

(12)

EUROPEAN PATENT APPLICATION

(21) Application number: 81200289.7

(51) Int. Cl.³: **B 07 C 1/02**
B 07 C 1/18

(22) Date of filing: 13.03.81

(30) Priority: 17.03.80 NL 8001577

(43) Date of publication of application:
23.09.81 Bulletin 81/38

(84) Designated Contracting States:
BE DE FR GB

(71) Applicant: Staat der Nederlanden (Staatsbedrijf der
Posterijen, Telegrafie en Telefonie)
P.O. Box 430
NL-2260-AK Leidschendam(NL)

(72) Inventor: Bordewijk, George Lourens
Terweeweg 79
NL-2341 CP Oegstgeest(NL)

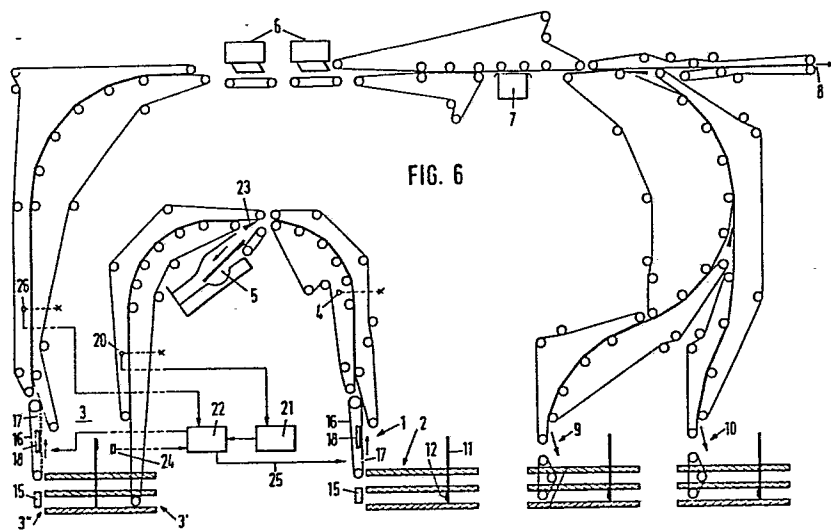
(72) Inventor: Verbeek, Wim Balthasar
Ocarinalaan 288
NL-2787 RJ Rijswijk (ZH)(NL)

(54) Take-off system for letters and the like.

(57) The invention relates to a take-off system for taking off letters and the like, comprising a first take-off device (1) into which the letters are supplied in an upright position on a transport bed (2), from where they can be conveyed one by one to a reversing station (3) for reversing the direction of movement, and further comprising an outlet (5) for separating letters with a non-acceptable length from the stream. The reversing station (3) is formed by the combination of a stacker (3') and a second take-off device (3''), the moment when a next letter is taken off being determined by the signal from a photodetector (26) concerning the passage of the letters taken off by said second take-off device, and by the information from a measuring point (20) with regard to the lengths of the letters which are supplied to the stacker (3'). The measuring point (20) and the photodetector (26) are connected to a processor (22), which puts the second take-off device into operation for a short moment at calculated points of time.

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Take-off system for letters and the like.

The invention relates to a take-off system for letters and the like, comprising a first take-off device into which the letters are supplied in an upright position on a transport bed from where they can be conveyed one by one to a reversing station for reversing the direction of movement, and further comprising an outlet for separating letters
5 with a non-acceptable length from the stream.

A take-off system of this kind is known from the Netherlands patent specification 160743, according to which a take-off device known from the Netherlands patent application 7507870 is made use of. With this
10 take-off device the pitch at which the letters are taken off is constant. As the lengths of the letters are different the distances between them are, consequently, unequal. The maximum length allowed is determinative for the length of the pitch, due to which the capacity of the take-off system is limited.

15 Take-off devices ensuring a constant distance between the letters are also known, but because of their constructional problems they are not in great demand. Moreover, with both types of take-off devices it occurs that letters overlap each other. Such overlappings have to be detected and removed from the transport system. This too causes loss
20 of capacity, which is not made good in the known system.

