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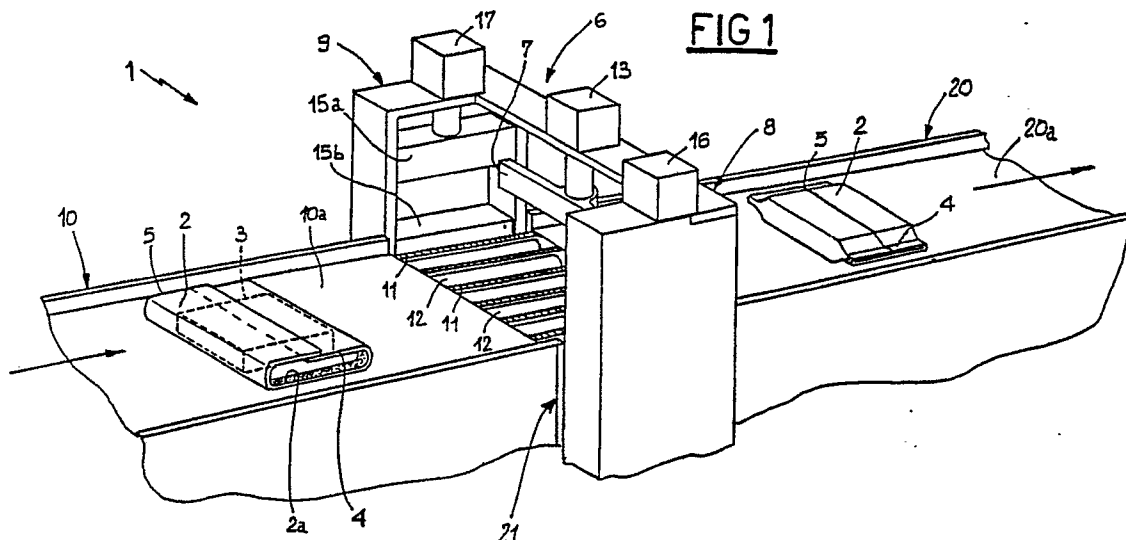
54 Method and equipment for sealing wrappings in the packaging of articles.

57 The method and equipment as described perform the sealing of wrappings (2) each consisting of a sheet wrapped around an article. The articles reach, singly and in sequence, a sealing station (6) equipped with dragging belts (11) which drive the article against an abutment (7) to orientate it with the wrapping ends aligned perpendicularly to the direction of the belt feed motion.

The article is lifted by rollers (12) moving up and down between the dragging belts, and rotatively

actuatable.

Thanks to rollers rotation, the article is shifted perpendicularly to the direction of dragging belts feed motion so as to subject, singly and in sequence, the opposite ends of the wrapping to the action of two sealing groups (8, 9) operating at opposite sides of the sealing station. Subsequently, the rollers are lowered and the packaged article is taken away from the sealing station by means of the dragging belts.



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## METHOD AND EQUIPMENT FOR SEALING WRAPPINGS IN THE PACKAGING OF ARTICLES

The present invention relates to a method and equipment for sealing wrappings in the packaging of articles, each of said wrappings consisting of a sheet of paper-material provided with a layer of adhesive material along at least three perimetrical edges thereof and wrapped substantially according to a tubular configuration around the article, said wrapping being arranged to be sealed at the opposite ends of said tubular configuration by a mutual overlapping of those edges having the adhesive layer interposed therebetween.

As it is known, many articles, such as books, fabrics, handworks for clothing or other, are packaged into wrappings simply formed by a sheet of paper-material provided with a layer of adhesive material applied on at least three perimetrical edges. The sheet is wrapped according to a substantially tubular configuration around the article to be packaged, so that two longitudinal edges are overlapped each other and fixed by the adhesive layer interposed therebetween. Subsequently, the sealing of the opposite ends is also carried out by compression, one on the other, the corresponding edges of the sheet so as to obtain a mutual fixing by means of the adhesive layer applied thereto.

As can be easily realized, the packaging of articles in the above referred manner occurs in a very practical and fast way. However, it is to be pointed out that up to now all the necessary operations for wrapping the sheet around the article and performing the subsequent sealing of the ends of the obtained wrapping, are carried out manually.

