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(54) Inked ribbon cassette.

(57) An ink replenisher (9; 51; 60; 70) supplies ink to the inked ribbon (2) in an inked ribbon cassette. The ink replenisher (9; 51; 60; 70) shares one wall with an inked ribbon cassette body (1) and is integrally formed therewith. The ink replenisher (9; 51; 60; 70) has a projection (14) extending into contact with a follower roller (6; 61) for supplying the ink through the follower roller (6; 61) to the inked ribbon (2).

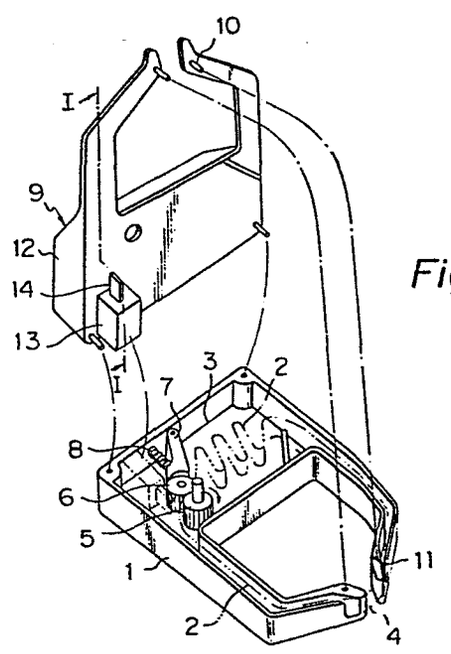

Fig. 1

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SPECIFICATION

INKED RIBBON CASSETTE

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BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to an inked ribbon cassette for being mounted on a printer carriage, and more particularly to an inked ribbon cassette having an ink replenisher for replenishing the inked ribbon with ink.

2. Description of the Related Art

There is known an inked ribbon cassette having an ink replenisher as shown in U.S. Patent No. 4,153,378, for example. The disclosed inked ribbon cassette includes an inked ribbon storage space partitioned to provide a chamber in which an ink cartridge is disposed. The ink cartridge supplies ink to a drive roller for driving the inked ribbon in a circulatory manner. Since the drive roller is held in contact with the inked ribbon, the ink supplied to the drive roller is fed to the inked ribbon.

The inked ribbon is of an endless configuration with a substantial length thereof being folded in the inked ribbon storage space. In printing operation, the inked ribbon is delivered from the storage space through one guide arm to an exposed portion where the inked ribbon can contact a print head. After the inked ribbon at the exposed portion has been pressed against a sheet of print paper by the print head to transfer ink to the sheet, the inked ribbon is passed through the other guide arm back into the storage space. This circulatory feeding process is repeated each time a printing operation is effected.

The ink in the inked ribbon is reduced in amount right after

it has been printed. However, since ink is supplied from the ink cartridge, the inked ribbon has a longer service life than would otherwise have.

The ink cartridge stores a small amount of ink because it is housed in the chamber in the inked ribbon storage space within the cassette. If a greater amount of ink were to be stored, then the inked ribbon cassette would be increased in size. The larger-size inked ribbon cassette would take up a larger installation space or impair an installation efficiency, and make it difficult to design a smaller and lighter printer.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide an inked ribbon cassette including an ink replenisher which is rendered larger in size without reducing the size of an inked ribbon storage space.

Another object of the present invention is to provide an inked ribbon cassette having an improved installation efficiency.

Still another object of the present invention is to provide an inked ribbon cassette having an inked ribbon of an increased service life.

According to the present invention, the above objects can be achieved by providing an ink replenisher sharing one wall with an inked ribbon cassette body and integrally formed with and positioned out of the ink ribbon cassette body. More specifically, an inked ribbon cassette according to the present invention comprises an inked ribbon, a container having an inked ribbon storage space in which the ink ribbon is stored, a drive roller for circulating the inked ribbon, a follower roller

pressed against the driver roller for sandwiching the inked ribbon therebetween, an ink replenisher formed integrally out of the container and sharing one wall with the container, and a projection extending from the ink replenisher into contact with the follower roller for supplying ink from the ink replenisher through the follower roller to the inked ribbon.

