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(54) A PRINTING UNIT HAVING A PAPER CUTTING APPARATUS AND A PRINTER HAVING THE SAME PRINTING UNIT

(57) A printing unit having a paper cutting apparatus and a printer having the same printing unit are disclosed. The printing unit comprises a main frame, One of the fixed and movable blades and a printing head are disposed at the upper and lower parts of the main frame, respectively. An upper frame is disposed at a side of the main frame. The other one of the fixed and movable blades and a printing roller are correspondingly disposed at the upper and lower parts of the upper frame. Two ends of a rotating shaft provided at the lower part of the main frame pass strip-shaped holes correspondingly provided at two ends of the upper frame. A spanner disposed at an end portion of the rotating shaft is provided with a handle, a groove and a push block- Two ends of a fixing plate for the printing head are provided with lock slots, in which a spindle of the printing roller is locked when the upper frame closes. With a printer in which the above described printing unit is disposed on a housing thereof, since the fixed blade of the cutter may be opened and closed along with a horizontal sliding movement of the upper frame, even the movable blade of the cutter has not retreated and thus superimposed on its fixed blade of, the open and close of the upper frame will not been influenced.

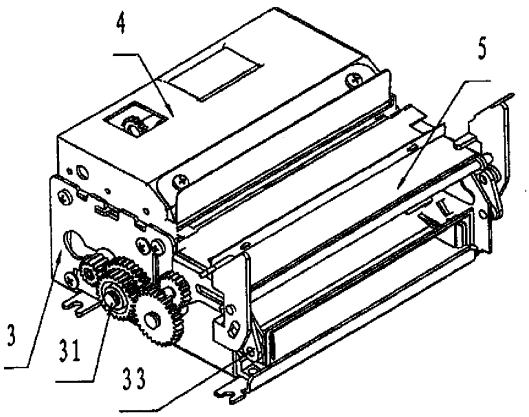

Fig. 13

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Description

Technical Field

[0001] The present invention relates to a printer and parts thereof, and in particular, to a printing unit having a paper cutting apparatus and a printer having the same printing unit.

Background Art

[0002] More and more printing units begin to have paper cutting apparatus, as the requirement of automatization of printing units is increasing. Currently, the construction of an ordinary printing unit having a paper cutting apparatus is as follow: a printing roller and a printing head are fixed on the main frame of the printing unit, wherein the printing head is tangential to and pressed against the printing roller under the action of an elastic apparatus; the paper cutting apparatus is also fixed on the main frame of the printing unit, wherein its paper cutting notch is substantially located on the printing head in the tangential direction at the position where the printing head contacts with the printing roller, thus, the printing media can easily enter the paper cutting notch of the cutter after passing though the clearance between the printing head and the printing roller, and is cut off with the cooperation of the fixed and movable blades.

[0003] In the printing unit with such a construction, when a printing media is to be installed, the printing media needs to be inserted manually between the printing head and the printing roller and comes out of the paper cutting notch of the cutter. Since the printing media is relatively soft and generally crinkled, and the distance from the clearance between the printing head and the printing roller to the paper cutting notch is relatively large due to the construction limitation, there is a problem that the printing media can't enter the paper cutting notch precisely And therefore it is inconvenient to install the printing media.

[0004] To solve the above problem, there is a printing unit having a separate type of cutter, the construction of which is shown in fig. 1 and 2. in such a printing unit, the cutter has a separate structure with a movable blade 18 and a fixed blade 12 disposed on two sides of the paper discharging passage, respectively, wherein the movable blade 18 is fixed on the frame 1 of the printing unit by means of a movable blade frame 19, and the fixed blade 12 and a printing roller 13 are fixed on a upper frame 11. The upper frame 11 is rotatablely fixed on the frame 1 of the printing unit. When it is needed to install a printing media, the upper frame 11 is rotated and opened, and a printing media is installed into the printing passage- Then, the upper frame 11 is closed and the operation of installing a printing media is completed, In the printing unit with such construction, the problem of inconvenience on Installing a printing media into a printing unit with an integrated cutter is solved, However, it brings a new problem that the upper frame 11 can not be opened, which causes a failure of the printing unit, if the movable blade 18 of the cutter sometimes has not retracted and superimposed on the fixed blade 12 due to some reasons.

Summary of the Invention

[0005] In view of the problems in the prior art, the present invention provides a printing unit having a paper cutting apparatus, wherein the open and close of the upper frame will not been influenced, even the movable blade of the cutter has not retreated.

[0006] According to the present invention, the above object is achieved by modification of the manner in which the upper frame is opened and closed. The rotating manner of the prior art is changed to a sliding manner. Thus, the open and close of the upper frame will not been influenced, even the movable blade of the cutter has not retreated and thus superimposed on its fixed blade.

[0007] The printing unit of the present invention comprises a main frame. One of the fixed and movable blades and a printing head are disposed at the upper and lower parts of the main frame, respectively. An upper frame is disposed at a side of the main frame. The other one of the fixed and movable blades and a printing roller are correspondingly disposed at the upper and lower parts of the upper frame. The upper frame Is mounted slidably on the main frame.

[0008] Two ends of a rotating shaft provided at the lower part of the main frame are inserted through a strip-shaped hole correspondingly provided at two ends of the upper frame. A spanner disposed at an end portion of the rotating shaft is provided with a handle, a groove and a push block. A fixing pole that can be locked in the groove is provided to the upper frame correspondingly. Two ends of a fixing plate for the printing head are provided with lock slots, in which a spindle of the printing roller is locked when the upper frame closes.

[0009] Also, the present Invention provides a printer having the above printing unit. The printer comprises a housing on which the above printing unit Is disposed.

[0010] When the spanner is rotated, the upper frame can slide along the strip-shaped hole in the main frame of the printing unit. Thus, the printing roller fixed on the upper frame separates from the printing head fixed on the main frame of the printing unit, and the fixed blade of the cutter fixed on the upper frame separates from the movable blade of the cutter fixed on the main frame of the printing unit. When a printing media is to be installed, the spanner is pulled, and the rotating shaft is driven by the rotating movement of the spanner. Then, the rotating shaft drives the upper frame to slide and the printing media is passed through the paper inlet passage. The paper supply operation is completed after the upper frame is closed. Since the fixed blade of the cutter is opened and closed along with a horizontal sliding movement of the upper frame, the open and close of the upper frame will not been influenced, even the movable blade of the cutter has not retreated and thus superimposed on its fixed

blade.