All this clearly represents a considerable increase in labor costs for the packaging of articles.

Hence, the main object of the present invention is to overcome, at least partially, the problems of the prior art through a method and equipment which allow to carry out, in a wholly automatic way, the sealing of the opposite ends of the wrapping, wound around the article to be packaged.

Another object of the present invention is to carry out the sealing of the wrapping in a very reliable way, independently of the dimensions of the wrapping or of the article contained therein.

These objects and other yet, which will be evidenced in the following description, are achieved substantially with a method for sealing wrappings in the packaging of articles, characterized by the steps of: conveying the articles toward a sealing station, each article having its wrapping arranged with the ends open and reciprocally aligned in a direction transversal to the feed direction of the article itself; arranging singly and in sequence the articles on the sealing station; shifting the article arranged on the sealing station ac-

5 cording to its feed direction during said conveying step, to carry it in abutment with a reference guide, in order to orientate the article with the wrapping ends aligned perpendicularly to said feed direction; lifting slightly the article; shifting the article in a direction perpendicular to its feed direction during the conveying step, to carry a first end of the wrapping into engagement with a first sealing group operating at a side of the sealing station; 10 sealing the wrapping end upon action of the sealing group; shifting the article in a direction opposite to the preceding shifting step in order to carry the second end of the wrapping into engagement with a second sealing group operating at the side of the sealing station opposite to the first sealing group; 15 sealing the second end of the wrapping upon action of the second sealing group; shifting the article to the center of the sealing station; lowering again and shifting the article in its feed direction during the conveying step, in order to take it away from the sealing station.

Further characteristics and advantages will be more evident from the following description of a preferred but not exclusive embodiment of a method and equipment for sealing wrappings in the packaging of articles, according to the present invention. Such description will be taken in the following reference to the attached drawings, given as an indicative and therefore not limitative example, in which :

-figure 1 shows schematically, in a perspective view, the equipment according to the present invention;

-figure 2 is a schematic cross-section of the sealing station during the positioning step of the article to be packaged;

-figure 3 is a cross-section of the sealing station during the lifting of the article;

-figure 4 shows, in a schematic cross-section, the sealing of a first wrapping end containing the article;

-figure 5 is a cross-section of the sealing station during the sealing of the second wrapping end;

-figure 6 shows, still in a schematic cross-section view, the sealing station arranged to carry out the taking away of the packaged article.

With reference to the above cited figures, and more particularly to figure 1, reference numeral 1 indicates as a whole, an equipment for sealing wrappings in the packaging of articles, according to the present invention.

The equipment 1 carries out the sealing of conventional wrappings 2 consisting substantially of a sheet of paper-material having at least three perimetrical edges provided with an adhesive layer,

partially visible and indicated by 2a in figure 1. Before being subjected to the action of the equipment 1, the sheet forming the wrapping 2 is wound, manually or by means of suitable automatic equipments, around an article 3 to be packaged so that two edges of the sheet itself are reciprocally overlapped and fixed, one on the other, through the adhesive layer there-between interposed. In this situation, the wrapping 2 extends around the article 3 according to a tubular configuration and has a first end 4 and a second end 5 ready to be sealed by means of the invented equipment.

According to the present invention, the equipment 1 carries out the sealing of wrapping 2 according to a method comprising the steps of:

- conveying the articles 3 toward a sealing station 6, each article 3 having its wrapping 2 arranged with the ends 4, 5 open and mutually aligned transversally to the feed direction of the article;
- arranging singly and in sequence the articles 3 on the sealing station 6;
- shifting the article 3 arranged on the sealing station 6 according to its feed motion during said conveying step, until carrying it in abutment with a reference guide 7 in order to orientate the article with the ends 4, 5 of wrapping 2 aligned perpendicularly to said feed direction;
- lifting slightly the article 3;
- shifting the article 3 in a direction perpendicular to its feed motion during conveying, until a first end 4 of wrapping 2 comes into engagement with a first sealing group 8 operating at one side of the sealing station 6;
- sealing the end 4 of wrapping 2 upon action of the sealing group 8;
- shifting the article 3 in a direction opposite to the previous shifting step in order to lead the second end 5 of wrapping 2 in engagement with a second sealing group 9 operating at the side of the sealing station 6 opposite to the first sealing group 8;
- sealing the second end 5 of wrapping 2 upon action of the second sealing group 9;
- shifting the article 3 to the center of the sealing station 6;
- lowering again and shifting the article 3 in its feed direction during the conveying step for taking it away from the sealing station 6.

