

(19)



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

**EP 0 766 858 B1**

(12)

**EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention  
of the grant of the patent:  
**30.09.1998 Bulletin 1998/40**

(51) Int Cl.<sup>6</sup>: **G07B 1/00**, G07B 11/00,  
B41J 3/28

(21) Application number: **95916835.2**

(86) International application number:  
**PCT/IT95/00055**

(22) Date of filing: **13.04.1995**

(87) International publication number:  
**WO 95/28689 (26.10.1995 Gazette 1995/46)**

(54) **PRINTER FOR TYPING DESIRED CHARACTERS ON MANUALLY ENTERED DOCUMENTS,  
SUCH AS TRAVEL AND TRANSPORT DOCUMENTS, INVOICES, ETC., WHILE IN MOVEMENT**

DRUCKER ZUM DRUCKEN VON GEWÜNSCHTEN ZEICHEN AUF MANUELL EINGEFÜHRTE  
DOKUMENTE, WIE REISE- UND TRANSPORTDOKUMENTE, RECHNUNGEN ODER DRGL.,  
UNTER BEWEGUNG DER DOKUMENTE

IMPRIMANTE SERVANT A IMPRIMER DES CARACTERES APPROPRIES SUR DES DOCUMENTS  
EN MOUVEMENT INTRODUIITS MANUELLEMENT, PAR EXEMPLE DES DOCUMENTS DE  
VOYAGE, DES TITRES DE TRANSPORT, DES FACTURES, ETC.

(84) Designated Contracting States:  
**AT CH DE ES FR IT LI**

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(30) Priority: **15.04.1994 IT FI940066**

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(43) Date of publication of application:  
**09.04.1997 Bulletin 1997/15**

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• **PATENT ABSTRACTS OF JAPAN, vol. 18 no. 189**  
**(P-1721), 31 March 1994 & JP-A-53 046932**  
**(HITACHI LTD), 27 December 1993**

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## Description

### Field of the invention

The present invention relates to the field of printers and more precisely to a printer for typing desired characters on manually entered documents such as travel and transport documents, invoices, etc., while in movement.

### Description of the prior art

Various types of printers exist for carrying out the function of printing desired characters on manually entered documents. There are, in fact, stamping and cancelling machines which are designed so that the document is entered into a slot and, once it reaches the correct position for printing, a punch blocks it in order to allow a printing head to operate. Upon completion of printing, the punch releases the document so that it can be extracted.

An essential characteristic of this type of printer is that the document is held still during printing since it is the printing head which shall move.

Making the printing head moveable involves the incorporation of suitable means to move the head in correlation to the characters which are progressively typed on the document. These means, of various types not described in detail inasmuch as they are well-known, are sufficiently reliable and precise. However, they involve a greater complexity of the printers suited to these objectives.

Another inconvenience of printers of this type is that while a very short time is sufficient for printing, a much longer time is normally needed for entering and extracting the document. In fact, the document is entered in a direction orthogonal to the line of characters to be printed and, therefore, it is necessary for the user to slide the document through the opening of the slot, enter it all the way, realize that the printing has taken place and extract the document. In situations such as the cancelling of tickets aboard a bus or at a train station, queues often form of people who, at the same time, wish to have their tickets cancelled. The seconds of waiting which pass between the extraction of one ticket and the entry of the next determine whether or not a queue will be formed. Notwithstanding the fact that the majority of people carrying out this operation do so on a daily basis, queues form all the same.

In order to avoid insofar as possible the formation of queues, in the similar field of magnetic cards, scanners have been created which provide for the entry of the card in a slot which runs longitudinally to the advancement of the person holding the card as he walks. The card is slid along the slot while a magnetic scanner contemporaneously reads the data encoded on it.

Means for detecting the speed of advancement of the card are unnecessary since the scanner is able to

read the data as long as the speed of advancement remains within a certain, sufficiently broad interval.

An existing printer, as described in EP 252575 A1, is capable of printing desired characters on a web of tickets on both sides. It comprises fixed printing heads and an optical sensor that indicates the speed and position of individual tickets in the web. The web is cut or torn into tickets in a second moment, after the printing. However, neither the documents can be separated before printing, nor can be manually entered one at a time.

Another printer, described in EP 0249212 A2 can be hand held and can print desired characters on a fixed paper surface. It has a printing head integral to the body of the printer and has an encoder associated with a roller signalling to a control system its position or its speed.

As regards printers of the above-mentioned type, on the other hand, none is known in which the printing of the line of characters occurs on separate documents in movement manually entered one at a time.

### Summary of the invention

The first object of the present invention is therefore to provide a printer for typing desired characters on manually entered documents held by a user and which need to be printed while in movement one at a time.

The second object of the present invention is to provide a printer for typing desired characters on manually entered documents which does not require means for moving the printing head and which, therefore, is less complex and expensive than the currently existing printers of the same type.

