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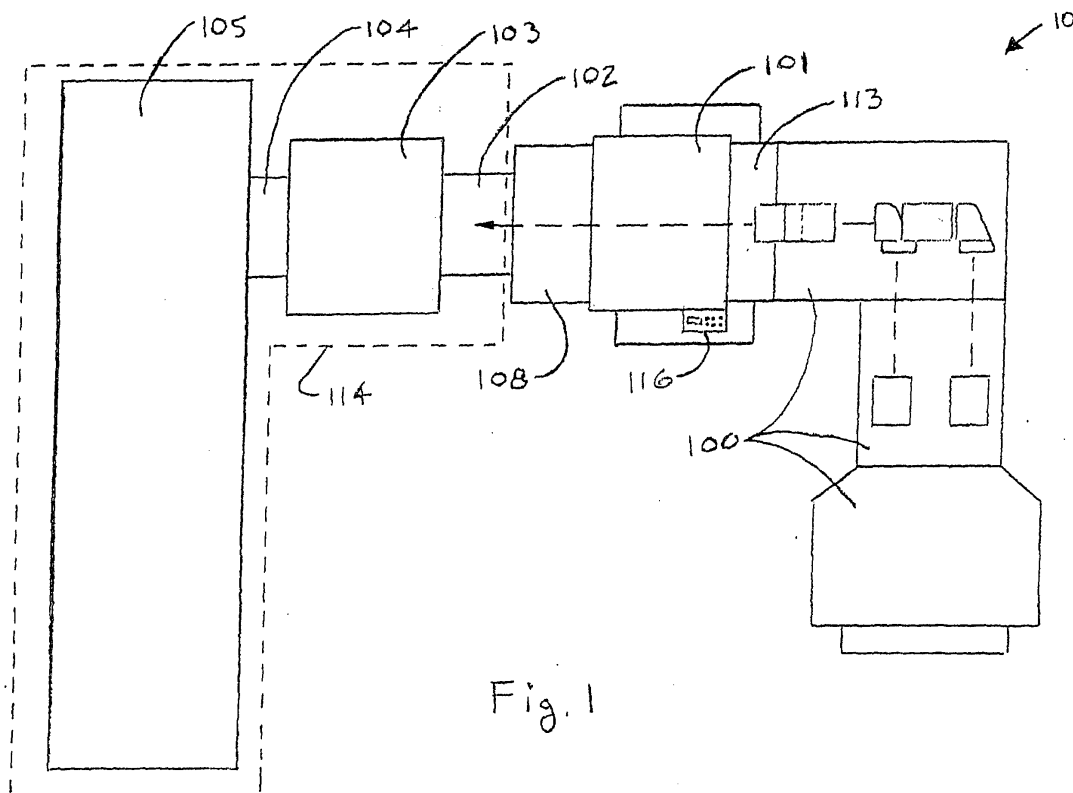
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(54) **Universal document processor for merging continuous and cut sheet documents into sets**

(57) The universal document processor provides for an economical document processing solution. Thus the capital investment in equipment could be maximized by the use of a single system to perform a wide variety of tasks by a single system. Presently, no system combines all these described functions in a single system,

instead requiring a plurality of input and output devices, frequently certain of them requiring installation and set-up to the exclusion of others, greatly decreasing efficiency in operation. With use on an inserter system one would have a universal document processing solution system processing both cut sheet and continuous in one front end.



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Description**Background of the Invention****Field of the Invention**

[0001] An apparatus for processing a variety of document types enables processing of multiple types in a single configuration.

Description of Related Art

[0002] A variety of document handlers are known. One is the continuous feed format handling device such as my co-invented, United States Patent N1 5,887,864 entitled "Method of and apparatus for processing and stacking printed forms" which issued March 30, 1999, which is incorporated by reference as if fully set forth herein. Direct feeding into an envelope inserter is also taught in the Golicz United States Patent N1 4,928,944 entitled "High speed sheet feeder singulator" which issued May 29, 1990, also incorporated by reference as if fully set forth herein.

