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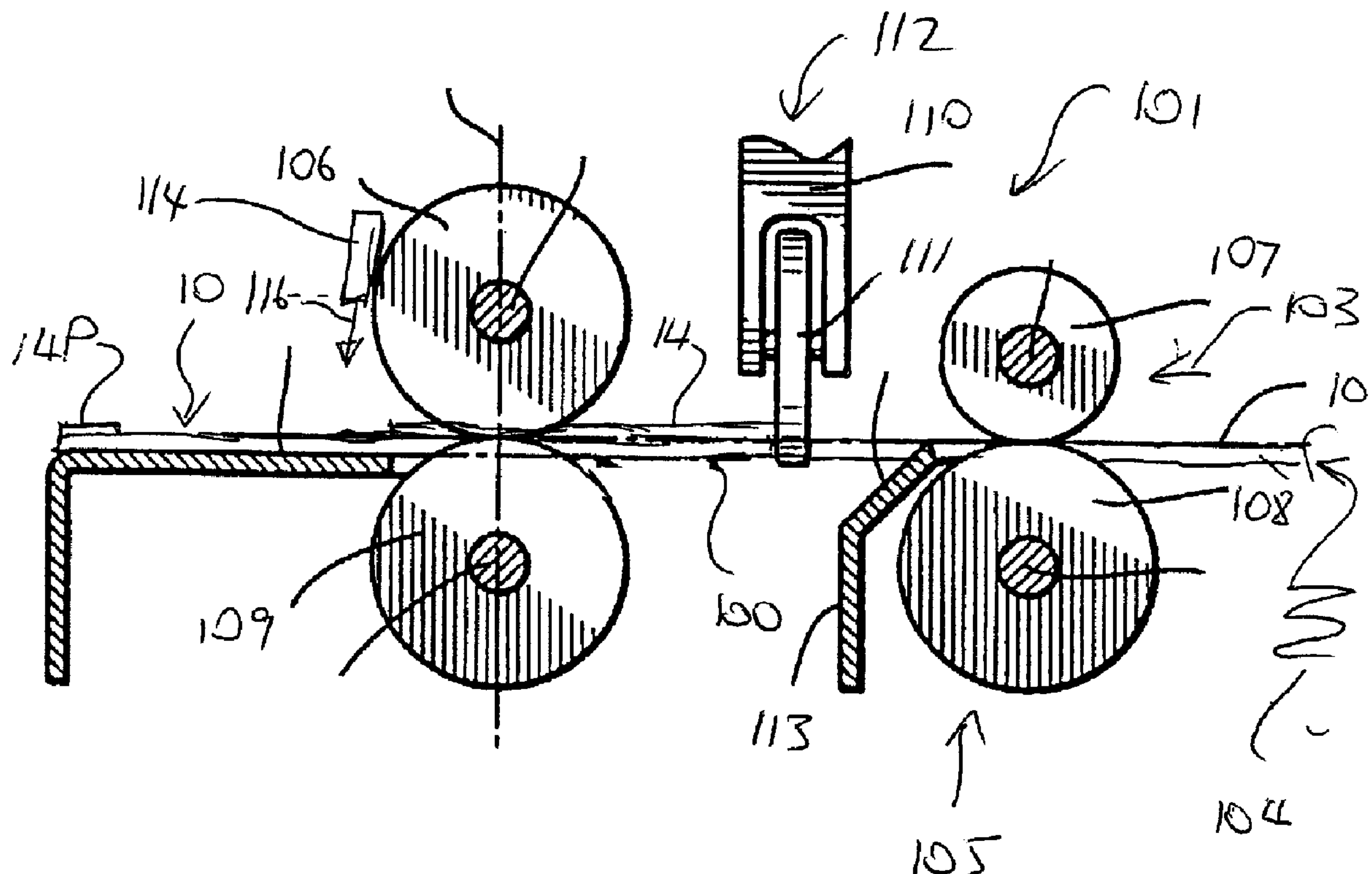
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(54) Titre : DISTRIBUTEUR DE BILLETS DE LOTERIE

(54) Title: APPARATUS FOR DISPENSING A LOTTERY TICKET



(57) Abrégé/Abstract:

A lottery ticket is printed on a substrate sheet material having a front surface with lottery game indicia printed thereon and a removable covering material, typically scratch-off material, covering the lottery game indicia which is removable by a player to

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

expose the game indicia for playing the game and other game information printed on the substrate sheet material where at least part of the substrate sheet material is formed of a translucent synthetic material to enable viewing through the part by the player. In order to allow the ticket to be dispensed in a row of the tickets from a dispensing machine with an optical sensor, a patch of an opaque or semi-opaque material is applied onto the substrate at a location to cooperate with the sensor while it is operating to detect ticket location.

ABSTRACT

A lottery ticket is printed on a substrate sheet material having a front surface with lottery game indicia printed thereon and a removable covering material, typically scratch-off material, covering the lottery game indicia which is removable by
5 a player to expose the game indicia for playing the game and other game information printed on the substrate sheet material where at least part of the substrate sheet material is formed of a translucent synthetic material to enable viewing through the part by the player. In order to allow the ticket to be dispensed in a row of the tickets from a dispensing machine with an optical sensor, a patch of an
10 opaque or semi-opaque material is applied onto the substrate at a location to cooperate with the sensor while it is operating to detect ticket location.

APPARATUS FOR DISPENSING A LOTTERY TICKET

This invention relates to dispensing a scratch-off lottery ticket where at least a part of the ticket, carrying the lottery ticket information and the covering material applied thereto, is transparent or translucent.

5 Also disclosed is a construction of the ticket and a method of playing a lottery ticket game where at a second ticket when viewed through a translucent part of a first ticket is arranged so that a characteristic of the translucent part exposes data on the second ticket which is not visible when viewed without the translucent part.

10 **BACKGROUND OF THE INVENTION**

Lottery tickets are well known and widely sold and typically comprise a sheet material of paper or card stock on which is printed lottery information and various indicia for the playing of one or more games. Many such games are instant win type games where the player can play the game or games by carrying out
15 various functions. These include a first type of ticket which involves removing a scratch-off layer for scratch-off tickets. A second type of ticket involves opening pull tabs windows for what are known as break-open tickets. Such tickets are also known variously as pull-tabs, pickle cards, jar tickets, hard cards and charitable gaming tickets. Typically, these two distinct types of lottery tickets are targeted to
20 different markets.

The break-open ticket is typically manufactured in a process which involves firstly printing using a printing press a full sheet which thus defines a set of

the tickets in rows and columns which is laminated to a similar sheet of top sheet portions. The laminated sheets then must be cut in a mechanical cutting station into the individual ticket portions. The tickets thus formed are limited to the symbol combinations printed in the set. This leads generally to a reduced level of security
5 for break-opens generally thus limiting the prize value which can be provided.

The present invention relates to both scratch-off and break-open tickets but is primarily concerned with scratch-off tickets where the substrate must also provide the necessary security characteristics such as opacity.

Scratch-off lottery tickets have up to date been printed on cardstock or
10 foil laminated substrates for decades. Such substrates are typically relatively stiff and dimensionally stable to allow printing and to provide a finished product which remains generally flat when used by the player. This flat stiff structure enables the player to easily hold the ticket and hold the game area flat as the scratching process is applied.

15 Also the substrate used to date is opaque. It will be appreciated that the area containing the game data must be sufficiently opaque that it cannot be compromised by a strong light shone through the substrate and the game data. The degree of opacity to obtain this feature is typically assisted by printed layers of opaque material including a backing layer under the game data and the scratch-off
20 material itself. Foil substrates are sufficiently opaque so that no additional layers are required although typically a white layer is applied beneath the game data to provide a higher contrast level between game indicia and the background. Card stock

requires additional layers to provide the opacity required. However in all cases the substrate used has itself an initial high opacity level and other less opaque materials have thus been considered unsuitable.

Also the substrate must pass through the printing process and allow
5 the printing to be registered with a particular location on the substrate. Thus again foil substrates have a very high dimensional stability and hence are particularly desirable. Card stock has less dimensional stability and may stretch slightly but in a manner which can be managed in the printing process. Other less stable materials have thus been considered unsuitable.

10 As the substrate used to date therefore is either laminate stock including but not limited to foil laminates, transfer film laminates, etc. or card stock including various stock weights such as text weight and cover weight, aesthetic variation are limited to combinations of graphics, inks and coatings. In the continuing challenge to capture the attention of consumers in the cluttered retail environment,
15 fast moving consumer packaged goods, including lottery tickets, rely on fresh new packaging options.

SUMMARY OF THE INVENTION

It is one object of the invention to provide a ticket using a substrate which is at least partly of a translucent plastics material which can be supplied to a
20 customer by cooperating with a dispensing machine.

According to the invention there is provided an apparatus for dispensing lottery tickets comprising:

a strip of tickets joined end to end in a row with a line of weakness between each ticket and the next;

a transport mechanism for feeding the tickets along a dispensing path;

a separator located along the dispensing path by which adjacent
5 tickets are separated from one another;

at least one rotationally driven feed roller contacting the tickets at a location along the dispensing path upstream of the separator to advance the tickets toward the separator;

at least one rotationally driven discharge roller contacting the tickets at
10 a location along the dispensing path downstream of the separator to discharge the articles from the separator;

an optical sensor operable during at least a part of the movement of the strip for detecting a location of a ticket as it moves along the dispensing path;

wherein the strip of lottery tickets comprises a substrate sheet material
15 where at least a portion of the substrate sheet material is translucent;

lottery game indicia printed a the front surface of each ticket;

an area of opaque material covering the lottery game indicia which material is removable to expose the game indicia;

and a patch of material which is more opaque than the substrate sheet
20 material which patch is located on the substrate sheet material in addition to the area of the opaque material;

the patch being located on the ticket at a location for cooperation with the optical sensor as the ticket moves on the path to prevent passage of light from the optical sensor through the translucent substrate from interfering with operation of the optical sensor.

5 In some cases it is necessary to prevent all transmission of light from the sensor so that the patch is substantially as opaque as the area of opaque material.

 In other cases the optical sensor can operate with some light transmission so that the patch allows passage of some light greater than that of the
10 area which is insufficient to interfere with the operation of the optical sensor.

 In some cases the patch is separate from the area so that there is a space between them of the translucent material. However in other cases the patch is contiguous with the area and hence is an additional portion of the area included not to cover the game data but so as to specifically cooperate with the location of the
15 optical sensor.

 For use with some arrangements of dispensing machines, the patch forms a strip along a center of the ticket and extends from a leading edge of the ticket to a trailing edge of the ticket. This prevents a centrally located optical sensor detecting a translucent area which it then determines to be a break in the strip which
20 can trigger a shutdown of the dispensing system.