To this end, the apparatus 1 includes a feed line 10 along which are conveyed, through a conveyor belt 10a or other equivalent means, the articles 3 which, wrapped into respective wrappings 2, are gradually laid down on the feed line itself.

More particularly, laying down of articles 3 on feed line 10 occurs in such a way that each one of wrappings 2 offer its ends 4, 5 open and aligned in a direction transversal to the feed of the articles along the feed line 10, as clearly visible in figure 1.

Located downstream the feed line 10, is said

sealing station 6, which is arranged to receive singly and in sequence the articles 3, placed on the feed line 10, in order to seal the ends 4, 5 of wrappings 2.

To this end, the sealing station 6 comprises first conveying means, preferably consisting of parallel dragging belts 11, arranged to shift the article conveyed to the sealing station 6 along the feed direction of feed line 10, as well as second conveying means arranged to shift the article 3 in a direction perpendicular to that of feed of first conveying means. Preferably, the second conveying means consist of a plurality of dragging rollers 12, each interposed between two consecutive dragging belts 11 and having the respective axis extending in parallel with respect to the belts. The rollers 12 are simultaneously movable, in a substantially vertical direction, from a rest position in which they are at a lower level with respect to the lying plane of the upper edges of dragging belts 11, to an operative position in which they protrude above said lying plane of the belts (fig 3).

The former (11) and latter (12) dragging means are integrated in a module, indicated as a whole by reference numeral 21, known per se' and of conventional type, and therefore are not further described as to their structure. The module 21, previously used for sorting post parcels or similar uses, was the object of the Italian patent No. 1025846, same inventor Ing. Mario SCATA', to which reference is made for eventual further details about such a module.

The sealing station 6 further comprises positioning means arranged to operate on the article 3, which reaches the station, for setting it according to a prefixed orientation.

More precisely, the positioning means make the article 3 oriented in such a way that the ends 4, 5 of the corresponding wrapping 2 are reciprocally aligned perpendicularly to the feed direction of feed line 10, as well as of dragging belts 11.

To this end, in the illustrated embodiment, the positioning means include the aforesaid guide 7, shiftable upon command of an actuator 13, from an operative position (figure 2) in which it works over the dragging belts 11 to provide a bearing seat for the article 3, to a rest position (figures 3 to 6) in which it is lifted by the dragging belts in order to let the article 3 pass under the reference guide itself.

Arranged at the opposite sides of the sealing station 6, are respectively the above mentioned first sealing group 8 and second sealing group 9, which operate to carry out, in a way which will appear better hereinafter, the sealing of the ends 4,5 of wrapping 2 in which the article 3 is enclosed.

For this purpose, according to the illustrated embodiment, each of the sealing groups 8,9 com-

prises essentially a pair of pressure elements 14a, 14b, 15a, 15b, slidably driven in a vertical direction and closable reciprocally, for instance upon command of an actuator 16, 17 or equivalent means.

The operation of the sealing station 6 acts so that the article 3, reaching the station, is initially laid down on the dragging belts 11, as can be seen in Fig. 1. The dragging belts 11, moving forward, lead the article 3 in abutment against the reference guide 7, arranged in the operative position. In this situation, the feed of belts 11 acts so that the article 3 is oriented parallel to reference guide 7, in order that the ends 4, 5 of wrapping 2 is aligned perpendicularly to the belts themselves

Once the correct positioning of the article 3 is detected, through known and conventional means, the dragging rollers 12, initially in a rest position, are raised in an operative position so as to lift slightly the article for disengaging it from the dragging belts 11, as can be seen from figure 3.

