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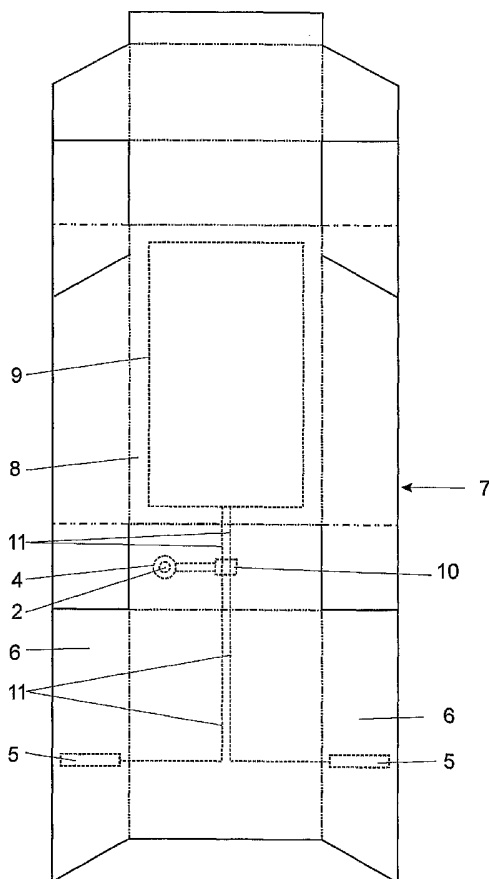
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(54) Title: ELECTRONIC CIGARETTE LIGHTER AND CIGARETTE PACK EMBODYING SAME



(57) Abstract: A cigarette pack (1) is provided that is manufactured from one or more blank components (7, 15, 12) of cut and sulcated sheet material folded to form a generally rectilinear shaped container defining a cigarette pack that embodies an electronic cigarette lighter. The cigarette lighter includes an electronic circuit and electronic components (2, 5, 10, 17, 19, 21) at least part of which, and preferably all of which, are applied to one or other blank component prior to folding thereof to form the container. The electronic lighter includes a battery (9, 22) formed on, or attached to, at least one wall, typically a major wall, of the cigarette pack. Preferably the battery is of a multi-layered configuration applied in a printing-like or laminating process. Switch means (5, 17) for operating the electronic lighter are preferably of the touch activated type and are suitably positioned to inhibit inadvertent operation. The invention also provides an electronic cigarette lighter having a special arrangement of heating elements (23, 27) forming a hot spot (2, 19).

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ELECTRONIC CIGARETTE LIGHTER AND CIGARETTE PACK EMBODYING SAME

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FIELD OF THE INVENTION

This invention relates to an electronic cigarette lighter and cigarette pack embodying same. More particularly, but not exclusively, the invention relates to an electronic cigarette lighter and cigarette pack embodying same that may be made as a disposable item.

It is to be understood that the term cigarette lighter and cigarette pack are not be interpreted as being limited to what are strictly known as cigarettes but is to be interpreted as including lighters and packs for similar items, in particular, cigars and cigarillos.

BACKGROUND TO THE INVENTION

It has long been recognized as being desirable on the part of a smoker that cigarettes contained in a pack can be lit without requiring a separate lighter or matches that may not be immediately available.

There have been various proposals that render the end of a cigarette to be lit sensitised, such as by way of a friction ignitable material. These methods would generally be unacceptable in modern times from a health point of view in consequence of the foreign and generally undesirable combustion products given off when such an ignitable material burns. United States patent 2,803,376 is but one example of such a proposal.

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There have also been proposed cigarette cases that have a built-in lighter. This expedient has the inconvenience of having to open a pack of cigarettes

and transfer them to the cigarette case. As a general rule, smokers do not wish to be troubled by such an activity and would prefer to remove a cigarette to be smoked directly from the package in which it was purchased. United States patent 4,342,902 is but one example of this type of proposal.

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Similar to these proposals are ones in which a lighter is configured to attach to a cigarette pack in the form in which it was purchased. These arrangements nevertheless require that the lighter be available so that it can be associated with the cigarette pack. It therefore does nothing to enable the
10 lighting of a cigarette simply following on the purchase of a cigarette pack. United States patents 4,579,222; 4,595,352 and 5,746,587 are examples of such a type of proposal.

