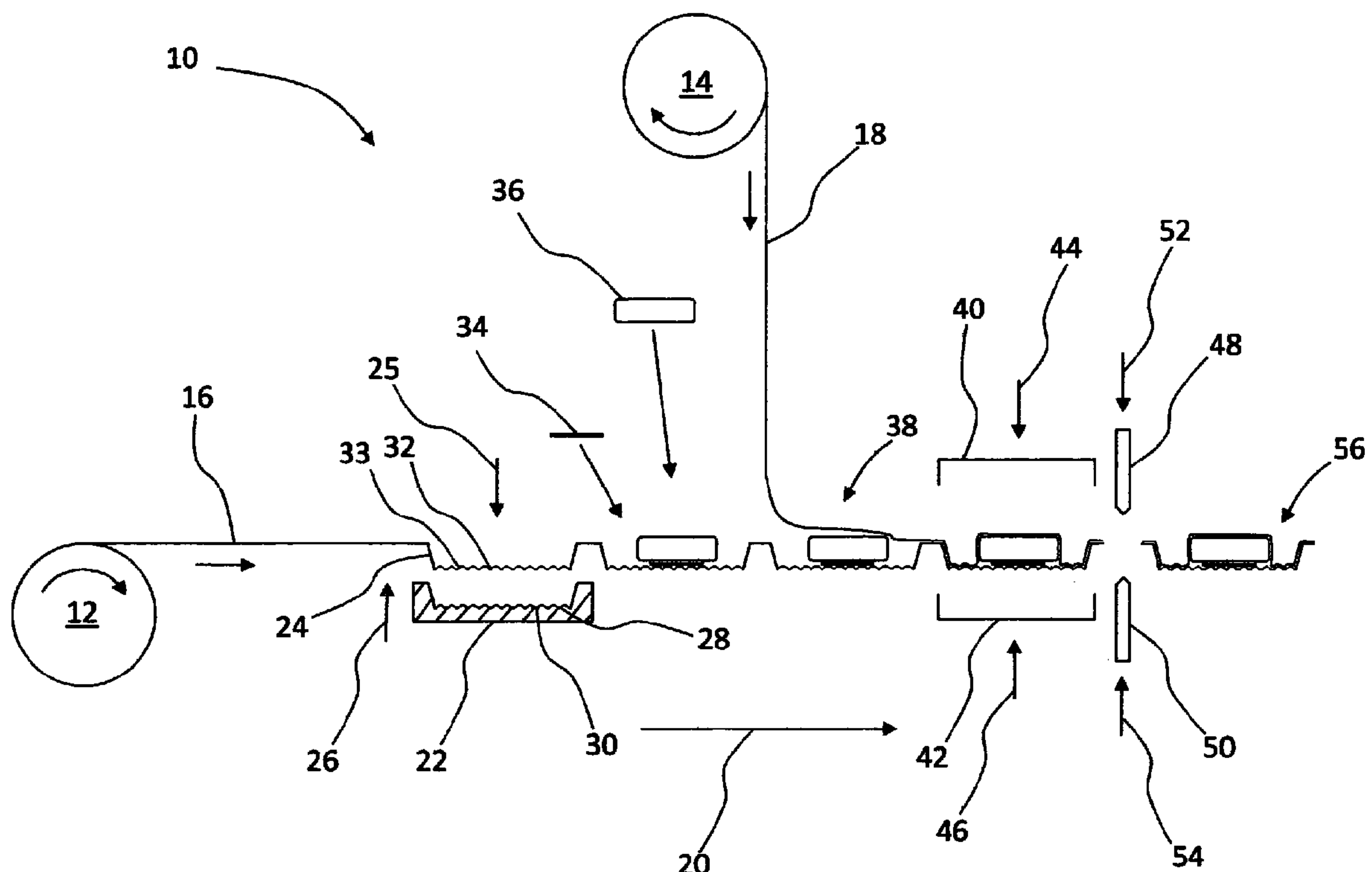




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(72) **Inventeur/Inventor:**
BARTON, WAYNE, GB
(73) **Propriétaire/Owner:**
ICELANDIC GROUP UK LTD, GB
(74) **Agent:** ADE & COMPANY INC.

(54) **Titre : AMELIORATIONS A L'EMBALLAGE D'ALIMENTS OU ASSOCIEES A CE DERNIER**
(54) **Title: IMPROVEMENTS IN OR RELATING TO THE PACKAGING OF FOOD**



(57) **Abrégé/Abstract:**

The invention relates to improvements in or relating to the packaging of food (36) between a first plastic film (16) and a second plastic film (18) using a packaging apparatus (10). A tray (24) is formed from the first plastic film (16), the tray having a floor (33) with at least one channel (32). An absorbent pad (34) is provided on the floor (33) of the tray (24). A portion of food (36) is provided on the floor (33) of the tray (24). The second plastic film (18) is placed on the tray (24) to sandwich the absorbent pad (34) and the portion of food (36) between the plastic films (16, 18). The packaging apparatus (10) is operated to urge the two plastic films (16, 18) together and to create a seal therebetween. At least one duct (76) is formed between said at least one channel (32) and at least one of the second plastic film (18), the absorbent pad (34), and the portion of food (36).



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(71) Applicant: ICELANDIC GROUP UK LTD [GB/GB];

Estate Road 2, South Humberside Industrial Estate,
Grimsby DN31 2TG (GB).

(72) Inventor: BARTON, Wayne; c/o Icelandic Group UK

Ltd, Estate Road 2, South Humberside Industrial Estate,
Grimsby DN31 2TG (GB).

(74) Agent: BATES, Daniel; Ogive Intellectual Property Ltd.,

34 Westgate, Northcave, Brough HU15 2NJ (GB).

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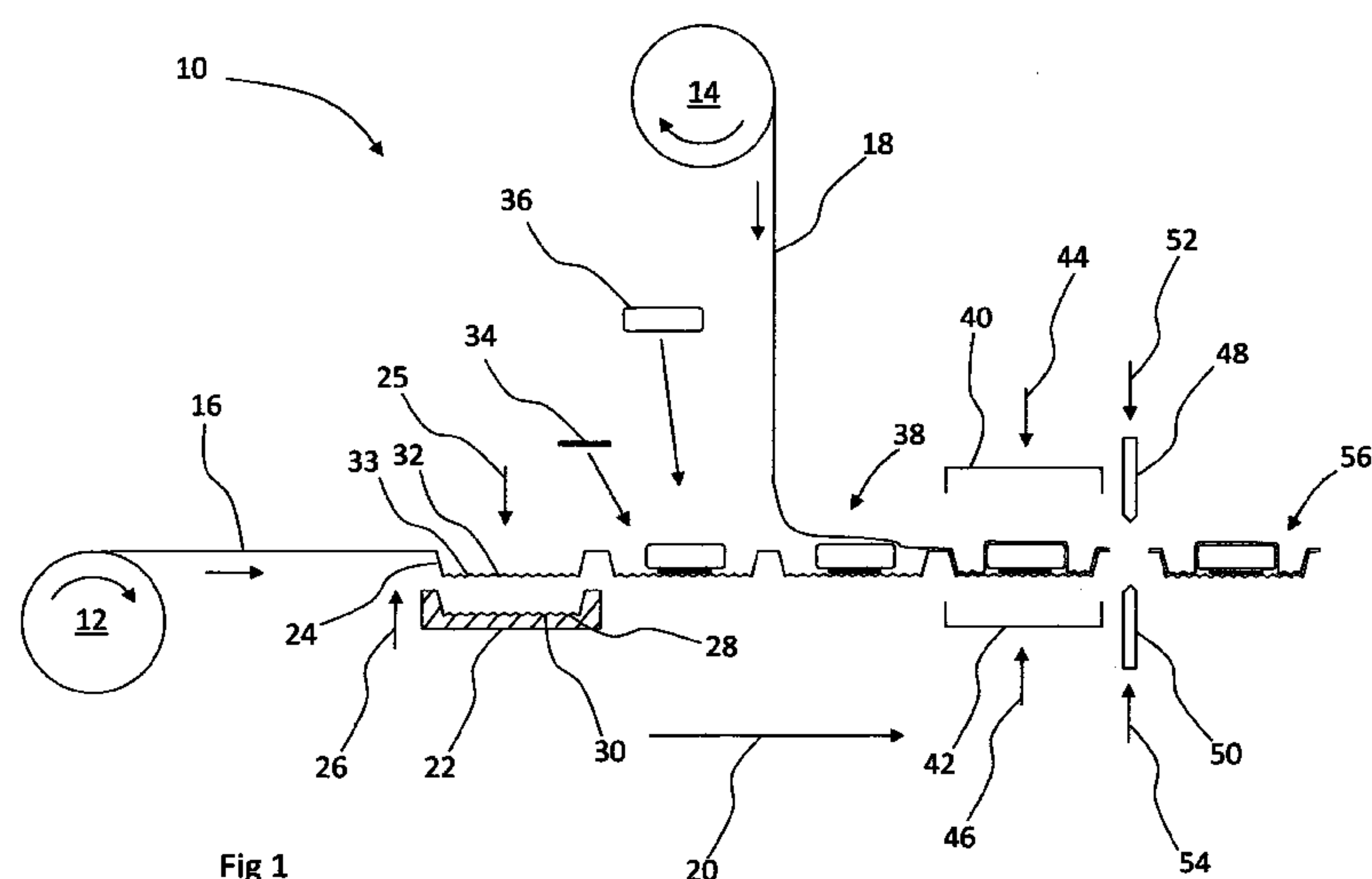


Fig 1

(57) **Abstract:** The invention relates to improvements in or relating to the packaging of food (36) between a first plastic film (16) and a second plastic film (18) using a packaging apparatus (10). A tray (24) is formed from the first plastic film (16), the tray having a floor (33) with at least one channel (32). An absorbent pad (34) is provided on the floor (33) of the tray (24). A portion of food (36) is provided on the floor (33) of the tray (24). The second plastic film (18) is placed on the tray (24) to sandwich the absorbent pad (34) and the portion of food (36) between the plastic films (16, 18). The packaging apparatus (10) is operated to urge the two plastic films (16, 18) together and to create a seal therebetween. At least one duct (76) is formed between said at least one channel (32) and at least one of the second plastic film (18), the absorbent pad (34), and the portion of food (36).

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Improvements in or Relating to the Packaging of Food**Technical Field**

The invention relates to improvements in or relating to the packaging of food.