Description of Figures

[0011]

Fig. 1 is a section view of a prior art printing unit;
Fig. 2 is a schematic view of the prior art printing unit, with the upper frame opened;
Fig. 3 is a schematic view of the printing unit of the present invention;
Fig. 4 is a schematic view of the printing unit according to the embodiment 1 of the present invention, with the upper frame removed;
Fig. 5 is a left section view of the printing unit according to the embodiment 1 of the present invention, with the upper frame removed;
Fig. 6 is a schematic view of the upper frame of the printing unit according to the embodiment 1 of the present invention;
Fig. 7 is a section view of the upper frame of the printing unit according to the embodiment 1 of the present invention;
Fig. 8 is a section view of the left spanner of the printing unit according to the embodiment 1 of the present Invention;
Fig. 9 is a schematic view of the installation structure for the left spanner according to the embodiment 1;
Fig. 10 is an enlarged partial view of fig. 9;
Fig. 11 is a schematic view showing the upper frame according to embodiment 1 in a closed state;
Fig. 12 is a schematic view showing the upper frame according to embodiment 1 in an opened state;
Fig. 13 is a schematic view of the printing unit according to the embodiment 2 of the present invention;
Fig. 14 is a schematic view of the printing unit according to the embodiment 2 of the present invention, with the upper frame removed;
Fig. 15 is a section view of the printing unit according to the embodiment 2 of the present invention, with the upper frame removed;
Fig. 16 is a schematic view of the upper frame of the printing unit according to n the embodiment 2 of the present Invention;
Fig. 17 is a section view of the upper frame of the printing, unit according to the embodiment 2 of the present invention;
Fig. 18 is a perspective view of the printing unit according to the embodiment 2;
Fig. 19 is a perspective view of the printing unit according to the embodiment 2 of the present Invention, with the upper frame opened;

Detailed Description of preferred embodiments

[Embodiment 1]

[0012] The printing unit according to the embodiment 1 of the present invention comprises a main frame 3. As shown in fig. 4, a fixing frame for a movable blade is provided on the upper part inside the main frame 3 on one side thereof. A movable blade 41 is provided on the fixing frame. As shown in fig. 5, a fixing seat 36 for a spring is provided under the fixing frame 4 for the movable blade, and a compressed spring 37 connected with a fixing plate 38 for the printing head is provided on the fixing seat 36. A printing head 39 is secured to the fixing plate 38. A flange 381 is provided on both sides of the fixing plate 38 for the printing head. A sliding groove 382 is formed in the flange 381,

[0013] An upper frame 5 is provided on the other side within the main frame 3, the structure of which upper frame is shown In fig. 7. A fixing frame 581 for a fixed blade is provided on the upper part of the upper frame 5 in the position corresponding to the fixing frame 4 for the movable blade. A fixed blade 58 is provided to the fixing frame 581. A protecting plate 52 for the fixed blade is further provided above the fixed blade 58. A printing roller 56 is provided on the lower part of the upper frame 5 In the position corresponding to the printing head 39. A gear 53 coupled to a printer driving apparatus 31 is provided at the end of the printing roller 56. As shown in fig. 6, there are a left flange 511 and a right flange 512 on each side of the main body 51 of the upper frame respectively. On the left flange 511, a left fixing pole 54 is fixed and a left strip-shaped hole 55 is opened. On the right flange 512, a right fixing pole 57 (see fig. 11) is fixed and a right strip-shaped hole 56 is opened.

[0014] A rotating shaft 32 is provided on the main frame 3. A left spanner 33 and a right spanner 34 are fixed to each side of the rotating shaft 32, respectively. Thus, the left and right spanners can rotate with the rotation of the rotating shaft, and the rotating shaft 32 can rotate with the rotation of either spanner. The rotating shaft 32 passes through the left strip-shaped hole 55 and the right strip-shaped hole 56 of the upper frame 5, so that the upper frame 5 can slide in the horizontal direction with respect to the main frame 3.

[0015] The structure of the left spanner 33 is shown in fig. 8. There is a left fixing hole 331 in the left spanner 33, for connecting fixedly with an end of the rotating shaft 32. A left protrusion 333 is on one side. There is a left groove 334 in the upper part of the left protrusion 333. There is a handle 332 provided at one side of the left protrusion 333. A left push block 335 is provided on the lower part of the left protrusion 333. As shown in fig. 14, there is a right fixing hole in the right spanner 34 with a right protrusion 343 on one side thereof. There is a right groove 344 In the right protrusion 343. A right push block 345 is provided on the lower part of the right protrusion 343.

[0016] In practical use, when the upper frame 5 Is in the closed state, the spindle of the printing roller 56 is locked in the sliding groove 382 of the fixing plate 38 for the printing head, and the printing head 39 is pressed against the surface of the printing roller 56. The left fixing

pole 54 of the upper frame 5 Is caught in the left groove 334 of the left spanner 33, and the right fixing pole 57 on the upper frame 5 is caught in the right groove 344 of the right spanner 34. The movable blade 41 is corresponding to the fixed blade 68. The horizontal movement of the movable blade 41 can cut off the printing media. In such a state, the compressed spring 37 in the printing unit applies a certain pressure to the printing head 39 by the fixing plate 38 for the printing head, such that the printing head 39 is pressed against the printing roller 56 and the pressure is applied to the upper frame 5 via the printing roller 56. The upper frame 5 is fixed securely on the main frame 3, since the fixing poles of the upper frame 5 are locked in the left and right grooves of the main frame 3 as described above.

[0017] When papers are supplied, it is required to separate the upper frame 5 from the main frame 3. The handle 332 of the left spanner 33 is rotated clockwise according to the direction in fig. 9, such that the left fixing pole 54 of the upper frame 5 is disconnected from the left groove 334. Since the rotating shaft 32 is rotated by the left spanner 33 and the right spanner 34 is rotated by the rotating shaft 32, the right fixing pole 57 of the upper frame 5 is disconnected from the right groove 344 of the right spanner 34. The upper frame 5 moves outward under the pressure of the compressed spring 37. At the same time, when the left spanner 33 is further rotated, the left push block 335 of the left spanner 33 is pushed to the left fixing pole 54 and the right push block 345 of the right spanner 34 is pushed to the right fixing pole 57 with the upper frame being moved outward. Thus, the upper frame 5 is separated from the main frame 3, as shown in fig. 12, such that the paper supply operation can be performed conveniently.

[0018] When the upper frame is to be closed, the protecting plate 52 for the fixed blade or other part of the upper frame 5 is moved with the upper frame being maintained in the horizontal direction such that the upper frame 5 moves horizontally. When the printing roller 56 contacts the printing head 39, the handle 332 of the left spanner 33 is rotated counter-clockwise in the direction in fig. 9, such that the left fixing pole 54 of the upper frame 5 is caught in the left groove 334 of the left spanner 33 and the right fixing pole 57 of the upper frame 5 is locked in the right groove 344 of the right spanner 34, whereby the upper frame 5 is tightly pressed on the main frame 3.

