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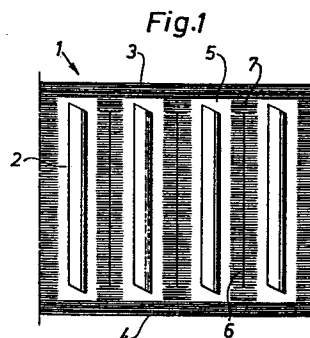
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(54) **Flexible band with transversely applied suction tubes.**

(57) Coherent bands (1) of suction tubes (2) wrapped in individual protective envelopes are used to make possible the mechanical and automatic application of suction tubes to individual packing containers. The bands consist of two strips (7) of flexible plastic material which are sealed to one another and between them enclose the suction tubes. To facilitate the separation of the suction tubes and surrounding protective envelopes from the band on application to the packing containers, the suction tube band is provided in accordance with the invention with transverse cuts (6) situated between the suction tubes which at their ends lead into further cuts which extend in longitudinal direction of the band or have a certain length in the said direction. The individual protective envelopes entering into the suction tube band are thus held together solely by two parts situated at a distance from one another and extending bandlike between the envelopes which can be cut through comparatively simply on application to the individual packing containers.



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FLEXIBLE BAND WITH TRANSVERSELY APPLIED
SUCTION TUBES

Flexible bands with transversely applied suction tubes (hereinafter called "suction tube bands") are used in the packaging industry to make possible the mechanical and automatic application of suction tubes to packing containers. The suction tube band comprises suction tubes which are wrapped in individual protective envelopes adapted to the shape of the suction tube. The protective envelopes in turn are joined to one another so that a band of coherent, wrapped, suction tubes is formed. The wrapped suction tubes are arranged transversely in relation to the band are evenly spaced. The protective envelopes may be in the form of separate sleeves, which are joined to one another by means of narrow bands or strips of paper or plastics, but they may also constitute integrated parts of the flexible band. A suction tube band thus may comprise two webs of plastic material between which the suction tubes are placed. The webs are joined to one another at least in the zones surrounding the suction tubes are held enclosed in individual, closed protective envelopes.

Suction tube bands of the type described above are used to make possible the mechanical and automatic application of individual suction tubes wrapped in the protective envelopes to packing containers e.g. for juice or other beverages which are intended to be drunk directly from the packing container with the help of suction tubes. To facilitate the automatic handling of the wrapped suction tubes, the suction tubes are fed to the machine in the form of the said

suction tube band, whereupon the machine separates one wrapped suction tube at a time from the band and transfers and applies it to a packing container passing through the machine. A machine of this type is described e.g. in Swedish patent application no. 780 10 67-5.

As the suction tube band is in the form of two plastic webs sealed to one another, between which are enclosed the suction tubes, certain difficulties arise sometimes for the application machine or the applicator in separating the individual, wrapped suction tubes from the suction tube band. These difficulties are associated with the fact that the demand for accurate and exact cutting off of the individual protective sleeves is difficult to combine with the high operating speed of the applicator. Moreover, the plastic material of which the suction tube band is made is comparatively tough and difficult to break up, causing the material to stretch, so that the severing is rendered more difficult and the cut will be incomplete or end up in an incorrect position, which involves the risk of the protective envelope being broken, so that it can no longer fulfil its object of protecting the wrapped suction tube from contaminations.

It is an object of the present invention to provide a flexible suction tube band which overcomes the aforementioned disadvantages and which is particularly suitable for use in suction tube applicators which operate at high speed.

It is a further object of the present invention to provide a flexible suction tube band wherein the individual suction tubes, wrapped in protective envelopes, are securely joined to one another, but still allow separation from each other in connection with the application to the individual packing containers.

It is a further object of the present invention to provide

a suction tube band which at the lowest possible cost is optimally adapted to co-operate with the suction tube applicator described in Swedish patent application no. 780 10 67-5.

These and other objects have been achieved in accordance with the invention, in that a flexible band with transversely applied suction tubes has been given the characteristic that the band is provided between two suction tubes with a transverse cutting line which at some distance inside the longitudinal edges of the band meets cuts which, seen in longitudinal direction of the band, take up a many times greater extent than the said transverse cutting line. By providing the webs forming the band already during the manufacture of the flexible suction tube band with suitably located cuts between the suction tubes, the separation of the individual protective envelopes from each other in the applicator is facilitated. A special design of the said separating lines makes it possible, moreover, to ensure, in spite of the flexible character of the material, a complete separation of the individual suction tube envelopes from one another even when the applicator operates at high speed.

Further embodiments of the flexible suction tube band in accordance with the invention have been given the characteristics which are evident from one or more of the enclosed subsidiary claims.