The above and other objects, features and advantages of the present invention will become more apparent from the following description when taken in conjunction with the accompanying drawings in which preferred embodiments of the present invention are shown by way of illustrative example.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is an exploded perspective view of an inked ribbon cassette according to a first embodiment of the present invention;

Fig. 2 is a cross-sectional view taken along line II - II of Fig. 1;

Fig. 3 is a side elevational view, partly in cross section, of a printer carriage on which the inked ribbon cassette of the first embodiment is mounted;

Fig. 4 is an exploded perspective view of an inked ribbon cassette according to a second embodiment of the present invention;

Fig. 5 is an exploded perspective view of an inked ribbon cassette according to a third embodiment of the present invention;

Fig. 6 is an exploded perspective view of an inked ribbon cassette according to a fourth embodiment of the present invention; and

Fig. 7 is a plan view of an inked ribbon cassette according

to a fifth embodiment of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Fig. 1 shows an inked ribbon cassette according to a first embodiment of the present invention.

The inked ribbon cassette includes an inked ribbon cassette body 1 having an inked ribbon storage space 3 in which a substantial length of an inked ribbon 2 is stored, with one end of the inked ribbon 2 being exposed at a distal end portion 4. The inked ribbon 2 is gripped between a drive roller 5 and a follower roller 6 pressed against the drive roller 5, the rollers 5, 6 being disposed in the inked ribbon storage space 3.

The follower roller 6 is supported on a movable support member 7 which is normally urged by a spring 8 in a direction to push the follower roller 6 against the drive roller 5. The inked ribbon cassette is mounted on a printer carriage (not shown). The drive roller 5 is rotated about its own axis in the direction of the arrow by a drive force which is derived from the movement of the carriage in a character-spacing direction.

The inked ribbon cassette also includes an ink replenisher 9 doubling as a cover for the inked ribbon cassette body 1 and has a plurality of engagement pins 10 which fit respectively in holes 11 defined in the inked ribbon cassette body 1 to anchor the ink replenisher 9 thereon.

The ink replenisher 9 has a hollow portion 12 containing therein an ink-impregnated body 15 (Fig. 2) such as a porous member such as a body of sponge or a fibrous member such as a body of felt that is impregnated with ink. A projection 14 impregnated with ink extends from a projecting block 13 formed on the hollow portion 12. The projection 14 is positioned for

contacting the follower roller 6 when the ink replenisher 9 is fixedly mounted on the ink ribbon cassette body 1.

As illustrated in Fig. 2, since the block 13 on the hollow portion 12 is integrally formed with the ink replenisher 9, the hollow portion 12 is prevented from being deformed under the pressure imposed from the follower roller 6. Therefore, even if the projection 14 and the follower roller 6 are differently positioned with respect to each other due to a manufacturing error than would otherwise be, only the projection 14 will flex to a different extent, but the pressure from the follower roller 6 remains the same and the rate of replenishment of ink remains unchanged.

Fig. 3 shows the manner in which the inked ribbon cassette is mounted on a printer carriage.

The inked ribbon cassette, designated at 31, mounted on the printer carriage, designated at 30, is disposed in surrounding relation to a print head 32, with the inked ribbon 2 being supplied between the print head 32 and a platen 34. The inked ribbon 2 lies and travels in a vertical zone indicated at W, and the hollow portion 12 of the ink replenisher 9 lies in a vertical zone indicated at L above the vertical zone W. Therefore, a space above the inked ribbon 2, which would otherwise be left empty is effectively employed as the vertical zone L for the hollow portion 12.

Fig. 4 shows an inked ribbon cassette according to a second embodiment of the present invention. Like or corresponding parts in Fig. 4 are denoted by like or corresponding reference characters in Fig. 1.

As illustrated in Fig. 4, an ink replenisher is mounted on an inked ribbon cassette body 1, rather than on a cover 40. The

ink replenisher has a projecting block 41 integral with the inked ribbon cassette body 1, so that the block 41 and a follower roller 6 will not be subjected to a relative positional displacement which would otherwise be caused by a manufacturing error.

Fig. 5 illustrates an inked ribbon cassette according to a third embodiment of the present invention. Like or corresponding parts in Fig. 5 are denoted by like or corresponding reference characters in Fig. 1.