The invention provides a solution for the difficulties mentioned, the

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reversing station being formed by the combination of a stacker and a second take-off device, and the moment when a next letter is taken off being determined by the signal from a photodetector concerning the passage of the letters taken off by said second take-off device, and
5 by the information from a measuring point with regard to the lengths of the letters which are supplied to the stacker.

Between the two take-off devices the letters which are non-acceptable because of their lengths or overlappings can be removed from the system. The chance that the second take-off device supplies letters that are
10 too long is now out of the question, and that it causes overlappings has become very faint, and should an overlapping occur as yet, the system can moreover automatically stop the supply of letters.

In contradistinction to the reversing station according to the known system the reversing station according to the invention can temporarily
15 store letters, thus creating the possibility of adapting the capacity. The invention will be elucidated with the help of the drawing, in which

Fig. 1 shows a known take-off system;

Fig. 2 a stream of letters with a constant pitch;

Fig. 3 a stream of letters with a constant distance
20 between them;

Fig. 4 a take-off device for a constant pitch between the letters;

Fig. 5 a take-off device for a constant distance between the letters;

25 Fig. 6 a take-off system according to the invention, and in which

Figs. 7 and 8 show the time t calculated by a processor. The known system according to Fig. 1 comprises a take-off device 1, a transport bed 2, a reversing station 3, a measuring point 4 and an
30 outlet 5. Moreover, Fig. 1 shows a pair of devices 6 for aligning the letters (Netherlands patent 141.461), a reading station 7 (Netherlands patent application 7614338) for reading a bar code, an outlet 8 to a

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battery of pigeon holes (Netherlands patent application 7412347), a branch path 9 for overflow and a branch path 10 for letters with a rejected code. The corresponding parts in Fig. 6 are designated by the same reference numerals.

5 In the Figs.1-6 the letters 11 are provided with a thickened portion 12, which represents a stamp in the top right-hand corner. The letters on the transport beds 2 of the take-off device 1 and on the branch paths 9 and 10 are in the same position. So the stacks can be taken from the transport bed 2, from the branch path 9 and, if present,
10 from the branch path 10 and simply be placed on the transport bed 2 of the take-off device 1, that is, without turning and shaking the stacks. This is realized by the reversing station 3. The position of the letters is important with a view to the reading station 7.

The above applies to Figs.1 and 6; regarding the reversing station 3
15 according to Fig. 6 it will be further explained.

From a comparison of the stream of letters with a constant pitch 13 (Fig. 2) with that with a constant distance 14 between the letters (Fig. 3) it can be seen that the length of the stream according to Fig. 3 is shorter, that is that in the same space of time more letters
20 can be handled.

The take-off devices 1 (Figs. 1 and 6) supply a stream of letters with a constant pitch 13.

A suction port 15 (Fig. 4) stops with a light suction a letter as long as the preceding letter has not yet been taken along by a belt 16.
25 Every time an opening 17 in the belt 16 moves past a suction chamber 18 a letter is taken along with a suction which is a little larger than that of the suction port 15. The rhythm at which letters are taken off is determined by the time of revolution of the opening 17. Fig. 5 shows a known take-off device for a constant distance between
30 the letters. In this case it is not well possible to place a suction port 15 at the trailing edge of the letters. A photodetector 19 detects the trailing edge of the letter, after which, after a certain interval of time, a vacuum pulse is given in the suction chamber 18. A belt 16

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moves past the suction chamber and due to the many holes in this belt a letter is immediately taken along as soon as a pulse occurs. The suction port 15, which here too has to stop a next letter, is placed at the leading edge of the letter. This is less favourable than the position of the suction port 15 according to Fig. 4 because limp letters are easily crumpled and it occurs that two letters are taken off at a time. The take-off system according to Fig. 6 distinguishes from that according to Fig. 1 inter alia because of the fact that the reversing station 3 is formed by the stacker 3' and the second take-off device 3'', and that the outlet 5 for letters with a non-acceptable length is not coupled to the reversing station. The second take-off device 3'' ensures a stream of letters with a constant distance between them, and yet it has the constructional advantages of the take-off device according to Fig. 4. By measuring beforehand by means of a photo-detector 20 the lengths of the letters are known, as a result of which a vacuum pulse can be delivered at the right moment via a store 21 and a processor 22.

