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(54) An apparatus for recording of information on an information strip.

(57) An apparatus for recording of information on an information strip in which the information strip is cut by means of a strip cutter to separate information documents from the strip and feed out these documents. The invention enables the obtaining of an apparatus which is compact and which may feed out information documents of short document length. This is obtained by an arrangement of a number of

displaceable guide plates which during the feeding forward of the information strip are distributed along the width of the information strip, while they during the cutting of the strip temporarily are displaceable to an end position outside one side edge of the information strip.

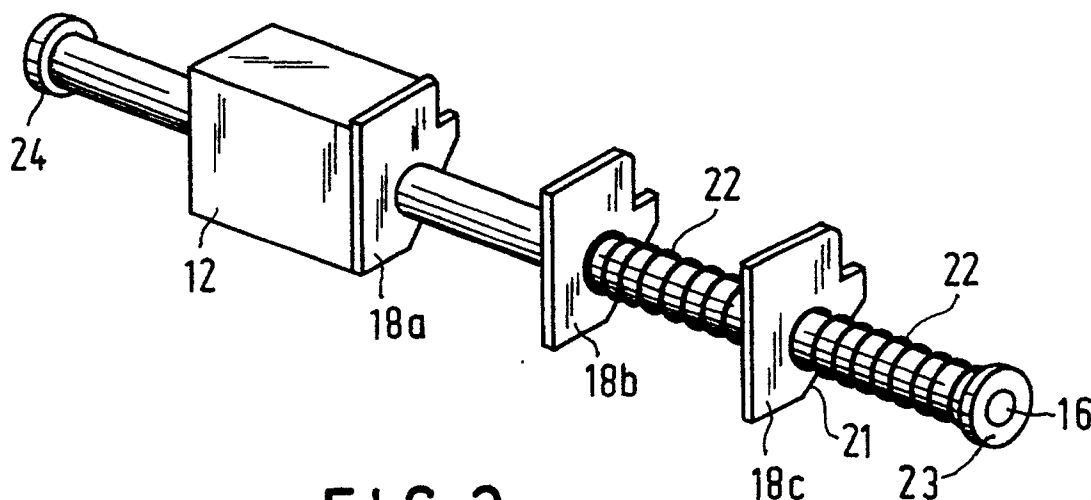


FIG. 2

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AN APPARATUS FOR RECORDING OF INFORMATION ON AN INFORMATION STRIP.

The present invention relates to an apparatus for recording of information on an information strip, for example, a paper strip, comprising a strip feeder for feeding of the information strip through the apparatus, a head transportable in a direction across the transport direction of the information strip for recording information, guiding means for guiding of the information strip, a strip cutter for cutting off the information strip to separate an information document.

Apparatuses of the above kind are commercially used inter alia as printers. For certain types of information strips the feeding of the strip and the feeding-out of information documents cut from the strip in connection thereto operates satisfying in the known apparatuses. For example, a paper strip being unwound from a roll does not cause any great problems. The somewhat bent paper strip is easy to guide towards the feeding-out opening of the strip again when an information document has been cut off. However, problems easily arise, for example, when feeding-out information documents cut off from strips which for use are kept stored folded in a flat bundle. In order to reduce the feeding-out problem the slot-shaped feeding-out opening of the apparatus may be enlarged. Such a solution is not desirable due to several reasons. An enlargement of the slot-shaped feeding-out opening results in that noise from the interior of the apparatus to a higher extent escapes and disturbs the surrounding, which is quite unacceptable. A narrow slot is also desirable from protection point of view due to the fact that less dust may enter the apparatus and that the interior of the apparatus is protected against touch. Accordingly, the proposed solution having an enlarged feeding-out opening is not attractive. Another conceivable possibility to increase the security in the feeding-out of the information documents might be to arrange fixedly mounted guide means close to the feeding-out opening. This renders the apparatus more space consuming and increases the shortest possible length of an information document cut off which is possible to feed out. For example in the case the information document fed out is intended to represent a ticket, it is of great interest to keep the document length in a shape rendering the ticket easy to handle. The proposed solution with fixedly mounted guiding means in the feeding-out opening does not fulfill the requirements imposed on the document length of the information document concerning the requirement that the information document should be easy to handle. In an apparatus known from U.S. patent 4,313,359, pivotable guide flaps are used for guiding the information strip

adjacent to the cutting line. The guide flaps and their support occupy a space which can not be used for cutting actions. Furthermore, no one of the proposed solutions gives the information strip any guiding in the space along which the strip cutter is transportable which might lead to disturbances in the feeding of the information strip.

