



(72) NATTERER, HANS, DE

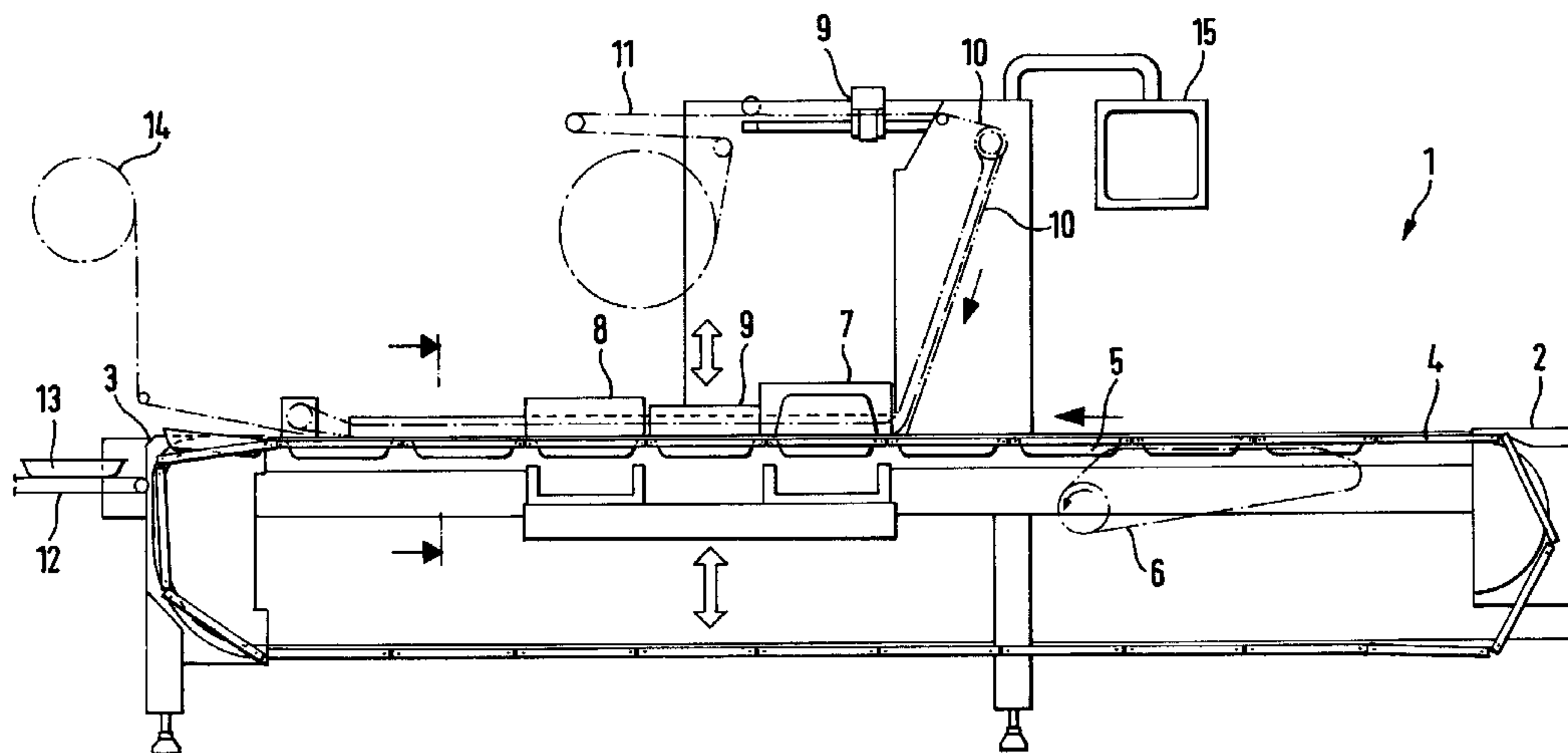
(71) MULTIVAC SEPP HAGGENMÜLLER GMBH & CO., DE

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(54) **APPAREIL ET METHODE POUR LA SEPARATION DE
COUCHES LAMELLEES DE PELLICULES MULTICOUCHES,
MACHINE D'EMBALLAGE COMPRENANT CET APPAREIL
ET EMBALLAGE COMPORTANT UNE PELLICULE DE
COUVERTURE COMPOSEE D'AU MOINS DEUX COUCHES
LAMELLEES**

(54) **APPARATUS AND METHOD FOR SEPARATING LAMINATED
LAYERS OF MULTI-LAYERED FILM, PACKAGING
MACHINE COMPRISING THIS APPARATUS AND PACKAGE
HAVING A COVER FILM CONSISTING OF AT LEAST TWO
LAMINATED LAYERS**



(57) The invention relates to an apparatus for separating the layers of a multi-layered film in at least an edge region thereof, the film having a first layer and a second layer bonded to the first layer with a limited bonding strength. The apparatus comprises a first means for sealing a defined region of said film from the remaining region, the defined region representing the edge region for separating the layers, and second means for feeding a pressurized fluid to the defined region. Furthermore, the invention provides a corresponding method of separating the layers of a film of this kind and a packaging machine, in particular a tray sealing machine. The invention further provides a package comprising a cover film consisting of at least two film layers bonded to each other with a limited bonding strength, the two layers being separated from each other in at least a border region of the film.

ABSTRACT

The invention relates to an apparatus for separating the layers of a multi-layered film in at least an edge region thereof, the film having a first layer and a second layer bonded to the first layer with a limited bonding strength. The apparatus comprises a first means for sealing a defined region of said film from the remaining region, the defined region representing the edge region for separating the layers, and second means for feeding a pressurized fluid to the defined region. Furthermore, the invention provides a corresponding method of separating the layers of a film of this kind and a packaging machine, in particular a tray sealing machine. The invention further provides a package comprising a cover film consisting of at least two film layers bonded to each other with a limited bonding strength, the two layers being separated from each other in at least a border region of the film.

APPARATUS AND METHOD FOR SEPARATING LAMINATED LAYERS OF
MULTI-LAYERED FILM, PACKAGING MACHINE COMPRISING THIS
APPARATUS AND PACKAGE HAVING A COVER FILM CONSISTING OF AT
LEAST TWO LAMINATED LAYERS

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BACKGROUND OF THE INVENTION

10 The invention relates to an apparatus and a method
for separating the layers of a multi-layered film having
at least two laminated layers, a packaging machine
comprising this apparatus and a package comprising a cover
film consisting of at least two laminated layers.