The third object of the present invention is to provide a printer for typing desired characters on manually entered, moving documents which is also able to considerably reduce the waiting time for users.

These objects are accomplished by the printer according to the present invention the novel feature of which is that the printing head is associated with a decoder for detecting the speed of advancement of the document with respect to the head, the document when manually passed being able to advance in a direction parallel to at least one line of characters printed by the printing head in correlation to the speed of advancement.

Preferably, the printing head does not move with respect to a printer support. The decoder is advantageously a roller connected to an encoder and rolling on the document, an element for pressing the document against the decoder and the printing head being provided to facilitate the rolling of the roller and allow for printing.

A slot into which the document is to be entered is advantageously defined by the pressing element and the support on which the printing head and the decoder are mounted.

According to a particularly preferred embodiment of the invention, the slot runs parallel to the direction of

advancement of a person carrying the document so that said person, without stopping, is able to advance the document by partially entering it in the slot and sliding it as he walks to accomplish the printing.

In order to check the presence, correct positioning and direction of advancement of the document, sensor means are provided which are connected, along with the decoder, to electronic means for the control of the printing head, which can be, for example, of an ink jet, thermal or needle type.

#### Brief description of the drawings

Further characteristics and advantages of the printer according to the present invention will become apparent in the description which follows of one of its possible embodiments given as an example and not limitative, with reference to the attached drawings in which:

- figure 1 shows a schematic longitudinal sectional view of a printer according to the present invention;
- figure 2 shows a partially sectioned perspective view of the printer of figure 1;
- figure 3 shows a top plan view of the support of the printer of figure 1;
- figure 4 shows a view similar to that of figure 3 of a different embodiment of the support of the printer shown in figure 1;
- figure 5 shows a block diagram of the functional connections of the printing head, sensor means and decoder with means of electronic control;
- figure 6 shows a flow chart of the program means loaded on a microprocessor comprised in the means of electronic control;
- figure 7 shows a block diagram similar to the one in figure 5 for a needle type printing head.

#### Description of the preferred embodiment

With reference to figure 1, a printer according to the invention for typing desired characters on manually entered documents in movement comprises a support 1 for a printing head 2, for example of the ink jet, thermal or needle type. On the support 1, a sensor 3, to signal the presence of a document 4, and a decoder 5, suited to roll on document 4 as it passes through a slot 6 defined by support 1 and a pressure plate 7 which faces support 1, are also provided. Plate 7 is resiliently connected to a fixed support 9 by means of springs 8 which press it with a pre-established force against support 1 so that document 4, when passing in slot 6, is in contact both with decoder 5 and head 2.

The pressure just described can be exercised, instead of by plate 7, by other pressure means such as dragging rollers, which are also resiliently suspended.

A preferred embodiment of the printer according to the present invention is shown in figure 2. Upon passage of document 4 in slot 6 by a user who holds the docu-

ment in his hand as he passes it through the slot, printing head 2, although fixed in place, prints a line 10 of characters on the face 4a of the document. The printing occurs in correlation to the speed at which document 4 advances in the direction of the arrow F since decoder 5, associated with printing head 2, has already detected the speed. Document 4 advances in a direction parallel to the line of printed characters 10.

According to the embodiment illustrated in figures 1 and 2, it is, therefore, possible for the user to accomplish the printing of line 10 by proceeding in a direction parallel to the direction of printing without stopping, keeping the document 4 in hand and sliding it in slot 6 in the direction of arrow F. This solution is particularly advantageous because it makes it possible to accomplish also the third object of the invention, i.e. the considerable reduction of time spent waiting for the printing on documents.

The second object of the invention is also accomplished since the printing head does not move with respect to a printer support and the user himself produces the relevant movement between the document and the head to allow for printing. The absence of means for moving the printing head, which are present in all the other known printers of this type, allows for a considerable simplification of the design.

A further advantage is the possibility of introducing document 4 in either of the two opposite directions of slot 6, using a single encoder able to distinguish the direction of advancement of the document.

Although reference has been made to a printer with slot 6 for the entry of document 4 parallel to the direction of advancement of the user, the invention can be applied also to traditional stamping and cancelling machines, with the entry and extraction of the document occurring through the same single slot. As shown in figure 4, with respect to the position described above and illustrated in figure 3, support 1 can be configured with printing head 2 and decoder 5 located side by side, with the addition of a further sensor 12 to the already provided sensor 3. In fact first sensor 12, upon detecting document 4, activates printing head 2, while second sensor 3 signals the end of the advancement of the document.

This solution, with respect to the previous one, even if it does not provide the advantage of eliminating the entry and extraction time, still has the advantage of not needing the motorization of the printing head 2 which does not have to move since the movement relative to the document is provided by the document itself, with correlated printing made possible by decoder 5 as illustrated above.

As described above, in order to check the presence, the correct positioning and the direction of advancement of the document, sensor means are provided connected, along with the decoder, to electronic means of control of the printing head, which can be, for example, of an ink jet, thermal or needle type.

