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⑲ Applicant: **COURTAULDS PACKAGING**
AUSTRALIA LIMITED
8-12 Cato Street
Hawthorn East Victoria 3122(AU)

⑳ Inventor: **Hackett, Malcolm John**
11 Gordons Road
Lower Templestowe 3107 Victoria(AU)
Inventor: **Kalkipsakis, Charalambos George**
Tungara Coulson
Monbulk 3793 Victoria(AU)

㉑ Representative: **Rees, David Christopher et al**
Kilburn & Strode 30 John Street
London WC1N 2DD(GB)

㉒ **Forming small flexible containers.**

㉓ Small containers are filled and formed from a large preformed and presterilized container, which incorporates communicating compartments. The volume of contents of each compartment are equalized by pressure application and then the compartments are sealed off and severed to form individual containers.

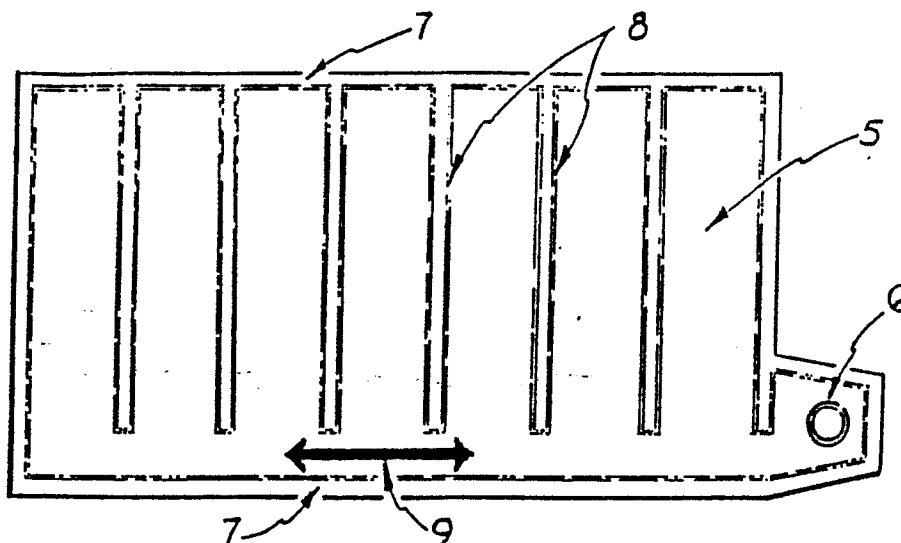


FIG. 1

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FORMING SMALL FLEXIBLE CONTAINERS

This invention relates to a method of forming small flexible containers.

Sachets of flexible film forming material are known. In the food packaging industry it has been conventional to "form, fill and seal". That is the individual flexible container is formed, it is then filled with food product and the container sealed. This means that one filling head can fill only one container at a time. For small containers production times are increased because the time taken to bring the container into alignment with the filling head and then to remove it, is significant and the volume of product, filled from any filling head is correspondingly reduced when smaller containers are filled.

For consumer use and for applications where measured quantities of product are desirable in disposable containers there is a demand for small volume containers.

The cost to food packagers of using a form, fill and seal method as opposed to buying preformed packages and only filling and sealing is also significant. However preformed packages especially for small volumes are difficult to handle. Further where aseptic techniques are used sterilization becomes a problem. Thus in these applications the form, fill and seal method has been seen to be advantageous because a sterilization step can be carried out between the forming and filling sequences.

A number of proposals have been made to increase the volume of production of small containers using the form, fill, seal method. U.S. Patent 4,517,787 is a recent example and U.K. 2054511 is an example of forming and filling a plurality of small compartments which are subsequently separated to form individual packages

It is an object of this invention to provide a more effective means of increasing the volume of production on filling small containers and to provide an alternative means to the capital intensive form, fill and seal method.

