(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 0 860 359 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
26.08.1998 Bulletin 1998/35

(51) Int Cl.[6]: **B65B 19/34**

(21) Application number: **98830075.2**

(22) Date of filing: **19.02.1998**

(84) Designated Contracting States:
AT BE CH DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **21.02.1997 IT FI970029**

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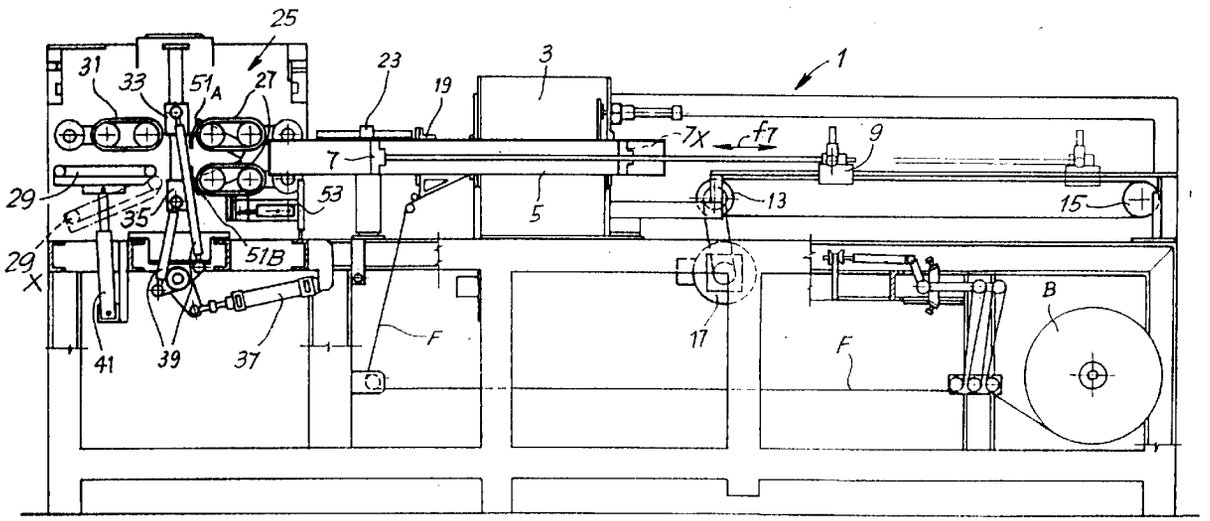
(54) Method and machine for forming packs of loose product using sealable film

(57) The machine comprises: means (5, 7) for feeding the loose material (P); feed means (27, 29, 31) and shaping means (19) for feeding the said continuous film (F) from which the packs (C_0, C_1, C_2) are formed; a first (27) and a second (29) means for advancing the packs being formed along an approximately horizontal path; and a cutting and sealing member (33, 35) located between the said first (27) and the said second (29) advance means. The second advance means (29) can be inclined downwards so that any product residues slide away from the sealing area.

FIG. 1



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Description

Technical Field

The present invention relates to a machine for packaging a loose product, for example a foodstuff, and in particular (but not exclusively) an elongated product such as, for example, long pasta, in a pack formed by sealing and cutting a continuous film.

Prior Art

At the present time, the machines used to package long pasta have a tube or channel into which predetermined amounts of product are unloaded and are then pushed into a tubular film which is formed around the product advancing channel using sheet film. Located at the exit to the channel are a first and a second means for advancing the packs being formed, with a sealing and cutting jaw positioned between the said means and forming transverse sealing and cutting lines in the film in order to form the packs of product one after the other.

Particularly when the product to be packaged is pasta, the feeding, weighing and loading operations involved can cause the product to break, forming small pieces or residues. These are often left behind in the area where the sealing and cutting jaws operate, with the result that the front and rear sealing lines of each pack may include foodstuff residues. This not only constitutes a disadvantage from a technical viewpoint, it also ruins the look of the product and may put the consumer off choosing it.