[0019] Since the upper frame 5 is kept in the horizontal direction during the movement of the upper frame 5, the upper frame 5 can be opened successfully and is not influenced by the movable blade 41, even the movable blade 41 in the fixing frame 4 can not retreat and thus superimposes on the fixed blade provided on the frame 5. Also, the upper frame 5 can be closed successfully.

[0020] In the above technical solution, the sliding movement of the upper frame 5 on the main frame 3 is achieved by providing a strip-shaped hole in the upper frame 5 and providing a rotating shaft on the main frame 3. Similarly, the sliding movement of the upper frame 5 on the main frame 3 can be achieved by providing a rotating shaft on the upper frame 5 and providing a corresponding strip-shaped hole in the main frame 3. The same technical effect can be achieved by these two solutions.

[0021] In the above technical solution, the difference between the left spanner 33 and the right spanner 34 is that the left spanner 33 has a handle 332. Similarly, a handle with the same function can be provided on the right spanner 34.

[0022] In the above technical solution, the fixing frame 4 for the movable blade is fixed to the main frame 3, and the fixing frame 581 for the fixed blade is fixed to the upper frame 5. Similarly, the same technical effect can be achieved by disposing the fixing frame 581 for the fixed blade on the main frame 3 and disposing the fixing frame 4 for the movable blade on the upper frame 5.

[Embodiment 2]

[0023] Fig. 13 is a schematic view of the printing unit according to the embodiment 2 of the present invention, and fig. 14 is a schematic view of the printing unit of the present invention with the upper frame removed. The fixing frame 4 for the movable blade and the upper frame 5 are provided oppositely on the main frame 3 of the printing unit, respectively. A driving mechanism 31 is provided on a side of the main frame 3- A left connecting rod 33 and a right connecting rod 331 are rotatably hinged with the left and right ends of the main frame 3. respectively. A left rotating shaft 32 is fixed to the left connecting rod 33 and a right rotating shaft 321 is fixed to the right connecting rod 331. Grooves 35 and 351 are formed on both sides of the main frame 3. A left hole 44 and a right hole 45 are disposed symmetrically on both sides of the main frame 3.

[0024] Fig. 15 is a section view of the printing unit of the present invention with the upper frame removed. A fixing seat 36 for an elastic member is provided on the middle part of the main frame 3. An elastic member 37 is provided on the fixing seat. The elastic member 37 presses the fixing plate 38 to which a printing head 39 is fixed. There is a flange 381 on either side of the fixing plate 38 for the printing head. A groove 382 is formed in the flange 381. There is a movable blade 41 in the fixing frame 4 for the movable blade. The movable blade 41 can move to the left and right in the direction in fig. 16.

[0025] Fig. 16 is a schematic view of the upper frame of the printing unit according to the present invention. Fig. 17 is a section view of the upper frame of the printing unit according to the present invention. A left flange 511 and a right flange 512 are provided on both sides of the main body,511 of the upper frame. A left strip-shaped hole 55 is formed in the left flange 511, and a left locking hook 60 is rotatably fixed thereto by a locking shaft 52. A strip-shaped hole 59 is formed in the right flange 512, and a right locking hook 61 is rotatably fixed thereto by the locking shaft 52, wherein the left locking hook 60 and

the right locking hook 61 are integrated with the locking shaft 52 and can rotate all together. The left locking hook 60 and the right locking hook 61 is disposed symmetrically relative to the main body 51 of the upper frame. A left sliding groove 601 and a left flange (not shown) are formed on the left locking hook 60. A right sliding groove 611 and a right flange 612 are formed on the right locking hook 61. A printing roller 56 is further rotatably hinged to the main body 51 of the upper frame. A gear 63 is fixed to the printing roller 56. A fixing frame 581 for the fixed blade is fixed to the main body 51 of the upper frame. A fixed blade 58 is provided on the fixing frame 581.

[0026] Fig. 18 is a perspective view of the printing unit of the present invention, and fig. 19 is a perspective view of the printing unit of the present invention with the upper frame opened. In fig. 18, the supporting shaft 46 of the upper frame passes through the left hole 44 and the right hole 45 of the main frame 3 and subsequently passes through the left strip-shaped hole 55 and the right strip-shaped hole 59 of the main body 51 of the upper frame, so as to connect the main frame 3 with the upper frame 5. In such a case, the spindle of the printing roller 56 is locked in the groove 382 of the fixing plate 38 for the printing head, and the frame 5 is in a locked state. The left rotating shaft 32 of the left connecting rod 33 passes through the left sliding groove 601 of the left locking hook 60, and the right rotating shaft 321 of the right connecting rod 331 passes through the right sliding groove 611 of the left locking hook 61. The extending line of the left connecting rod 33 passes through the hinge point of the main body 51 of the upper frame and the left locking hook 60. and the upper end of the left connecting rod 33 is located in the upper most limit position of the left sliding groove 601. The extending line of the right connecting rod 331 passes through the hinge point of the main body 51 of the upper frame and the right locking hook 61, and the upper end of the right connecting rod 331 is located in the upper most limit position of the right sliding groove 611. The main body 61 of the upper frame, the left locking hook 60 and the left connecting rod 33 constitute a connecting rod system. Similarly; the main body 51 of the upper frame, the right locking hook 61 and the right connecting rod 331 constitute a connecting rod system. These two connecting rod systems are eudipleural and move synchronously. The left flange of the left locking hook 60 abuts against the upper part of the main body 51 of the upper frame, and the right flange 612 of the right locking hook 61 abuts against the upper part of the main body 51 of the upper frame

[0027] In the present printing unit, since the printing roller 56 in the upper frame 5 is in contact with the printing head 39 fixed in the main frame 3, the force F rightward in the horizontal direction in fig. 18 applied to the printing head 39 by the elastic member 37 is partly transferred to the upper frame 5. The force F can be decomposed into two forces on the frame 5. One is a vertical upward force F1, and the other is F2 in the direction of the hinge shaft of the left locking hook 60 and the main body 51 of the upper frame, the left rotating shaft 32 and the hinge shaft of the left connecting rod 33 and the main frame 3. The supporting shaft 46 of the upper frame counteracts the F1. The force F2 is transferred to the main frame 3 via the hinge shaft of the left locking hook 60 and the main body 51 of the upper frame, the hinge shaft of the left connecting rod 33 and the main frame 3, and the left rotating shaft 32. in such a case, the upper frame 5 is in a relatively steady state.

[0028] When papers are to be supplied, it is required to separate the upper frame 5 from the main frame 3. The left locking hook 60 and the right locking hook 61 are rotated in the clockwise direction in fig. 13, At this time, the left rotating shaft 32 get away from the original position. The hinge shaft of the left locking hook 60 and the main body 51 of the upper frame, the left rotating shaft 32 and the hinge shaft of the left connecting rod 33 and the main frame 3 are not collinear any more. The hinge shaft of the right locking hook 61 and the main body 51 of the upper frame, the right rotating shaft 321 and the hinge shaft of the right connecting rod 331 and the main frame 3 are not collinear any more, either. The balance of forces in the locked state is destroyed. The upper frame 5 is separated from the main frame 3 by the force F applied to the upper frame 5 by the printing head 39, as shown in 19.

