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(54) Apparatus for processing documents, such as for instance letters, brochures, magazines

(57) An apparatus for processing documents, such as for instance letters, brochures, magazines and the like, wherein for forming sorted stacks from documents, the apparatus comprises a number of document feeders, a conveying track and a control, wherein the document feeders are positioned relative to the conveying track so that documents fed by the document feeders end up directly or indirectly on the conveying track, wherein the conveying track comprises conveying means for advancing the documents over the conveying track, wherein the conveying means and the control are designed to enable conveyance of the documents over the conveying track in a first direction and in a second, opposite direction, wherein the conveying track in a first direction connects to, or continues in a first document-stack processing line and in the second direction connects to, or continues in a second document-stack processing line.

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Description

The invention relates to an apparatus for processing documents, such as for instance letters, brochures, magazines and the like.

Such apparatus is for instance described in European patent application EP-A-686 555.

An important part of such apparatus is formed by the so-called sorting section for forming sorted stacks from documents. The sorting section comprises a number of document feeders, a conveying track and a control. The document feeders are disposed relative to the conveying track so that documents fed by the document feeders end up on the conveying track. The conveying track comprises conveying means for moving the documents over the conveying track. In the known apparatus, a document-stack processing line connects to the conveying track, in which processing line the stacks of documents are further processed. In this regard, one may for instance think of the processing as described in the above-mentioned European patent application EP-A-0 686 555. Such a construction has the drawback that after the formation of the sorted stacks, only one type of further processing is possible. This type of further processing is dictated by the type of packaging line that connects to the above-mentioned conveying track of the sorting section. In some situations, however, it is desired that more than one type of further processing is possible with the sorted stacks. In practice, this is for instance realized by utilizing switches, whereby some stacks of documents are guided in the direction of a first document-stack processing line and other stacks of documents are guided to a second document-stack processing line, depending on the position of the switch. Such a solution is costly on account of the necessary presence of the switch module.

The object of the invention is to provide an apparatus for processing documents wherein at least two different types of further processing after the formation of sorted stacks are possible without requiring the presence of a switch module.

To this end, according to the invention, the apparatus for processing documents such as for instance letters, brochures and magazines and the like is characterized in that for forming sorted stacks from documents, this apparatus comprises a number of document feeders, a conveying track and a control, wherein the document feeders are positioned relative to the conveying track so that documents fed by the document feeders end up directly or indirectly on the conveying track, wherein the conveying track comprises conveying means for advancing the documents over the conveying track, wherein the conveying means and the control are designed to enable conveyance of the documents over the conveying track in a first direction and in a second, opposite direction, wherein the conveying track in a first direction connects to, or continues in a first document-stack processing line and in the second direction connects to or continues in a second document-stack processing line.

An apparatus of such design provides the possibility, in a very economical manner, of performing two types of document-stack processing with one and the same series of document feeders. An additional switch module for guiding the stacks of documents to one or the other document-stack processing line is not necessary and the number of components of the sorting section, which consists of the document feeders, the conveying track and the control, need not be extended. Only the drive of the conveying means and the control require at the most some adjustment to enable conveyance in a first direction and in a second, opposite direction. Wherever the user needed two separate apparatus for processing documents or an apparatus comprising a switch, it is now possible to perform two types of processing with one single apparatus.

Further elaborations of the invention are described in the subclaims and will hereinafter be specified on the basis of an exemplary embodiment, with reference to the accompanying drawings.

Fig. 1 is a top plan view of an exemplary embodiment of the apparatus, wherein the first document-stack processing line shown to the right in the drawing is active;

Fig. 2 is a side elevation of the apparatus shown in Fig. 1;

Fig. 3 is a top plan view similar to Fig. 1, wherein the second document-stack processing line shown to the left in the Figure is active; and

Fig. 4 is a side elevation of the apparatus shown in Fig. 3, in the same condition.

