

Description

Background of the Invention

The present invention relates to a ribbon cassette 5
attaching/detaching mechanism of a printer.

Conventionally, in a ribbon cassette attaching/detaching mechanism, an engaging hook 3a is formed on a carrier frame 3, and this engaging hook 3a engages with an engaging pin 7a of a ribbon cassette 7, as shown in Fig. 7A. 10

When disengaging the ribbon cassette 7, as shown in Figs. 7B and 7C, the ribbon cassette 7 is rotated clockwise about its engaging pin 7a as the center, is moved to the left, and is pulled upward, thereby removing the ribbon cassette 7. However, before the engaging pin 7a is not disengaged from the engaging hook 3a of the carrier frame 3, if the ribbon cassette 7 is forcibly lifted upward or is further rotated clockwise from the state shown in Fig. 7D, the engaging pin 7a or the engaging hook 3a may be broken. 15 20

Summary of the Invention

It is an object of the present invention to provide a ribbon cassette attaching/detaching mechanism in which the engaging pin or the engaging hook will not be broken when removing the ribbon cassette. 25

In order to achieve the above object, according to the present invention, there is provided a ribbon cassette attaching/detaching mechanism comprising a carrier frame having engaging hooks, a ribbon cassette having an engaging pin, the ribbon cassette being fixed to the carrier frame when the engaging pin engages with the engaging hooks, and being removed from the carrier frame when the ribbon cassette is pivoted about the engaging pin as a center from a state of being fixed to the carrier frame to disengage the engaging pin from the engaging hooks, and projecting members which come into contact with an end portion of the ribbon cassette on an engaging pin side, when the ribbon cassette is pivoted through a predetermined angle about the engaging pin as the center, thereby moving the engaging pin away from the engaging hooks. 30 35 40 45

Brief Description of the Drawings

Fig. 1 is a perspective view showing a ribbon cassette attaching/detaching mechanism according to the first embodiment of the present invention; Fig. 2 is an enlarged side view showing the engaging portion of the ribbon cassette attaching/detaching mechanism shown in Fig. 1; Figs. 3A to 3C are side views showing the attaching/detaching operation of the ribbon cassette shown in Fig. 1; Figs. 4A to 4D are side views of the main part of the ribbon cassette shown in Figs. 3A to 3C which is in the attaching/detaching operation; 50 55

Fig. 5 is a perspective view showing a ribbon cassette attaching/detaching mechanism according to the second embodiment of the present invention;

Fig. 6 is a perspective view of the main part of a modification of the ribbon cassette attaching/detaching mechanism of the present invention; and

Figs. 7A to 7D are side views showing the attaching/detaching operation of a conventional ribbon cassette.

Description of the Preferred Embodiments

The preferred embodiments of the present invention will be described in detail with reference to the accompanying drawings.

Fig. 1 shows an ink ribbon cassette attaching/detaching mechanism according to the first embodiment of the present invention. Referring to Fig. 1, a platen 101 opposes a print head 102 through a recording sheet. The print head 102 performs printing on the recording sheet on the platen 101 with an impact generated by a wire in the head 102 through an ink ribbon. The print head 102 is fixed to a carrier frame 103. The carrier frame 103 is supported by a guide shaft 104 and a main stay 105 and can be slid by a timing belt 106 in the longitudinal direction of the guide shaft 104. A ribbon cassette 107 is detachably mounted on the carrier frame 103. A pair of opposing projecting segments 107b are formed on the rear end of the ribbon cassette 107 on the main stay 105 side, and an engaging pin 107a parallel to the main stay 105 is provided between the distal end portions of the projecting segments 107b. Curved surfaces 107c of the distal ends of the projecting segments 107b form arcuated surfaces each having a predetermined diameter. 25 30 35 40 45

Fig. 2 shows the engaging portion of the ribbon cassette 107 and the carrier frame 103. On the inner sides of the projecting segments 107b, a pair of engaging hooks 103a are integrally formed on the carrier frame 103 to correspond to the engaging pin 107a of the ribbon cassette 107 such that they oppose the ribbon cassette 107. The engaging hooks 103a hook the engaging pin 107a serving as the pivot shaft. On portions of the outer side surfaces of the engaging hooks 103a that oppose the curved surfaces 107c of the distal ends of the projecting segments 107b, inclined projections 103b are formed integrally with the engaging hooks 103a. Each inclined projection 103b is formed to be sharply lowered toward the engaging portion of the engaging pin 107a and the corresponding engaging hook 103a. 50 55