[0029] When the upper frame is to be closed, the upper frame is, pushed to move horizontally with the upper frame 5 being kept in the horizontal direction. When the printing roller 56 contacts the printing head 39, the extending line of the left connecting rod 33 passes through the hinge point of the main body 51 of the upper frame and the left locking hook 60, and the upper end of the left connecting rod 33 is located in the upper most limit position of the left sliding groove 601. The extending line of the right connecting rod 331 passes through the hinge point of the main body 51 of the upper frame and the right locking hook 61, and the upper end of the right connecting rod 331 is located in the upper most limit position of the right sliding groove 691. Equilibrium is reached. The upper frame 5 is in a steady state and locked on the main frame 3.

[0030] Since the upper frame 5 is kept moving in the horizontal direction during the movement of the upper frame 5, the upper frame 5 can be opened successfully and is not influenced by the movable blade 41, even the movable blade 41 in the fixing frame 4 can not retreat and thus superimposes on the fixed blade 58 provided on the frame 5. Also, the upper frame 5 can be closed successfully.

[0031] In the above technical solution, the sliding movement of the upper frame 5 on the main frame 3 is achieved by providing a strip-shaped hole in the upper frame 5 and providing a shaft on the main frame 3. Similarly, the sliding movement of the upper frame 5 on the main frame 3 can be achieved by providing a shaft on the upper frame 5 and providing a corresponding strip-shaped hole in the main frame 3. The same technical

effect can be achieved by these two solutions.

[0032] In the above technical solution, the left locking hook 60 and the right locking hook 61 are provided on the both ends of the upper frame 5, respectively. However, the above technical effect can be achieved by providing only one locking hook on one end of the upper frame.

[0033] In the above technical solution, the fixing frame 4 for the mobable blade is fixed on the main frame 3, and the fixing frame 581 for the fixed blade is fixed on the upper frame 5. Similarly, the same technical effect can be achieved by disposing the fixing frame 581 for the fixed blade on the main frame 3 and disposing the fixing frame 4 for the movable blade on the upper frame 5.

[0034] Particular embodiments of the present invention disclose preferred modes for carrying out the invention, but the present invention is not limited thereto. A person skilled in the art can easily understand the spirit of the present invention through the above embodiments, and can make various developments and modifications, which are within the protecting scope of the present invention without departing from the spirit of the same.

Claims

1. A printing unit comprising a main frame, one of the fixed and movable blades and a printing head being disposed at the upper and lower parts of the main frame, respectively, an upper frame being disposed at a side of the main frame, the other one of the fixed and movable blades and a printing roller being correspondingly disposed at the upper and lower parts of the upper frame, is **characterized in that**, the upper frame is slidably mounted to the main frame.

2. The printing unit of claim 1, **characterized in that**, two ends of a rotating shaft provided at the lower part of the main frame pass through strlp-shaped holes correspondingly provided at two ends of the upper frame.

3. The printing unit of claim 2, **characterized in that**, a spanner is disposed at an end portion of the rotating shaft.

4. The printing unit of claim 3, **characterized in that**, the spanner is provided with a handle, a groove and a push block; and the upper frame is provided a fixing pole accordingly that can be locked in the groove.

5. The printing unit of claim 4, **characterized in that**, two ends of a fixing plate for the printing head are provided with lock slots, in which a spindle of the printing roller is locked when the upper frame closes.

6. The printing unit of claim 2, **characterized In that**, a sliding groove is formed in a locking hook hinged with the main body of the upper frame; the main frame is hinged with the lower part of a connecting rod whose upper end can slide along the sliding groove of the locking hook; the extending line of the connecting rod passes though the hinge point of locking hook with the upper frame and the upper end of the connecting rod is located In the upper most limit position of the sliding groove, when the upper frame is in a closed state; and a flange of the upper part of the locking hook abuts against the upper surface of the main body of the upper frame.

7. A printer having the printing unit as claimed in any one of the above claims, comprising a housing on which a main frame is provided, one of the fixed and movable blades and a printing head being disposed at the upper and lower parts of the main frame, respectively, an upper frame being disposed at a side of the main frame, the other one of the fixed and movable blades and a printing roller being correspondingly disposed at the upper and lower parts of the upper frame, is **characterized in that**, the upper frame is slidably mounted on the main frame.

8. The printer of claim 7, **characterized in that**, two ends of a rotating shaft provided at the lower part of the main frame pass through strip-shaped holes correspondingly provided at two ends of the upper frame.

9. The printer of claim 8, **characterized in that**, a spanner is disposed at an end portion of the rotating shaft.

10. The printer of claim 9. **characterized in that**, the spanner is provided with a handle, a groove and a push block; and the upper frame is provided a fixing pole accordingly that can be locked in the groove.

11. The printer of claim 10, **characterized in that**, two ends of a fixing plate for the printing head are provided with lock slots, in which a spindle of the printing roller is locked when the upper frame closes.

12. The printer of claim 8, **characterized in that**, a sliding groove is formed in a locking hook hinged with the main body of the upper frame; the main frame is hinged with the lower part of a connecting rod whose upper end can slide along the sliding groove of the locking hook; the extending line of the connecting rod passes though the hinge point of locking hook with the upper frame and the upper end of the connecting rod is located in the upper most limit position of the sliding groove, when the upper frame is in a closed state; and a flange of the upper part of the locking hook abuts against the upper surface of the main body of the upper frame.