To this end the present invention provides a method of forming filled flexible containers comprising:

filling a large flexible container having heat sealable walls with a fluid product,

applying to the container a template means to divide the container into separate communicating compartments by bringing opposed walls of the container into contact,

distributing the content of the fluid product between said compartments by varying the pressure applied to the container to obtain a desired distribution, and

heat sealing the opposed walls of the container

together to form sealed filled compartments which are capable of separation into individual filled containers.

It is possible by this method to use a pre-sterilized container of the kind described in Australian patent 552,032. It can be filled and sealed and then stored or transported prior to being further handled to form the separate small packages. This method ensures that higher volume throughputs on the filling machine can be achieved. Aseptic packaging is also a feature of this method.

A further aspect of this invention is to provide a preformed flexible container with preformed intercommunicating compartments. The compartments may be formed by heat sealing portions of the walls of the larger container in a pattern which creates a series of intercommunicating compartments. For example in a rectangular envelope type container with an inlet at one end heat seals extending across the width of the container from the edge seams create a series of rectangular compartments. If a portion on line from the inlet is left unsealed a fill channel is formed. If this fill channel is down the centre of the envelope then it is possible to form two series of compartments.

Once the compartmented container is filled and sealed the final step of sealing the individual compartments can be performed at any desired time. To do this it is necessary to ensure a correct distribution of fluid content between the compartments. It is not necessary for these to be of the same size or for them to be filled to the same extent. The volume of product in each compartment is related to the pressure in each compartment and by varying the applied pressure it is possible to obtain any desired volume distribution between the compartments.

Fluid flow between the compartments is hindered by any creasing or kinking of the flexible package. By tensioning the package in the direction of the intercommunicating passages flow between compartments is facilitated. Thus during the step of distributing product between compartments the container envelope is preferably tensioned. This can be done by stretching or by supporting the envelope along the lines separating the compartments which are lateral to the intercommunicating passages. The weight of product then tensions the flexible container material to provide a crease free passage between compartments. This then facilitates the final heat sealing step whereby the passages are closed and separate sealed compartments are formed.

Figures 1 and 2 of the drawings illustrate two embodiments of this invention and figure 3 is a schematic representation of the apparatus used to distribute product between compartments and to heat seal them.

Figures 4, 5, 6 and 7 illustrate an alternative method of filling and forming utilizing the package construction shown in figure 2.

In figure 1 a simple 4 compartment package is illustrated. This comprises an envelope 5 having a filling gland 6, an edge seal 7 and lateral heat seal seams 8. The passage 9 allows product entering through gland 6 to enter all compartments formed by the seams 8. The envelope 5 and the gland 6 are as described in Australian patent 552,032.

Figure 2 is a variation of the package shown in figure 1. The envelope 11 has the filling gland 12 and edge seams 13 as previously described. The lateral seams 14 form two series of compartments on either side of a central passage 15. Two of the compartments are shown as having preformed seams 17 which are shaped to assist in product equilibration as described below. These seams are also shaped to enable easier dispensing of contents through the outlet 18 which in the separated container can be slit to allow pouring.

In figure 3, the package of figure 1 is schematically illustrated in the apparatus which achieves final product distribution between the compartments. The container 5 is supported by a corrugated base 21 along each lateral seam 8 by individual ribs 22. This opens up the channel 9 in the package 5 and allows free product flow. It also ensures that the walls of the envelope will have flat contact to facilitate good heat sealing. To obtain equal distribution of contents to each compartment the plate 24 applies pressure to the envelope 5. If desired individual pressure plates can be provided for each compartment and pressure measured to achieve a volume distribution calibrated on the measured pressure. Once the desired distribution is achieved the heat sealing rods 25 are lowered to heat seal the walls of the envelope together to extend seams 8 so that they extend from one edge seam 7 to the other and so form 4 separate compartments.

There is no limit on the number of compartments which may be formed. After heat sealing the compartments are separated by cutting along the centre of each seam 8 or 14. Alternatively the partition seals 8 or 14 may be partially or fully present or perforated to accommodate the decrease in horizontal length of the middle section when the multi pouch container 5 is filled. Where seals 8 and 14 are perforated these will split once the container is in the volume equalizing device of figure 3. A further heat seal is usually effected to enable the gland 6 to be discarded.