Finally, there have been proposed lighters that are accommodated within a
15 chamber formed in the cigarette pack itself and that may either be removable and reusable, or disposable with the empty pack. Examples of these proposals are US patents 3,976,194 and 5,558,217. These proposals have, until the present time, been costly as they involve the production of a separate lighter for inclusion in the pack and they increase the size of the
20 cigarette pack.

OBJECT OF THE INVENTION

It is, accordingly, an object of this invention to provide a combination
25 cigarette pack and lighter that will obviate at least some of the disadvantages associated with the prior art proposals of such a combination or, alternatively, that will simply be more appealing to a smoker. It is another object of the invention to provide an electronic lighter that is particularly suitable for incorporation into such a cigarette pack in amongst other applications.

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SUMMARY OF THE INVENTION

In accordance with one aspect of this invention there is provided a cigarette pack manufactured from one or more blank components of cut and sulcated sheet material that is folded to form a generally rectilinear shaped container
5 defining a cigarette pack that embodies an electronic cigarette lighter, the cigarette pack being characterized in that the cigarette lighter includes an electronic circuit and electronic components at least part of which are applied to a blank component prior to folding thereof to form the container, and in that
10 the electronic lighter includes a battery formed on, or attached to, at least one wall of the cigarette pack.

Further features of the invention provide for the battery to be of a multi-layered configuration applied to at least one major wall of the cigarette pack
15 in a printing-like or laminating process; for the circuit of the electronic lighter to include touch activated switch means exposed either to the outer surface of the pack (when devoid of any outer wrapper) or, in the case of a flip top cigarette box, to the outer surface of the upwardly projecting inner skirt that is located inside the flip top lid in the closed condition; for the touch activated
20 switch means to include, in the case that same is exposed to the outside of the pack, two touch activated switch means exposed on opposite faces of the outer surface of the pack, preferably, the two side surfaces, with the exposed switch means preferably being located centrally up the height of the pack and wherein the two touch activated switch means are arranged in series or in an
25 "AND" configuration so that both need to be activated simultaneously for operation of the electronic lighter; for the electronic lighter to include a hot spot energized by the battery in response to activation of the switch means with the hot spot being adapted to ignite at least a portion of a combustible end of a cigarette; for the hot spot to include an array of resistance heated
30 wires arranged to enable the paper of a cigarette to be engaged therewith, inter alia; and for the hot spot to be located either on the outer surface of the pack in which case it is preferably on the bottom end surface thereof, or

alternatively, in the case of a flip top cigarette box, on the upwardly projecting inner skirt so as to be covered in the closed condition of the pack.

5 Preferably, the entire circuit of the electronic lighter is applied to one or other blank component of the cigarette pack by well known electronic production processes that are very much akin to printing processes and whereby the entire circuit can be applied in a stepwise, layered manner to the blank component prior to its being folded to form, or to be incorporated in, the cigarette pack.

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Typically the cigarette pack will be of the so-called flip top configuration in which case at least a major part of the electronic circuit can be embodied in the relatively small separate blank component that, in the assembled condition of the flip top cigarette box, forms the upwardly projecting inner skirt that fits into the lid in the closed condition. This arrangement has the particular advantage that the blank of the inner skirt component can be preformed on flexible electrically insulating material, in well known manner, and such electrically insulating material can be laminated with a card or the like to form the final inner skirt blank component. The advantage of this is that the inner skirt component is rather small relative to the major blank component that forms the majority of the sidewalls and top. Such prefabricated inner skirt components can thus be mass-produced at an electronics factory at a place remote from that where the cigarette packs are assembled.

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In accordance with a second aspect of the invention there is provided an electronic cigarette lighter that includes, as a hot spot for igniting a cigarette end, a plurality of fine heating elements arranged to preferentially contact the outer paper of a cigarette end to ignite same as required.

