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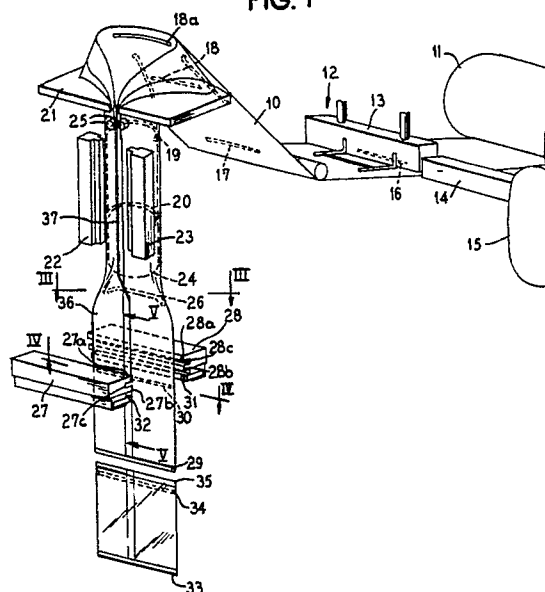
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54 **Reclosable bag material, method and apparatus.**

57 A new method of making a form fill bag having a reclosable fastener thereon and a mechanism therefor wherein a continuous length of film (10) is advanced and joined first and second fastener profile strips (16) are laid laterally onto the film of a length substantially equal to one-half of the film width, the film is advanced and formed into a tube with the side edges folded together and seamed, the first profile strip is attached to the surface of the film prior to forming it into the tube and the second opposed interlocked profile strip is attached to the inner surface of the film after it is formed into a tube, and a cross-seam is formed in the tube above the closure strip to form the bottom of the succeeding bag and a completed bag is cut from the film by cutting below the bottom seam and above the fastener strips.

FIG. 1



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RECLOSABLE BAG MATERIAL, METHOD AND APPARATUS

The present invention relates to improvements in methods and apparatus for making bags by a form fill process wherein the bags have a reclosable fastener at the top. In the vertical form fill process, a length of plastic film is led downwardly over a tube with the lateral edges brought together and seamed to form a side seam, a cross-seam is created to form the bottom of a bag and contents are normally dropped in the bag through the tube about which the film is formed.

In the process of making reclosable bags that have a pressure closable fastener at the top, this fastener must be secured to the bag material in such a manner so that it is located at the top of the bag. The type of fastener to which the present invention relates is one which has interlockable rib and groove profiles. Where the bags are made of a thin film, these profiles are conveniently formed in strips of separate material. In this manner, the film of the bag can be made of a thin lightweight tough plastic having physical characteristics best suited for the bag. The fastener can be made of a different plastic having physical characteristics best suited for the fastener. The fastener is attached to the bag material by suitable means such as by adhesive or by heat sealing, and where both members are of plastic, the form of heat sealing attachment is particularly well suited for rapid operation and a secure joining between the fastener and the film of the bag material.

In a suitable manufacturing process wherein a series of bags are formed from a continuous supply of film, it is, of course, desirable that the machine can be operated at relatively high speed. Formation and filling of the bag involves drawing the film down over a vertical tube, forming the film into tubular shape, creating a side seam where the edges of the film are brought together and creating a bottom seam. The contents of the bag are then dropped through the tube and the tube drawn down whereupon the top is closed such as by pressing the rib and groove profile elements together to interlock them. The arrangement for providing the fastener strips on the inner surface of the bag wall is that the top of the bag creates difficulty in the high speed machine. One manner of attaching such fasteners has been to provide a continuous fastener strip across the film wherein the fastener strip has a plurality of ribs and grooves so that it can be folded on itself and the folded edge of the strip shifts so that the ribs enter the grooves. The difficulty with this arrangement is that this type of fastener strip often does not seal completely at the end and requires more plastic than the more simple rib and groove fastener. Other arrangements

have been attempted which encounter difficulties and are not completely satisfactory.

It is accordingly an object of the present invention to provide an improved method and apparatus for forming reclosable bags from a thin film wherein a fastener is provided at the top in a way that high speed operation can be achieved and the attachment of the fastener does not in any way impede the speed and facility of making and filling the bags by a form fill process.

A further object of the invention is to provide an improved method and apparatus for forming bags in a form fill process wherein a simple rib and groove profile fastener strip can be utilized for the top closure of the bag.

A further object of the invention is to provide an improved arrangement wherein the fastener can be attached to film for a film to be used in a form, fill and seal process in a reliable and expeditious manner.

