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

(11) Publication number: **0 387 699 A1**

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **90104417.2**

(51) Int. Cl.5: **B41J 32/00**

(22) Date of filing: **08.03.90**

(30) Priority: **13.03.89 IT 1975089**

(43) Date of publication of application:
19.09.90 Bulletin 90/38

(84) Designated Contracting States:
DE ES FR GB SE

(71) Applicant: **LEPTONS ITALIA S.p.A.**
Viale Milanofiori A1F
I-20094 Assago (Milan)(IT)

(72) Inventor: **Lupoli, Franco**
Via Mangiagalli 7
I-20133 Milan(IT)

(74) Representative: **Dr. Ing. A. Racheli & C.**
Viale San Michele del Carso, 4
I-20144 Milano(IT)

(54) Cartridge of heat-sensitive material for thermal printers.

(57) A cartridge for a heat-sensitive material tape (17) for use on a thermal printer (1), comprising a reusable support consisting of two asymmetrical side plates (10, 11), connected to each other by spindles (12-15) forming guides for the tape (17), projecting rollers (18, 19) being mounted on the inner plate (10) of the cartridge, for loading and rewinding respectively of the heat-sensitive material (17), the cartridge bearing at least one hollow or solid spindle (15, 21) to accommodate or be accommodated in a corresponding projecting spindle (8, 7) mounted on a supporting side panel (3) of the printer (1).

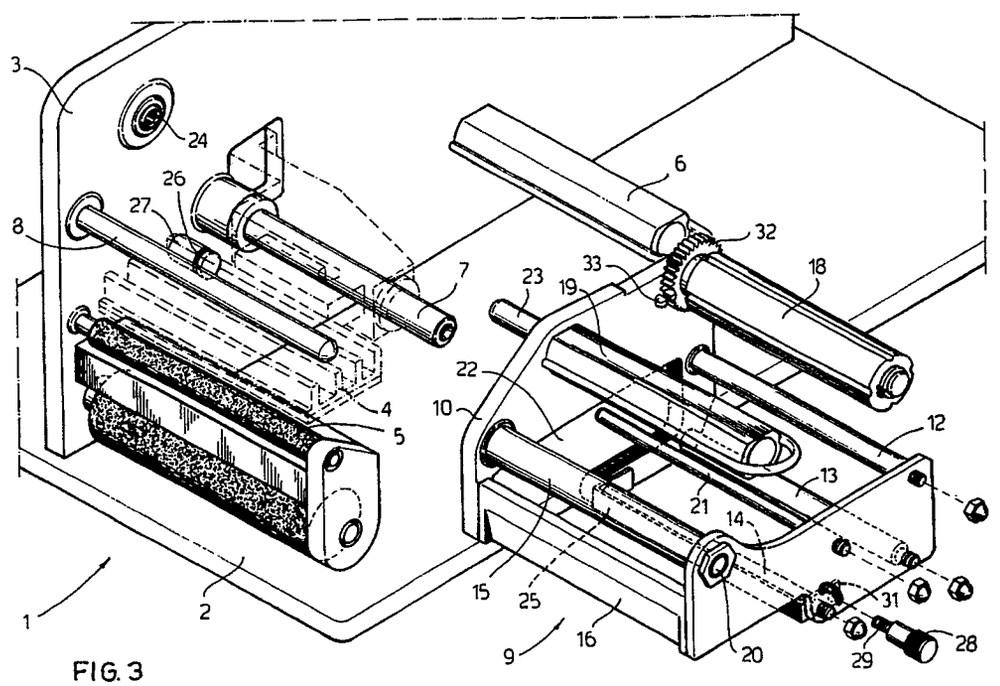

FIG. 3

EP 0 387 699 A1

The present invention concerns a cartridge for a heat-sensitive material tape for use on a thermal printer, particularly for printing labels.

Thermal printers of the above type use a heat-sensitive material tape, consisting of a plastic film with a coating of waxy ink which, following localized heating by a special thermal head, is transferred onto the material to be printed, generally a paper web.