For use with some arrangements of dispensing machine there is provided at least one additional patch at a location on the ticket spaced from the first patch and from the area.

The additional patch is typically arranged at a location on the ticket for cooperation with a second optical sensor as the ticket moves on the path to prevent passage of light from the second optical sensor through the translucent substrate from interfering with operation of the second optical sensor. The additional patch is typically in this case arranged at a location on the ticket so that the patch and the additional patch are symmetrically arranged relative to a center line of the ticket. In this case the additional patch and said patch are arranged at a leading or trailing edge of the ticket opposite the area so that the patches render the substrate opaque at the adjacent edge and the area renders the substrate opaque at the opposite edge for detection of the leading and trailing edges by the optical sensors.

In most cases the patch is formed by an ink printed onto the translucent substrate material. However the patch can be another material such as a label applied onto the substrate.

In most cases the whole of the ticket is formed by the translucent substrate so that the game indicia and the covering and the patch is applied onto the translucent substrate. However the substrate may be a composite construction where a part only of the substrate is formed by said translucent material and other parts of another material which is not translucent. In this case the patch may be located at or defined by the other material. That is the substrate material may be

laminated to another material and a part of the other material is omitted or removed to expose the translucent material .

The ticket can be arranged for security so that observation by an intruder of the game data from a rear of the ticket is prevented by printing onto a rear
 5 surface of the substrate an opaque ink. Typically this can be in a thickness in the range 0.5 to 2 microns which is arranged to absorb or reflect any electromagnetic energy applied thereto.

The substrate can be arranged to have the characteristic of a surface energy greater than 39 Dyne/cm by applying to the substrate an acrylic emulsion or
 10 by treatment with corona discharge.

One example of the translucent material is where the substrate is PET but other materials may be used.

The substrate may be colored.

The arrangement herein may be used with a method of constructing a
 15 lottery ticket comprising:

forwarding a substrate sheet material comprises a synthetic or polymer material;

printing onto a front and rear surface of said substrate material an opaque non-removable lilypad;

20 printing onto the front and rear surface and on top of the opaque lilypad a white lilypad;

printing onto the front surface and onto the white lily pad using variable image printing an ink material arranged to display lottery game indicia;

printing onto the front surface and covering the lottery game indicia with one or more clear protective layers;

- 5 printing onto the front surface of the clear protective layer an opaque material covering the lottery game indicia which is removable by a player to expose the game indicia for playing the game;

wherein the substrate is arranged to have the following characteristics

Melting Point	$\geq 150\text{ C}^{\circ}$	10
Softening Point	$\geq 110\text{ C}^{\circ}$	
Shrinkage	$\leq 3\%$ (30 min at 150 C°)	
Surface Energy	$\geq 39\text{ Dyne/cm}$	
Optical Transmission	$\geq 80\%$ (400 to 700 nm)	
Tensile Strength	$\geq 20\text{ Kg/mm}^2$	15
Tear Strength	$\geq 20\text{ g/Mil}$	
Caliper	25 – 500 micron	

20 Preferably the substrate is PET, but other materials defined herein can be used.

For effective use as a lottery ticket, preferably the substrate has a fold endurance of ≥ 103 cycles.

Preferably the litho ink is cured by ultraviolet or electron beam radiation energy but other types of curing processes can be used.

Typically the layers are applied to a portion only of the substrate leaving at least one other part which is translucent for use in the operation of the
5 ticket as described hereinafter.

In some cases the substrate is colored.

In some cases the whole of the ticket is formed by said substrate so that the game indicia and the covering is printed on the said substrate but other embodiments can be provided where a part only of the substrate is formed by said
10 material.

In some cases the synthetic plastics material is laminated to another material and a part of the other material is omitted or removed to expose the synthetic plastics material for example in the form of a window in the ticket.

The method described above may be used to form a lottery ticket
15 comprising:

a substrate sheet material having a front surface having lottery game indicia printed thereon;

a removable covering material covering the lottery game indicia which is removable by a player to expose the game indicia for playing the game;

20 game information printed on the substrate sheet material;

wherein at least part of the substrate sheet material comprises a polymer material.

Preferably the synthetic or polymer material is translucent to enable viewing through said at least a part by the player.

The method described above may be used to form a lottery ticket comprising:

5 a substrate sheet material having a front surface having lottery game indicia printed thereon;

a removable covering material covering the lottery game indicia which is removable by a player to expose the game indicia for playing the game;

game information printed on the substrate sheet material;

10 wherein at least part of the substrate sheet material is translucent to enable viewing through said at least a part by the player.

Preferably the translucent material is arranged to have a character to change the appearance of an underlying object viewed through the translucent material. That is the material can be the colored or polarized or may have other
15 characteristics which affect what is viewed underneath.

The ticket may also include the use of refractive synthetic material to provide a holographic appearance to all or a portion of the ticket.

The whole of the substrate can be formed by said material so that the game indicia and the covering is printed on the said material or a part only of the
20 substrate is formed by said material.

Preferably the synthetic or polymer material is laminated to another material and a part of the other material is omitted or removed to expose the synthetic plastics material.

For example the part removed may form a window in the ticket or a
5 band across the ticket or any other shape within the main body of the ticket.

Preferably a part only of the substrate is formed by said material and another part is formed of a card or foil stock and the game indicia and the scratch-off or break-open covering is applied onto the other part.

Preferably the ticket is formed so that it has a dimensional stability and
10 will be of similar caliper and stiffness so the ticket is relatively uniform

Preferably the translucent/polymer material is selected so that it has an opacity or can be made opaque with the use of opacifying chemistry to hide gaming indicia

Preferably the translucent/polymer material is selected so that it has an
15 array of thickness to satisfy the end user's needs.

The translucent/polymer material can be of single material construction or made of multi-layers so that characteristics such as stiffness, dimensional stability and acceptance of printing can be selected and tailored to form a composite material.

20 The method described above may be used in a method of playing a lottery ticket game comprising:

providing a first and a second lottery ticket wherein each ticket comprises:

a substrate sheet material having a front surface having lottery game indicia printed thereon;

5 a removable covering material covering the lottery game indicia which is removable by a player to expose the game indicia for playing the game;

game information printed on the substrate sheet material;

wherein at least part of the substrate sheet material is translucent to enable viewing through said at least a part by the player;

10 and viewing the second ticket through a translucent part of the first ticket;

wherein the translucent part is arranged so that a characteristic of the translucent part of the first ticket combines with a characteristic of the viewed part of the second ticket.

15 As used herein, the surface with the game data on is termed as the front surface but this could be either the surface of a single substrate or on any one or more of the surfaces of a multi-layer ticket such as a folded or multi-page ticket.

For example the characteristic of the translucent part of the first ticket combines with the characteristic of the viewed part of the second ticket to expose
20 data on the second ticket which is not visible when viewed without the translucent part.

Alternatively the characteristic of the translucent part of the first ticket combines with the characteristic of the viewed part of the second ticket to allow data on the second ticket to be combined with data on the first ticket.

As yet further alternatives, the characteristic of the translucent part of
5 the first ticket combines with the characteristic of the viewed part of the second ticket to allow graphic or other elements of the second ticket to be combined with graphic or other elements of the first ticket to create new aesthetic effects or messages.

As yet further alternatives, the characteristic of the translucent part of
the first ticket combines with the characteristic of the viewed part of another printed
10 item such as a photograph or digital image to create new aesthetic effects or messages.

As yet further alternatives, the translucent portion(s) are covered in whole or in part with scratch-off layers or a tab so that the translucent portion is not usable or only partially visible until the ticket is purchased and played.

15 As yet further alternatives, multiple translucent films could be combined in a movable format such that they reveal or enhance part of the ticket experience when rotated or repositioned over each other.

As yet further alternatives, the translucent film combines with an encapsulated compound whereby applying the film to the ticket surface and rubbing
20 the film causes the capsules to release a compound that would react with an invisible dye to make it visible.

As yet further alternatives, the translucent film can be folded over onto the same ticket to enhance another printed graphic element or the game play experience.

The term "translucent" as used herein includes materials where light
5 can pass through the substrate so that this may include materials which are transparent where no light scattering occurs.

As described herein there is provided a substrate, comprising synthetic substrate(s) or a combination of synthetic substrate(s) with card stock and/or other types of opaque scratch-off lottery ticket substrate(s), to produce a distinctive looking
10 lottery ticket. The new substrate, whether it is synthetic or a combination of synthetic and conventional scratch-off ticket substrate(s) will satisfy the physical security requirements commonly provided by conventional ticket substrates for scratch-off lottery tickets.

The synthetic substrate can be transparent, semi-opaque, colored
15 and/or patterned. The scratch-off tickets feature an underlying layer or layers beneath the game data, which will provide the opacity requirements to prevent transmitted light compromise or other methods of compromise used with the application of various frequencies of lighting, filters and image capture and a layer or layers which will provide the contrast level between the background and game data
20 to provide good legibility. In addition this combination of layers will also provide the adhesion characteristics necessary to bond the data to the synthetic substrate and compatibility with overlying security coatings designed to secure the variable data

elements and provided the release characteristics required for scratch-off removal by player. Similarly portions of the synthetic substrate may be coated with underlying layer or layers to improve graphic appearance and durability of the graphic images. The synthetic substrate provides enhanced chemical resistance to compromise attempts from the back of the tickets compared to cardstock tickets.

Typical polymeric materials (sometimes known as plastics or synthetic materials) include as examples:

Polyester (PES).

Polyethylene terephthalate (PET).

10 Polyethylene (PE).

High-density polyethylene (HDPE).

Polyvinyl chloride (PVC).

Polyvinylidene chloride (PVDC).

Low-density polyethylene (LDPE).

15 Polypropylene (PP).

Polystyrene (PS).

Polycarbonate (PC).

Polymethyl methacrylate (PMMA) (Acrylic).

Polytetrafluoroethylene (PTFE).

20 Poly lactic acid (PLA)

Bioplastics

Biobased polymers

Recycled plastics

The material may be formed from one or more layers of these materials to provide the required characteristics defined herein.

For hybrid ticket combining the synthetic and conventional ticket
5 substrates, the synthetic substrate may be printed with artistic images and/or game-related information or data and the card stock or other conventional ticket substrate contains the security layers, game indicia and scratch-off material. The synthetic and conventional ticket substrate(s) are laminated together such that the appearance and transparent or partially transparent quality of the synthetic printed portion is
10 preserved in part or in its entirety, and the opaque, conventional stock portion(s) provides physical ticket security qualities in keeping with conventional scratch-off lottery tickets.