In accordance with the invention, a continuous supply of bag film is fed forward to a form, fill and seal machine. Prior to entering the machine, a fastener strip is attached to the surface of the film. The fastener strips contain pre-joined interlocked rib and groove strips and only one of the strips is attached to the film with the other strip facing upwardly, or in other words, inwardly toward the interior of the bag to be formed. The combined fastener strip is preferably advanced laterally across the film during the time it stops for the cross-sealing and filling process of the form fill machine. Only one of the profile strips is secured to the surface of the film, that is, secured in one form at the center of the film being of only half of the film width. In another form, the strip can be attached at one side of the film extending halfway across.

The film is then advanced to the form fill machine and drawn down over the filling tube with the longitudinal side edge of the film brought together and seamed. The fastener strips, attached at one location on the inner surface of the film, slide over the form fill tube. The film is cross-sealed at the bottom of the bag and drawn downwardly, and the cross-sealing mechanism used to then join the other wall of the bag to the other fastener strip. This will provide a fastener strip at the top of the bag wherein the strips are joined to opposing walls and interlock. Simultaneously, a cross-seal is formed above the strips and the tube is cut across below the cross-seal and above the fastener strips to remove a completed filled, closed bag.

ON THE DRAWINGS

Other objects, advantages and features will become more apparent with the teaching of the principles of the invention in connection with the disclosure of the preferred embodiments thereof in the specification, claims and drawings in which:

FIG. 1 is a perspective view, shown somewhat schematically, of a mechanism including form, fill and seal apparatus constructed and operating in accordance with the principles of the present invention;

FIG. 2 is an enlarged perspective view of a portion of the film with fastener strips attached prior to being formed into a bag;

FIG. 3 is a sectional view taken substantially along line III-III of Fig. 1;

FIG. 4 is a sectional view taken substantially along line IV-IV of Fig. 1;

FIG. 5 is a sectional view taken substantially along line V-V of Fig. 1;

FIG. 6 is an enlarged perspective view, similar to Fig. 2, but illustrating another manner in which the fastener strips can be attached;

FIG. 7 is a sectional view similar to Fig. 3 illustrating the position of the fastener strips when they are attached in accordance with the illustration of Fig. 6; and

FIG. 8 is a sectional view similar to Fig. 4 but illustrating the fastener strips when attached as illustrated in Fig. 6.

As illustrated in Fig. 1, a continuous supply of thin bag making film 10 is fed forwardly off a supply roll 11. The film is drawn forwardly by a suitable mechanism which pulls the film downwardly to form it into a tube so that the contents of the formed bag can be dropped down through a filling tube into the tubularly formed bag.

As the film is fed forwardly to the form, fill and seal machine, a fastener strip assembly 16 is attached to the inner surface of the film. That is, it is attached to the surface which will be on the inside of the bag when the bag is formed into a tube. The fastener strip may be laid directly on the film, but preferably is fed laterally across the upper surface of the film at right angles to the longitudinal edges of the film, or in other words at right angles to the longitudinal formation axis of the film.

The fastener strip is provided from a supply roll 15 fed through a guide 14 and into a channel 13. Suitable means are provided for cutting off a length of fastener strip from the film and the length of the strip 16 will be substantially equal to one-half of the film width.

The fastener strip will include two profile strips which are interlocked. As shown, one profile strip contains a groove and the other, an arrowhead shaped profile which is lockingly received in the

groove and the rib and groove profile strips are interlocked or joined before they are fed across the film. The guide mechanism shown generally at 12 includes a channel 13 which positions the strip assembly 16. The strip is secured or attached to the film so that only the lower portion of the profiles is secured to the film. The first portion 41a, Fig. 2, is bonded to the surface of the film such as by applying heat from outside of the surface of the film. The first strip 41a may be fully bonded or only tacked to the film, but as such will support the second profile strip 41b which is interlocked thereto. The strips are attached at midpoint of the edges of the film 10 and the lateral portions of the film beyond the ends of the strips 41 are sufficiently long so that they can be folded over the top of the strips 41.

The film has fastener strips attached to the upper surface, extending laterally, at spaced intervals as shown by the strips 17, 18, 18a, 19, 20, 26 and 30.

The film is fed downwardly over shaping shoulders 21 to guide the film over a vertical forming and filling tube 24. The edges of the film are brought together and are pressed together by rollers 25 to form a flange seam. The seam is welded by heated welding bars 22 and 23 which are brought together against opposite sides of the fin seam 37. Contents are then dropped through the tube 24 into the tubular formed bag which has a lower seam 29.