Brief Description of the Invention

[0003] This invention has a special uniqueness in the automated mailing industry and provides distinct competitive advantages such as a smaller foot print, lower cost, central control of combined operations, sheet and continuous merged and nest folded documents, and flexibility through a wide range of form types, formats and sizes.

[0004] The invention enables the combination of both cut sheet and continuous document processing in one integrated and centrally controlled product.

[0005] The merging of cut sheet and continuous documents in the same process for accumulation and nested folding of said documents prior to the delivery to a downstream device such as an accumulator, folder, collector and to a document inserting machine in an in-line inserting systems application. In one embodiment the invention provides a universal processing method of processing paper documents comprising the steps of:

feeding continuous sheet documents or cut sheet documents to a document transport;
reading optically printed indicia on said continuous sheet documents or said cut sheet documents and programmably determining subsequent steps based on indicia;
selectively passing said continuous sheet documents or said cut sheet documents to a subsequent step or holding said continuous sheet documents or said cut sheet documents in said document transport while waiting for other continuous sheet documents or cut sheet documents;
sequencing and merging said continuous sheet

documents or said cut sheet documents to create a merged set; and

passing said merged set from said document transport to a subsequent step while initiating the creation of a second merged set until a predetermined number of merged sets are created.

[0006] Desirably, said selective passing or holding step being performed by reading said indicia and determining said continuous sheet documents or said cut sheet documents have been printed in the formats of North/South, West/East or East/West.

[0007] Said sequencing and merging step may be performed by a sequencer merger receiving said continuous sheet documents or said cut sheet documents from said continuous feed processor or said cut sheet processor, directing said continuous sheet documents or said cut sheet documents in a selected order and transporting said continuous sheet documents or said cut sheet documents to an output end, said sequencer merger adaptable to process said continuous sheet documents or said cut sheet documents as a stack.

[0008] The invention may also provide a universal processing method of processing paper documents comprising the steps of:

programming a CPU for electronically reading optically printed indicia on cut sheet documents or continuous sheet documents to set the number and configuration of merged sets;
signaling the feed of said cut sheet documents or said continuous sheet documents to a document transport;
selectively passing said continuous sheet documents or said cut sheet documents through said document transport or holding said continuous sheet documents or cut sheet documents in said document transport while waiting for other continuous sheet documents or cut sheet documents;
sequencing and merging said continuous sheet documents or cut sheet documents held in said document transport to create a merged set;
passing said merged set from document transport to a subsequent step while selectively initiating the passage of other cut sheet or continuous sheet documents or holding said continuous sheet documents or cut sheet documents to create another merged set.

[0009] In a further embodiment a universal document processor is provided for merging continuous sheet documents or cut sheet documents comprising:

at least one continuous sheet document processor, adapted to feed said continuous sheet documents;
at least one cut sheet document processor, adapted to feed said cut sheet documents;
a document transport, adapted to receive docu-

ments from said at least one cut sheet document processor and said at least one continuous sheet document processor;

a central processor unit for controlling said at least one continuous sheet document processor, said at least one cut sheet document processor and said document transport adapted vary the quantity, makeup and number of merged sets;

said document transport located downstream from said at least one continuous sheet document processor and said at least one cut sheet document processor and adapted to selectively pass said cut sheet documents or said continuous sheet documents or merge said cut sheet documents or said continuous sheet documents into said merged sets; whereby said cut sheet documents, said continuous sheet documents and said merged sets are expelled from said document transport.

[0010] Said document transport may be operatively connected to an optical reading device adapted to read indicia affixed on said forms;

said document transport, said at least one cut sheet processor, and said at least one continuous sheet processor being controlled by a computer;

said computer, said document transport, said at least one cut sheet processor, and said at least one continuous sheet processor being operable independent of an inserter and being operable in coordination with said inserter for off-line or on-line operation.

[0011] Said at least one continuous sheet document processor, said at least one cut sheet document processor, central processing unit and said document transport desirably share a common supplier of motive power.