The tickets can be supplied in the form of continuous, fanfolded books with perforations separating the individual tickets. They can however also be
15 provided as single tickets or sheets of tickets or rolls of tickets.

In the preferred embodiments, the new substrate enables interactivity between two or more tickets by overlaying the tickets and reading data, information or graphics printed on one ticket in combination with data, information or graphics printed on another ticket to form a new combination of data, information or graphics.
20 Other embodiments are also possible, including but not limited to the use of the synthetic substrate as a decoder. In this embodiment, the synthetic substrate could be semi-opaque, tinted or patterned, and when over-laid on top of another ticket,

could serve to decode hidden or scrambled information that may be related to the game play. The synthetic substrate provides a unique appearance for graphics and, optionally, game elements, and the ability to overlay one ticket on another to form a new graphic effect or new combination of information, potentially transforming a non-winning ticket into a winner.

The unique appearance of the synthetic ticket can catch attention at retail which drives sales for impulse products like lottery tickets. The unique tactile quality and optional ability to combine multiple tickets for an added entertainment or additional chances to win will create a higher perceived value for consumers, resulting in higher satisfaction and additional sales.

The tactile quality is obtained by selecting the characteristics so that the substrate is smooth and slick, giving the ticket a rich, high quality feel that is distinct from conventional scratch-off ticket substrates. It may also be textured or molded to add variety to the tactile sensation.

In one example the characteristic of the translucent part of the first ticket combines with the characteristic of the viewed part of the second ticket to enhance other images, create new graphic effects or decode hidden messages.

In one example the translucent material is patterned to enhance other images or create new visual effects or decode hidden messages.

The film preferably has the following characteristics:

---Caliper = 25 micron to 500 micron

---Printable on one or both side of the substrate using lithography, flexography, gravure, screen and digital printing

---Substrate service temperature: -70 C to 200 C

---Specific gravity of the film(s): 1.0 to 1.5 g/cm³

5 ---Surface energy level of 30 to 60 dyne

---Water and oil resistant as it pertains to security lab testing

---Acid and alkali resistant as it pertains to security lab testing

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a plan view of a first ticket according to the invention where
10 the ticket substrate is formed from a plastics or synthetic material with the game data and removable covering printed on the substrate.

Figure 2 is a plan view of a second ticket according to the invention where the ticket substrate is formed mainly from a conventional card stock which is laminated to a window area formed from a plastics or synthetic material with the
15 game data and removable covering printed on the card stock.

Figure 3 is a plan view of a third ticket according to the invention where the ticket substrate is formed mainly from a conventional card stock which is laminated to a window area formed from a plastics or synthetic material with the game data and removable covering printed on the card stock.

20 Figure 4 is a cross-sectional view along the lines 4-4 of Figure 1.

Figure 4A is a cross-sectional view along the lines 4-4 of Figure 1 showing a modified ticket with additional security components.

Figure 5 is a cross-sectional view along the lines 5-5 of Figure 2.

Figure 6 is an alternative cross-sectional view along the lines 5-5 of Figure 2.

Figure 7 is a plan view of a first and second ticket according to the invention where the game data or other elements of the second ticket are viewed through the translucent window of the first ticket to reveal game data or other elements not otherwise visible.

Figure 8 is a schematic illustration of the method of manufacture of the ticket.

Figure 9 is a side elevational view of the components of a dispensing machine cooperating with a ticket of the type shown in Figure 4A.

Figure 10 is a plan view of a row of the tickets of Figure 9 with the opaque patches which are located to cooperate with the optical sensor of Figure 9.

Figure 11 is a plan view of a ticket of Figure 9 with an alternative arrangement of the opaque patch which is located to cooperate with the optical sensor of Figure 9.

DETAILED DESCRIPTION

As shown in Figures 1, 2 and 3, there is provided a lottery ticket 10, 10A, 10B each of which includes a substrate sheet material 11 having a front surface 12 having lottery game indicia 13 printed thereon. A removable covering material 14 covers the lottery game indicia 13 which is removable by a player to

expose the game indicia for playing the game. The front surface includes game information 15 printed on the substrate sheet material 11.

In each of the figures the removable covering comprises a scratch-off coating 14 typically printed over a release coating or varnish layer 16C. The game data is printed onto a security layer 16 which includes one or more pigmented layers to form an opacity to prevent transmission of light and which typically includes a white lily pad to provide a base to render the game data 13 more visible.

In another arrangement, the game data can be printed on one synthetic substrate and then laminated another synthetic substrate over top to protect the data.

In the present invention, at least part of the substrate sheet material comprises a synthetic plastics material 17. The plastics material can be formed of different layers 17A, 17B to provide the required characteristics as described herein.

As shown in Figure 1, the whole of the substrate is formed by the plastics material so that the game indicia 13 and the covering 14 is printed on the material.

As shown in Figure 2 and 3, a part only of the substrate is formed by the material.

As shown in Figures 5 and 6 synthetic polymer material 11 is laminated to another material 18 such as the card stock and a part of the other material is omitted or removed at an opening 19 to expose the synthetic plastics

material 11. In Figure 5 the part removed forms a window in the ticket. In Figure 3 the part removed forms a band 19A across the ticket.

As shown in figure 7 the synthetic polymer material 11 in the window 19 is translucent to enable viewing by the player through the part of the substrate which is formed by the material. As shown a second ticket 10C is viewed through the window and the translucent material is arranged to have a character to change the appearance of an underlying object in this case the game data 13 viewed through the translucent material. That is additional data 13A may become or be made visible by the effect of the change made by the translucent material. Typically the translucent material is simply colored which then cooperates with colors on the game data to make the game data more or less visible.

However other characteristics in the material can be used such as the translucent material is polarized. Alternatively, the translucent material could be patterned to enhance other images or create new visual effects or decode hidden messages.

Where a part only of the substrate is formed by the polymer material and another part is formed of a card or foil stock and the game indicia and the covering is typically but not necessarily applied onto the other part as shown in Figure 2 or 3.

In the method of playing a lottery ticket game shown in Figure 7 using two of the tickets shown in Figure 2 the player views the second ticket through the translucent part of the first ticket and the translucent part is arranged so that a

characteristic of the translucent part of the first ticket combines with a characteristic of the viewed part of the second ticket to expose data on the second ticket which is not visible when viewed without the translucent part or acts to allow data on the second ticket to be combined with data on the first ticket where the data by placing
5 one set of data 13B on the translucent material of the first ticket at or adjacent the data 13 on the underlying second ticket.

In the method of constructing a lottery ticket the following steps are followed as shown in Figures 4A and 8.

10 A substrate sheet material comprising a synthetic polymer material is forwarded from a supply. The substrate is coated on both sides by an acrylic emulsion layer 30, 31 which provides for the substrate the characteristic of a surface energy greater than 39 Dyne/cm. The emulsion is typically applied in a conventional coating process during manufacturing so that the substrate is supplied in the coated
15 form.

Onto a front surface of the substrate material over the emulsion 30 only in the game area 33 is printed an adhesive promoting layer 32 of a litho ink in a thickness in the range 0.5 to 2 microns. The layer 32 is then cured by ultraviolet or electron beam radiation energy to provide bonding to the substrate. This may occur
20 through cross-linking between the substrate and the layer 32 or other bonding action may occur.

The confusion pattern may be a random selection of ascii characters or a pattern of randomly placed shapes likes squares for example.

Onto a front surface of the substrate material over the layer 32 in the game area 33 is printed an opaque non-removable lilypad 16A followed by a white
5 lilypad 16B

A confusion pattern 34 in two to four different colors is printed onto the substrate in the game area only at a location between the adhesive promoting layer 32 and the lilypad 16A.

Onto the white lilypad using variable image printing is printed an ink
10 material arranged to display lottery game indicia 13 and this is covered and protected by one or more clear protective covering layers 16C typically of a clear varnish.

Onto the front surface of the clear protective layer is printed an opaque material in one or more different layers 14A, 14B covering the lottery game indicia
15 which is removable by the player by scratching so that the material fragments and breaks away to expose the game indicia for playing the game.

Onto a rear surface of the substrate is printed onto the emulsion 31 a litho ink layer 35 in a thickness in the range 0.5 to 2 microns which is arranged to absorb or reflect any electromagnetic energy applied thereto.

20 In order to ensure proper printing of the required layers on the ticket and to ensure security of the game data against typical attacks, the ticket as printed has characteristics as set out hereinafter.

Property of Substrate	Value Range
Melting Point	150 – 290 C°
Softening Point	110 – 260 C°
Shrinkage	0 – 3 % (30 min at 150 C°)
Surface Energy	39 – 50 Dyne/cm
Optical Transmission	≥ 80% (400 to 700 nm)
Tensile Strength	M.D. ≥ 20 Kg/mm ² C.D. ≥ 20Kg/mm ²
Tear Strength	≥ 20 g/Mil
Fold Endurance	≥ 103 Cycles
Caliper	25 – 500 micron

5

It is necessary therefore to ensure that the ticket printed on the translucent substrate is secure against convention attack methods known in the industry.

10

Selection of the synthetic plastic used to print lottery tickets plays a role in the build of a secure lottery ticket. Consideration needs to be given to the physical properties of the substrate such as film lamination combination, orientation, refractive index, melting point, softening point, tensile strength, tear strength and
5 electrical properties as an example. This needs to be taken into account with respect to the printing equipment being used for producing said ticket. It also needs to be taken into account for the security and performance of the ticket/game.

The substrate selected is PET so that it can stand up to the printing process. The PET can be heated and not reach its melting point while running
10 through gas fired forced air dryers and IR dryers while drying the inks and coatings applied to make the substrate functional and secure. PET provides a softening point selected so that the substrate minimizes the distortion under tension through the printing process. The PET substrate due to the strength properties performs as expected as a scratch lottery ticket and the demands from the market place. The
15 ticket must meet standards to be used for example in distribution methods like vending machines and ticket dispensers.

The foundation ink film(s) needs to provide adhesion to the substrate. One consideration is the surface energy of the synthetic substrate and how to increase surface energy to promote adhesion of coatings and inks. Consideration
20 must also be given to the selection of the chemistry used to promote bonding to the type of synthetic substrate being printed, or the use of plasma treatment to obtain the correct surface energy for the film of choice.

In order to print on the PET the material is treated with an acrylic emulsion applied to promote adhesion of printing inks. The material can be used without the coating applied but the process needs to treat the film with a plasma treatment to increase the surface energy.

5 The initial base layer 21 printed on the treated film is printed as a thin film to promote adhesion with a chemistry which is energy curable.

