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(54) **Method and apparatus for making a pre-padded food bag**

(57) There is provided a method for manufacturing pre-padded food-containing bag (10) by perforating across a continuous web (11) of flattened tubular thermoplastic material, forming an opening in a layer of the perforated web, separating the layers (13,14) of the web, inserting an absorbent pad (25) through the open-

ing (20) into the inside of the tubular web (11) and making a seal (30) across the tubular web (11) at predetermined lengths to form a bag (10). The result is that a continuous web of bags containing absorbent pads at discrete intervals. There is also provided an apparatus for carrying out the method.

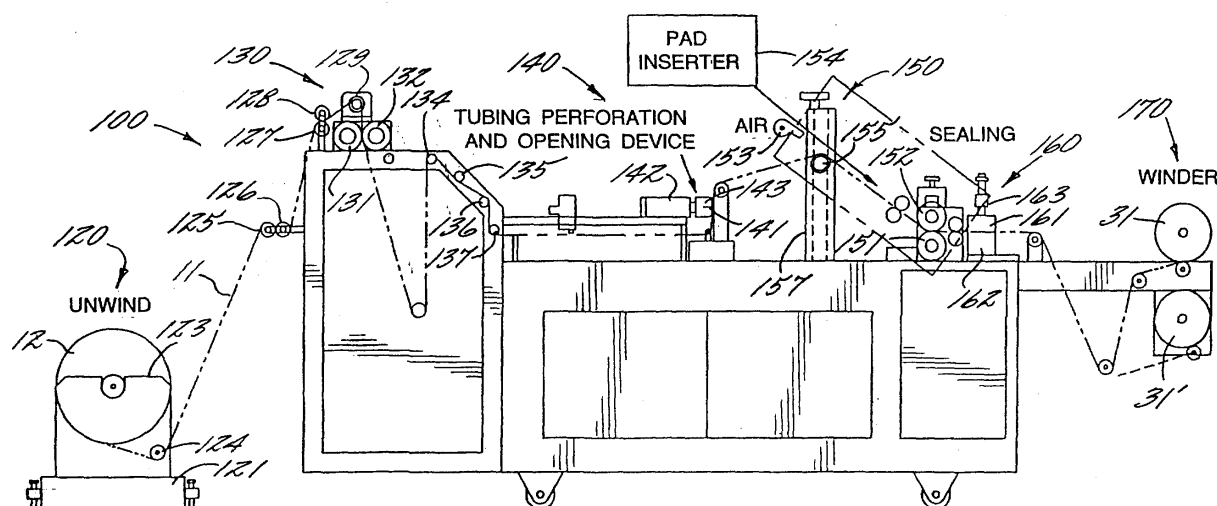


FIG. 1.

Description

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The present invention relates to a method and apparatus for making a pre-padded food-containing bag for such products as fresh poultry and meat. More particularly, this invention relates to methods and apparatus for placing an absorbent pad into a food-containing bag made from a web of tubular thermoplastic material.

Description of the Prior Art.

[0002] Poultry and meat are frequently sold in transparent plastic bags. Despite the customer being able to see the contents of the bag prior to purchasing, a problem with this type of packaging is that the poultry or meat, no matter how carefully prepared, contains residual blood and other fluids that flow out of the meat after it has been packaged. The blood and other fluids accumulate in the package, thereby detracting from its appearance. In addition, the blood and fluid sometimes leak from the package while the consumer is transporting it home from the market. To counter this problem food bag manufacturers include an absorbent pad in the bag prior to loading the food product. The pad absorbs the exuded blood and fluid into the pad and also enhances the appearance of the finished bagged product. The manual labor associated with placing the absorbent pad in the bag prior to product loading adds to the cost and time associated with this operation.

[0003] There are numerous patents directed to thermoplastic food bags with an absorbent pad for packaging food products. One such patent is U. S. Patent No. 4,815,590 to Peppiatt, *et al.* that discloses a generally rectangular pad attached to the side closest to the bag opening so that the pad is not dislodged when the product is placed in the bag. The pad absorbs blood and other fluids in the meats to keep the package neat and clean and minimize the danger of leakage.

[0004] An example of a pad for absorbing exuded juices or liquids is shown in U. S. Patent No. 4,410,578 to Miller. This patent discloses an absorbent pad for use in a bag or tray intended to contain and display fresh food such as poultry or meat. The absorbent pad includes a mat of liquid absorbing material, and liquid impermeable plastic sheets overlying and underlying the absorbent mat. At least one of the sheets is perforated, and a spacer is disposed between the two liquid impermeable plastic sheets to maintain their separation under the compressive load of the food product resting thereon, such that the ability of the pad to absorb liquids is unimpaired. When a food product is positioned upon the upper sheet of the absorbent pad, any exuded liquids will flow around the pad and enter the pad by capillary action through the perforated openings in the bottom

sheet, and the liquids will be held out of contact with the food product minimizing contamination of the product, maintaining its appearance, and improving its shelf life.