It is an object of the invention to provide a compact apparatus which may feed out information documents having a short document length.

The object of the invention is obtained by means of an apparatus according to the first paragraph characterized in that the guiding means comprise a number of guide plates displaceably arranged along the transporting path of the strip cutter, the guide plates being distributed along the transporting path when the strip cutter is in its rest position, the guide plates during the activation of the strip cutter being transported to an end position outside one of the side edges of the information strip.

By arranging transportable guide plates along the transporting path of the strip cutter no additional space is required within the apparatus for the guide plates in the feeding-out direction of the information strip. The guide plates do not either require any essential space outside the one edge of the information strip, due to the fact that the guide plates may be pressed towards each other into a very compact unit. The space needed is commonly already available within the apparatus. The transportable guide plates ensure that the information strip is guided correctly even in the space along the transporting path of the strip cutter.

According to a favourable embodiment of the apparatus it is characterized in that the strip cutter during its activation in direct mechanical contact displaces the guide plates in front of itself to the end position. By using the movement of the strip cutter to transport the guide plates, no separate drive means are needed to transport the guide plates. The embodiment is component saving and accordingly advantageous in cost. Also a preferred embodiment of the apparatus in which the strip cutter is arranged displaceably on a rod and which apparatus is characterized in that the guide plates are displaceably supported by said rod, is component saving. This saving of components is obtained by the use of a common rod for the strip cutter and the guide plates.

According to a preferred embodiment springs arranged on the rod between the guide plates are used to distribute the guide plates. The springs distribute the guide plates along the transporting

path when the strip cutter is in its rest position at the same time as they admit the guide plates together with springs to be pressed together to a compact unit in the end position of the guide plates outside one edge of the information strip.

According to another favourable embodiment guide means are used in which at least one guide plate comprises a region of a magnetical material and the rest of the guide plates comprise a region attracted by the magnetical material to distribute the guide plates when the strip cutter is in its rest position.

Advantageously one of the guide plates may be fixed to the strip cutter and when using magnetical material in one or some of the guide plates to distribute the guide plates, the guide plate fixed to the strip cutter suitably comprises such a region of magnetical material.

The invention will below be described in more detail with reference to the drawings, in which

Figure 1 schematically shows a side view of an apparatus according to the invention,

Figure 2 shows a perspective view of some details included in the apparatus according to a first embodiment,

Figure 3 in perspective view,

Figure 3a in side view, and

Figures 3b and 3c show some details included in the apparatus according to a second embodiment.

The apparatus according to the invention is schematically shown in side view in Figure 1 having one of the side walls of the envelope removed. The essential means to understand the invention are shown within an envelope having the general reference numeral 1. The strip 3 is transported from a supply magazine 2, preferably in the shape of a folded stored information strip is led between two rolls 5 and 6 into the space between a feed roll 7 and a pressure roll 8. A drive motor, not shown, drives the feed roll 7 by means of which the information strip in cooperation with the feed roll and the pressure roll is fed forward or in some situations backward. The roll 5 lies with its relatively high weight against the roll 6 and is positioned by a second guiding 9. The feed roll 7 feeds the information strip 3 past a head 10 with an accompanying printing bar 11. The head is movable in a direction perpendicular to the plane of the drawing. When the information strip 3 has passed the head 10 it is brought past a strip cutter 12 in order to later on be fed out through a feeding-out opening 13. The strip cutter comprises a roll 14 provided a knife, the strip cutter of which is provided on a carriage is displaceable along a rod 16. A rail 17 is located opposite to the roll 14 provided with a knife. When the strip cutter 12 is activated the strip cutter is transported along the rod 16 at

the same time as the roll provided with a knife 14 runs against the edge 17 of the rail providing a cut of the information strip 3 for separation of an information document. On the rod 16 supporting the strip cutter 12, there are a number of guide plates 18 displaceable along the rod. Examples of the way of arranging the guide plates are shown and will be described with reference to Figures 2 and 3. The electronic of the apparatus is collected in an electronic unit 19 at the back part of the apparatus.