Once the article 3 has been lifted, the reference guide 7 is restored into the rest position and the dragging rollers are simultaneously rotated clockwise in order to shift the article in a transversal direction towards right, with reference to the attached drawings. When the first end 4 of wrapping 2 gets between the pressure elements 14a, 14b of the first sealing group 8, a photoelectric cell 18, or a technically equivalent sensor, controls the stop of the dragging rollers 12 and the mutual closing of the pressure elements upon the action of the actuator 16. In this situation, as clearly evidenced in figure 4, the edges of wrapping 2 at the first end 4 are squashed one upon the other, in order to produce their mutual firm union by means of the adhesive layer 2a therebetween interposed.

The pressure elements 14a, 14b of the first sealing group 8 are open again and then, the dragging rollers 12 are rotated counterclockwise in order to shift the article 3 to the left and arrange then the second end 5 for undergoing the action of the second sealing group 9 (figure 5).

Similarly to what hereinabove referenced, when the second end 5 is interposed between the pressure elements 15a, 15b of the second sealing group 9, the actuator 17, driven by a photoelectric cell 19, causes the mutual closing of the pressure elements for obtaining the sealing of the second end 5 of wrapping 2. When the pressure elements 15a 15b of the second sealing group 9 have been open again, the dragging rollers 12 are actuated clockwise again in order to carry the packaged article 3 to the center of the sealing station 6, whereupon they are restored into the rest position. As evidenced in figure 6, the article 3 is thus lowered again and laid down on the dragging belts 11 which take it away from the sealing station 6. In a more detailed way, in the example illustrated in

figure 1 there is provided that the packaged articles are laid down on a discharge line 20 providing for the subsequent conveying of the articles through a belt conveyor 20a or other similar means.

The present invention achieves the proposed objects. Indeed, the method and equipment of the invention prove to be able to perform automatically the sealing of the opposite ends of the wrapping wherein the article to be packaged is enclosed. Evidently, to this solution corresponds evidently a great reduction of manpower employed in the prior art, for packaging the articles through the use of wrappings as above specified.

It must be noted that, thanks to the transversal shifting of the article 3 by means of the dragging rollers 12, the present invention allows to carry out the sealing of wrappings 2 independently of their sizes without requiring, for such purpose, any intervention for performing adjustments or other similar operations.

Naturally, to this invention so conceived, several modifications and variations can be introduced, all falling within the inventive sphere.

## Claims

1. Method for sealing wrappings in the packaging of articles, each of said wrapping comprising a sheet of paper-material provided with a layer of adhesive material along at least three perimetrical edges thereof and wrapped substantially according to a tubular configuration around the article, said wrapping being arranged to be sealed at the opposite ends of said tubular configuration by a mutual overlapping of the edges wherebetween the adhesive layer is interposed, characterized by the steps of :

- conveying the articles toward a sealing station, each article having its wrapping arranged with the ends open and reciprocally aligned in a direction transversal to the feed direction of the article itself;
- arranging singly and in sequence the articles on the sealing station;
- shifting the article arranged on the sealing station according to its feed motion during said conveying step, to carry it in abutment with a reference guide, in order to orientate the article with the wrapping ends aligned perpendicularly to said feed direction;
- lifting slightly the article;
- shifting the article in a direction perpendicular to its feed direction, during the conveying step to carry a first wrapping end into engagement with a first sealing group, operating at a side of the sealing station;
- sealing the wrapping end upon action of the sealing group;
- shifting the article in a direction opposite to the

preceding shifting step in order to carry the second wrapping end into engagement with a second sealing group operating at the side of the sealing station opposite to the first sealing group;

-sealing the second wrapping end upon action of the second sealing group;

-shifting the article up to the center of the sealing station;

-lowering again and shifting the article in its feed direction during the conveying step for taking it away from the sealing station.