[0005] There remains a need for a pre-padded thermoplastic food bag. Such a bag would increase packaging rates and reduce labor cost at the packing plant.

BRIEF SUMMARY OF THE INVENTION

[0006] It is an object of the present invention to provide a method for making a food-containing bag from a web of thermoplastic tubular material and placing an absorbent pad therein.

[0007] Another object of the present invention is to provide an apparatus for making a food-containing bag having an absorbent pad therein from a web of thermoplastic tubular material.

[0008] Yet another object of the present invention is the provision of a method for manufacturing pre-padded food-containing bags that have fewer seals than conventional bags.

[0009] A further object of the present invention is to provide a pre-padded food-containing bag available in roll form.

[0010] It has been found that the foregoing objects may be accomplished in accordance with this invention by providing a method for manufacturing pre-padded food-containing bag by perforating across a continuous web of flattened tubular thermoplastic material, forming an opening in a layer of the perforated web, separating the layers of the web, placing an absorbent pad through the opening into the inside of the tubular web and making a seal across the tubular web at predetermined lengths to form a bag. The result is a continuous web of bags containing absorbent pads at discrete intervals. There is also provided an apparatus for carrying out the method.

[0011] More specifically, in a preferred embodiment, a predetermined continuous length of lay-flat seamless tubular thermoplastic web is unwound from a roll. The layers of the lay-flat tubular web are perforated at a predetermined length. The tubular web is fed through a tube opener where the upper layer perforations are separated creating an opening. The tubular web then passes to the inserter where during the seal dwell time, a pair of nip rollers, located at a predetermined distance from the web opening, squeeze the upper and bottom layers together. Air is blown into the opening in an amount sufficient to cause the upper layer of the tubular web to open sufficiently wide for an absorbent pad to be inserted through the opening. The absorbent pad may have either pressure sensitive or low temperature food grade adhesive attached on one side thereof so that when the excess air is removed from the tubular web the pad is adhered to one of the layers. The tubular web, having the absorbent pad positioned between the layers, passes between laterally adjustable nip rollers to squeeze the air out of the tubing prior to entering the sealer. As

the tubular web passes through the sealer a transverse seal is made. The sealer is displaced transversely across the tubular web for delimiting a predetermined length serving to define the bag size. The seal may be straight or curved. The seal can be made using an impulse sealer which employs a hot wire. The bags containing the pads may be wound into a roll and separated when used at the perforations in the bottom layer of the tubular web. There is also provided an apparatus for carrying out the method.

[0012] In a second embodiment, the method is similar to the first embodiment described above but differs in that when the tubular web passes through the perforator and opener the bottom layer of the tubular web is perforated and the upper layer is severed or cut. A knife is provided on reciprocating base to cut a slit through the upper layer but not the bottom layer. The perforations in the bottom layer are provided by perforation knife positioned in restraining block and piercing only the bottom layer. To insert the pad it is necessary to open the layers of the tubular web from each other so that air may be blown into the tube to make the tube wide enough to insert the pad. There are several means for separating the layers from each other, such as the eccentric wheel of the first embodiment or vacuum cups. The pad is inserted and the bag is formed by sealing as in the first embodiment.

[0013] In another embodiment, the flat tubular web is slit along one side and the absorbent pad is inserted at a right angle to the direction of travel of the web and the slit side is heat sealed.

[0014] The packaging costs at the consumer level are reduced due to reduction in labor costs associated with manual placement of pads in bag and subsequent increase in productivity by the use of the pre-padded bags. In addition, there are other applications where it is desirable to scavenge oxygen from the bagged product, or add moisture in the bag or anti-microbial pad in the bagged product. All the above can be accomplished by having a pre-padded bag with the appropriate pad.