5

Background

It is known to provide a way of packaging food such as fresh fish between two plastic films as a continuous process using a packaging apparatus. The two plastic films have an adhesive coating which is heat-activated. A first lower film is fed from a first roll onto a
10 mould and formed into a series of trays having flat bases. A portion of fresh fish is then placed onto each flat base. A second upper film is fed from a second roll over the trays and the portions of fish. A partial vacuum is applied below the tray and above and the second upper film together with the application of heat to the second upper film. The region above the top film is then vented to atmosphere to bond and seal the two films
15 together so that the portions of fish are hermetically sealed between the two films. The two films having the fish sealed between them are then repeatedly cut so that separate packages containing the fish are produced. Typically the lower film is an opaque material, and the upper film is a clear material so that the portion of fish is visible. Overall the packages have the effect of keeping the fish fresher for a longer period of time and thereby
20 increasing the shelf life. The packages are suitable for transporting to a supermarket in bulk and for stacking on shelves ready for sale. The packages also present the fish to the consumer in an appealing manner because it has a three-dimensional appearance. Such a way of packaging may be termed skin packaging which is characterised by the use of adhesive between the two films, and whereby the upper film is a shrink wrap film. The

skin packaging method is distinct from conventional vacuum packaging which merely applies a partial vacuum and then creates a seal around a perimeter of the food.

Whereas the package may keep the portion of fish fresh, for example, up to seven days,
5 a problem may be encountered towards the end of this shelf life because water and juices may be lost from the fish. The water collects on the top and on the side of the portion of fish within the pack itself. The water may contribute to reducing the shelf life of the fish within the package, or at least contribute to a reduction in the colour, flavour or integrity of the fish. In addition the water looks unsightly and may be unappealing to the consumer.

10

Water collecting within the package may be a particular problem when the package containing the fish is frozen prior to transportation and delivery to the supermarket. Such freezing is typically required when the fish is being transported of a long distance such as exporting to another country. At the supermarket the package typically undergoes a
15 controlled defrosting process before it is placed on the supermarket shelves for sale. Such freezing increases the volume of the portion of fish because water expands when frozen. This in turn causes the upper plastic film to stretch and become loose. The upper plastic film may also become loose when the fish has moved or slipped on the tray whether the fish has not been frozen or not. If the package is displayed in an upright position the water
20 may collect in a pouch of the upper plastic film. Overall the collection of water in the pouch between the fish and the top plastic film provides a poor presentation of the package to the customer.

It is known in the packing of meats such as pork, chicken or beef to use an absorbent sheet between the meat and the tray. The absorbent sheet soaks up any unwanted water and juices from the meat. However, the use of such an absorbent sheet when packaging food using the skin packaging method described above is expressly not recommended within the industry because the absorbent sheet may interfere with the seal between the two films.

Another problem of the known tray is that the portion of fish may slide on the flat base during the packing process or during transport of the finished package. During the packing process such sliding may be occur when the operator places the portion of fish on the tray, or it may be due to changes in speed or direction of the tray imparted by the packaging apparatus prior to the formation of the upper film on the tray. Sliding of the fish on the tray may leave a residue from the food which may interfere with the bond and seal between the two films of plastic and reduce its effectiveness. Such a reduction in the integrity of the seal may affect the shelf life of the fish.

A further problem with the known tray is that it is relatively flimsy, which may bend excessively when the top film is peeled away from it. The water between the two films of plastic may then spill out of the package which is undesirable for the end user.

It is broadly an aspect of the present invention to address one or more of the above mentioned disadvantages of the previously known ways of packaging food.

Summary

What is required is a way of packaging food which may reduce or minimise at least some of the above-mentioned problems.

5 According to a first aspect of the invention, there is provided a method of packaging food between a first plastic film and a second plastic film using a packaging apparatus, the method including;

forming a tray from the first plastic film, the tray having a floor with at least one channel;

10 providing an absorbent pad on the floor of the tray;

placing a portion of food on the floor of the tray;

placing the second plastic film on the tray to sandwich the absorbent pad and the portion of food between the plastic films; and

15 using the packaging apparatus to urge the two plastic films together and to create a seal therebetween, wherein at least one duct is formed between said at least one channel and at least one of the second plastic film, the absorbent pad, and the portion of food.

Such a method has the advantage that the portion of food may be kept fresher for a longer period of time, which may increase the shelf life, or at least contributes to an improved
20 colour, flavour or integrity of the food over a given period of time. This advantage is provided by the ability of the water and other juices from the portion of food to pass to the absorbent pad via said at least one duct. The Applicant has discovered that water is not good for the food, and in particular for the shelf life of fish, which has a tendency to deteriorate more quickly. Since the use of an absorbent pad when packaging fish is

expressly not be recommended by packaging suppliers this represents a prejudice away from using absorbent pads in the technical field. The Applicant has discovered that with the invention the risks associated with using an absorbent pad are avoided or at least significantly reduced or minimised to acceptable levels. The Applicants have also realised
5 that when the fish is frozen there is an opportunity for ice crystals to develop and grow within the tissue of the food. The tissue of fish is thought to release more water when defrosted.

In addition, a further advantage is provided by said at least one channel which may assist
10 with gripping of the food to inhibit it from sliding on the tray. This may provide the advantage of improving the integrity of the seal between the two films. Furthermore, said at least one channel may stiffen the tray. This may provide the advantage of making the second plastic film easier to remove from the tray or avoiding the tray flexing excessively. Such a stiffer tray may also allow a lighter weight tray to be used, which may provide a
15 cost and environmental advantage. It will be appreciated that the tray may be formed by the packaging apparatus or it may be pre-formed separately and then subsequently fed into the packaging apparatus.

Preferably the method further includes cutting the two films to create a separate package
20 containing the portion of food and the absorbent pad.

Preferably the method further includes providing the absorbent pad on the floor of the tray so that it at least partially covers at least a part of said at least one channel. Preferably the method further includes placing the portion of food on the floor of the tray so that it

at least partially covers a part of said at least one channel. Preferably the method further includes placing the portion of food on the floor of the tray so that it is at least partially on the absorbent pad, and preferably so that it wholly covers the absorbent pad. Such arrangements permits the water or juices to pass more easily to the absorbent pad.

5

Preferably the method further includes forming the tray with a continuous lip around the portion of food, said at least one channel and the absorbent pad, the lip for providing a continuous seal between the plastic films. This has the advantage of providing an improved seal. Preferably the method includes forming the lip on the floor of the tray.

10

Preferably the method further includes forming the floor of the tray with a plurality of channels for providing a plurality of ducts between the plurality of channels and at least one of the second plastic film, the absorbent pad, and the portion of food. Preferably the method further includes forming the plurality of channels so that the ducts are in communication with one another. Such arrangements permits the water or juices to pass more easily to the absorbent pad, and may also assist with stiffening the tray, and allow a lighter weight tray to be used, which may provide a cost and environmental advantage.

15

Preferably the method further includes forming said at least one channel using a row or a grid of raised portions of the floor of the tray. Such arrangements permit the water or juices to pass more easily to the absorbent pad, and may also assist with stiffening the tray. Furthermore, the raised portions may help the tray to grip the food and to inhibit it from moving on the tray.

20

Preferably the method is provided as a continuous process. Preferably the first plastic film and/or the second plastic film are provided on respective feed reels. Preferably the portion of food is fish.

- 5 Preferably the method further includes using the vacuum packaging apparatus to urge the two plastic films together by applying a partial vacuum above the second plastic film and below the first plastic film, and then venting a region above the second plastic film to atmospheric pressure. Preferably the method further includes using the packaging apparatus to apply heat to at least partially bond the two plastic films together. The heat may
10 activate an adhesive of one or both of the plastic films.

Preferably the method further includes forming a well in the floor of the tray, wherein the well is in communication with the at least one channel.

- 15 According to a second aspect of the invention there is provided a package of food produced using the method according to the first aspect of the invention.

- According to a third aspect of the invention there is provided a package containing a portion
20 of food, the package comprising a tray, a plastic film and an absorbent pad, the tray having a floor with at least one channel, the absorbent pad and the portion of food being provided on the floor of the tray, the plastic film being formed onto the tray to sandwich the absorbent pad and the portion of food between the plastic film and the tray to create a seal therebetween, wherein at least one duct is formed between said at least one channel and at
25 least one of the plastic film, the absorbent pad, and the portion of food.

Such a package has the advantage that the portion of food may be kept fresher for a longer period of time, which may increase the shelf life, or at least contributes to an improved colour, flavour or integrity of the food. This advantage is provided by the ability of the water and other juices from the portion of food to pass to the absorbent pad via said at least one duct. In addition, said at least one channel may assist with gripping of the food to inhibit it from sliding on the tray. This may provide the advantage of improving the integrity of the seal between the two films. Furthermore, said at least one channel may stiffen the tray. This may provide the advantage of making the second plastic film easier to remove from the tray or avoiding the tray flexing excessively. Such a stiffer tray may also allow a lighter weight tray to be used, which may provide a cost and environmental advantage.

Preferably the absorbent pad at least partially covers at least a part of said at least one channel. Preferably the portion of food on the floor of the tray at least partially covers a part of said at least one channel. Preferably the portion of food on the floor of the tray is at least partially on the absorbent pad, and preferably the portion of food on the floor of the tray wholly covers the absorbent pad. The absorbent pad may be provided on a part or the whole of the floor of the tray. Such arrangements permits the water or juices to pass more easily to the absorbent pad.

Preferably the tray has a continuous lip around the portion of food, said at least one channel and the absorbent pad, the lip for providing a continuous seal between the lip and the plastic

film. This has the advantage of providing an improved seal. Preferably the lip is formed on the floor of the tray.

Preferably the floor of the tray has a plurality of channels for providing a plurality of ducts
 5 between the plurality of channels and at least one of the second plastic film, the absorbent pad, and the portion of food. Preferably the plurality of channels run along the length of the floor of the tray. Preferably the plurality of channels run along the width of the floor of the tray. Preferably the plurality of channels are provided so that the ducts are in communication with one another. A spacing between adjacent channels may be between 0.5cm and 2.0cm,
 10 and preferably 1.0cm. Such arrangements permits the water or juices to pass more easily to the absorbent pad, and may also assist with stiffening the tray.

Preferably said at least one channel is provided by a row or a grid of raised portions of the floor of the tray. Preferably the raised portions are discrete projections from the floor of the
 15 tray. Preferably each raised portion has an apex. Preferably each apex has an area of between 0.75 to 4mm², and preferably 2.5mm². Such arrangements may provide the advantage of helping the tray to grip the food and to inhibit it from moving on the tray.

Preferably each raised portion has at least one face which is concave. Preferably each
 20 raised portion has a height of between 1.0mm and 7.0mm, and preferably 3.6mm. Such arrangements may provide the advantage or promoting a separation between the tray and the film to create said at least one duct.

Preferably the portion of food is fish. One or both of the plastic film and the tray may be a thermoforming material.

Preferably the tray has a sidewall extending from the floor. Preferably the tray is an
5 opaque plastic. Preferably at least a part of the plastic film is a see-through plastic film.