Once the base foundation chemistry and coating is identified then one or more opaque coatings are printed to protect the game data from various forms of surreptitious readout,

10 The confusion pattern made of one or multiple colours is used to deter or reduce the ability to read game data or visualise components of the game data ink by use of electromagnetic energy. A coating or ink is also applied to the opposite side of the lottery ticket to reflect or absorb electromagnetic energy to secure the lottery ticket from readout of gaming data.

15 As an alternative or as an additional measure, a coating may be chosen to prevent the migration of the components of the imaging ink to the base i.e. clear substrate.

Irradiation can be applied to the non-game side of the game piece to reduce the migration. That is a solution or at least a potential solution to mitigate or
20 eliminate the migration that is being seen on the ticket back using the current production method.

Refractive index of the synthetic substrate and possible lamination combinations to improve the security of the game data via surreptitious readout. This is a possible solution the migration issue by using a substrate that comprises two films with differing refractive index values which refracts the electromagnetic
5 energy so the game data is not visible.

Imaging ink chemistry needs to be considered in the ticket formulation as it critical to the overall security of the ticket. The use of a pigmented imaging ink versus a dye based imaging ink or an energy curable ink needs to be taken into account to achieve ticket security. Imaging ink component migration is a key
10 consideration. Pigmented and energy curable inks are better due to the cleaner chemistry and components that make up the ink.

As shown in Figure 4A there is provided a patch 14P of an opaque material printed or applied onto the ticket at a position spaced from the material 14 covering the game data.

15 In Figure 9, 10 and 11 is shown a dispensing system 101 for a row 100 of the tickets 10. A plurality of individual tickets 10 are connected in a fanfold strip or stream 100. Individual tickets 10 are joined to an adjacent ticket by a line of weakness 102 which typically comprises perforations. The tickets 10 are provided in a fanfold stack which is compact and easily transportable and typically include as
20 many as 300 tickets in each stack. A stack 104 of fanfold tickets is contained in a storage compartment (not shown) in the lottery ticket dispenser. Each ticket 10 is connected to an adjacent ticket 10 along the line of weakness 102 and it will be

understood that each successive following ticket 10 is joined to an adjacent ticket by a similar line of weakness 102.

The fanfold stream 100 of tickets 10 is fed along a dispensing path 103 from the storage compartment toward an outlet (not shown). The stream 103 is transported along the dispensing path by the transport mechanism 105 including
5 opposed upper feed roller 107 and lower feed rollers 108 and opposed upper discharge roller 106 and lower discharge roller 109. It will be appreciated that there is shown in Figure 9 only one station but that in most arrangements a row of such stations will be arranged side by side for dispensing parallel rows of tickets.

10 A generally circular burster wheel 111 or similar bursting arrangement is mounted for rotation between spaced, downwardly extending flanges 110 of a burster block 112. The burster wheel 26 is mounted for rotation on the burster block 112 on an axle extending between the spaced flanges 110. The burster block 112 is mounted for a translation along a rail 113 to separate each ticket from the next while
15 the tickets are held between the rollers 106/109 and 107/108.

A sensor 114 generating a light beam 116 is located at a suitable location in the system for detecting the presence of the tickets in the stream during the dispensing action. In one example shown the sensor 114 is located immediately downstream from the dispensing rollers 106/109 to detect the leading edge 115 of
20 the leading ticket 10 of the stream of tickets being input into the system. In one embodiment the sensor 114 is an optical device known to those skilled in the art which generates a beam and detects light from that beam, which may be reflected or

transmitted to a receiver, to confirm the presence or absence of the ticket. More than one sensor can be provided at different locations along the path to detect different components of the tickets including both the leading edge 115 and the trailing edge 117 as they pass.

5 The apparatus for dispensing lottery tickets thus includes the strip 100 of tickets 10 joined end to end in a row with the line of weakness 102 between each ticket and the next. The transport mechanism defined by the two sets of rollers acts for feeding the tickets along the dispensing path and the separator or burster is located along the dispensing path by which adjacent tickets are separated from one
10 another.

Thus at least one rotationally driven feed roller 107, 108 contacts the tickets at a location along the dispensing path upstream of the separator 111 to advance the tickets toward the separator and at least one rotationally driven discharge roller 106, 109 contacts the tickets at a location along the dispensing path downstream of the
15 separator to discharge the articles from the separator for dispensing to the customer.

The optical sensor 114 is operable during at least a part of the movement of the strip for detecting a location of a ticket as it moves along the dispensing path.

The strip of lottery tickets as described above comprises a substrate
20 sheet material where at least a portion of the substrate sheet material is translucent and includes lottery game indicia printed on the front surface of each ticket and an

area 120 of the opaque material 14 covering the lottery game indicia which material is removable as described above to expose the game indicia.

A patch 121, 122 of material, which is more opaque than the substrate sheet material, is located on the substrate sheet material in addition to the area 120
5 of the opaque material 14. In Figure 10 there are two patches 121, 122 where the additional patch 122 is provided at a location on the ticket spaced from the patch 121 and from the area 120.

The patches are arranged at a location on the ticket so that the patch 121 and the additional patch 122 are symmetrically arranged relative to a center line
10 of the ticket.

The patches are located on the ticket at a location for cooperation with the optical sensors 114 as the ticket moves on the path 103 to prevent passage of light from the optical sensor through the translucent substrate from interfering with operation of the optical sensor. That is the patch operates as a reflective zone on
15 the ticket so that the beam is reflected and not passed through. In this way the optical sensor properly detects the presence of the ticket at the time and location where it is expected to confirm and control the operation of the dispenser as known to persons skilled in this art.

That is the additional patch 122 is arranged at a location on the ticket
20 for cooperation with a second optical sensor 124 as the ticket moves on the path again to prevent passage of light from the second optical sensor through the translucent substrate from interfering with operation of the second optical sensor.

In Figure 10, the additional patches 121 and 122 are arranged at the leading edge 115 of the ticket opposite the area 120 so that the patches render the substrate opaque at the leading edge. In this embodiment, the area 120 is located at the trailing edge 117 and renders the substrate opaque at the edge 117 for
5 detection of the leading and trailing edges by the optical sensors. However where the area 120 is spaced from the trailing edge 117 in some designs not shown third and fourth patches can be located at the trailing edge 117.

Where necessary, the patch or patches are substantially as opaque as the area of opaque material and can use the same material so that the patch is
10 formed by an ink printed onto the translucent substrate material. The patches 121, 122 are separate from the area 120. In this arrangement the whole of the ticket is formed by the translucent substrate so that the game indicia and the covering 14 and the patch 121, 122 are applied onto the translucent substrate.

In Figure 11 is shown an alternative design of patch where the patch
15 130 is contiguous with the area 120 and forms a strip along a center of the ticket and extends from the leading edge 115 of the ticket to the trailing edge 117 of the ticket. This arrangement of patch is continuous so that it prevent a break in the beam 132 from the sensor 131 as the ticket passes. In this arrangement, the patch does not need to prevent all passage of light so that the patch allows passage of some light
20 greater than that of the area which is insufficient to interfere with the operation of the optical sensor.

CLAIMS

1. Apparatus for dispensing lottery tickets comprising:

a strip of tickets joined end to end in a row with a line of weakness between each ticket and the next;

5 a transport mechanism for feeding the tickets along a dispensing path;

a separator located along the dispensing path by which adjacent tickets are separated from one another;

at least one rotationally driven feed roller contacting the tickets at a location along the dispensing path upstream of the separator to advance the tickets
10 toward the separator;

at least one rotationally driven discharge roller contacting the tickets at a location along the dispensing path downstream of the separator to discharge the articles from the separator;

an optical sensor operable during at least a part of the movement of
15 the strip for detecting a location of a ticket as it moves along the dispensing path;

wherein the strip of lottery tickets comprises a substrate sheet material where at least a portion of the substrate sheet material is translucent;

lottery game indicia printed on the front surface of each ticket;

an area of opaque material covering the lottery game indicia which
20 material is removable to expose the game indicia;

and a patch of material which is more opaque than the substrate sheet material which patch is located on the substrate sheet material in addition to the area of the opaque material;

the patch being located on the ticket at a location for cooperation with
5 the optical sensor as the ticket moves on the path to prevent passage of light from the optical sensor through the translucent substrate from interfering with operation of the optical sensor.

2. The apparatus according to any preceding claim wherein the patch is substantially as opaque as the area of opaque material.

10 3. The apparatus according to any preceding claim wherein the patch allows passage of some light greater than that of the area which is insufficient to interfere with the operation of the optical sensor.

4. The apparatus according to any preceding claim wherein the patch is separate from the area.

15 5. The apparatus according to any preceding claim wherein the patch is contiguous with the area.

6. The apparatus according to any preceding claim wherein the patch forms a strip along a center of the ticket and extends from a leading edge of the ticket to a trailing edge of the ticket.

20 7. The apparatus according to any preceding claim wherein there is provided at least one additional patch at a location on the ticket spaced from the patch and from the area.

8. The apparatus according to claim 7 wherein said least one additional patch is arranged at a location on the ticket for cooperation with a second optical sensor as the ticket moves on the path to prevent passage of light from the second optical sensor through the translucent substrate from interfering with
5 operation of the second optical sensor.

9. The apparatus according to claim 7 wherein said at least one additional patch is arranged at a location on the ticket so that the patch and the additional patch are symmetrically arranged relative to a center line of the ticket.

10. The apparatus according to claim 7 wherein said at least one
10 additional patch and said patch are arranged at a leading or trailing edge of the ticket opposite the area so that the patches render the substrate opaque at the adjacent edge and the area renders the substrate opaque at the opposite edge for detection of the leading and trailing edges by the optical sensors.

11. The apparatus according to any preceding claim wherein the
15 patch is formed by an ink printed onto the translucent substrate material.

12. The apparatus according to any preceding claim wherein the whole of the ticket is formed by said substrate so that the game indicia and the covering and the patch is applied onto the translucent substrate.

13. The apparatus according to any preceding claim wherein a part
20 only of the substrate is formed by said translucent material.

14. The apparatus according to any preceding claim wherein observation by an intruder of the game data from a rear of the ticket is prevented by

printing onto a rear surface of the substrate ink in a thickness in the range 0.5 to 2 microns which is arranged to absorb or reflect any electromagnetic energy applied thereto.

15. The apparatus according to any preceding claim wherein the
5 substrate is arranged to have the characteristic of a surface energy greater than 39 Dyne/cm by applying to the substrate an acrylic emulsion.

16. The apparatus according to any preceding claim wherein the substrate is PET.

17. The apparatus according to any preceding claim wherein the
10 substrate has a fold endurance of $\geq 10^3$ cycles.

18. The apparatus according to any preceding claim wherein the substrate is colored.

19. The method according to any preceding claim wherein the translucent material is laminated to another material and a part of the other material
15 is omitted or removed to expose the translucent material.