15 In the field of meat packaging the problem arises
that fresh meat in contact with the oxygen of the air
exhibits a red color, but changes to a brown or violet
color under exclusion of oxygen, thereby having an
unappetizing appearance. The conventional skin packages
have the meat lying in a tray and covered by an upper or
20 cover film which is sealed to the edge of the tray and
coats the meat like a skin. In case that this cover film
consists of an oxygen impermeable film, some time after
the packaging process the above-mentioned color change of
the meat to a brown or violet color will take place. When
25 using an oxygen permeable film for the cover film, the
meat will retain the red color or take it on again.

In order to solve this problem, US Patent 5,591,468
proposes to use two overlying separate layers as cover
film, the lower layer being oxygen-permeable and the upper
30 layer being oxygen-impermeable. The two layers are sealed
to the edge of the package at respective two separate
sealing seams. The upper layer can be pulled off imme-
diately before offering the packages for sale, whereby the
meat takes on a red color and a hermetic seal of the
35 package up to this point in time is ensured, thereby
keeping the quality of the meat. However, the known method

and package disadvantageously require the use of two
separate film rolls for producing the package and the
generation of two separate sealing seams. This renders the
entire method complicated and the corresponding apparatus
5 expensive.

European patent application EP 0 721 899 A1 discloses
the use, for skin packages, of a cover film consisting of
laminated layers. With this known skin package, however,
the problem arises that it is difficult to separate the
10 laminated layers from each other and a separate apparatus
is required for providing a point of impact for separating
the upper layer from the lower layer.

OBJECTS OF THE INVENTION

15 It is an object of the invention to provide an im-
proved apparatus and method for separating the layers of a
multi-layered film. It is a further object of the inven-
tion to provide an improved packaging machine using such a
20 multi-layered film and a package comprising such a multi-
layered film. Specifically, it is an object of the inven-
tion to provide a package which ensures that the product
therein, in particular meat, is kept fresh and which
allows, at a desired moment, oxygen to come into contact
25 with the product in an easy manner. It is a still further
object of the invention to provide an apparatus for
separating a film consisting of at least two laminated
layers, and a corresponding method, providing an easy way
of separating one layer from the other, whereby this film
30 can be used as cover film in packages. Finally, it is an
object of the invention to provide a packaging machine for
producing the above-mentioned packages.

SUMMARY OF THE INVENTION

35 In order to achieve the above-mentioned objects, the
invention provides an apparatus for separating the layers

of a multi-layered film in at least an edge region thereof, the film having a first layer and a second layer bonded to the first layer with a limited bonding strength, the first layer having a portion which projects beyond the second layer, the apparatus comprising means for sealing a defined region of the film from the remaining region thereof, the defined region representing the edge region for separating the layers and including at least part of the projecting portion of the first layer, and means for feeding a pressurized fluid to the defined region.

According to a further aspect the invention provides a method of separating the layers of a multi-layered film in an edge region thereof, the film having a first layer and a second layer bonded to the first layer with a limited bonding strength, the method comprising the steps of clamping the film along a border of the edge region and passing a pressurized fluid through the edge region.

According to a third aspect the invention provides a packaging machine comprising an input side, an output side, a plurality of working stations arranged between the input side and the output side, conveyor means for conveying packages along a conveyor path from the input side to the output side through the working stations, the packages having product carrying means with a product thereon, means for feeding a cover film onto the packages, the cover film having a first layer and a second layer bonded to the first layer with a limited bonding strength, the first layer having a portion which projects beyond the second layer, and means for separating the first layer from the second layer in a defined region extending across the cover film transversely to the conveyor path.

According to a fourth aspect the invention provides a package comprising a product receiving member having an edge, a product on the product receiving member, and a cover film covering said product and sealed to the edge so

as to enclose the product between the product receiving member and the cover film, the cover film being a laminated film having at least two layers bonded to each other with a limited bonding strength and separated from each other at a region adjacent to a lateral edge of the cover film, the cover film projecting beyond the edge of the product receiving member at the separated region.

BRIEF DESCRIPTION OF THE DRAWINGS

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Further advantages, features and objects of the invention will be apparent from the description of embodiments with reference to the drawings. In the drawings:

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Fig. 1 is a side view of a packaging machine;

Fig. 2 shows a section of an apparatus for separating two laminated layers of a packaging film, seen in conveying direction;

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Fig. 3 is a top view of the apparatus of Fig. 1, showing boundary lines of the separating region;

Fig. 4 showing a portion of Fig. 2 in an enlarged representation;

Fig. 5 is a top view of a further embodiment of an apparatus for separating two laminated layers;

25

Fig. 6 is a top view of a package having the two laminated layers of the cover film separated at one side of the package;

Fig. 7 is a side view of the package of Fig. 6;

30

Fig. 8 is a side view of a package according to Fig. 6 with inert protective gas; and

Fig. 9 is a top view of a package having the laminated layers of the cover film separated at one corner of the package.

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DESCRIPTION OF THE PREFERRED EMBODIMENTS

As shown in Fig. 1 a packaging machine 1, specifically a tray sealing machine, comprises a machine frame having an input side 2 and an output side 3. A plurality of tray carriers 4 adapted to receive trays 5 are conveyed along the frame from the input side to the output side through working stations arranged successively in conveyor direction. A conveyor device 6 formed as a conveyor chain is provided for conveying the continuous series of tray carriers 4. The working stations include a closing or sealing station 7 for sealing an upper film or cover film 11 to the peripheral flange or edge of the trays for sealing the package and a cutting station 8 for cutting the cover film. A separating station 9 for separating the laminated layers of the cover film is arranged at the supply region of the cover film 11. Furthermore, there is provided a transporting device 10 for feeding and transporting the cover film 11.

The packaging machine further includes a conveyor belt 12 for taking away the finished packages 13 after their passage through the working stations. Moreover, a roll 14 serves for winding up the remainders of the cover film 11 after the cutting operation.

A control device 15 controls the operation of the packaging machine in a coordinated manner.

As shown in the Figures 2 to 9 the cover film 11 is a laminated film having at least two laminated layers, a first layer 20 which is substantially oxygen impermeable and a second layer 21 which is bonded to the first layer and substantially oxygen-permeable. The first layer and the second layer 21 are bonded to each other with a limited bonding or adhesive strength therebetween which means that the layers can be separated from each other without damaging the same. As shown in particular in the Figures 2 to 5 the web of the oxygen-impermeable first

layer 20 is wider than that of the oxygen-permeable second layer 21 by an amount s and projects on one side beyond the second layer 21 by the amount s in a border region 22 of the web. The oxygen-impermeable first layer is stronger than the oxygen-permeable layer. Since the oxygen-impermeable layer projects beyond the oxygen-permeable layer and forms the stronger one of both layers, the oxygen-impermeable layer can be firmly gripped without risk of damage at the edges of the film for transport thereof.