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Further features of this aspect of the invention provide for the plurality of heating elements to be arranged radially with respect to a circular shaped hot

spot; for there to be a series of such radially extending heating elements or, alternatively, for the heating elements to be arranged in a polygonal shape dimensioned so that the outer paper of a cigarette engages the heating elements at two positions in respect of each corner of the polygonal shape; 5 for the heating elements to be inclined progressively upwardly or outwardly with increasing distance from the centre of the hot spot so as to favour contact with the outer paper of a cigarette engaged therewith; and for the plurality of heating elements to be connected to electronic circuitry for energising same wherein the electronic circuitry is adapted to apply power 10 across the plurality of heating elements in a sequential manner in order to limit the rate at which power is drawn from a battery energising same.

In order that the invention may be more fully understood two proposed embodiments thereof with the electronic lighter embodied in a cigarette pack 15 will now be described with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:-

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Figure 1 is a schematic isometric view of a cigarette pack according to the invention taken from the front and top thereof;

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Figure 2 is a schematic isometric view of the cigarette pack taken from the rear and bottom thereof;

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Figure 3 is a plan view of a cut and sulcated blank to which has been applied the electronic circuit and battery of the electronic lighter according to the invention;

- Figure 4 is a view similar to Figure 1 of a second embodiment of the invention and showing the flip top lid in an open condition from one side of the pack;
- 5 Figure 5 is a view of the embodiment illustrated in Figure 4 from the opposite side of the pack;
- Figure 6 is a view similar to Figure 3 but showing the blank with an inner skirt defining component attached thereto that carries the circuit in a prefabricated form;
- 10 Figure 7 is a view of the skirt defining component illustrated in Figure 6 from the opposite side thereof;
- Figure 8 is a schematic plan view of one form of hot spot of an electronic lighter according to the invention;
- 15 Figure 9 is an elevation of the hot spot shown in Figure 8; and,
- Figure 10 is a view similar to figure 8 but showing an alternative arrangement of heating element wires.
- 20

DETAILED DESCRIPTION WITH REFERENCE TO THE DRAWINGS

- 25 In the embodiment of the invention illustrated in Figures 1 to 3 of the drawings, a substantially conventional flip top type of cigarette pack, generally indicated by numeral (1), is provided with an electronic cigarette lighter according to the invention.
- 30 From the broader perspective, the electronic cigarette lighter has an active hot spot (2) exposed to the outer surface thereof and, in this embodiment of the invention, located on the bottom (3) of the pack. The hot spot is carried

on a suitable heat insulating base (4) carried by the bottom (3) of the pack itself. The hot spot is configured and dimensioned so that it is small enough not to consume excessive electrical energy but is adequate to comfortably ignite at least part of an end of a cigarette to effectively light same. It is particularly envisaged that the technology on which the hot spot will operate will preferably be as is described below in more detail with reference Figures 8, and 9 or 10.

Switch means are provided for activating the hot spot as and when required. In this embodiment of the invention, the switching means comprises a pair of oppositely located touch activated switch means (5) that in this embodiment of the invention are located midway up the height of each of the two side walls (6) of the pack. The location of the switch means midway up the height of each of the two side walls means that either end of the pack can be gripped between a finger and thumb, for example, without accidentally activating the cigarette lighter. Also, the two switch means need to be operated simultaneously by simultaneous touch contact, typically with a finger and thumb, in order to close the circuit that supplies the hot spot with electrical energy. Accidental activation of the hot spot is thus rendered substantially impossible, or at least completely unlikely. It is also to be noted that the shape of the switch means is preferably an elongate shape extending across the width of the side wall to facilitate ease of contact and thus ease of operation. It is also envisaged that the two switch means could be located at different heights up their sidewalls that correspond to an unnatural grip on the two sides of the pack to provide for the protection against both being inadvertently attached to the same time.

Any suitable touch type of technology can be employed such as that which provides contact in the area of touch through the skin of a finger or thumb in contact with the touch means to change the state of an electronic component such as a MOSFET in the electronic circuitry referred to below from a non-conducting condition to a conducting condition.

Referring now more particularly to Figure 3, the various components of the electronic cigarette lighter are applied to a blank (7) that is die-cut and sulcated so as to be foldable into the erected condition illustrated in Figures 1 and 2 in a substantially conventional manner.