The measuring point 4 functions in the same way as with the take-off system according to Fig. 1. Two letters which overlap each other and slightly stick together will cause difficulties when they are machine-handled, which can also be the case with letters that are too long. The measuring point 4 detects letters which are too long, inclusive of overlappings. The actual length does not matter. The letters that are too long are separated via an outlet 5, a switch 23 of which is controlled by the measuring point 4. The take-off device 1 can have a larger capacity than the rest of the system in consequence of which the dropouts via the outlet 5 need not mean a loss of capacity. A stack of letters is placed on the take-off device 1 in the usual way, and they are taken off at a constant pitch of 36 ± 3.6 cm. The transit time from take-off device 1 to take-off device 3'' amounts to 4 ms^{-1} , which means a capacity of 40,000 letters per hour. When the stacker 3' informs the processor 22 by means of a detector 24 that it is full,

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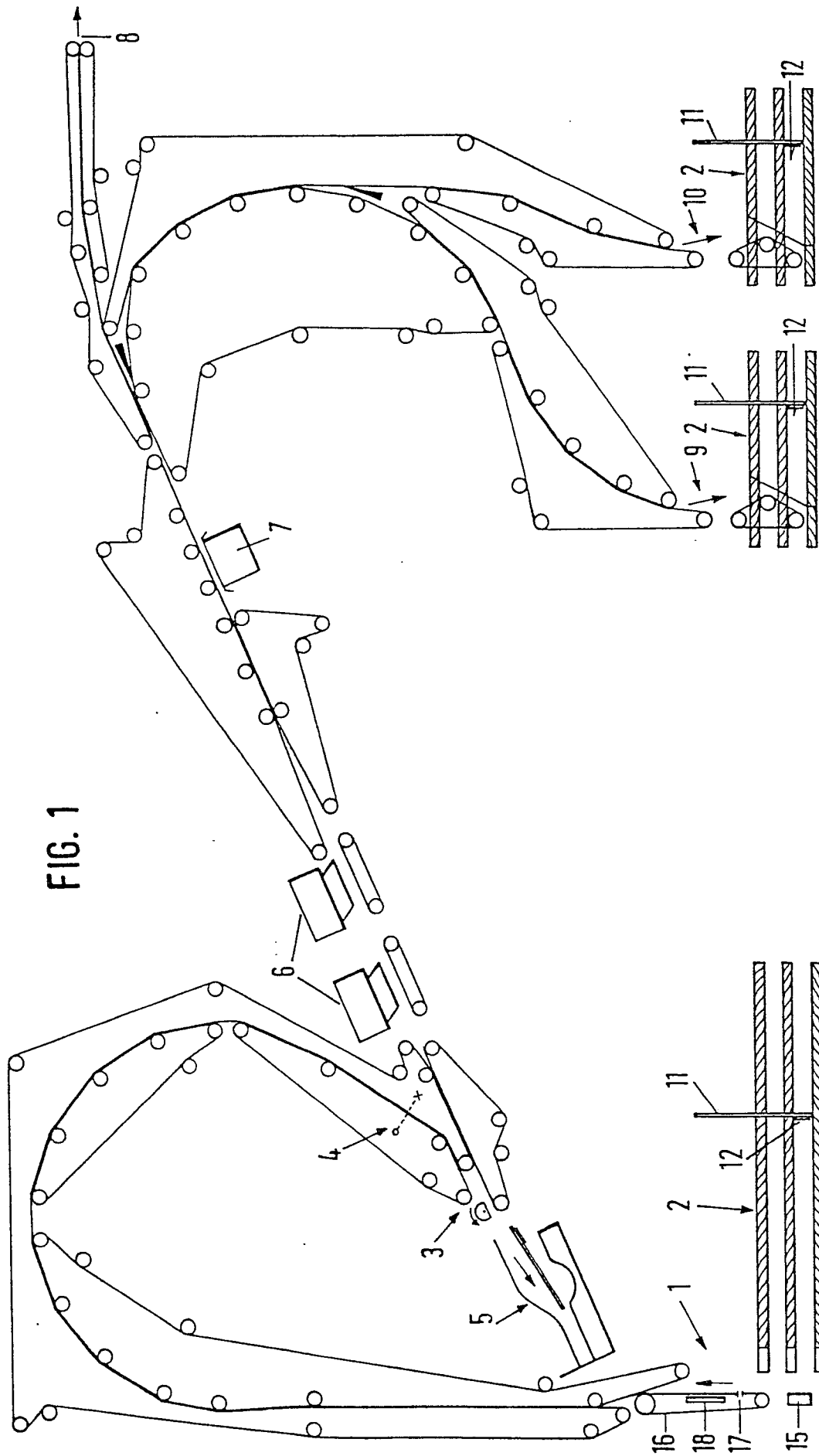
the take-off device 1 is temporarily stopped (stop-signal line 25).
By measuring the lengths of the letters by means of the photo-
detector 20 the store 21 knows what lengths the take-off device 3''
can expect. A detector 26 informs the processor 22 of the passage of
5 a letter, after which the processor 22 delivers pulses to the take-
off device 3'' at the right moment. This is elucidated with the help
of Figs. 7 and 8.