In more detail, as shown in figure 5, decoder 5 and

sensor 3 are connected to microprocessor control means 13. The control means command printing head 2 which can be, for example, of an ink jet or thermal type, by means of an appropriate driver 14 on the basis of the signal coming from sensor 3 through an amplifier 15 as well as on the basis of signals coming from decoder 5 through a decoder 16 of the direction of the movement of document 4. Control means 13 are able to operate on the basis of program means loaded in a memory 17.

These program means operate, for example, according to the logic of the flow chart illustrated in figure 6. As already mentioned, the printing head 2 can be, for example, of an ink jet, thermal or needle type. In the last of these cases, the printing head, while not having to move, must comprise sliding means for an ink ribbon. Therefore, in the case of a needle printing head, the block diagram of figure 5 will be modified as indicated in figure 7, with the addition of a cartridge 18 connected to control means 13 by a driver 19 of a known type.

While up to this point reference has been made to a printer with a single printing head able to print only a single line of characters, the possibility of needing to print more than one parallel line on the same document can not be excluded. This need can be met by the present invention by using, for example, more than one printing head in parallel or a single printing head able to print more than one parallel line contemporaneously.

#### Claims

1. Printer for typing desired characters (10) on manually entered documents (4) held by a user and which need to be printed one at a time, comprising a printing head (2) mounted on a support (1) on which said documents (4) are manually passed, characterized in that said printing head (2) is associated with a decoder (5) of the sliding speed with respect to the printing head (2) of the document (4) while in movement, said document (4) when manually passed advancing in a direction (F) parallel to at least one line of characters (10) to be printed on the document (4) itself in correlation to said sliding speed.
2. Printer according to claim 1, wherein said printing head (2) does not move with respect to said support (1).
3. Printer according to claims 1 or 2, wherein said decoder is a roller (5) rolling on the document and connected to an encoder (16).
4. Printer according to any of the preceding claims, wherein a pressure element (7) is provided to press the document (4) against the decoder (5) and the printing head (2) which are integral to said support (1) thereby facilitating the functioning of the decoder (5) and allowing for printing.

5. Printer according to claim 4, wherein said pressure element (7) and said support (1) define a slot (6) for the insertion of said document (4).

6. Printer according to claim 5, wherein said slot (6) is formed parallel to the direction (F) of advancement of a person carrying said document (4), so that said person, without stopping, can enter it partially in the slot (6) making it slide in order to cause the printing (10).

7. Printer according to any of the previous claims, wherein sensor means (3) of the presence of said document (4) are provided which are connected, along with said decoder, to electronic means (13) of control of the printing head (2).

8. Printer according to any of the claims 1 to 7, wherein said printing head is of a needle type, with an ink ribbon provided to move in correspondence with it.

9. Printer according to claims 1 to 7, wherein said printing head is of an ink jet type.

10. Printer according to claims 1 to 7, wherein said printing head is of a thermal type.

#### Patentansprüche

1. Drucker zum Drucken von gewünschten Zeichen (10) auf manuell eingeführte Dokumente (4), die durch einen Benutzer gehalten werden und die einzeln bedruckt werden müssen, mit einem Druckkopf (2), der auf einem Gestell (1) montiert ist, auf dem die Dokumente (4) manuell vorbeigeführt werden, **dadurch gekennzeichnet**, daß dem Druckkopf (2) ein Decoder (5) für die Gleitgeschwindigkeit des Dokuments in Bezug auf den Druckkopf während der Bewegung zugeordnet ist, und daß das Dokument (4), wenn es manuell vorbeigeführt wird, sich in einer Richtung (F) parallel zu zumindest einer Linie von auf das Dokument (4) zu druckenden Zeichen (10) korrelierend zur Gleitgeschwindigkeit voranbewegt.
2. Drucker nach Anspruch 1, **dadurch gekennzeichnet**, daß der Druckkopf (2) sich in bezug auf das Gestell (1) nicht bewegt.
3. Drucker nach Anspruch 1 oder 2, **dadurch gekennzeichnet**, daß der Decoder als Rolle (5), die auf dem Dokument (4) entlangrollt, ausgebildet und mit einem Encoder (16) verbunden ist.
4. Drucker nach einem der voranstehenden Ansprüche, **dadurch gekennzeichnet**, daß ein Andrückelement (7) zum Andrücken des Dokuments (4)

gegen den Decoder (5) und den Druckkopf (2), die in das Gestell (1) integriert sind, vorgesehen ist, damit das Funktionieren des Decoders (5) erleichtert und das Drucken ermöglicht wird.