The object of the present invention is to provide a packaging machine and method that do away with the disadvantages described above.

Summary of the Invention

The present invention basically provides a machine for packaging loose products of the type referred to above - comprising first and second means for advancing the packs being formed along an approximately horizontal path, and in which a cutting and sealing member is located between the first and the second advance means - in which the second advance means can be inclined downwards relative to the path of advance of the packs being formed, its motion being synchronized with the motion of the cutting and sealing member. It is thus possible to incline the pack being formed once the loose product has been inserted therein and before the rear end of the pack is sealed and cut. In this way, any product residues found in the area where the sealing and cutting are to take place, slide down to the bottom of the pack under the effect of gravity and do not obstruct the area in which the sealing and cutting members operate.

In order to prevent the formation of folds or other film feed problems upstream of the sealing area when the pack being closed is inclined downwards, in a particularly advantageous embodiment of the invention a film support element is provided underneath the path of advance of the packs, between the first advance means and the cutting and sealing member. This support element can be raisable so as to be moved from a retracted position, beneath the path of advance, into a position that approximately corresponds to the path of advance of the packs being formed. Thus, when the second pack advancing means is inclined downwards, the film upstream of the support element remains in its correct horizontal position.

The support element can consist of a first portion of a clamp having two elements, one placed above and the other below the path of advance of the packs. In this case, the clamp is closed at the same time as the pack being formed is inclined downwards, thereby clamping the tubular film in an intermediate position between the sealing and cutting member and the area for loading the loose product.

Further advantageous features and embodiments of the machine according to the invention are described in the appended claims.

The invention also relates to a method for packaging a loose product in packs formed by sealing and cutting a continuous film, comprising the following stages:

- making a flat film into a tubular film by joining its longitudinal edges and sealing them together;
- creating a first transverse sealing line in the said tubular film so as to close the front end of a first pack;
- inserting a predetermined amount of the said product into the said first pack;
- advancing the said first pack along an approximately horizontal path; and
- creating a second transverse sealing line in the said film so as to close the rear end of the pack and cutting the film transversely so as to separate the first pack from the film.

According to the invention, the method is characterized in that the pack being formed is temporarily inclined downwards before the second sealing line is formed and cut, so that any product residues in the sealing area slide away under the effect of gravity.

Further advantageous features of the method according to the invention are listed in the appended claims.

Brief description of the drawings

A better understanding of the invention will be gained by following the description and accompanying drawing, the latter showing a practical, non-limiting example of the said invention. In the drawing:

Fig. 1 shows a diagrammatic general side view of a machine for packaging long pasta; and

Figs 2 to 5 show the successive operational phases of the machine, the diagrams being limited to the sealing and cutting area.

Detailed description of the invention

In the following description the invention is described as applied to a machine designed specifically for packaging long pasta, such as spaghetti, bucatini or the like; however, it should be understood that the same inventive principle can also be applied to other machines, including machines for packaging products of a different kind, while achieving the same objectives and the same advantages.

Referring initially to Fig. 1, the machine - denoted overall by the reference 1 - has a loading area 3 into which weighed batches of product to be packaged are unloaded one after the other, collecting in a subjacent horizontal tube or channel 5. Located inside the tube 5 is a piston 7 which has a reciprocating motion as shown by the arrow f7 and is controlled by means of, for example, a pusher element 9 attached to a belt 11 that runs around two pulleys 13, 15, one of which is driven by a brushless motor 17 which imparts a reciprocating motion to the belt 11. In Fig. 1 the dashed lines show the position 7X in which the piston 7 is fully retracted and in which it is located when the loose product is unloaded into the channel 5.