Preferably the plastic film is formed onto the tray by applying a partial vacuum above the plastic film and below the tray, and then venting a region above the plastic film to atmospheric pressure to urge the plastic film and the tray together. Preferably the plastic
10 film is at least partially bonded to the tray with the application of heat. The heat may activate an adhesive of the plastic film or the tray.

Preferably the floor of the tray has a well in communication with the at least one channel.

15 Preferably the plastic film is a breathable film.

According to a fourth aspect of the invention there is provided a packaging apparatus for packaging a portion of food and an absorbent pad between a tray and a plastic film, the tray having a floor with at least one channel, the absorbent pad being located on the floor
20 of the tray, the portion of food being located on the floor of the tray, the plastic film being located on the tray to sandwich the absorbent pad and the portion of food between the tray and the plastic film, the packaging apparatus operable to urge the tray and the plastic film together and to create a seal therebetween, wherein at least one duct is formed

between said at least one channel and at least one of the second plastic film, the absorbent pad, and the portion of food.

- Such an apparatus has the advantage that the portion of food may be kept fresher for a longer period of time, which may increase the shelf life, or at least contributes to an improved colour, flavour or integrity of the food. This advantage is provided by the ability of the water and other juices from the portion of food to pass to the absorbent pad via said at least one duct. In addition, said at least one channel may assist with gripping of the food to inhibit it from sliding on the tray. This may provide the advantage of improving the integrity of the seal between the two films. Furthermore, said at least one channel may stiffen the tray. This may provide the advantage of making the second plastic film easier to remove from the tray or avoiding the tray flexing excessively. Such a stiffer tray may also allow a lighter weight tray to be used, which may provide a cost and environmental advantage.
- 15 Preferably the tray is formed by a mould of the apparatus from a second plastic film. Preferably one or both of the first and second films are provided on respective feed reels. Preferably the apparatus has a blade to cut the tray and the plastic film to create a separate package containing the portion of food and the absorbent pad. Such arrangement provide the advantage that the apparatus can be operated as a continuous process where
- 20 successive portions of food are packaged.

Preferably the apparatus is arranged to provide the absorbent pad on the floor of the tray so that it at least partially covers at least a part of said at least one channel. Preferably the

apparatus is arranged to place the portion of food on the floor of the tray so that it is at least partially covers a part of said at least one channel. Preferably the apparatus is arranged to place the portion of food on the floor of the tray so that it is at least partially on the absorbent pad, and preferably so that the portion of food on the floor of the tray wholly covers the
5 absorbent pad. Such arrangements permits the water or juices to pass more easily to the absorbent pad.

Preferably the tray is formed with a continuous lip around the portion of food, said at least one channel and the absorbent pad, the apparatus being arranged to form a continuous seal
10 between the lip and the first plastic film. This has the advantage of providing an improved seal. Preferably the lip is formed on the floor of the tray.

Preferably the apparatus is arranged to form said at least one channel using a row or a grid of raised portions of the floor of the tray. Such arrangements may provide the advantage of
15 helping the tray to grip the food and to inhibit it from moving on the tray.

Preferably the apparatus is arranged to form the floor of the tray with a plurality of channels for providing a plurality of ducts between the plurality of channels and at least one of the plastic film, the absorbent pad, and the portion of food. Preferably the apparatus is arranged
20 to form the plurality of channels so that the ducts are in communication with one another. Such arrangements permit the water or juices to pass more easily to the absorbent pad, and may also assist with stiffening the tray.

Preferably the apparatus is arranged for packaging successive portions of food as a continuous process.

Preferably the apparatus is operable to urge the plastic film onto the tray by applying a partial vacuum above the plastic film and below the tray, and then venting a region above the plastic film to atmospheric pressure. Preferably the apparatus is operable to bond the plastic at least partially bonded to the tray with the application of heat. The heat may activate an adhesive of the plastic film or the tray.

Preferably the floor of the tray has a well in communication with the at least one channel.

Preferably the plastic film is a breathable film.

According to a fifth aspect of the invention there is provided an apparatus for performing the method according to the first aspect of the invention, or for making the package according to the second aspect of the invention.

According to a sixth aspect of the invention there is provided method of packaging food between a tray and a plastic film using a packaging apparatus, the method including;

providing a floor of the tray with at least one channel;
providing an absorbent pad on the floor of the tray;
placing a portion of food on the floor of the tray;
placing the plastic film on the tray to sandwich the absorbent pad and the portion of food between the plastic film and the tray; and

using the packaging apparatus to urge the two plastic films together and to create a seal therebetween, wherein at least one duct is formed between said at least one channel and the plastic film, or the absorbent pad, or the portion of food.

- 5 According to a seventh aspect of the invention there is provided an apparatus for performing the method according to the sixth aspect of the invention, or for making the package according to the sixth aspect of the invention.

According to an alternative characterisation of the invention there is provided a method
10 of vacuum packaging food between a first plastic film and a second plastic film using a vacuum packaging apparatus, the method including;

forming a tray from the first plastic film, the tray having a floor with at least one channel running in a transverse direction along the tray, and at least one channel running in a longitudinal direction along the tray, said channels intersecting each other so that
15 they are in communication with each other, said channels formed by a plurality of raised portions of the floor;

providing an absorbent pad on the floor of the tray so that it covers at least one of said channels;

placing a portion of food on the absorbent pad, wherein the absorbent pad has a
20 smaller area than the portion of food so that it is concealed by the portion of food and so that the portion of food is in contact with the raised portions of the tray around a perimeter of the absorbent pad;

placing the second plastic film on the tray to sandwich the absorbent pad and the portion of food between the plastic films; and

using the vacuum packaging apparatus to urge the two plastic films together to create a seal therebetween, wherein a plurality of intersecting ducts are formed between said channels and each of the second plastic film, the absorbent pad, and the portion of food to permit liquid to pass to the absorbent pad.

5

According to an alternative characterisation of the invention there is provided a vacuum package containing a portion of food, the package comprising a tray, a plastic film and an absorbent pad, the tray having a floor with at least one channel running in a transverse direction along the tray, and at least one channel running in a longitudinal direction along the tray, said channels intersecting each other so that they are in communication with each other, said channels formed by a plurality of raised portions of the floor, the absorbent pad and the portion of food being provided on the floor of the tray so that they cover at least one of said channels, the absorbent pad having a smaller area than the portion of food so that it is concealed by the portion of food and so that the portion of food is in contact with the raised portions of the tray around a perimeter of the absorbent pad, the plastic film being vacuum formed onto the tray to sandwich the absorbent pad and the portion of food between the plastic film and the tray to create a seal therebetween, wherein a plurality of intersecting ducts are formed between said channels and each of the plastic film, the absorbent pad, and the portion of food to permit liquid to pass to the absorbent pad.

20

According to an alternative characterisation of the invention there is provided a vacuum packaging apparatus for vacuum packaging a portion of food and an absorbent pad between a tray and a plastic film, the tray having a floor with at least one channel running

- in a transverse direction along the tray, and at least one channel running in a longitudinal direction along the tray, said channels intersecting each other so that they are in communication with each other, said channels formed by a plurality of raised portions of the floor. the absorbent pad being located on the floor of the tray so that it covers at least one of
- 5 said channels, the portion of food being located on the absorbent pad, wherein the absorbent pad has a smaller area than the portion of food so that it is concealed by the portion of food and so that the portion of food is in contact with the raised portions of the tray around a perimeter of the absorbent pad, the plastic film being located on the tray to sandwich the absorbent pad and the portion of food between the tray and the plastic film,
- 10 the vacuum packaging apparatus operable to urge the tray and the plastic film together to create a seal therebetween, wherein a plurality of intersecting ducts are formed between said channels and each of the plastic film, the absorbent pad, and the portion of food to permit liquid to pass to the absorbent pad.
- 15 According to another aspect of the invention, there is provided a method of vacuum packaging food between a first plastic film and a second plastic film using a vacuum packaging apparatus, the method including; forming a tray from the first plastic film, at least one of the tray and the second plastic film having an adhesive thereon, the tray having a floor with at least one channel running in a transverse direction along the tray, and at least
- 20 one channel running in a longitudinal direction along the tray, said channels intersecting each other so that they are in communication with each other, said channels being formed by a plurality of raised portions of the floor; forming said channels using a row or a grid of raised portions of the floor of the tray, the raised portions being discrete projections from the floor of the tray, each raised portion having an apex; providing an absorbent pad on the floor
- 25 of the tray so that it covers at least one of said channels; placing a portion of food on the absorbent pad, wherein the absorbent pad has a smaller area than the portion of food so that it is concealed by the portion of food and so that the portion of food is in contact with the apex of the raised portions of the tray around a perimeter of the absorbent pad to grip the portion of food; placing the second plastic film on the tray to sandwich the absorbent pad
- 30 and the portion of food between the plastic films; and using the vacuum packaging apparatus to urge the two plastic films together to create a seal therebetween such that an adhesive bond is provided between the plastic film and each apex of the raised portions

around the portion of food, wherein a plurality of intersecting ducts are formed between said channels and each of the second plastic film, the absorbent pad, and the portion of food to permit liquid to pass to the absorbent pad.

5 According to a further aspect of the invention, there is provided a vacuum package containing a portion of food, the package comprising a tray, a plastic film and an absorbent pad, the tray having a floor with at least one channel running in a transverse direction along the tray, and at least one channel running in a longitudinal direction along the tray, said channels intersecting each other so that they are in communication with each other, said
10 channels being formed by a plurality of raised portions of the floor, said raised portions being provided as a row or a grid, the raised portions being discrete projections from the floor of the tray, each raised portion having an apex, the absorbent pad and the portion of food being provided on the floor of the tray so that they cover at least one of said channels, the absorbent pad having a smaller area than the portion of food so that it is concealed by the
15 portion of food and so that the portion of food is in contact with the apex of the raised portions of the tray around a perimeter of the absorbent pad to grip the portion of food, the plastic film being vacuum formed onto the tray to urge the plastic film and the tray together and to sandwich the absorbent pad and the portion of food between the plastic film and the tray to create a seal therebetween, wherein a plurality of intersecting ducts are formed
20 between said channels and each of the plastic film, the absorbent pad, and the portion of food to permit liquid to pass to the absorbent pad, wherein at least one of the tray and the plastic film has an adhesive thereon such that an adhesive bond is provided between the plastic film and each apex of the raised portions around the portion of food by said plastic film being vacuum formed onto the tray.

25

According to yet another aspect of the invention, there is provided an apparatus for performing the method as described above.

According to a still further aspect of the invention, there is provided an apparatus for making
30 the package as described above.

Any preferred or optional features of one aspect or characterisation of the invention may be a preferred or optional feature of other aspects or characterisations of the invention.