The heat-sensitive material tape and the paper web are loaded into the machine as rolls, passed over a series of guide and/or tension rollers, and then rewound on respective rewinding rollers, the path of the tape and web being such that both pass between the thermal head and the corresponding print roller.

While loading of the paper web does not cause any particular problems, partly due to the fact that the paper has a certain degree of stiffness, loading of the heat-sensitive material tape proves somewhat laborious in that it consists of a very thin film and thus tends to crease when it is threaded through the various parts of the machine, for example between the thermal head and the print roller. Loading of the heat-sensitive tape is further complicated by the fact that since it has to be loaded directly on the machine, the operator has little room for maneuver.

Another problem related to loading of the heat-sensitive material tape directly on the machine arises when there is a change in production and printing has to be done on a paper web that is narrower than the heat-sensitive material tape already loaded on the machine. In these cases, it is extremely difficult, if not impossible, to replace the heat-sensitive material tape already in use, so it is left in place and this gives rise to an obvious waste, since this material is normally much more expensive than ordinary paper.

Although cartridges of heat-sensitive material to fit onto a thermal printer have already been proposed, they solve the problems described only in part, since they are laborious to mount and to fix. In addition, these cartridges are of the disposable type, thus further raising the cost of the heat-sensitive material tape, which is already high.

The aim of the invention is to eliminate the above problems by proposing a cartridge for heat-sensitive material tapes, characterized in that it has a reusable support.

This means that the tape can be loaded away from the machine, an operation which proves much simpler and more rapid.

Mounting of the cartridge and its exact positioning on the machine are ensured by suitable guide spindles. Means of fixing the cartridge onto the machine and stretching the heat-sensitive material tape in the working position are also provided.

In particular the cartridge consists of two asymmetric side plates connected to each other by shafts forming guide rollers for the tape, whereas the roller on which the heat-sensitive material tape is fitted and the rewinding roller are mounted to project from the inside plate of the cartridge.

Further characteristics of the invention will be made clearer by the detailed description that follows, which refers to an exemplary and therefore non-limiting embodiment, illustrated in the attached drawings, in which:

Figure 1 is an external side view of the cartridge, as it appears when mounted on the machine in a working position;

Figure 2 is a plan view from above of the cartridge in Figure 1, without the tape and with some parts in cross-section;

Figure 3 is an axonometric view of the cartridge according to the invention, shown during mounting on a thermal printer.

In Figure 3 part of a thermal printer is shown, designated as a whole by reference number 1, of the type using a heat-sensitive material tape for printing on a paper web not shown.

The printer 1 comprises a base 2 and a supporting side panel 3, on which projecting shafts are mounted to feed and guide the heat-sensitive material tape and the paper web. In particular, the paper web to be printed is loaded as a roll, passes over guides not shown, and is fed between a thermal head 4, indicated by the dashed and dotted line in Figure 3, and a print roller 5, normally motor-driven, then rewound onto a rewinding roller 6, also motor-driven.

According to the embodiment shown in Figure 3, the head 4 pivots around a hollow spindle 7 and can be raised from the roller 5 by means disposed on the rear of the side panel 3. The hollow spindle 7, together with another spindle 8 provided on the front of the side panel 3, also serves as a guide for insertion of the cartridge according to the invention, which will now be described.

The cartridge for the heat-sensitive material tape, indicated as a whole by reference number 9, comprises two asymmetric side plates 10 and 11, connected to each other by spindles 12, 13, 14 and 15 and by a chanfered front wall 16, forming guides for the heat-sensitive material tape, indicated by reference number 17, which is loaded as a roll onto a roller 18 projecting from the inside wall 10, and rewound onto a rewinding roller 19, also projecting from the wall 10.

The outer side plate 11 is lower than the inner plate 10, so as to permit axial insertion on the roller 18 and removal from the roller 19 of rolls of heat-sensitive material 17.

The guide roller 15 provided in the front part of the cartridge 9 has an internal through hole 20, so

that it can accommodate the spindle 8 mounted on the side 3 of the machine. On the outer plate 11 of the cartridge 9 a spindle 21 is also mounted, projecting and facing towards the opposite plate 10, designed to be accommodated in the hollow spindle 7 mounted on the side 3 of the printer.