2. Equipment for sealing wrappings in the packaging of articles, each of said wrappings comprising a sheet of paper-material provided with a layer of adhesive material along at least three perimetrical edges thereof and wrapped substantially according to a tubular configuration around the article, said wrapping being arranged to be sealed at the opposite ends of said tubular configuration by a mutual overlapping of the edges between which the adhesive layer is interposed, characterized in that it comprises:

-a feed line along which are carried the articles wrapped into their respective wrappings, each wrapping having its ends open and mutually aligned transversally to the feed of the articles along the feed line, and a sealing station located downstream and feed line and arranged to receive, singly and in sequence, the articles carried by the feed line in order to seal the ends of said wrappings, said sealing station comprising:

-first shifting means to shift, in the feed direction of the feed line, the article conveyed on said sealing station;

-positioning means effective to operate on said article for arranging it according to a prefixed orientation;

-two sealing groups placed respectively at the opposite sides of the sealing station to carry out the sealing of the wrapping ends wherein the article is enclosed;

-second shifting means, prearranged to operate after the positioning means, to shift the article perpendicularly to the feed direction of the first shifting means in order to prearrange, singly and in sequence, the wrapping ends for the sealing upon the action of the sealing groups.

3. Equipment according to claim 2, characterized in that said first shifting means comprise a plurality of dragging belts extending along the feed direction of the feed line, said second shifting means comprising a plurality of dragging rollers, each arranged between two said dragging belts according an axis parallel to the longitudinal extension of these latter, said rollers being simultaneously movable from a rest position, in which they are placed below the lying plane of the dragging belts, to an operative position in which they project above said lying