5 **Brief Description of the Drawings**

Other features of the invention will be apparent from the following description of preferred embodiments shown by way of example only with reference to the accompanying drawings, in which;

- 10 Figure 1 shows a schematic side view of an apparatus for packaging food according to an embodiment of the invention;
 Figure 2 shows a perspective view of the tray shown in Figure 1;

Figure 3 shows a close-up perspective view of a tray floor shown in Figures 1 and 2;

Figure 4 shows a cross sectional view of the tray shown in Figures 1 - 3;

Figure 5 shows a cross sectional view of the package shown in Figure 1;

5 **Figure 6** shows steps of a method according to embodiment of the invention;

Figure 7 shows a plan view and a cross section of a mould according to an embodiment of the invention;

Figure 8 shows a perspective view of a tray according to another embodiment of the invention; and

10 **Figure 9** shows experimental results relating to embodiments of the invention.

Detailed Description

Figure 1 shows a schematic side view of an apparatus for packaging food according to an embodiment of the invention, generally designated 10. The apparatus 10 has two feed
15 reels 12, 14 of sheet or film plastics material. The first feed reel 12 has a stock of opaque plastic film 16 which is a thermoforming material. The second feed reel 14 has a stock of see-through or clear plastic film 18 which is also a thermoforming material. In the apparatus 10 the opaque plastic film 16 is arranged to travel in a direction from left to right as shown by the arrow 20, which is the direction of travel of a production line of the
20 apparatus 10. The opaque plastic film 16 and the clear plastic film 18 are comprised of a mixture of food grade plastics including poly styrenic resins. One or both of the two plastic films 16, 18 have a known adhesive coating which is, for example heat-activated or activated by the application of light having a particular wavelength. In one arrangement the plastic film 16 is a gas permeable plastic film.

The opaque plastic film 16 is fed from the first feed reel 12 onto a mould 22 or forming tool where it is formed into a series of trays 24, which are attached to each other. For example, heat is applied to the opaque plastic film 16 from above as shown by arrow 25, and the mould 22 is moved upwards as shown by arrow 26 to form the trays 24. A partial vacuum or air pressure may be applied to the opaque plastic film 16 during the moulding stage to form the trays 24. The mould 22 has a mould floor 28 with a series of channels 30 which have been machined into it. The channels 30 of the mould 22 produce corresponding channels 32 in a tray floor 33 of the trays 24 when formed. The channels 32 are described in greater detail below with reference to Figures 2 - 5.

Whereas the term tray 24 is used it will be understood that the tray 24 is a container or a receptacle having an open top, and which has a floor and a side wall which extends from the floor and is continuous. In an alternative arrangement the tray 24 does not have side walls and is substantially planar and includes the channels 32.

The apparatus 10 is arranged to place an absorbent sheet or pad 34 onto the base 28 of each formed tray 24. Alternatively the absorbent sheet 34 may be placed manually onto each tray 24. The apparatus 10 then places a portion of fresh fish 36 onto the absorbent sheet 34 of each tray 24. Alternatively the portion of fresh fish 36 may be placed manually onto each tray 24. The absorbent sheet 34 is of a known kind, and acts to absorb water and other juices/liquid from the portion of fresh fish 36 as described in greater detail below. The absorbent sheet 34 has a smaller area than the portion of fish 36 when viewed from above so that it is concealed by the portion of fish 36. It will be appreciated that the

step of forming the tray 24 requires the application of heat 25. The formed tray 24 is required to be sufficiently cool before the portion of fish 36 is placed on it to reduce the possibility of heating or partially cooking it. In this respect the absorbent sheet 34 has the advantage that it may provide an amount of heat insulation between the portion of fish 36
5 and the tray 24 to reduce or avoid unwanted heating or cooking of the fish 36.

The apparatus 10 then feeds the clear plastic film 18 from the second feed reel 14 over the trays 24 and the portions of fish 36 having the absorbent sheet 34 underneath them, as shown at 38. A vacuum packaging device 40, 42 then moves over each tray 24 as
10 shown by arrows 44, 46 to apply a partial vacuum below the tray 24 and above and the clear plastic film 18 together with the application of heat to the clear plastic film 18. For example, the clear plastic film 18 may reach a temperature of around 200 – 210°C under the application of heat. For example, the partial vacuum may be around 3 to 10 mbar. The region above the clear plastic film 18 film is then vented to atmosphere. This process
15 removes sufficient air between the two plastic films 16, 18. The apparatus applies heat, for example using a heating element of the vacuum packaging device 40, 42, to activate the adhesive on the plastic films 16, 18 to adhesively bond and seal them together at the points where they are in contact with each other. In this manner the portions of fish 36 and the absorbent sheet 34 are hermetically sealed between the two plastic films 16, 18.
20 The two plastic films 16, 18 and the vacuum packaging device 40, 42 are of a known kind whereby the two plastic films 16, 18 are arranged to bond or partially bond to each other during the venting of the region above the clear plastic film 18 to atmospheric pressure and/or heat. One or both of the films 16, 18 may be provided with the adhesive to provide the required bonding therebetween. The apparatus 10 has cutters 48, 50 which move as

shown by arrows 52, 54 to consecutively cut each tray 24 so that separate packages 56 containing the fish 36 are produced. As an alternative to using the adhesive, the cutters 48, 50 may partially melt the films 16, 18 together to form the seal therebetween at the points where they are in contact with each other.

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The apparatus 10 produces packages 56 of fish 36 between the two plastic films 16, 18 as a continuous process on the production line of the apparatus 10. Alternatively the apparatus 10 may be arranged to produce packages 56 of fish 36 in batches as a continuous process. Whereas the apparatus 10 has been described above it will be appreciated that it
10 may be constructed from a known apparatus such as a CRYOVACTM DARFRESHTM apparatus available from Sealed Air Corporation, which has been modified according to the embodiments of the invention. With such an apparatus, or using the apparatus 10 described above, the opaque plastic film 16 may be a black film having the technical specification PFIL059, and the clear plastic film 18 may be a multi-layer clear plastic film
15 having a thickness of 400 micrometres and comprised in the majority of styrenic resins. Packages 56 produced using the DARFRESHTM apparatus or the apparatus 10, may be described as skin packs or skin packages because they have a base tray 24 with a plastic film 18 or a skin which has been formed thereon. Such a way of packaging may be termed skin packaging which is characterised by the use of adhesive between the two films 16,
20 18, and whereby the upper film is a shrink wrap film so that it stretches around the fish 36.

The package 56 comprises a moulded tray 24 where the clear plastic film 18 envelops the fish 36 and cooperates with the tray 24 to bond to it. The clear plastic film 18 is a

transparent protective film which adheres to the tray 24 while allowing sight of the fish 36 by the consumer.

Whereas the apparatus 10 shows that the tray 24 is formed by the apparatus 10, it will be appreciated that alternatively the tray 24 may be pre-formed elsewhere and then fed into the apparatus 10. If the tray 24 is pre-formed it may not necessarily be of a thermoforming plastic, and it may be for example expanded foam. The steps of placing the fish 36 and absorbent pad 34 onto the tray 24 and laying the clear plastic film 18 onto the tray 24 prior to applying the partial vacuum and venting to atmospheric pressure can then be performed by the apparatus 10.

Figure 2 shows a perspective view of the tray 24 shown in Figure 1. In Figure 2 like features to the arrangements of Figure 1 are shown with like reference numerals. In Figure 2 the channels 32 of the tray floor 33 are shown to run in a transverse direction along the tray 24 as indicated by an arrow 58. The channels 32 also run in a longitudinal direction along the tray 24 as indicated by an arrow 60. It will be appreciated that the arrows 58, 60 are perpendicular to each other when the tray 24 is viewed from above. In another embodiment the transverse and longitudinal channels 32 may not be perpendicular or aligned with a width or length of the tray. As shown in Figure 2 there are sixteen channels 32 which run in the transverse direction 58, and eight channels 32 which run in the longitudinal direction 60. The transverse channels 58 and the longitudinal channels 60 intersect each other so that they are in communication with each other i.e. so that the lowest point or bottom of the channels are in communication with each other. The channels 32 are formed by a plurality of raised portions 62 of the tray floor 33. In this

manner the channels 32 are recessed in the tray floor 33. The raised portions 62 are arranged in rows in a grid formation. In the embodiment shown the raised portions 62 are provided on substantially the entire tray floor 33. With such an arrangement the area of the raised portions 62 is larger than the footprint of the portion of fish 36. Also shown is
5 a raised rim or lip 64 of the tray floor 33, which runs around the channels 32 and the raised portions 62. The lip 64 is between the tray floor 33 and sides 66 of the tray.

Figure 3 shows a close-up perspective view of the tray floor 33 shown in Figures 1 and 2. In Figure 3 like features to the arrangements of Figures 1 and 2 are shown with like
10 reference numerals. In Figure 3 each raised portion 62 is shown to be a pyramid having a square base 68 and an apex 70 which is truncated to create a flat top or a curved top. Each apex 70 may have an area of between 0.75 to 4mm^2 , and preferably 2.5mm^2 . The apex 70 of each raised portion 62 promotes release of the tray 24 from the mould 22. Each pyramid has four faces 72 which are concave, i.e. which bow inwards. Such an arrangement of the
15 raised portions promotes the creation of a duct 76 (shown in Figure 5) between the two films 16, 18 in the region of the channels 32 when they are bonded together during the application of a partial vacuum and venting to atmospheric pressure as described above. The flat or curved top of each apex 70 reduces the possibility for the raised portions to pierce the portions of fish 36 or the clear plastic film 16, and they provide a way of
20 gripping the fish 36 to inhibit it from moving on the tray 24 during the packing process described above and during transportation to a supermarket. The apex 70 of each raised projection 62 bonds with the second film 18 when a partial vacuum and heat is applied followed venting to atmospheric as described above. It will be appreciated that the channels 32 are formed by the raised portions 62, i.e. substantially entirely formed by the

raised portions with the exception of the channel 32 formed adjacent to the lip 64 that is around the raised portions 32. The raised portions 32 are not strips or elongate portions of the tray floor 33, but are discrete portions (i.e. symmetrical discrete projections) arranged in a grid formation. Alternatively the raised portions 32 may be termed
5 castellations which each have the apex 70.

