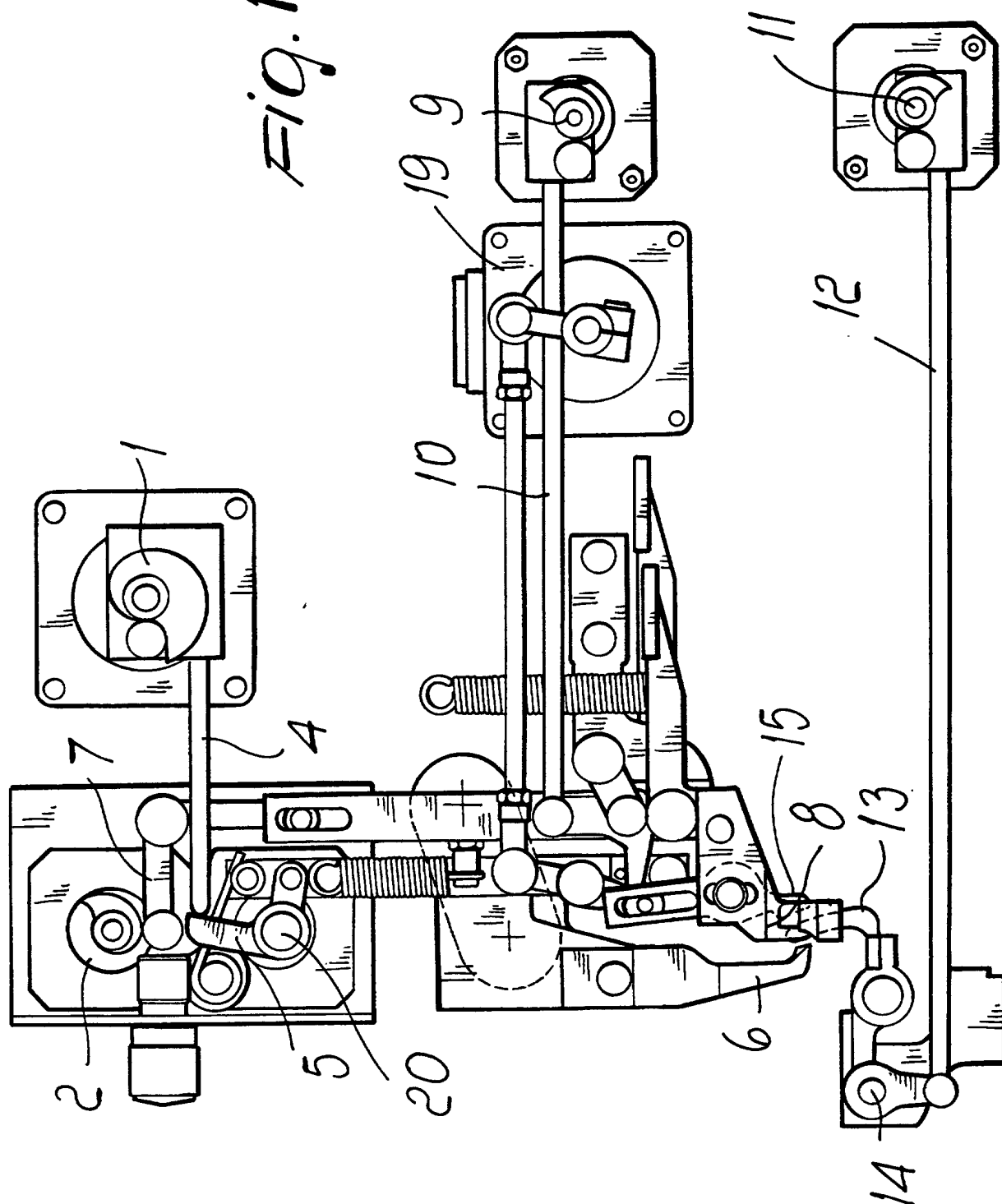
coupante (15) avec un mouvement de va-et-vient, la vitesse de rotation dudit moteur (19) étant indépendante de la vitesse d'actionnement de ladite machine, déterminée par le moteur principal.

5. Machine de pliage et de collage selon la revendication 4, **caractérisée en ce que** la fréquence d'oscillation de ladite lame (15) est corrélée, sous la forme d'un sous multiple ou d'un multiple, à la vitesse de rotation dudit moteur principal de la machine.