5. Drucker nach Anspruch 4, **dadurch gekennzeichnet**, daß das Andrückelement (7) und das Gestell (1) einen Schlitz (6) zum Einführen des Dokumentes (4) ausbilden.
6. Drucker nach Anspruch 5, **dadurch gekennzeichnet**, daß der Schlitz (6) parallel zu der Richtung (F) der Fortbewegung einer Person, die das Dokument (4) trägt, ausgebildet ist, so daß die Person es, ohne anzuhalten, teilweise in den Schlitz (6) mit einer Gleitbewegung einführen kann, um das Bedrucken zu veranlassen.
7. Drucker nach einem der voranstehenden Ansprüche, **dadurch gekennzeichnet**, daß Sensoreinrichtungen (3) für das Vorhandensein des Dokuments (4) vorgesehen sind, die, zusammen mit dem Decoder, mit elektronischen Steuermitteln (13) des Druckkopfes (2) verbunden sind.
8. Drucker nach mindestens einem der Ansprüche 1 bis 7, **dadurch gekennzeichnet**, daß der Druckkopf ein Nadeldruckkopf ist, mit einem Farbband, daß sich in Übereinstimmung zu ihm bewegt.
9. Drucker nach mindestens einem der Ansprüche 1 bis 7, **dadurch gekennzeichnet**, daß der Druckkopf ein Tintenstrahldruckkopf ist.
10. Drucker nach mindestens einem der Ansprüche 1 bis 7, **dadurch gekennzeichnet**, daß der Druckkopf ein Thermodruckkopf ist.

#### Revendications

1. Imprimante permettant d'écrire des caractères (10) déterminés sur des documents (4) introduits manuellement tenus par un usager et qui nécessitent d'être imprimés un à un, comprenant une tête d'impression (2) montée sur un support (1) sur lequel lesdits documents (4) sont passés manuellement, **caractérisée en ce que** ladite tête d'impression (2) est associée à un décodeur (5) de la vitesse de glissement en rapport à la tête d'impression (2) du document (4) pendant que ce dernier est en mouvement, ledit document (4) lorsqu'il est passé manuellement avançant dans une direction (F) parallèle à au moins une ligne de caractères (10) devant être imprimés sur le document (4) lui-même en corrélation avec ladite vitesse de glissement.
2. Imprimante selon la revendication 1, dans laquelle

ladite tête d'impression (2) ne se déplace pas par rapport au dit support (1).

3. Imprimante selon la revendication 1 ou 2, dans laquelle ledit décodeur est un rouleau (5) roulant sur le document et connecté à un codeur (16).
4. Imprimante selon l'une quelconque des revendications précédentes, dans laquelle un élément de pression (7) est prévu pour presser le document (4) contre le décodeur (5) et la tête d'impression (2) qui font corps avec ledit support (1) facilitant de ce fait le fonctionnement du décodeur (5) et permettant l'impression.
5. Imprimante selon la revendication 4, dans laquelle ledit élément de pression (7) et ledit support (1) définissent une fente (6) pour l'insertion dudit document (4).
6. Imprimante selon la revendication 5, dans laquelle ladite fente (6) est parallèle à la direction (F) d'avancement d'une personne portant ledit document (4), de façon que ladite personne, sans s'arrêter, puisse insérer le document partiellement dans la fente (6) le faisant glisser dans le but de provoquer l'impression (10).
7. Imprimante selon l'une quelconque des revendications précédentes, dans laquelle sont prévus des moyens de détection (3) de la présence dudit document (4) qui sont connectés, avec ledit décodeur, à des moyens électroniques (13) de commande de la tête d'impression (2).
8. Imprimante selon l'une quelconque des revendications 1 à 7, dans laquelle ladite tête d'impression est d'un type à aiguilles, avec un ruban-encreur prévu pour se déplacer en correspondance avec elle.
9. Imprimante selon les revendications 1 à 7, dans laquelle ladite tête d'impression est d'un type à jet d'encre.
10. Imprimante selon les revendications 1 à 7, dans laquelle ladite tête d'impression est d'un type thermique.