An operation of removing the ribbon cassette 107 will be described with reference to Figs. 3A to 3C and Figs. 4A to 4D. Fig. 3A shows a state wherein the ribbon cassette 107 is completely mounted on the carrier frame 103, and Fig. 4A shows part of Fig. 3A. In the state shown in Figs. 3A and 4A, when the ribbon cassette 107 is lifted upward from the print head 102 side,

the ribbon cassette 107 is pivoted clockwise about the engaging pin 107a as the center to obtain a state shown in Fig. 3B. When the ribbon cassette 107 is lifted further upward, a state shown in Fig. 4C is obtained through a state shown in Fig. 4B. The curved surfaces 107c of the distal ends of the ribbon cassette 107 come into contact with the inclined projections 103b. The curved surfaces 107c of the distal ends of the projecting segments 107b slide on the inclined surfaces of the inclined projections 103b to move the engaging pin 107a supported by the projecting segments 107b. As the inclined surface of each inclined projection 103b is formed to be sharply lowered toward the engaging portion of the engaging pin 107a and the corresponding engaging hook 103a, the engaging pin 107a smoothly slides on the curved surfaces 107c of the distal ends of the projecting segments 107b along the inclined surfaces of the inclined projections 103b to naturally disengage from the engaging hooks 103a as it is pushed outward. As shown in Fig. 4D, when the ribbon cassette 107 becomes perpendicular to the carrier frame 103, the engaging pin 107a is completely disengaged from the engaging hooks 103a. Fig. 3C shows a state wherein the ribbon cassette 107 is kept disengaged from the carrier frame 103.

As described above, the engaging pin 107a can be naturally disengaged from the engaging hooks 103a only by pivoting the ribbon cassette 107 through almost 90°. Even if the ribbon cassette 107 is rotated through more than 90°, as the engaging pin 107a has already been disengaged from the engaging hooks 103a, an excessive force will not act on the engaging pin 107a or the engaging hooks 103a, so that they will not be broken.

Fig. 5 shows the second embodiment of the present invention. In Fig. 1, during engagement, the engaging hooks 103a are arranged between (on the inner sides of) the projecting segments 107b. In contrast to this, in the second embodiment, engaging hooks 203a of a carrier frame 203 are arranged on the outer sides of projecting segments 207b of a ribbon cassette 207. Engaging pins 207a which are to be hooked by the engaging hooks 203a are cantilevered to project to the outer sides of the projecting segments 207b. Reference numeral 201 denotes a platen; 202, a printer head; 204, a guide shaft; 205, a main stay; and 206, a timing belt, respectively. Inclined projections 203b are formed integrally with the carrier frame 203 on sides opposite to the positions of the inclined projections 103b of Fig. 1, i.e., on the inner sides of the engaging hooks 203a to correspond to curved surfaces 207c of the distal ends of the projecting segments 207b.

The present invention is not limited to the embodiments described above. For example, as shown in Fig. 6, cylindrical projections 303b integrally formed on engaging hooks 303a may be used in place of the inclined projections. More specifically, as far as the projections have inclined surfaces (cylindrical surfaces if the projections are cylindrical projections) which are

sharply lowered toward the engaging pin engaging with the engaging hooks, the rear end portion of the ribbon cassette slides on these inclined surfaces, so that the engaging pin can be removed smoothly. The projections such as inclined projections or cylindrical projections may not be formed on the engaging hooks but be fixed on the carrier frame directly.

As has been described above, in the ribbon cassette attaching/detaching mechanism according to the present invention, since projections having inclined surfaces are provided, the carrier frame can be prevented from being broken, and the ribbon cassette can be removed easily.

Claims

1. A ribbon cassette attaching/detaching mechanism characterized by comprising:

a carrier frame (103) having engaging hooks (103a);

a ribbon cassette (107) having an engaging pin (107a), said ribbon cassette being fixed to said carrier frame when said engaging pin engages with said engaging hooks, and being removed from said carrier frame when said ribbon cassette is pivoted about said engaging pin as a center from a state of being fixed to said carrier frame to disengage said engaging pin from said engaging hooks; and

projecting members (103b) which come into contact with an end portion of said ribbon cassette on an engaging pin side, when said ribbon cassette is pivoted through a predetermined angle about said engaging pin as the center, thereby moving said engaging pin away from said engaging hooks.

