



(22) Date de dépôt/Filing Date: 1992/03/04

(41) Mise à la disp. pub./Open to Public Insp.: 1992/09/13

(45) Date de délivrance/Issue Date: 2002/01/22

(30) Priorité/Priority: 1991/03/12 (667,838) US

(51) Cl.Int.⁵/Int.Cl.⁵ B65B 25/08, B65B 9/12, B65B 9/10

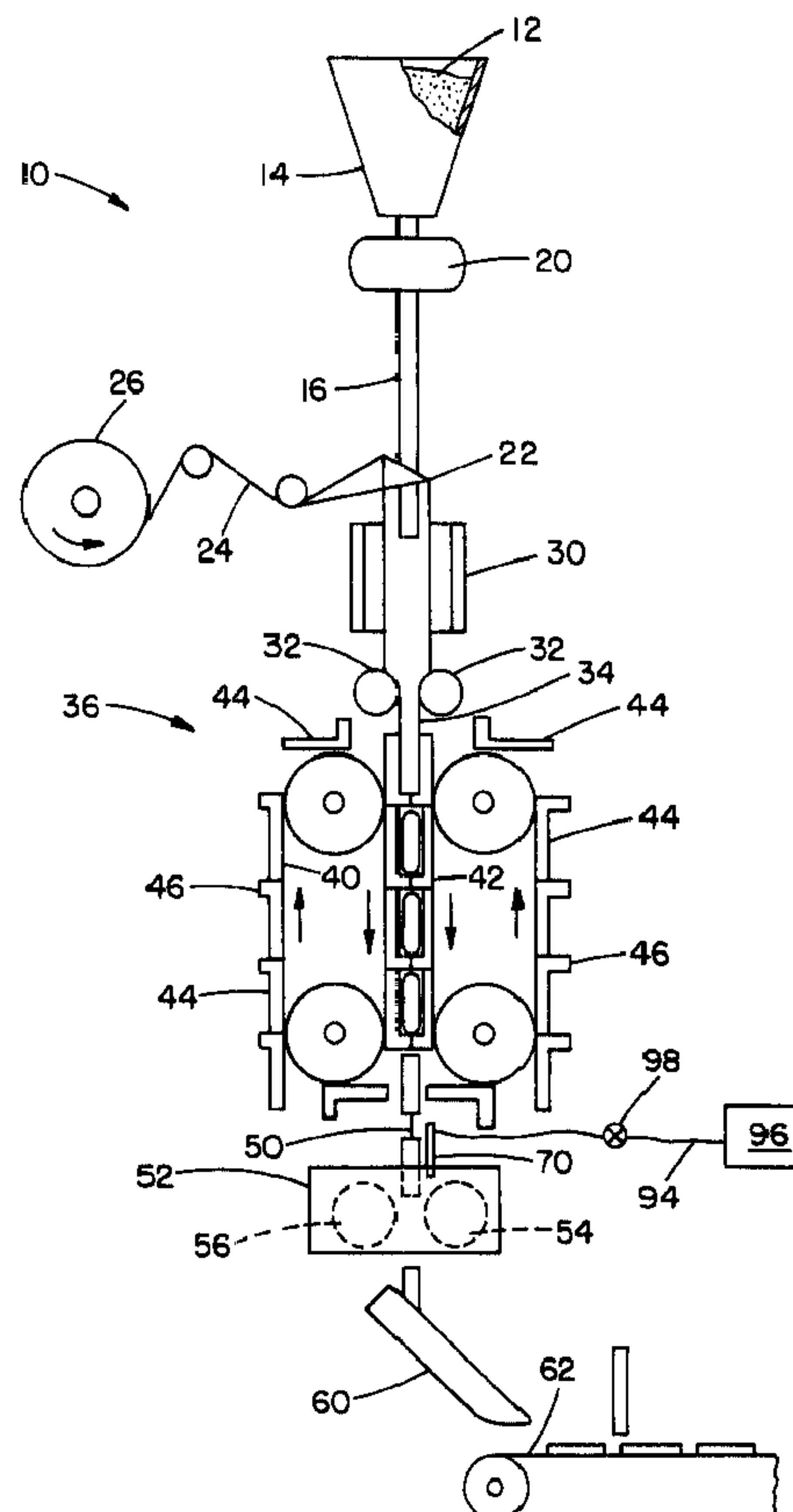
(72) Inventeur/Inventor:
Laplace, Christian, CA

(73) Propriétaire/Owner:
Kraft Canada Inc., CA

(74) Agent: MCFADDEN, FINCHAM

(54) Titre : APPAREIL DE FABRICATION DE PRODUITS ALIMENTAIRES PREEMBALLES SOUS FORME DE
TRANCHES INDIVIDUELLES ET METHODE CONNEXE

(54) Title: METHOD AND APPARATUS FOR PRODUCING A WRAPPED FOOD MATERIAL IN SINGLE SLICE FORM



(57) Abrégé/Abstract:

A method and apparatus for producing a wrapped food material in single slice form. The apparatus comprises means to conduct the food material into a wrapping film to form a wrapped food material, a slice forming assembly to press the wrapped food



(57) Abrégé(suite)/Abstract(continued):

material at spaced intervals to form a continuous strip of connected, wrapped food material slices, and a cutting assembly to cut that continuous strip at the spaced intervals to produce individually wrapped and sealed food material slices. The apparatus also includes a guide plate to guide the continuous strip of wrapped food material slices from the slice forming assembly to the cutting assembly along a predetermined path of travel; a partial vacuum is developed between the continuous strip of wrapped food material slices and at least a portion of the guide plate to draw that strip thereagainst as the strip of connected slices passes to the cutting assembly.

