(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 037 937**
A2

(12) # EUROPEAN PATENT APPLICATION

(21) Application number: **81102256.5**

(22) Date of filing: **25.03.81**

(51) Int. Cl.³: **B 65 C 11/02**

(30) Priority: **16.04.80 JP 49166/80**

(43) Date of publication of application: **21.10.81 Bulletin 81/42**

(84) Designated Contracting States: **CH DE FR GB IT LI NL SE**

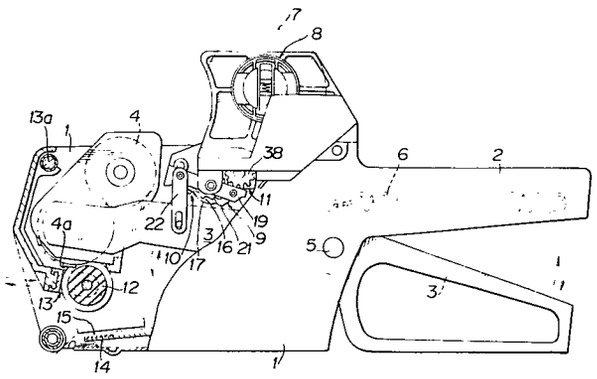
(71) Applicant: **Kabushiki Kaisha Sato Kenkyusho, 21-23, 3-chome Kamikitazawa Setagaya-ku, Tokyo (JP)**

(72) Inventor: **Sato, Yo, 15-5, 1-chome, Shibuya, Shibuya-ku Tokyo (JP)**

(74) Representative: **Patentanwälte Grünecker, Dr.Kinkeldey Dr.Stockmair, Dr.Schumann,Jakob, Dr.Bezold Meister, Hilgers, Dr.Meyer-Plath, Maximilianstrasse 43, D-8000 München 22 (DE)**

(54) **Printing device.**

(57) Herein disclosed is such a printing device to be used with a hand labeler or the like as is enabled to prevent in advance a printing medium such as labels or tags from being thinly printed so that averaged clean prints may be made at all times. The printing device includes actuating means for bringing a printing head into and out of engagement with a printing medium such as a label so that the printing medium may be imprinted. Further inclusive is a counting mechanism which is made cooperative with the actuating means for counting the number of prints. When this counting mechanism counts a predetermined number of prints, a print stopping mechanism stops the operation of the actuating means. A print returning mechanism releases the stopped condition of the actuating means so that the printable condition may be restored.



EP 0 037 937 A2

TITLE

see front page

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a printing device which is enabled to prevent in advance a printing medium such as labels or tags (which will be shortly referred to as "labels or the like") from being thinly printed so that averaged clean prints may be attained at all times.

Description of the Prior Art

In a hand labeler (i.e., a portable type label printing and applying machine), for example, according to the prior art, the replacement of an ink roller due to its lifetime has been performed exclusively by judging the density of the prints upon the labels with the naked eye. More specifically, during the operations of printing the labels by operating the actuating lever and of adhering the printed labels to articles, the ink roller is replaced by a new one when it is recognized with the unaided eye that the prints on the labels become thinner than the normal ones. Similar replacements are also performed in another printing device such as that of table type.

However, the aforementioned conventional method, in which the ink roller is replaced after the prints upon the labels or the like are found remarkably thin, raises a serious defect in the POS (which is the abbreviation of "Point-of-Sale") system which is being spread in recent years. This

is because, in the POS system, the information displayed in the bar codes or the like printed on the labels or the like is read out by means of an optical reader and is then processed by means of a computer. Then, the prints such as the aforementioned bar codes or the like are required to have a far higher clearness than that in case they are read out with the naked eye. If, therefore, the prints should not be clear, they could not be read out by the optical reader thereby to invite a serious trouble in the smooth practice of the POS system.

SUMMARY OF THE INVENTION

In view of the background thus far described, it is an object of the present invention to provide a printing device, in which an actuating lever cannot be operated, after a predetermined number of prints have been performed, so that the printing operation becomes impossible to require replacement of an ink roller whereby the prints are prevented in advance from becoming thin so that they can be made clear at all times.