If the edge seals 7 of figure 1 and 13 of figure 2 are gusseted when the individual containers are sealed and separated this gusseted edge will form a base enabling the containers to stand upright.

The size of the compartment forming machine need only be half the length of the container envelope as the corrugated base increases tension on the envelope to allow easy flow along passage 9 and in so doing decreases the effective length of the envelope.

The embodiment shown in figures 4 to 7 represents schematically the forming of the package shown in figure 2.

The filled bag 11 is draped over a central rail or saddle 30 and the filling gland 12 is secured by clamp 31 and the end of the bag 11 is secured at seam 13 by clamp 32 as shown in figure 4.

Subsequently as shown in figure 5 side pressure is applied by the pressure plates 33 and 34 to equalize the fluid level across all the compartments between the seams 14. Once equilibrium has been achieved the side pressure from plates 33 and 34 is released.

Next, as shown in figure 6 tension is applied between clamps 31 and 32 to remove creases which may have formed across passage 15. Heat sealing bars 35 and 36 are then applied against the sides of the bag to seal the top of each compartment along the lines bordering passage 15 and intersecting the ends of the seams 14.

The compartments may each then be separated by severing along the centre of the seams 14 and the newly formed topseals bordering passage 15.

As shown in figure 7 after the severing operation only passage 15 and the filling gland 12 remain and these can be released from clamps 31 and 32 and discarded.

There is no restriction on the shape or size of the container or of the number, shape or size of compartments. The filling gland may be located at any convenient position either centrally of the container or at its periphery. An alternative to a rectangular container is a circular container with a central gland and radial seams to form compartments.

Thus it can be seen that the present invention provides a unique means of forming small filled flexible packages whilst maintaining high production rates at the filling machine, eliminating the need to have expensive form, fill and seal machinery and also utilize aseptic filling techniques.

Claims

1. A method of forming filled flexible containers comprising:
filling a large flexible container having heat

sealable walls with a fluid product,

applying to the container a template means to divide the container into separate communicating compartments by bringing opposed walls of the container into contact,

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distributing the content of the fluid product between said compartments by varying the pressure applied to the container to obtain a desired distribution, and

heat sealing the opposed walls of the container together to form sealed filled compartments which are capable of separation into individual filled containers.

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2. A method as claimed in claim 1 wherein the large container is an envelope of heat sealable plastic which incorporates preformed intercommunicating compartments formed by heat sealing opposed walls of the container but leaving portions unsealed to enable product flow between compartments.

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3. A preformed compartmented container for use in the method of claim 2 comprising an envelope having outer sealed edges,

a product inlet closed by a removable rupturable seal,

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a pattern of heat welds sealing the opposed walls of the envelope together to form a plurality of intercommunicating compartments capable of being separated.

4. The container of claim 3 wherein the outer sealed edges are gusseted so that this gusseted edge provides a support base in separated filled containers formed by heat sealing the intercommunicating passages and severing the connecting heat welds.

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5. A preformed compartment as claimed in claim 3 wherein the heat welds between compartments are slit or perforated to enable partial separation of compartments to occur when external pressure is applied to the filled large container.

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6. A system for forming filled containers comprising:

a large flexible container having heat sealable walls, intercommunicating compartments formed by welding opposed walls together and a removable rupturable product inlet,

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means for filling the container with fluid product through said product inlet,

means for applying pressure to the filled container to obtain a desired distribution of fluid product between said compartments,

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means for closing said intercommunicating passages by heat sealing said opposed walls to form individual filled compartments capable of separation into filled containers.