The exemplary embodiment shown of the apparatus for processing documents such as, for instance, letters, brochures, magazines and the like comprises four document feeders 2,3,4,5. The document feeders 2,3,4,5 are disposed at a conveying track 12, with the document feeders 2,3,4,5 being positioned relative to the conveying track 12 so that documents fed by the document feeders end up on the conveying track 12. The conveying track 12 comprises conveying means for advancing the documents over the conveying track. The different document feeders 2,3,4,5 and the conveying means are controlled by a control not shown in the drawing. Henceforth, the document feeders 2,3,4,5 and the conveying track 12 will be referred to by the term 'sorting section'. Such a sorting section is known per se for assembling a stack of documents which, after assembly, are optionally packaged in film or paper and can be mailed as mail item or distributed otherwise. The different document feeders 2,3,4,5 generally contain different types of documents and a stack of documents to be formed by the sorting section contains a selection of a number of these documents, which selection is for instance determined by the wishes of a customer in ques-

tion, which wishes are stored in the control.

The particular feature of the present apparatus according to the invention is that the conveying means and the control are of such design that the conveyance of the documents in a first direction and in a second, opposite direction over the conveying track 12 is possible, wherein the conveying track 12 in a first direction connects to, or continues in a first document-stack processing line 6,7,8,9,10,13,14,11 and in the second direction connects to, or continues in a second document-stack processing line 1,11.

Because the conveying means and the control are designed to enable conveyance of the documents in a first direction and in a second, opposite direction over the conveying track 12, the rather costly sorting section can essentially be used for two types of document-stack processing line. This use for two types of document-stack processing line is possible without necessitating costly switches or like provisions.

In Figs. 1 and 2, the sorting section 2,3,4,5,12 with the first document-stack processing line 6,7,8,9,10,13,14,11 connected thereto are shown in full lines, while the part of the second document-stack processing line 1 is shown in dotted lines. In Figs. 3 and 4, the sorting section 2,3,4,5,12 and the second document-stack processing line 1,11 are shown in full lines, and the first document-stack processing line 6,7,8,9,10,13,14 is shown in dotted lines.

With reference to Figs. 1 and 2, in which the conveying direction of the documents is shown by the arrow P, the different parts of the first document-stack processing line will be discussed.

The first document-stack processing line comprises an addressing station 6 where a stack of documents can be provided with the address to which the stack is to be mailed. Located downstream of the addressing station 6 is a feed-in module 13 which is for instance described in European patent application EP-A-0 685 417, the subject matter of which publication is hereby understood to be incorporated herein by reference. The feed-in module 13 is followed by a packaging module 7 in which the stacks of documents are optionally packaged in film or paper. After all, for some applications, the packaging of the stacks of documents, which stacks may also be formed by a single document, is not necessary. The packaging module for instance contains a folding element as described in EP-A-0 686 555, whose subject matter is understood to be incorporated herein by reference. The film or paper web in which the stack of documents is packaged in the packaging station 7 is unrolled in an unrolling station 8 and guided from this unrolling station to the folding element of the packaging module 7. The packaging module 7 also comprises a separator in which the stacks of documents packaged in the paper or film web are separated from one another. Such separator is for instance described EP-A-o 689 994, whose subject matter is understood to be incorporated herein by reference. Next, the thus packaged stacks of documents are guided to an ejecting station 9, which guides the packaged mail items that are suitable for mailing to a stacker 10 and ejects the mail items that fall short. In the stacking station 10, the mail items are stacked and next, via a conveyor 14, fed to a strapping module 11 for bundling the stack of mail items by means of a band or strap. The first document-stack processing line 6,13,7,8,9,10,14,11 may also be of an entirely different construction and for instance only comprise the packaging module 7 and the associated unrolling station 8.

In Figs. 3 and 4, the above-described first document-stack processing line is shown in dotted lines and the conveying direction of the conveying track 12 of the sorting section 2,3,4,5,12 is reversed, as indicated by the arrow P. This second document-stack processing line comprises a stack-takeover station 1 and a stack packaging station 11 that is designed as a strapping module 11 for bundling a stack of documents by means of a band or strap. For the strapping station 11, the same strapping station can be used that forms, in Figs. 1 and 2, the final part of the first document-processing line. In this manner, a single strapping station 11 may suffice. Of course, in that case it is necessary that the strapping station 11 be readily displaceable, for instance in that it is provided with wheels. As is shown and clearly visible in Fig. 4, the document feeders 2,3,4,5 in this exemplary embodiment are positioned higher than in the application as shown in Figs. 1 and 2. Hence, at least the outlets of the document feeders can be brought into an elevated position for forming higher stacks. The second document-processing line 1,11 can for instance be used for forming sorted stacks of magazines intended for different kiosks or bookshops. In this manner, for each kiosk a packet of magazines can be assembled that contains the desired number of each type of magazine. As for this, the stacks are typically considerably higher than is conventional for mail items, it is necessary that at least the outlets of the document feeders 2,3,4,5 can be brought into an elevated position.