According to a feature of the present invention, there is provided a printing device comprising: actuating means for relatively bringing a printing head and a printing medium such as a label into and out of engagement with each other thereby to imprint said printing medium; a counting mechanism made cooperative with said actuating means for counting the

number of prints; a print stopping mechanism made operative, when said counting mechanism counts a predetermined number of prints, for stopping the operation of said actuating means; and a print returning mechanism for releasing the stopped condition thereby to restore a printable condition.

BRIEF DESCRIPTION OF THE DRAWINGS

Other objects, advantages and features of the present invention will become apparent from the following description taken in conjunction with the accompanying drawings showing one embodiment of the present invention:

Fig. 1 is a partially cut-away side elevation showing the hand labeler which is equipped with a printing device according to the present invention;

Figs. 2(A) and (B) are perspective views showing an essential portion of the printing device of the present invention, as viewed from the lower side thereof opposite to Fig. 1, wherein Fig. 2(A) shows the inoperative condition of the stopper, and Fig. 2(B) shows the operative condition of the stopper;

Fig. 3 is a perspective view showing the print stopping mechanism of the printing device of the present invention in an enlarged scale; and

Fig. 4 is a front elevation showing the essential portion of the printing device.

1

DESCRIPTION OF THE PREFERRED EMBODIMENT

The present invention will now be described in detail with reference to the accompanying drawings showing the printing device of a hand labeler as one embodiment thereof. First of all, the overall construction of the hand labeler will be briefly described with reference to Fig. 1. A grip 2 is integrally made to extend from the rear portion (as shown at the righthand side of Fig. 1) of a frame 1. An actuating lever 3 carrying a printing head 4 at its front portion is hinged to the frame 1 by means of a pivot pin 5. Said actuating lever 3 is biased clockwise at all times by the action of a spring 6 which is held under tension between the upper center portion of the frame 1 and the rear end of the grip 2. The frame 1 has its upper end provided with a label holder 8 for a rolled continuous strip of labels 7. Below the label holder 8, there are provided a counting mechanism 9, a print stopping mechanism 10 and a print returning mechanism 11, all of which are made coactive with the aforementioned actuating lever 3. To the front portion of the frame 1, on the other hand, there is rotatably attached by means of a pivot pin 13a an ink supply mechanism 13 which is made operative to apply ink to the types 4a of the aforementioned printing head 4 through an ink roller 12. A platen 14 is disposed below the printing head 4. An unrolled continuous strip of labels 15 is unrolled from the aforementioned rolled continuous strip of labels 7

and fed onto that platen 14 by the action of a not-shown feeding mechanism so that it is imprinted by the aforementioned printing head 4.

The aforementioned counting mechanism 9, print stopping mechanism 10 and print returning mechanism 11 will now be described in detail with reference to Figs. 2 to 4.

The counting mechanism 9 is similar to the well-known mechanism. A plurality of rotary wheels 17, each of which has its outer circumference formed with ten engagement grooves 16, are mounted on a shaft 18 in juxtaposition to one another such that they can rotate independently of one another. At both the end portions of those rotary wheels 17, there are hinged to the shaft 18 both the side plates of a pawl holder 19 which is generally formed into a shape of letter "C". Between both the side plates of that pawl holder 19, there is hingedly connected a pawl member 20 which is formed with such pawls 21 of the number equal to that of the aforementioned rotary wheels 17 as consecutively protrude with different length s. The pawl member 20 thus formed is biased by a not-shown spring in the direction that the tips of the respective pawls 21 are brought into engagement with the engagement grooves 16 of the respective rotary wheels 17. Here, one of the aforementioned engagement grooves 16 is made deeper than the remaining ones.