A window 22 is provided in the inner plate 10 of the cartridge 9 through which the hollow spindle 7 and the whole head assembly 4, shown by broken lines in Figure 3, can pass.

Mounting of the cartridge 9 on the printer 1 is achieved by aligning spindles 15 and 21 respectively with spindles 8 and 7 and pushing the cartridge so that the spindles 8 and 21 enter spindles 15 and 7 respectively. With this operation, a central shaft 23 of the rewinding roller 19, protruding from the inner wall 10 of the cartridge, fits into a motor-driven floating coupling 24, provided in the side 3 of the printer. The coupling 24 is designed to be floating to simplify insertion of the shaft 23 and to compensate for any slight shifts out of axis of the latter.

The cartridge is fixed by means of a small bracket 25 that can be brought to engage with a circular groove 26 of a pin 27 fixed to the side 3 of the machine. The bracket 25 is pivoted to the guide spindle 14 and can be turned through about 90° by means of a knob 28, the threaded shank of which passes through a slot 30 with a circular section made in the outer plate 11 of the cartridge 9 and screws into the outer arm 31 of the bracket 25. In the attached figures the bracket 25 is shown in the cartridge locking position. In this position the bracket 25 also serves to stretch the tape 17, particularly the section of tape between the bracket and the chamfered wall 16, which falls between the head 4 and the print roller 5. When the cartridge 9 has to be removed, it is sufficient to loosen the knob 28 and slide it into the highest part of the slot 30, so that the bracket 25 is disengaged from the groove 26 of the pin 27, and at the same time the band 17 is slackened.

Means are also provided for locking the loading roller 18 of the roll of heat-sensitive material 17 when the cartridge is not mounted on the machine. These means, according to the embodiment shown in the attached figures, consist of a cogged pinion 32 provided at the base of the loading roller 18, which is engaged and thus locked by a tooth 33 of a pawl 34 which crosses the inner plate 10 of the cartridge and can move only axially against a return spring 35. When the cartridge 9 is mounted on the machine, the pawl 34 comes to rest against the side 3, compressing the spring 35 and moving away the tooth 33 of the pinion 32.

Claims

1. A cartridge for a heat-sensitive material tape for use on a thermal printer (1), characterized in that it has a reusable support.

2. A cartridge according to claim 1, characterized in that it has at least one hollow or solid spindle (15, 21) to accommodate or be accommodated in a corresponding spindle (8, 7) mounted in cantilever fashion on a side panel (3) of the printer (1), means being provided to lock the cartridge during operation and to stretch the heat-sensitive material tape (17).

3. A cartridge according to claim 1 or 2, characterized in that it has two asymmetric side plates (10, 11) connected by spindles (12-15), forming guides for the heat-sensitive material tape (17), projecting rollers (18, 19) being mounted on the inner plate (10) for loading and rewinding of the tape (17).

4. A cartridge according to claim 3, wherein the outer plate (11) is lower than the inner plate (10), the latter being provided with a window (22) through which the assembly comprising the thermal head (4) can pass.

5. A cartridge according to any one of claims 1 to 4, characterized in that centrally to the rewinding roller (19) a shaft (23) protruding from the inner plate (10) is designed to be inserted in a motor-driven floating coupling (24) provided on the side panel (3) of the printer.

6. A cartridge according to claim 2, wherein said locking means consist of a bracket (25) that can engage in a groove (26) of a pivot (27) fixed to the side panel (3) of the printer.

7. A cartridge according to claim 6, characterized in that said bracket (25) also serves to stretch the heat-sensitive material tape (17) and can be operated by an external knob (28).

8. A cartridge according to any one of the preceding claims, characterized in that it provides means (32-35) for locking the loading roller (18) of the tape when the cartridge is not being used.

9. A cartridge according to claim 8, wherein said locking means consist of cogged pinion (32) at the base of the roller (18) which, under the action of a spring (35), engages at least one tooth (33) of a pawl (34) which crosses the inner plate (10) of the cartridge.

10. A thermal printer, of the type using a heat-sensitive material tape (17) to print on any support, for example a paper web, characterized in that said heat-sensitive material tape (17) is loaded in a cartridge according to any one of claims 1 to 9.