[0012] These and other features of the present invention will be better understood with reference to the following drawings.

Description of the Drawings

[0013]

Figure 1 is a plan view of a universal document processor in an inserter line, in accordance with the present invention.

Figure 2 is a plan view of a pair of universal document processors in an inserter line including a continuous processor and a cut sheet processor.

Figure 3 is a perspective view of the universal document processor shown with the high capacity document cut sheet processor disconnected from the continuous document processor.

Figure 4 is a plan view showing the general layout of the apparatus used in practicing the method.

Detailed Description of the Preferred Embodiment

[0014] The universal document processor 10, as shown in figure 1, will intelligently process a variety of cut sheet documents with 1-up and 2-up continuous documents. The continuous document processor (100) and the cut sheet document processor (101) share the same output devices such as an accumulator (102), folder (103), collector (104), and inserter (105). This invention saves floor space and provides for ergonomic operator interfacing. Unique features are that the continuous (120) and cut sheet (122) documents can be merged together for processing prior to delivery to any downstream device such as an accumulator (102), folder (103) collector (104) and inserter (105) and both cut sheet (122) and continuous (120) operations are centrally controlled via CPU (116). Existing industry configurations consist of a separate cut sheet processor with output devices (106) and separate continuous processor with output devices (107) (figure 2). Existing industry configurations use additional floor space for the 2nd document processor, operators have to walk around each document processor to get to the others' control and set-up areas, and the output from each processor cannot be merged and nested prior to folding and delivering to the inserter.

[0015] The continuous document processor (100), as shown in figure 4, delivers a cut sheet (122) or a continuous sheet (120) document into the document transport (108) delivering it to the transport dump rollers (109), shown best in figure 3, in the document transport (108) where the cut sheet (122) or continuous sheet (120) document waits for the next upstream document from the continuous document processor (100) or a document from the cut sheet document processor (101). The document transport (108) has two inputs, the feeder input (112) and transport input (113) whereas documents from the cut sheet document processor (101) and continuous document processor (100) can be staged or merged in the document transport (108).

[0016] These inputs, as shown in figure 1, can be used integrally allowing documents to be merged in the document transport (108) or a downstream device (114) such as an accumulator (102), folder (103), collector (104), and inserter (105). Whereas documents are fed from the cut sheet document processor (101) or continuous document processor (100) into the document transport input (113) via round transfer belts (115) and held at the transport dump rollers (109), shown best in figure 3. The CPU (116) can be set to a predetermined page quantity (a set) divided between the cut sheet document processor (101) and continuous document processor (100) or from either the cut sheet document processor (101) or the continuous document processor (100), either directly by the user or automatically via an integrated OMR, BCR or OCR reading system. The reading system scans both the cut sheet documents and the continuous documents for the presence of control-

ling indicia to be read. Thereby, controlling indicia that is read may be present on both the cut sheet documents and continuous documents, or either ones. As a result, the system is reversible by being capable of being solely or alternatingly controlled by indicia on documents emanating from either or both cut sheet and continuous sheet document processors. More than one of each type processor may also be employed, as one skilled in the art would appreciate. This provides a universal system. A page set can be either single-page or multiple pages. When merging in a downstream device (114), see figure 1, the document transport (108) empties the first page of a merging set into the downstream device (114) and the CPU (116) simultaneously initiates the next document in that set from either the continuous document processor (100) or cut sheet document processor (101) to be fed into the document transport (108). This process continues until the pre-determined page set (qty) is reached in the downstream device (114) such as an accumulator (102), folder (103), collector (104) and inserter (105). When merging in the document transport (108) the document transport (108) holds the first page of a merging set fed from either the cut sheet document processor (101) or continuous document processor (100) waiting for the subsequent pages for that set to be delivered to the document transport (108) from the cut sheet document processor (101) or continuous document processor (100). Once the set is complete it is delivered to a downstream device such as an accumulator (102), folder (103), collector (104) and inserter (105). Documents may thus be expelled from the document transport (108) individually or in merged sets.