2. A mechanism according to claim 1, wherein said projecting members comprise inclined projections having inclined surfaces that are inclined downward toward said engaging pin engaging with said engaging hooks.

3. A mechanism according to claim 1, wherein said projecting members comprise cylindrical projections.

4. A mechanism according to claim 1, wherein said projecting members are integrally formed on side surfaces of said engaging hooks.

5. A mechanism according to claim 1, wherein end portions of said ribbon cassette which come into contact with said projecting members have curved surfaces (107c).

6. A mechanism according to claim 1, wherein said ribbon cassette has a pair of opposing projecting

segments (107b) for supporting said engaging pin, and distal end faces of said projecting segments come into contact with said projecting members.

7. A mechanism according to claim 6, wherein said engaging pin has two ends supported by said projecting segments, and said engaging hooks are provided between said projecting segments. 5
8. A mechanism according to claim 6, wherein said engaging pin is cantilevered by a corresponding one of said projecting segments to project outward, and said engaging hooks are provided on outer sides of said projecting segments. 10

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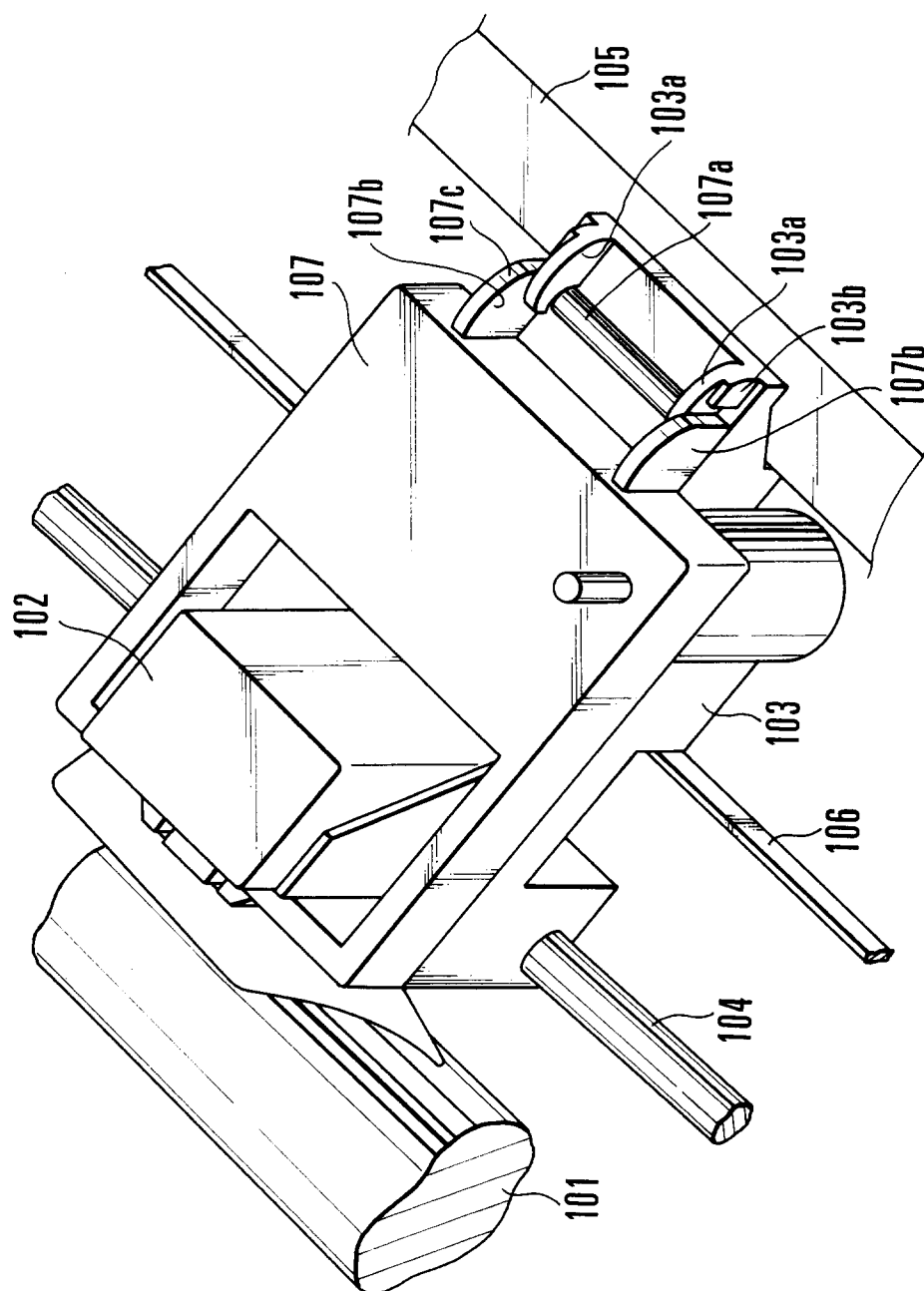