Positioned around the channel 5 is a shaping collar 19, of a type known per se and not described in detail, around which is shaped a sealable plastic film F which is unwound from a reel B located in the bottom of the machine (on the right-hand side in the figure). Located downstream of the shaping collar 19, which folds the flat film so as to join its longitudinal edges, is a longitudinal sealing unit 23 which seals the longitudinal edges of the film F in order to form a tubular film which is then sealed and cut along transverse lines to form the product packs once the product to be packaged has been inserted.

The reference 25 generically denotes the station in which the film is sealed and cut transversely to form the individual packs. Located in the station 25 is a first means for advancing the packs being formed, consisting of a pair of flexible conveyors or belts 27 which have the dual function of advancing the packs being formed and of entraining the film F so as to unwind it from the reel B and pull it through the shaping collar 19 and through the longitudinal sealing unit 23.

Located downstream of the first pair of conveyors 27 is a second feed means consisting of a lower conveyor 29 and an upper belt 31. Both these elements also have the function of advancing the packs being formed and entraining the film.

Located between the first advance means 27 and the second advance means 29 is a pair of sealing and cutting jaws 33 and 35 which are opened and closed by a cylinder and piston actuator 37 via lever mechanisms denoted overall by the reference 39 and of a type known per se.

According to the invention, the advance means 29, which consists of a flexible conveyor or equivalent device, is mounted so that it can pivot downwards and assume the inclined position 29X indicated by dashed lines in Fig. 1. This movement is controlled by a cylinder and piston actuator 41. Fig. 4 shows the moving element 43 on which are mounted the rollers 45, 47 around which the conveyor 29 travels. The moving element 43 is hinged about an axis A-A located between the sealing and cutting jaws 33, 35 and the advance means 27, for reasons which will be explained below. Jaws 33, 35, each of which has a pair of sealing bars 33A, 33B and 35A, 35B are shown in greater detail in Fig. 4 and in the remaining Figs 3 and 5, a cutting blade 34 being positioned between the sealing bars 33A, 33B and engaging in a channel 36 formed between the sealing bars 35A, 35B.

Positioned between the advance means 27 and the sealing and cutting jaws 33 and 35 is a clamp 51 formed by two portions 51A, 51B, the first placed above and the other below the path of advance of the packs in the machine. The clamp 51 is opened and closed by a cylinder and piston actuator 53, diagrammatically indicated in Fig. 1, via a suitable lever mechanism which is not shown.

The way in which the machine described above works will be explained with reference to Figs 2 to 5 in particular.

Fig. 2 shows the position of the machine when a pack C_0 of product P has been formed and is located between the belt 31 and the conveyor 29. The sealing and cutting jaws 33, 35 are in the closed position and have just formed a rear transverse sealing line in the pack C_0 and a front transverse sealing and cutting line in the next pack being formed, denoted C_1. The latter is located between the belts 27. The product P1 which is to be packaged in the pack C_1 has been inserted by the piston 7 so that it takes up all the available space between the piston 7 and the front sealing line formed by the sealing bars 33B, 35B of the jaws 33, 35.

Fig. 3 shows the next stage, in which the sealing and cutting jaws 33, 35 have been opened and, by activating the conveyor 29 and the belts 27, 31, the film has been made to advance by a distance equivalent to the length of a pack. The pack being formed, denoted C_1, is now between the conveyor 29 and the belt 31, in a position ready to be transversely sealed at the rear and cut to separate the pack C_1 from the next pack. The piston 7 has been retracted so as to allow a new batch of product to be loaded into the tube or channel 5. At this stage in the process, pieces or residues of product, indicated diagrammatically by the letter R, may be found in the area in which the jaws 33, 35 operate.

In order to remove the pieces and residues from the sealing and cutting area, the conveyor 29 is made to pivot downwards so as to assume the inclined position indicated in Fig. 4. Since the pivoting axis A-A of the

conveyor 29 is located upstream of the sealing and cutting jaws 33, 35, inclining the pack downwards allows all the residues found in the sealing and cutting area to slide away.