ABSTRACT

1 A method and apparatus for producing a wrapped food
material in single slice form. The apparatus comprises means
to conduct the food material into a wrapping film to form a
wrapped food material, a slice forming assembly to press the
5 wrapped food material at spaced intervals to form a
continuous strip of connected, wrapped food material slices,
and a cutting assembly to cut that continuous strip at the
spaced intervals to produce individually wrapped and sealed
food material slices. The apparatus also includes a guide
10 plate to guide the continuous strip of wrapped food material
slices from the slice forming assembly to the cutting
assembly along a predetermined path of travel; a partial
vacuum is developed between the continuous strip of wrapped
food material slices and at least a portion of the guide
15 plate to draw that strip thereagainst as the strip of
connected slices passes to the cutting assembly.

20

25

30

35

METHOD AND APPARATUS FOR PRODUCING
A WRAPPED FOOD MATERIAL IN SINGLE SLICE FORM

BACKGROUND OF THE INVENTION

This invention generally relates to methods and apparatus for packaging food materials in the form of individually wrapped single slices; and more specifically, to such a method and apparatus having an improved arrangement for guiding a continuous strip of wrapped food material to a cutting assembly that cuts that continuous strip into individually wrapped single slices.

Various food materials, particularly cheeses, are sold in packages containing individually wrapped single slices of the food material, and various prior art methods and apparatuses are known for preparing food materials in this form. Typically, with these prior art arrangements, as exemplified in U.S. Patent 4,015,021, a food material is extruded into a continuous envelope or tube of wrapping film to form a wrapped food material, that wrapped food material is then flattened into a continuous strip, and this continuous strip is pressed at spaced intervals to express the food material from between those spaced intervals, thereby establishing wrapped food material slices of a predetermined length. The continuous strip of wrapped slices is then cut to produce individually wrapped slices of the food material.

While these prior art methods and apparatuses perform very satisfactorily, it is believed that they may be improved. For instance, in these prior art methods and apparatuses, typically the continuous strip of wrapped food

1 material is loosely fed to the assembly that cuts that strip
into the individual pieces. Because of this, the continuous
strip is not always properly fed to the cutting assembly,
particular upon the initial feeding of the strip to the
cutting assembly. Also, the continuous strip of wrapped food
5 material sometimes becomes blocked in its passage through the
cutting assembly.

SUMMARY OF THE INVENTION

10 The present invention relates to a method and
apparatus for producing a wrapped food material in single
slice form. The apparatus comprises means to conduct the
food material into a wrapping film to form a wrapped food
material, slice forming means to press the wrapped food
15 material at spaced intervals to form a continuous strip of
connected, wrapped food material slices, and cutting means to
cut that continuous strip at those spaced intervals to
produce individually wrapped and sealed food material slices.
The apparatus also includes means to guide the continuous
strip of wrapped food material slices from the slice forming
20 means to the cutting means along a predetermined path of
travel. This guiding means, in turn, includes a guide plate
located between the slice forming means and the cutting
means, and extending along said path of travel, and means to
develop a partial vacuum between the continuous strip of
25 wrapped food material slices and at least a portion of the
guide plate to draw that strip thereagainst as the strip of
connected slices passes to the cutting means.

30 Preferably, a venturi effect is used to develop the
desired partial vacuum between the continuous strip of the
wrapped food material and the guide plate. More

specifically, this vacuum is developed by conducting a first
1 stream of air laterally outward in a first direction from a
given area of the guide plate and conducting a second stream
of air laterally outward in a second direction from that same
given area of the guide plate. These two air streams thus
5 produce a partial vacuum between the continuous strip of
wrapped food material slices and that given area of the guide
plate.

Further benefits and advantages of the invention
will become apparent from a consideration of the following
10 detailed description given with reference to the accompanying
drawings, which specify and show preferred embodiments of the
invention.

BRIEF DESCRIPTION OF THE DRAWINGS

15 Figure 1 is a schematic, side elevation view of an
apparatus embodying the present invention.

Figure 2 shows in greater detail a portion of the
apparatus of Figure 1.