FIG. 1

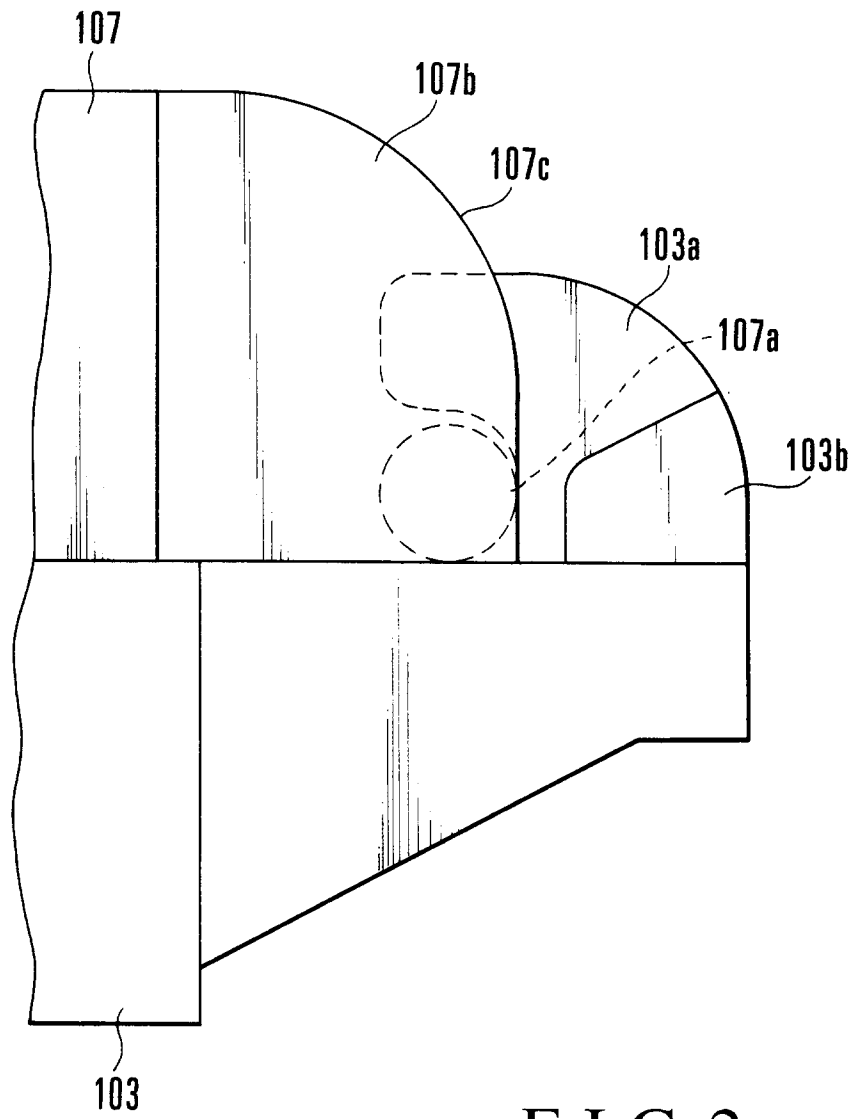


FIG. 2

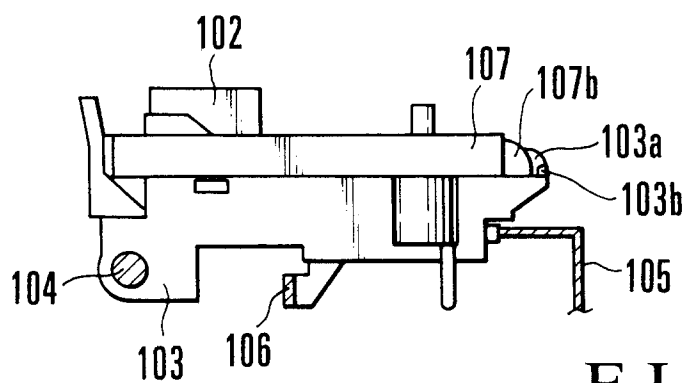


FIG. 3 A

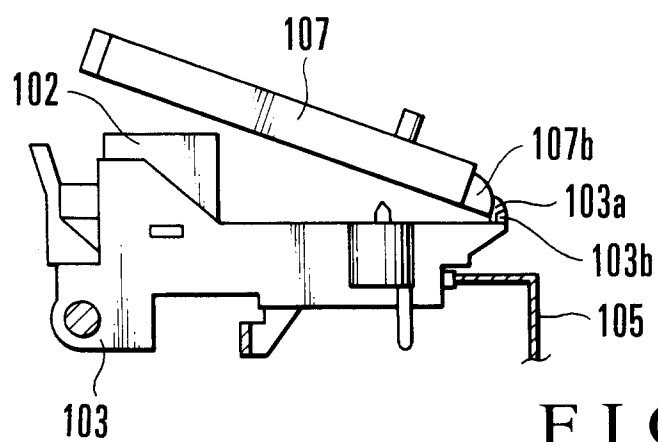