Revendications

1. Machine pour plier et coller les bords de matières en forme de feuilles, en particulier des parties en cuir de tiges de chaussures, comprenant une surface de travail et des éléments mécaniques tels qu'un pied (6) servant à plier le bord de la partie à traiter, un guide (8) pour faire venir en butée la partie à traiter, et un élément de pliage (13), un moteur principal étant prévu pour l'actionnement de ladite machine et un micro-ordinateur étant prévu pour stocker des paramètres liés au fonctionnement de ladite machine, **caractérisée en ce que** chacun desdits éléments mécaniques (6, 8, 13) est équipé d'un moyen d'actionnement indépendant qui permet un réglage indépendant de chaque élément mécanique de ladite machine, en fonction du traitement à effectuer sur ladite partie et des caractéristiques de ladite partie.
2. Machine de pliage et de collage selon la revendication 1, **caractérisée en ce que** chacun desdits moyens d'actionnement indépendants comprend un servo-moteur connecté à un moyen à excentrique (1, 2, 11) accouplé avec un élément mécanique correspondant (6, 8, 13) à actionner.
3. Machine de pliage et de collage selon la revendication 1, **caractérisée en ce que** lesdits moyens d'actionnement règlent la position horizontale/verticale dudit pied (6), la position horizontale/verticale dudit guide (8) et la position horizontale dudit élément de pliage (13).
4. Machine de pliage et de collage selon la revendication 1, **caractérisée en ce qu'elle** comprend en outre une lame coupante (15) qui est équipée d'un moyen d'actionnement d'aplomb synchronisé avec ledit moteur principal, ledit moyen d'actionnement d'aplomb comportant un moteur (19) accouplé avec un levier (17) pour l'actionnement de ladite lame