Fig. 1

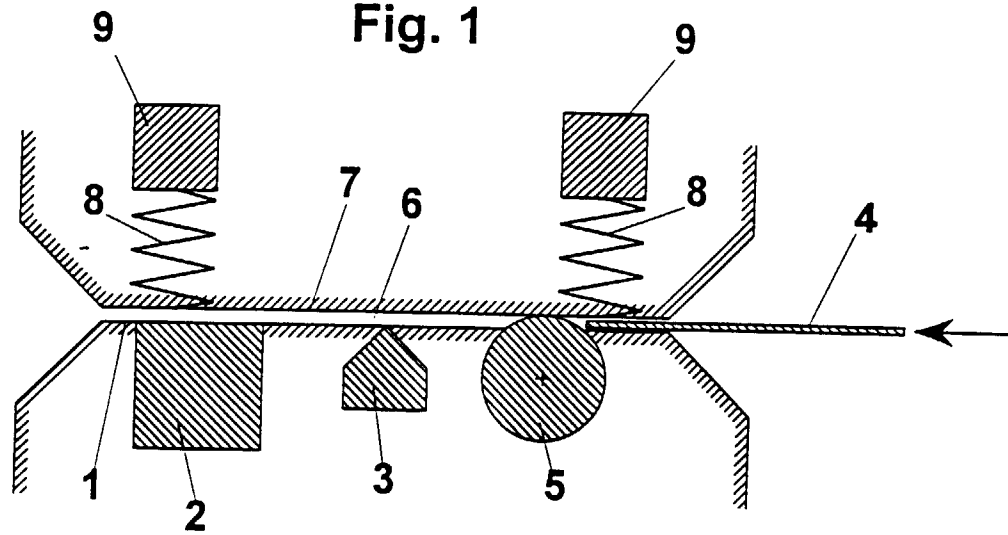
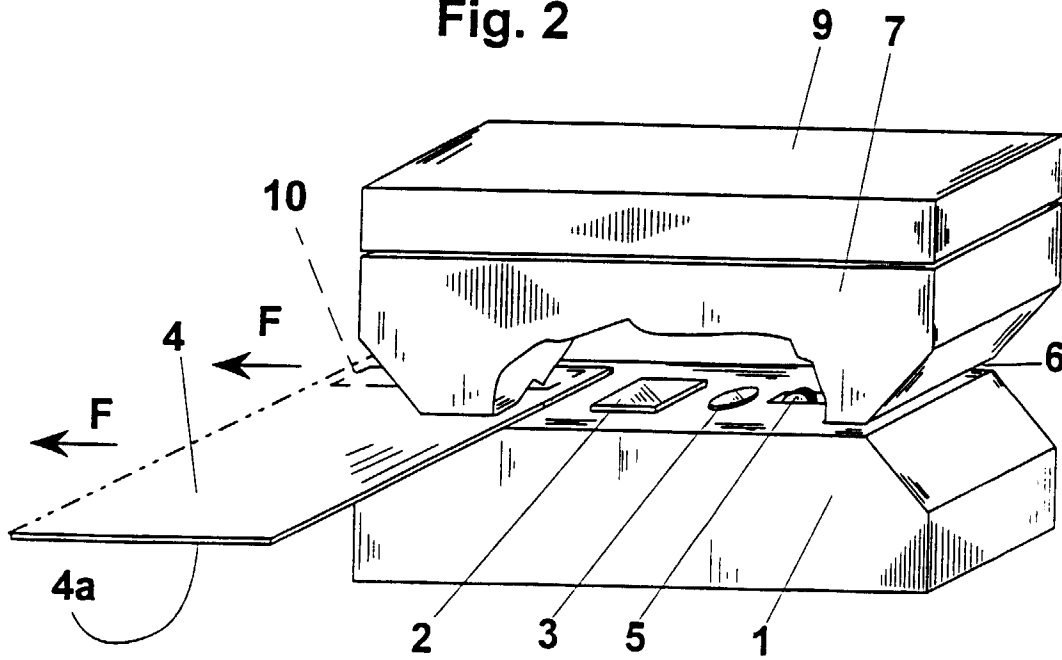