The feeding-out of an information document takes place according to the following. When the feed roll 7 has fed the information strip 3 to such a position that the location of the information strip 3 to be cut off lies right before the strip cutter 12, it is transported along the rod 16 from a position at one of the edges of the information strip 3 across the strip to a position outside the other side edge of the strip. During this transport the rod provided with a knife 14 runs along the rail 17 and carries out a cut of the strip 3 in cooperation with the rail 17. The information document cut off is put into the recess 20 included in the rail 17 waiting for an operator to lift away the information document. In order not to damage the front edge closest to the strip cutter of the information strip 3, the information strip is transported backwards a bit by means of a reversed driving of the feed roll. The strip cutter 12 now returns to its rest position by a translation along the rod 16. At the continued feeding a critical situation arises when the information strip is to be fed forward from the retracted position past the strip cutter and out through the feeding-out opening 13. Without special measures the front edge of the strip has difficulties to reach the desired feeding out opening. Great problems may inter alia arise when using information strips of folded type, in which the position of the cut region relative to the folds strongly influences the position reached by the front edge of the strip relative to the feeding-out opening.

In order to ensure that the front end of the strips reaches the feeding-out opening a number of guide plates 18 are arranged in connection to the rod 16 along which the strip cutter 12 is transportable. During the feeding forward of a strip, the guide plates occupy positions along the rod so that an inclined edge 21 of the guide plates 18 contributes to the guiding of the front edge of the information strip towards the feeding-out opening 13 in that case the front end has a tendency to deflect from the direction towards the feeding-out opening. The guide plates 18 are arranged to be displaced along the rod to a position outside the side edge of the strip 3 when the strip cutter 12 is transported transversely to the transport direction of the information carrier.

A first embodiment of displaceably arranged

guide plates 18 is shown schematically in Figure 2. According to this embodiment the strip cutter 12 together with a number of guide plates 18 are displaceably arranged on a rod 16. Furthermore, a number of helical springs 22 are present on the rod 16. The rod 16 is terminated in its ends by means of not in detail shown stops 23, 24. In the rest position the strip cutter 12 is in the position shown in the figure. In this position the springs are allowed to separate the guide plates 18 from each other and from the stop 23. Due to the fact that the guide plate 18a closest to the strip cutter is fixed directly on the same, there is no spring requirement between the two guide plates 18a, 18b situated closest to the strip cutter. When activating the strip cutter 12 the springs 22 are pressed together and displaced together with the guide plates 18 towards the stop 23 of the rod 16. In its most compressed position the guide plates 18 are transported to a position totally outside one of the side edges of the information strip. The strip cutter is again displaced towards the position shown in Figure 2 during the final phase of the activation of the strip cutter at the same time as the springs contribute to a redisplacement of the guide plates 18 to the positions shown in the figure in order to facilitate the forward feeding of the information strip towards the feeding-out opening.

A second embodiment of displaceably arranged guide plates 18 is shown in Figure 3. In this case the guide plate 18a which is fixed to the strip cutter is provided with a region of magnetical material 25, the other guide plates 18 comprising a region 26 each attracted by the magnetical material. When the strip cutter is activated, it is displaced along the rod 16 from the position shown in Figure 3a towards the end 23 of the rod 16. During this displacement the guide plates are displaced in front of the strip cutter towards the same end 23 of the rod 16. When the strip cutter 12 returns to the position shown in Figure 3a the guide plates follow the movement of the strip cutter at least a part of the distance along the rod as result of the magnetical coupling between the guide plates 18. By means of stop lugs 27 arranged on a rail 29 running parallel to the rod 16, the guide plates 18 are separated from the strip cutter one by one with the exception of the guide plate 18a situated closest to the strip cutter and fixed to the strip cutter. Each stop lug 27b, 27c are intended to engage with a respective guide plate 18b and 18c, respectively. According to the shown embodiment this is obtained in that the stop lugs have different lengths and the guide plates have recesses 28b, 28c of various widths. Accordingly the stop lug 27c admits the guide plate 18b to pass because the recess 28c has such large width that a section of the recess is situated right before the stop lug 27c.

The guide plate 18c is, however, stopped by the stop lug 27c because the recess 28c of the guide plate has such a small width that the stop lug 27c is situated beside of the recess of the guide plate. The guide plate 18b is stopped by the stop lug 27b because the stop lug 27b has a larger width than the stop lug 27c and the recess of the guide plate does not have sufficient depth to admit the guide plate 18b to pass stop lug 27b. Further not shown stop lugs may be arranged displaced relative to the recesses of the guide plate 50 that another section of the recesses may be utilized for the separation of the guide plates. Accordingly, by varying the dimensions and the position of the recesses of the guide plates as well as the length and position of the stop lugs, a great number of guide plates may be separated.