FIG. 3 B

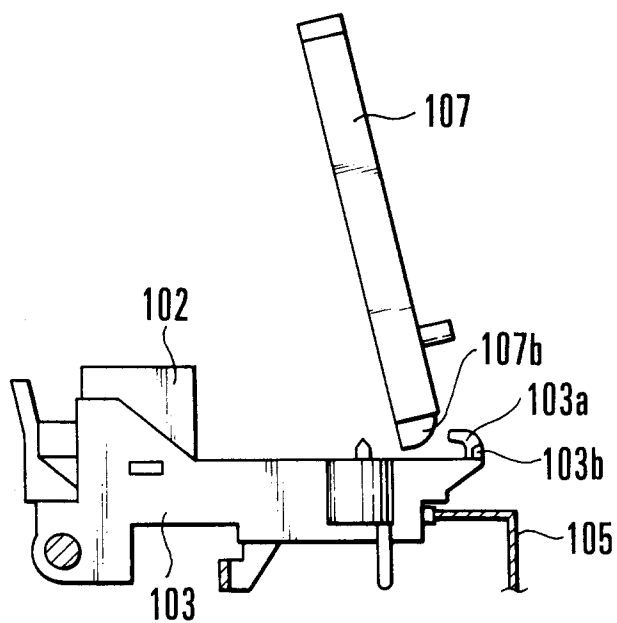


FIG. 3 C

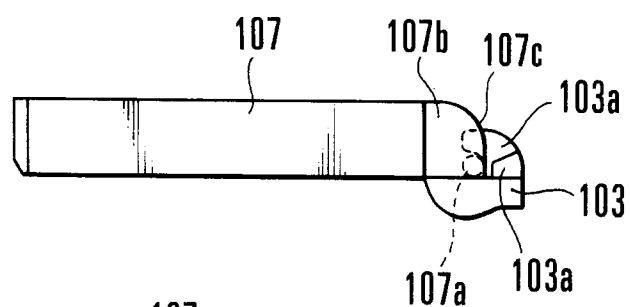


FIG. 4A

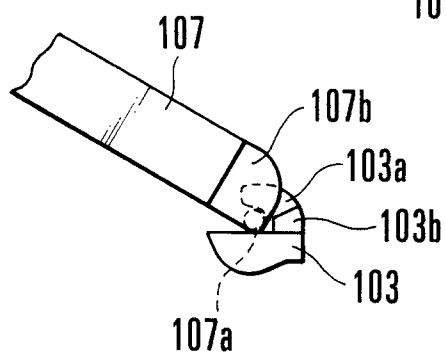