20 Figure 3 is a plan view of a guide plate used in
the apparatus of Figure 1.

Figure 4 is a cross-sectional view taken along Line
IV-IV of Figure 3.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

25 Figure 1 illustrates a preferred food processing
apparatus 10 employing teachings of this invention. A food
material 12, which may be fluid or semi-fluid, such as
processed cheese or cheese foods, is placed into a hopper 14
and continuously fed to a nozzle 16 by means of a pump 20.
30 The nozzle is inserted into a tube of wrapping film 22, which

has been formed from a strip 24 mounted on a film holder 26,
1 and a cooling assembly 30 is provided to cool the food
material discharged from nozzle 16.

The tubular film 22 filled with the food material
12 is then fed between press rolls 32 that press the food
5 material into a strip form 34 in which the food material is
in intimate contact with the inner surface of the film. The
rolls 32 serve not only to reduce the wrapped food material
to a strip form but also to transport the formed strip.
After leaving rolls 32, the food material strip 34 is then
10 press molded to the desired shape by means of a molding
device 36, which comprises a pair of moving belts 40 and 42
and a multitude of molding frames 44 mounted on each of those
belts.

The inner runs of belts 40 and 42 are arranged in
15 opposing relation to each other so that a pair of molding
frames, one on belt 40 and one on belt 42, come into matching
contact between the inner runs of the belts. Each of the
molding frames has a projecting wall portion 46 that extends
horizontally when the frame is moving vertically between the
20 inner runs of the belt, and the outer most ends of the
projecting wall portions of opposing molding frames come into
matching contact between the inner runs of belts 40 and 42 to
press strip 34 at regular, spaced intervals. This forms
connecting sections 50 on strip 34 and also squeezes the food
25 material out of those connecting sections to form slices of
the food material.

Strip 34 then is conducted to cutting apparatus 52,
which comprises anvil 54 and rotary cutter 56. The rotary
cutter slices the strip 34 along connecting sections 50,
30 producing individual slices of wrapped food material. These

individually cut, wrapped food material single slices are
1 fed, one after another, onto a delivery conveyor 62 and
thereafter a stacking wheel (not shown) is used to stack the
slices in a pile.

Guide plate 70 is located between assembly 36 and
5 cutting assembly 52 to guide strip 34 into that latter
assembly, and a partial vacuum is developed between the food
material strip and at least a portion of plate 70 to draw
that strip thereagainst as the strip of food material passes
into the cutting assembly. In this way, plate 70 positively
10 guides the strip 34 into cutting assembly 52, between anvil
54 and rotary knife 56, insuring that the strip of food
material properly enters and passes smoothly through that
cutting apparatus.

Any suitable means or system may be used to produce
15 the desired partial vacuum between strip 34 and guide plate
70; however, preferably, a venturi effect is used to generate
the desired vacuum. Even more preferably, this venturi
effect is produced by directing first and second streams of
air laterally outward in first and second opposite directions
20 from a given area of guide plate 70, thereby producing a
partial vacuum between food strip 34 and that given area of
the guide plate.

As described above, apparatus 10 produces one strip
34 of food material. With modifications well within the
25 ability of those of ordinary skill in the art, apparatus 10
may be constructed and operated to produce two or more such
strips in parallel; and, indeed, the preferred embodiment of
guide plate 70 described below in detail is designed to guide
two parallel strips of food material from assembly 36 to
30 cutting assembly 52.

Guide plate 70 is illustrated in greater detail in
1 Figures 2-4; and with reference thereto, the guide plate
preferably includes a base member 72 and a pair of discharge
manifolds 74. Base member 72 defines a preferably planar
guide surface 76 and a pair of grooves or recesses 80. These
5 grooves extend inward from that guide surface, and in
apparatus 10, grooves 80 extend along the direction of travel
of food strip 34. Each discharge manifold 74 is positioned
in a respective one groove 80 and forms a longitudinally
extending conduit 82 and first and second series of
10 transverse outlet openings 84 and 86. In use, high-pressure
air is conducted into conduit 82, openings 84 conduct a first
air stream, referenced at 90 in Figure 4, outward from
conduit 82 and toward the first transverse side of plate 70,
and openings 86 conduct a second air stream, referenced at 92
15 in Figure 4, outward from conduit 82 and toward the second
transverse side of the guide plate. These air streams
produce the above-discussed venturi effect, which in turn
produces a low pressure region, or partial vacuum, between
food strip 34 and the portion of guide plate 70 between these
20 air streams.

As illustrated in Figures 3 and 4, each discharge
manifold 74 has a U-shaped transverse cross-section, and
includes base portion 74a and first and second leg portions
74b and 74c, which extend outward from the transverse ends of
25 base portion 74a, perpendicular thereto. Openings 84 are
formed in leg portion 74b and preferably are equally spaced
apart along the length of this leg portion; and similarly,
openings 86 are formed in leg portion 74c and preferably are
equally spaced apart along the length of this leg portion.
30

With particular reference to Figure 4, each groove
1 80 preferably is formed by a central surface portion 80a and
a pair of lateral surface portions 80b and 80c. Each
discharge manifold 82 is positioned immediately over the
central surface portion of a respective one groove 80; and
5 the lateral surface portions 80b and 80c of each groove
extend laterally outwardly upwardly in first and second
opposite directions, respectively, from the central surface
portion of the groove to help guide the first and second air
streams outward from the discharge manifold positioned in the
10 groove.