[0015] Other objects, features and advantages of the invention will become evident from the following description of the drawings and detailed description of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] Having thus described the invention in general terms, reference will now be made to the accompanying drawings, which are not necessarily drawn to scale, and wherein:

FIG. 1 is a front view of a bag-forming machine used to make pre-padded bags according to an embodiment of the present invention;

FIG. 2 is an isometric view of an absorbent pad positioned in a transparent thermoplastic bag made according to the method of this invention;

FIG. 3A-3E show a schematic of the method of forming bags with adsorbent pads of one of the preferred embodiments of the present invention;

FIG. 4 is a top view showing the path of the tubular web shown in the method of FIGs. 3A-3E;

FIG. 5 is a top view of the pad inserting section of the method of the present invention showing inline insertion of the pads;

FIG. 6 is a side view of the pad inserting section of the bag-forming machine;

FIG. 7 illustrates another embodiment of the pad inserting section of the present invention showing insertion of absorbent pads at a right angle to the direction of travel of the web;

FIG. 8 shows a side view of an alternative embodiment of the pad inserter taken along line 8-8 of FIG. 7;

FIG. 9A-9E shows the steps used in the method shown in FIGs. 7-8;

FIG. 10 illustrates an alternative transverse seal - a curved seal; and

FIG. 11 illustrates the pad having an adhesive attached thereto.

DETAILED DESCRIPTION OF THE INVENTION

[0017] The present inventions now will be described more fully hereinafter with reference to the accompanying drawings, in which some, but not all embodiments of the invention are shown. Indeed, these inventions may be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will satisfy applicable legal requirements. Like numbers refer to like elements throughout.

[0018] Referring now to drawings, there is shown in FIG. 1 a bag forming machine for making a pre-padded food-containing bag such as the one shown in FIG. 2. The bag **10** is made from conventional tubular thermoplastic packaging material that is defined by seals **30** and has a fluid-absorbing pad **25** placed therein. Typically, the thermoplastic material will be polyethylene, although other thermoplastic materials known to those skilled in the art may be used, such as the materials disclosed in U. S. Patent No. 3,741,253 to Brax.

[0019] As shown in FIG. 1, the bag-forming machine **100** includes a tubular web supply section **120** and a bag forming section **130**. The tubular web supply section **120** includes a pair of cradles **123** mounted on a support base **121** and spaced apart from each other a sufficient distance to accommodate a roll **12** of tubular plastic material. The continuous length of lay-flat seamless tubular web **11** may be unwound from the roll **12** and passed around guide roll **124**.

[0020] The tubular thermoplastic web **11** is drawn in a flattened condition from the supply section **120** to the bag forming section **130** through the nips of tensioning rolls **125**, **126** and **127**, **128** and around guide roll **129**.

A pair of drive rolls **131**, **132** forming a nip through which the tubular web **11** passes is provided. The tubular web **11** passes around idler roll **133** and is guided by guide rollers **134**, **135**, **136**, **137** to the tube perforator and opener **140**.

[0021] The tubular web passes through the perforator and opener **140** where the bottom layer of the tubular web is perforated and the upper layer is severed or cut at a predetermined length. A knife **141** is provided on reciprocating base **142** to cut the upper layer. The perforations in the bottom layer are provided by perforation knife (not shown) positioned in restraining block **143** and piercing only the bottom layer. To insert the pad it is necessary to open the layers of the tubular web **11** from each other so that air may be blown into the tube to make the tube wide enough to insert the pad. There are several means for separating the layers from each other to create a bag opening, such as an eccentric wheel (FIG. 3) or vacuum cups (not shown).

[0022] The tubular web **11** then lead to the pad insertion section **150** by passing the tubular web **11** around guide roll **155**. During the seal dwell time, pair of laterally adjustable nip rollers **151**, **152** positioned prior to the sealer **160** and located at a predetermined distance from the opening in tubular web **11** to squeeze the upper and bottom layers together squeezing the air out of the tubular web. The nip rollers are positioned from the opening **20** at a predetermined distance to correspond with the length between the perforations **17** (FIG. 4). The length of the bag **10** may be varied by changing the distance between the perforations **17** and changing the distance from the opening **20** at the pad inserter to the nip rollers. Blower **153** blows air into the opening formed in the tubular web causing it to open wide enough to insert an absorbent pad. At the same time a pad **25** passes from pad inserter **154** through the opening in the tubular web where the pad comes to rest inside the tubular web **11**. The pad inserter is mounted to vertically adjustable support **157**.

[0023] Sealer **160** is displaced transversely across the tubular web **11** for forming bag **10** at a predetermined a length. The sealer **160** may include a sealing bar **161** which when in sealing position is disposed against restraining bar **162** opposite each other forms a transverse seal (straight or curved heat seal) to form the bag. A hydraulic cylinder **163** is provided for advancing and retracting the seal bar **161** and restraining bar **162** toward and away from the tubular web **11**. It will be understood by those skilled in the art that means other than a hydraulic cylinder, e.g. electric motor, may be used to advance and retract the seal bar. The continuous length of perforated, pre-padded bags then passes to winder assembly **170** where the bags are wound up in a roll **31**. When roll **31** is full the continuous length of pre-padded bags is shifted to a second roll **31'** and roll **31** is removed and set up for another winding operation when roll **31'** is full.