20. The method according to claim 19 wherein the part removed forms a window in the ticket.

FIG. 1

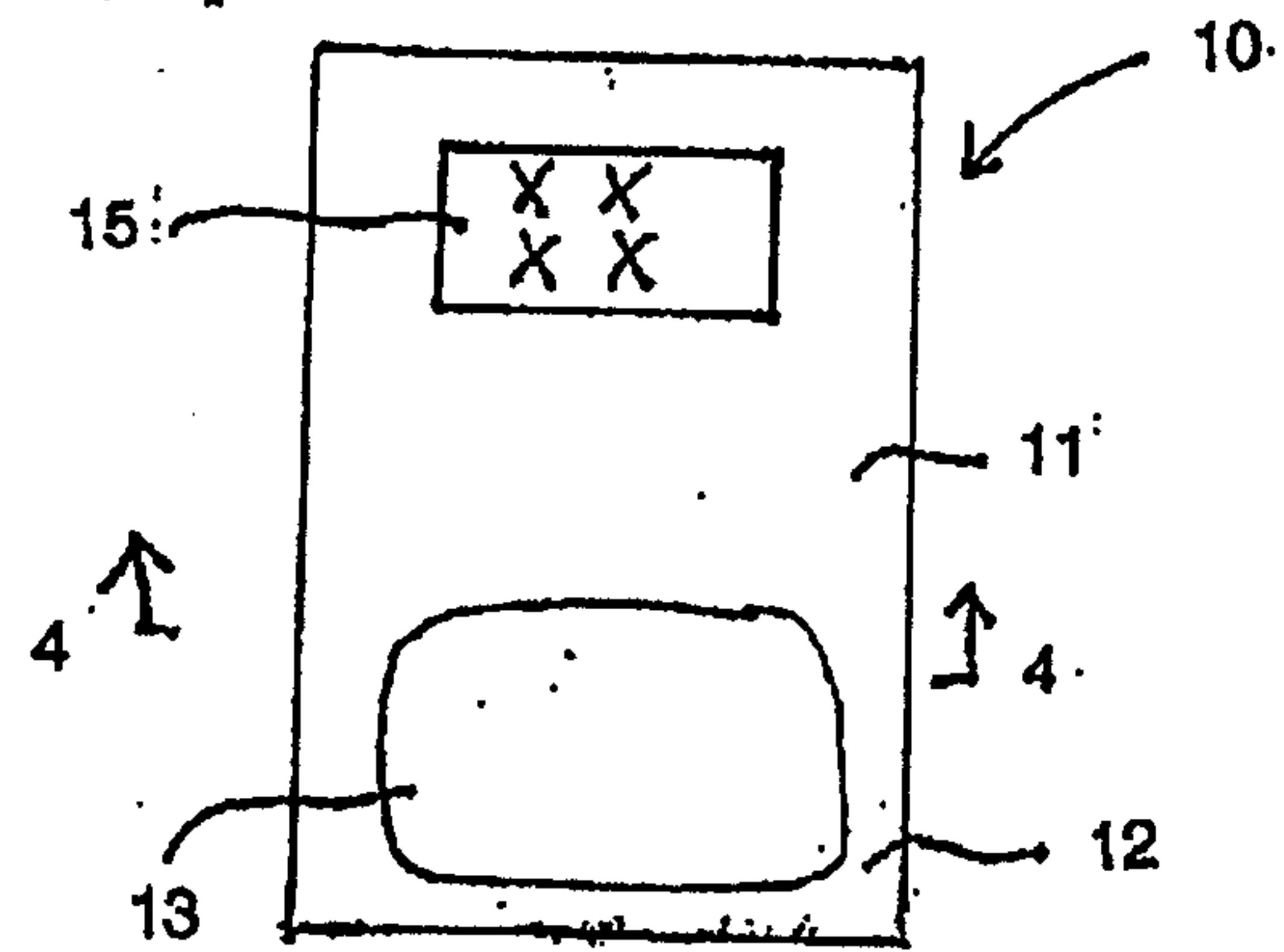


FIG. 2

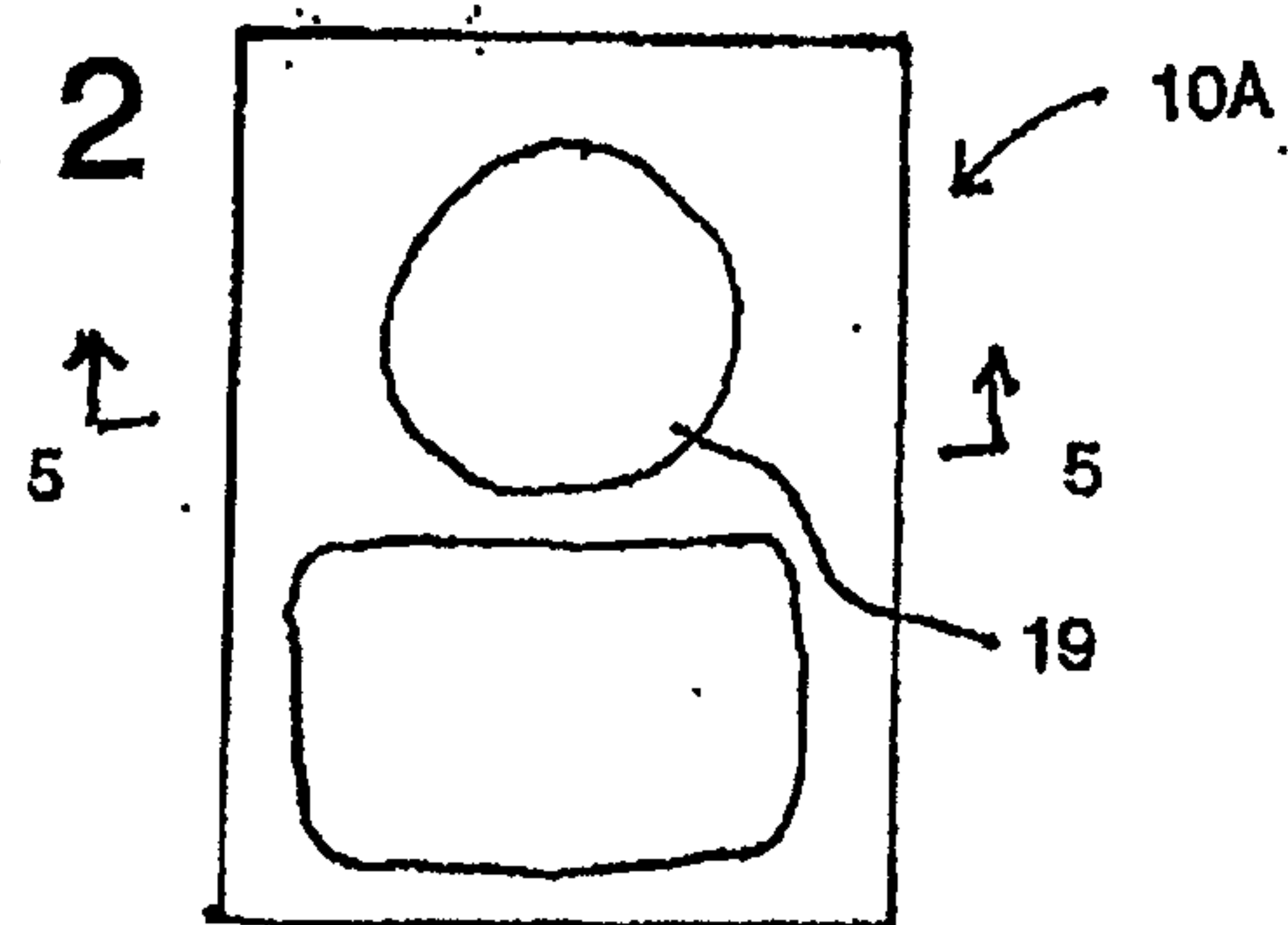
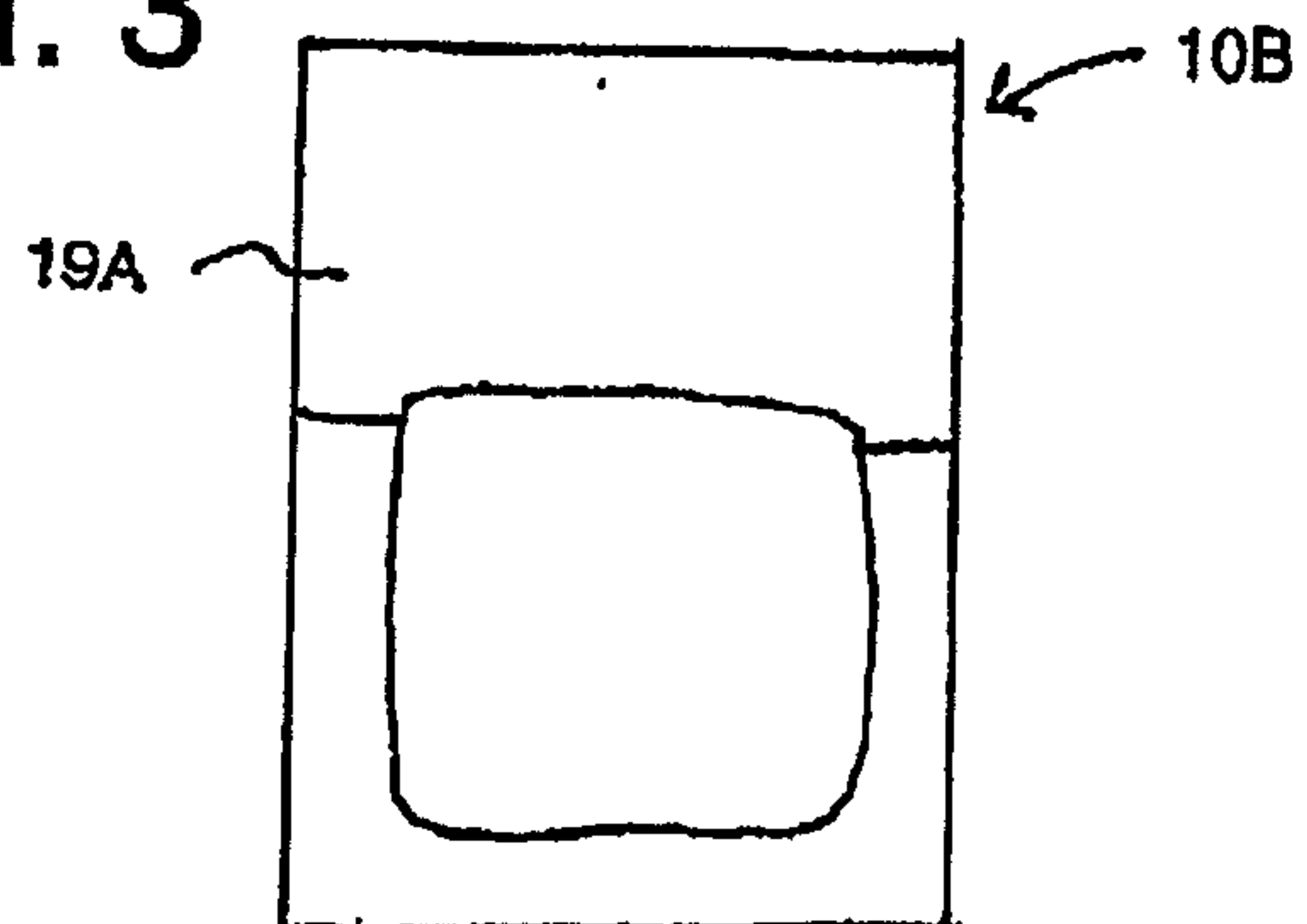