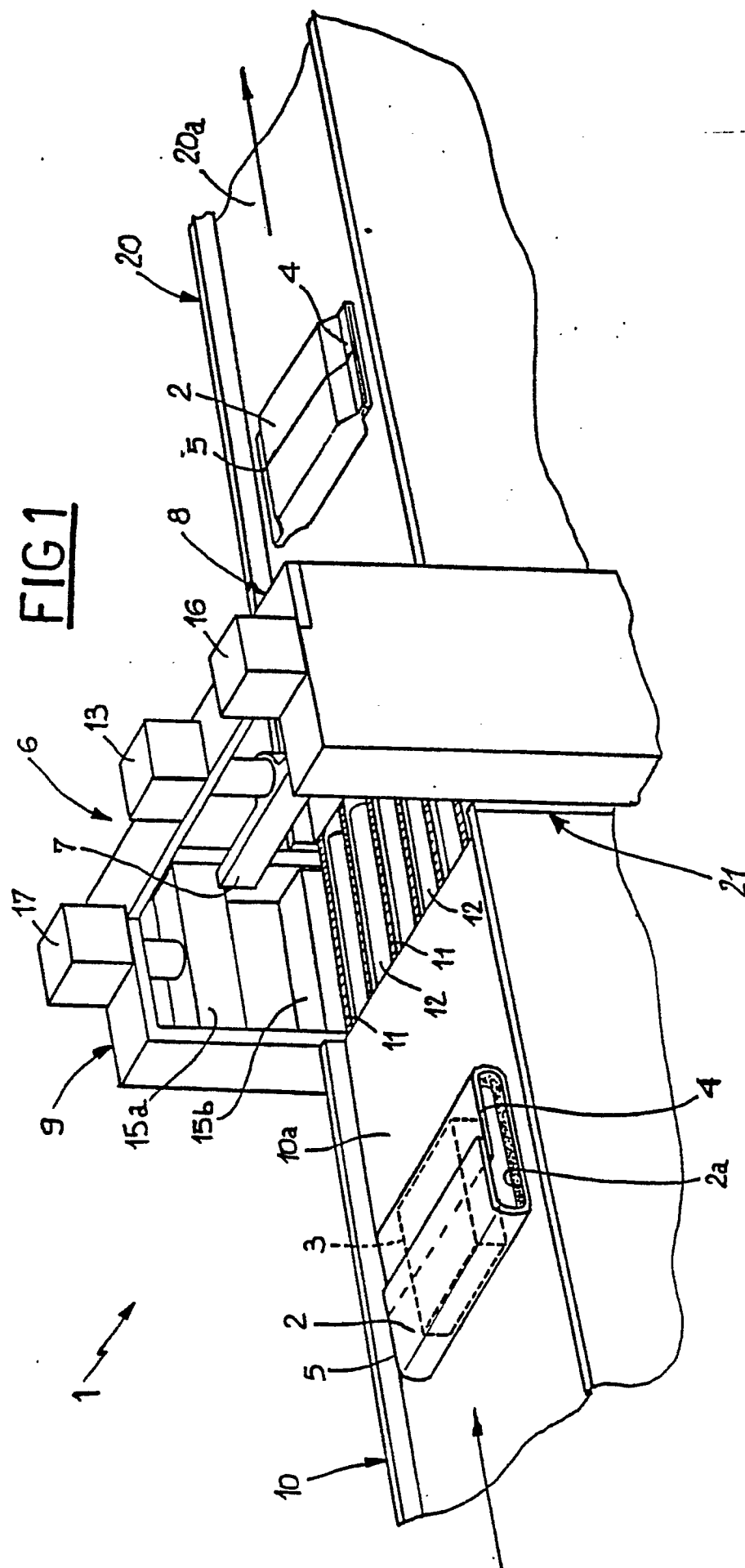
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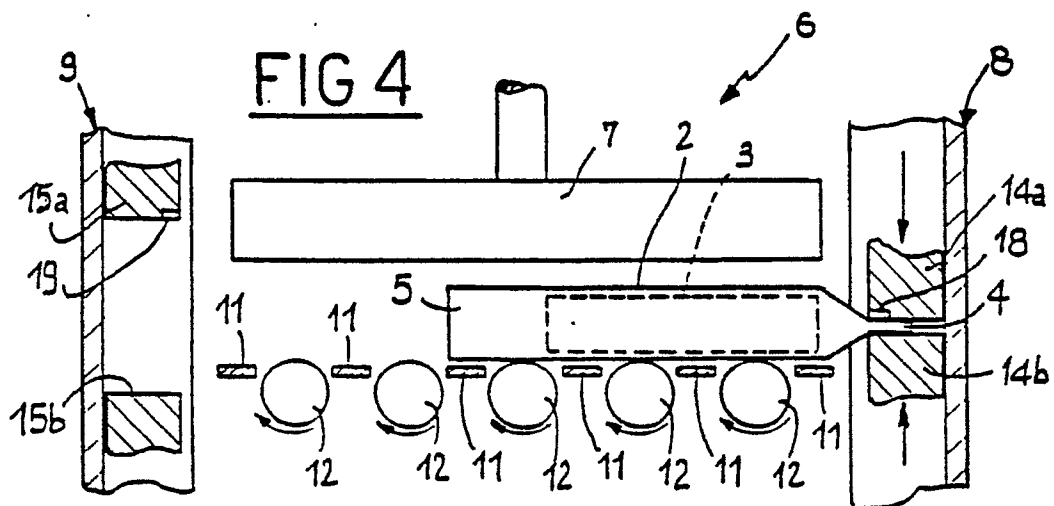
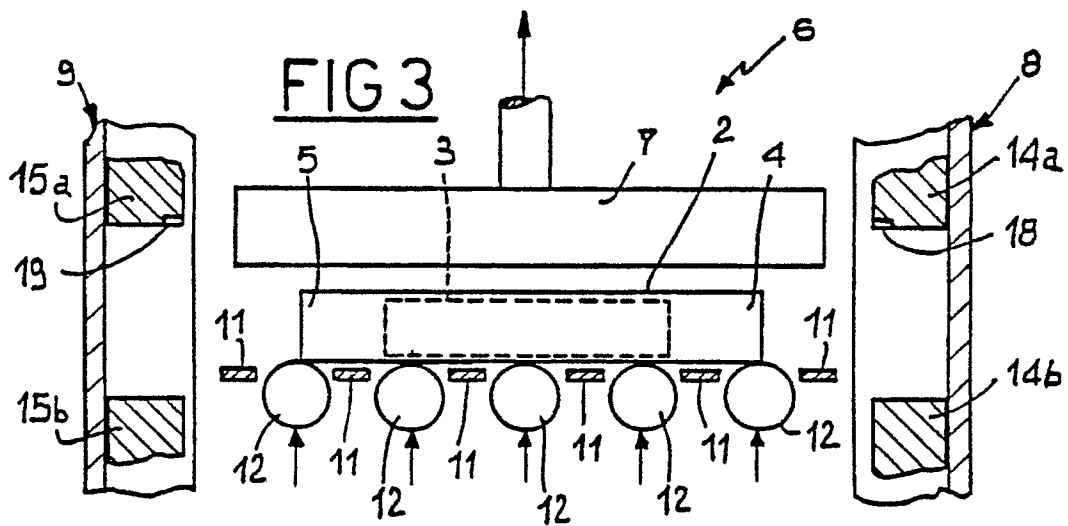
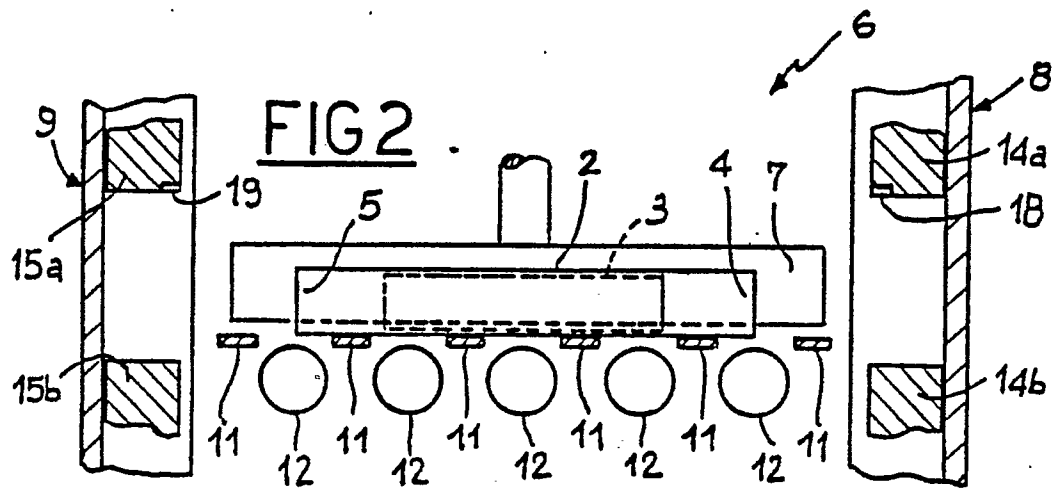
4. Equipment according to claim 2, characterized in that said positioning means include at least a reference guide extending perpendicularly to the feed direction of the articles on the feed line, said reference guide being displaceable from an operative position, in which it operates on said first shifting means, in order to provide a positive stop seat for said article, to a rest position in which it is lifted from the shifting means in order to allow the passing through of the article under the reference guide itself.