As is known per se, the conveying track 12 comprises a conveying surface on which the documents rest, with the conveying means comprising a drivable conveying chain or conveying belt which extends below the conveying face and is provided with projections that project from the conveying surface through slots in the conveying surface, and are adapted to push on the stacks of documents over the conveying surface. It is understood that the reversal of the conveying direction can readily be effected by driving the conveying chain or conveying belt by means of a motor whose direction of rotation is reversible. Also, the design of the projections should of course be suitable for pushing on a stack with one side thereof as well as with the opposite side thereof. Of course, the control should be capable of realizing such reversal of the direction of rotation of the drive motor. Optionally, detecting means such as, for instance, angle encoders are present, so that the position

of the different projections is known to the control.

In particular for the use of the second document-stack processing line as described hereinabove, according to a further elaboration of the invention, it may be particularly favorable when, for pushing on higher stacks, the projections can be provided with projection-extension parts. Such projection-extension parts prevent the upper documents of a stack from sliding from the stack during conveyance because they were not pushed on by the projection.

In the present exemplary embodiment, the conveying means are driven continuously in the case where the first document-stack processing line is active and driven intermittently in the case where the second document-stack processing line is active.

It is understood that the invention is not limited to the exemplary embodiment described, but that various modifications are possible within the framework of the invention, which is defined by the claims. For instance, the second document-stack processing line could be a line of the type described hereinabove with reference to the first document-stack processing line, wherein, however, the first document-stack processing line for instance packages with paper and the second document-stack processing line packages with film. The second document-stack processing line could for instance also be designed as an enveloping line for inserting stacks of documents into envelopes. For the enveloping line, a continuous drive of the conveying means is desired. Also, the strapping station could be replaced by a device for providing and shrinking film around a stack of documents.

Claims

1. An apparatus for processing documents, such as for instance letters, brochures, magazines and the like, wherein for forming sorted stacks from documents, the apparatus comprises a number of document feeders (2,3,4,5), a conveying track (12) and a control, wherein the document feeders (2,3,4,5) are positioned relative to the conveying track (12) so that documents fed by the document feeders (2,3,4,5) end up directly or indirectly on the conveying track (12), wherein the conveying track (12) ccmprises conveying means for advancing the documents over the conveying track (12), wherein the conveying means and the control are designed to enable conveyance of the documents over the conveying track (12) in a first direction and in a second, opposite direction, wherein the conveying track in the first direction connects to, or continues in a first document-stack processing line (6,7,8,9,10,11,13,14) and in the second direction connects to, or continues in a second document-stack processing line (1,11).

2. An apparatus according to claim 1, characterized in that the first document-stack processing line comprises at least a packaging module (7) and an unrolling module (8), wherein the packaging module is adapted to package the fed stacks of documents in film or paper to form separate packets.

3. An apparatus according to claim 1 or 2, characterized in that the second document-stack processing line comprises a stack-takeover station (1) and a stack-packaging station (11).

4. An apparatus according to claim 3, characterized in that the stack-packaging station (11) is a so-called strapper (11) for bundling a stack of documents by means of a band, strap or film.

5. An apparatus according to claim 3 or 4, characterized in that at least the outlets of the document feeders (2,3,4,5) can be brought into an elevated position relative to the conveying track (12) for forming higher stacks.

6. An apparatus according to any one of the preceding claims, characterized in that the conveying track (12) comprises a conveying surface on which the documents rest, wherein the conveying means comprise a drivable conveying chain or conveying belt which extends below the conveying surface and is provided with projections that project from the conveying surface through at least one slot in the conveying surface and are adapted to push on the stacks of documents over the conveying surface.

7. An apparatus according to claims 5 and 6, characterized in that for pushing on higher stacks, the projections can be provided with projection-extension parts.

8. An apparatus according to claim 1 or 2, characterized in that the second document-stack processing line is an enveloping line for inserting stacks of documents into envelopes.