[0017] It will be appreciated that the apparatus and process of the invention involve the capability of scanning both cut sheet documents and continuous sheet documents for controlling indicia on either or both. In a preferred embodiment the cut sheet documents are used as a control document. In accordance with the present invention there is a selective feeding of documents that are selected from continuous sheet documents and/or cut sheet documents. All documents that are fed, which may emanate from either or both type of document processors, are read for controlling indicia. Thus, the system is reversible by being capable of being solely or alternatingly controlled by indicia on the continuous cut sheets or continuous sheets, or both, since the system involves scanning all such documents that are being fed. The system is thereby reversible and overcomes the deficiencies in the prior art.

[0018] As will be clear to those skilled in the art, multiple units of cut sheet and continuous sheet processors may be provided to feed documents to the document transport and controlled by a CPU that is in communication with the reader (e.g., an optical scanner or the like).

[0019] As such many and varied modifications of the subject matter of this invention will become apparent to those skilled in the art from the detailed description giv-

en hereinabove, it will be understood that the present invention is limited only as provided in the claims appended hereto.

Claims

1. A universal processing method of processing paper documents into merged sets comprising the steps of:

selectively feeding documents selected from continuous sheet documents and cut sheet documents to a document transport;
scanning the documents for the presence of controlling printed indicia thereon and reading controlling printed indicia present;
programmably determining subsequent steps based on the read controlling indicia;
selectively passing documents selected from said continuous sheet documents and said cut sheet documents to a subsequent step or holding said documents in said document transport while waiting for other documents;
sequencing and merging said documents to create a merged set; and
passing said merged set from said document transport to a subsequent step while initiating the creation of a second merged set until a pre-determined number of merged sets are created.

2. The method according to claim 1 and said sequencing and merging step being performed by a sequencer merger receiving said documents, directing said documents in a selected order and transporting said documents to an output end, said sequencer merger adaptable to process said documents selected from the continuous sheet documents and said cut sheet documents as a stack.

3. A universal processing method of processing paper documents comprising the steps of:

programming a CPU for electronically reading optically printed indicia on cut sheet documents and/or continuous sheet documents to set the number and configuration of merged sets;
signaling the feed of said documents to a document transport;
selectively passing said documents through said document transport, or holding said documents in said document transport while waiting for other documents and sequencing and merging said documents held in said document transport to create a merged set;
passing said merged set from the document transport to a subsequent step while selectively