A flexible suction tube band in accordance with the invention will now be described in greater detail with special reference to the enclosed schematic drawing which only shows the details necessary for an understanding of the invention.

Figure 1 shows part of a suction tube band in accordance with a first embodiment of the invention.

Figures 2, 3 4 and 5 show further embodiments of the suction tube band in accordance with the invention.

The suction tube band in accordance with the invention comprises a band 1 which consists of two webs of thermoplastic material of equal width placed against each other. The suction tube band comprises moreover suction tubes 2 which are placed between the said thermoplastic material webs and are wholly enclosed by the same. The suction tubes 2 are placed transversely in relation to the band 1, that is to say substantially at right angles to the longitudinal edges 3 and 4 of the band. The two webs forming the band 1 are of a width which somewhat exceeds the length of the suction tubes 2, thus making it possible to seal the two webs to one another in a zone (which is indicated as a hatched area in figure 1, corresponding zones existing also in the other embodiments shown, but having been left out in figures 2 - 5, so as not to impair the clarity of the figures) which wholly encloses each individual suction tube 2, so that each suction tube is enclosed in an airtight suction tube envelope 5.

To facilitate the separation of the individual suction tube envelopes 5 from the coherent suction tube band 1 on application of a suction tube wrapped in an envelope to a packing container with the help e.g. of the suction tube applicator, which is shown in Swedish patent application no. 780 10 67-5, the suction tube band in accordance with the invention has been provided between each individual suction tube with a transverse cutting line 6, which linearly cuts through the two webs forming the band 1 in the sealed region between the individual, airtight suction tube envelopes 5. The cutting line 6 extends transversely over the suction tube band 1 but terminates at some distance inside the two longitudinal edges 3, 4 of the band 1, so that two strips or bridges 7 are formed in the band material which strips or bridges hold together the individual suction tube envelopes to a coherent band. The two strips 7 extend at a distance from one another parallel along the longitudinal edges 3, 4 of the suction tube band, thus ensuring that the individual suction tube envelopes 5 maintain their correct position in the suction tube band so that the latter obtains a rope-ladderlike form.

The provision of cutting lines 6, which are produced with the help of heated knives in connection with the heat-sealing of the two webs to one another, facilitates appreciably the subsequent separation of the individual suction tube envelopes 5 from the suction tube band in the applicator. In the said separation now only a cutting through or punching through of the relatively narrow strips or bridges 7 is required which remain between end points of the cutting line 6 and the two longitudinal edges 3, 4 of the suction tube band. This cutting through can be carried out relatively simply compared with the cutting over the whole width of the band necessary previously. However, during continuous operation at high speed certain difficulties arise when the two necessary cuts have to be placed through the strips 7 in the extension of the cutting line 6 made previously, so that a complete separation is achieved. This is connected with the capacity of the suction tube band to stretch and, altogether, its flexible construction which renders difficult a cutting through with the high precision which is desirable if the cuts are to coincide. To overcome this difficulty, the suction tube band in accordance with the invention has also been provided with further cuts which, like the cutting lines 6, are brought about with the help of heated cutting elements in connection with the manufacture of the suction tube band, and are placed at the positions at some distance inside the two longitudinal edges 3, 4 of the suction tube band where the end points of the cutting lines are situated. Each cutting line 6 thus meets at some distance inside the longitudinal edges of the band at both its ends cuts 8 which seen in longitudinal direction of the band 1 take up a many times greater extent than the said transverse cutting line 6, whose main direction is in fact transversely in relation to the band 1. The width of the cutting lines 6 is negligible and merely corresponds to the necessary thickness of the heated knife by means of which they are produced. The cuts 8 are linear and extend sub-

stantially at right angles to the cutting line 6, that is to say, the cuts 8 extend in the longitudinal direction of the suction tube band 1. By the provision of the cuts, the punching through of the strips 7 in the applicator is facilitated appreciably, since the punching no longer needs to be done with the same precision. To ensure a complete separation of a suction tube envelope 5 from the remaining suction tube band 1 it is now only necessary for the cut, which severs the strips 7, to meet or cross at some place the respective cut 8 and the placing of the cut will no longer be critical. The length of the cuts 8 determines the tolerance which can be allowed in the placing of the separating cut through the strips 7, and the cuts 8 are made therefore as long as is possible without any risk of their reaching or negatively influencing the unsealed region of the suction tube band 1 which forms the airtight suction tube envelope 5.