According to the third embodiment, an ink replenisher 51 has a thickness equal to that of a container composed of an inked ribbon cassette body 52 and a cover 53, the ink replenisher 51 being attached to the rear end of an inked ribbon storage space 54.

The ink replenisher 51 has attachment arms 56a, 56b having respective holes 55a, 55b and positioned on the opposite ends of one side thereof, from which a projection 14 extends laterally. The inked ribbon cassette body 52 and the cover 53 have pins 57 which fit in the holes 55a, 55b to join the body 52, the cover 53, and the ink replenisher 51 together. When the body 52, the cover 53, and the replenisher 51 are thus assembled, the projection 14 is held in contact with the followerroller 6.

Fig. 6 shows an inked ribbon cassette according to a fourth embodiment of the present invention. Like or corresponding parts in Fig. 6 are denoted by like or corresponding reference characters in Fig. 5.

The inked ribbon cassette shown in Fig. 6 is basically of the same construction as that of the inked ribbon cassette illustrated in Fig. 5, except that a follower roller 61 and a movable support member 62 therefor are mounted on the side of an

ink replenisher 60 to which attachment arms 56a, 56b are attached. The movable support member 62 is integrally formed with the ink replenisher 60, and is molded of a plastic material such as polyacetal for example. The movable support member 62 includes a resilient portion 62a having a thickness ranging from 0.5 to 1 mm for making the support member 62 springy so as to keep the follower roller 61 resilient against a projection 14. The other structural detail of Fig. 6 are the same as those of Fig. 5 and will not be described.

Fig. 7 illustrates an inked ribbon cassette according to a fifth embodiment of the present invention. The inked ribbon cassette of Fig. 7 is in fact a modification of the fourth embodiment. An ink replenisher 70 has a support member 71 attached to an end thereof such that the ink replenisher 70 is angularly movable about the support member 71 with respect to an inked ribbon casse tte : body. A spring 73 acts on the end of the ink replenisher 70 remote from the support member 71 for normally urging the ink replenisher 70 in a direction to press a follower roller 6 against a drive roller 5.

In the third through fifth embodiments, the thickness of the container of the ink replenisher can be identical to the thickness of the container of the inked ribbon cassette body, so that the ink replenisher is increased in size up to the thickness of the container of the inked ribbon cassette body. Therefore, the service life of the inked ribbon can be prolonged for allowing the inked ribbon cassette to be used for a longer period of time.

Since the ink replenisher is positioned out of the inked ribbon cassette body, it does not reduce the capacity of the inked ribbon storage space in the inked ribbon cassette body.

Although certian preferred embodiments have been shown and described, it should be understood that many changes and modifications may be made therein without departing from the scope of the appended claims.

CLAIMS

1. An inked ribbon cassette comprising an inked ribbon (2), a container having an inked ribbon storage space (3) in which said inked ribbon (2) is housed in a folded configuration, a drive roller (5) disposed in said container for circulating said ink ribbon (2), a follower roller (6; 61) held against said drive roller (5) for sandwiching said inked ribbon (2) therebetween, and an ink replenisher for supplying ink to said inked ribbon (2), characterized in that said ink replenisher (9; 51; 60; 70) is integral with and disposed out of said container, said ink replenisher (9; 51; 60; 70) sharing one wall with said container, and a projection (14) extends from said ink replenisher (9; 51; 60; 70) into contact with said follower roller (6; 61) for supplying ink from said ink replenisher (9; 51; 60; 70) through said follower roller (6; 61) to said inked ribbon (2).

2. An inked ribbon cassette according to claim 1, wherein said ink replenisher (9) is positioned on one side of said ink ribbon storage space (3) with respect to the direction in which said inked ribbon (2) is circulated.

3. An inked ribbon cassette according to claim 2, including a cover for said container, said ink replenisher (9) being integral with said cover.

4. An inked ribbon cassette according to claim 1, wherein said ink replenisher (51; 60; 70) has a width which is substantially the same as that of said container, and is disposed on an extension of said inked ribbon storage space (54).

5. An inked ribbon cassette according to claim 4, wherein said ink replenisher (60; 70) includes an integral member (62) on

which said follower roller (61) is supported.