One side plate of the aforementioned pawl holder 19

is made to have its one end connected to the aforementioned actuating lever 3 through a link 22. On the other hand, the outer side of the rotary wheel 17, which is positioned at the opposite side to the aforementioned one side plate, is provided with a pair of releasing pins 23 which are arranged at diametrically opposite positions with respect to the shaft 18. Incidentally, since the rotary wheels 17 provided in the present invention are four, the counting mechanism 9 can count a number of four figures.

The print stopping mechanism 10 is constructed, as shown in Fig. 3, of a stopper 24, which is rotatably mounted on the aforementioned shaft 18, and a retaining member 25 which is made operative to retain and release said stopper 24. This stopper 24 has its substantially half circumference formed with teeth 26 and its other half circumference tapered until its leading end is bent to form an L-shaped retaining protrusion 27. As shown in Fig. 4, moreover, the stopper 24 is biased clockwise, as viewed from Figs. 2 and 3, at all times by the action of a spring 28 which is mounted on the shaft 18 between the outer side of the aforementioned pawl holder 19 and said stopper 24.

The retaining member 25 is such a slender member as has its one end pivotally mounted on a pin 29 and its other end formed with a bent hook 30 and is biased counter-clockwise, as viewed from Figs. 2 and 3, at all times by the action of

a torsion spring 31 which is wound on said pin 29. On the other hand, the substantially center portion of that retaining member 25 is formed with such an L-shaped protrusion 32 as protrudes toward the opposite side to the aforementioned hook 30 and as allows one of the aforementioned releasing pins 23 to engage therewith (as shown in Fig. 3).

The stopper 24 and the retaining member 25 having the constructions thus far described are made such that their retaining protrusion 27 and hook 30 engaging with each other under a normal printing condition, as shown in Figs. 2(A) and 3, and such that their engagement is released under the print-stopped condition, as shown in Fig. 2B, until the stopper 24 is rotated about 90 degrees in the clockwise direction.

On the other hand, the print returning mechanism 11 is constructed of a sliding member 34, which is transversely slidably received in a recess 33 formed in the outer wall of the frame 1, a first pinion 36, which is made to engage with a rack 35 provided in the lower side of said sliding member 34, and a second pinion 38 which is integrally connected to the first pinion 36 through the frame 1 by means of a shaft 37. Said second pinion 38 is made to engage with the teeth 26 of the aforementioned stopper 24 inside of the frame 1 so that the stopper 24 can be rotated through the first and second pinions 36 and 38 by sliding said sliding member 34 with the use of a knob 39 which is formed at one end of the sliding

member 34. Incidentally, reference numeral 40 indicates a cover for the sliding member 34.

The operations of the present embodiment will be described in the following. Under the normal condition of the hand labeler, as shown in Figs. 2(A) and 3, the stopper 24 and retaining member 25 of the print stopping mechanism 10 retain each other at their respective retaining portion 27 and hook 30. If, under this particular condition, the actuating lever 3 shown in Fig. 1 is squeezed toward the grip 2 so that it is rotated counter-clockwise, the printing head 4 is moved down, while having its lower end types 4a supplied with ink by the ink roller 12, until it is brought into abutment engagement with the label 15 on the platen 14 so that the label 15 is imprinted. In cooperation with this, moreover, the pawl holder 19 of the aforementioned counting mechanism 9 is rotated counter-clockwise (as viewed from Fig. 1) through the link 22 so that the pawl 21 (i.e., the longest one) at the lowermost unit of the pawl member 20 is brought into engagement with the engagement groove 16 of the rotary wheel 17, which is positioned to correspond to said pawl 21.

If the actuating lever 3 is then released, it is rotated clockwise by the tensile force of the spring 6 so that it is returned to the initial position shown in Fig. 1 and so that the label 15 imprinted is fed out of the hand

labeler by the action of the feeding mechanism until it is adhered to an article. In response to the returning operation of that actuating lever 3, the number of prints is counted by the counting mechanism 9. By the clockwise rotation of the actuating lever 3, more specifically, the aforementioned pawl holder 19 is also rotated clockwise through the link 22 the rotary wheel 17 (i.e., the rotary wheel 17 at the righthand end of Fig. 4), which has its engagement groove 16 engaging with the pawl 21 at the lowermost unit, as has been described before, is rotated a predetermined angle (e.g., 36 degrees) by said pawl 21. Moreover, when the aforementioned printing operations are performed ten times, said rotary wheel 17 is rotated one turn so that the rotary wheel 17 at the next unit is each time rotated a predetermined angle (e.g., 36 degrees), as is similar to the well-known counting mechanism.