The cuts 8 located at the end of each cutting line 6 do not have to be rectilinear and parallel with the two edges 3, 4 of the suction tube band 1. The cuts can also be endless and enclose portions of the suction tube band which have been removed by punching-out etc. during the manufacture of the band. As shown schematically in figure 2, each cut thus may be in the form of a circular hole 9 at the end of the cutting line 6. The hole 9 also serves as a "hollow recess", which prevents that on stressing of the suction tube band the cutting line 6 is unintentionally widened or extended to the edge of the suction tube band. The hole 9 is obtained in the same manner as the linear cuts 8 described earlier, at the same time as when the cutting line 6 is produced with the help of a heated knife or punching element, during the manufacture of the suction tube band. In connection therewith, however, waste material is produced which must be taken care of so as not to affect the manufacturing process by acting as an obstacle and diminishing the rate of production.

In figure 3 is shown a further embodiment of the flexible suction tube band in accordance with the invention, wherein the cut has been given the form of a substantially triangular

hole 10. The triangular hole 10 has the advantage over the circular hole described earlier that it has a distinctly limited area which makes it possible to produce the hole by melting off the thermoplastic material in connection with the production of the cutting line 6. Consequently the handling and taking care of waste material during the manufacture of the suction tube band can be avoided.

Naturally the portions removed, or the holes, may also have other shapes. The important thing is, that the extension of the hole, seen in longitudinal direction of the band, is greater than the corresponding width of the cutting line 6, so that the placing of the supplementary cuts, in connection with the separation of the individual suction tube envelopes from the band, is facilitated, and that the shape of the hole is such that the hole serves as a recess at the end of the cutting line. A hole of approx. 5mm diameter has been found to be satisfactory and appreciably increases the area within which the supplementary cuts can be placed, since normally the width of the main cut will be less than 1 mm. The distance between two suction tubes located next to each other is typically 15mm.

In figures 4 and 5 further embodiments of the suction tube band in accordance with the invention are shown, which embodiments differ from the embodiments shown earlier in that the strips or bridges 7, which hold together the individual, airtight suction tube envelopes 5 to a coherent suction tube band, are situated a small distance inside the two edges 3 and 4 of the suction tube band. The reason for this is that the feed and the guiding of the suction tube band through the applicator should be possible, through the collaboration between the feed and guiding elements of the applicator and edge area of the suction tube band, without the severing of the strips 7 being affected by or hindering the feed. This has been achieved in accordance with the invention in that further cutting lines 6' extend from the edges 3, 4 of the web inwards between two suction tubes 2, which cutting lines 6'

are terminated by cuts 8' which in longitudinal direction of the suction tube band 1 take up a many times greater extent than the said cutting line 6'. The two cuts 8 and 8' together demarcate the strips or bridges 7 holding together the suction tube envelopes, and in the subsequent separation of the individual suction tube envelopes from the suction tube band in the applicator, the severing may be carried out anywhere along the whole length of the strips 7, thus reducing the need for precision and ensuring good and faultless functioning of the applicator.

As indicated in figure 5, the cuts 8' may also enclose removed portions of the band, so that the cuts substantially obtain the form of circular holes 9'.

By the invention a suction tube band is provided which, in spite of being easy to handle and extremely simple, can be broken up into individual suction tube envelopes with the help of a suction tube applicator of known type. Owing to the design of the suction tube band, the division into individual suction tube envelopes may be done at great speed without safety being endangered, and, owing to the special design of the suction tube band, moreover, optimum operational safety is achieved, even if the position of the band, owing to its flexibility, varies within wide limits at the instant of severance.

C L A I M S

1. Flexible band with transversely applied suction tubes, characterized in that the band (1) is provided between two suction tubes (2) with a transverse cutting line (6) which at some distance inside the longitudinal edges (3, 4) of the band meets cuts (8) which, seen in longitudinal direction of the band (1) take up a many times greater extent than the said transverse cutting line (6).
2. Flexible band in accordance with claim 1, characterized in that the cuts (8) are linear and extend substantially at right angles to the cutting line (6).
3. Flexible band in accordance with claim 1 characterized in that the cuts (8) enclose portions of the band (1) which have been removed.
4. Flexible band in accordance with claim 3, characterized in that the cuts are constituted by circles (9).
5. Flexible band in accordance with claim 3, characterized in that the cuts are constituted by triangular holes (10).
6. Flexible band in accordance with anyone of the preceding claims, characterized in that the cuts terminate the cutting line (6).
7. Flexible band in accordance with anyone of the preceding claims, characterized in that further cutting lines (6')

extend from the edges (3, 4) of the web (1) and in between two suction tubes (2) which cutting lines (6') are terminated by cuts (8') which, seen in longitudinal direction of the band (1) take up a many times greater extent than the said cutting lines (6').