Fig. 1



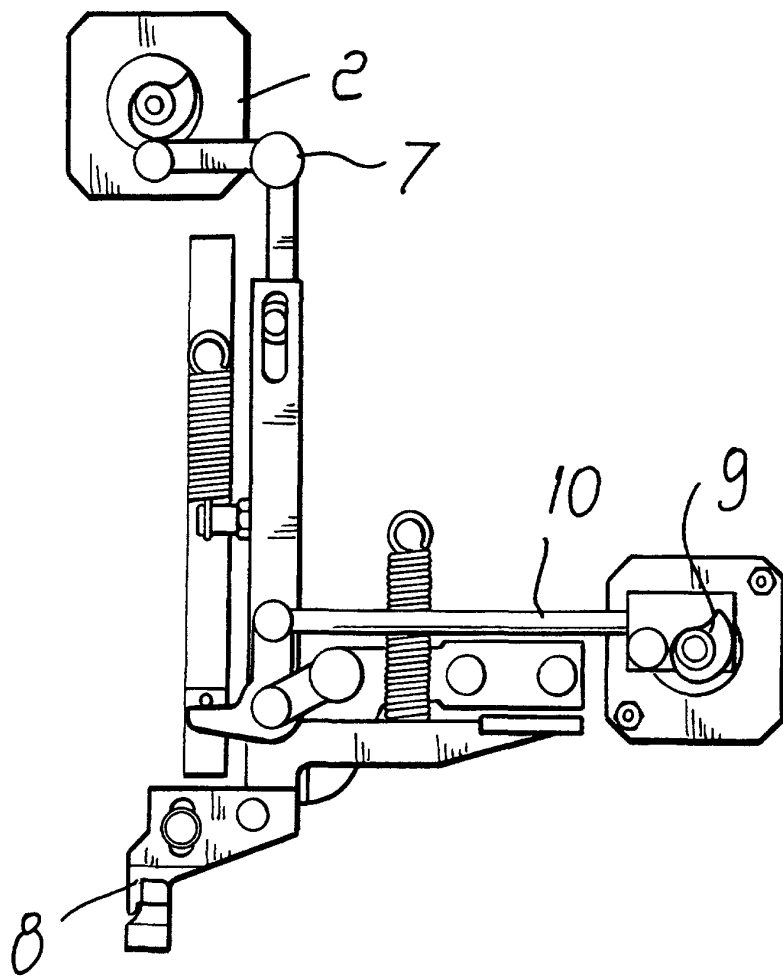


Fig. 2

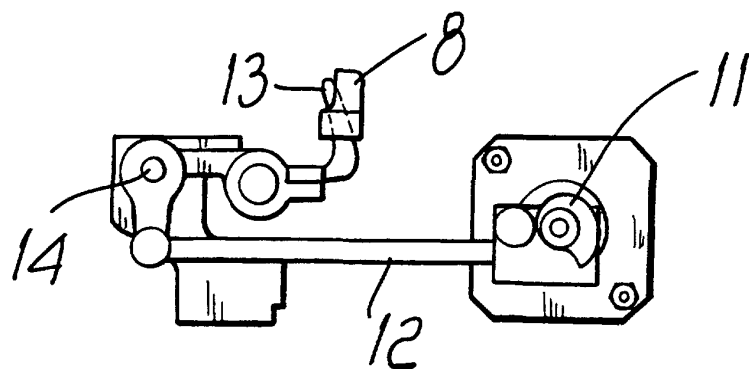


Fig. 3

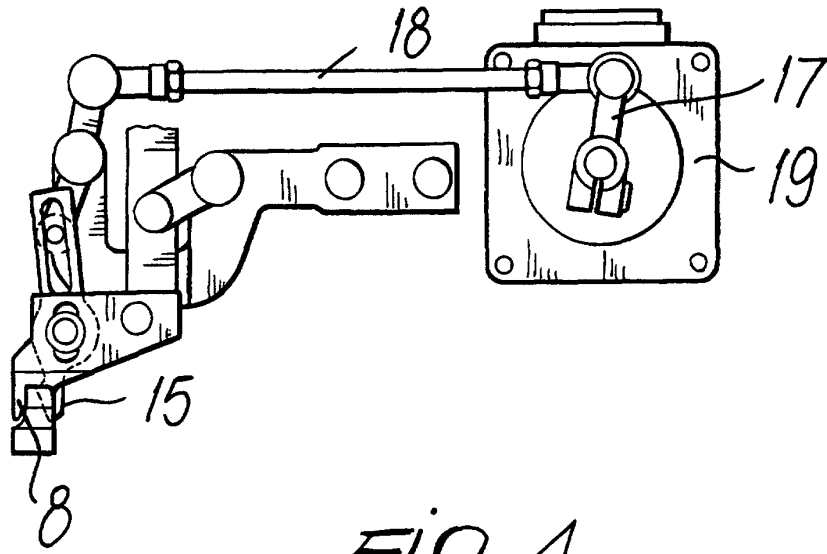


Fig. 4

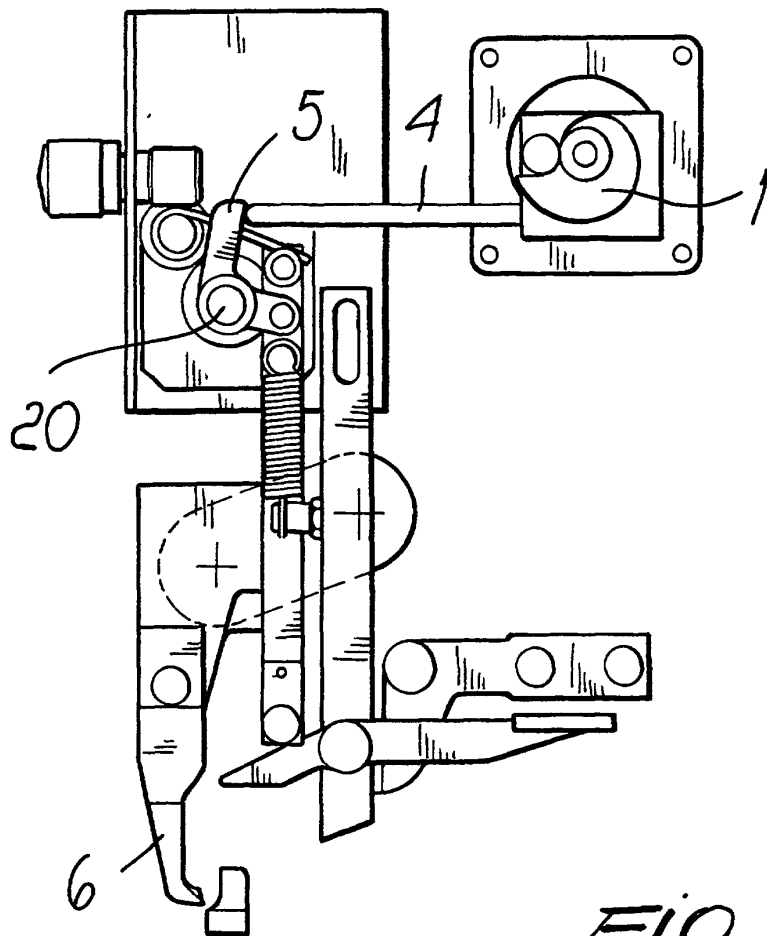


Fig. 5