As particularly shown in Fig. 2 the inventive separating station 9 for the cover film 11 comprises a first tool member being a lower tool member 30 and extending across the entire width of the cover film 11 transversely to the conveyor direction, and a second tool member, being an upper tool member 31 and in working cooperation with the lower tool member 30. The lower tool 30 can be lifted and lowered relative to the upper tool member 31 by means of a lifting device formed as a piston-cylinder-device 32, as shown in Fig. 2. The lower tool member 30 and the upper tool member 31 are both formed as bars or beams having respective short sides 34, 36 extending parallel to the conveyor direction and long sides 35, 37 extending perpendicular or transverse to the conveyor direction. As shown in the Figures 2 and 4, the lower tool member 30 comprises a hollow or trough-shaped recess 33 spaced from the short side 34. At a position opposite to the recess 33, in a cooperating state of both tool members, the upper tool member 31 comprises means for feeding compressed air in the form of two bores 38, 39 extending vertically through the entire upper tool member 31. The upper end of the bores facing away from the lower tool member 30 is connected with a compressed-air source 100.

As shown in the Figures 2 to 4 the upper tool member 31 further comprises, at its lower side facing the lower tool member 30, a channel or groove 40 extending, in the

first embodiment shown in Fig. 3, substantially parallel to the long side 37 and substantially parallel to one of the short sides 36 and spaced therefrom. An O-ring gasket or toroidal sealing ring 41 is located within the groove 40 for sealing purposes. The groove 40 is not a closed loop; rather, it is open at the other short side of the upper tool member. The gasket 41 in the groove 40 defines, in cooperating state of the tool members, a region 42 between both tool members within the loop formed by the groove which is sealed off from the region 43 between both tool members outside of the groove. The groove 40 is further arranged so as to include, in a cooperating state of both tool members, the recess 33 at the lower tool member 30 in the sealed region 42. In the embodiment shown in Fig. 3 the sealed region 42 formed in cooperating state of the tool members 30, 31 is formed as a straight strip extending across the film web. The fact that the groove 40 is open at one end enables air to flow through the sealed region 42 from the ends of the bores 38, 39 facing the compressed-air source to the side of the upper tool member having the open ends of the groove 40.

The separating station 9 is disposed in the packaging machine in such a manner that, in cooperating state of the tool members, the projecting region 22 of the first layer 20 of the cover film 11 overlaps the trough-shaped recess. The diameter of the trough-shaped recess 33 is slightly greater than the projecting amount of the first layer 20 beyond the second layer 21, whereby the second layer 21 projects into the trough-shaped recess 33 to some extent in cooperating state of the tool members.

In operation of the packaging machine the transporting device 10 firmly grips the cover film 11 on both sides of the film web and passes it through the working stations closely above the trays 5. In cases in which the product is within the trays, the trays are sealed in the sealing station 6 in conventional manner. However, the same

machine is also suitable to seal packages wherein the product projects beyond the upper edge of the trays, since the cover film is held in stretched condition and urges the product into the tray, whereafter the sealing operation is carried out. The cover film 11 connecting the individual packages is cut in the cutting station 8. The remainders of the cover film are wound up onto the roll 14.

The separating station 9 is operated in every working cycle of the packaging machine. The lifting device 32 moves the lower tool member 30 towards the upper tool member 31 and effects a predetermined contact pressure of the lower tool member 30 against the upper tool member 31, whereby the cover film 11 is clamped between the lower tool member 30 and the upper tool member 31. As a result of the positioning of the separating station 9 relative to the film web of the cover film 11 the region 22 of the first layer 20 projecting beyond the second layer 21 is placed above the recess 33 and the gasket 41 is inside of the outer edge of the projecting region 22 of the first layer 20.

In this working cycle pressurized air is subsequently fed into the sealed region 42 through the compressed-air bores 38, 39 in the upper tool member 31. The pressurized air generates a force acting onto the projecting region 22 of the first layer so as to urge this projecting region into the recess 33. The resulting stress between the first layer 20 and the second layer 21 causes a detachment or separation of the second layer from the first layer first in the region of the recess 33. Since the sealed region 42 is open at one side of the tool members, the pressurized air may enter or penetrate between the layers, and the separation of the second layer 21 from the first layer 20 continues, starting from the recess 33, across the entire width of the cover film 11 so as to form, in the cover film, a separated region of both laminated layers 20 and

21, the separated region forming a straight strip extending transversely across the film web.

After passing the cutting station the finished package 13 is formed as shown in Fig. 6. The tray 5 contains a product 50 and is sealed with the cover film in the region of the peripheral rim or edge 51 of the tray. The packages are severed in the cutting station 8 in such a manner that the separated region of the laminated layers 20, 21 of the cover film 11 forms a tab 52 projecting beyond the rim 51 of the tray 5. Since the tray carriers are adapted to carry the trays 5 having their narrow side extending transversely to the conveyor direction, the tab region 52 is formed at the narrow side of the package 13. Fig. 7 shows an example of a package 13 wherein the product projects above the upper side 51 of the tray, and Fig. 8 shows an example of a package 13' having the product within the tray and being entirely below the upper rim 51 of the tray, for example, in the case of a package with protective inert gas. The cover film is arranged so that the oxygen-permeable layer 21 is at the side of the cover film facing the product and the oxygen-impermeable layer 20 is on the opposite side of the cover film facing away from the product.

Before displaying the packages for sale the second layer 21 of the cover film, i.e. the upper layer, is grasped in that region where it is separated from the lower layer 20, and pulled off from the lower layer 20.

In the further embodiment of a separating station 9' shown in Fig. 5 the groove 40 with the gasket 41 therein is specifically shaped for producing the region 60 of a package 131 shown in Fig. 9, the region 60 defining the separation of the laminated layers 20, 21 being produced, in this case, at a corner of a package. To this end the groove 40 runs along a long side of the upper tool member 31 so as to form a number of indentations or bays 61 corresponding to the number of packages arranged side by

side and having a contour of a lying divided U, whereby the rounded base 62 of the U corresponds to the curvature of one corner of the tray edge. The bays 61 of the groove 40 define corner regions 63 of the sealed region 42 so
5 that, after cutting the cover film in the cutting station, the region 60 of the cover film shown in Fig. 9 and defining the separated region of the laminated layers is formed at one corner of the package.