As the film is formed into tubular shape, the fastener strips, which are shown at 26 in Fig. 3, slide over the vertical form fill tube 24. The tube has the appearance of Fig. 3 and as it moves downwardly, it is flattened so it has the appearance shown in Fig. 4. As will be noted at this point, with the film in the tubular condition shown in Fig. 3 and in the flattened condition of Fig. 4, only the first profile strip is secured to the inner surface of one side wall of the bag.

When the contents are in the tube, having been dropped downwardly through the filling tube 24, the top of the bag is completed. This completion involves a number of operations which are performed simultaneously by sealing and cutting bars 27 and 28 which are moved against the outer surfaces of the tubular film by mechanism, not shown.

The bars 27 and 28 secure the profile strips to the inner surface of the bag. The bar 27 has a heated sealing bar 32, and the bar 28 has a heated sealing bar 31. These move against the profile strips applying heat to the outer surface of the film causing the film to be heat sealed to both strips. While the film has already been sealed to one of the strips at the station 12, it may be that the strip at this point was only tacked to the film so that a full heat seal is accomplished by the bar 31. The

second strip 41b has been free of attachment to the opposing bag wall, but at the location shown, the bar 32 moves against the film and causes it to be heat welded to the second fastener strip 41b.

Fig. 5 shows this in detail wherein the bar 31 which is heated engages the film outside of a base 43 of the profile strip 16. Heated bar 32 engages the film outside of a base 44 of the other fastener strip so that each of the strips are heat welded to the film.

Above the interlocked fastener strip 16, Fig. 5, the opposing bars 27 and 28 seal both the top of the prefilled package and the bottom of the next succeeding package. The bars 27 and 28 have a heated portion 27a and 28a which form a seam for the bottom of the next succeeding bag. Raised portions 27b and 28b of the bars 27 and 28 join the layers of film to form a seam above the fastener strip 16. This seam is a pilfer-evident closure for the bag and the seam can be removed cut off the top of the bag before the bag is to be used.

Located in the center of the bars 27 and 28 is a knife 28c which cuts the plastic film at 45 with the knife pressing against an anvil 28c. This separates the lower filled bag from the formed tube above permitting it to drop down as shown in Fig. 1 wherein a cross-seam 33 is formed at the bottom of a bag, a fastener 34 is at the top of the bag, and a pilfer-evident seal 35 is above the fastener.

Figs. 5 through 8 illustrate a modified way of attaching the assembled strips. In this arrangement, the strips are also of a length equal to approximately one-half the width of the film, but are located at one side of the film rather than the center. As shown in Fig. 6, the film 50 has strips 51 and 52 secured to the surface of the film laterally of the longitudinal formation axis 50a of the film. At the edges 53 and 54 of the film, these edges will be brought together to form a seam as shown in Figs. 7 and 8. The assembled fastener strips will lie along one inner wall of the tube as shown in Fig. 7 when the film is tubular shaped and continue to lie along one wall when the film tube is flattened as shown in Fig. 8. In the arrangement of Figs. 6 through 8, the fin seam 53, 54 will be present at the side of the bag rather than along the center of one face as it is in the arrangement of Figs. 2 through 4.

In operation as illustrated in Fig. 1, a length of film 10 is moved forward incrementally and at spaced intervals, assembled fastener strips such as 16 and 17 are secured to the upper surface of the film with only one of the interlocked strips joined to the surface of the film.

The film is then pulled forward and formed into tubular shape over a form fill tube 24 and the edges of the film are joined in a seam 37. The fastener strip lies along one inner wall of the tube,

out of the way when contents are dropped into the bag through the form fill tube 24.

Bars 27 and 28 are brought laterally against the tube clamping it, and these bars are moved downwardly to pull a fresh length of film down over the tube 24. The bars also function to apply heat to the outer surface of the film and thereby join the second profile strip of the film to the opposite wall of the bag. The bars also have spaced heating faces to form cross-seams across the film with the lower seam providing a pilfer-evident closure at the top of the bag and the upper seam forming a bottom seam for the next succeeding bag. A knife 28c carried by the bars severs the film between the cross-seals so as to cut off and drop a filled bag, and this operation is shown in greater detail in Fig. 5.