Figure 3b shows the guide plate 18b adjacent to the stop lug 27c, while Figure 3c shows the guide plate 18c adjacent to the same stop lug 27c. The stop lug 27c admits the guide plate 18b to pass, the guide plate 18c being stopped. This results in that the guide plate 18b may be admitted to follow the strip cutter 12 a bit further towards the rest position of the strip cutter than the guide plate 18c before stop lugs overcome the magnetical forces keeping the guide plates together.

The described apparatus is very suitable for use together with information strips of paper type for information recording by impact. However, the apparatus also may be used together with information strips of other types, for example, for optical recording or recording by means of an ink jet.

Claims

1. An apparatus for recording information on an information strip, comprising a strip feeder for feeding the information strip through the apparatus, a head transportable in a direction across the transport direction of the information strip for recording information, guiding means for guiding the information strip, a strip cutter for cutting off the information strip to separate an information document, characterized in that the guiding means comprise a number of guide plates displaceably arranged along the transporting path of the strip cutter, the guide plates being distributed along the transporting path when the strip cutter is in its rest position, the guide plates during the activation of the strip cutter being transported to an end position outside one of the side edges of the information strip.
2. An apparatus as claimed in claim 1, characterized in that the strip cutter when it is activated in direct mechanical contact displaces the guide plates in front of itself to the end position.
3. An apparatus according to any of the claims 1

and 2, in which the strip cutter is displaceably arranged on a rod, characterized in that the guide plates are displaceably supported by said rod.

4. An apparatus as claimed in claim 3, characterized in that springs are arranged on the rod between the guide plates.

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5. An apparatus as claimed in any of the claims 1-3, characterized in that at least one guide plate comprises a region of magnetical material and that the rest of the guide plates comprise a region attracted by the magnetical material.

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6. An apparatus as claimed in any of the preceding claims, characterized in that one of the guide plates is fixed to the strip cutter.

7. An apparatus as claimed in the claims 5 and 6, characterized in that the guide plate fixed to the strip cutter comprises said region of magnetical material.

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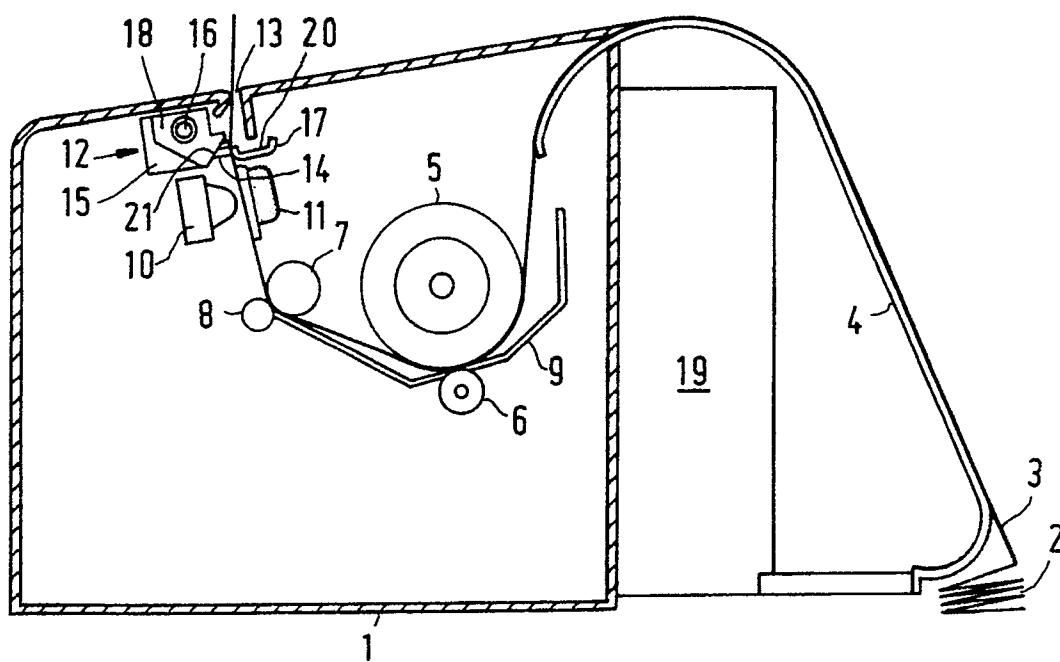