[0024] A method for making the pre-padded bags **10**

is shown in FIGs 3A-3E wherein a roll **31** of individual bags **10** each having an absorbent pad **25** is produced. In FIG. 3A, at station #1, a predetermined continuous length of lay-flat seamless tubular thermoplastic web **11** is unwound from roll **12**. The lay-flat tubular web **11** has an upper layer **13** and the bottom layer **14**. The tubular web **11** is fed along a path of travel to a perforator **15** and backing bar **16** where the upper layer **13** and the bottom layer **14** of tubular web **11** are perforated at a predetermined length to define the length of the bag (FIG. 4). The perforations are shown by forming line **17** in FIG. 4. In the case of the upper layer **13** the perforation is used to form opening **20** and in the case of the bottom layer **14** the perforation is used to separate each bag for the next succeeding bag.

[0025] The perforated tubular web **11** is fed to station #2 shown in FIG. 3B, through a tube opener where the upper layer **13** perforations are separated creating an opening **20**. In the embodiment shown in FIG. 3B the opening is provided using eccentric wheel **18** acting against the upper layer **13** of the tubular web and a back up roller **19** to separate at the perforation in upper layer **13**. In another embodiment, that shown in FIG. 1, the opening is formed by severing or cutting upper layer **13** and perforating the bottom layer **14**.

[0026] As shown in FIG 3C, the tubular web **11** next passes to station #3 for pad insertion from the pad inserter **24** where during the seal dwell time pair of nip rollers **21**, **22** located at a predetermined distance from the opening **20** to squeeze the upper layer **13** and bottom layer **14** together to close off a section of the tubular web **11** ahead of the absorbent pad **25** so that when the air from air source **23** is blown into the opening **20** the upper layer **13** and the bottom layer **14** of the tubular web **11** are caused to separate sufficiently for absorbent pad **25** to be placed through the opening and into the tubular web. At the same time the absorbent pad **25** is inserted inside the tubular web **11** through the opening **20**.

[0027] As shown in the enlarged views of FIGs. 5 and 6 the pad **25** is dispensed from a roll of pads **24**, such as DRI-LOC® absorbent pads available from Sealed Air Corporation, and inserted inline in the direction of travel of the tubular web. In FIGs 5 and 6 only bottom layer **14** of the tubular web is shown for clarity. Thus, because upper layer **13** is not shown, opening **20** is not shown. In the embodiment shown in FIG. 5 an indefinite length of pads is fed intermittently at a predetermined time interval from a stock roll **24** a cutting device (not shown) severs the pads from each other. Each pad is then delivered at the predetermined time into the opening **20** of the tubular web. The blowing air assists in pushing the pad into the tubular web. As shown in FIG. 11, The absorbent pad may have either pressure sensitive or low temperature food grade adhesive on one side thereof so that when the excess air is removed from the tubular web **11** the pad is adhered to one of the layers, preferably the bottom layer **14**.

[0028] The excess air is removed from the tubular web **11** having the absorbent pad **25** positioned between the upper layer **13** and the bottom layer **14**. As shown in FIG. 3D, station #4, one method of removing the excess air is to pass the tubular web **11** between laterally adjustable nip rollers **26, 27** to squeeze the excess air from the tubing prior to forming the bag.

[0029] Bags are then formed at station #5 by converting the tubular web **11** into a continuous series of connected end-seal bags **10**, each containing an absorbent pad as shown in FIG. 3E. The bags may be formed by sealing the tubular web across its width at discrete intervals. As the tubular web **11** passes between sealer **28** and restraining bar **29** a transverse seal **30** is made by heated sealing member **28**. The sealing member **28** is displaced transversely across the tubular web **11** for delimiting a predetermined length serving to limit the size bag **10**. The sealing member **28** is moved toward the restraining bar **29** to form a seal **30**. The seal **30** may be straight, as shown in FIG. 2 or curved as shown in FIG. 10. It should be understood that any well-known method of sealing is used to form the bags **10**. The bags containing the pads may be wound into a roll **31**. Alternatively, the bags may be folded along the seal and placed in a box until used.