Any suitable means may be used to conduct air to
guide plate 70, and in particular, into conduits 82 thereof.
For example, with the arrangement shown in Figure 1, a hose
or air line 94 is used to conduct pressurized air from a
15 source thereof 96 and into one end of each conduit 82.
Alternatively, for example, openings (not shown) may be
formed through base member 72 extending outward from and in
fluid communication with each conduit 82, and a hose or air
line may be secured in each of these openings to conduct
20 pressurized air from a source thereof and into conduits 82,
between the longitudinal ends thereof.

Preferably, control means are provided to control
the volume of air in the air streams 90 and 92, and this may
be done by controlling the amount of air supplied to conduits
25 82. With the embodiment of apparatus 10 shown in Figure 1,
this control means includes a valve 98 disposed in line 94
and which is operated, either manually or automatically, to
adjust the volume of air conducted through line 94 and,
thereby, to adjust the venturi effect produced by air
30 streams 90 and 92.

Guide plate 70 has a generally flat, thin shape,
1 although preferably the top and bottom ends of the plate are
slanted, as shown in Figure 2, to facilitate positioning that
plate between assemblies 36 and 52. Plate 70 may be made of
any suitable material, such as steel. Preferably, however,
5 plate 70, or at least surface 76 thereof, is comprised of
chromium or a chromium alloy to reduce the friction between
the guide plate and food strip 34. The guide plate 70 may be
supported in assembly 10 in any acceptable manner; and for
example, this plate may be connected to and supported by
10 cutting assembly 52. Also, manifold members 74 may be
secured to base member 72 in any suitable manner. For
example, a suitable friction fit may be developed between
manifold member and base member to hold the manifold member
in place in one of the grooves 80. Alternatively, for
15 example, the manifold members may be bolted or welded to the
base member.

Hopper 14, nozzle 16, pump 20, film 24, sealing
assembly 30, rolls 32, molding assembly 36, and cutting
assembly 52 may all be comprised of standard or known items
20 in the art, and it is unnecessary to describe these elements
of apparatus 10 herein in detail. Further, each molding
frame 44 may be provided with a press plate (not shown) of
the type known in the art to press against the top surface of
the food material in strip 34 to produce slices having a
25 uniform thickness and an exact shape.

In addition, various items may be added to
apparatus 10 without departing from the scope of the present
invention; and in particular, additional cooling means,
heating means, or both may be added at various locations in
30 apparatus 10 to control the temperature of the wrapped food

material moving therethrough. Further, the embodiment of
1 apparatus 10 shown in Figure 1 uses a nozzle 16 having a
circular shaped outlet. Instead of using such a nozzle,
apparatus 10 may be provided with a nozzle having a narrow,
slit-shaped outlet; and when such a nozzle is used, it may be
5 unnecessary to use press rolls 32 to flatten the food
material discharged from the nozzle. In addition, apparatus
10 may be provided with a sealing assembly to form a sealed
seam on the wrapping film after that film has been filled
with food material. Also, other cutting devices may be used
10 in apparatus 10; and, for example, this apparatus may be
provided with a rotary heat cutter that cuts connecting
sections 50 of strip 34 by melting those areas of the food
strip.

While it is apparent that the invention herein
15 disclosed is well calculated to fulfill the objects
previously stated, it will be appreciated that numerous
modifications and embodiments may be devised by those skilled
in the art, and it is intended that the appended claims cover
all such modifications and embodiments as fall within the
20 true spirit and scope of the present invention.

25

30

35

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE
PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1 1. Apparatus for producing a wrapped food material
in single slice form, comprising:

 means to conduct the food material into a wrapping
film to form a wrapped food material;

5 slice forming means to press the wrapped food
material at spaced intervals to form a continuous strip of
connected, wrapped food material slices;

 cutting means to cut said continuous strip at said
spaced intervals to produce individually wrapped and sealed
10 food material slices; and

 means to guide said continuous strip from the slice
forming means to the cutting means along a predetermined path
of travel, and including

 i) a guide plate located between the slice forming
15 means and the cutting means, and extending along said path of
travel, and

 ii) means connected to the plate to develop a
partial vacuum between said continuous strip and at least a
portion of the guide plate to draw said strip thereagainst as
20 the strip of connected slices passes to the cutting means.

 2. Apparatus according to Claim 1, wherein:

 the guide plate has first and second opposite
transverse sides, defines a guide surface and includes

 i) a base member forming a groove extending inward
25 from the guide surface, and

 ii) means located in the groove to conduct a first
stream of air laterally outward from said groove and towards
the first transverse side of the guide plate, and to conduct
a second stream of air laterally outward from the groove and
30 towards the second transverse side of the guide plate,

wherein said first and second streams of air
1 produce a partial vacuum between a portion of the guide
surface and the continuous strip of wrapped food material
slices; and

the means to develop a partial vacuum includes
5 means to conduct pressurized air to said groove from a source
of pressurized air.