In order to keep the film F in the correct position in the area upstream of the position of the sealing jaws, the clamp 51 has been closed, causing the portions 51A, 51B to meet approximately on the path of advance of the packs being formed. The lower portion 51B therefore forms a support for the film F, preventing it from being pulled downwards in the area in which the belts 27 operate. For even greater reliability, the film is also held in place by the upper portion 51A of the clamp, even though, in theory, the lower support formed by the portion 51B should be sufficient.

The machine then returns from the position shown in Fig. 4 to that shown in Fig. 5 (corresponding to that of Fig. 2) by closing the closing and cutting jaws 33, 35 and raising the conveyor 29, at which point the piston 7 can advance and push a new batch of product P2 towards the closed jaws 33, 35, the clamp 51 having been opened in the meantime. At this stage the pack C_1 has been completed, the rear sealing line having been formed by the sealing bars 33A, 35A and cut by the blade 34, and formation of the next pack C_2 containing the product P2 is started between the belts 27.

It should be understood that the drawing shows only one example which is given solely by way of practical demonstration of the invention, the forms and arrangements of which can vary without thereby departing from the scope of the underlying concept of the said invention. The presence of any reference numerals in the appended claims has the function of facilitating the reading of the claims with reference to the description and to the drawing and does not limit the scope of protection represented by the claims.

Claims

1. Machine for packaging a loose product in a pack formed by sealing and cutting a continuous film (F), comprising:

   - means (5, 7) for feeding the loose material (P);
   - feed means (27) and shaping means (19) for feeding the said continuous film (F) from which the packs (C_0, C_1, C_2) are formed;
   - a first (27) and a second (29) means for advancing the packs being formed along an approximately horizontal path; and
   - a cutting and sealing member (33, 35) located between the said first (27) and the said second (29) advance means;

   characterized in that
   the said second advance means (29) can be inclined downwards relative to the path of advance of the packs being formed, its downward motion being synchronized with the motion of the cutting and sealing member.

2. Machine according to Claim 1, characterized in that an element (51B) for supporting the film (F) is positioned underneath the path of advance of the packs being formed, between the first advance means (27) and the cutting and sealing member (33, 35).

3. Machine according to Claim 2, characterized in that the said support element (51B) can be moved upwards, towards the path of advance of the packs being formed.

4. Machine according to Claim 2, characterized in that the said support element (51B) consists of a clamp (51) having two elements (51A, 51B), the first placed above and the other below the path of advance of the packs being formed.

5. Machine according to Claim 4, characterized in that when the said clamp (51) is in the closed position, the two elements that make it up clamp the film approximately on the path of advance of the packs being formed.

6. Machine according to one or more of the preceding claims, characterized in that the said second advance means (29) consists of a continuous flexible conveyor that travels around two cylinders (45, 47), carried by a movable element (43) that pivots about an approximately horizontal axis (A-A) located upstream of the conveyor (29) relative to the direction of advance of the packs being formed.

7. Method for packaging a loose product in packs formed by sealing and cutting a continuous film (F), comprising the following stages:

   - making a flat film into a tubular film by joining its longitudinal edges and sealing them together;
   - creating a first transverse sealing line in the said tubular film (F) so as to close the front end of a first pack (C_1);
   - inserting a predetermined amount of the said product (P_1) into the said first pack;
   - advancing the said first pack (C_1) along an approximately horizontal path; and
   - creating a second transverse sealing line in the said film so as to close the rear end of the pack (C_1) and cutting the film transversely so as to separate the first pack (C_1) from the film (F),