In a further embodiment shown schematically in Fig. 1
10 a separating station 9' for separating the laminated layers of the cover film, as described above, is arranged behind the sealing station 7 rather than before the sealing station as in the case of the separation station 9. The position behind the sealing station is advantageous
15 in that the positions of the separated regions need not be taken into account in the sealing station, because these regions are produced after the sealing operation.

While the invention has been described in preferred form, it is not limited to the precise nature shown as
20 various modifications may be made without departing from the scope and spirit of the appended claims.

What is claimed is:

1. An apparatus for separating the layers of a multi-layered film in at least an edge region thereof, said film
5 having a first layer and a second layer bonded to said first layer with a limited bonding strength, said first layer having a portion which protrudes beyond said second layer, said apparatus comprising
means for sealing a defined region of said film from
10 the remaining region thereof, said defined region representing said edge region for separating said layers and including at least part of said protruding portion of said first layer, and
means for feeding a pressurized fluid to said defined
15 region.

2. The apparatus of claim 1, said means for sealing a defined region comprising an upper tool member, a lower tool member and lifting means for lifting and lowering
20 said lower tool member relative to said upper tool member, the lower and upper tool members being disposed on opposite sides of said film, gasket means being provided between said lower tool member and said upper tool member for defining said defined region of said film for separating
25 said layers.

3. The apparatus of claim 2, comprising an inlet and an outlet for passing pressurized air through said defined region.

30

4. The apparatus of claim 3, wherein said inlet comprises an aperture formed in said upper tool member and communicating with a compressed-air source, and the outlet is formed by an aperture in said gasket between said lower
35 tool member and said upper tool member.

5. The apparatus of claim 4, comprising a hollow recess formed in said lower tool member on a side opposite to said aperture in said upper tool member, said recess being located within said defined region included by said gasket for receiving said protruding portion of said first layer.

6. The apparatus of claim 2, wherein said gasket comprises a channel formed in a side of the upper tool member facing said lower tool member, and sealing material disposed in said channel.

7. The apparatus of claim 1, said film being a film web and said defined region extending transversely across said film web.

8. A packaging machine comprising
an input side,
an output side,
a plurality of working stations arranged between said input side and said output side,
conveyor means for conveying packages along a conveyor path from said input side to said output side through said working stations, said packages having a product carrying means with a product thereon,
means for feeding a cover film onto said packages, said cover film having a first layer and a second layer bonded to said first layer with a limited bonding strength, said first layer having a portion protruding beyond said second layer, and
means for separating said first layer from said second layer in a defined region extending across said cover film transversely to said conveyor path.

9. The packaging machine of claim 8, wherein said means for separating comprises means for sealing said

defined region of said cover film from the remaining regions thereof, said defined region including at least part of said protruding portion of said first layer, and means for feeding a pressurized fluid to said defined region.

10. The packaging machine of claim 8, wherein one of said working stations is a sealing station and said means for separating said first layer from said second layer is located ahead of said sealing station in said conveyor path.

11. The packaging machine of claim 8, wherein one of said working stations is a sealing station and said means for separating said first layer from said second layer is located behind said sealing station in said conveyor path.

12. The packaging machine of claim 8, wherein said packages are trays sealed by said cover film and said packaging machine is a tray sealing machine.

13. A method of separating the layers of a multi-layered film in an edge region thereof, said film having a first layer and a second layer bonded to said first layer with a limited bonding strength, said method comprising the steps of

clamping said film along a border of said edge region, and

passing a pressurized fluid through said edge region.

14. The method of claim 13, comprising using a film having a portion of said first layer projecting beyond said second layer.

15. The method of claim 14, wherein said edge region for separating said layers includes part of said projecting portion.

5 16. The method of claim 15, comprising sealing said edge region for separating said layers from the remaining region of said film, and passing pressurized air through said sealed region.

10 17. The method of claim 16, comprising passing said pressurized air from the side of said second layer to a region of said protruding portion.

15 18. A package comprising
a product receiving member having a peripheral rim,
a product on said product receiving member,
a cover film covering said product and sealed to said rim so as to enclose said product between said product receiving member and said cover film,
20 said cover film being a laminated film having at least two layers bonded to each other with a limited bonding strength and separated from each other at a region adjacent to an edge of said cover film,
said cover film projecting beyond said edge of said
25 product receiving member at said separated region.

30 19. The package of claim 18, wherein said product receiving member is a preformed tray having a substantially rectangular or square shape.

20. The package of claim 19, wherein said separated region is at at least one corner of said peripheral rim of said package.

21. The package of claim 19, wherein said separated region is on at least one side of said peripheral rim of said package.

5 22. The package of claim 18, wherein one of said layers of said cover film is an oxygen-impermeable layer and another of said layers of said cover film is a substantially oxygen-permeable layer.

10 23. The package of claim 22, wherein said oxygen-permeable layer is on the side of said cover film facing said product and said oxygen-impermeable layer is on the opposite side of said cover film facing away from said product.

15 24. A method for producing a package having a tray with a peripheral rim, a product on said tray and a cover film covering said product and sealed to said rim so as to enclose said product between said tray and said cover
20 film, said cover film being a laminated film having at least two layers bonded to each other with a limited bonding strength and separated from each other at a defined region adjacent a lateral edge of said cover film, said cover film projecting beyond said edge of said tray
25 in said separated region,

 said method comprising the steps of
 arranging a series of successive trays to be filled,
 filling said product into said trays,
 gripping a web of said cover film,
30 closing said filled trays using said cover film by sealing said cover film to said rim of said trays,
 cutting said cover film between successive trays for forming individual packages, and
 separating said layers of said cover film in said
35 defined region by clamping said cover film along a border

of said defined region and passing a pressurized fluid through said defined region.

5 25. The method of claim 24, comprising separating said layers of said cover film before sealing said cover film to said trays.

10 26. The method of claim 24, comprising separating said layers of said cover film after sealing said cover film to said trays.