FIG. 3



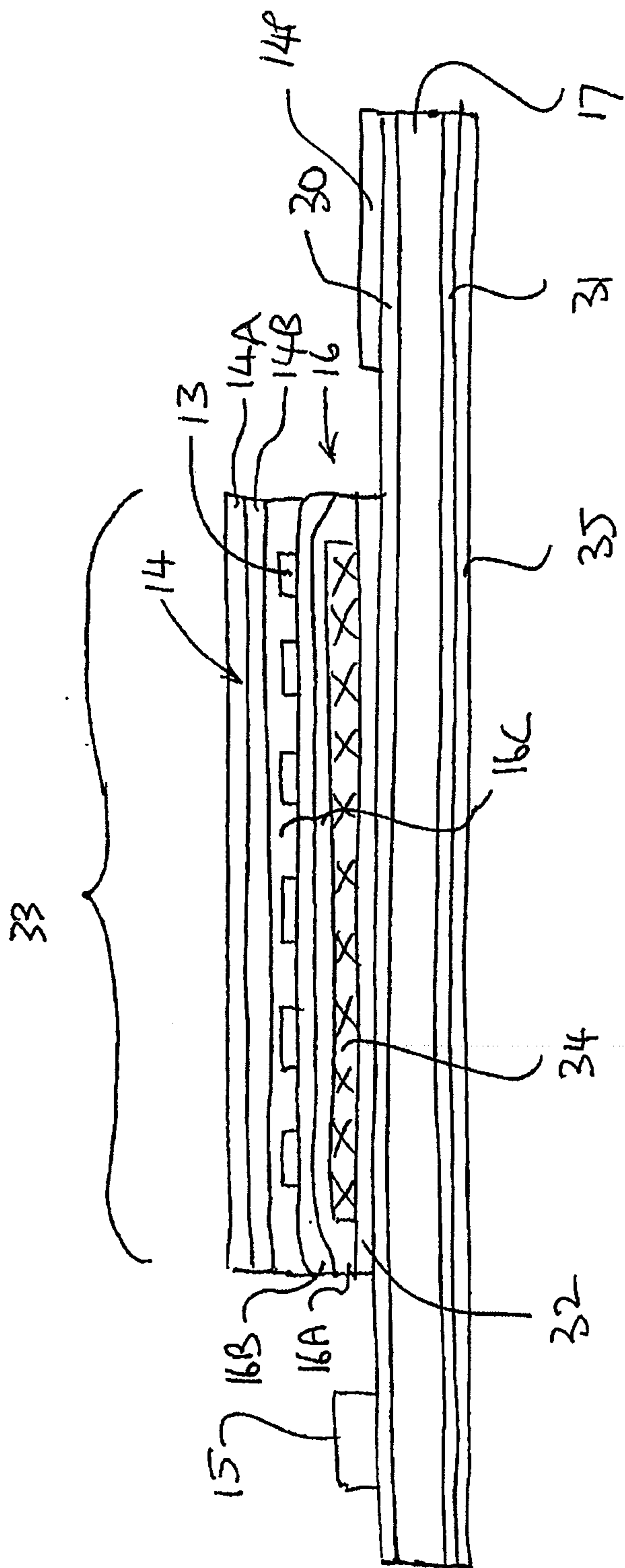
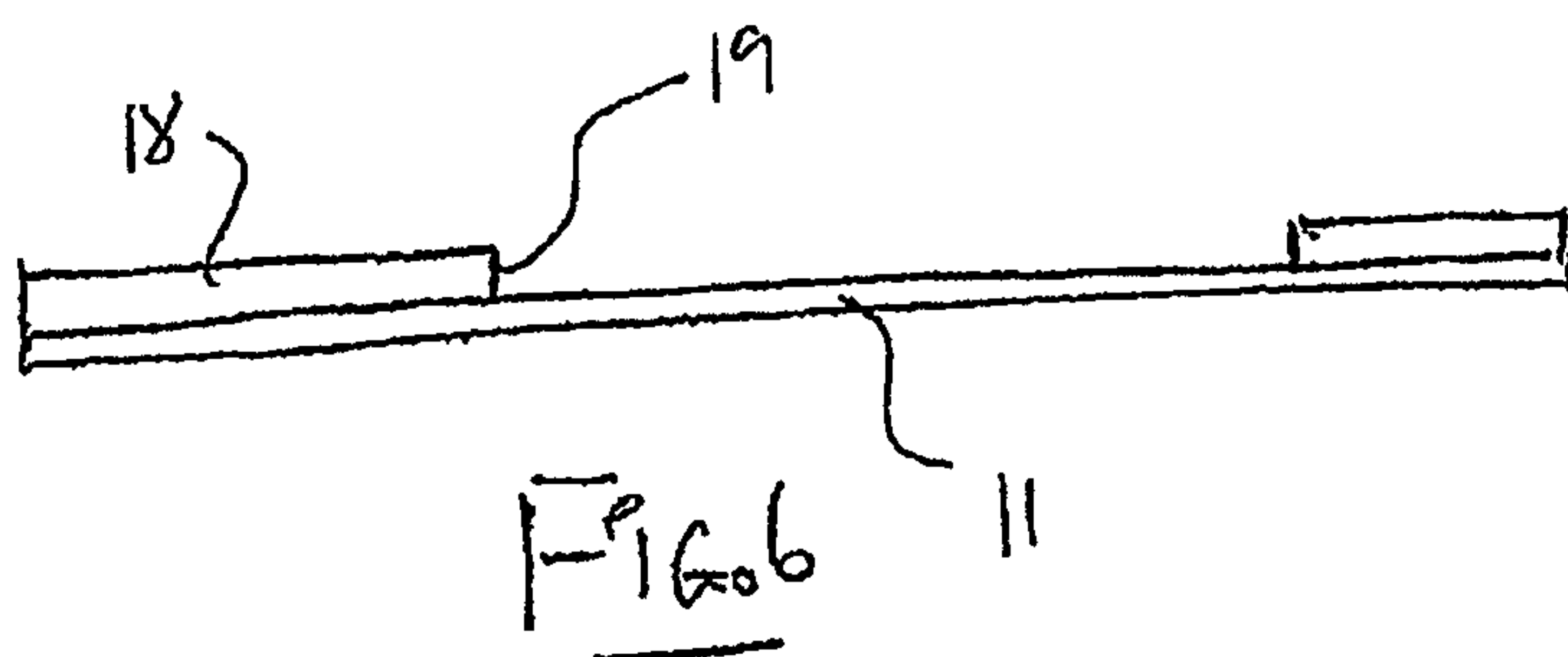