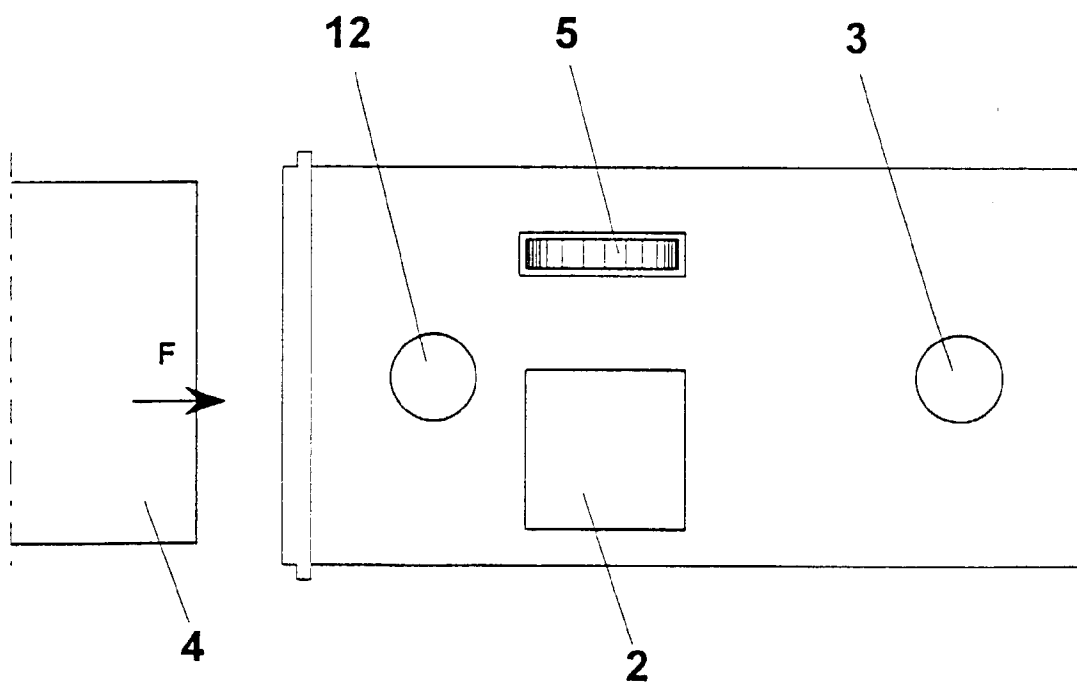
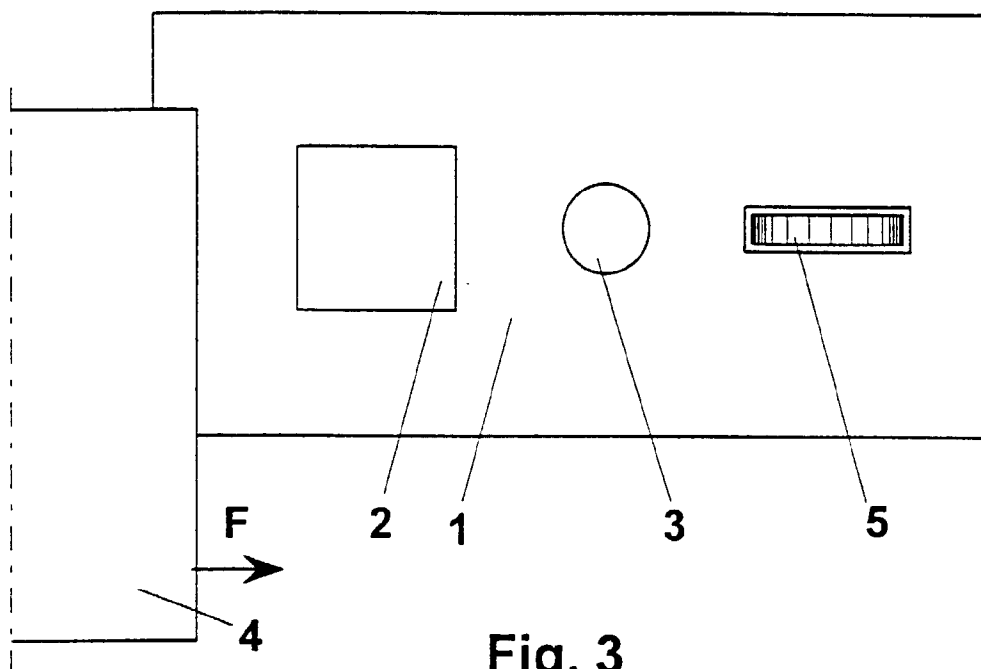
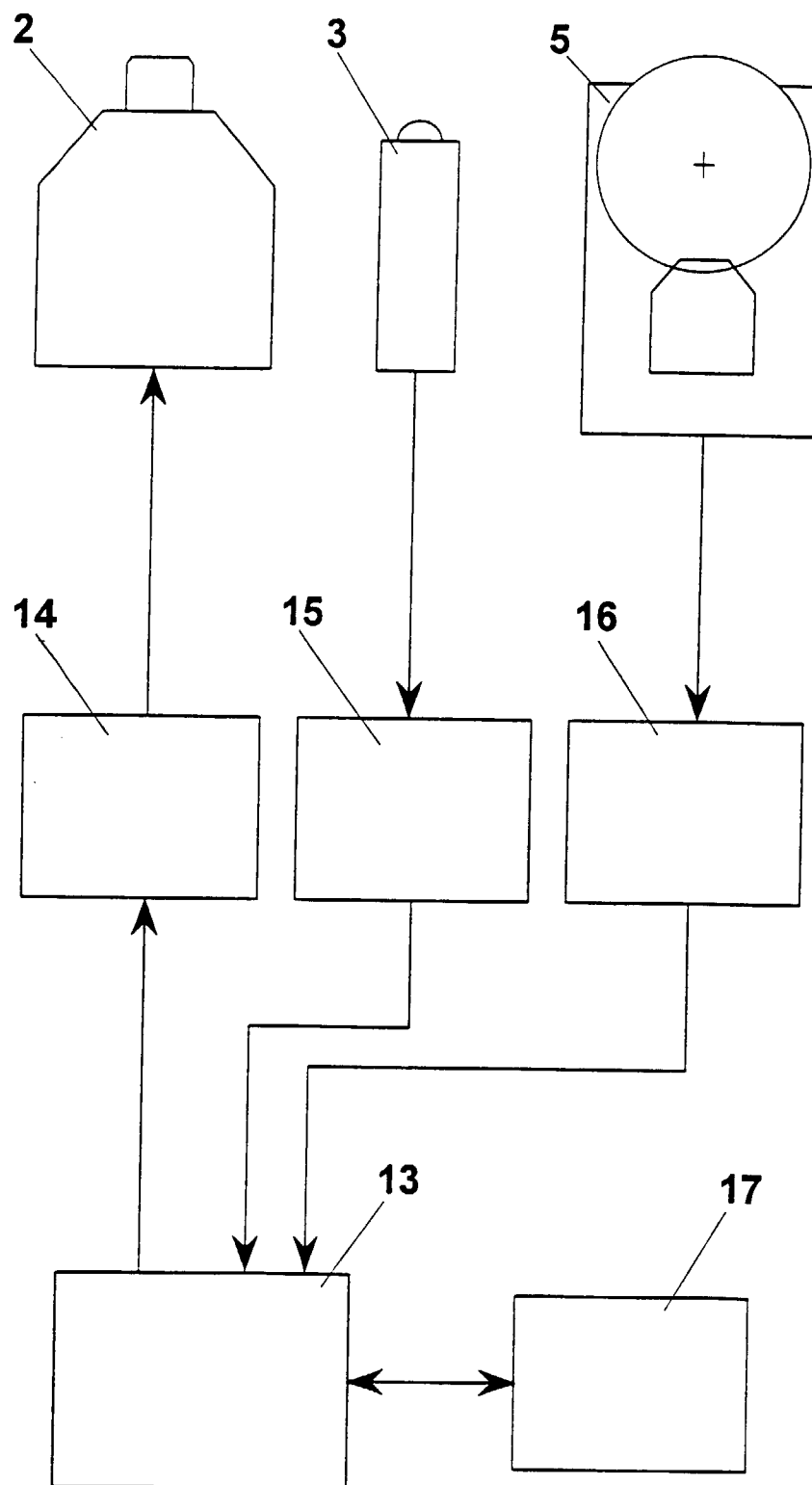