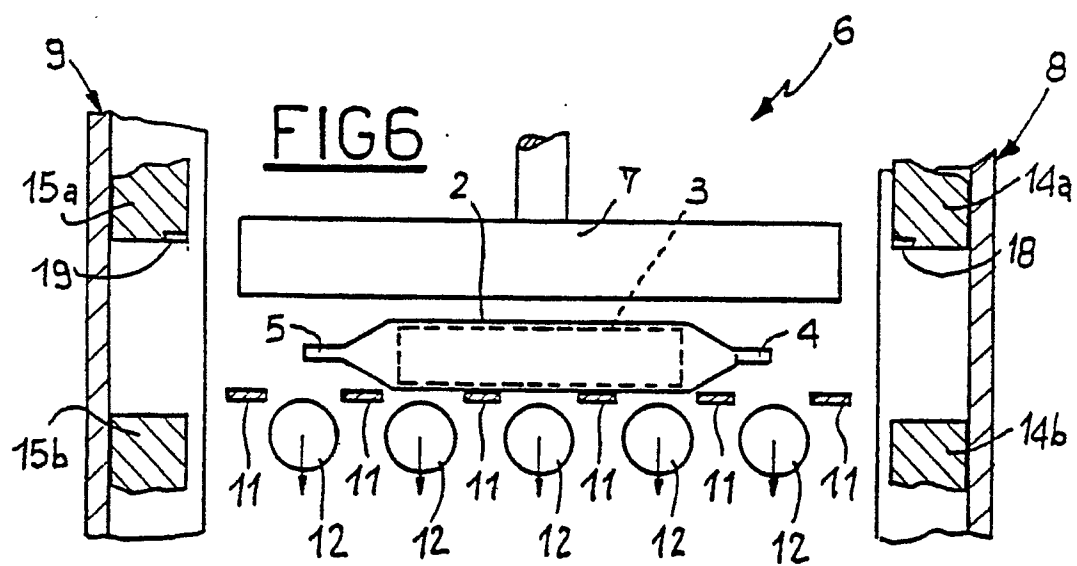
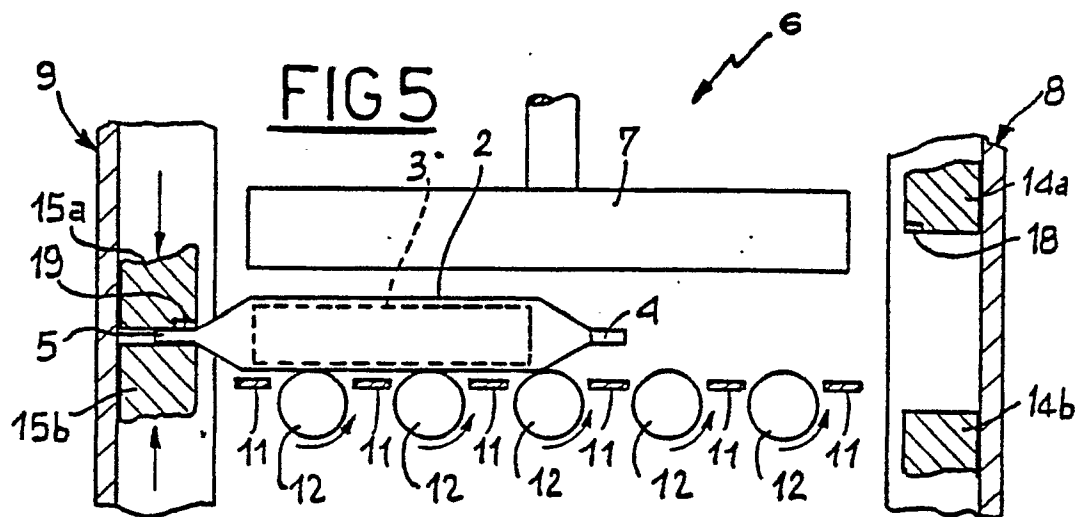
5. Equipment according to claim 2, characterized in that each sealing group comprises a pair of pressure elements reciprocally opposed, slidably driven in a vertical direction and movable for reciprocal approach to carry out the sealing of the wrapping ends therebetween interposed.