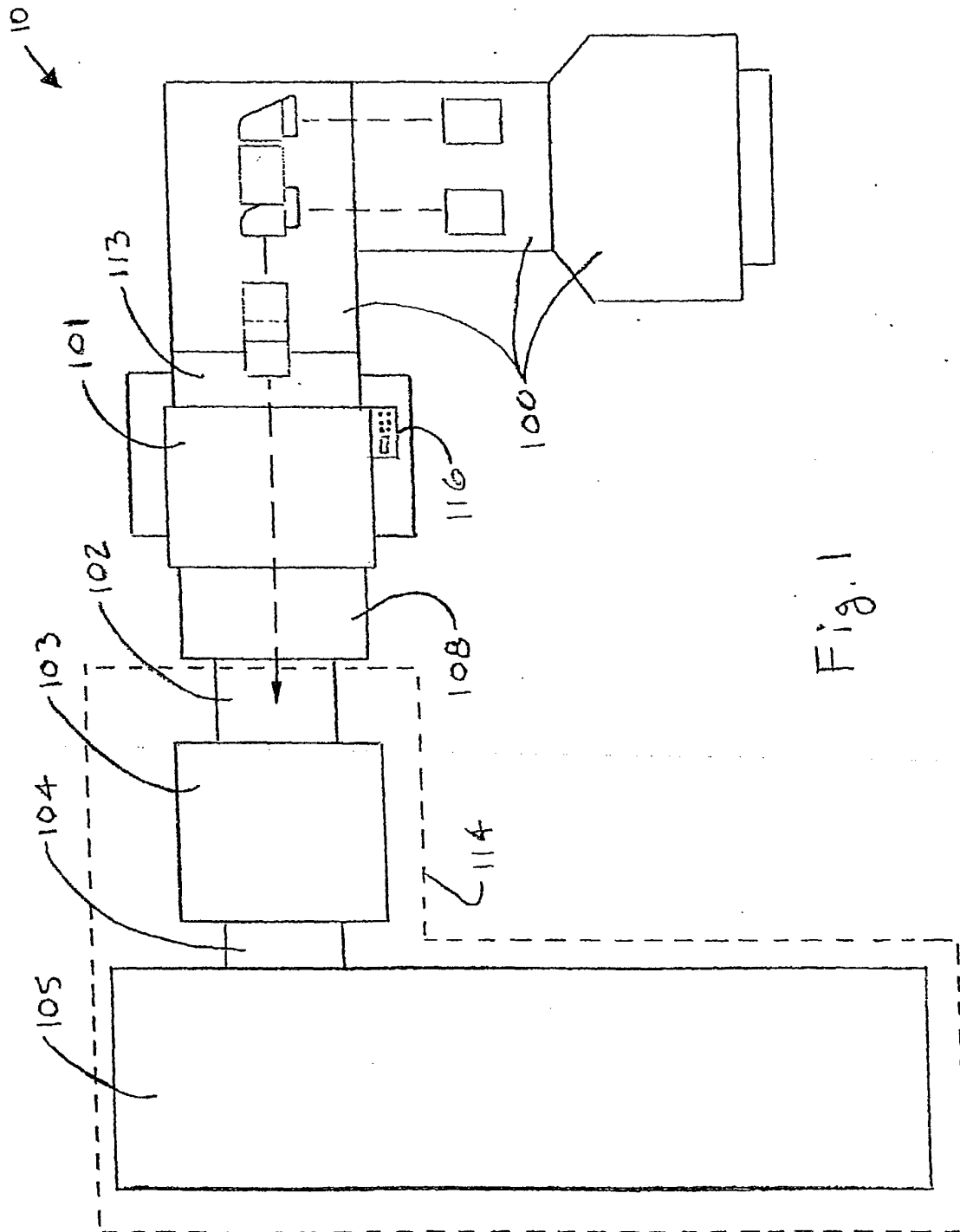
initiating the passage of other documents or holding other documents to create another merged set.

4. A universal document processor for merging documents selected from continuous sheet documents and/or cut sheet documents comprising:

at least one continuous sheet document processor adapted to feed said continuous sheet documents; 10
 at least one cut sheet document processor, adapted to feed said cut sheet documents;
 a document transport adapted to receive documents from said at least one cut sheet document processor and/or said at least one continuous sheet document processor; 15
 a reader for reading controlling indicia on said continuous sheet documents and/or said cut sheet documents; 20
 a central processor unit in communication with said reader for controlling:

said at least one continuous sheet document processor; 25
 said at least one cut sheet document processor; and,
 a document transport adapted to vary the quantity, makeup and number of merged sets; 30
 said document transport located downstream from said at least one continuous sheet document processor and said at least one cut sheet document processor and adapted to selectively pass documents selected from said cut sheet documents and/or said continuous sheet documents, or merge documents selected from said cut sheet documents and/or said continuous sheet documents into merged sets; 35
 whereby said documents are expelled from said document transport individually or in merged sets. 40

5. The processor according to claim 4 and 45
 said document transport being operatively connected to an optical reading device adapted to read controlling indicia affixed on said documents;
 said document transport, said at least one cut sheet processor, and said at least one continuous sheet processor being controlled by a computer; 50
 said computer, said document transport, said at least one cut sheet processor, and said at least one continuous sheet processor being operable independent of an inserter and being operable in coordination with said inserter for off-line or on-line operation. 55