FIG. 1

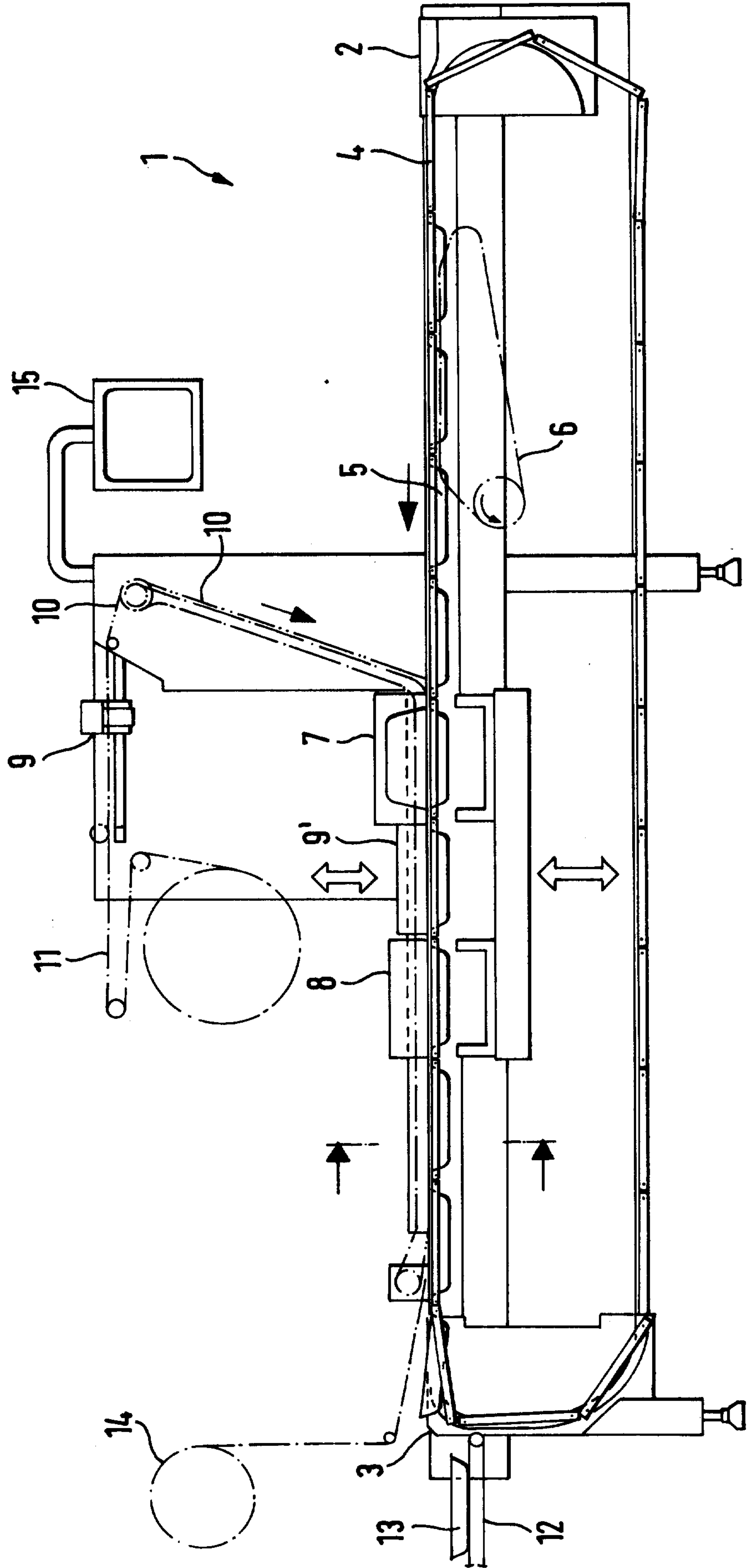


FIG.2

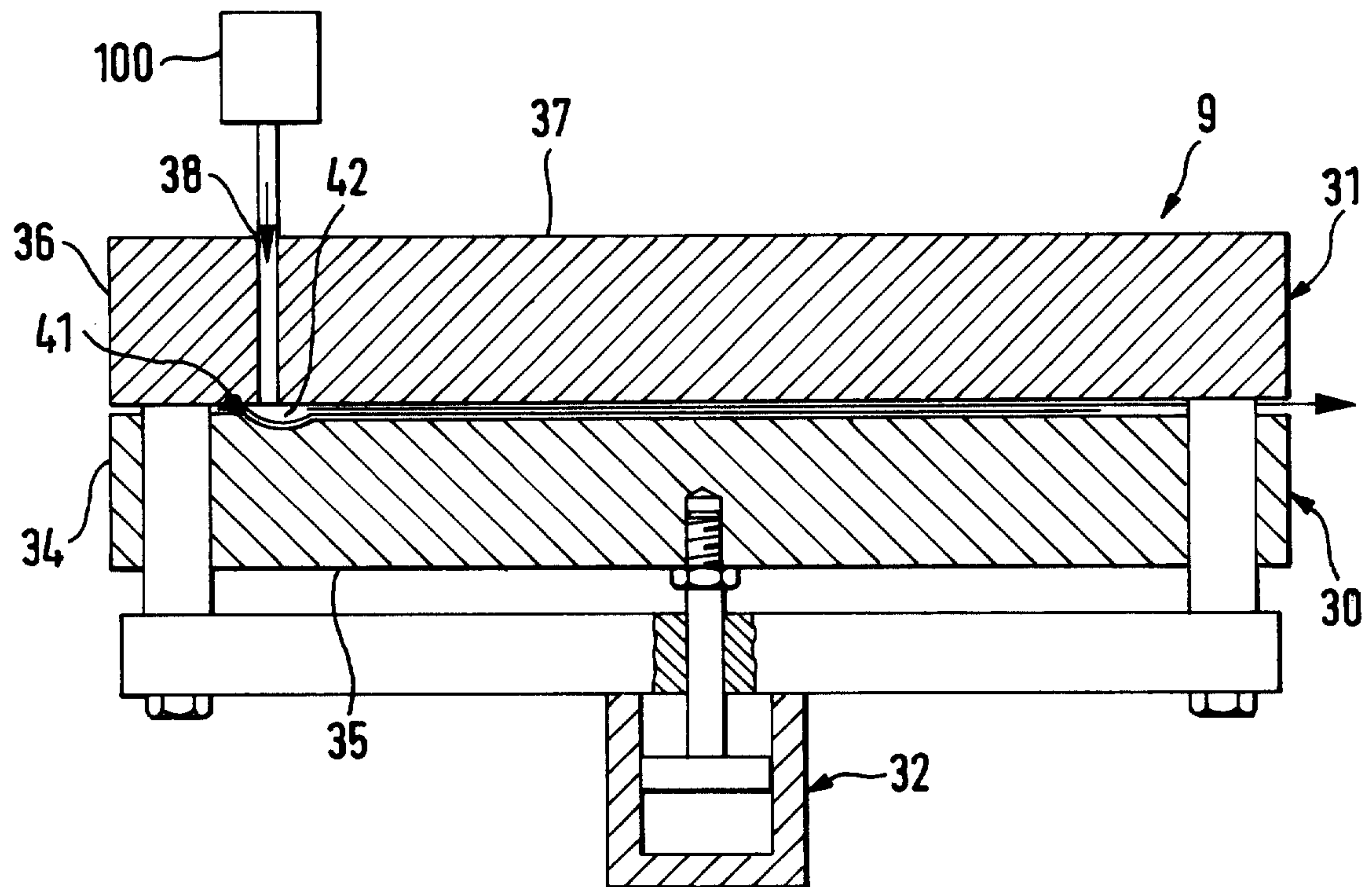