Thus, it will be seen that there has been provided an improved mechanism for form, fill and seal equipment, attaching assembled fastener strips in a unique manner by preattaching them to the film in advance of the formation of the film into a tube. The preassembled fastener strips slide past the tube during the filling operation and attachment of the strips to the other wall of the bag is completed after the bag has been filled. This arrangement substantially speeds up operation, insuring a secure attachment of the film to the fastener and completing the bag in a single rapid process.

Claims

1. In a form fill process of making bags with reclosable fasteners comprising the steps: supplying a continuous film of plastic bag material; positioning a fastener having first and second interlocked fastener profile strips on the surface of the film; securing one of said strips to the film surface at a location corresponding to the reclosable opening of a bag formed from the film with the strip secured to the inner surface of one of the bag walls; forming the bag; and thereafter securing the other of said strips to the inner surface of the formed bag so that the strips will be on opposing bag surfaces at the bag opening.

2. In a form fill process of making bags with reclosable fasteners in accordance with the steps of claim 1, wherein the fastener is positioned laterally of the length of the continuous film of plastic bag material and laterally of the forming axis of the bag.

3. In a form fill process of making bags with reclosable fasteners in accordance with the steps of claim 1, wherein the fastener is positioned by moving laterally across the axis of the film of plastic bag material.

4. In a form fill process of making bags with

reclosable fasteners in accordance with the steps of claim 1, wherein the fastener is positioned at the center of the film midway between the longitudinal edges thereof.

5. In a form fill process of making bags with reclosable fasteners in accordance with the steps of claim 1, wherein the fastener is positioned at one side of the continuous film of plastic bag material. 5

6. In a form fill process of making bags with reclosable fasteners in accordance with the steps of claim 1, including the step of first assembling and interlocking the fastener profiles before positioning them on the film. 10

7. A mechanism for making reclosable bags comprising in combination: means for supplying a continuous film of plastic bag material; means positioning a fastener having first and second interlocked fastener profile strips on the surface of the film leaving a portion of the film to be laid over the fastener; means securing the first of the strips to the film surface; means forming the film into a bag with the strips on the inner surface of the one of the bag walls; and means securing the second strip to the inner surface of the opposing bag wall. 15 20 25

8. A mechanism for making reclosable bags constructed in accordance with claim 7, wherein said positioning means moves the fastener laterally across the film at right angles to the longitudinal forming axis of the film. 30

9. A mechanism for making reclosable bags constructed in accordance with claim 7, including means for folding the film bringing the lateral edges together joining said edges prior to securing the second strip to the inner surface of the bag wall. 35

10. A supply of plastic film material for forming a bag comprising: a continuous film strip for forming a series of plastic bags; and a plurality of fasteners on the surface of the strip at locations extending laterally of the longitudinal forming axis of the strip and having first and second interlocked profile strips with the first strip secured to the film surface and extending only a portion of the way across the film so that the remainder of the film can be folded over the strip to attach the second profile strip to the film after the bag is formed. 40 45