FIG. 1

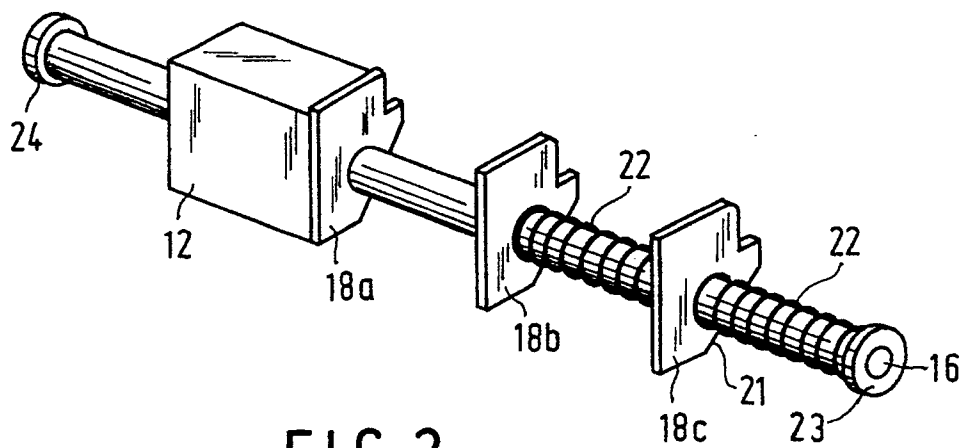


FIG. 2

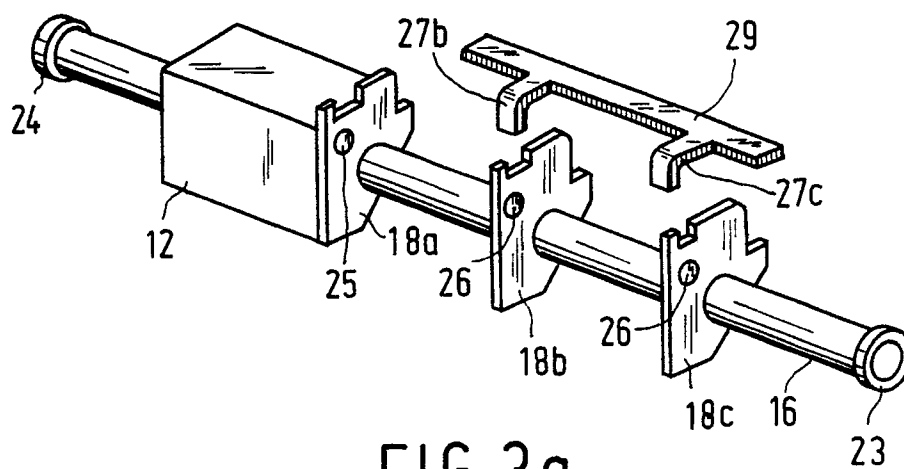


FIG. 3a

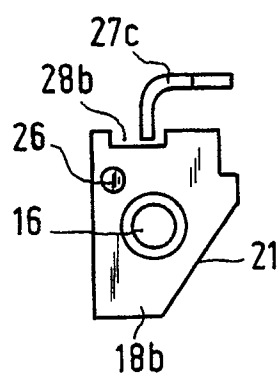


FIG. 3b

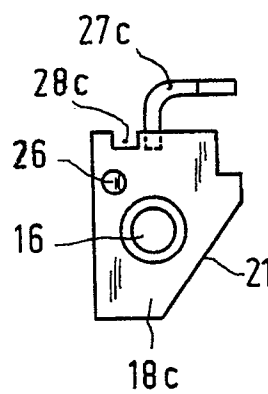


FIG. 3c



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.)
A	US,A, 4 211 498 (SHIMIZU ET AL) 8 July 1980 *see the whole document* - - -	1	B 41 J 11/70
A	SE,B, 362 631 (UARGO INCORPORATED) 28 October 1973 *See the whole document* - - -	1	
A	US,A, 4 712 461 (RASMUSSEN) 15 December 1987 *See the whole document* - - -	1	
A	FR,A1, 2 441 570 (LEIFHEIT INTERNATIONAL GUNTER LEIFHEIT G.M.B.H.) 16 June 1980 *See the whole document* - - -	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.)
			B 41 J G 06 K B 65 H
The present search report has been drawn up for all claims			
Place of search STOCKHOLM		Date of completion of the search 20-12-1990	Examiner Drangel U
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