Figure 4 shows a cross sectional view of the tray 24 shown in Figures 1 – 3. In Figure 4 like features to the arrangements of Figures 1 - 3 are shown with like reference numerals. In Figure 4 the cross sectional view is along the length of the tray 24 and through the
10 apexes 70 of the raised portions 62. It will be appreciated that the cross sectional view along the width of the tray 24 is similar. The height of each raised portion 62 between the lowest point of the channel 32 and the highest part of the apex 70 is indicated by the double arrows 74. In the embodiment shown the dimension 74 is about 3.6mm. It is envisaged that the dimension 74 could be between 1.0mm and 7.0mm whilst still
15 providing the desired effect. The width between successive lowest points of the channel 32 is indicated by the double arrows 75. In the embodiment shown the dimension 75 is about 1.0cm. It is envisaged that the dimension 75 could be between 0.5cm and 2.0cm whilst still providing the desired effect. However, if the spacing of the channels 32 is large it will be appreciated that any water from the fish 36 may not find its way to the
20 absorbent sheet 34. In addition the apexes 70 of the raised portions 62 may not grip the fish 36 sufficiently well to reduce the chances of it slipping on the tray floor 33 during packing and transport. Also shown is the lip 64 which runs around the channels 32 and the raised portions 62. The lip 64 is between the tray floor 33 and sides 66 of the tray. The skilled person will know the requirements to provide the required drainage of the fish

36 whilst also providing an appropriate spacing of the channels. Whereas Figure 4 depicts a cross sectional view, it will be appreciated that the view is what would be seen if the tray 24 is cut along its length in the middle thereof, and viewed from a side thereof.

5 Figure 5 shows a cross sectional view of the package 56 shown in Figure 1. In Figure 5 like features to the arrangements of Figures 1 - 4 are shown with like reference numerals. In Figure 5 spaces or ducts 76 are shown to be created between the two plastic films 16, 18 that have been bonded or partially bonded to each other. The ducts 76 are in the region adjacent to the lowest point of the channels 32. The ducts 76 are also created between the
10 absorbent sheet 34 and the opaque plastic film 18, and between the portion of food 36 and the opaque plastic film 18. The ducts 76 may be present in one or more of these three locations. It will be appreciated that due to the lattice of channels 32 of the tray 24 which are arranged as a grid the ducts 76 are interconnected to each other. In this manner the fish 36 is raised above the lowest part of the tray floor 33 by the raised portions 62. It can
15 also be seen that the apexes 70 of the raised portions 62 touch and grip the portion of fish 36, which inhibits movement of the fish 36 on the tray 24. Also shown is the lip 64 which is continuous around the channels 32 and the raised portions 62. The lip 64 creates a part of the tray 24 onto which the clear plastic film 16 can bond which provides an improved seal between the two plastic films 16, 18 that is continuous around the portion of fish 36.

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From the above Figures 2 - 5 it can be seen that the ducts 76 are in communication with each another. This is because the channels 32 are connected to each other, and because the clear plastic film 16 is above the floor of each channel 32. If the package 56 is tipped from the horizontal position any water or juices from the fish 36 finds its way to the

absorbent sheet 34 underneath the fish 36. The raised portions 62 lift the portion of fish 36 above the floor of the channels 32 so that the fish 36 does not rest in the water or juices. It will be appreciated that the channels 32 and raised portions 62 are not mere surface decoration, and have been specifically designed to form ducts 76 with the clear plastic film 16 to perform the function of permitting water and other juices from the fish 36 to pass more easily to the absorbent sheet 34. Furthermore the ducts 76 are typically not mere capillary ducts that operate under capillary action, but are ducts 76 through which water and other juices can flow under the action of gravity.

Figure 6 shows steps of a method according to embodiment of the invention, generally designated 80. It will be appreciated that the steps may be performed in a different order, and may not necessarily be performed in the order shown in Figure 6. The method 60 is a method of packaging food 36 between a first plastic film 12 and a second plastic film 14 using a packaging apparatus 10. The method includes forming a tray 24 from the first plastic film 12, as shown at 82, the tray 24 having a floor 33 with at least one channel 32. The method includes providing an absorbent pad 34 on the floor 33 of the tray 24, as shown at 84. The method includes placing a portion of food 36 on the floor 33 of the tray 24, as shown at 85. The method includes placing the second plastic film 14 on the tray 24 to sandwich the absorbent pad 34 and the portion of food 36 between the plastic films 16, 18, as shown at 86. The method includes using the packaging apparatus 10 to urge the two plastic films 16, 18 together and to create a seal therebetween, as shown at 88, wherein at least one duct 76 is formed between said at least one channel 32 and at least one of the second plastic film 16, the absorbent pad 34, and the portion of food 36.

The method further includes cutting the two films 16, 18 to create a separate package 56 containing the portion of food 36 and the absorbent pad 34, as shown at 90. The method further includes providing the absorbent pad 34 on the floor 33 of the tray 24 so that it at least partially covers at least a part of said at least one channel 32, as shown at 84. The method further includes placing the portion of food 36 on the floor 33 of the tray 24 so that it is at least partially cover a part of said at least one channel 32, as shown at 85. The method further includes placing the portion of food 36 on the floor 33 of the tray 24 so that it is at least partially on the absorbent pad 34, as shown at 85. The method further includes placing the portion of food 36 on the floor 33 of the tray 24 so that it wholly covers the absorbent pad 85.

The method further includes forming the tray 24 with a continuous lip 64 around the portion of food 36, said at least one channel 32 and the absorbent pad 34, the lip 64 for providing a continuous seal between the plastic films 16, 18. The method further includes forming the floor 33 of the tray 24 with a plurality of channels 32 for providing a plurality of ducts 76 between the plurality of channels 32 and at least one of the second plastic film 18, the absorbent pad 34, and the portion of food 36. The method further includes forming the plurality of channels 32 so that the ducts 76 are in communication with one another, as shown at 82. The method further includes forming said at least one channel 32 using a row or a grid of raised portions 62 of the floor 33 of the tray 24. The method further includes forming the tray 24 with a sidewall 66 extending from the floor 33. The method further includes using the packaging apparatus 10 to urge the two plastic films 16, 18 together by applying a partial vacuum above the clear plastic film 18 and below the opaque plastic film 16, and then venting a region above the clear plastic film 18 to

atmospheric pressure. The method further includes using the packaging apparatus 10 to apply heat to at least partially bond the two plastic films 16, 18 together.

Figure 7 shows a plan view and a cross section of the mould 22 according to an embodiment of the invention. In Figure 7 like features to the arrangements of Figures 1 - 6 are shown with like reference numerals. Figure 7 shows dimensions in mm. Also shown are raised portions 92 and apexes 94 of the mould 22 which form the raised portions 62 and the apexes 70 of the tray 24.

Figure 8 shows a perspective view of a tray according to another embodiment of the invention, generally designated 95. In Figure 8 like features to the arrangements of Figures 1 to 5 are shown with like reference numerals. In Figure 8 a trough 96 is shown in the centre of the tray floor 33. The trough 96 is at the same level as the channels 32 and operates as a well or sink to collect water from the fish 36 so that it passes to the absorbent sheet 34 more efficiently. In other words, the trough 96 is recessed in the tray floor 33 in a similar manner to the channels 32. The trough 96 operates to connect the channels 32 to the absorbent sheet 34. The trough 96 is smaller than the footprint of the portion of fish 36 on the tray floor 33. The trough 96 is rectangular and has a length of about 90mm and a width of about 10mm. It is envisaged that the length of the trough 96 may be between 80 to 100mm. It is envisaged that the width of the trough 96 may be between 5 to 15mm. The trough 96 has a floor 98 which is flat, and may be used for embossing text thereon. The trough 96 is relatively narrow and relatively long, which is advantageous because the spaces or ducts 76 are maintained and the apexes 70 still operate to grip the fish 36.

Figure 9 shows experimental results relating to embodiments of the invention. The Applicant has conducted experiments to compare the shelf life of the fish 36 using the package 56 of the embodiments above, and with the package of the prior art. Figure 9 shows a graph with quality grading scores on the y-axis, and time on the x-axis. The aim of the experiment was to assess and compare samples of fish 36 (skinless cod fillets) in the package 56 and a prior art package. The fish 36 in the package 56 and the prior art package was assessed at different time points during the product shelf life, commencing at day 1 (indicated D+1) and finishing at day 8 (indicated D+8). The packages were placed in chilled storage. The sensory quality assessment included raw appearance and odour, and cooked appearance, odour, flavour and texture/mouthfeel comments, and a quality grading score in accordance with the assessment scale shown in Table 1.

Quality Grading Score	Sensory Quality
9	Excellent Quality
8	Very Good Quality
7	Good Quality
6	Fairly Good Quality
5	Satisfactory Quality
4	Just Acceptable Quality
3	Poor Quality
2	Very Poor Quality
1	Bad Quality

Table 1

A summary of the quality grading score for each package is shown in Table 2 and in Figure 9.

Product	Quality Grading Score			
	D+1	D+6	D+7	D+8
Prior art package	8	4	3	Not Assessed
Package 56	8	7	6	3

Table 2

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In Figure 9 the left bar 100 for each day shows the prior art package, and the right bar 102 for each day shows the package 56. At the start of the trial D+1 there was little or no difference between the packages, both being rated as Very Good Quality for all attributes. Figure 9 shows that after D+6 the left bar 100 is consistently lower than the right bar 102.

10 A significant result is shown for D+7 where the left bar 100 has a quality grading score of 3, and the right bar 102 has a quality grading score of 6. The experiment was ended after D+8.

Whereas the package of the prior art may be able to keep the fish fresh, for example, up to seven days, the package 56 of the above embodiments has been shown in the experiments to keep the fish fresh for up to one or two days longer. Extending the shelf life of the fish 36 by at least one or two days is a highly significant achievement because it may avoid the requirement to discard the fish 36 if it has not been sold by the supermarket, which reduces food waste. The advantage of keeping the fish 36 fresher for longer is due to the fact that the fish 36 rests in less water when in the package 56. In

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addition, since little or no water pools in the package 56 it provides an improved appearance to the consumer, particularly towards the end of the shelf life.

The use of an absorbent sheet 34 when packaging fish 36 is expressly not be
5 recommended by packaging suppliers because it may interfere with the seal between the two films 16, 18. Such a recommendation against using absorbent sheet 34 represents a prejudice in the technical field. However, the Applicant has conducted experiments using the embodiments of the invention describe above to show that the problems associated with interfering of the seal between the two films 16, 18 of the package 56 are avoided or
10 at least significantly reduced or minimised to acceptable levels because the tray 24 grips the fish 36 to inhibit it from moving on the tray 24 and because water is absorbed by the absorbent pad 34.

The packages 56 are suitable for transporting to a supermarket in bulk and for stacking
15 on shelves ready for sale. The packages 56 present the fish 36 to the consumer in an appealing manner because it is visible through the clear plastic film 16 and has a three-dimensional appearance. The packages 56 may also be frozen for transporting long distance. Such freezing may expand the volume of the portion of fish 36. If the package 56 undergoes a controlled thawing process prior to stacking on a supermarket shelf
20 additional water and juices may be released by the portion of fish 36. With the embodiments of the invention the additional water and juices are able to pass more easily to the absorbent sheet 34 due to the ducts 76. When the package 56 undergoes freezing and defrosting the fish 36 is kept fresher for a longer period of time because there is little or no water for the fish 36 to rest in which increases the shelf life.