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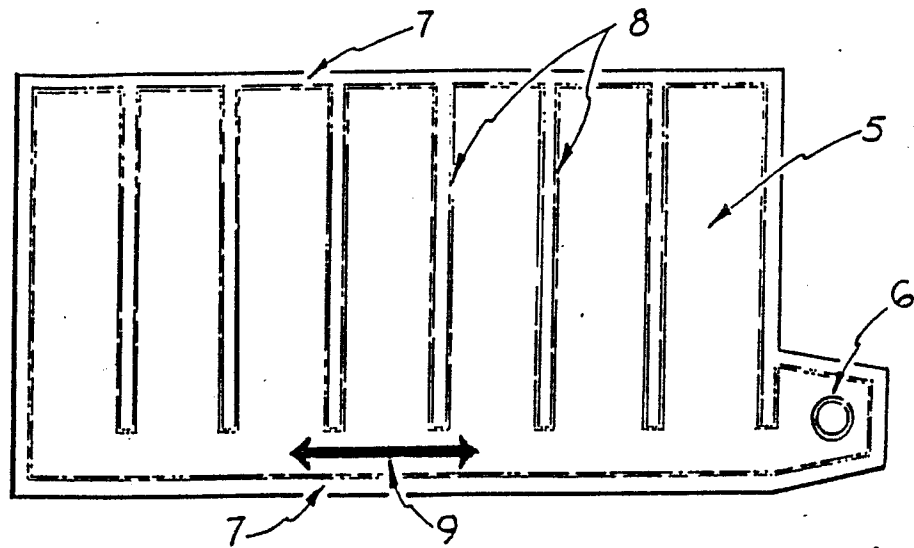