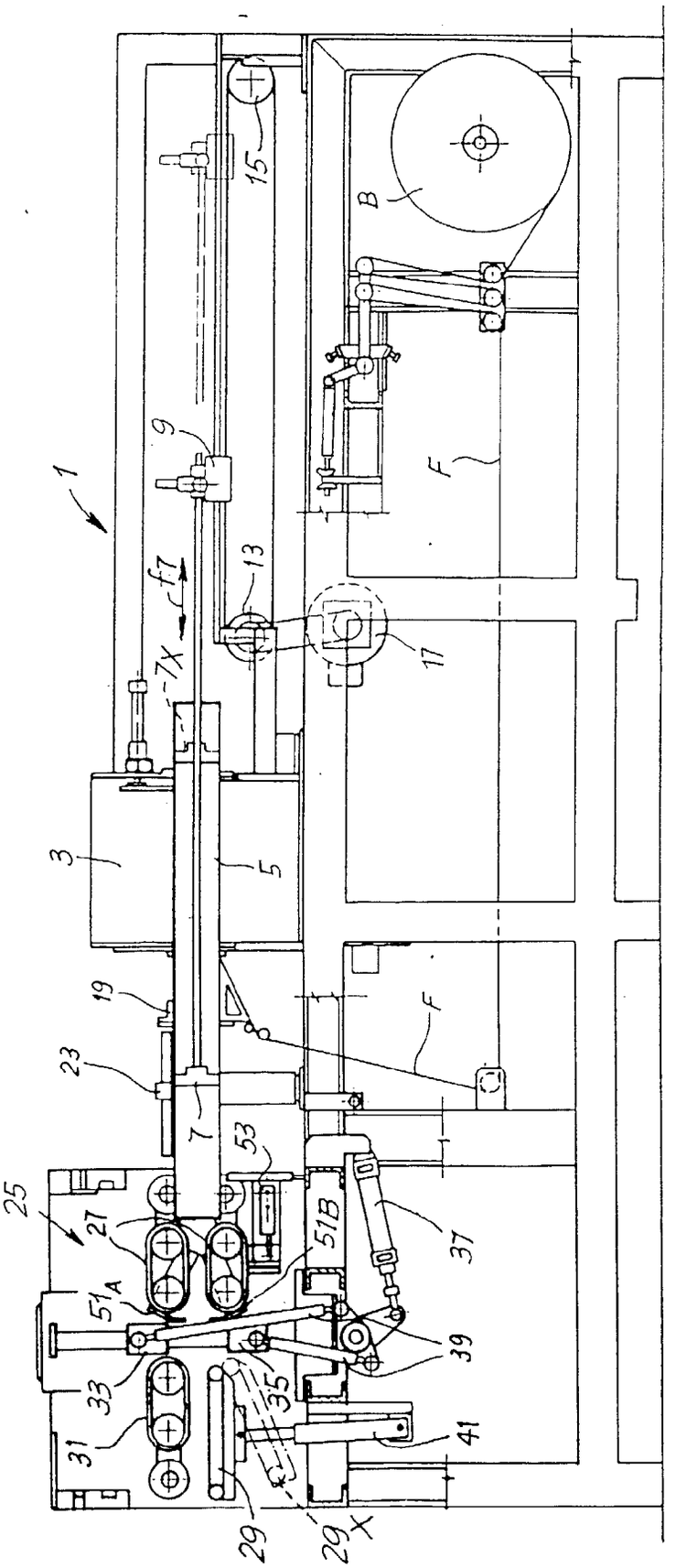
   characterized in that the pack being formed is temporarily inclined downwards before the said second sealing line is formed, so that any product residues

slide away from the sealing and cutting area under the effect of gravity.

8. Method according to Claim 7, characterized in that a point (51B) for supporting the tubular film is formed upstream of the area in which the said second sealing line is to be formed, the said support point (51B) being located approximately on the path of advance of the packs being formed, the said support point being retracted from the said path so as to allow the packs being formed to advance.

9. Method according to Claim 8, characterized in that the tubular film forming the packs is clamped at the said support point.