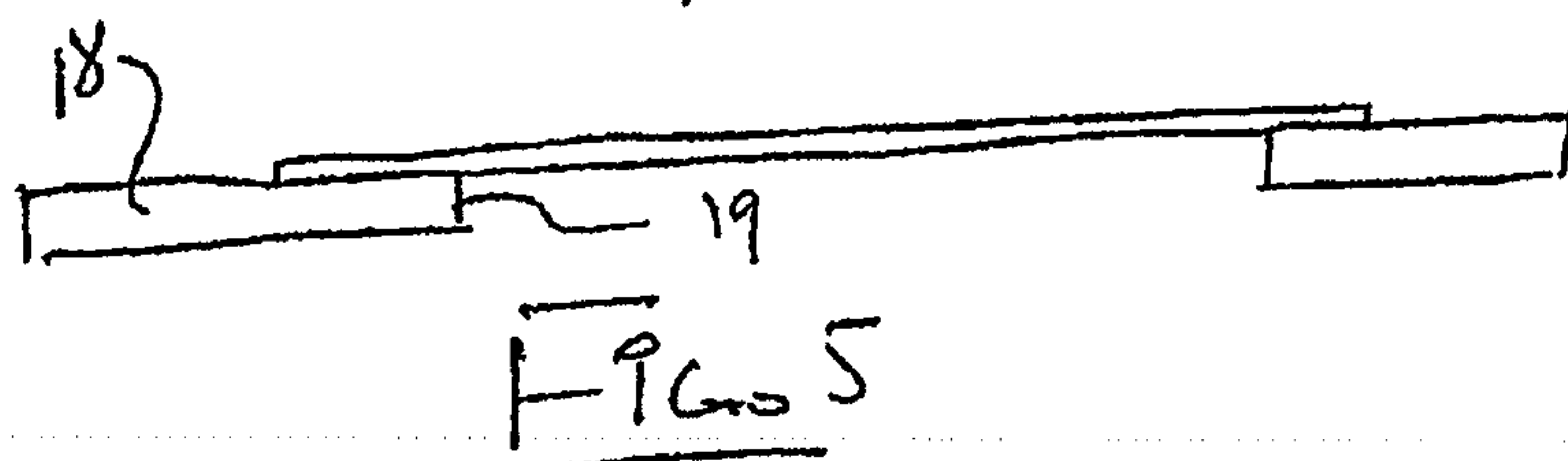
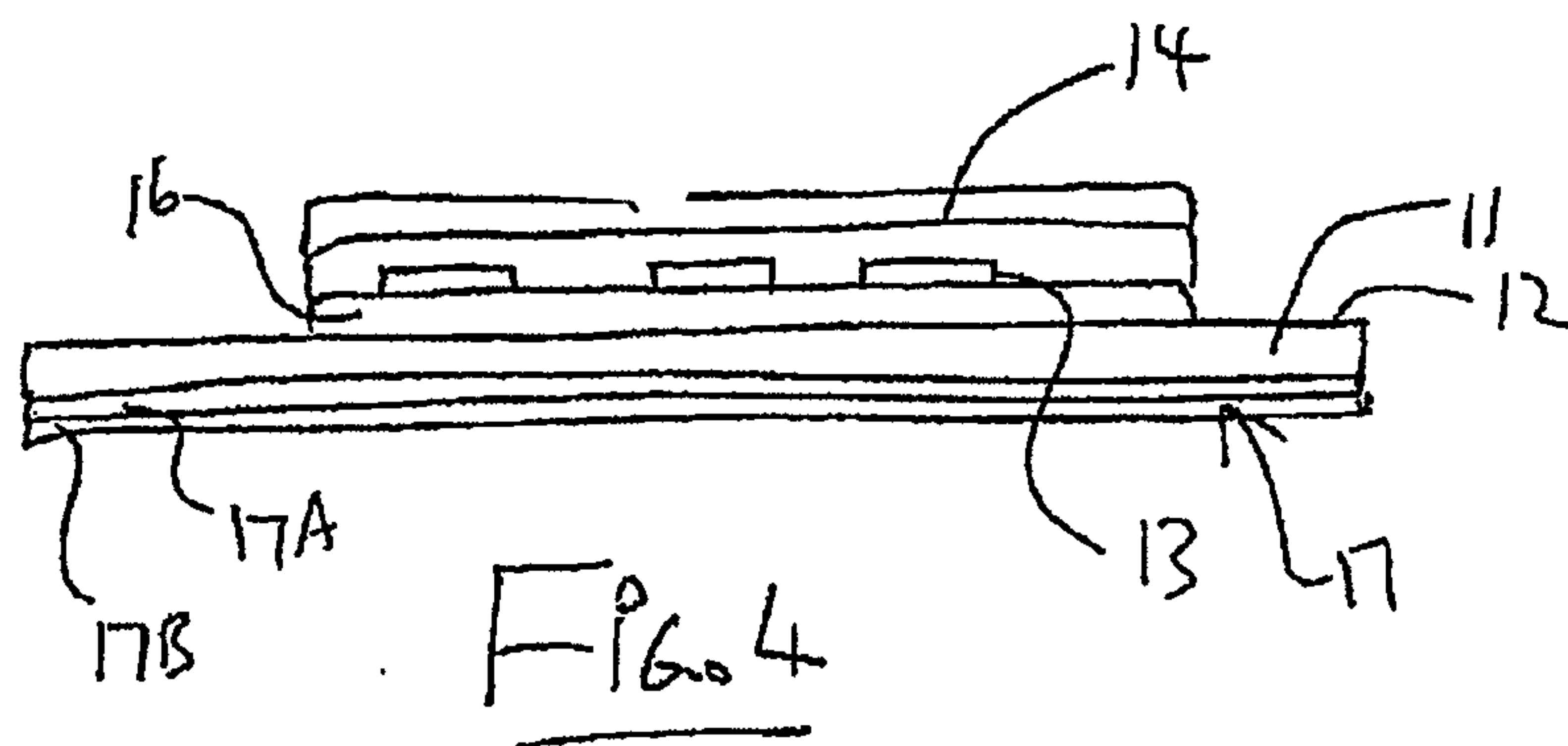
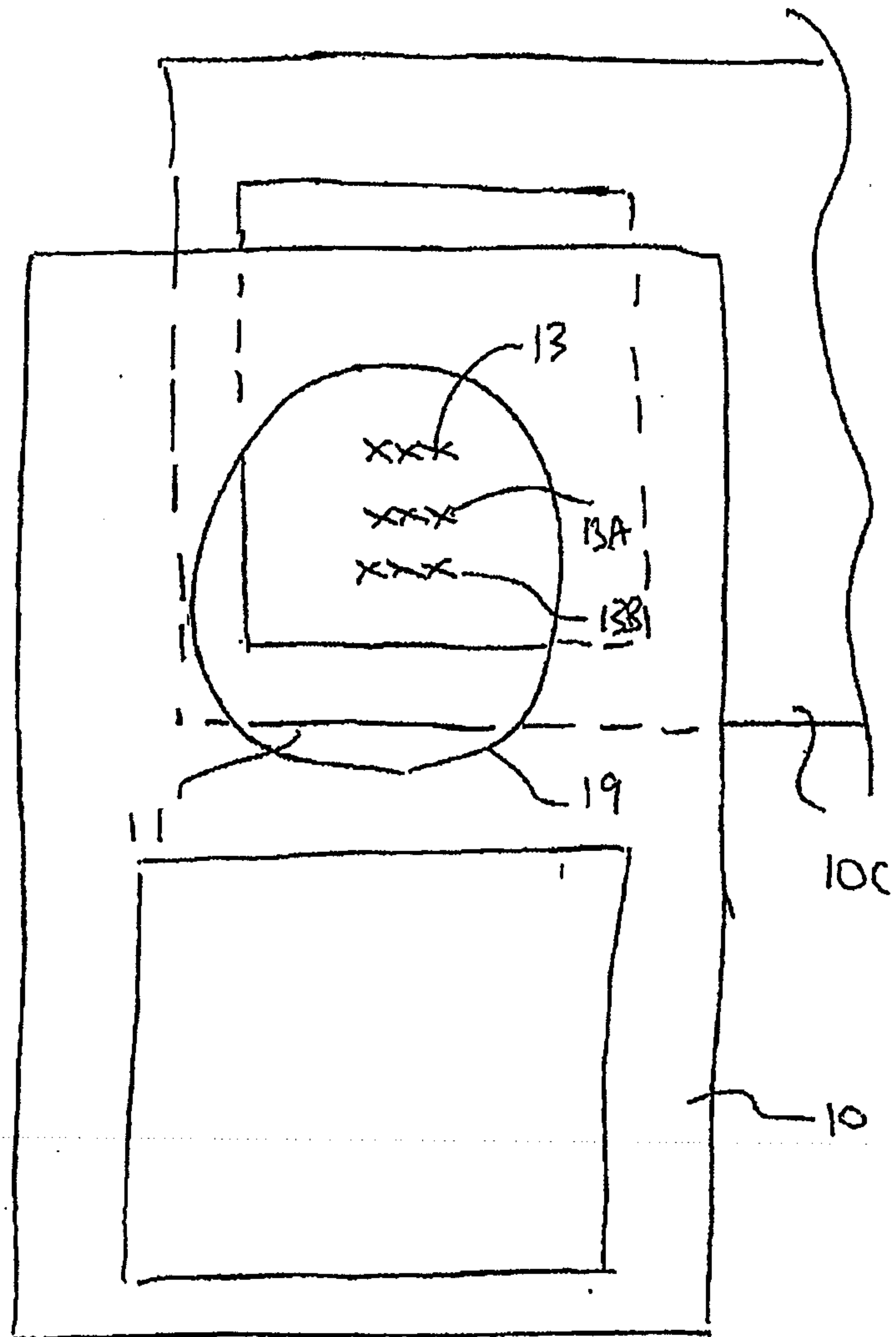