- Another advantage provided by the tray 24 is that it is relatively rigid due to the raised portions 62 which provide a structure to the tray 24 which stiffens it. This provides the advantage that it is much easier to peel away the clear plastic film 16 from the opaque plastic film 18 to open the package 56. Furthermore, if a small amount of liquid is present in the package 56 it is less likely to spill or splash when the package 56 is opened because the tray 24 is relatively stiff. Furthermore, such a stiffer tray 24 may also allow a lighter weight tray 24 to be used, which may provide a cost and environmental advantage.
- 10 In the above embodiments the channels 32 are shown to have a curved floor between the raised portions 62 where the square bases 68 of each pyramid meet. The curved floor and the pyramid structure mean that the trays 24 can be formed easily by the mould 22, and are readily releasable from the mould 22. It will be appreciated that the raised portions 62 and channels 32 may have any suitable shape that permits the formation of a duct 76 with the clear plastic film 16. It will also be appreciated that the number of channels 32 and orientation relative to the tray 24 may also be varied. In one arrangement the channels 32 are comprised of recessed lettering or writing on the tray floor 33. Such recessed lettering or writing may be used to display instructions or a Trade Mark into the tray 24.
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- 20 Whereas the packaging of fish 36 is mentioned above it will be appreciated that the method, package and apparatus may also be used to package other food that may release water or juices such as chicken, pork, beef, seafood, other proteins etc.

Whereas the above embodiments describe a plurality of channels 32, raised portions 62 and/or ducts 76, it will be appreciated that the embodiments may at least partially provide the desired effect with only one channel 32, raised portion 62 and/or duct 76, with the proviso that the water or other juices from the portion of fish 36 is able to pass to the absorbent sheet 34. Furthermore, whereas the absorbent sheet 34 is shown in the above embodiment to be wholly covered by the portion of fish 36, the desired effect may at least partially be provided by having the portion of fish 36 covering only a part of the absorbent sheet 34. Alternatively the portion of fish 36 and the absorbent sheet 34 may be located away from each other on the tray floor 33 and connected to each other by the duct 76 between the clear plastic film 16 and the opaque plastic film 18.

Whereas in the above embodiments the fish 36 is in contact with the absorbent pad 34, in an alternative arrangement the fish 36 is not in contact with the absorbent pad 34. With such an arrangement the fish 36 and the pad 34 are located on separate parts of the floor 33, and are in communication with one another by said at least one duct 76.

Whereas the above embodiments have been described as being able to extend the shelf life of food it will be appreciated that in general such an extension of time may be dependent on many factors including, for example, the particular supermarket or retailer, the manner in which the packages 56 are handled or transported, or the final destination country. Whereas, in general the shelf life may be extended, it will be appreciated that the food may remain fresher for longer over a given shelf life period.

In one embodiment the clear plastics film 18 is a breathable film, which may be a legal requirement for sale of the package 56 in certain countries, for example the US. Such a breathable film may be of polyethylene, which is porous to oxygen. For example, the breathable film may have a water vapour transmission rate of 2.1 gms/100 sq. in./24 hrs, and may have an oxygen transmission rate of 12,000 cc/m²/24hrs. A suitable breathable film is available from Sealed Air Corporation having the product code VF310K. The oxygen permeable film 18 guards against anaerobic conditions being generated within the package 56 that may cause anaerobic bacterial spores, such as Clostridium botulinum, to germinate and produce toxins.

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The Applicant has conducted microbiological experiments using such a breathable film to compare the package 56 and the prior art package. The experiments show that viable colony counts for aerobic bacterial colonies is greatly reduced using the package 56. Table 3 shows results for Salmon using the prior art package. Table 4 shows results for Salmon using the package 56.

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P+Day	Aerobic Colony Count cfu/g FM0010GL	Presumptive Coliforms cfu/g FM0030GL	Sulphite Reducing Clostridia cfu/g FM0056	Presumptive E.coli cfu/g FM0160DGL	Listeria spp. Detection per 25g FM0220EGY	Presumptive Pseudomonas spp. Count cfu/g FM0280GL	Salmonella spp. Detection per 25g FM077GY	Coagulase Positive Staphylococci cfu/g FM804GL
P+08	50,000 [100,000]	60 [100]	<10 [10]	<10 [10]	Not Detected: [ND]	600,000 [1,000,000]	Not Detected: [ND]	<20 [100]
P+08	33,000 [100,000]	220 [100]	<10 [10]	<10 [10]	Not Detected: [ND]	32,000 [1,000,000]	Not Detected: [ND]	<20 [100]
P+07	3,000 [100,000]	10 [100]	<10 [10]	<10 [10]	Not Detected: [ND]	12,000 [1,000,000]	Not Detected: [ND]	<20 [100]
P+06	38,000 [100,000]	630 [100]	<10 [10]	<10 [10]	Not Detected: [ND]	12,000 [1,000,000]	Not Detected: [ND]	<20 [100]
P+05	<1000 [100,000]	<10 [100]	<10 [10]	<10 [10]	Not Detected: [ND]	16,000 [1,000,000]	Not Detected: [ND]	<20 [100]

Table 3

P+Day	Aerobic Colony Count cfu/g FM0010GL	Presumptive Coliforms cfu/g FM0030GL	Sulphite Reducing Clostridia cfu/g FM0056	Presumptive E.coli cfu/g FM0160DGL	Listeria spp. Detection per 25g FM0220EGY	Presumptive Pseudomonas spp. Count cfu/g FM0280GL	Salmonella spp. Detection per 25g FM077GY	Coagulase Positive Staphylococci cfu/g FM804GL
P+09	<1000 [100,000]	<10 [100]	<10 [10]	<10 [10]	Not Detected: [ND]	<20 [1,000,000]	Not Detected: [ND]	<20 [100]
P+08	<1000 [100,000]	10 [100]	<10 [10]	<10 [10]	Not Detected: [ND]	<2000 [1,000,000]	Not Detected: [ND]	<20 [100]
P+07	1,000 [100,000]	<10 [100]	<10 [10]	<10 [10]	Not Detected: [ND]	<2000 [1,000,000]	Not Detected: [ND]	<20 [100]
P+06	<1000 [100,000]	<10 [100]	<10 [10]	<10 [10]	Not Detected: [ND]	<2000 [1,000,000]	Not Detected: [ND]	<20 [100]
P+05	<1000 [100,000]	110 [100]	<10 [10]	<10 [10]	Not Detected: [ND]	<2000 [1,000,000]	Not Detected: [ND]	<20 [100]

Table 4

Accordingly, the package 56 with a breathable film 18 produces an additional benefit of reducing viable bacterial colonies, which is due to the ducts 76 allowing water and other

5 juices from the fish 36 to pass to the absorbent pad 34.

CLAIMS

1. A method of vacuum packaging food between a first plastic film and a second plastic film using a vacuum packaging apparatus, the method including;
 - 5 forming a tray from the first plastic film, at least one of the tray and the second plastic film having an adhesive thereon, the tray having a floor with at least one channel running in a transverse direction along the tray, and at least one channel running in a longitudinal direction along the tray, said channels intersecting each other so that they are in communication with each other, said channels being formed by a plurality of
 - 10 raised portions of the floor;
forming said channels using a row or a grid of raised portions of the floor of the tray, the raised portions being discrete projections from the floor of the tray, each raised portion having an apex;
 - providing an absorbent pad on the floor of the tray so that it covers at least one
 - 15 of said channels;
placing a portion of food on the absorbent pad, wherein the absorbent pad has a smaller area than the portion of food so that it is concealed by the portion of food and so that the portion of food is in contact with the apex of the raised portions of the tray around a perimeter of the absorbent pad to grip the portion of food;
 - 20 placing the second plastic film on the tray to sandwich the absorbent pad and the portion of food between the plastic films; and
using the vacuum packaging apparatus to urge the two plastic films together to create a seal therebetween such that an adhesive bond is provided between the plastic film and each apex of the raised portions around the portion of food, wherein a plurality

of intersecting ducts are formed between said channels and each of the second plastic film, the absorbent pad, and the portion of food to permit liquid to pass to the absorbent pad.

5 2. A method according to claim 1, and further including cutting the two films to create a separate package containing the portion of food and the absorbent pad.

3. A method according to claim 1 or 2, and further including forming the tray with a continuous lip around the portion of food, said channels and the absorbent pad, the lip
10 for providing a continuous seal between the plastic films.

4. A method according to any one of claims 1-3, and further including forming the tray with a sidewall extending from the floor.

15 5. A method according to any one of claims 1-4, wherein the method is provided as a continuous process.

6. A method according to claim 5, wherein the first plastic film and/or the second plastic film are provided on respective feed reels.

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7. A method according to any one of claims 1-6, wherein the portion of food is fish.

8. A method according to any one of claims 1-7, and further including using the vacuum packaging apparatus to urge the two plastic films together by applying a partial vacuum above the second plastic film and below the first plastic film, and then venting a region above the second plastic film to atmospheric pressure.

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9. A method according to any one of claims 1-8 and further including using the packaging apparatus to apply heat to at least partially bond the two plastic films together.

10 10. A method according to any one of claims 1-9, and further including forming a well in the floor of the tray, wherein the well is in communication with the at least one channel.

11. A vacuum package containing a portion of food, the package comprising a tray,
 15 a plastic film and an absorbent pad, the tray having a floor with at least one channel running in a transverse direction along the tray, and at least one channel running in a longitudinal direction along the tray, said channels intersecting each other so that they are in communication with each other, said channels being formed by a plurality of raised portions of the floor, said raised portions being provided as a row or a grid, the
 20 raised portions being discrete projections from the floor of the tray, each raised portion having an apex, the absorbent pad and the portion of food being provided on the floor of the tray so that they cover at least one of said channels, the absorbent pad having a smaller area than the portion of food so that it is concealed by the portion of food and so that the portion of food is in contact with the apex of the raised portions of the tray

around a perimeter of the absorbent pad to grip the portion of food, the plastic film being vacuum formed onto the tray to urge the plastic film and the tray together and to sandwich the absorbent pad and the portion of food between the plastic film and the tray to create a seal therebetween, wherein a plurality of intersecting ducts are formed
 5 between said channels and each of the plastic film, the absorbent pad, and the portion of food to permit liquid to pass to the absorbent pad, wherein at least one of the tray and the plastic film has an adhesive thereon such that an adhesive bond is provided between the plastic film and each apex of the raised portions around the portion of food by said plastic film being vacuum formed onto the tray.

10

12. A package according to claim 11, wherein the tray has a continuous lip around the portion of food, said channels and the absorbent pad, the lip for providing a continuous seal between the lip and the plastic film.

15 13. A package according to claim 11 or 12, wherein a spacing between adjacent channels is between 0.5cm and 2.0cm.