According to Fig. 7 the detector 26 detects the leading edge of a let-
ter 11. The lengths of the letters plus the distances 14 between them
10 are determinative for the moment when the next letter has to be de-
tected. To realize this a pulse (i) has to be delivered to the take-
off device a fixed time T (indicated as a distance T in Fig. 7) earlier.
The processor 22 calculates the time t (also drawn as a distance), which
is between the detection point and the moment a pulse is delivered.
15 According to Fig. 8 the detector 26 detects the trailing edge of a
letter 11. Now the length of the next letter is an important factor
to determine the time t.

In practice the distance between the letters can be 12.5 ± 3.6 cm,
in which case the capacity can be from 30,000 to 40,000 letters per
20 hour.

Claims:

1. Take-off system for taking off letters and the like, comprising a first take-off device into which the letters are supplied in an upright position on a transport bed from where they can be conveyed one by one to a reversing station for reversing the direction of movement, and further comprising an outlet for separating letters with a non-acceptable length from the stream, characterized in that the reversing station (3) is formed by the combination of a stacker (3') and a second take-off device (3''), the moment when a next letter is taken off being determined by the signal from a photodetector (26) concerning the passage of the letters taken off by said second take-off device, and by the information from a measuring point (20) with regard to the lengths of the letters which are supplied to the stacker (3').
2. Take-off system in accordance with claim 1, characterized in that the measuring point (20) is connected to a processor (22) via a store; in that the photodetector (26) is also connected to the processor, and in that means are provided by which the processor (22) can put the second take-off device into operation for a short moment at calculated points of time.
3. Take-off device in accordance with claim 2, comprising a perforated belt moving past a suction chamber, characterized in that the perforated belt (16) has many holes, and in that means are provided for applying short vacuum pulses to the suction chamber (18).
4. Take-off device in accordance with claim 2, characterized in that the stacker (3') is provided with a "full" detector (24), and in that the first take-off device (1) can be controlled by means of the detection signal (stop-signal line 25).