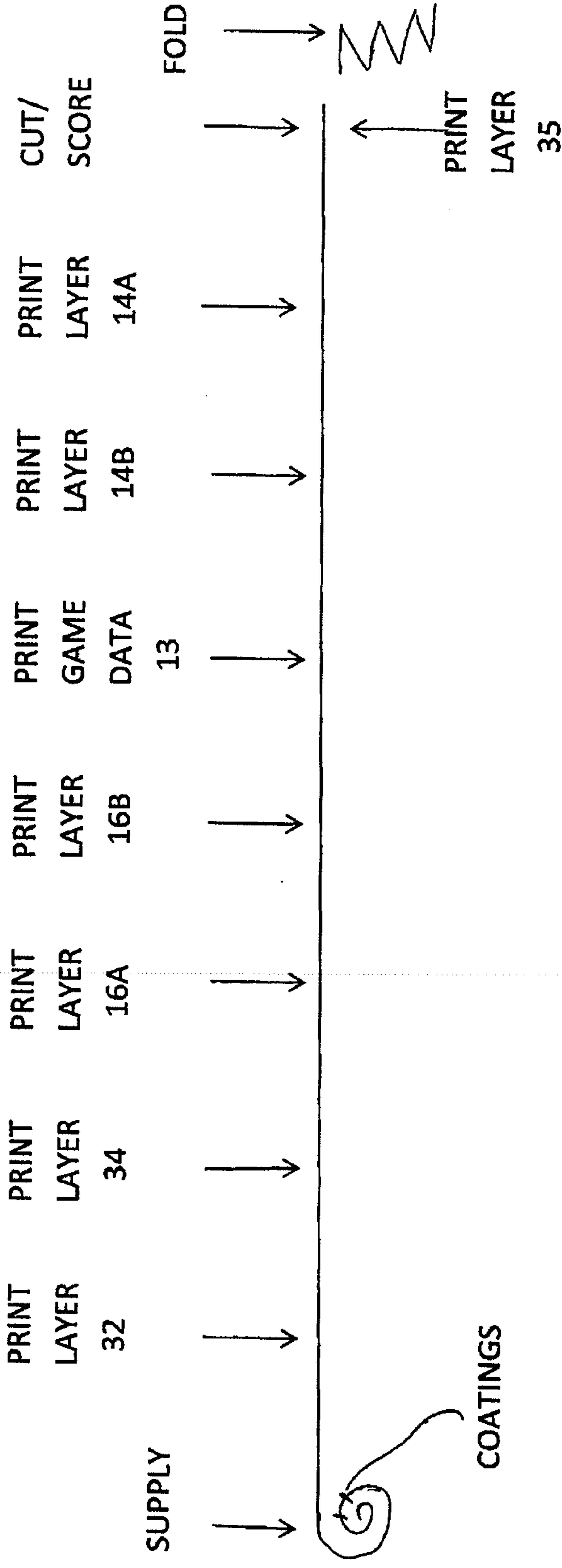
FIG. 4A

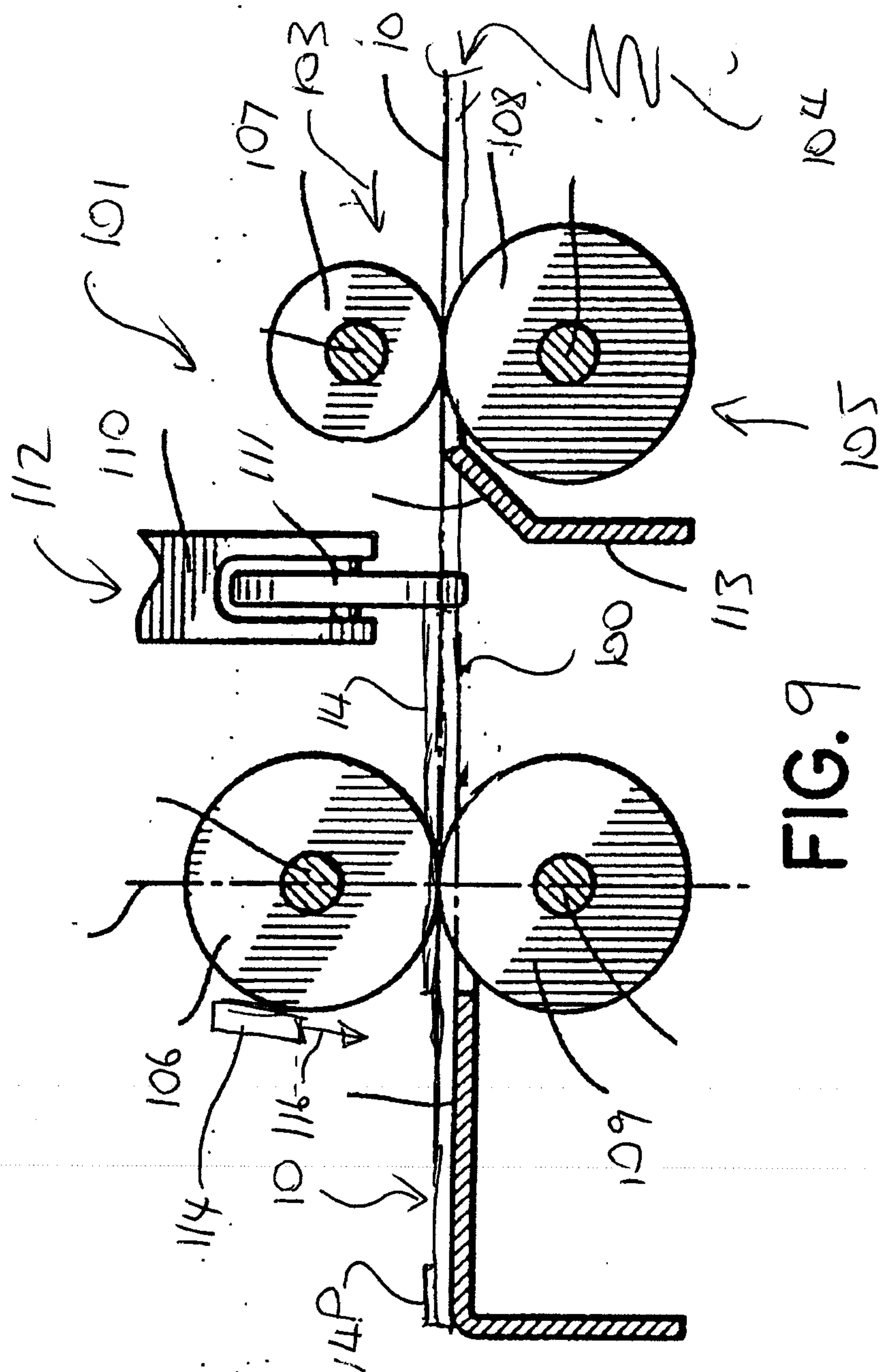


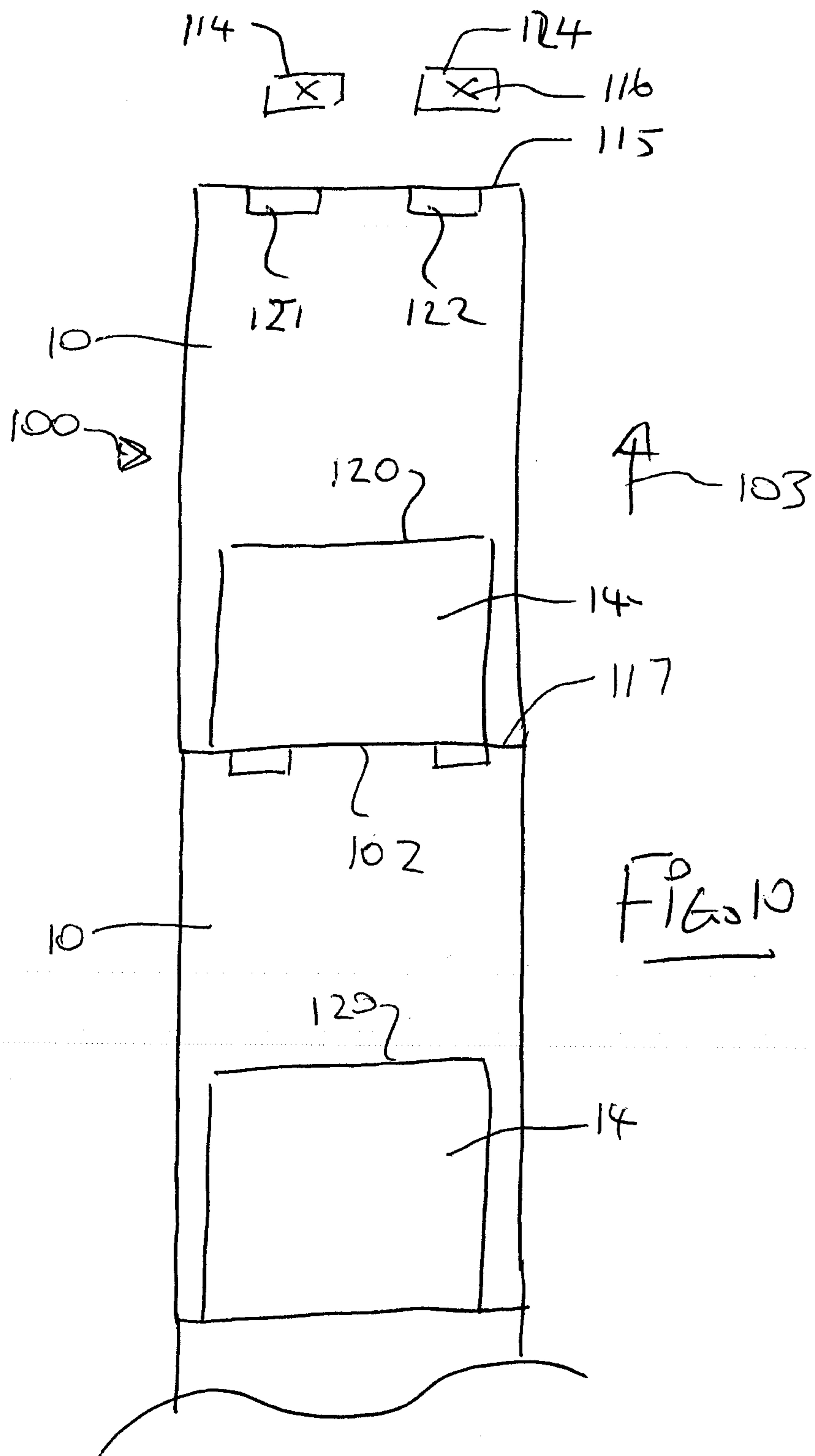


Figs 7

FIG.8







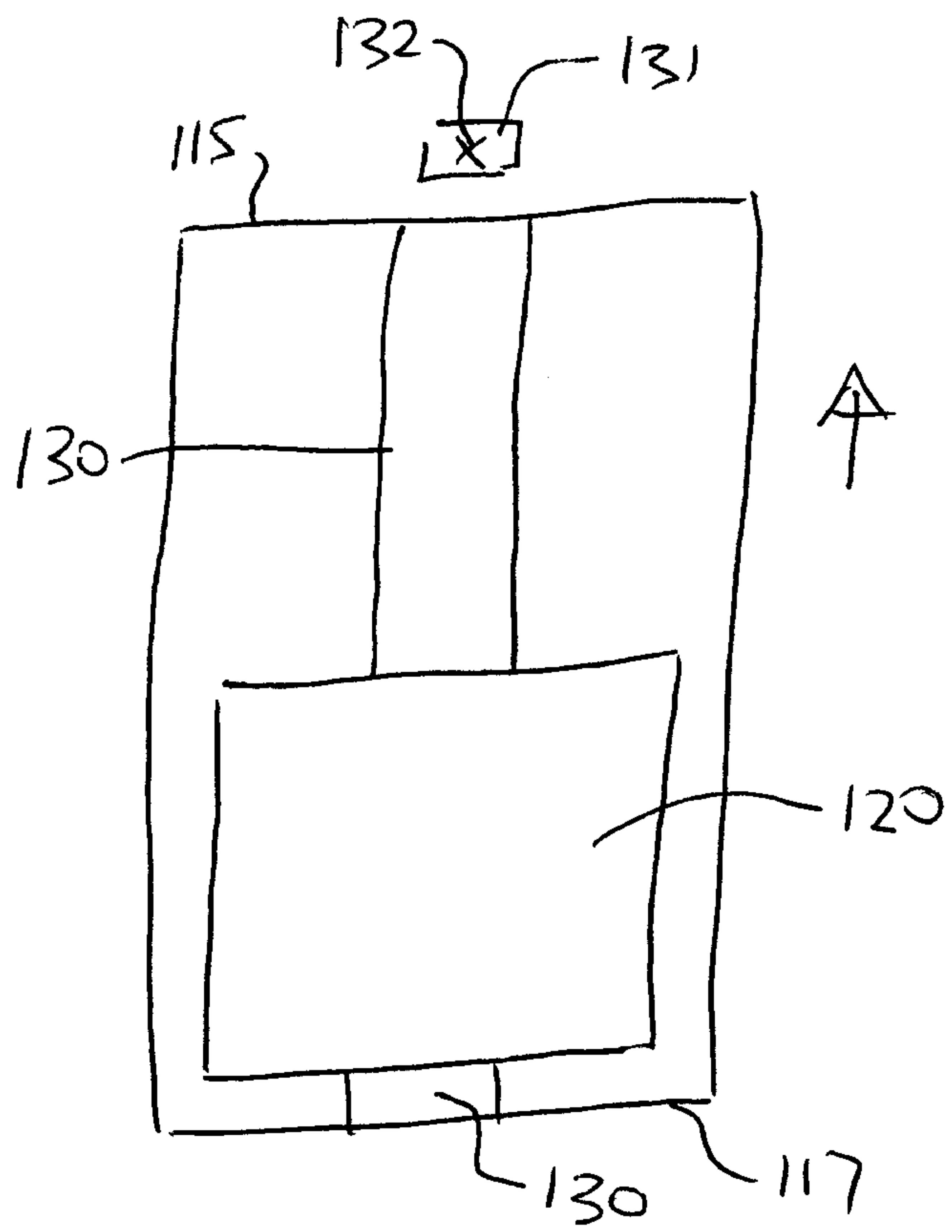


FIG. 11