[0030] FIGs. 7 and 8 illustrate an embodiment of the absorbent pad dispensing portion of the apparatus showing delivery from a roll **24** of absorbent pads **25** at an angle, preferably a right angle; to the direction of travel of the bottom layer **14** of tubular web **11** intermittent of perforations **17**. For purposes of illustration, the upper layer **13** is not shown. In the embodiment of FIG. 7, the flat tubular web **11** (see FIG. 9A) is slit along one side of the flattened tubular web **11** at slit line **32** (FIG. 9B). The absorbent pad **25** is inserted through the slit line **32** at an angle to the direction of travel of the web **11** as shown in FIG. 9C. The split side of the tubular web **11** containing the pad **25** is band sealed **33** as shown in FIG. 9D. Transverse straight seal **30** (FIG. 9E) or curved seal **30** FIG. 10) may be used to complete the pre-padded bag **10**.

[0031] Many modifications and other embodiments of the inventions set forth herein will come to mind to one skilled in the art to which these inventions pertain having the benefit of the teachings presented in the foregoing descriptions and the associated drawings. Therefore, it is to be understood that the inventions are not to be limited to the specific embodiments disclosed and that modifications and other embodiments are intended to be included within the scope of the appended claims. Although specific terms are employed herein, they are used in a generic and descriptive sense only and not for purposes of limitation.

Claims

1. A method of making a bag from a tube of thermo-

plastic material comprising the steps of:

providing a continuous length of lay-flat seamless tubular thermoplastic web having an upper layer and a bottom layer;
perforating at least one layer of said tubular web;
forming an opening in said tubular web;
separating said tubular web sufficiently wide for an absorbent pad to be placed through said opening;
placing an absorbent pad into said opening in said tubular web;
removing excess air from the tubular material, and
converting said tubular web into a plurality of end-seal bags whereby a continuous series of bags containing said absorbent pads at discrete intervals is formed.

2. The method according to Claim 1 wherein said converting comprises heat sealing across said tubular web to form a bag.
3. The method according to Claim 2 wherein said continuous series of bags containing absorbent pads is wound onto a roll.
4. The method according to Claim 1 further comprising: adhering said absorbent pad to an inside surface of said tubular web.
5. The method according to Claim 1 further comprising perforating both layers.
6. The method according to Claim 1 further comprising cutting through said upper layer and perforating said bottom layer.
7. The method according to Claim 1 wherein said opening in said tubular web is formed by an eccentric wheel acting against said tubular web.
8. The method according to Claim 1 wherein the layers of said lay-flat tubular web are separated by blowing air into said opening.
9. The method according to Claim 1 wherein said excess air is removed from said tubular web by passing the web through a pair of nip rolls to squeeze the air out of the tubular web.
10. The method according to Claim 1 further comprising slitting said flat tubular web along one side thereof, inserting said absorbent pad at an angle to the direction of travel of said web, and sealing said split side of said web.

11. A method of making a bag from a tube of thermoplastic material comprising the steps of:

providing a continuous length of lay-flat seamless tubular thermoplastic web having an upper layer and a bottom layer; 5
 perforating at least one layer of said tubular web;
 forming an opening in said tubular web;
 squeezing said upper layer and said bottom layer together to close off a section of the tubular web ahead of an absorbent pad; 10
 blowing air into said opening to separate said upper layer from said bottom layer sufficiently wide for an absorbent pad to be placed through said opening; placing an absorbent pad into said opening in said tubular web; 15
 removing excess air from the tubular material, sealing said tubular web into a plurality of end-seal bags whereby a continuous series of bags containing said absorbent pads at discrete intervals is formed; and 20
 winding said continuous series of bags containing an absorbent pad onto a roll. 25

12. A bag machine for forming a bag having an absorbent pad therein from a roll of flattened tubular web material comprising:

a tubular supply section comprising 30
 a holder for said roll of flattened tubular web material; and
 a bag forming section comprising;
 means for moving said tubular web along a predetermined path; 35
 a perforator for perforating at least on layer of said tubular web;
 a means for opening one side of said tubular web;
 means for inserting air into said tubular web in an amount sufficient to open said tubular web enough to insert an absorbent pad; 40
 means for delivering and inserting said absorbent pad into said tubular web;
 means for removing air from said tubular web; and 45
 a sealer displaced transversely across said tubular web for
 delimiting the length serving to form a bag, said means for delimiting the length forming a bottom seal of said bag. 50

13. The bag machine for forming a bag according to Claim 12 further comprising means for winding said bags onto a roll. 55

14. The bag machine for forming a bag according to Claim 12 wherein said sealer for delimiting said

length serving to form said bag is a heat sealing wire.

15. The padded bag machine for forming a bag according to Claim 13 wherein said air removal means is a pair of nip rolls through which tubular web passes.

16. The bag machine for forming a bag according to Claim 12 wherein said perforator is a perforation knife set to perforate both the upper layer and the lower layer.