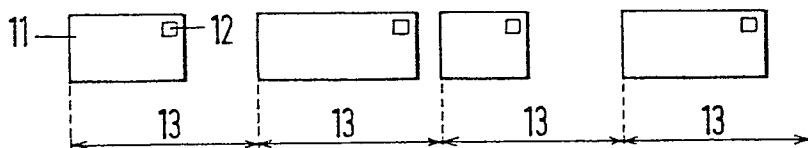


FIG. 2

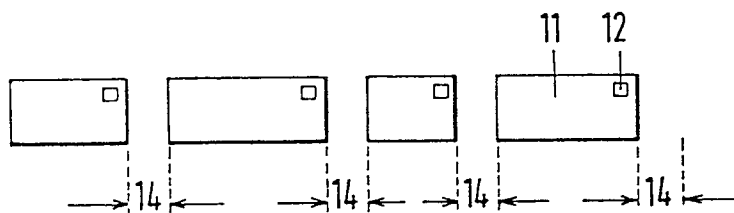


FIG. 3

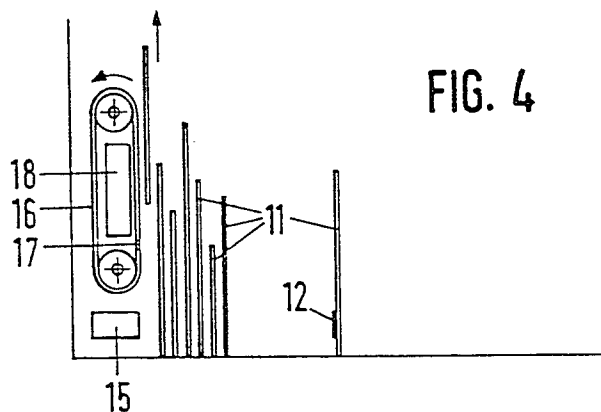


FIG. 4

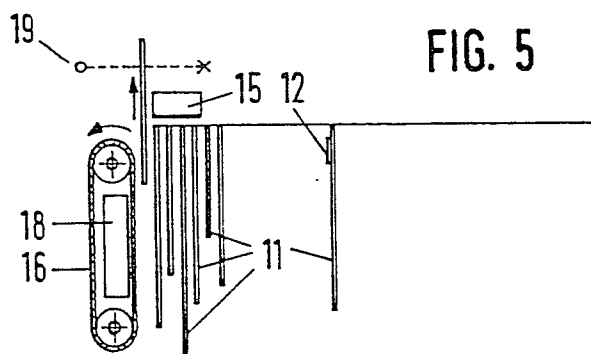


FIG. 5

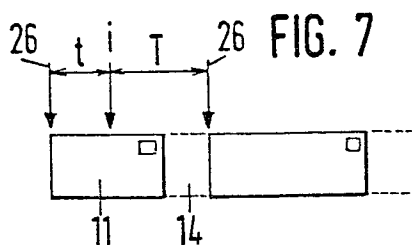


FIG. 7

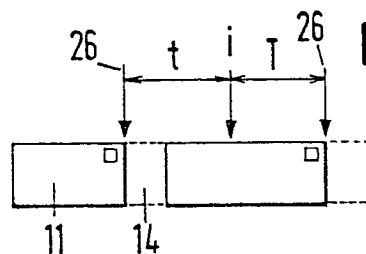
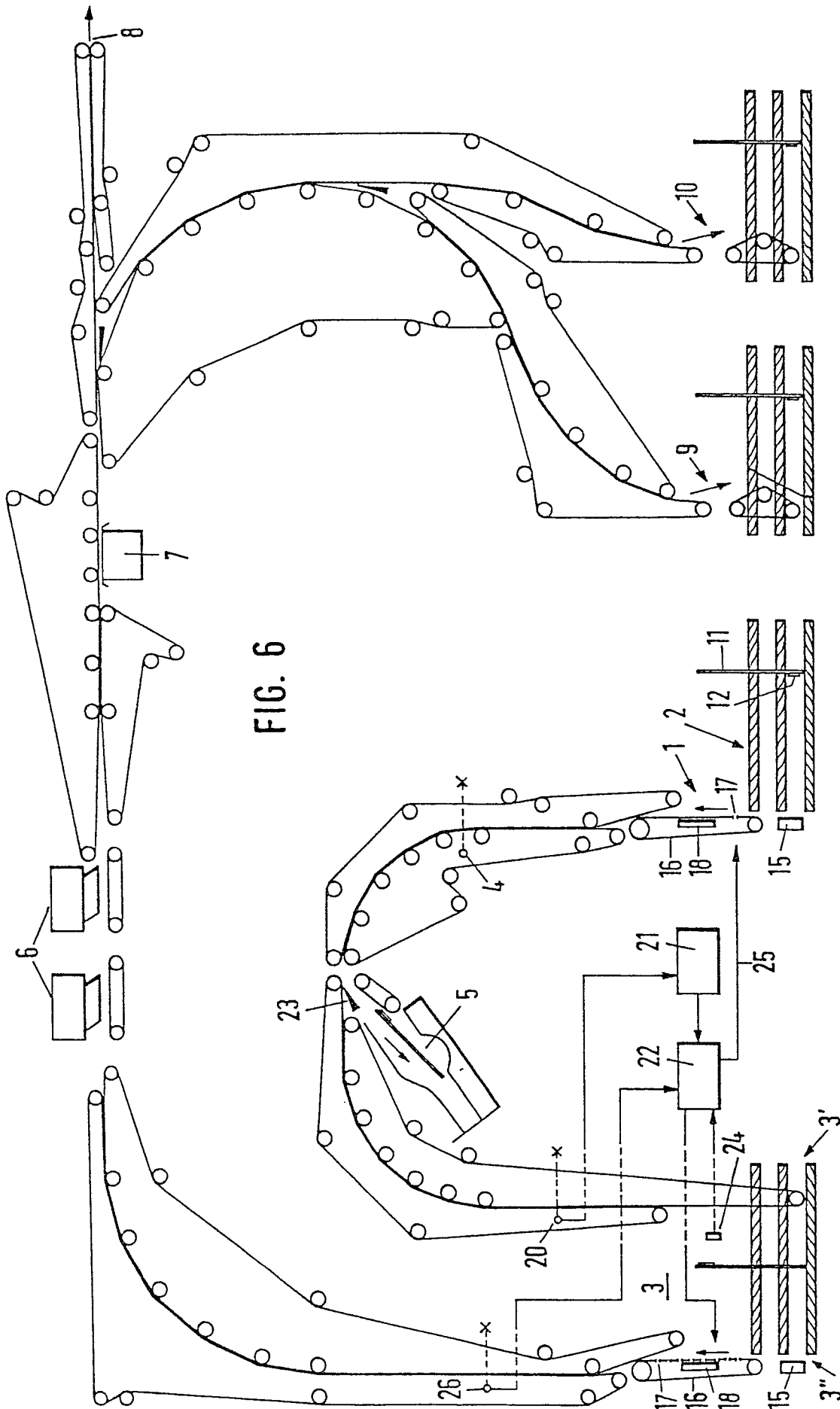