When the number of prints reaches a predetermined value (e.g., 5000 in the present embodiment) as a result of the repetitions of the aforementioned squeezing and releasing actions of the actuating lever 3 so that the rotary wheel 17 (i.e., the rotary wheel at the lefthand side of Fig. 4) corresponding to the unit of one thousand is rotated 36 degrees, the releasing pin 23 provided at said rotary wheel 17 abut against and push the protrusion 32 of the aforementioned retaining member 25 so that this retaining member 25 is rotated as a whole in the clockwise direction, as viewed from

Figs. 2(A) and 3, thereby to release the retention between the hook 30 of said retaining member 25 and the retaining protrusion 27 of the stopper 24. As a result, the stopper 24 is rotated clockwise by the action of the spring 28. Incidentally, this particular condition takes place when the actuating lever 3 is released, i.e., when the actuating lever 3 is brought remarkably close to the stopper 24. As a result, the stopper 24 is not rotated fully over its stroke of 90 degrees but is stopped when it abuts against the upper side of the actuating lever 3.

If the actuating lever 3 is then squeezed for the printing operation, it is moved down at the aforementioned position of the stopper 24 so that this stopper 24 is rotated clockwise, as viewed from Fig. 2(B), about 90 degrees from the aforementioned retained position thereby to displace its retaining protrusion 27 to its lowermost position (as indicated at double-dotted lines in Fig. 4). As a result, since the retaining protrusion 27 of the aforementioned stopper 24 has its lower side abutting against the upper side of the actuating lever 3 even if this actuating lever 3 is released, this lever 3 cannot be rotated any more but is stopped under its substantially squeezed condition.

Since the predetermined number of prints for actuating that stopper 24 is predetermined in conformity with the lifetime (i.e., the time when the prints start to become thin) of the

ink roller 12, this ink roller 12 of the ink supply mechanism 13 is replaced by a new one at the time when the aforementioned actuating lever 3 cannot be returned.

Incidentally, under the condition having the actuating lever 3 squeezed, the ink supply mechanism 13 is pushed out clockwise, as viewed from Fig. 1, by the printing device 4 so that it is brought into a position in which it protrudes to the front of the hand labeler. Thus, it is possible to replace the ink roller 12 without any difficulty.

Next, the stopper 24 is returned to its initial position, in which the printing operation can be performed, by the action of the aforementioned print returning mechanism 11. Specifically, if the sliding member 34 is pushed into the cover 40 (i.e., to the right, as viewed from Fig. 2(B)), the second pinion 38 is rotated clockwise through the rack 35 and the first pinion 36 so that the stopper 24 is rotated counter-clockwise by the teeth 26 which are in engagement with that second pinion 38. After the stopper 24 has been rotated about 90 degrees, it is stopped because the retaining protrusion 27 at its leading end is brought into engagement with the hook 30 of the retaining member 25, as shown in Fig. 2(A).

As a result, the actuating lever 3 is rotated clockwise by the action of the spring 6 simultaneously with the rotation of the stopper 24 until it is returned to its initial position shown in Fig. 1.

When the squeezing and releasing operations of the actuating lever 3 are subsequently repeated similarly to the aforementioned manner until the number of prints again reaches five thousands, the other releasing pin 23, which is disposed at a symmetrical position with respect to the aforementioned releasing pin 23, abuts against and pushes the protrusion 32 of the retaining member 25 thereby to rotate this retaining member 25. As a result, the retention between the hook 30 and the retaining protrusion 27 is released so that the stopper 24 again becomes operative. Incidentally, simultaneously with the operation (i.e., the rotation) of this stopper 24, the sliding member 34 is moved through the second and first pinions 38 and 36 to the left from the condition shown in Fig. 2(A) and to the condition shown in Fig. 2(B).