FIG. 1

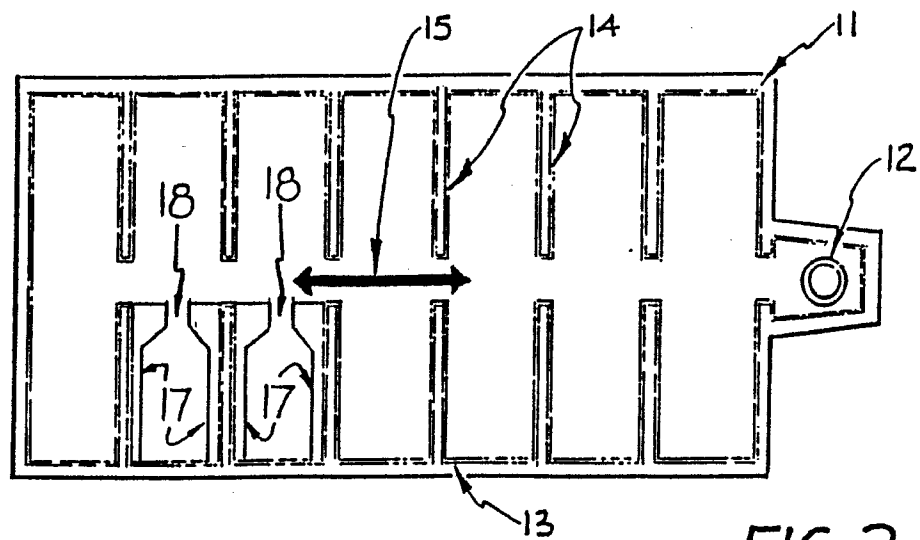


FIG. 2

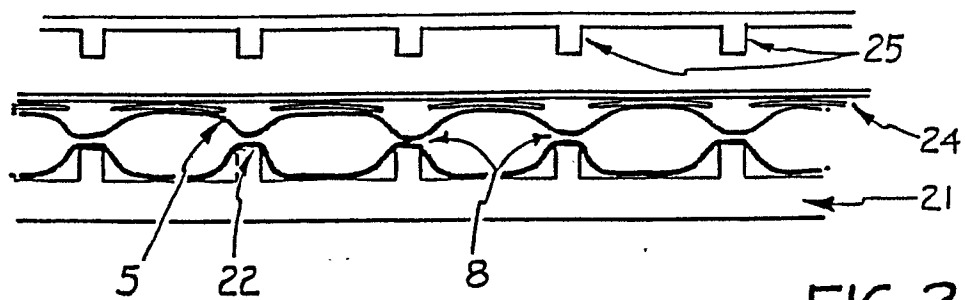


FIG. 3

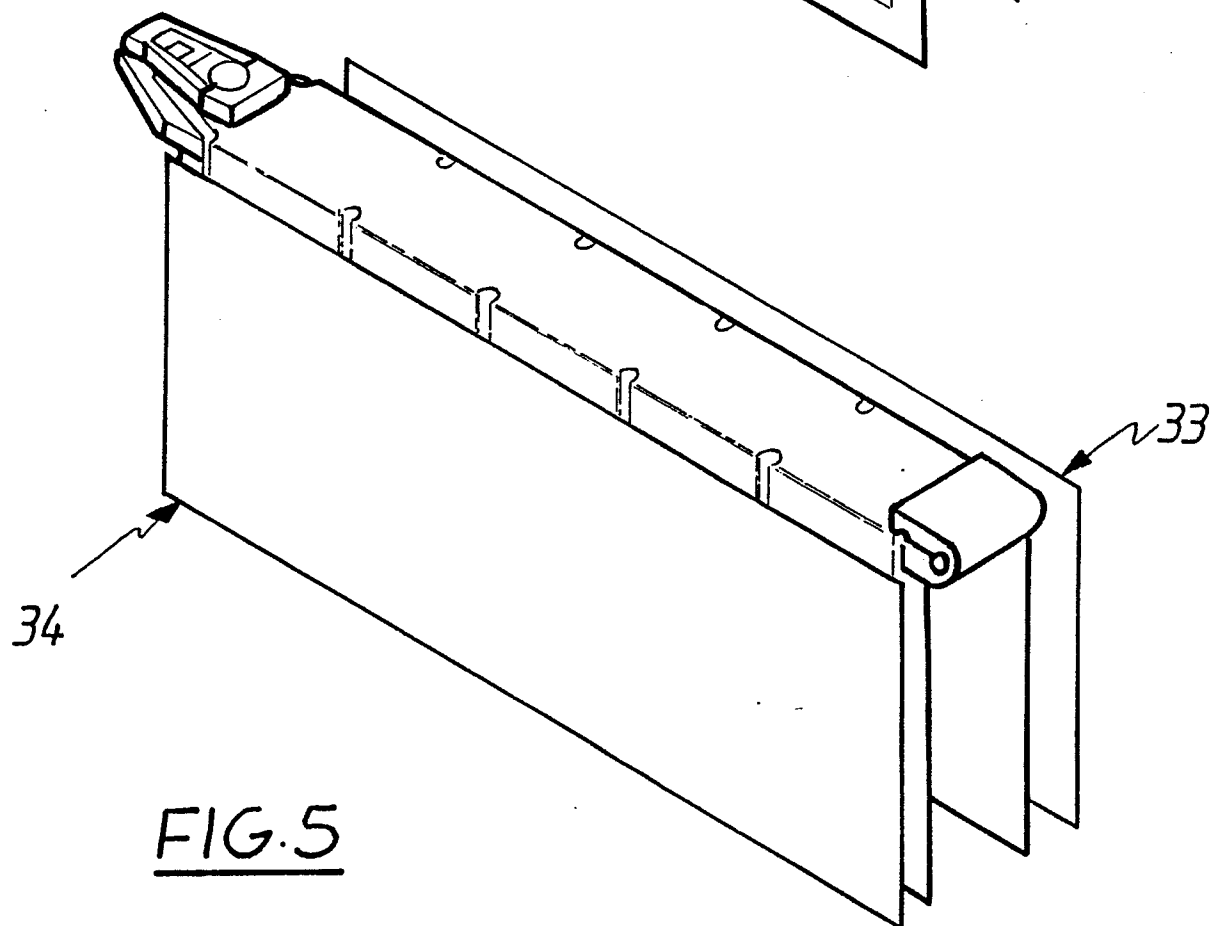
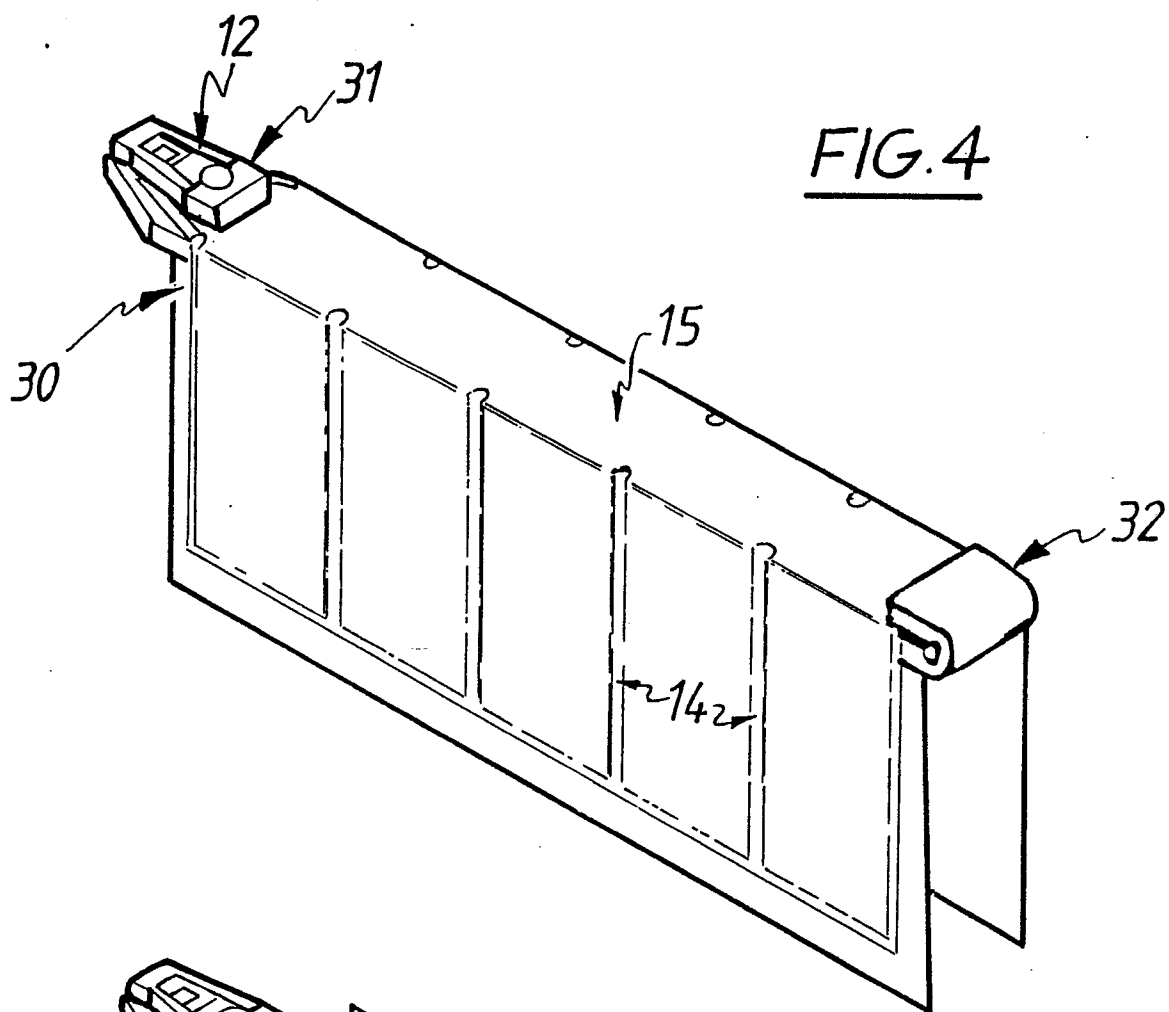
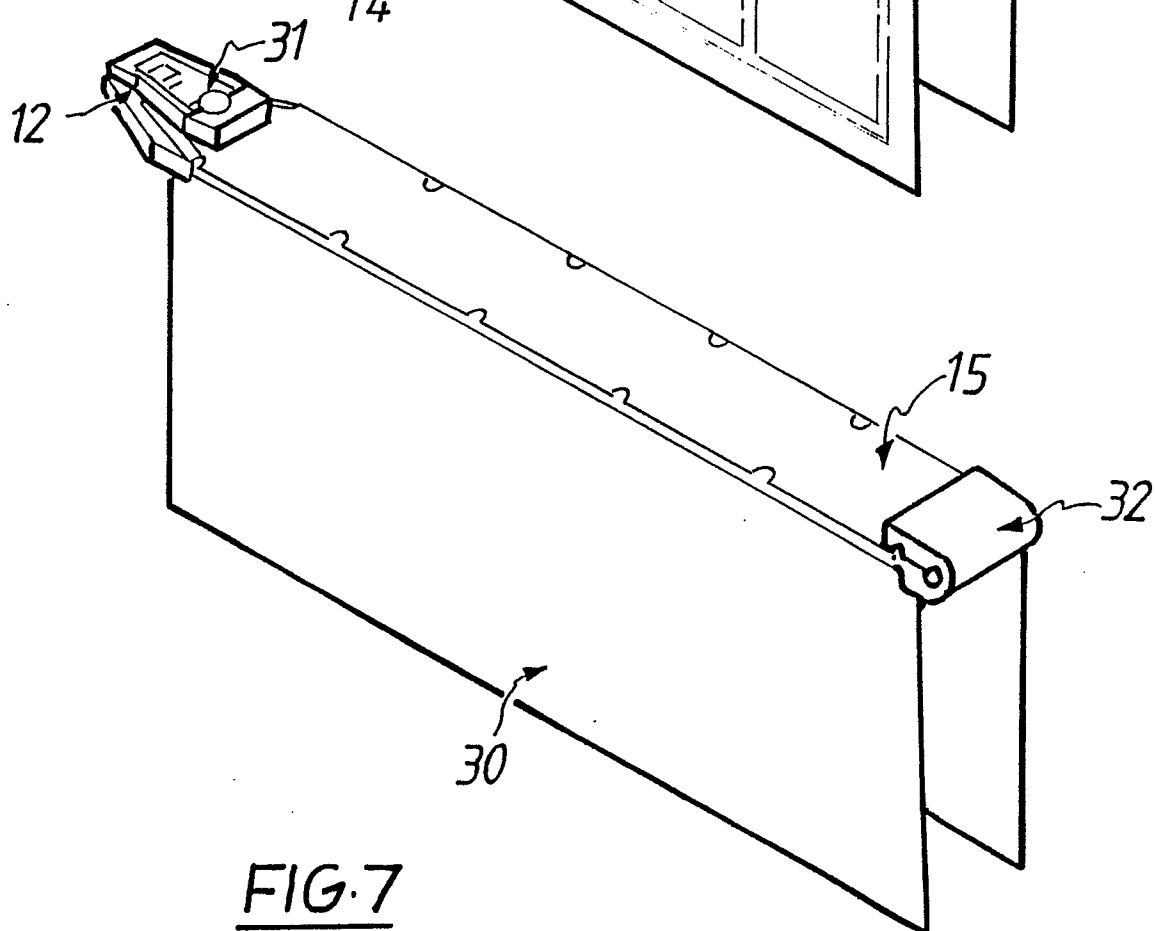