FIG. 4B

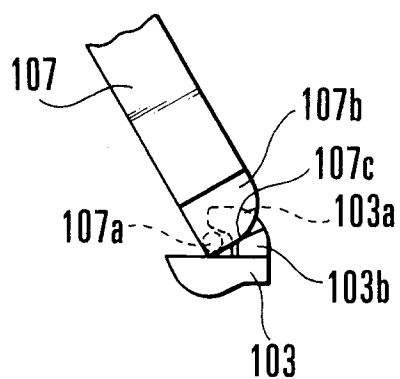


FIG. 4C

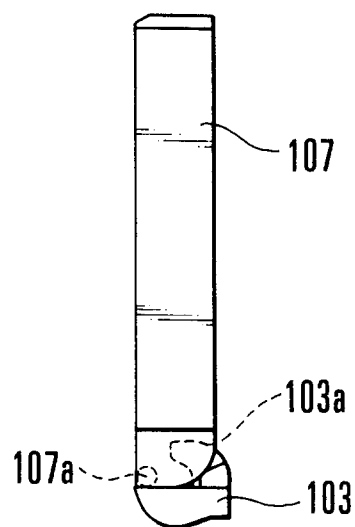
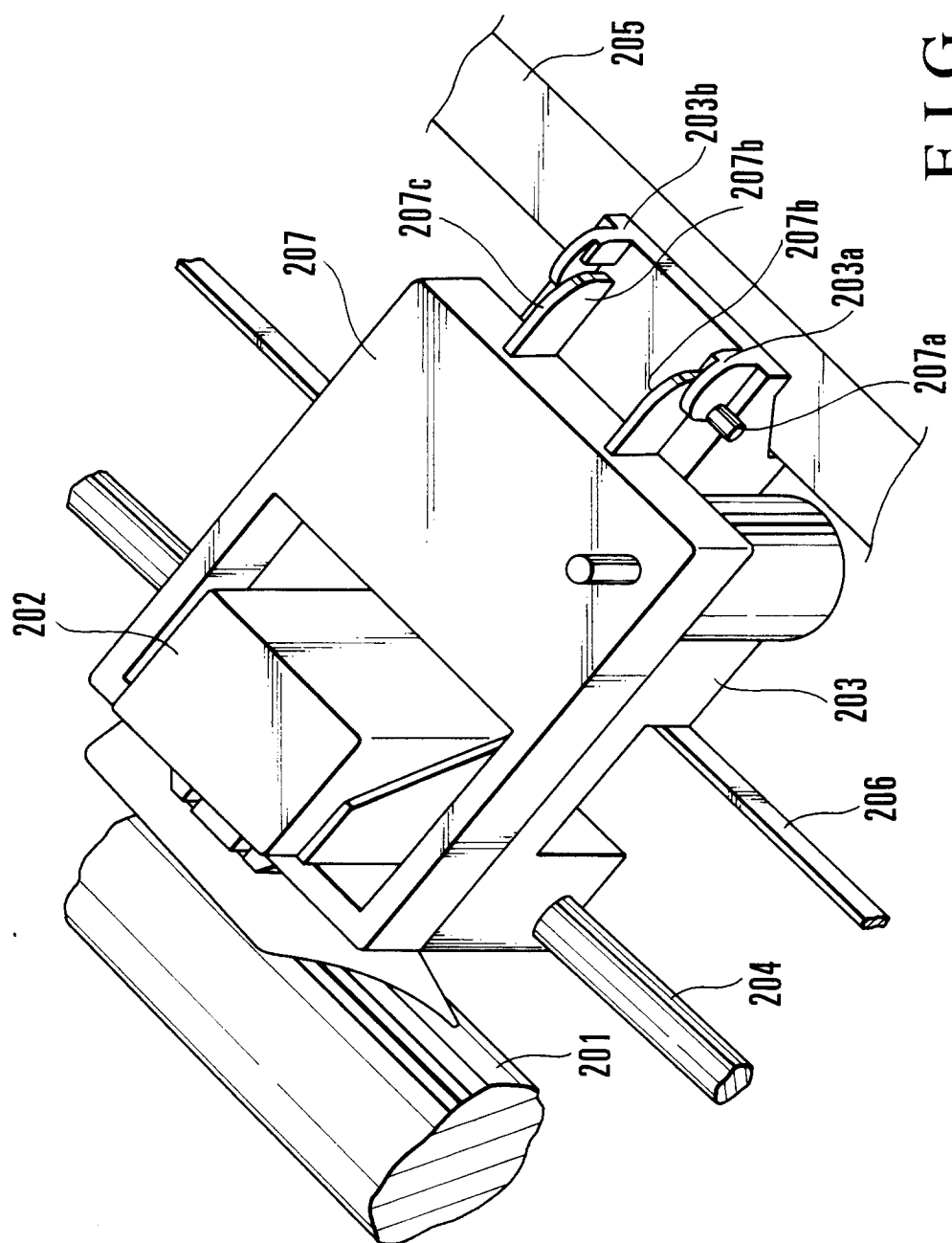