Moreover, it is quite natural that the number of prints for the stopper 24 to operate can be adjusted by the number of the aforementioned releasing pins 23. For example, if the numer of the releasing pin 23 is one, the stopper 24 operates every ten thousand prints thereby to stop the printing operation.

The present invention should not be limited to the printing device of the type, in which the printing head is brought into and out of contact with the fixed platen, as is exemplified in the aforementioned embodiment, but can be applied to the printing device of the type, in which the platen is moved relative to the fixed printing head or in which the

two are relatively brought into and out of contact with each other. Moreover, the present invention should not be limited to the hand labeler but can be applied to a table type printing device.

As has been described hereinbefore, the printing device according to the present invention is so constructed that the print stopping mechanism operates, when a predetermined number of prints is reached, to stop the printing operation. As a result, by replacing the ink supply member such as the ink roller at the stopped time, the prints upon labels or the like can be prevented in advance from becoming thin so that averaged clear prints can be attained at all times. Therefore, the printing device according to the present invention can find its suitable application as a printing device for the POS.

1

WHAT IS CLAIMED IS:

1. A printing device comprising:

actuating means for relatively bringing a printing head and a printing medium such as a label into and out of engagement with each other thereby to imprint said printing medium;

a counting mechanism made cooperative with said actuating means for counting the number of prints;

a print stopping mechanism made operative, when said counting mechanism counts a predetermined number of prints, for stopping the operation of said actuating means; and

a print returning mechanism for releasing the stopped condition thereby to restore a printable condition.

2. A printing device according to Claim 1, wherein said actuating means includes an actuating lever carrying said printing head and made manually actuatable to bring said printing head into and out of engagement with said printing medium, and a link operatively connecting said actuating lever and said counting mechanism.

3. A printing device according to Claim 1, wherein said counting mechanism includes a shaft, a plurality of rotary wheels rotatably mounted on said shaft in juxtaposition to

1

one another and each formed with engagement grooves in its outer circumference, a pawl holder generally having a shape of letter "C" and having its side plates pivotally mounted on said shaft while interposing said rotary wheels inbetween. a pawl member hingedly interposed between the side plates of said pawl holder and having pawls of different leggthes biased to engage with the engagement grooves of said rotary wheels, respectively, and at least one releasing pin provided on the opposite side rotary wheel to said link.

4. A printing device according to Claim 3, wherein said print stopping mechanism includes a stopper rotatably mounted on said shaft and having its substantially half circumference formed with teeth and its other half circumference tapered to have its leading end formed with an L-shaped protrusion, a retaining member having its one end pivotally mounted to retain and release said stopper and its other end formed with a bent hook, and biasing means for bring the protrusion of said stopper and the hook of said retaining member into engagement with each other, said retaining member being formed at its center with an L-shaped protrusion which is made engageable with said releasing pin.

5. A printing device according to Claim 4, wherein said print returning mechanism includes a sliding member formed with

a rack, a first pinion made engageable with the rack of said sliding member, and a second pinion integrally connected to the first-named pinion and made engageable with the teeth of the stopper of said print stopping mechanism thereby to rotate said stopper out of engagement with said retaining member.