14. A package according to claim 13 wherein the spacing between adjacent channels is 1.0cm.

20

15. A package according to claim 11, wherein each apex has an area of between 0.75 to 2.5mm².

16. A package according to any one of claims 11 - 15, wherein each raised portion has at least one face which is concave.
17. A package according to any of claims 11 - 16, wherein each raised portion has a
5 height of between 1.0mm and 7.0mm.
18. A package according to claim 17, wherein each raised portion has a height of 3.6mm.
- 10 19. A package according to any one of claims 11 - 18, wherein the tray has a sidewall extending from the floor.
20. A package according to any one of claims 11 - 19, wherein the portion of food is fish.
- 15 21. A package according to any one of claims 11 - 20, wherein one or both of the plastic film and the tray are of thermoforming material.
22. A package according to any one of claims 11 - 21, wherein the tray is an opaque
20 plastic.
23. A package according to any one of claims 11 - 22, wherein at least a part of the plastic film is a see-through plastic film.

24. A package according to any one of claims 11 - 24, wherein the floor of the tray has a well in communication with the at least one channel.

25. A package according to any one of claims 11 - 24, wherein the plastic film is a
5 breathable film.

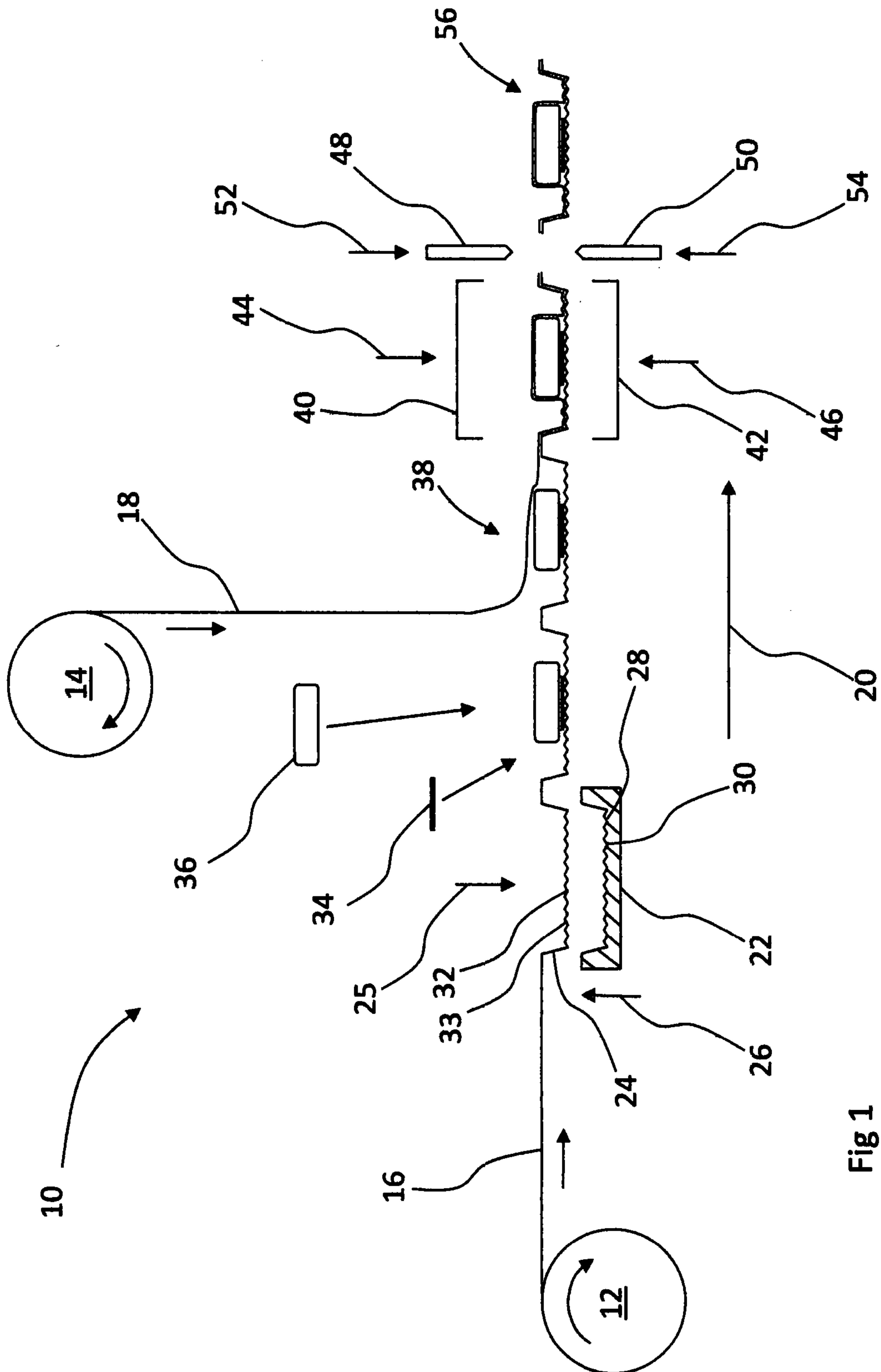
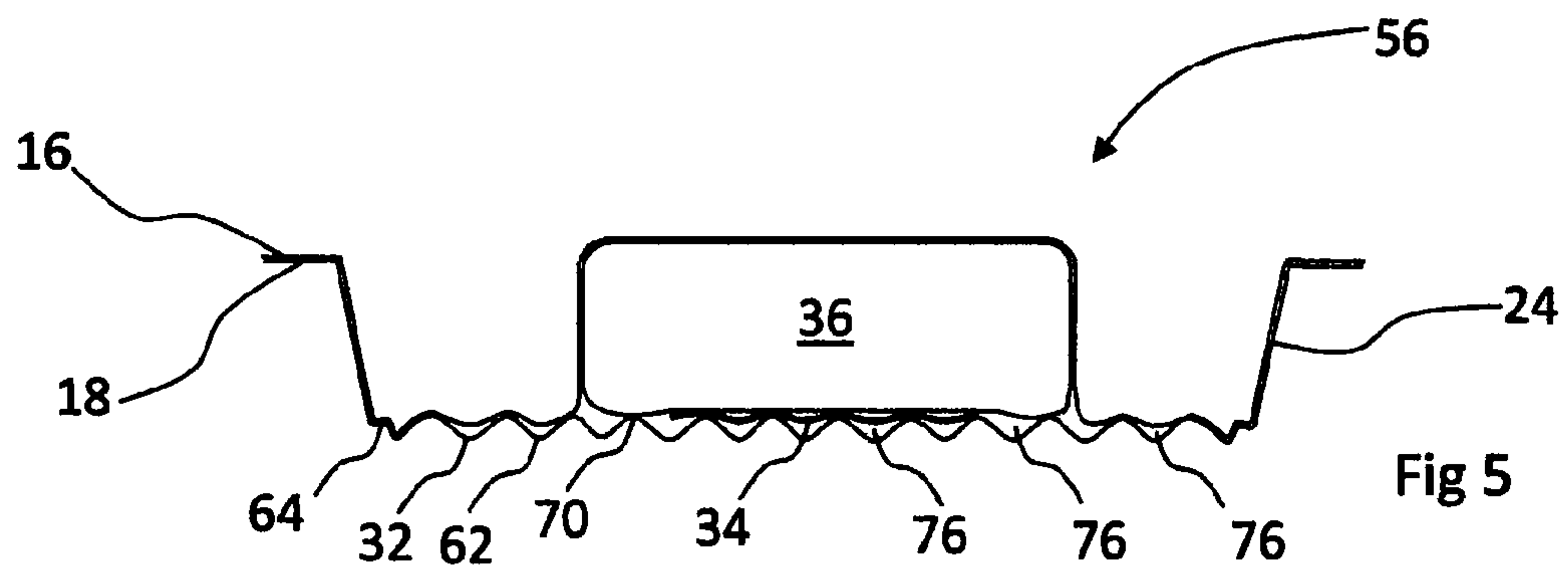
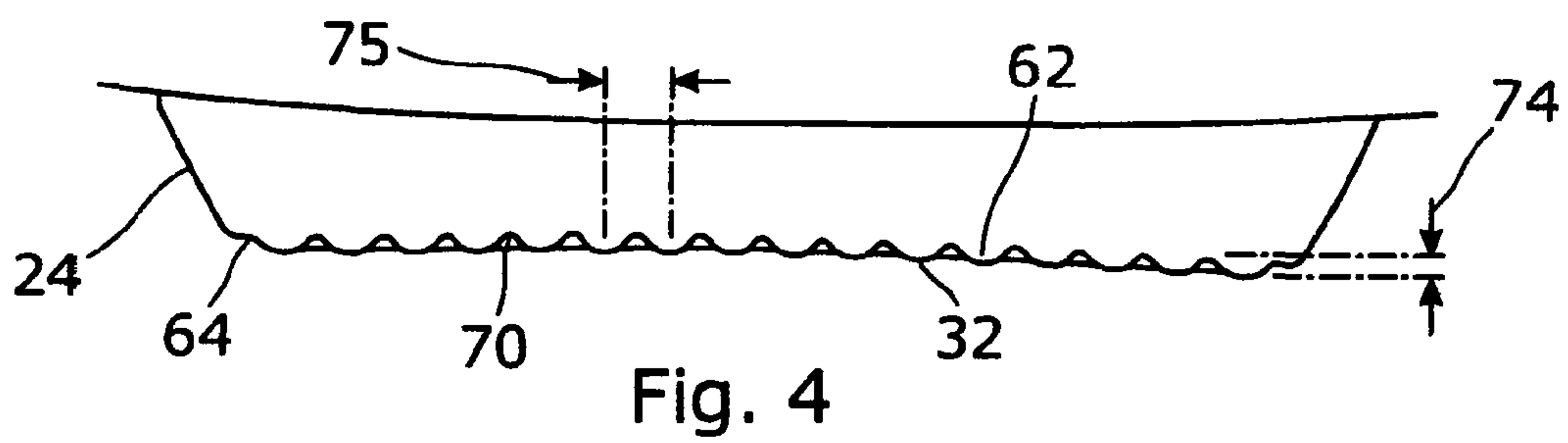
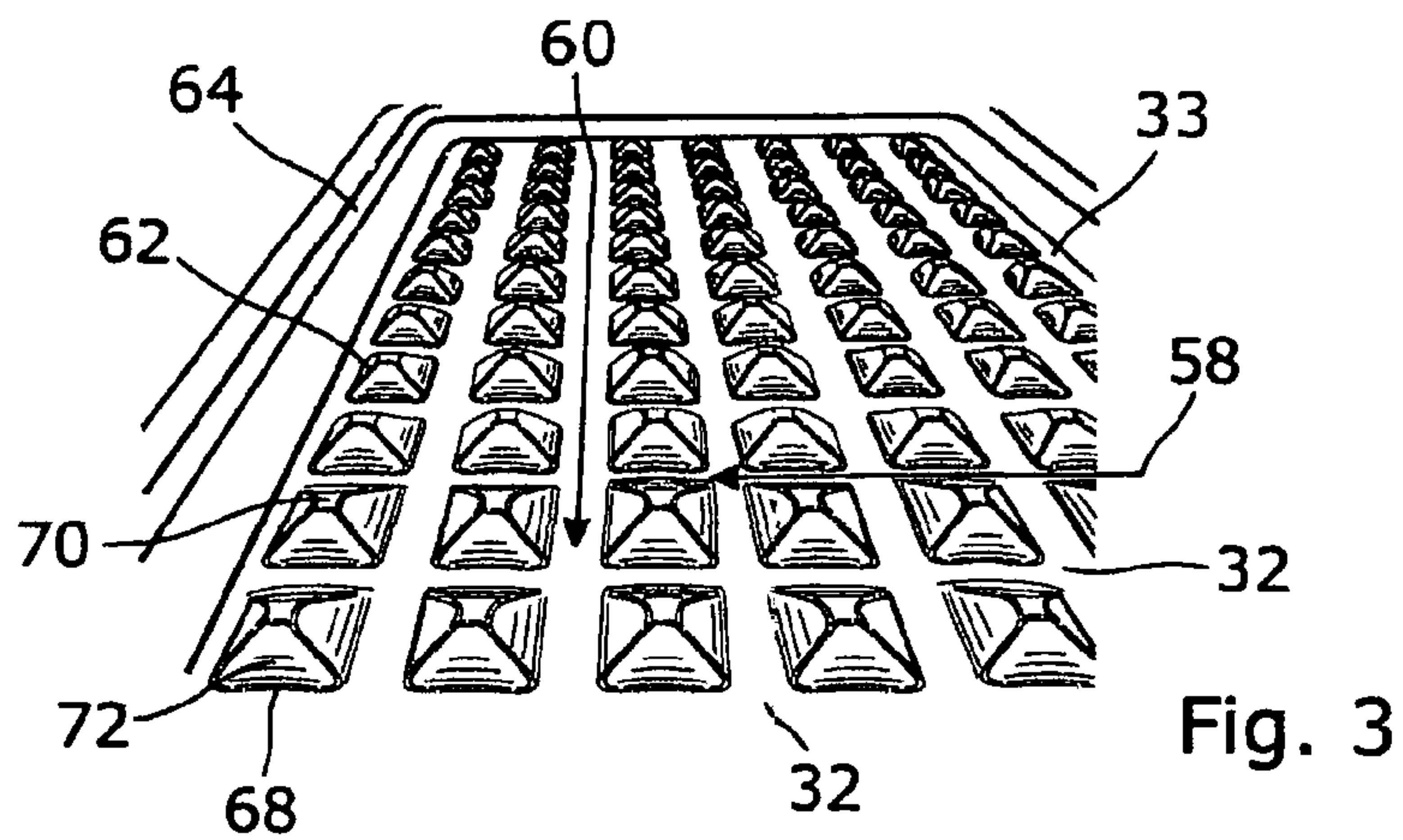
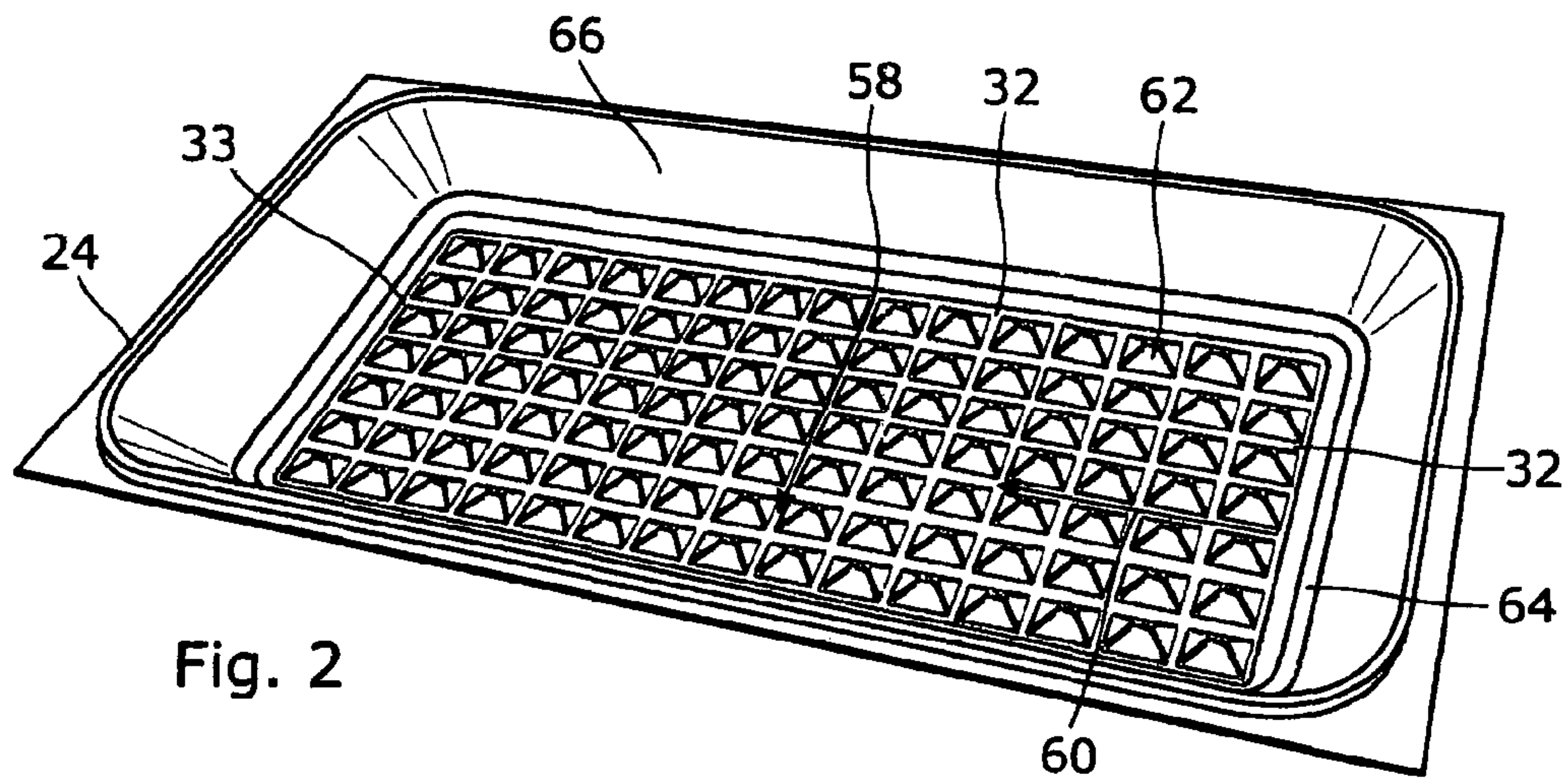