FIG. 8





European Patent
Office

EUROPEAN SEARCH REPORT

0036237

Application number

EP 81 20 0289

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl. 7)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
	<p>DE - B - 1 243 108 (TELEFUNKEN PATENTVERWERTUNGS GmbH)</p> <p>* figures 1 and 2; column 3, line 10 to column 5, line 8 *</p> <p>--</p> <p>US - A - 3 724 657 (TAKEO KATAGIRI)</p> <p>* figure 3; column 4, line 40 to column 5, line 24 *</p> <p>--</p> <p>US - A - 3 604 702 (TAKEO KATAGIRI)</p> <p>* figures 1 and 2; abstract *</p> <p>--</p> <p>DE - A - 2 419 630 (TOKYO SHIBAURA ELECTRIC CO.)</p> <p>* figures 1 to 10; pages 2 and 3; pages 5 to 8 *</p> <p>--</p> <p>A DE - B - 1 431 001 (TELEFUNKEN PATENTVERWERTUNGS GmbH)</p> <p>* figure 1; columns 1 to 5 *</p> <p>--</p> <p>A GB - A - 1 094 917 (SIEMENS A.G.)</p> <p>* figures 1 to 4 *</p> <p>--</p> <p>A FR - A - 2 278 410 (STAAT DER NEDERLANDEN P.T.T.)</p> <p>D & NL - C - 160 743</p>	<p>1,3</p> <p>1</p> <p>1</p> <p>1,2,3</p> <p>2,4</p> <p>1</p> <p>1,2</p>	<p>B 07 C 1/02 1/18</p> <p>TECHNICAL FIELDS SEARCHED (Int. Cl. 7)</p> <p>B 07 C 1/02 1/04 1/06 1/10 1/12 1/14 1/18 1/20 3/06</p> <p>CATEGORY OF CITED DOCUMENTS</p> <p>X: particularly relevant A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: conflicting application D: document cited in the application L: citation for other reasons</p> <p>& member of the same patent family, corresponding document</p>
<p>The present search report has been drawn up for all claims</p>			
Place of search	Date of completion of the search	Examiner	
The Hague	17-06-1981	PESCHEL	