FIG. 1


1
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9
13
15
17
19
21
23
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27
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29X
31
33
35
37
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51A
51B
53
B
F
F
F7
7X

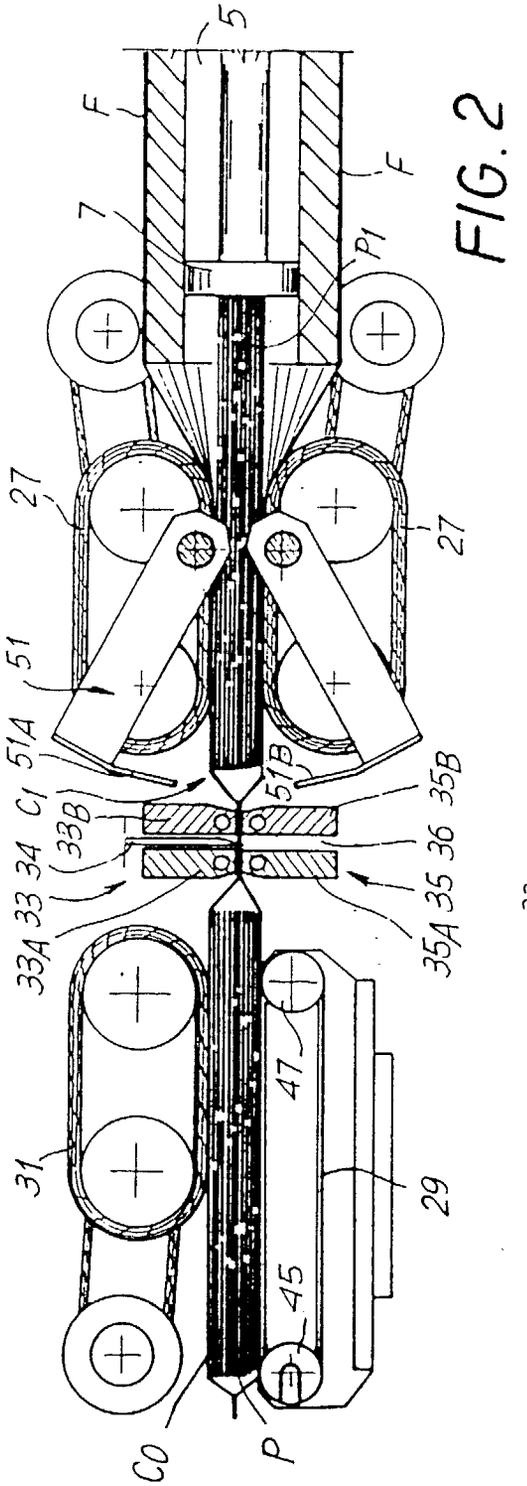
5
F
7
P1
27
51
51A
51B
C1
33B
33
34
33A
35B
36
35
35A
47
31
29
45
C0
P