FIG. 3

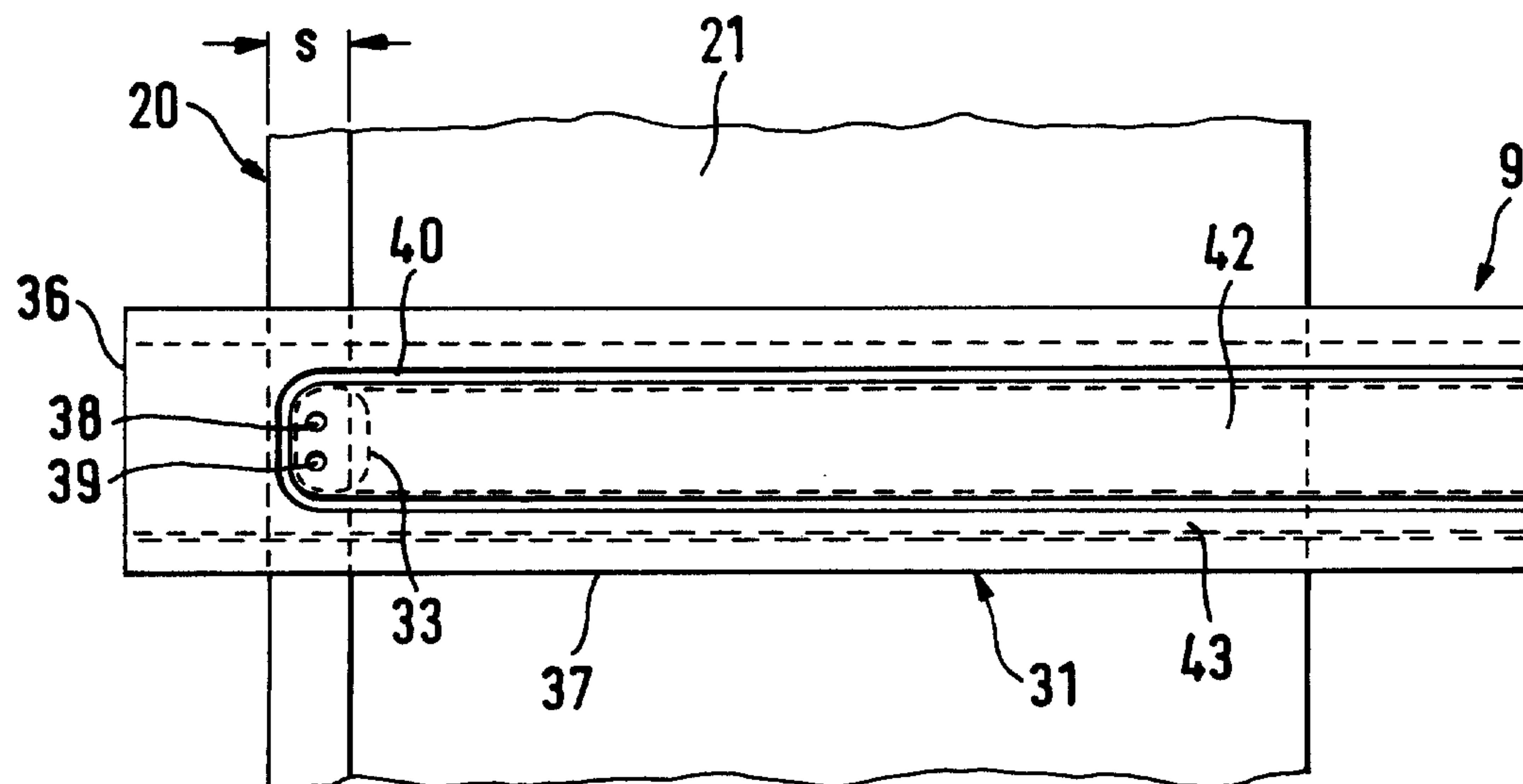


FIG. 4

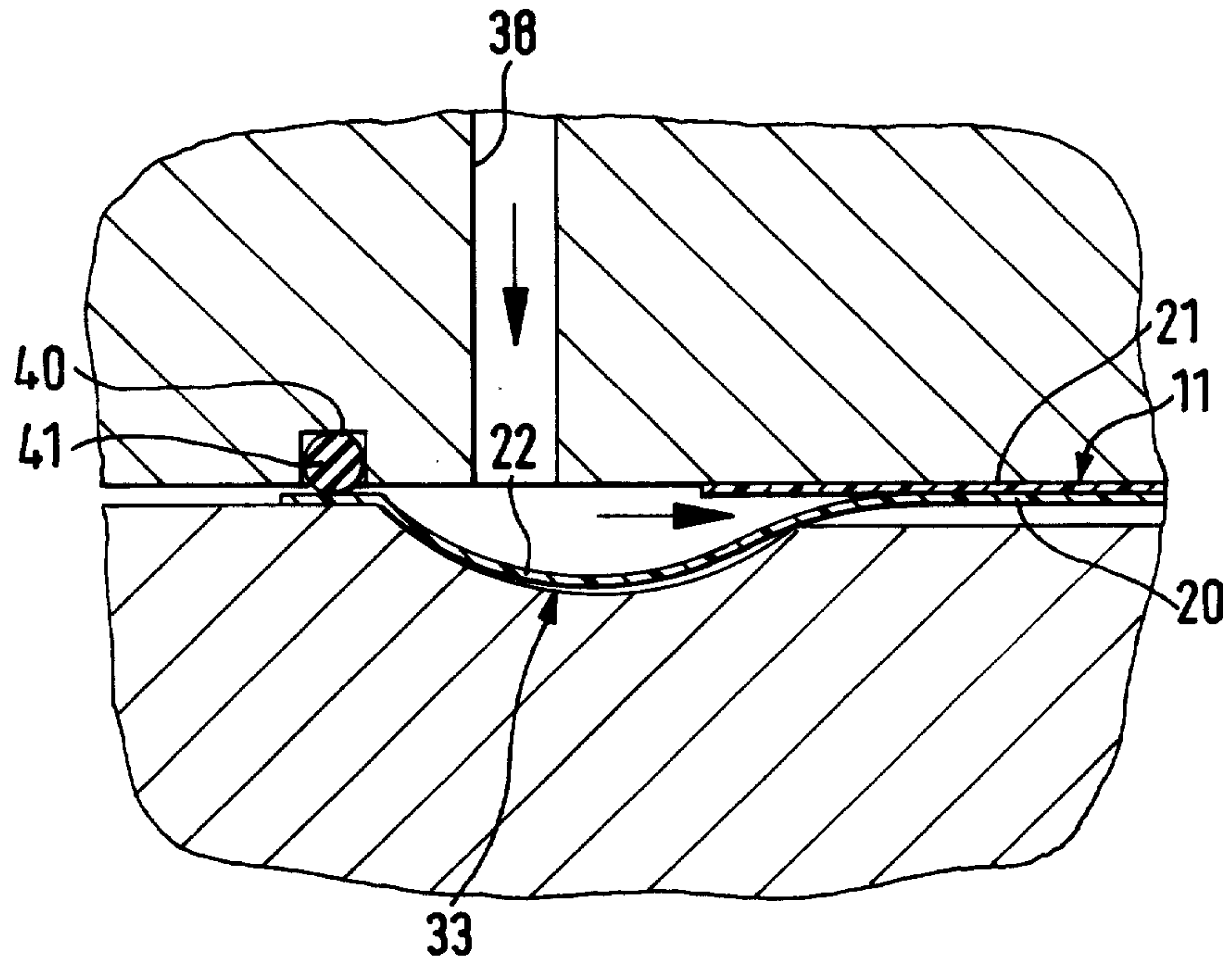