6. An inked ribbon cassette according to claim 5, wherein said integral member (62) includes a resilient portion (62a).

7. An inked ribbon cassette according to claim 5, wherein said ink replenisher (70) has a support member (71) attached to one end thereof and pivotally connected to said container, and spring means (73) on an opposite end thereof for normally urging said ink replenisher (70) to move in a direction toward said container.

Fig. 1

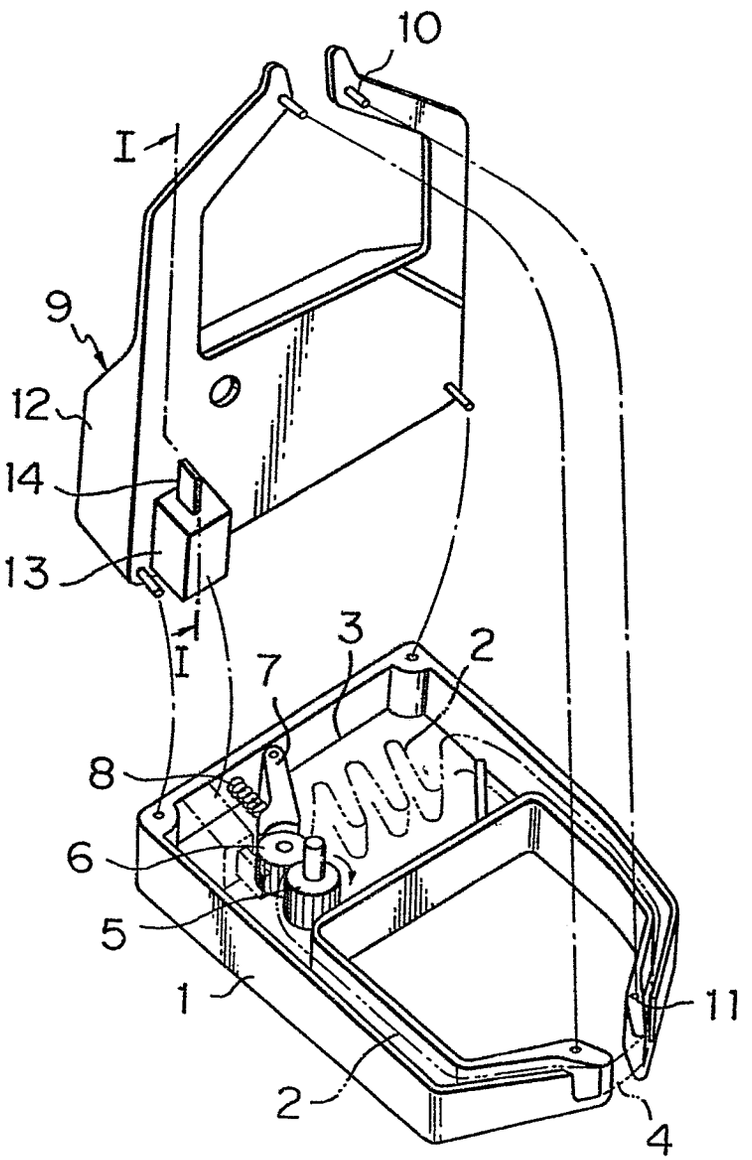

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Fig. 2

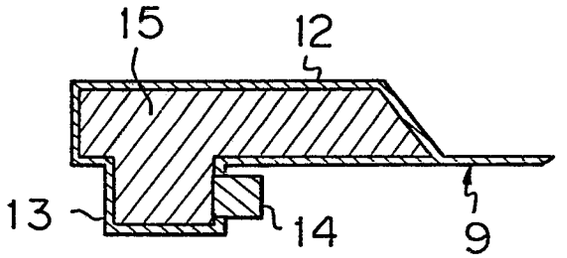

Fig. 3

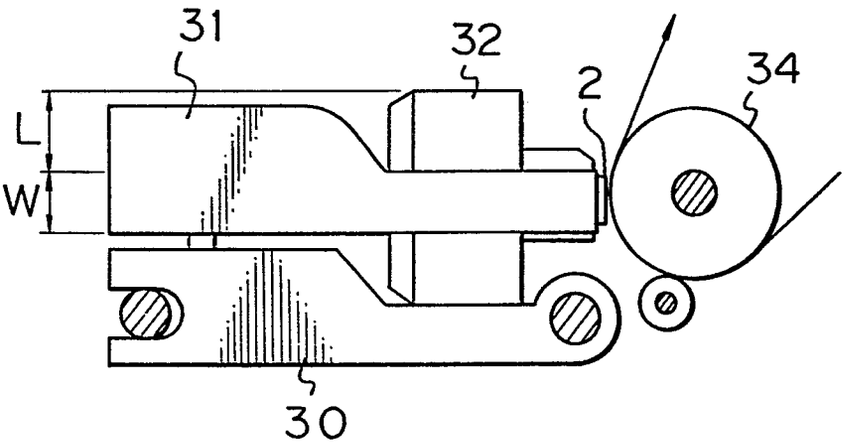

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Fig. 4

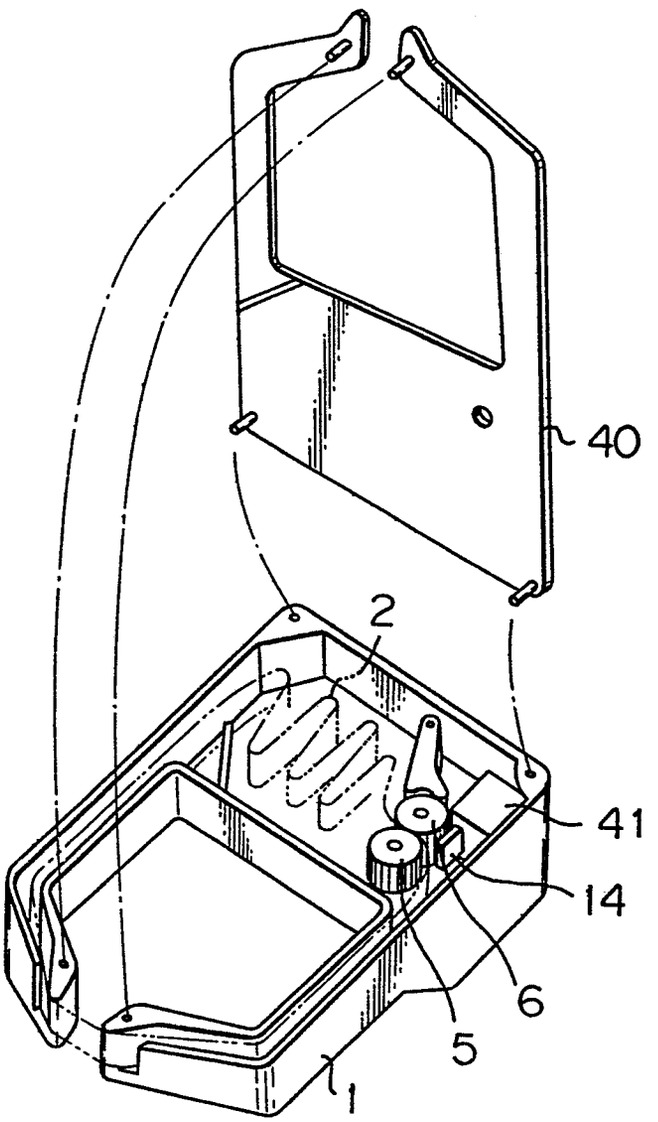

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Fig. 5