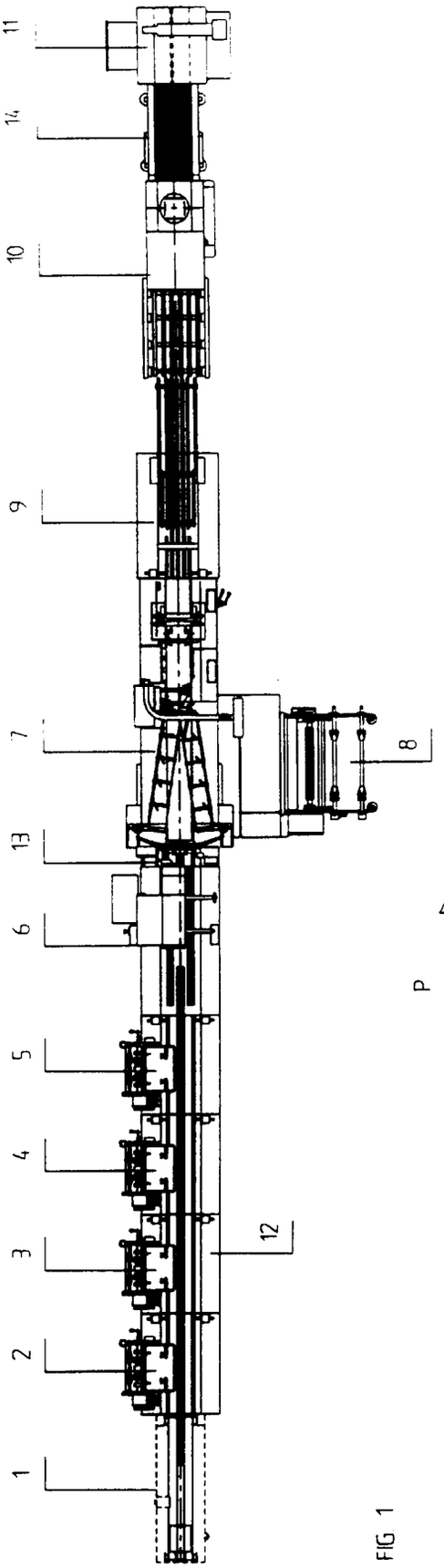

FIG 1

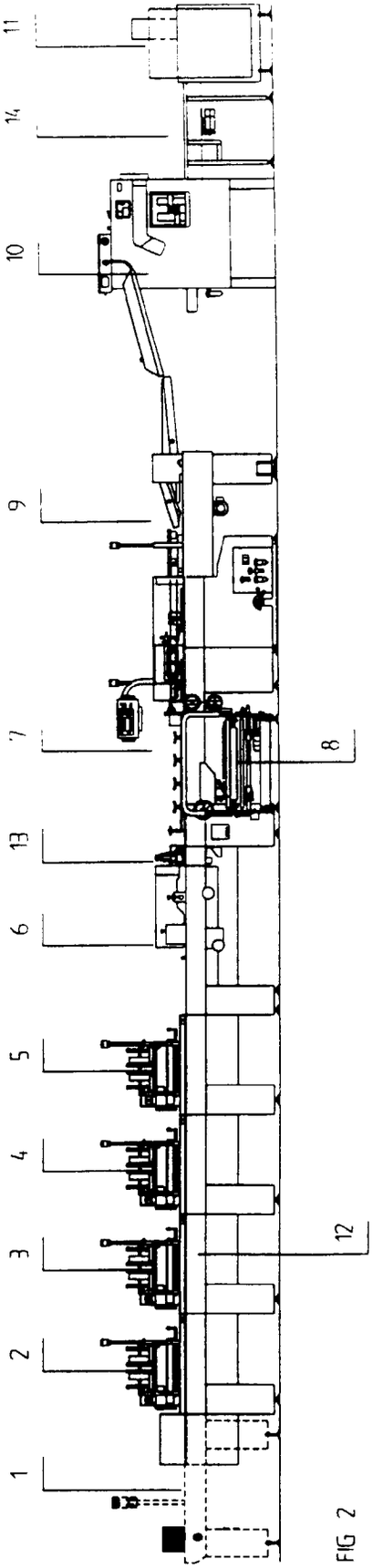

FIG 2

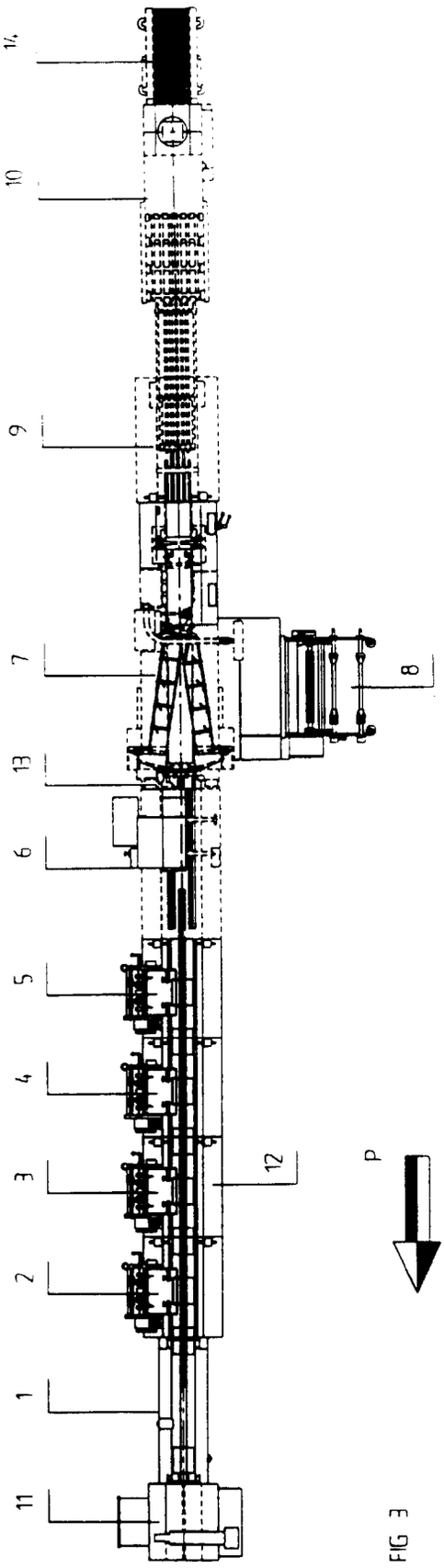

FIG 3

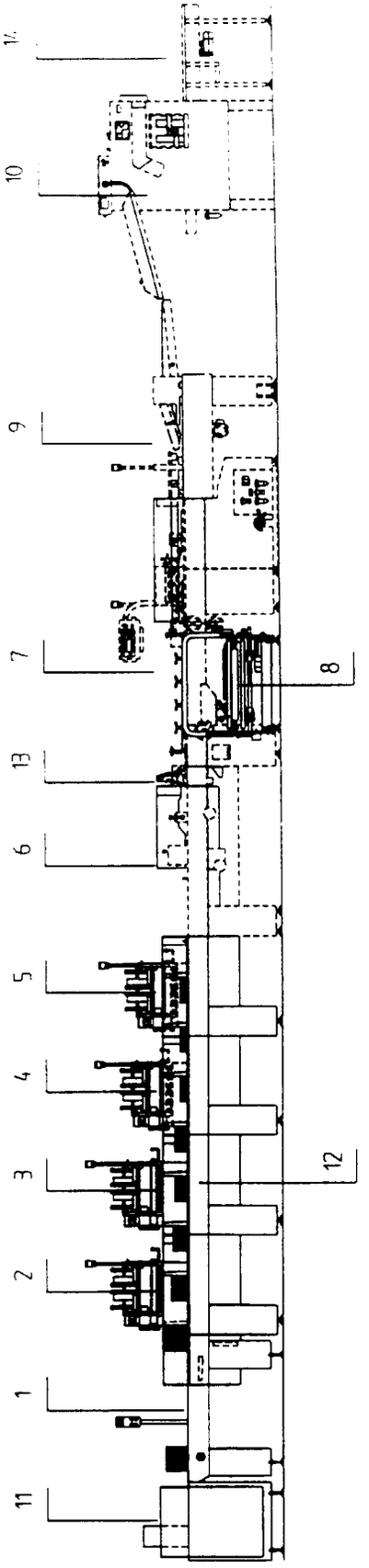

FIG 4

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 97 20 2882

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)
A	DE 94 12 677 U (BÖWE SYSTEC AG) 3 November 1994 * the whole document *	1	B65H39/02
A	US 4 790 119 A (MCDANIELS PAUL T) 13 December 1988 * the whole document *	1	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

B65H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	17 December 1997	Henningsen, O

CATEGORY OF CITED DOCUMENTS

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