FIG. 4D



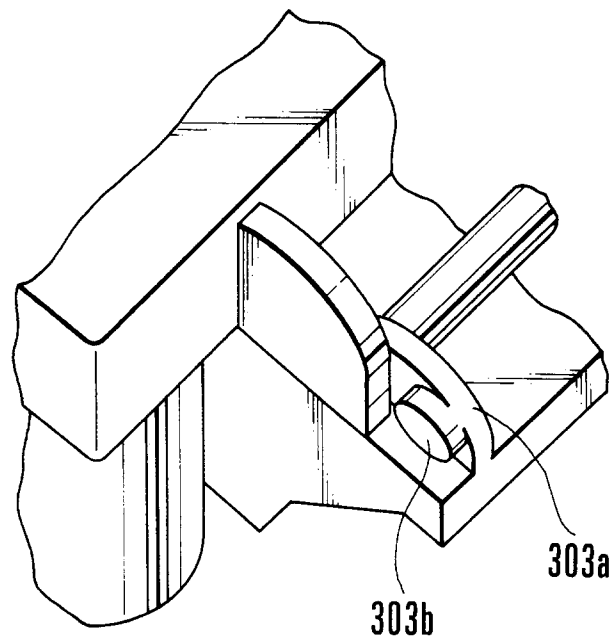


FIG. 6

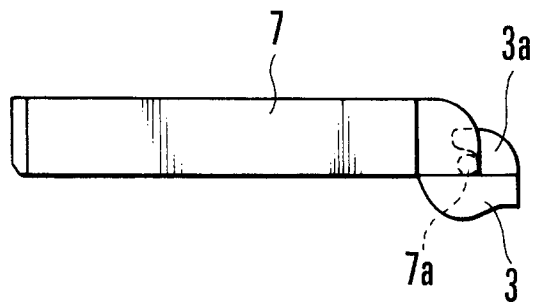


FIG. 7 A
PRIOR ART

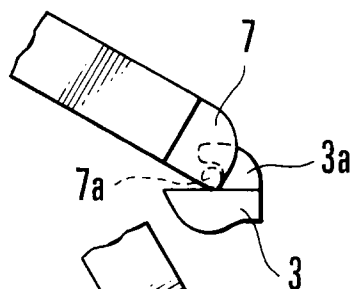


FIG. 7 B
PRIOR ART

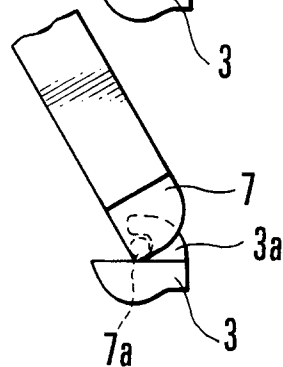


FIG. 7 C
PRIOR ART

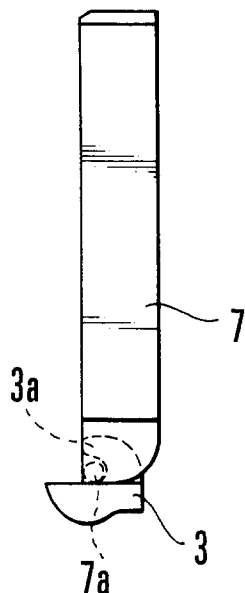


FIG. 7 D
PRIOR ART



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 96 11 0531

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X A	DE-A-37 23 507 (AEG OLYMPIA AG) * column 2, line 51 - line 60; figure 1 * ---	1,5,6 2-4,7,8	B41J35/28
X	PATENT ABSTRACTS OF JAPAN vol. 13, no. 489 (M-888) [3837] , 7 November 1989 & JP-A-01 195089 (MATSUSHITA ELECTRIC IND CO LTD), 4 August 1989, * abstract *	1	
A	DE-A-32 01 258 (SCM CORP.) * page 12, paragraph 2 - page 13, paragraph 1 *	1-8	
A	EP-A-0 499 103 (OKI ELECTRIC INDUSTRY CO., LTD.) * figure 1 *	1-8	
A	EP-A-0 434 199 (ING. C. OLIVETTI & C.) * the whole document * -----	1-8	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			B41J
Place of search		Date of completion of the search	Examiner
THE HAGUE		25 September 1996	Joosting, T
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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