0037937

FIG.1

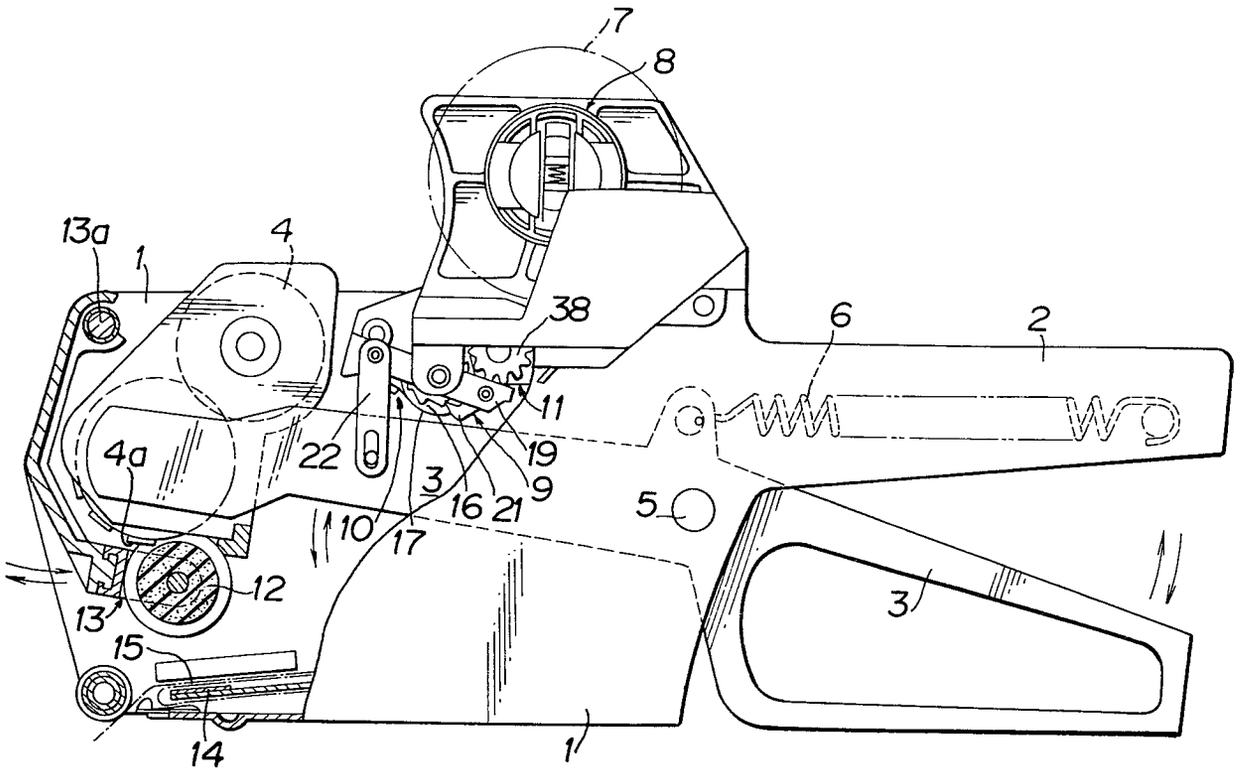
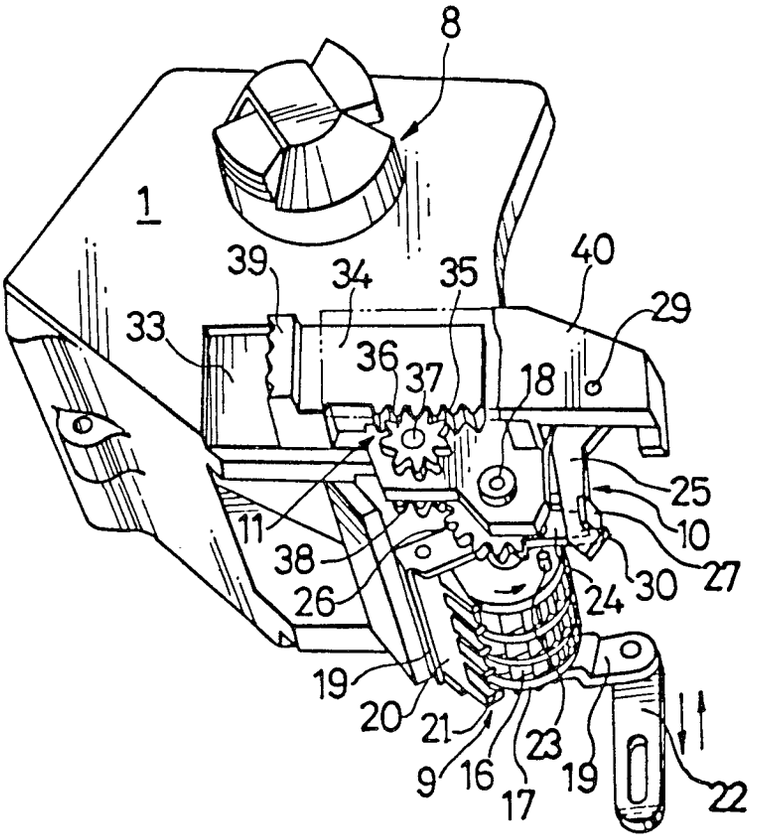