FIG. 2

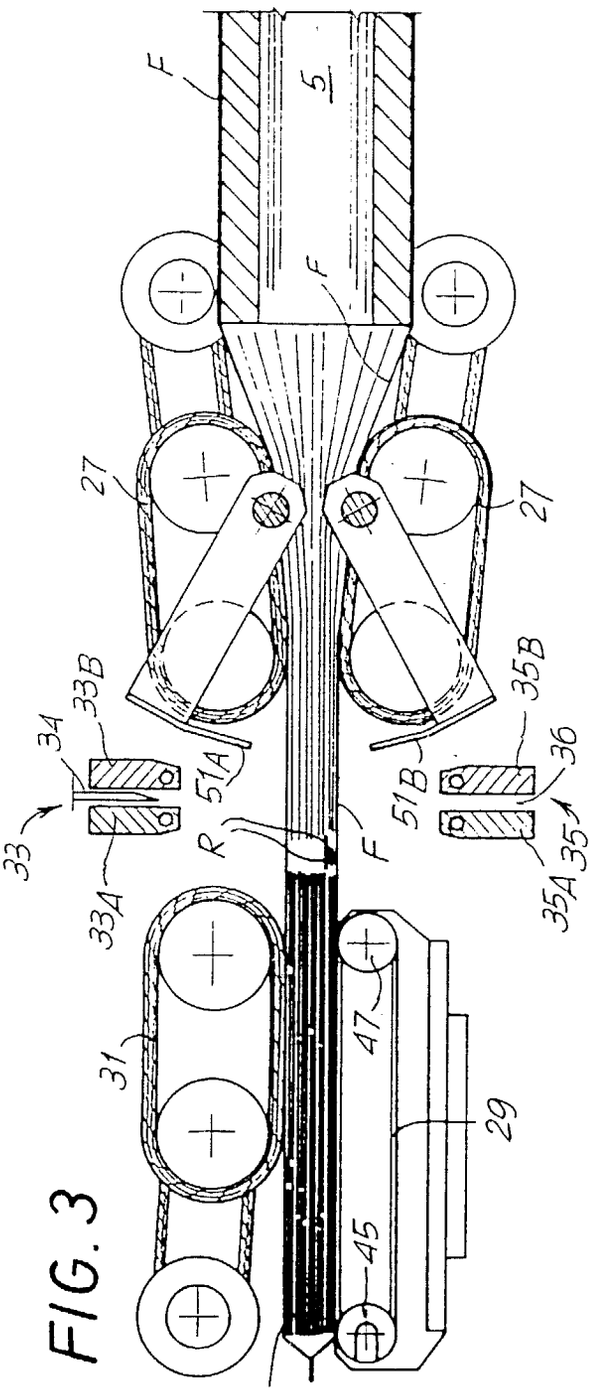
F
5
27
33B
34
51A
35B
36
33
R
51B
33A
35
35A
31
47
29
45

FIG. 3

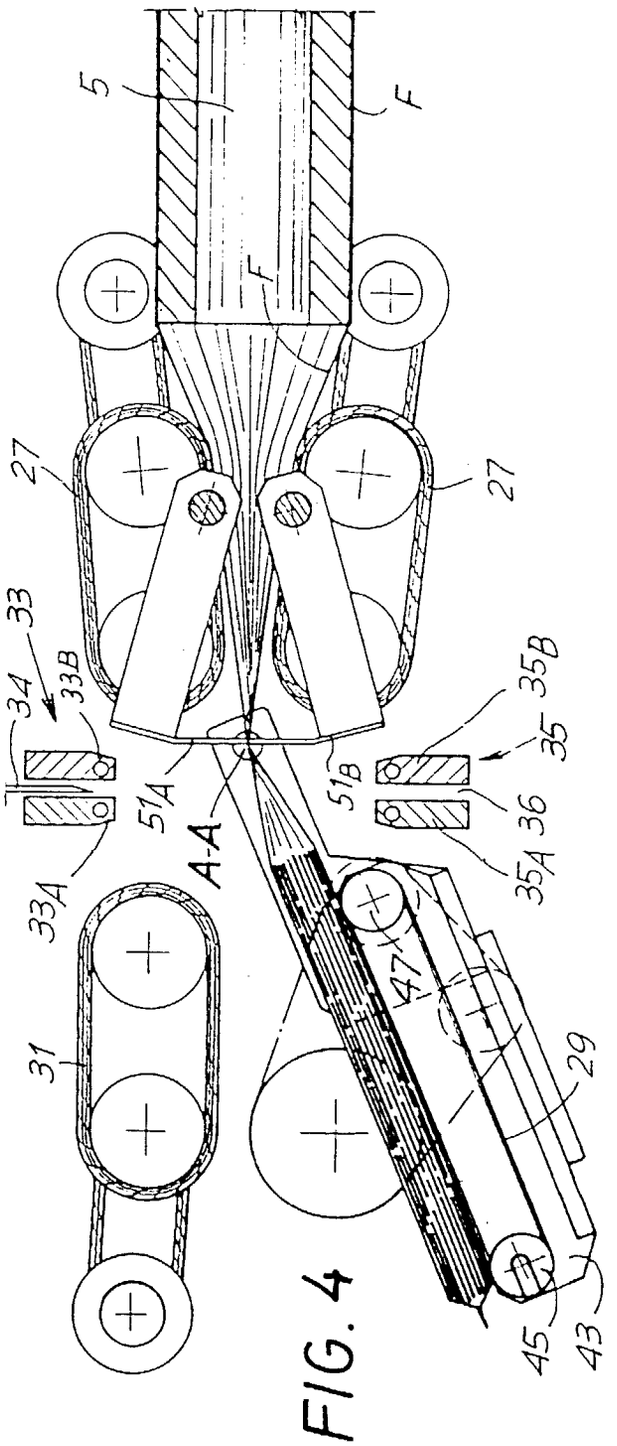
5
F
27
33
34
33B
33A
51A
A-A
51B
35B
35
36
35A
31
47
29
45
43