17. The bag machine for forming a bag according to Claim 12 wherein said perforator is set to perforate one of the layers and a knife is provided to cut a slit in the other layer.

18. The bag machine for forming a bag according to Claim 12 wherein said means for opening said tubular web is an eccentric wheel acting against said tubular web.

19. The bag machine for forming a bag according to Claim 12 wherein said means for removing excess air from said tubular web is a pair of nip rolls to squeeze the air out of the tubular web.

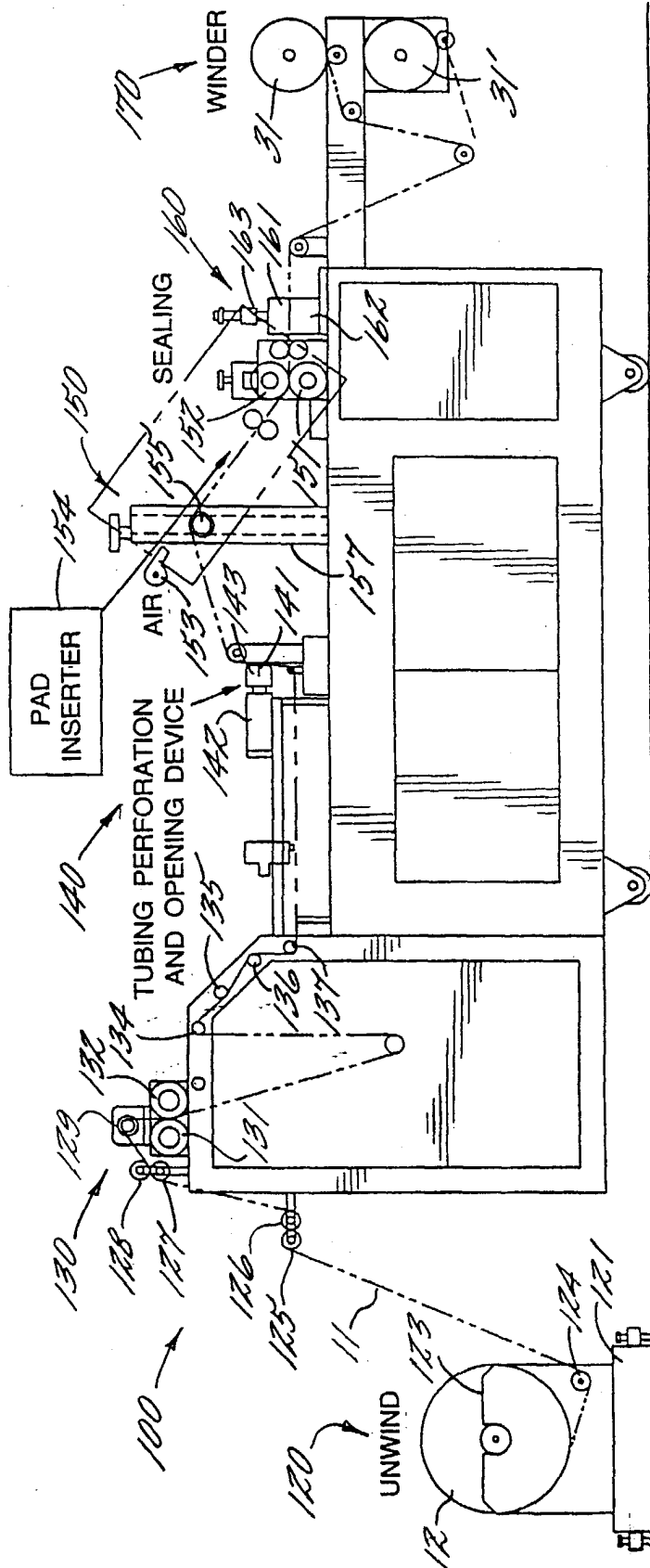


FIG. 1.

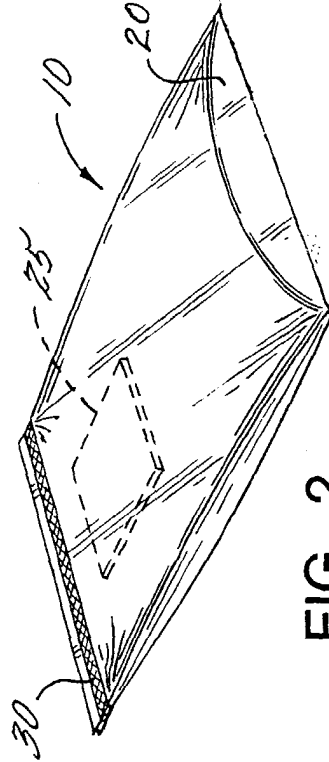


FIG. 2.