FIG. 5

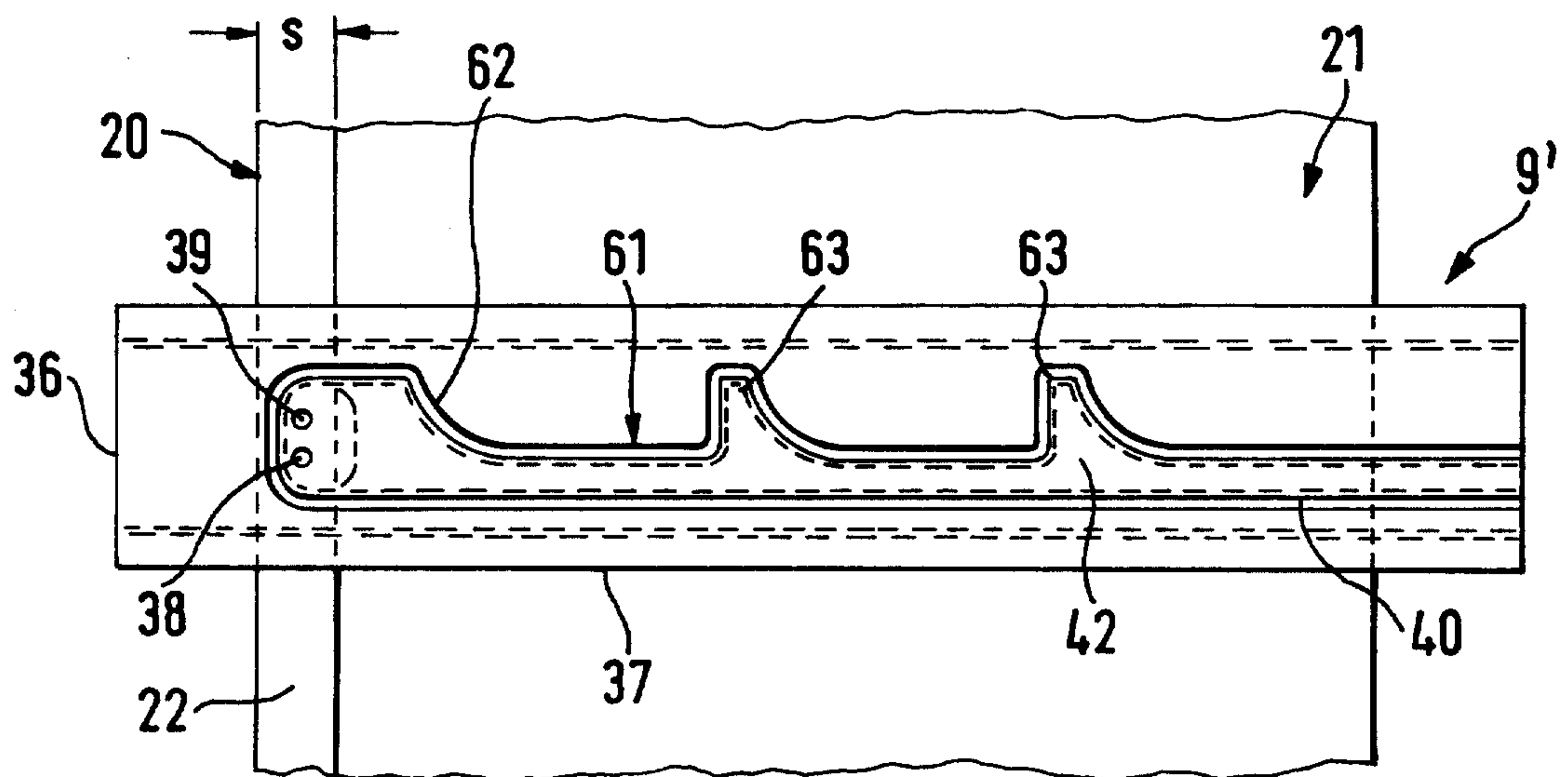


FIG. 6

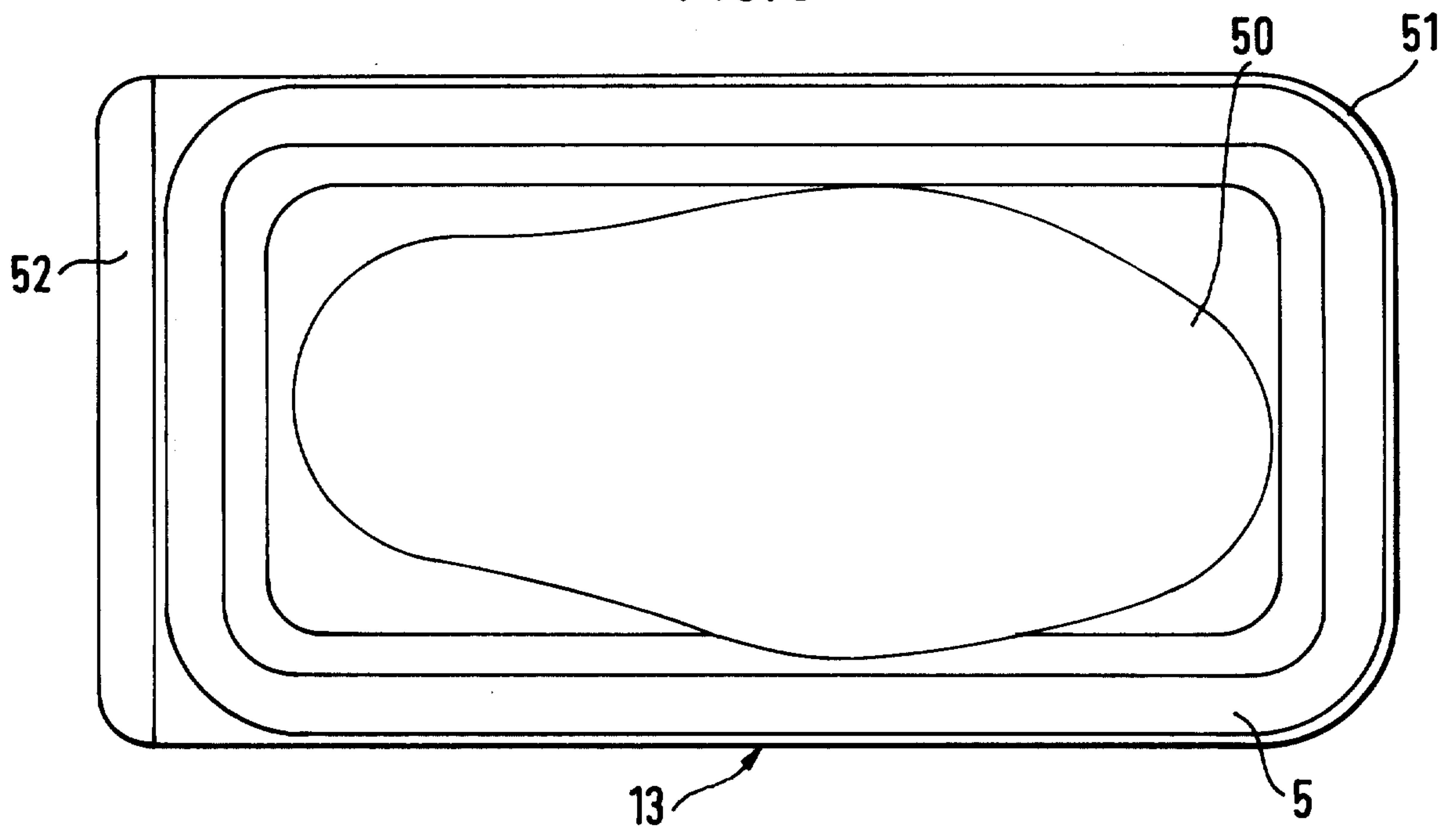


FIG. 7