Fig 1



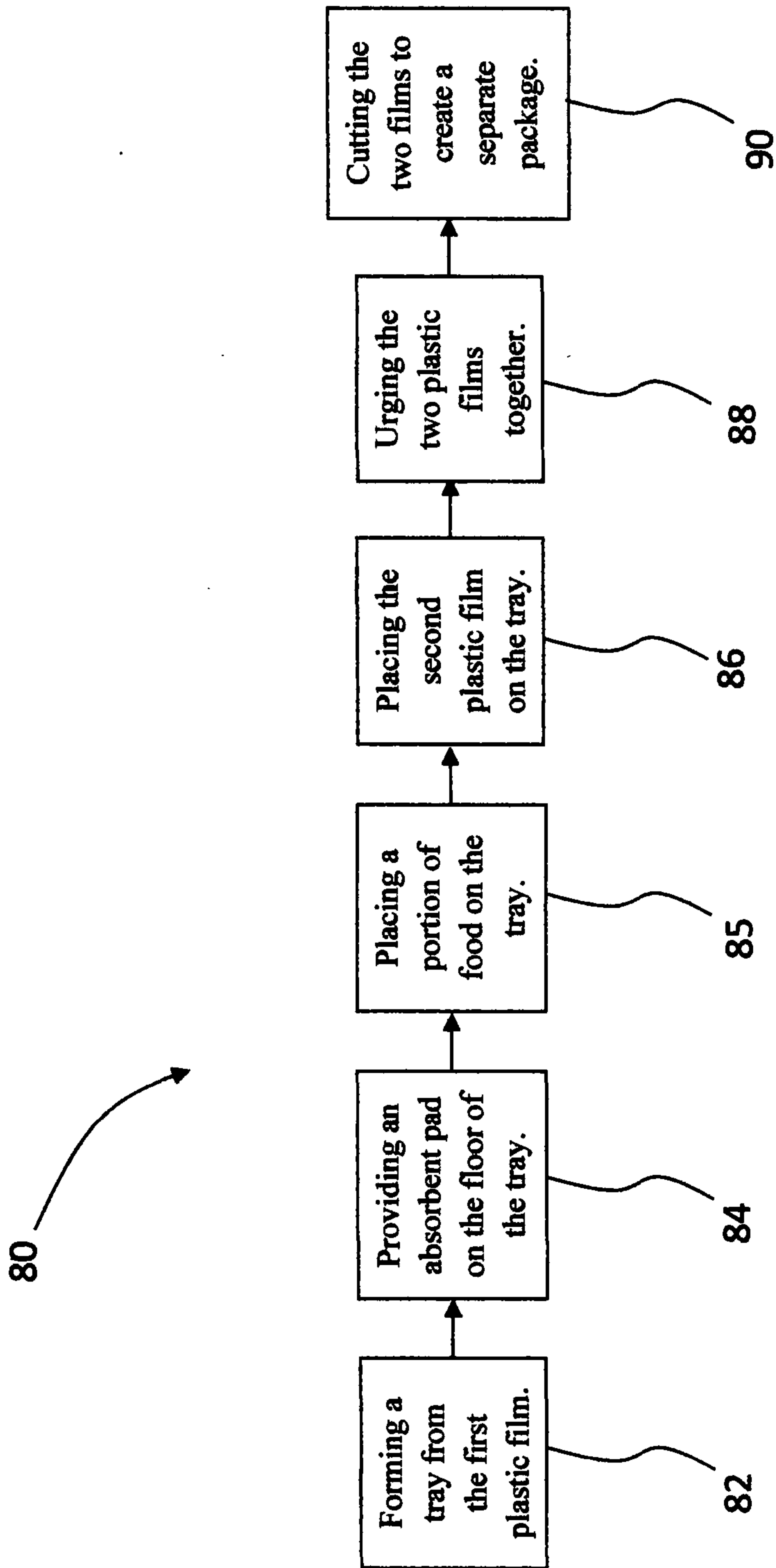


Fig 6