Fig. 2



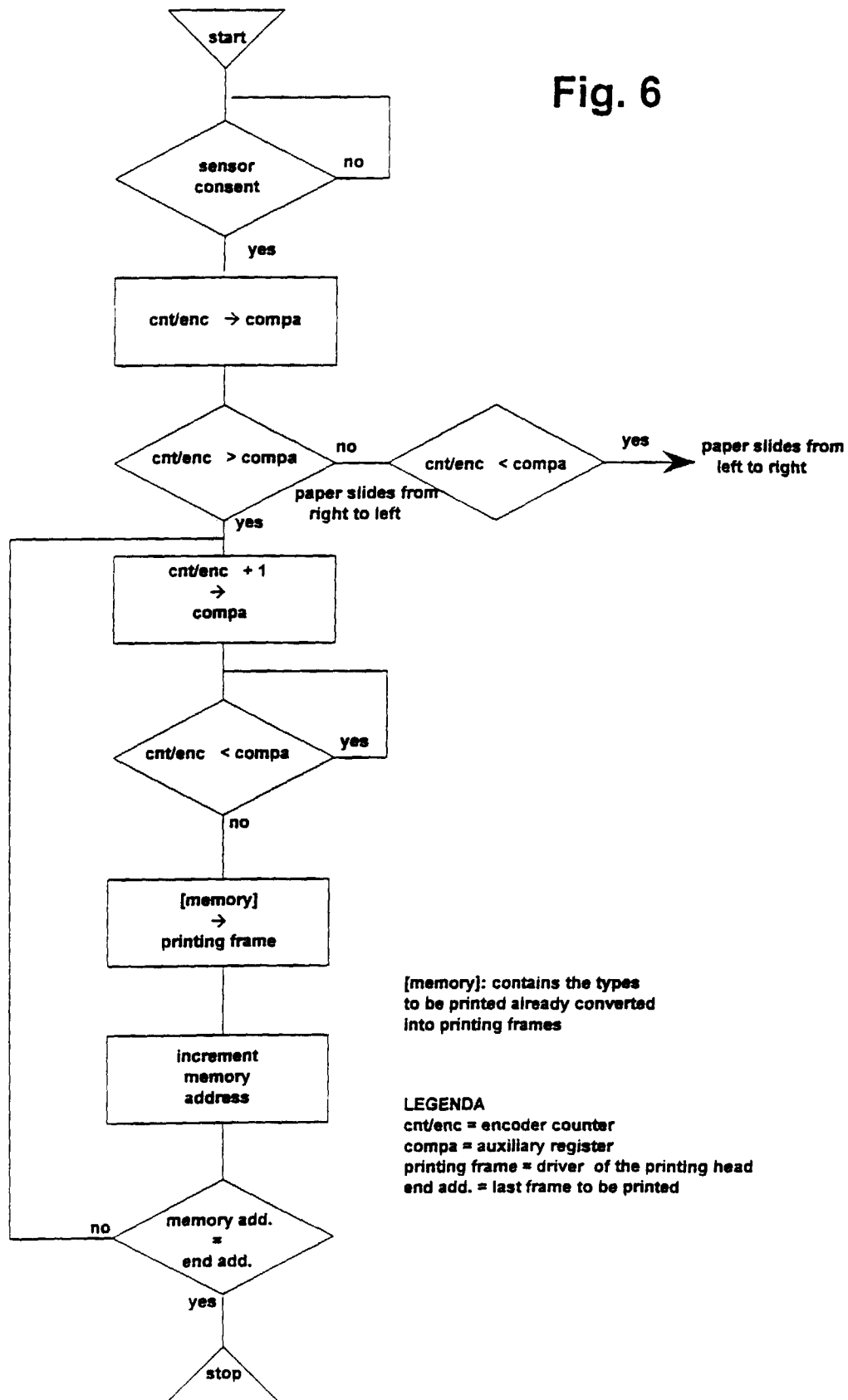