6. Equipment according to claim 5, characterized in that to each sealing group is associated at least a sensor, which controls the release of second shifting means and the reciprocal approach of the pressure elements when the wrapping end is placed between the pressure elements themselves.

7. Method and equipment for sealing wrappings in the packaging of articles, according to the preceding claims and what hereinabove described and illustrated for the specified objects.











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**PARTIAL EUROPEAN SEARCH REPORT**  
which under Rule 45 of the European Patent Convention  
shall be considered, for the purposes of subsequent  
proceedings, as the European search report

Application number

EP 90 11 1865

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.4)
Y	US-A-2 362 819 (HINCHEY)  * Page 2, column 2, line 61 - page 3, column 1, line 66; figures 1,11-15 *	1-4	B 65 B 51/14 B 65 B 59/00
A	--	5	
Y	GB-A-2 134 891 (WOLF)  * Abstract; figures 1,2 *	1-4	
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			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			B 65 B B 65 G
<b>INCOMPLETE SEARCH</b>			
<p>The Search Division considers that the present European patent application does not comply with the provisions of the European Patent Convention to such an extent that it is not possible to carry out a meaningful search into the state of the art on the basis of some of the claims.</p> <p>Claims searched completely:</p> <p>Claims searched incompletely: 7</p> <p>Claims not searched:</p> <p>Reason for the limitation of the search:</p> <p>Rule 29(6) of European Patent Convention</p>			
Place of search THE HAGUE		Date of completion of the search 22-08-1990	Examiner CLAEYS
CATEGORY OF CITED DOCUMENTS		<p>T : theory or principle underlying the invention</p> <p>E : earlier patent document, but published on, or after the filing date</p> <p>D : document cited in the application</p> <p>L : document cited for other reasons</p> <p>&amp; : member of the same patent family, corresponding document</p>	
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