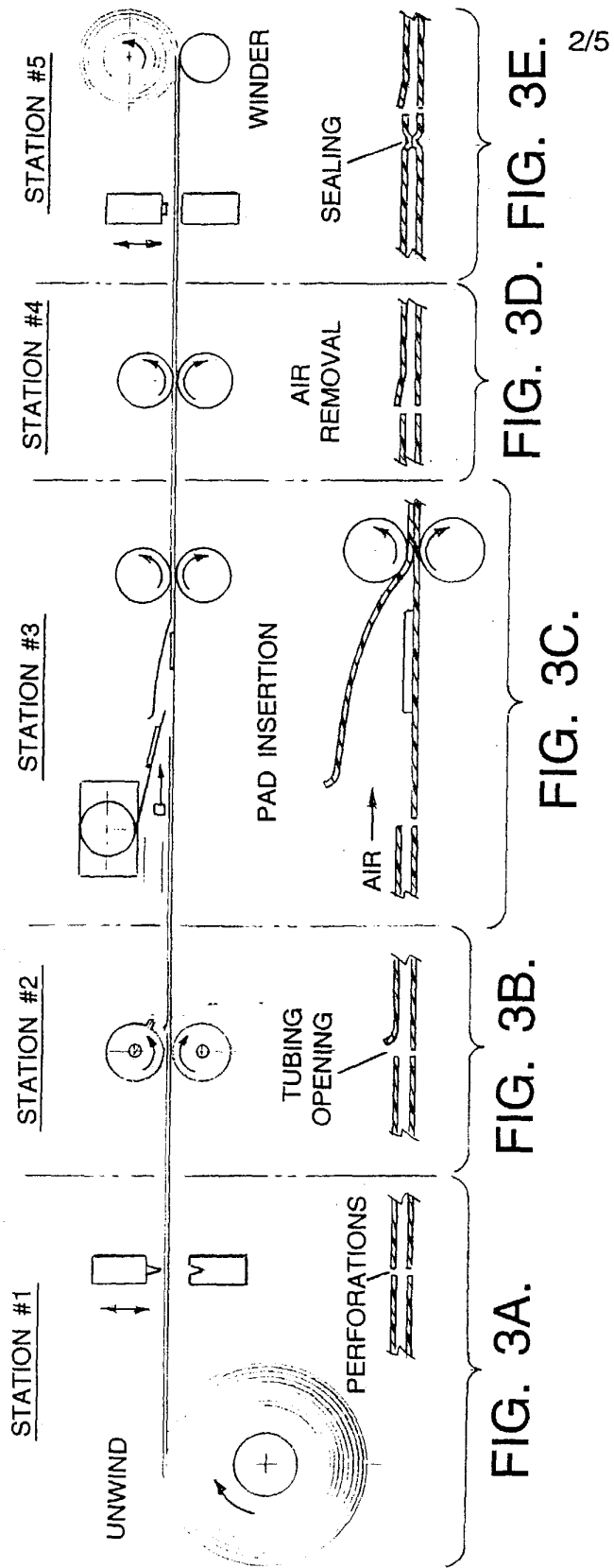


FIG. 4.

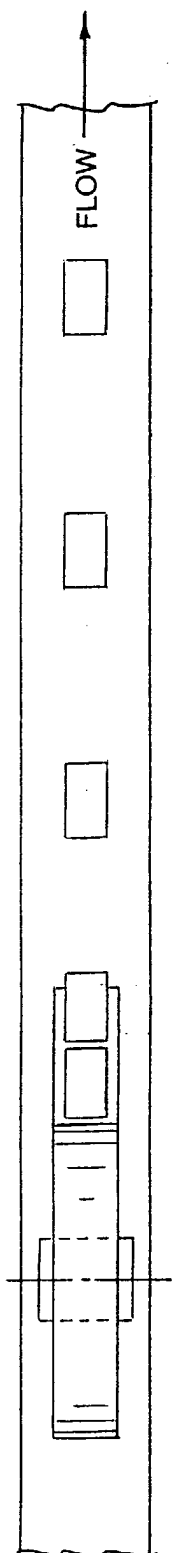


FIG. 5.