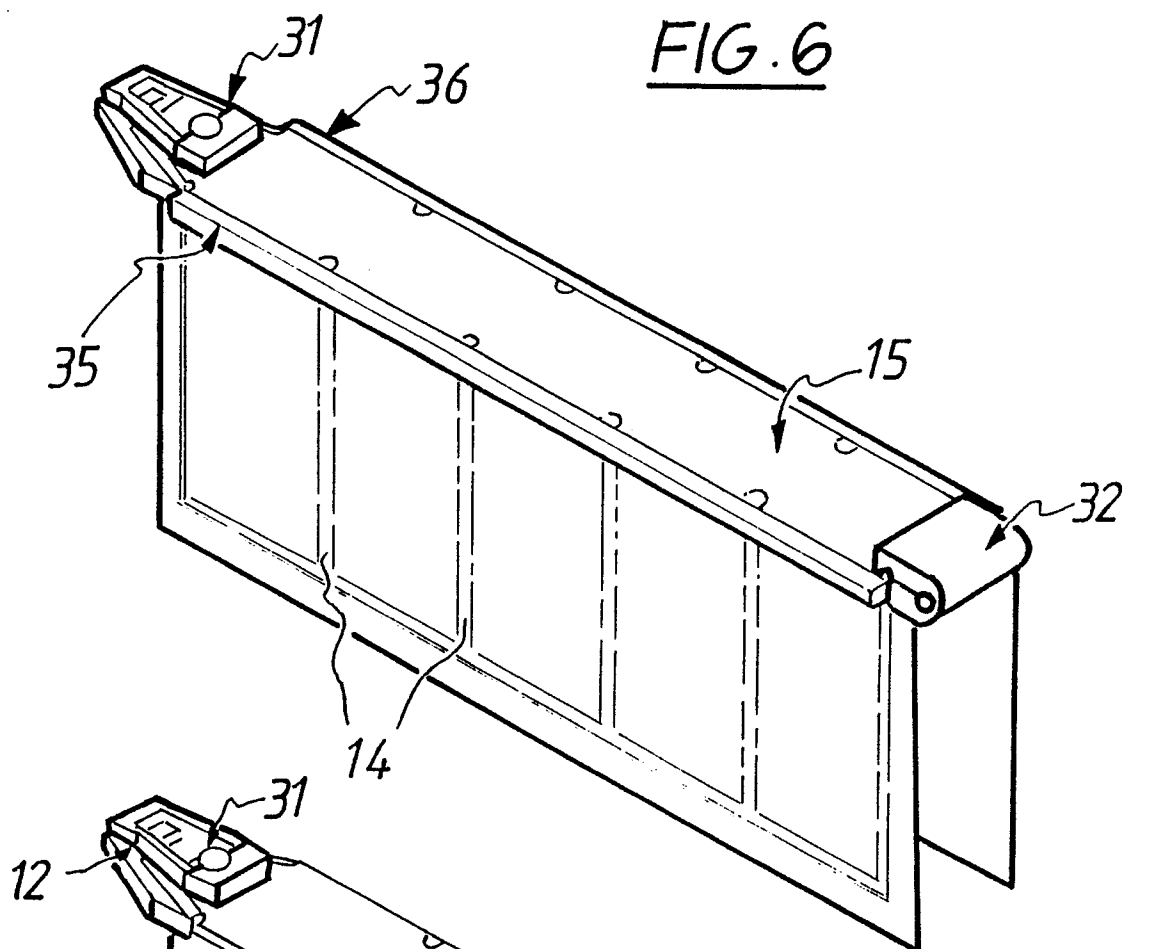


FIG. 6FIG. 7



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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)
X	FR-A-1 055 171 (CLOT) * Whole document *	1-3,6	B 65 B 3/04
Y	---	4,5	
Y	US-A-2 885 846 (HARKER) * Figures 5,9-14 *	4	
Y	US-A-3 492 783 (DOHMEIER) * Column 2, line 65 - column 3, line 11; figure 1 *	5	
A	FR-E- 61 695 (S.E.A.B.) -----		
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int. Cl. 4)
			B 65 B
Place of search		Date of completion of the search	Examiner
THE HAGUE		03-03-1988	CLAEYS H.C.M.
CATEGORY OF CITED DOCUMENTS			
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