3. Apparatus according to Claim 2, wherein:

the means to conduct the first and second streams
of air outward from said groove includes a discharge manifold
10 located in the groove; and

the discharge manifold defines

i) a conduit for receiving the pressurized air,
ii) a first series of openings to conduct
pressurized air outward from said conduit and towards the
15 first transverse side of the guide plate, and

iii) a second series of openings to conduct
pressurized air outward from said conduit and towards the
second transverse side of the guide plate.

4. Apparatus according to Claim 3, wherein:

20 the discharge manifold includes

i) a base portion,
ii) a first leg portion connected to and extending
from the base portion, and

25 iii) a second leg portion connected to and
extending from the base portion; and

the first series of openings are formed in the
first leg portion of the discharge manifold, and the second
series of openings are formed in the second leg portion of
the discharge manifold.

30

35

5. Apparatus according to Claim 4, wherein
1 the base member of the guide plate includes a
central surface section spaced inward from the guide surface;
the manifold extends over said central surface
section;

5 the base member of the guide plate further includes
i) a first lateral surface portion extending
laterally outwardly upwardly from the central surface section
to guide the first air stream outward from the first series
of openings, and
10 ii) a second lateral surface portion extending
laterally outwardly upwardly from the central surface section
to guide the second air stream outward from the second series
of openings.

6. Apparatus according to Claim 3, wherein the
15 means to conduct pressurized air to said groove includes a
fluid line to conduct pressurized air into the conduit of the
discharge manifold from the source of pressurized air.

7. Apparatus according to Claim 6, wherein the
means to develop the partial vacuum further includes valve
20 means connected to the fluid line to control the volume of
air conducted therethrough.

8. A guide plate for guiding a continuous strip of
wrapped food material moving past the guide plate,
comprising:

25 a base member having first and second opposite
lateral sides, and defining a guide surface and a groove
extending inward therefrom; and
a discharge manifold positioned in said groove and
defining
30 i) an air conduit for receiving a supply of air,

ii) a first series of outlet openings to conduct a
1 first stream of air outward from said conduit and toward the
first lateral side of the base member, and

iii) a second series of outlet openings to conduct
a second stream of air outward from said conduit and toward
5 the second lateral side of the base member,

wherein the first and second air streams produce a
low pressure region immediately over the discharge manifold
to draw the continuous strip of food material against the
guide plate.

10 9. A guide plate according to Claim 8, wherein:
the base member of the guide plate includes a
central surface spaced inward from the guide surface;

the discharge manifold extends over said central
surface section; and

15 the base member of the guide plate further includes
i) a first lateral surface portion extending
laterally outwardly upwardly from the central surface section
toward the first lateral side of the base member to guide the
first air stream outward from the first series of openings,
20 and

ii) a second lateral surface portion extending
laterally outwardly upwardly from the central surface section
toward the second lateral side of the base member to guide
the second air stream outward from the second series of
25 openings.

10. A guide plate according to Claim 9, wherein:
the discharge manifold includes

i) a base portion,

ii) a first leg portion connected to and extending
30 from the base portion, and

iii) a second leg portion connected to and
1 extending from the base portion;

the first series of openings are formed in the
first leg portion of the discharge manifold, and the second
series of openings are formed in the second leg portion of
5 the discharge manifold.

11. A guide plate according to Claim 10, wherein:
said guide surface is substantially planar; and
the base portion of the discharge manifold defines
an outside surface substantially co-planar with the guide
10 surface.

12. A method for producing a wrapped food material
in single slice form, comprising:

conducting the food material into a wrapping film
to form a wrapped food material;

15 pressing the wrapped food material at spaced
intervals to form a continuous strip of connected, wrapped
food material slices;

conducting said continuous strip along a
predetermined path of travel to a cutting apparatus,
20 including

i) conducting the continuous strip past a guide
plate extending along said path of travel, and

ii) developing a partial vacuum between the
continuous strip and the guide plate to draw the continuous
25 strip thereagainst; and

using the cutting apparatus to cut the continuous
strip at said spaced intervals to produce individually
wrapped food material slices.

13. A method according to Claim 12, wherein the
30 developing step includes the steps of:

conducting a first stream of air laterally outward
1 in a first direction from a given area of the guide plate;
and

conducting a second stream of air laterally outward
in a second direction from said given area of the guide
5 plate;

wherein said first and second streams of air
produce a partial vacuum between the continuous strip of
food material slices and said given area of the guide plate.

14. A method according to Claim 13, wherein the
10 developing step further includes the step of controlling the
volume of air in said first and second streams.