Fig.1

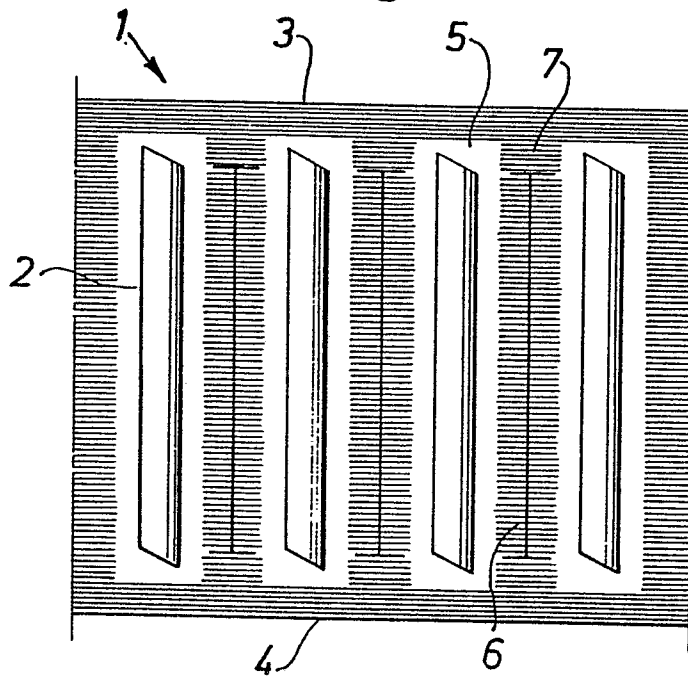


Fig.2

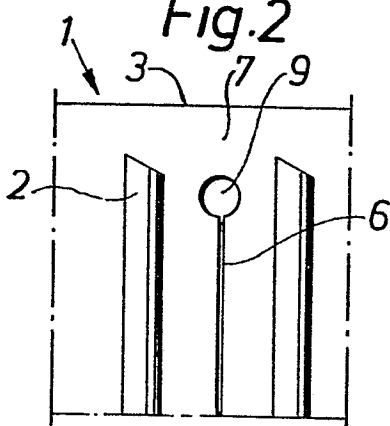


Fig.3

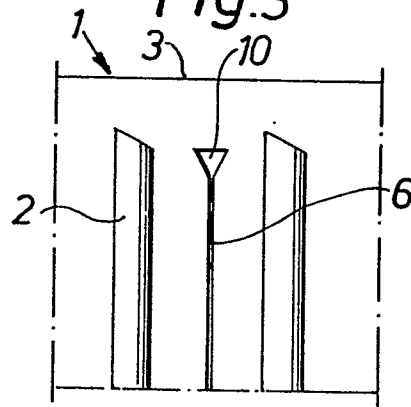


Fig.4

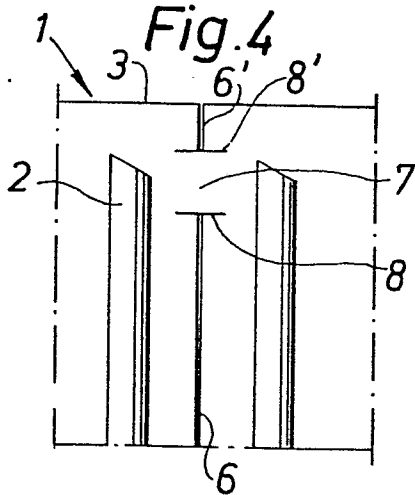
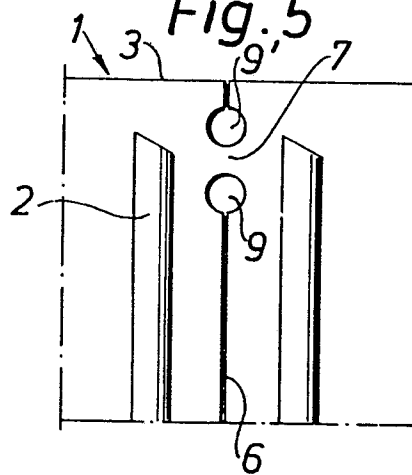


Fig.5





European Patent
Office

EUROPEAN SEARCH REPORT

0043030

Application number

EP 81104637.4

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
A	<u>CH - A - 331 131</u> (FABER) --		B 65 D 75/42
A	<u>CH - A - 352 620</u> (FABER) --		
A	<u>US - A - 3 779 373</u> (MAIER) -----		
			TECHNICAL FIELDS SEARCHED (Int. Cl. ³)
			B 65 D 75/00 B 65 D 85/00 B 65 D 83/00
			CATEGORY OF CITED DOCUMENTS
			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
			&: member of the same patent family, corresponding document
X The present search report has been drawn up for all claims			
Place of search VIENNA		Date of completion of the search 14-09-1981	Examiner JANC