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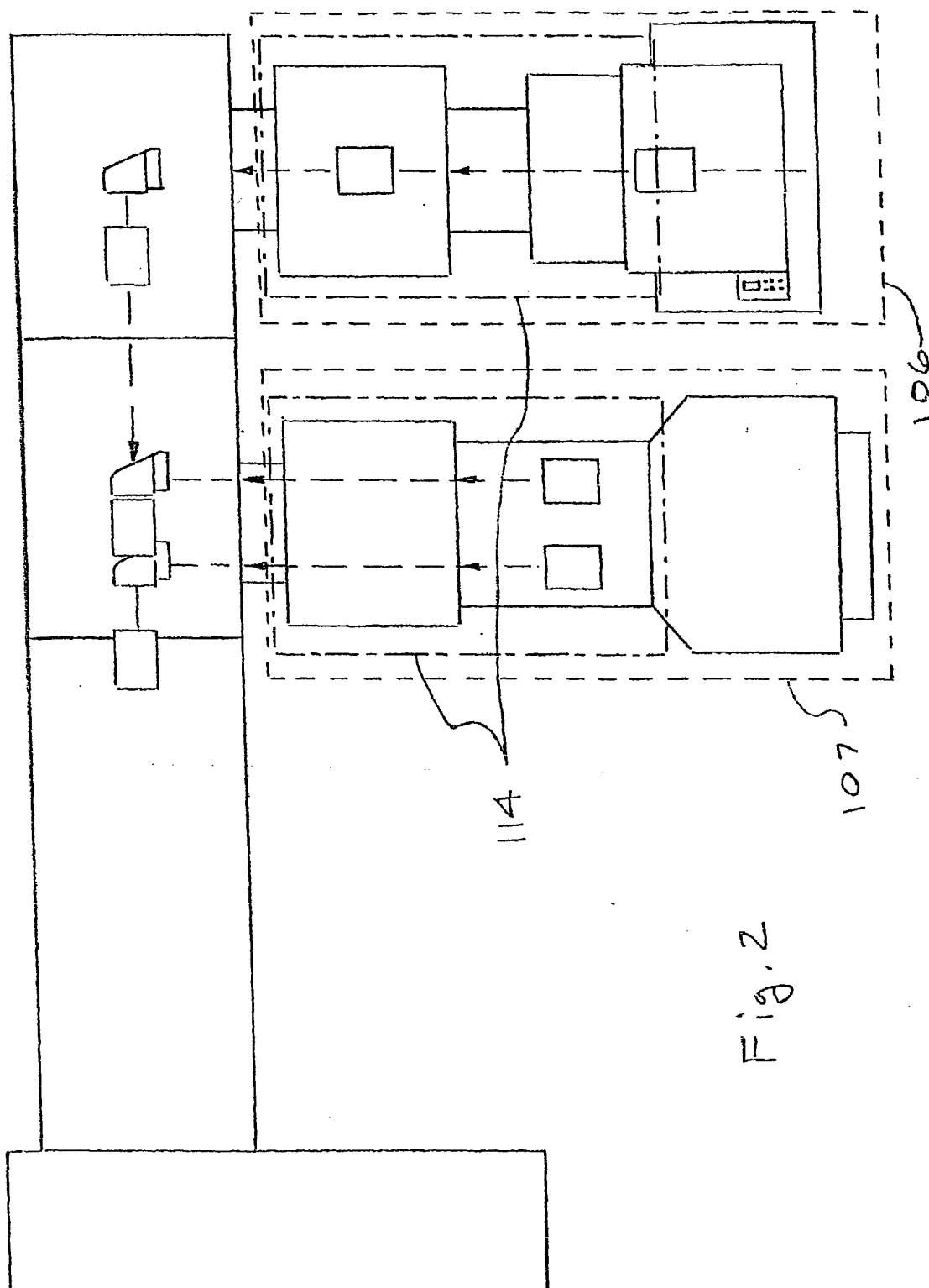
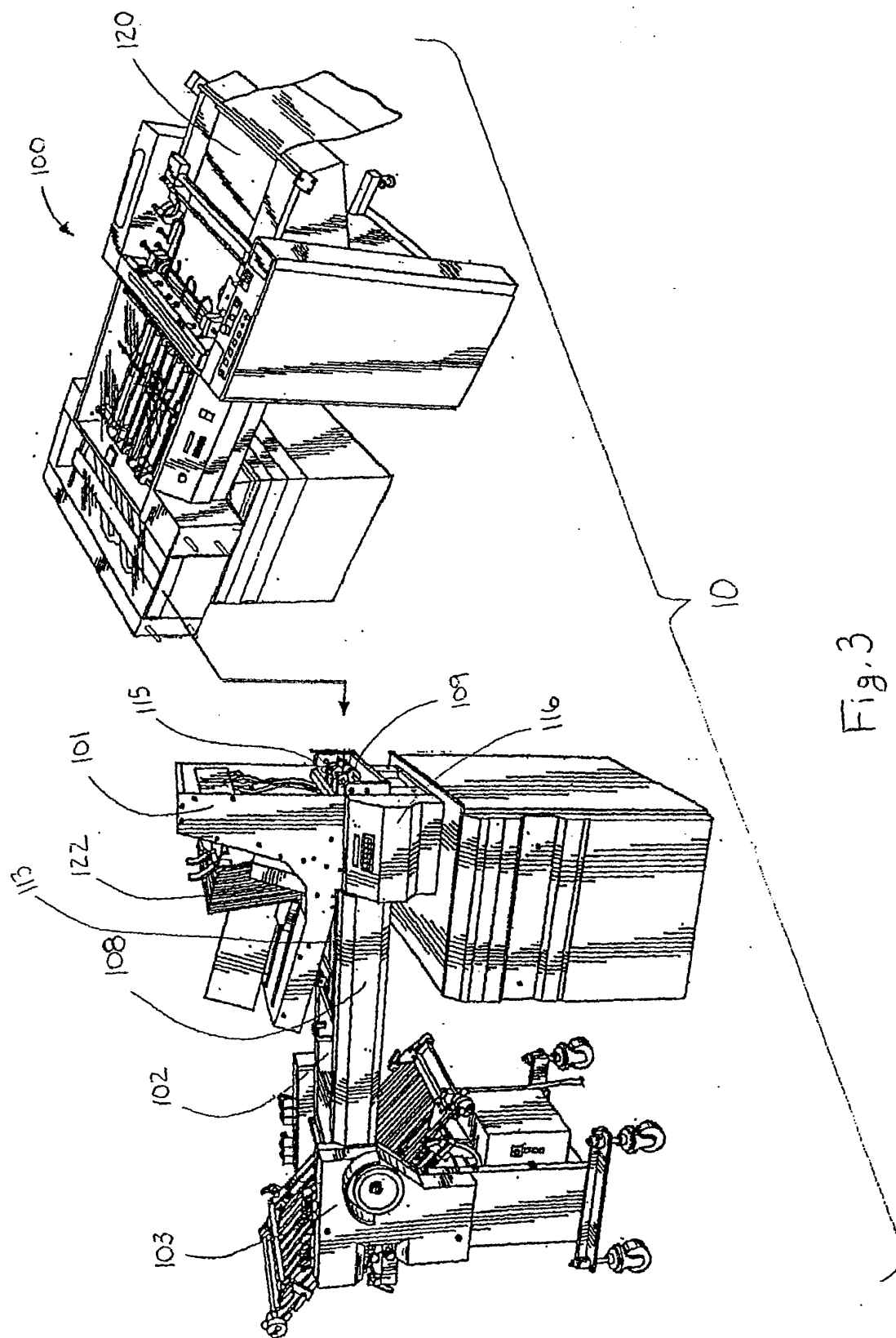
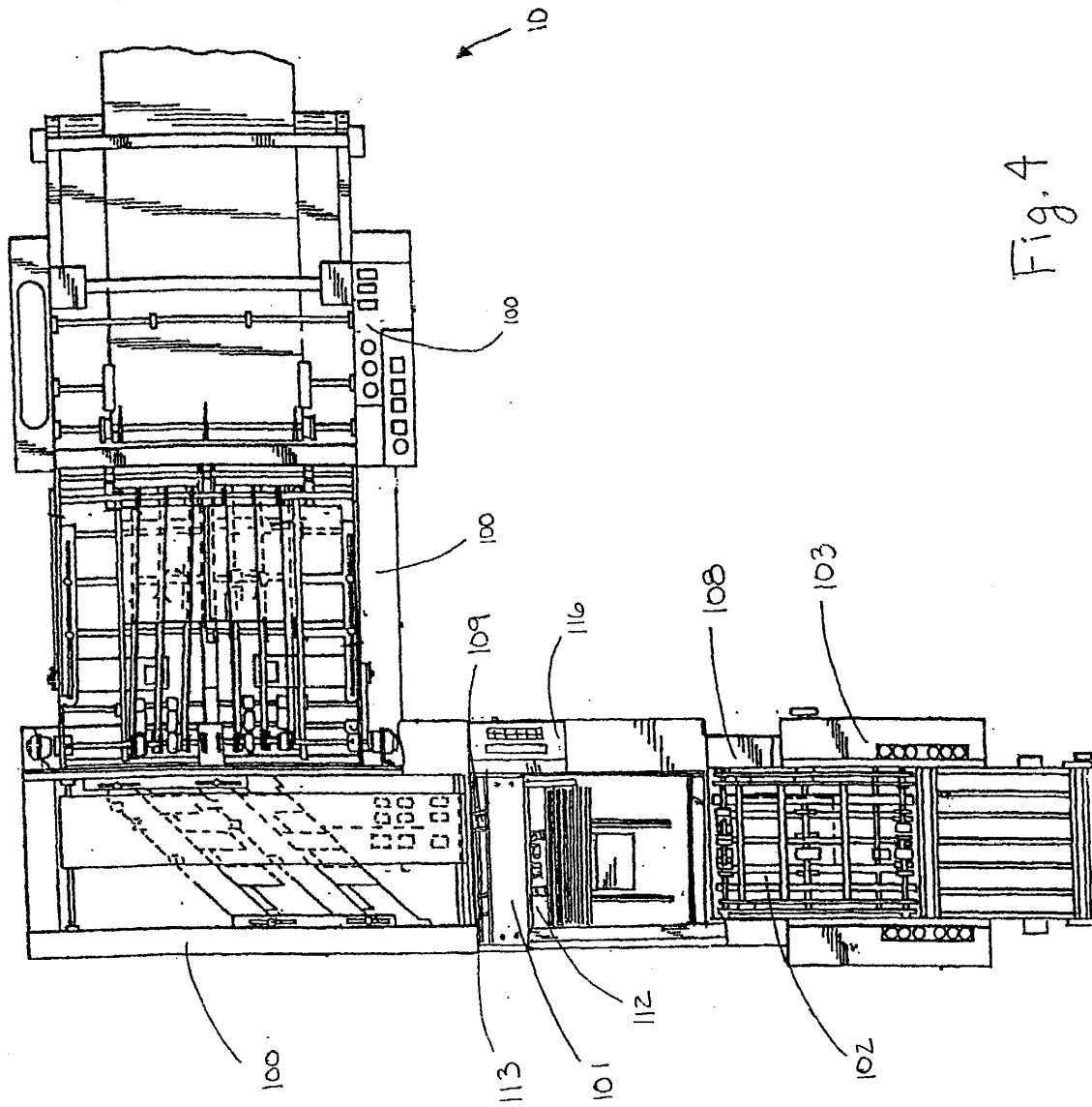


Fig. 2





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EUROPEAN SEARCH REPORT

Application Number
EP 03 39 4039

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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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 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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