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To the back panel (8) of the pack is applied, by a printing or layering process, a multi-layered battery (9) of substantially known type such as that made available by Power Paper Limited of Einat, Israel under their registered trademark "POWER PAPER". The capacity of the battery can be selected
10 according to the number of cigarettes to be lit by the lighter and also according to the remainder of the circuit and the power demands thereof.

The circuit of the electronic lighter also includes a control unit (10) that serves as a CPU and embodies the required electrical switching component that is
15 typically, as indicated above, a MOSFET. The control unit also preferably includes a timing device to limit power drain from the battery and typically limiting the "on time" of the power supply to the battery to say five to seven seconds or any other time period that may be suitable. In the instance that the hot spot is as described below with reference to Figures 8 and 9, or with
20 reference to Figure 10, the control unit also serves to apply current sequentially to the various heating elements.

The control unit is applied to the blank by a printing type of process of any suitable type and conductors, generally indicated by numeral (11), are
25 simultaneously formed during the composite printing process.

It will be understood that the electronic circuit and battery can be applied to either the inner or outer surfaces of the final pack, the final choice being determined by various constraints. In the event that the circuit and battery
30 are applied to the outer surface of the pack, they will have to be covered adequately by a protective and insulating layer. In the event that the circuit and battery are applied to the inner surface of the pack then arrangement

must be made for enabling the hot spot and the touch activated switch means to be located on the outer surface. There are various ways of achieving this.

5 Turning now to the embodiment of the invention illustrated in Figures 4 to 7 of the drawings, substantially the entire circuit of the electronic lighter is applied to a prefabricated flexible printed circuit sheet (12) that is laminated with a cardboard sheet (13). The laminated sheet is shaped to define the upwardly projecting inner skirt (14) that is typically made as a separate blank
10 component from the main blank component (15) wherein the two ends (16) of the laminated sheet are to be attached to the main blank component in the usual way.

The flexible printed circuit sheet has a single touch activated switch means
15 (17) that is in registration with an aperture (18) cut through the cardboard sheet (13) and a hot spot, generally indicated by numeral (19) also in registration with an aperture (20) die cut through the cardboard sheet. The switch means and hot spot are located on opposite sides of the upwardly projecting inner skirt.

20 The flexible printed circuit sheet also carries the control unit (21) and the entire circuit is energized by a similar battery (22) to that described above and carried by the rear wall of the main blank component. Only two suitable electrical connections need to be made between the conductors on the
25 flexible printed circuit sheet and the battery.

It will be understood, that in the case of this second embodiment of the invention, there is no need for there to be two touch activated switch means as the single one (17) is covered at all times that the cigarette packet is
30 closed and there is thus no potential danger of inadvertently activating the hot spot with the consequence either of the heating the battery or creating a

dangerous situation. Also, the lid covers the hot spot in order to protect the rather fine heating element wires in the closed condition.

Turning now to the electronic hot spot provided by the invention, and with particular reference to Figures 8 and 9 of the drawings, the hot spot in this instance, comprises a series, in this case six, radially extending fine heating element wires (23) connected at their inner ends to a common terminal (24) and at their outer ends (25), individually to the control unit. As shown in Figure 9, the heating element wires are inclined away from an electrically insulating support base (26) with increasing distance from the centre of the hot spot so that initial contact with the outer paper of a cigarette end is favoured. The control unit is configured to energize the heating elements to a red hot ignition temperature sequentially so as to limit current demand on the battery.

The electronic lighter described above, when energized, thus causes the heating elements to be heated sequentially in rapid succession and the arrangement of the heating elements is such that they will tend to cut into the end edge of the paper of a cigarette and thereby greatly facilitate ignition thereof.

As an alternative arrangement of heating element, and as illustrated in Figure 10, the heating element wires (27) is may be arranged to a polygonal configuration, in particular triangular, and more particularly, square, as illustrated. This arrangement of heating element wires is dimensioned so that the paper of cigarettes will contact the wires towards the corners of the polygonal shape so that the paper is cut/ignited twice towards each corner.

It will be understood that numerous variations may be made to the embodiments of the invention described above without departing from the scope hereof. In particular, the technology employed in respect of each of

the various components can be varied widely and, indeed, it is envisaged that new technology will supersede existing technology from time to time.