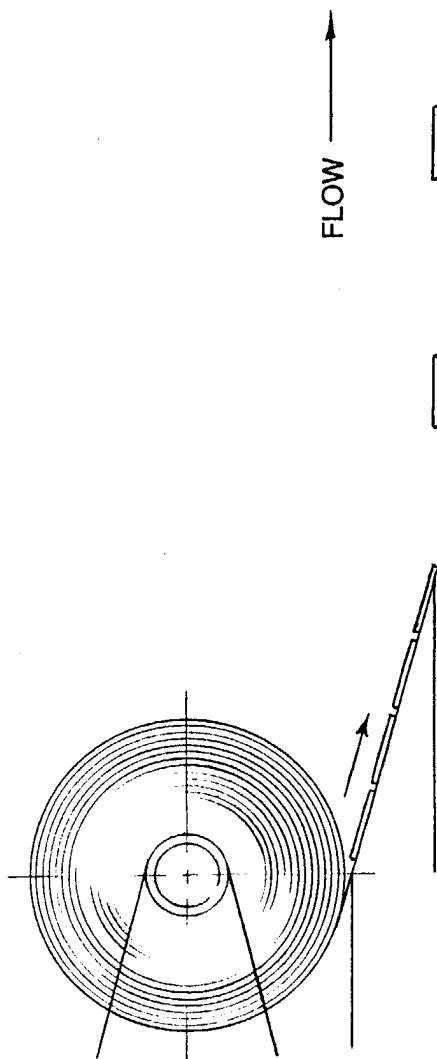


FIG. 6.

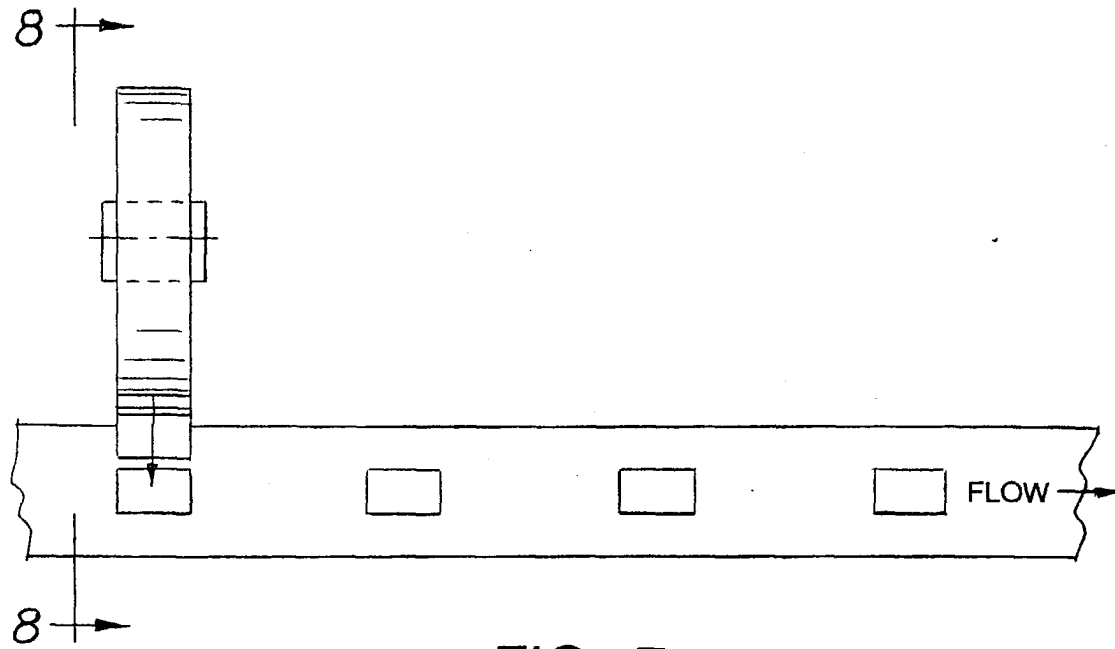


FIG. 7.

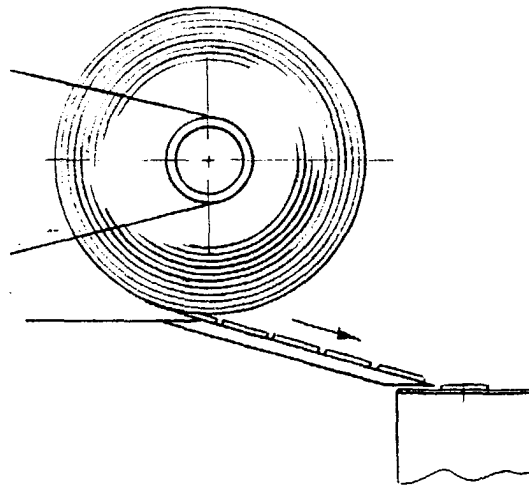


FIG. 8.