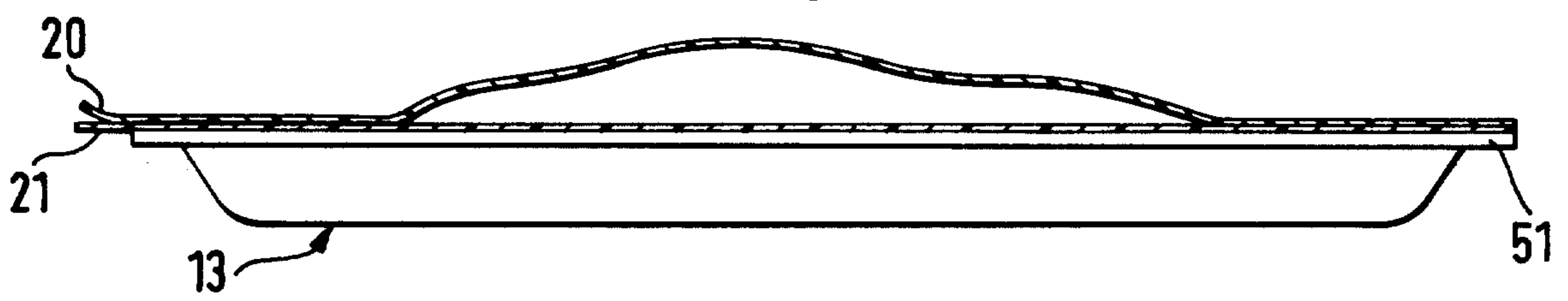


FIG. 8

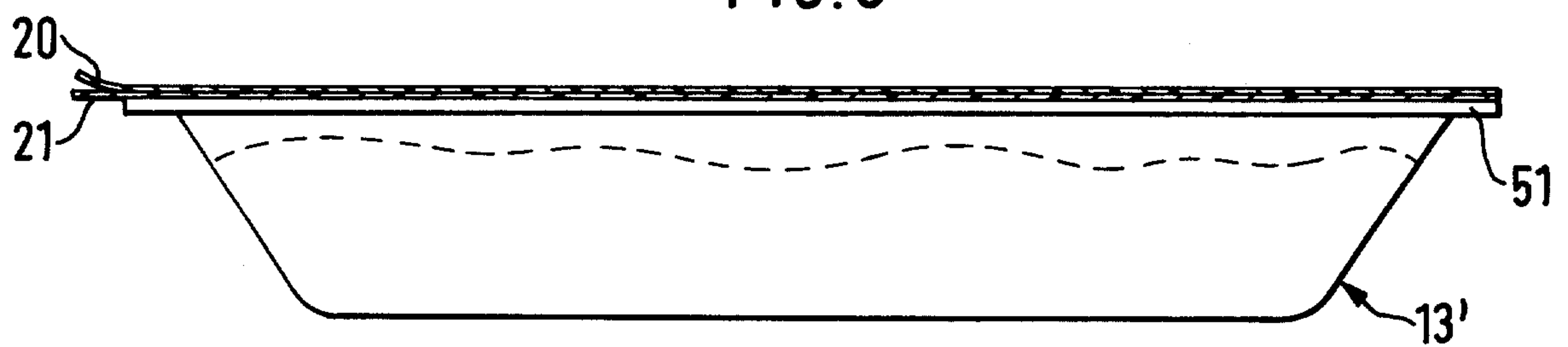


FIG.9