FIG.2 (A)



0037937

FIG.2(B)

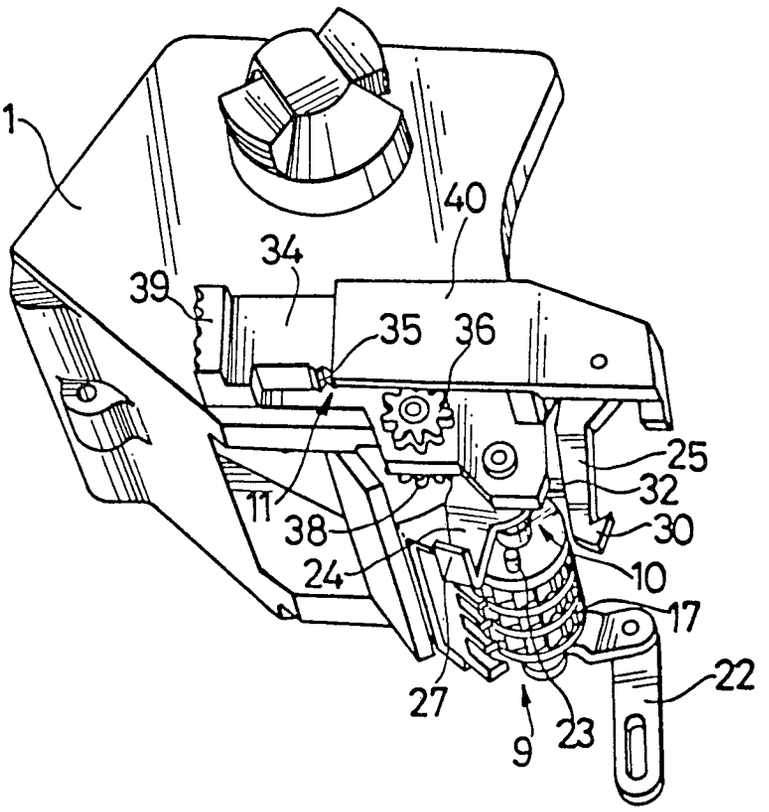


FIG.3

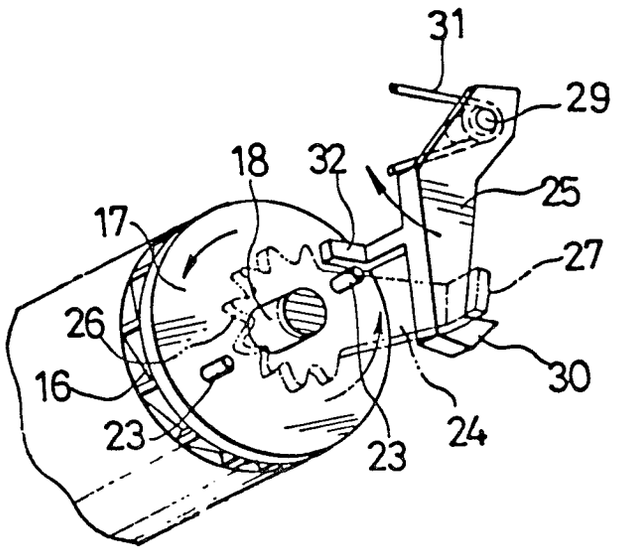


FIG.4