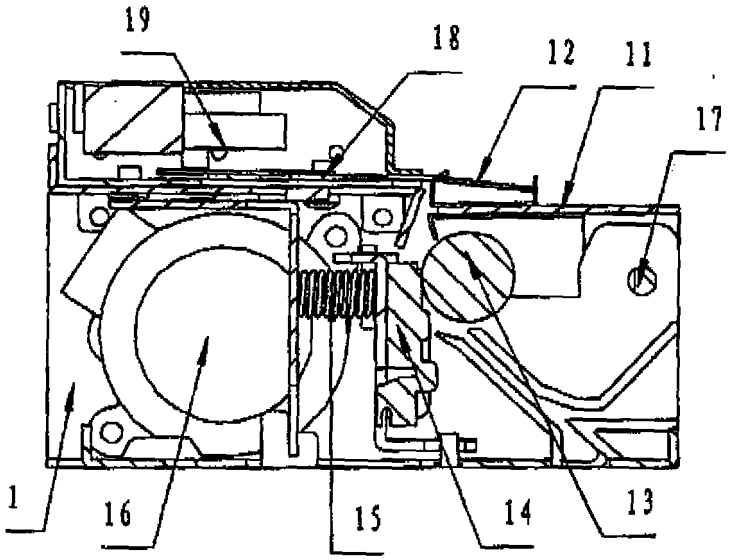

Fig. 1

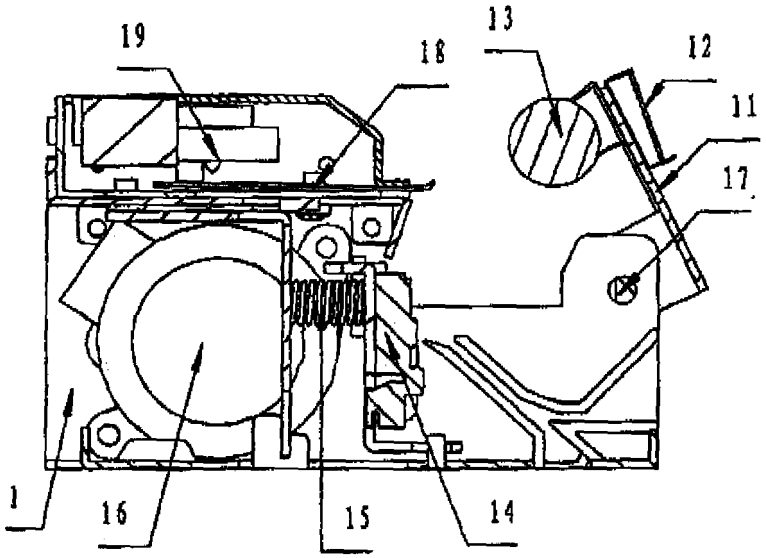

Fig. 2

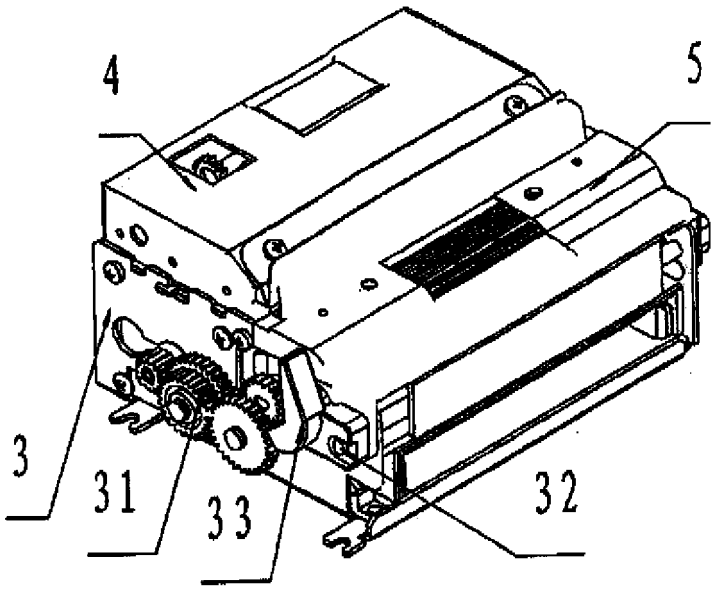

Fig. 3

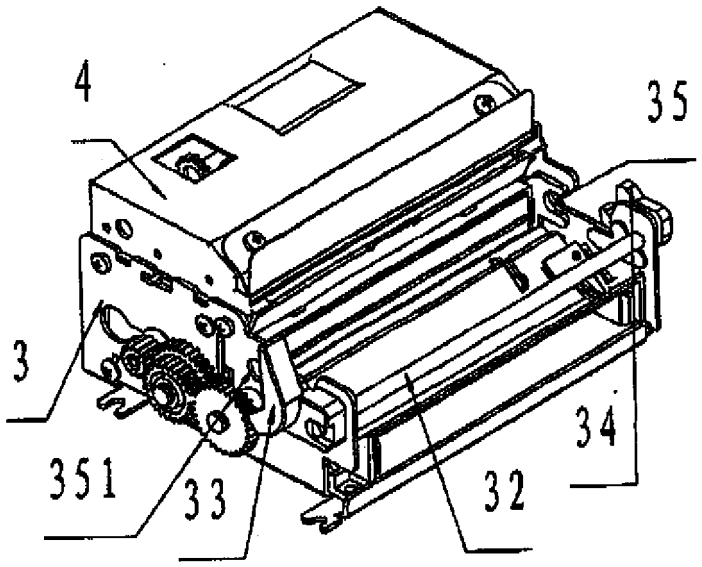

Fig. 4

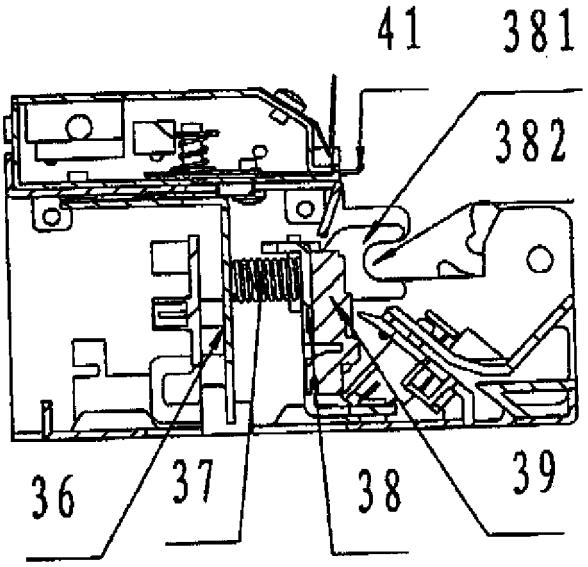

Fig. 5

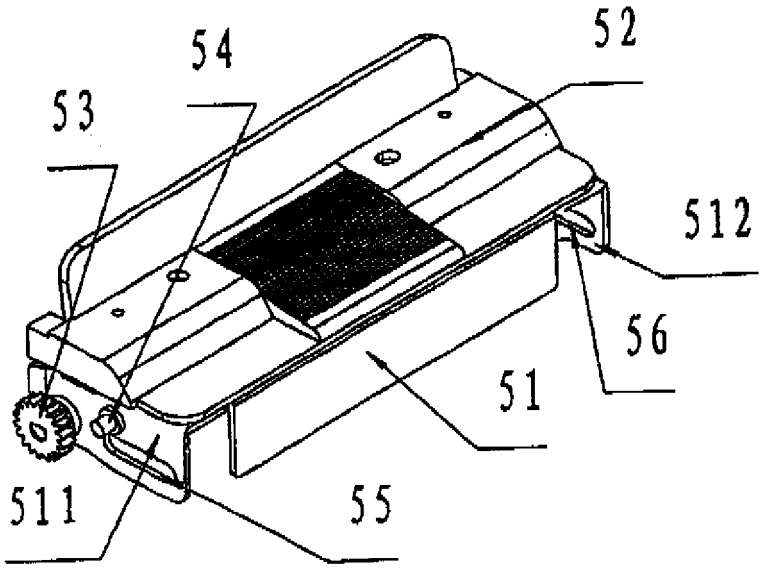

Fig. 6

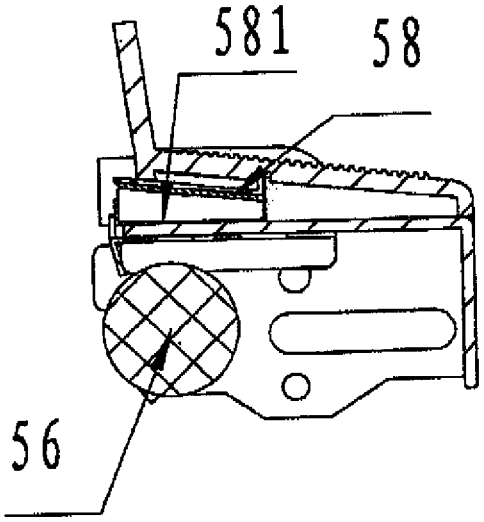

Fig. 7

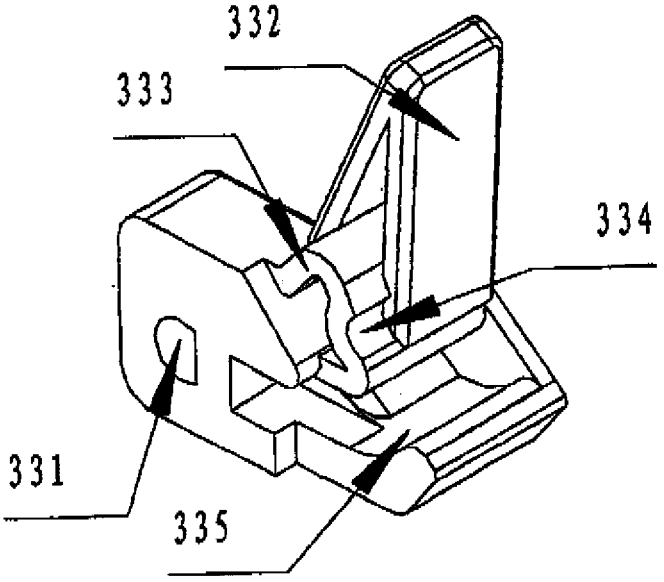

Fig. 8

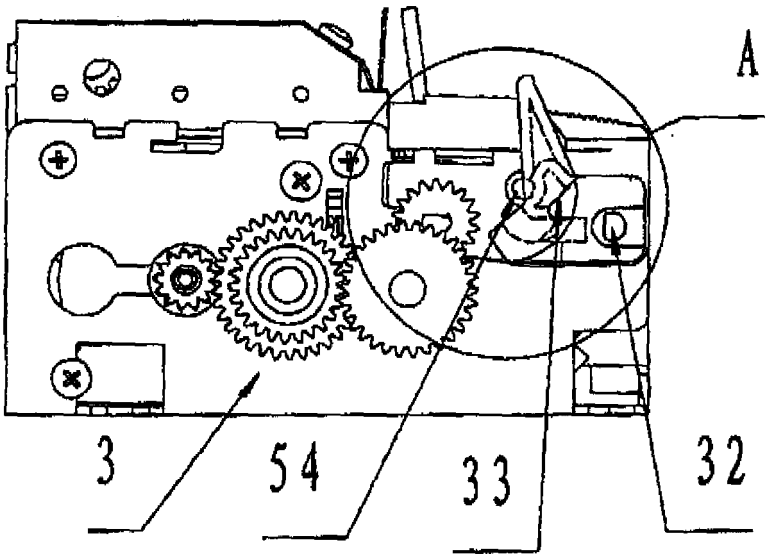

Fig. 9

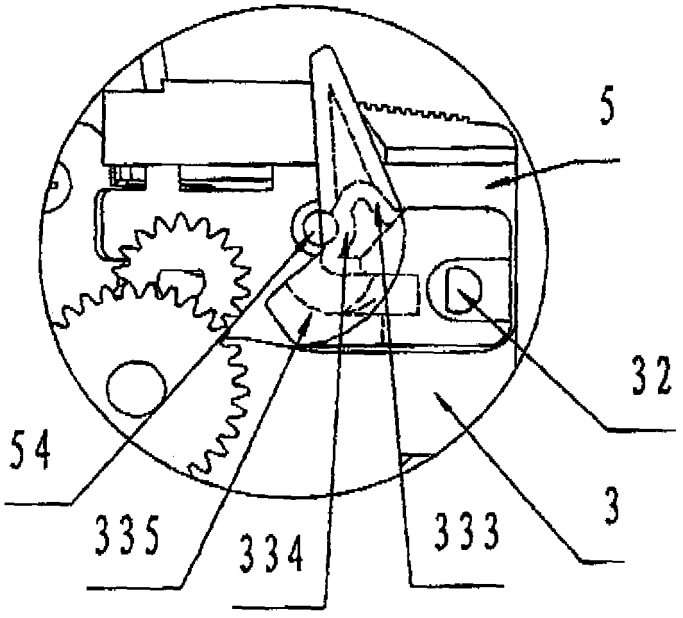

Fig. 10

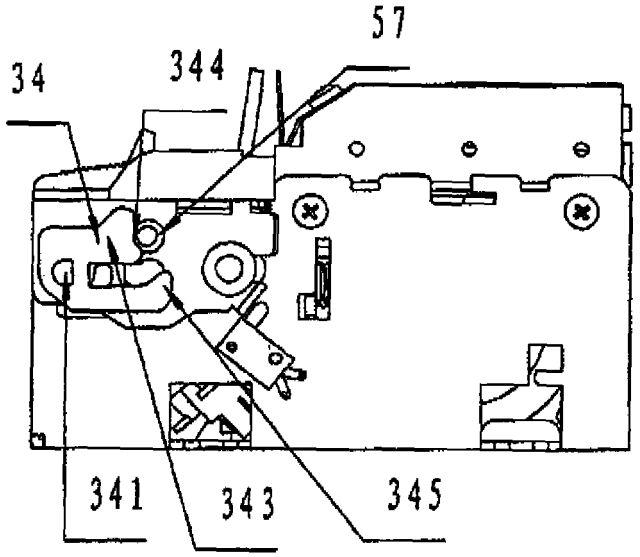