15. A method according to Claim 13, wherein the
guide plate includes a body member and a manifold connected
to the body member, and wherein:

15 the developing step further includes the step of
conducting a supply of air from a source thereof to the
manifold;

the step of conducting the first stream of air
includes the step of discharging the first stream of air
20 laterally outward from a first side of the manifold; and

the step of conducting the second stream of air
includes the step of discharging the second stream of air
laterally outward from a second side of the manifold.

25

30

35

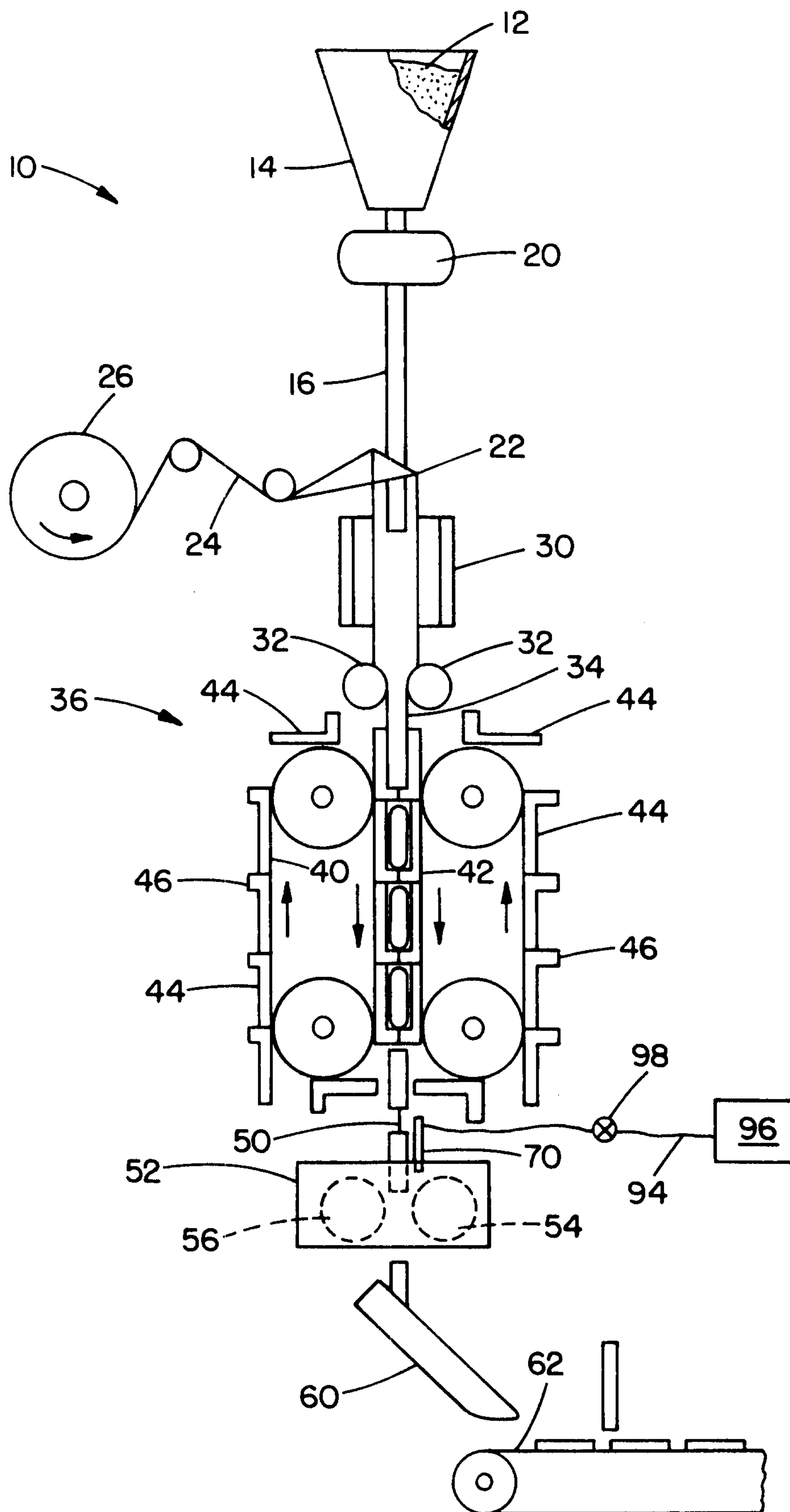


FIG. 1

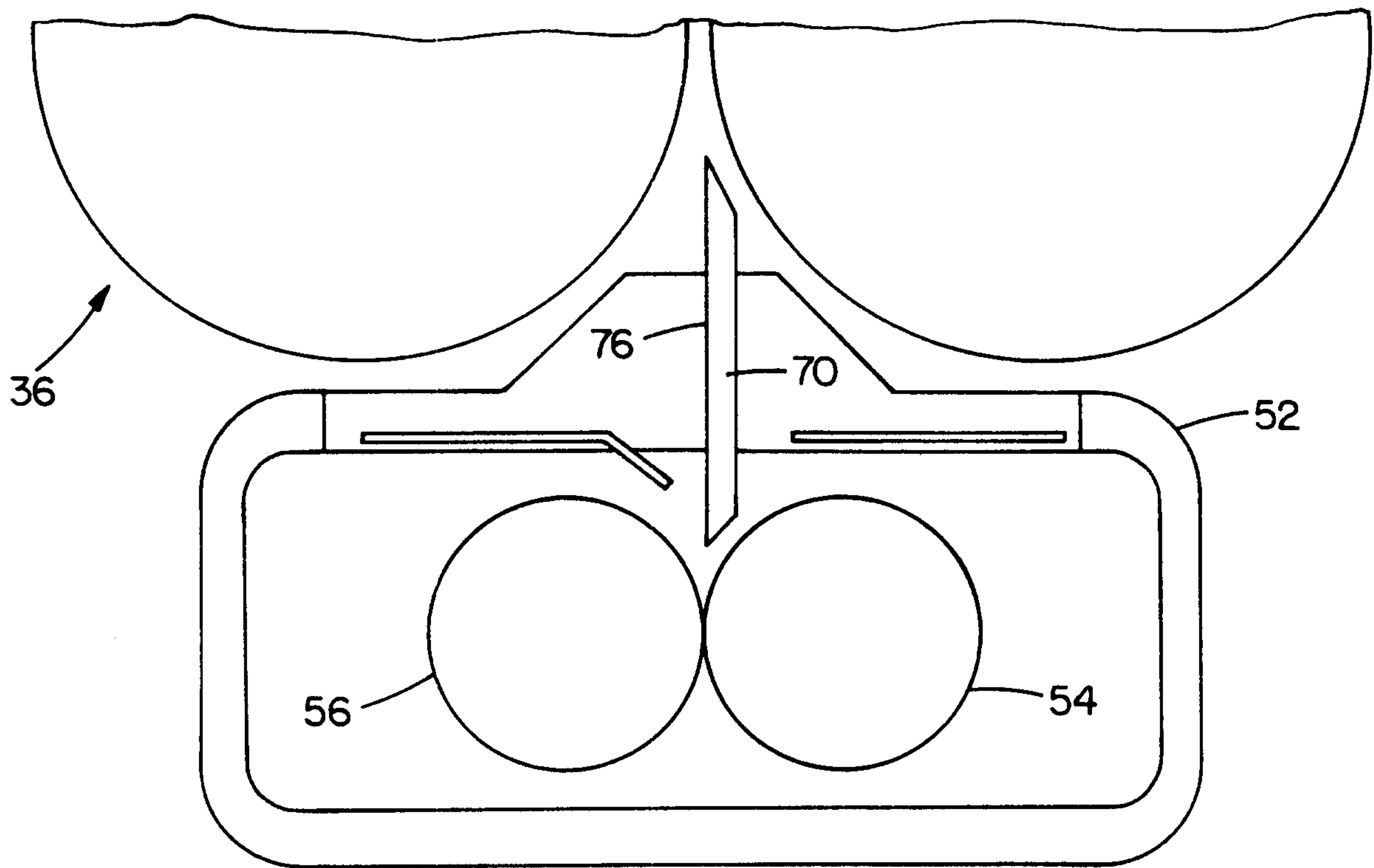


FIG. 2

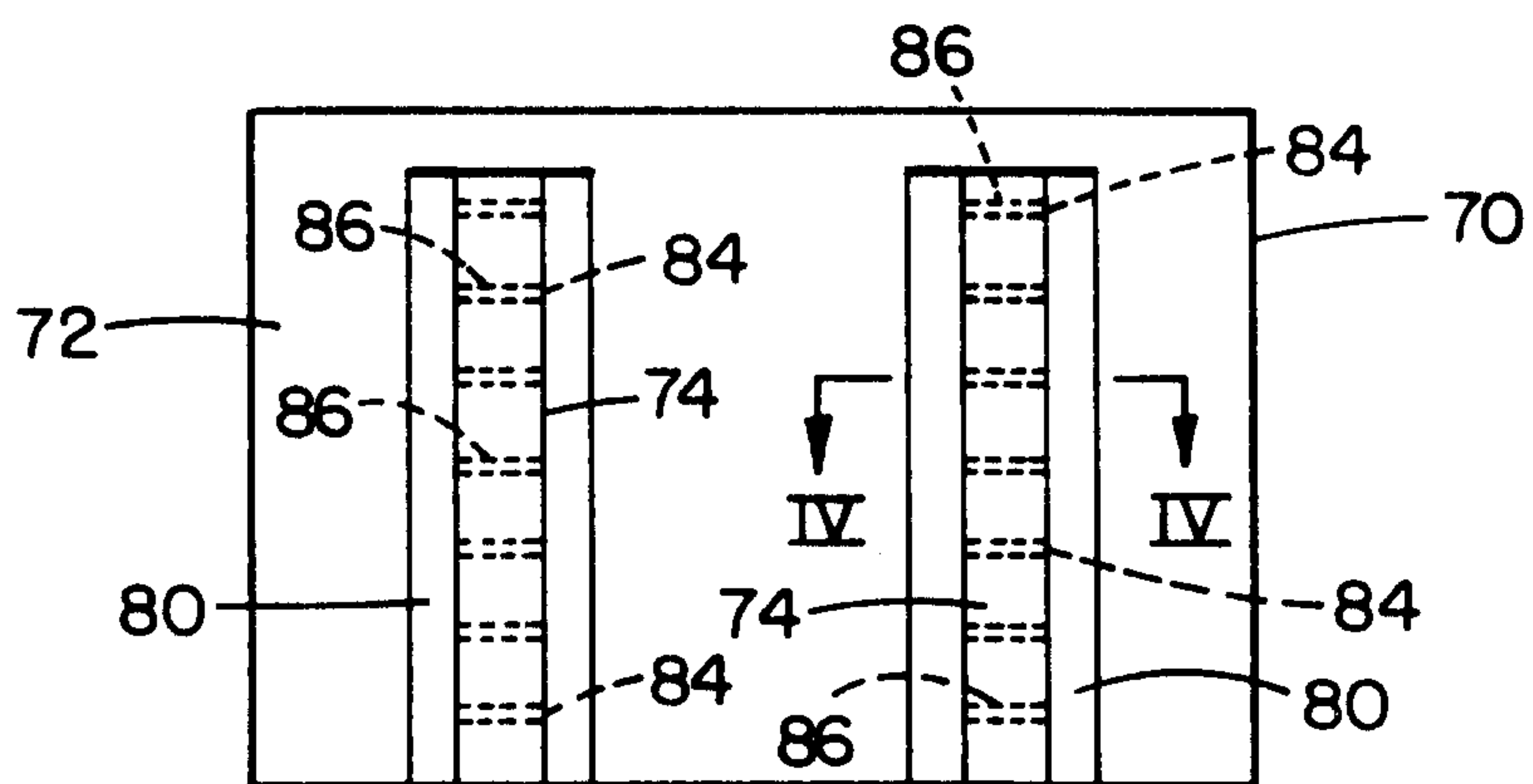


FIG. 3

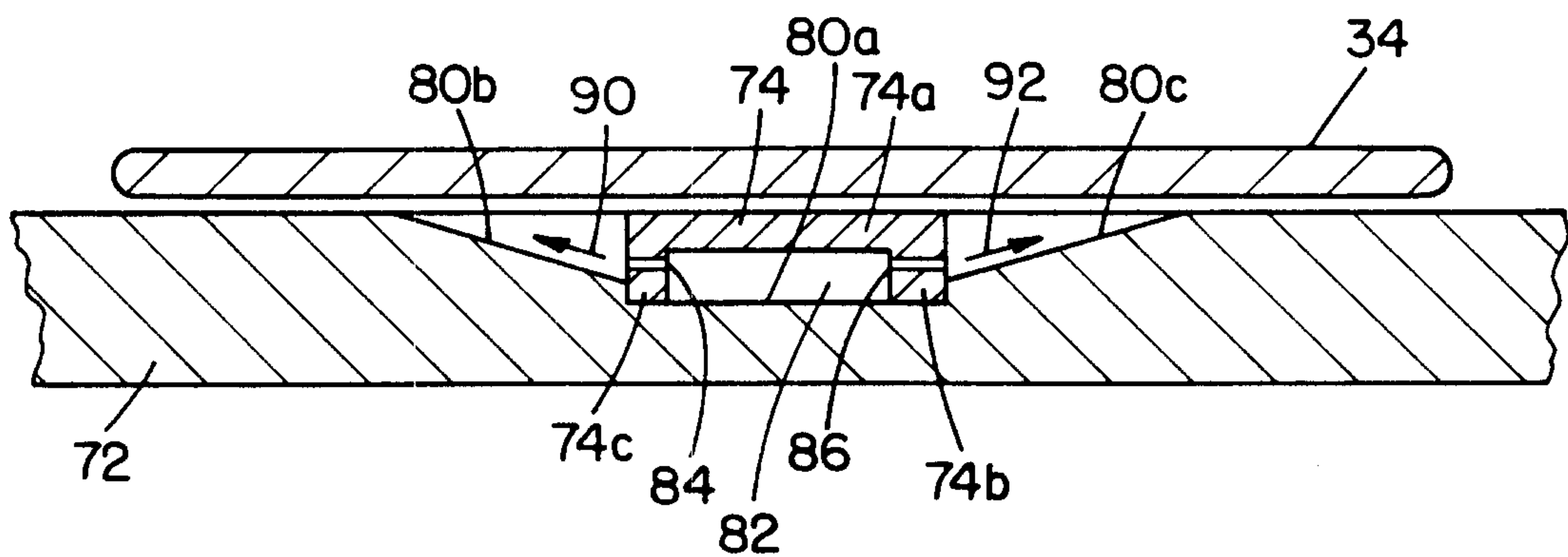


FIG. 4