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FIG. 1

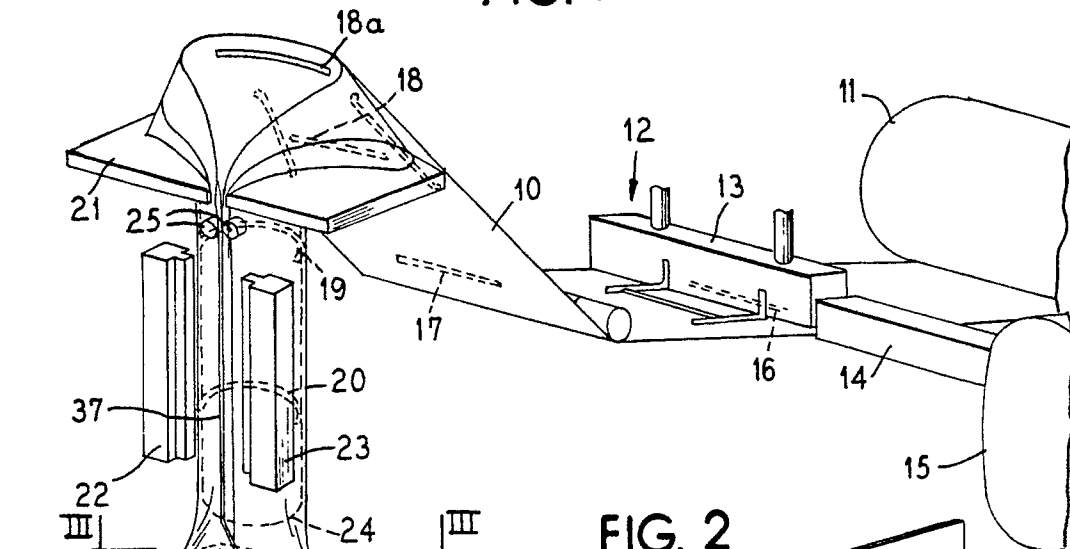


FIG. 2

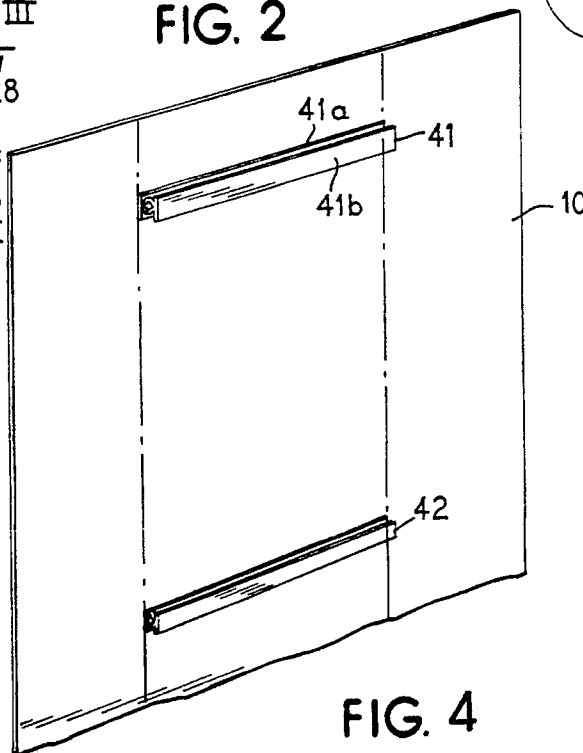


FIG. 3

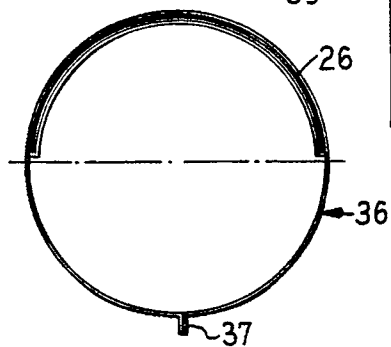
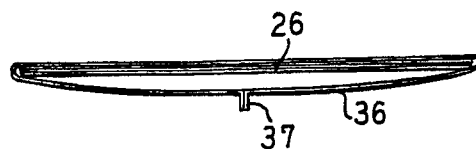
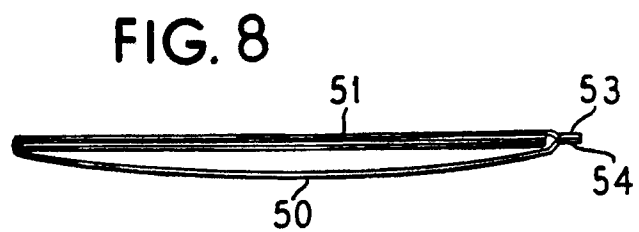
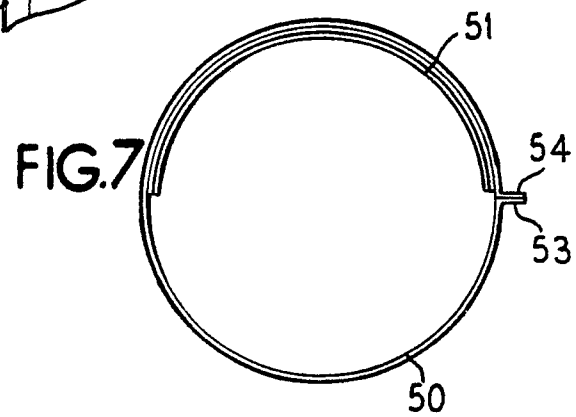
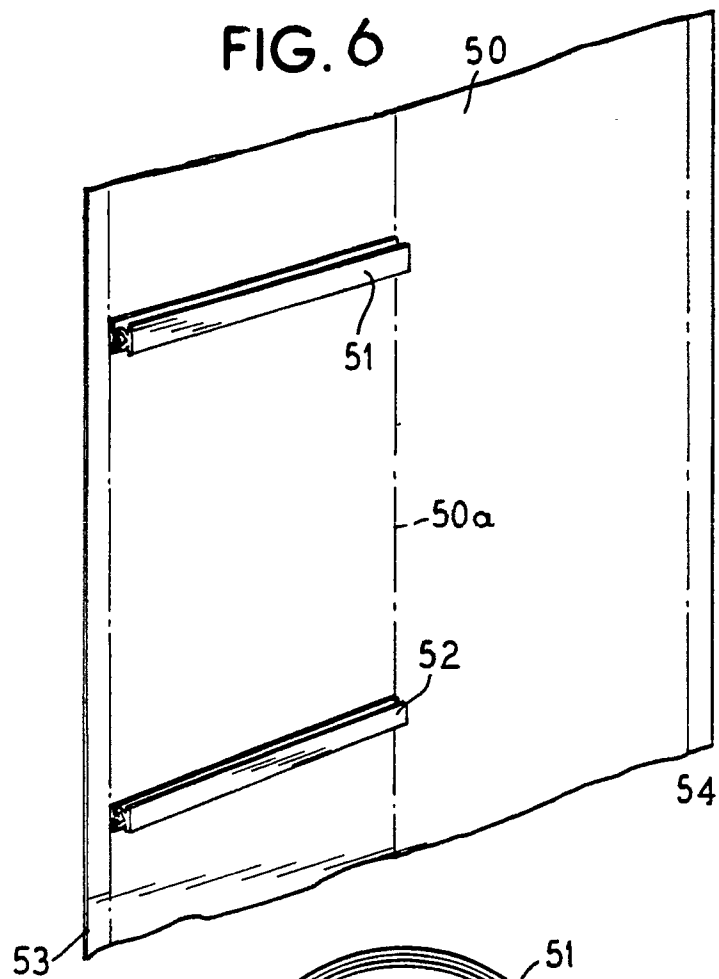
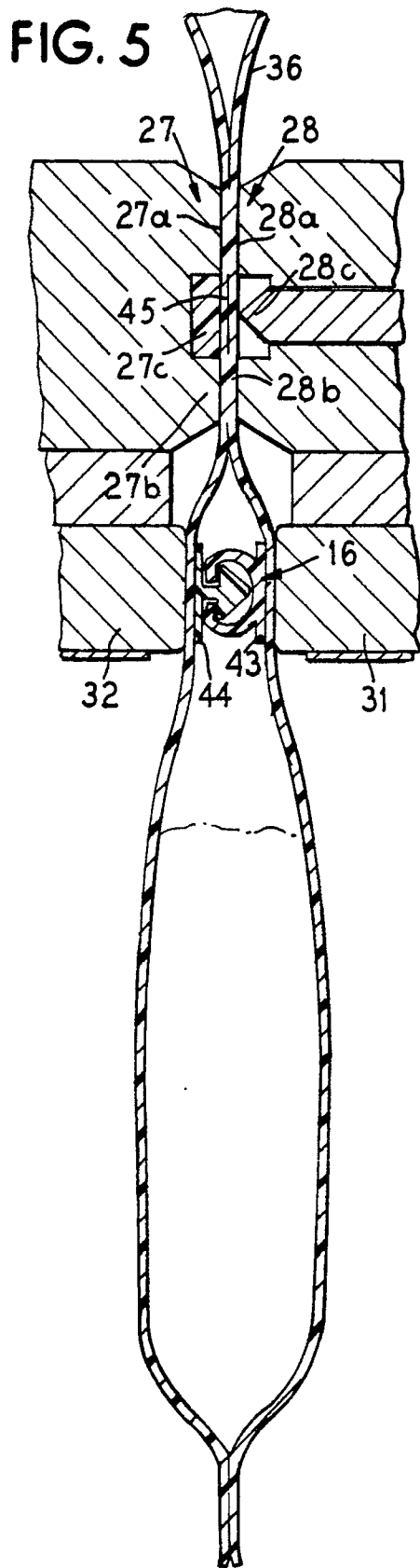


FIG. 4







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EUROPEAN SEARCH REPORT

Application Number

EP 90 11 1299

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.5)
A	EP-A-0 282 723 (MINIGRIP) * Abstract; figures * - - -	1-10	B 31 B 19/90
A	US-A-4 617 683 (CHRISTOFF) - - -		
A	US-A-4 844 759 (BOECKMANN) - - -		
A	US-A-4 666 536 (VAN ERDEN) - - - - -		
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			B 31 B B 65 D
The present search report has been drawn up for all claims			
Place of search		Date of completion of search	Examiner
The Hague		29 October 90	PEETERS S.
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