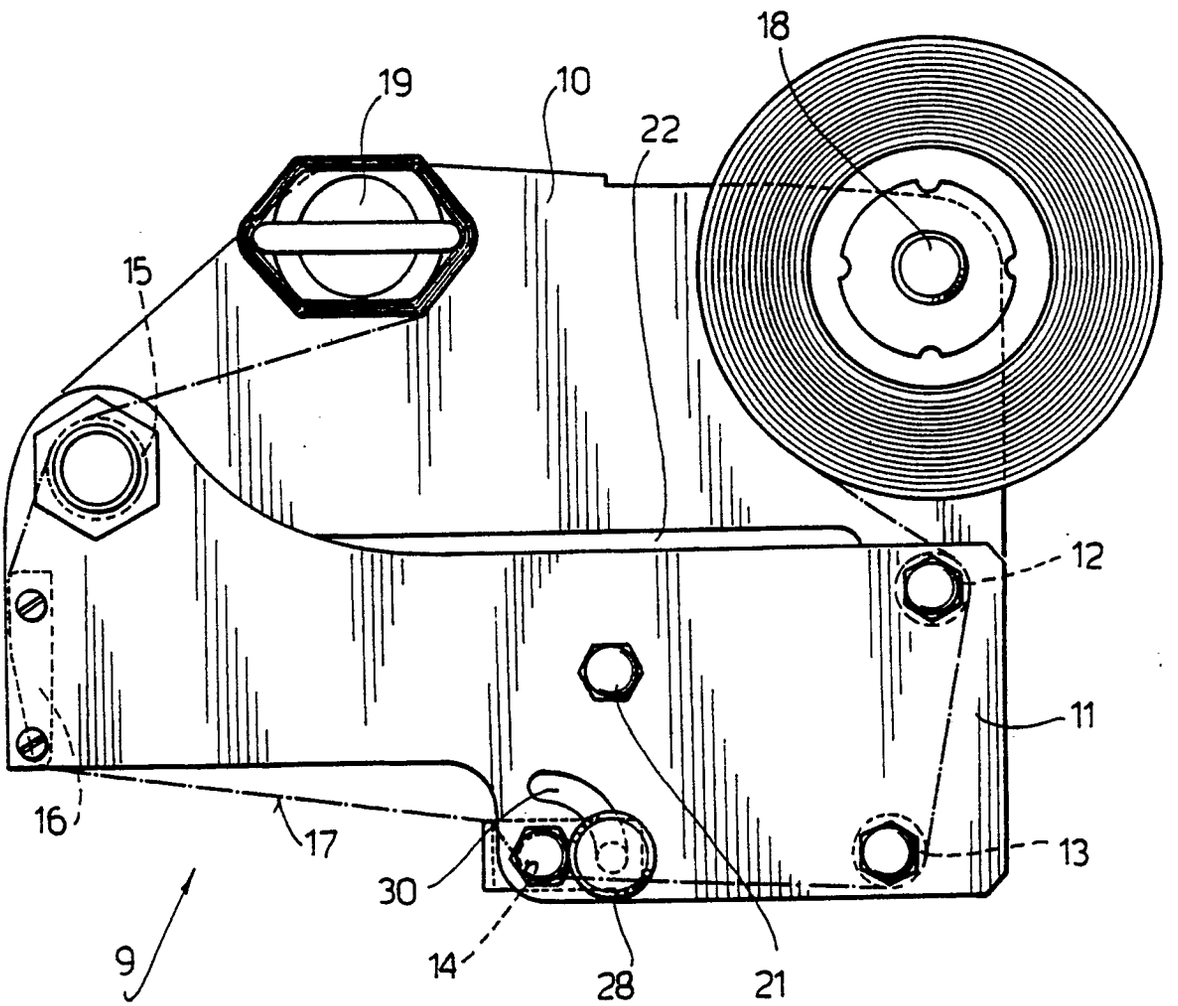

FIG. 1

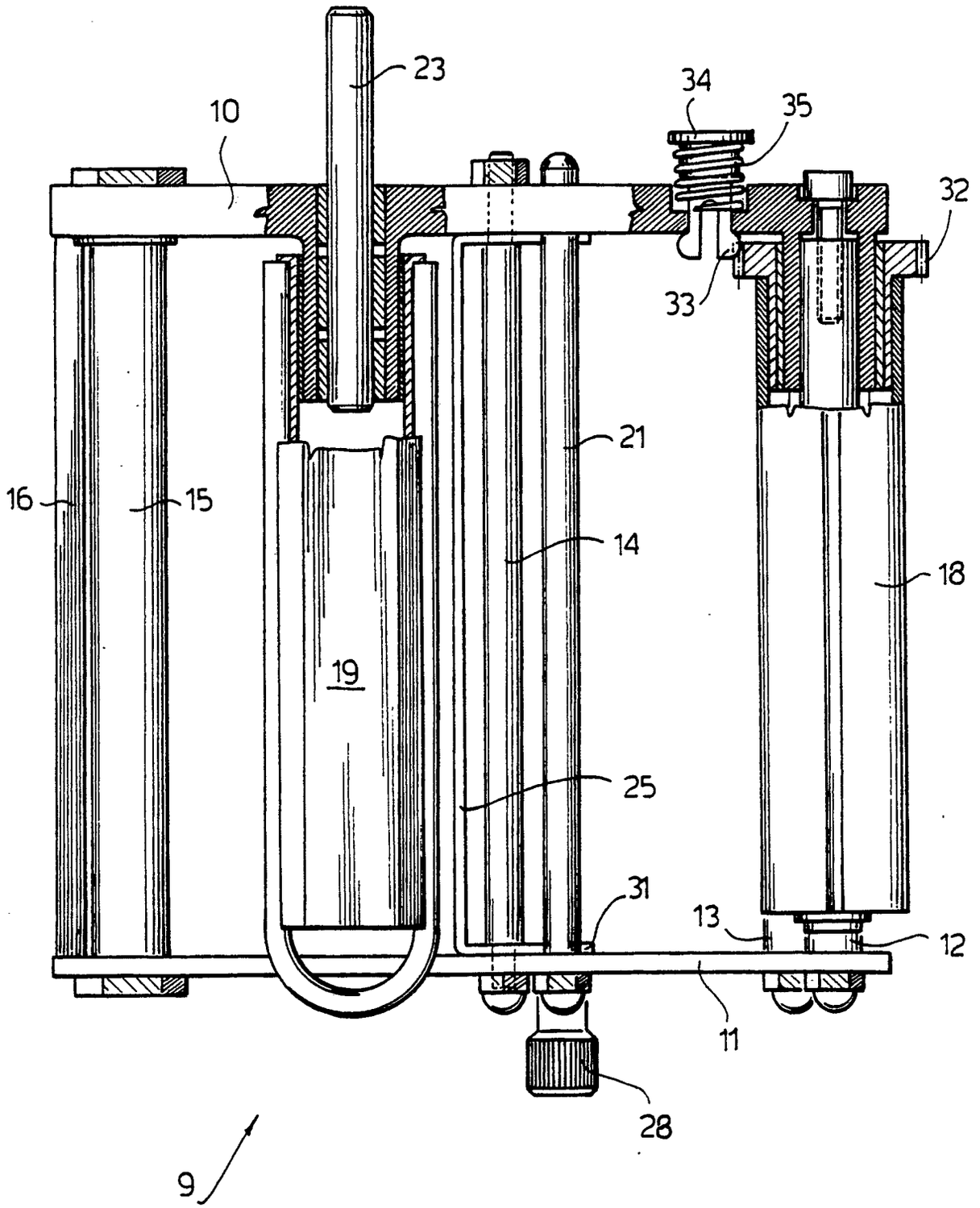

FIG. 2

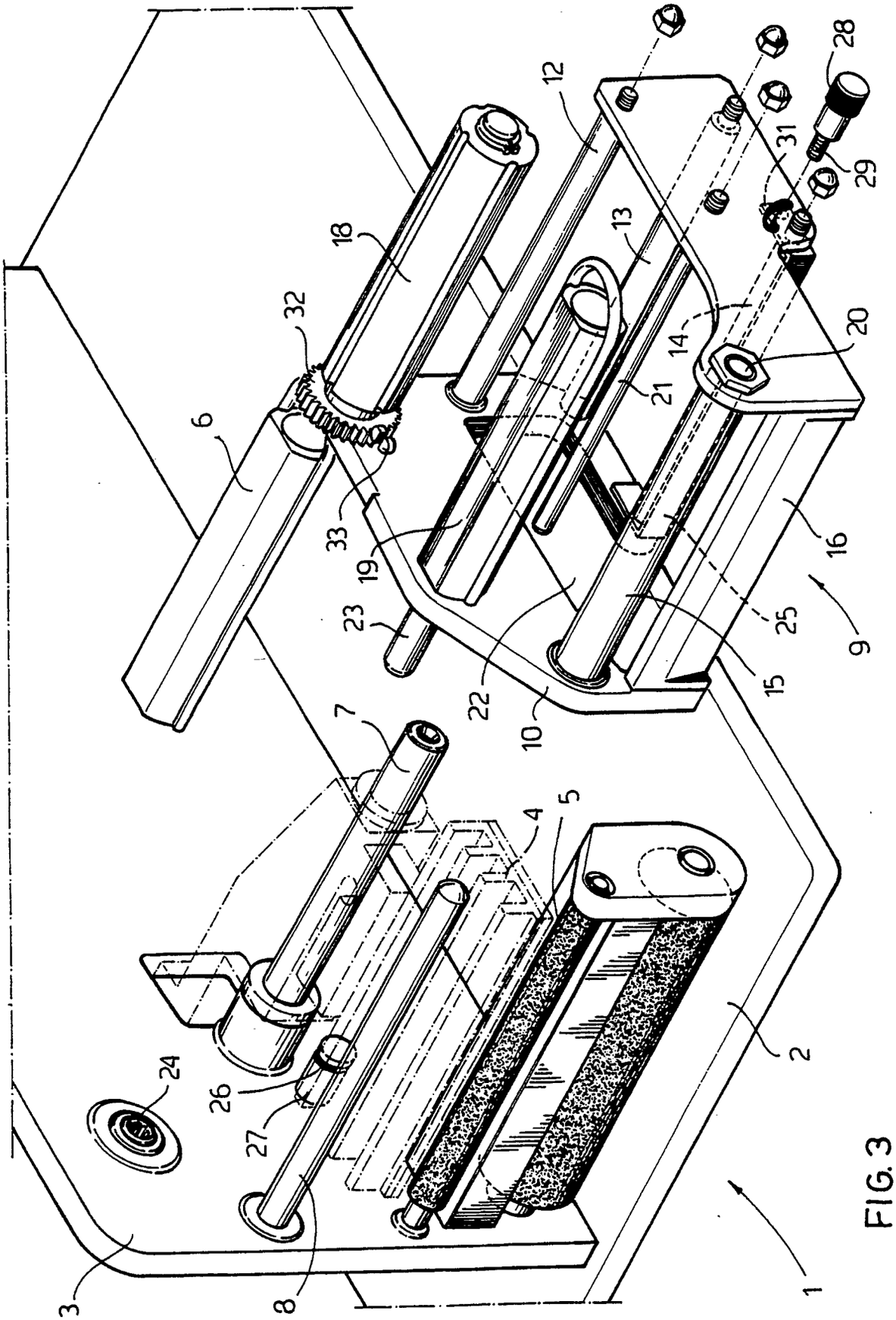
1
2
3
4
5
6
7
8
9
10
12
13
14
15
16
18
19
20
21
22
23
24
25
26
27
28
29
31
32
33

FIG. 3

European Patent Office

EUROPEAN SEARCH REPORT

Application number

EP 90104417.2

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.5)
X	US - A - 4 673 304 (LIU et al.) * Fig. 2; abstract *	1	B 41 J 32/00
A		2,4,5, 10	
A	US - A - 4 676 678 (WATANABE) * Fig. 2; abstract *	2-5	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

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	19-06-1990	MEISTERLE

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

EPO Form 1503 03 82