**Fig. 5**



Fig. 6



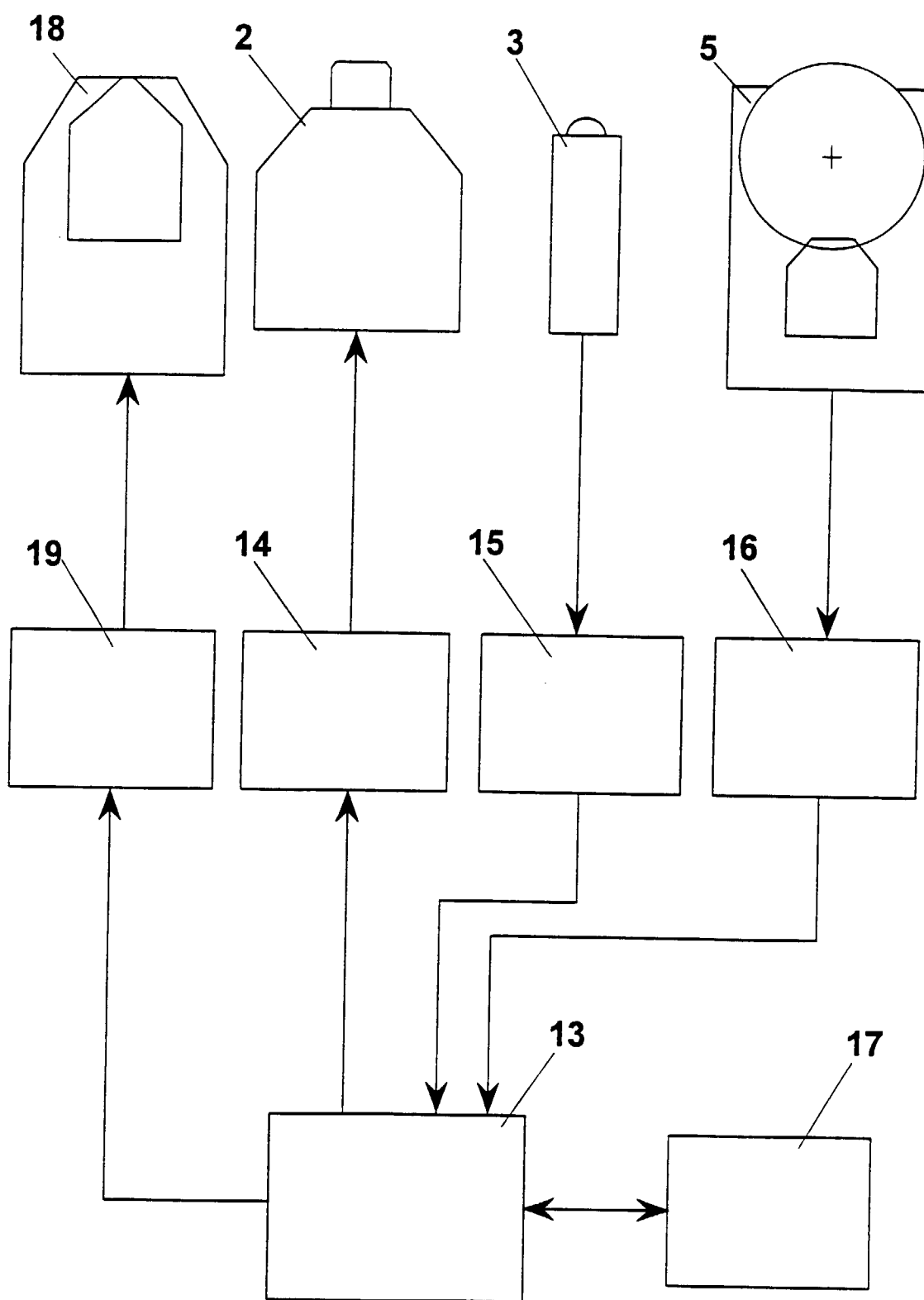


Fig. 7