FIG. 4

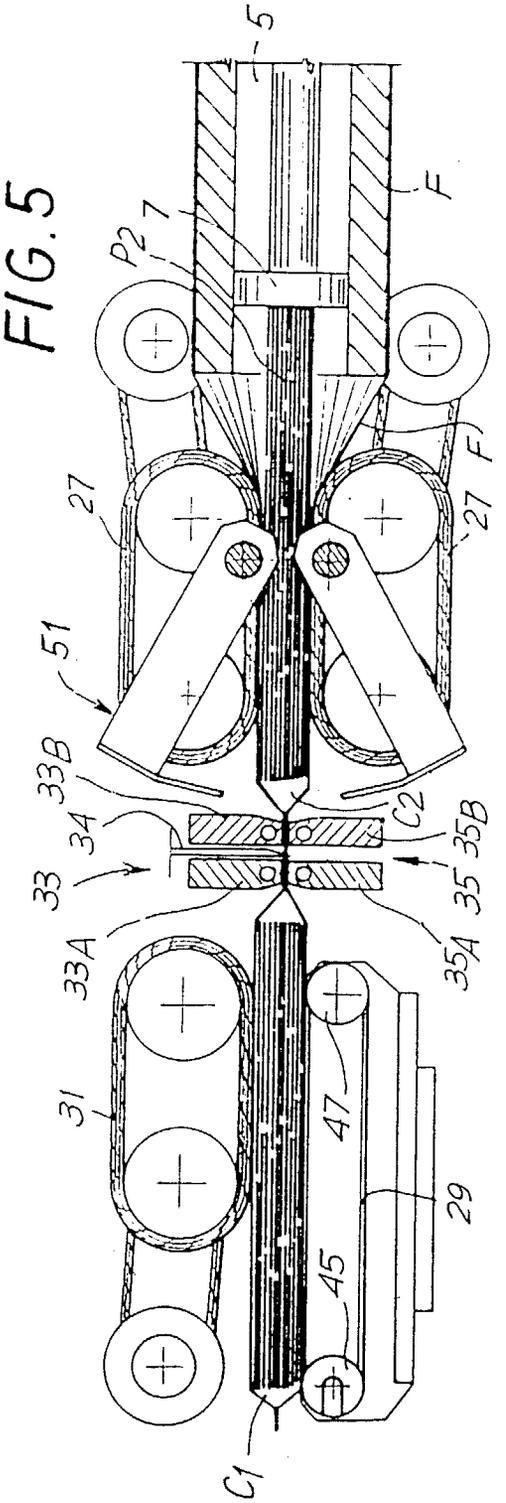
5
P2
7
F
27
51
33B
34
C2
33
35B
35
35A
33A
31
47
29
45
C1

FIG. 5

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 98 83 0075

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 27 34 526 A (BOSCH) * the whole document *	1,7	B65B19/34
A	FR 1 498 142 A (HOLWEG) * the whole document *	1,7	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

B65B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	18 May 1998	Claeys, H

CATEGORY OF CITED DOCUMENTS

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