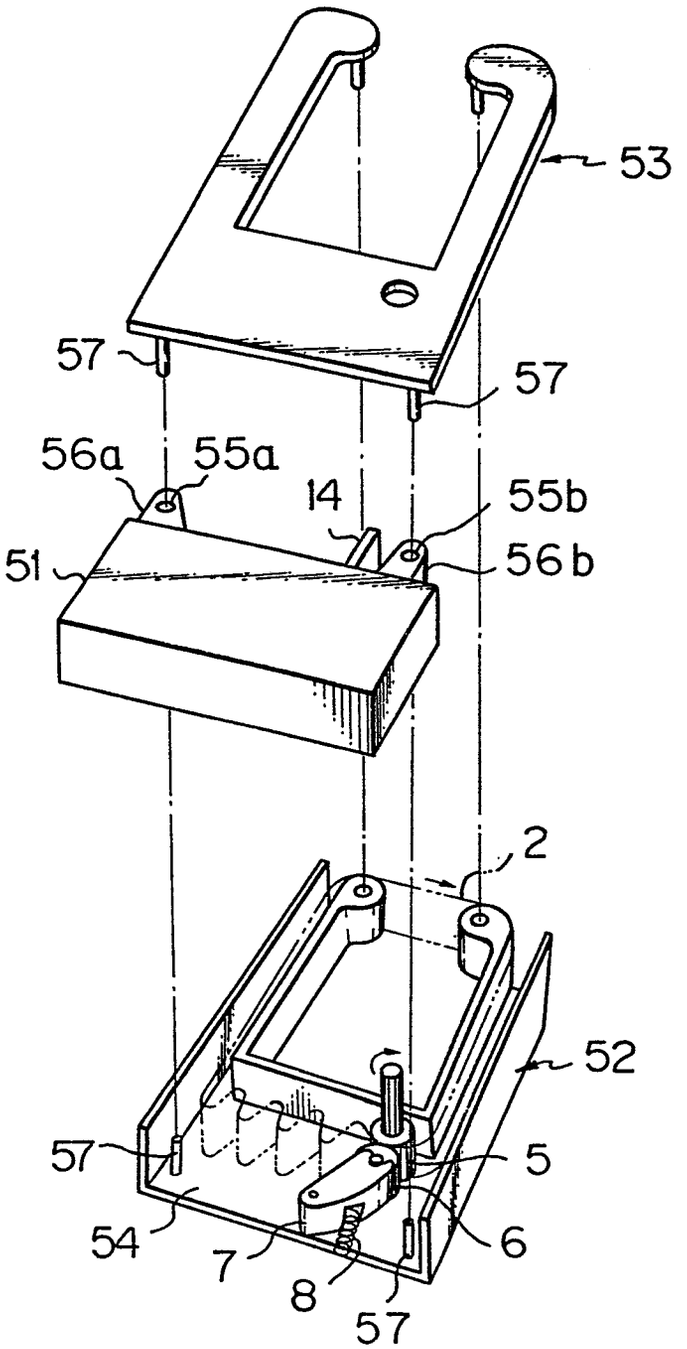

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Fig. 6

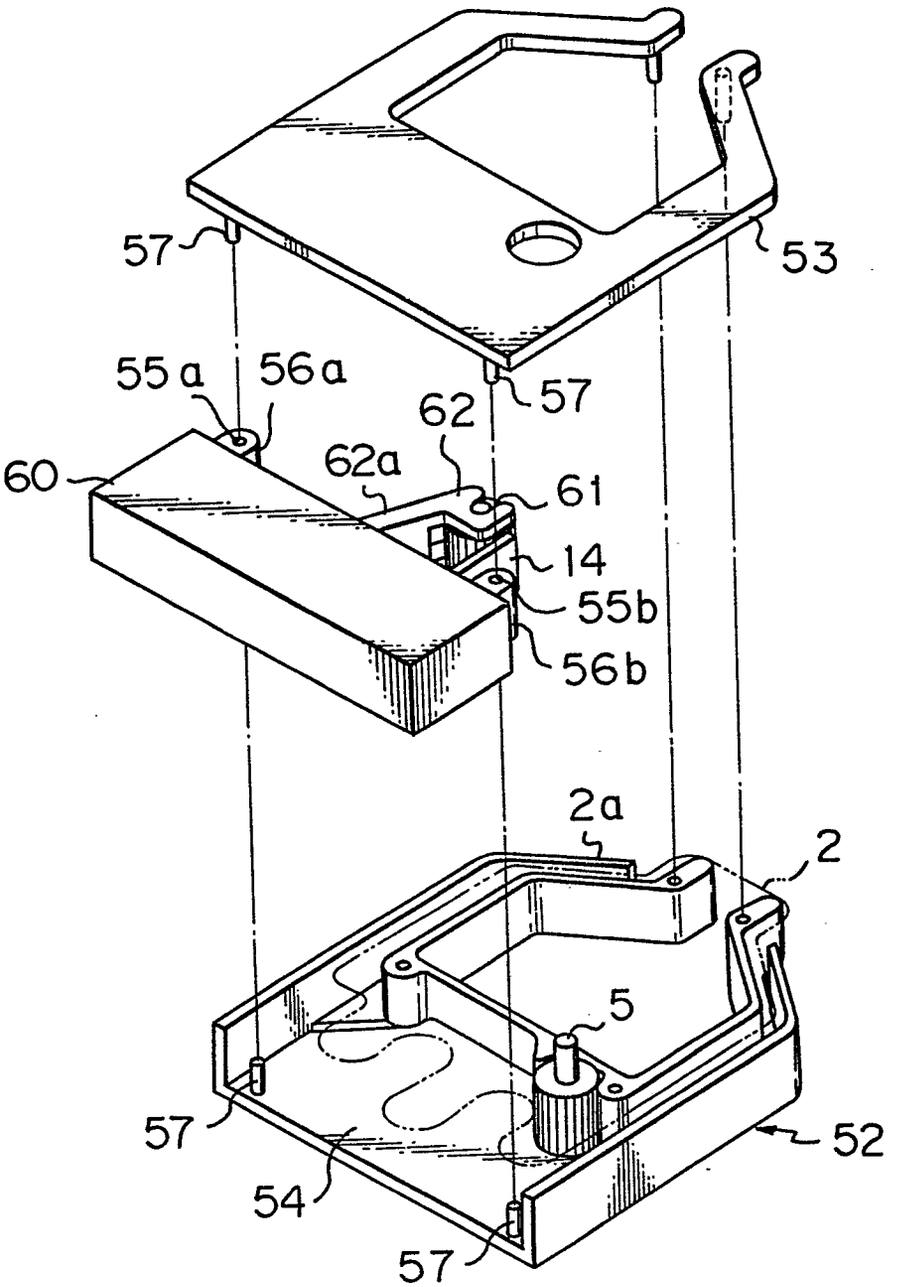
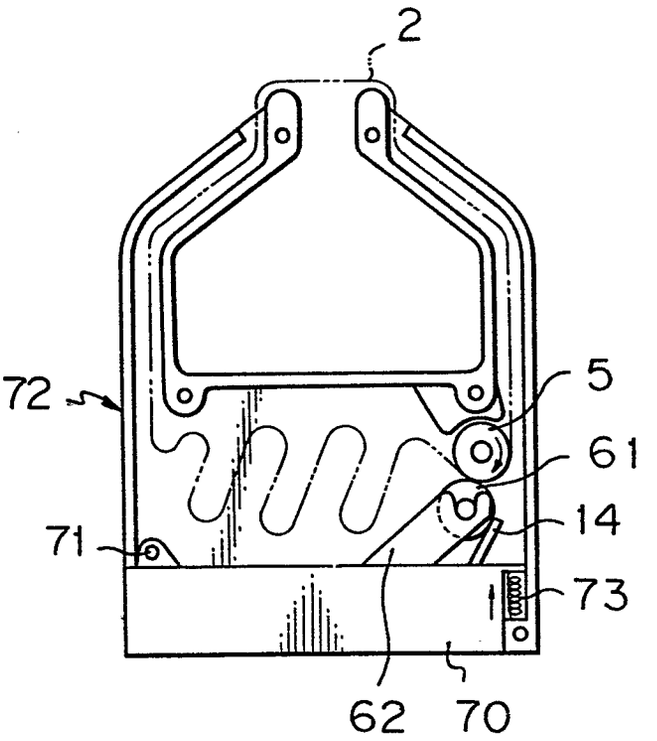


Fig. 7



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EUROPEAN SEARCH REPORT

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Application number

EP 85107531.7

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 4)
D,A	US - A - 4 153 378 (SCHERRER) * Fig. 5,8 * --	1,2,7	B 41 J 32/02
A	DE - A1 - 2 939 344 (HONEYWELL INFORMATION SYSTEMS) * Fig. 1-4 * ----	1,2	

TECHNICAL FIELDS SEARCHED (Int Cl 4)

B 41 J

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
VIENNA	25-09-1985	MEISTERLE

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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