Fig. 11

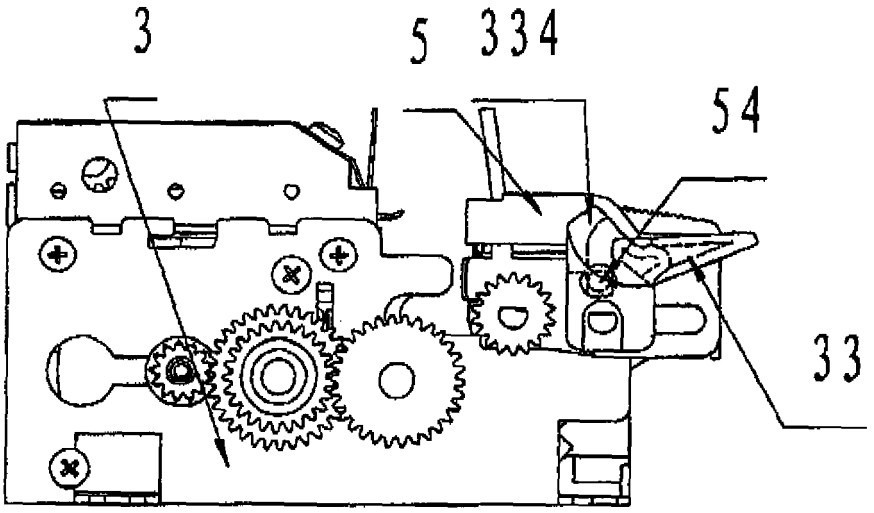

Fig. 12

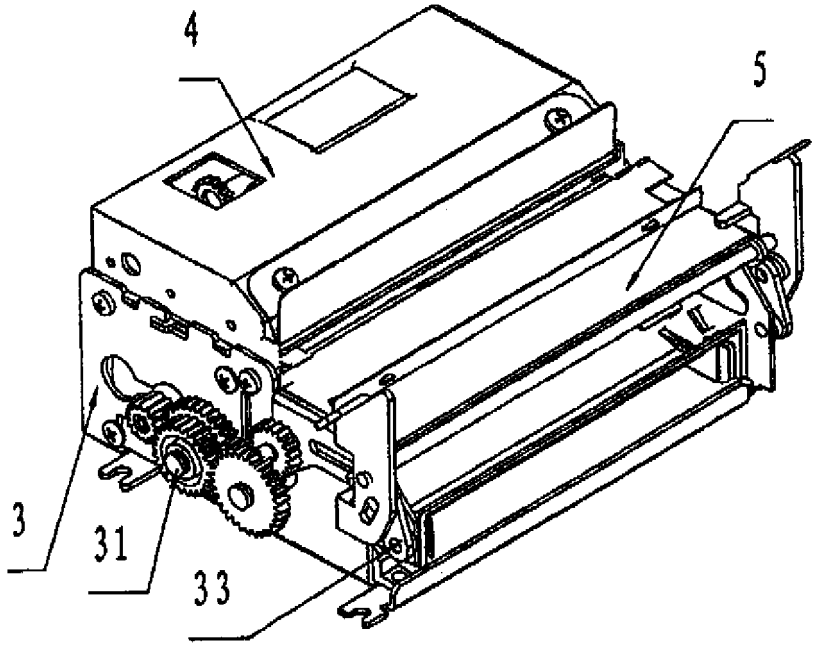

Fig. 13

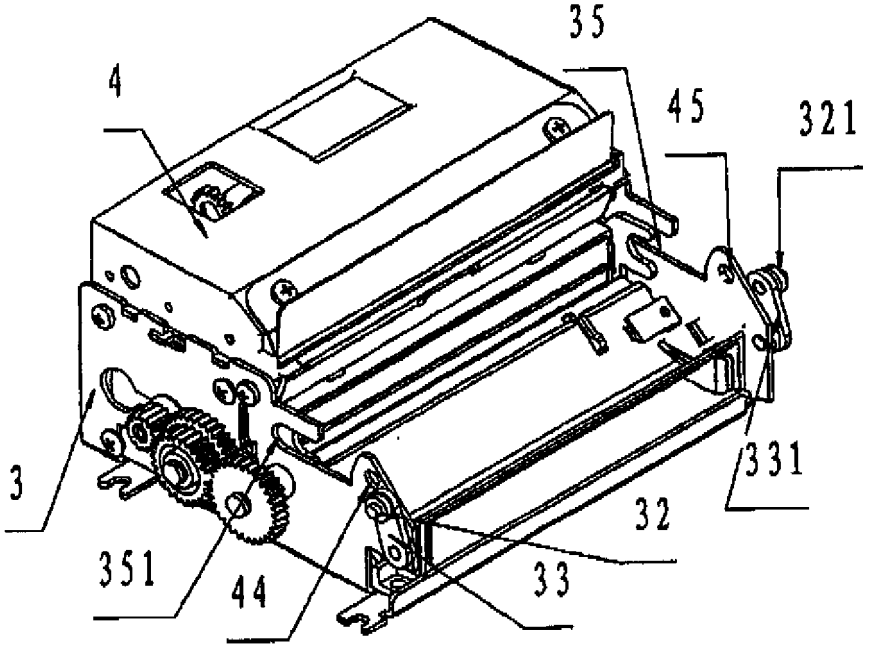

Fig. 14

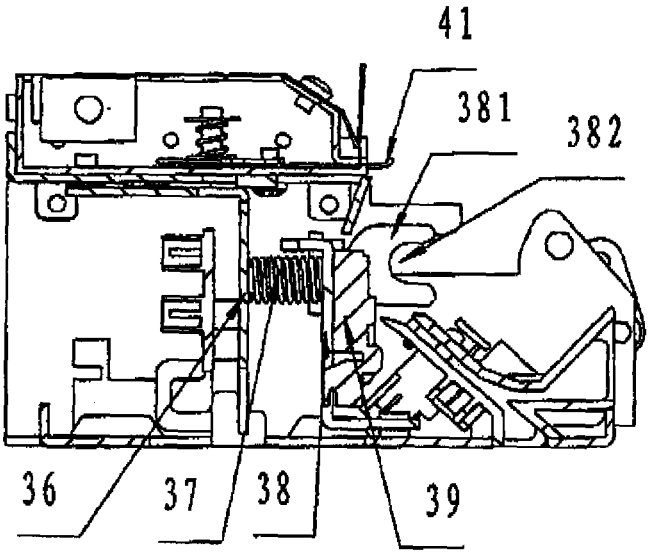

Fig. 15

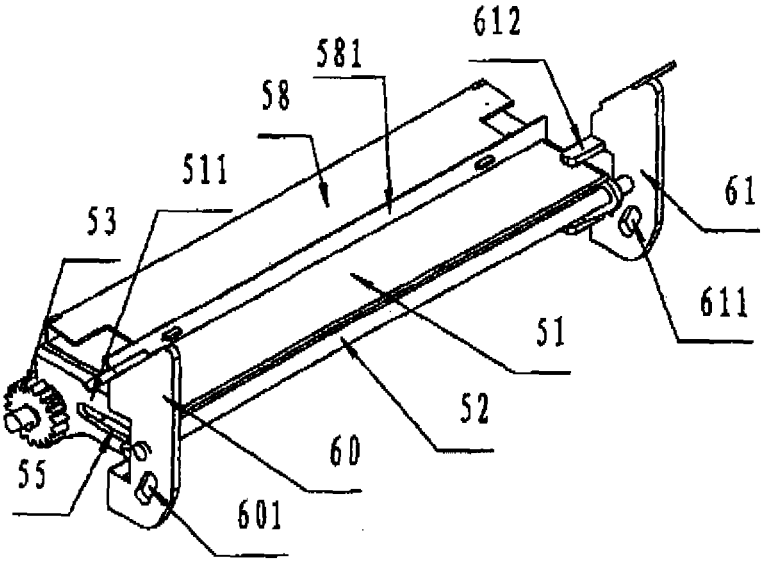

Fig. 16

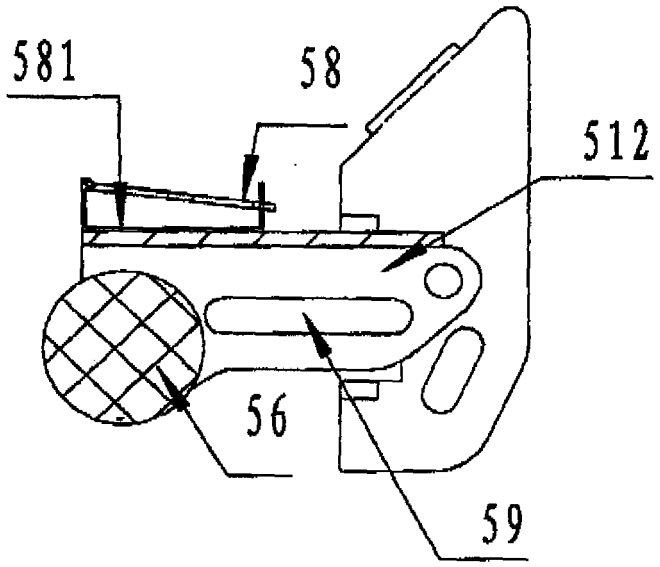

Fig. 17

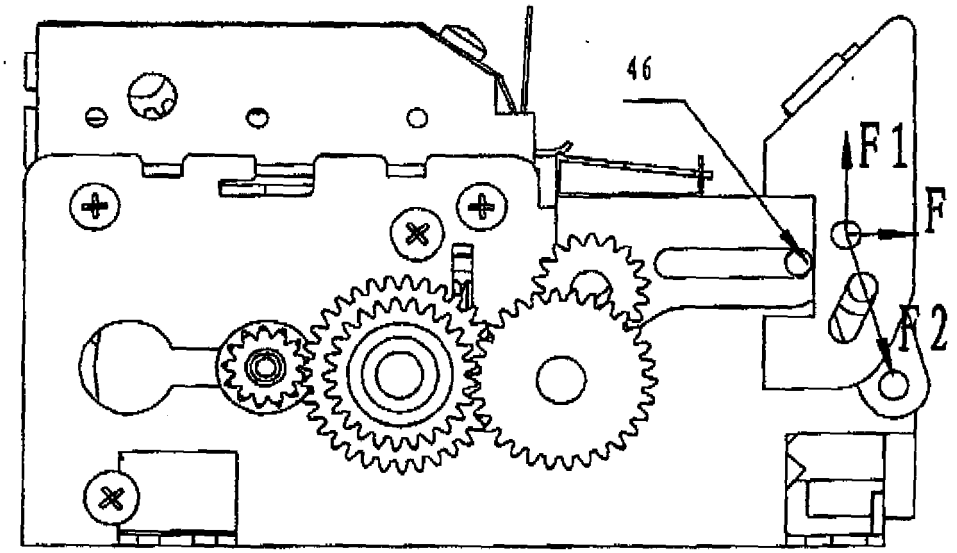

Fig. 18

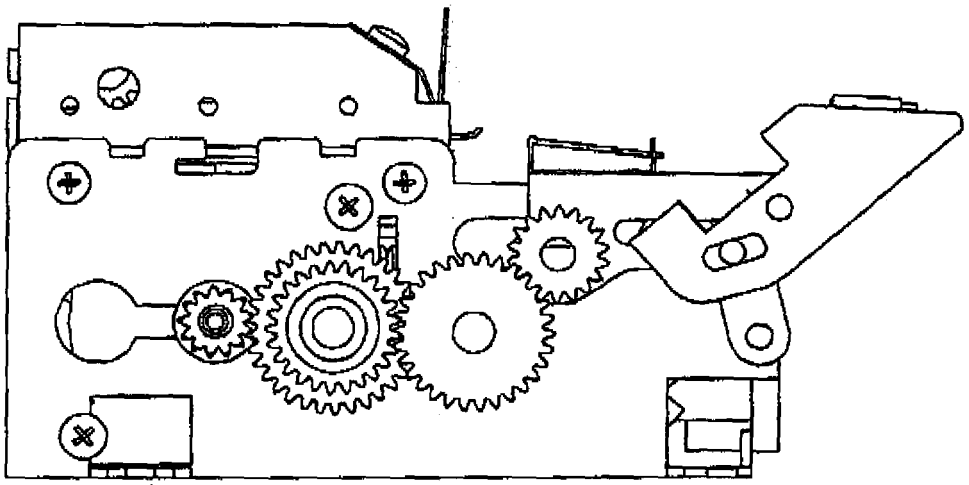

Fig. 19

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2006/000831

A. CLASSIFICATION OF SUBJECT MATTER

B41J11/66(2006.01)i

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC[8] B41J11/00, B41J11/66, B41J11/68, B41J11/70, B41J15/04

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

CHINESE INVENTION (1985-2005) CHINESE UTILITY MODEL (1985-2005)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC, WPI, PAJ, CNPAT

B41J11/66/EC/IC, cut+, slid+,(frame? Or bracket?), (fix+ or mov+) 3w (blade? Or knife? Or cutter?)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN,C,1158185 (SEIKO EPSON CORP) 21.JUL.2004(21.07.2004) See the whole document	1,7
A	US,A,5833380 (SEIKO EPSON CORP) 10.NOV.1998(10.11.1998) See the whole document	1,7
A	CN,A,1483585 (TOSHIBA TEC KK) 24.MAR.2004(24.03.2004) See the whole document	1,7
A	CN,C,1193893 (SEIKO EPSON CORP) 23.MAR.2005(23.03.2005) See the whole document	1,7

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&"document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
05.JUL.2006(05.07.2006)	10 · AUG 2006 (10 · 08 · 2006)

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2006/000831

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