The invention therefore provides an extremely useful, self-contained cigarette
5 pack and lighter assembly that it is envisaged will generally be disposable but
that may, as required, be reusable and indeed, the battery could be
rechargeable.

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CLAIMS:

1. A cigarette pack (1) manufactured from one or more blank components (7, 15, 12) of cut and sulcated sheet material that is folded to form a generally rectilinear shaped container defining a cigarette pack that embodies an electronic cigarette lighter, the cigarette pack being characterized in that the cigarette lighter includes an electronic circuit and electronic components (2, 5, 10, 17, 19, 21) at least part of which are applied to a blank component prior to folding thereof to form the container, and in that the electronic lighter includes a battery (9, 22) formed on, or attached to, at least one wall of the cigarette pack.
2. A cigarette pack as claimed in claim 1 in which the battery (9, 22) is of a multi-layered configuration applied to at least one major wall (8) of the cigarette pack in a printing-like or laminating process.
3. A cigarette pack as claimed in either one of claims 1 or 2 in which the circuit of the electronic lighter includes touch activated switch means (5, 17) exposed either to the outer surface of the pack (1) (when devoid of any outer wrapper) or, in the case of a flip top cigarette box, to the outer surface of the upwardly projecting inner skirt (14) that is located inside the flip top lid in the closed condition.
4. A cigarette pack as claimed in claim 3 in which the touch activated switch means include, in the case that same is exposed to the outside of the pack, two touch activated switch means (5) exposed on two different faces of the outer surface (6) of the pack and wherein the two touch activated switch means are arranged in series or in an "AND" configuration so that both need to be activated simultaneously for operation of the electronic lighter.

5. A cigarette pack as claimed in any one of the preceding claims in which the electronic lighter includes a hot spot (2, 19) energized by the battery in response to activation of the switch means with the hot spot being adapted to ignite at least a portion of a combustible end of a cigarette.
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6. A cigarette pack as claimed in claim 5 in which the hot spot includes an array of resistance heated wires (23, 27) arranged to enable the paper of a cigarette to be engaged therewith, inter alia.
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7. A cigarette pack as claimed in either one of claims 5 or 6 in which the hot spot is located either on the outer surface of the pack or alternatively, in the case of a flip top cigarette box, on the upwardly projecting inner skirt so as to be covered in the closed condition of the pack.
- 15
8. A cigarette pack as claimed in any one of the preceding claims in which the entire electronic circuit of the electronic lighter is applied to one or other blank component of the cigarette pack by electronic production processes very much akin to printing processes and whereby the entire circuit is applied in a stepwise, layered manner to the blank component
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- prior to its being folded to form, or to be incorporated in, the cigarette pack.
9. A cigarette pack as claimed in any one of the preceding claims in which
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- the cigarette pack is of the so-called flip top configuration and at least a major part of the electronic circuit is embodied in the relatively small separate blank component (12) that, in the assembled condition of the flip top cigarette box, forms the upwardly projecting inner skirt (14) that fits into the lid in the closed condition.

10. An electronic cigarette lighter that includes, as a hot spot for igniting a cigarette end, a plurality of fine heating elements (23, 27) arranged to preferentially contact the outer paper of a cigarette end to ignite same.
- 5 11. An electronic cigarette lighter as claimed in claim 10 in which the plurality of heating elements (23) is arranged radially with respect to a circular shaped hot spot.
- 10 12. An electronic cigarette lighter as claimed in claim 10 in which the heating elements (27) are arranged in a polygonal shape dimensioned so that the outer paper of a cigarette engages the heating elements at two positions in respect of each corner of the polygonal shape.
- 15 13. An electronic cigarette lighter as claimed in any one of claims 10 to 12 in which the heating elements are inclined progressively upwardly or outwardly with increasing distance from the centre of the hot spot so as to favour contact with the outer paper of a cigarette engaged therewith.
- 20 14. An electronic cigarette lighter as claimed in any one of claims 10 to 12 in which the plurality of heating elements is connected to electronic circuitry for energising same wherein the electronic circuitry is adapted to apply power across the plurality of heating elements in a sequential manner in order to limit the rate at which power is drawn from a battery energising same.

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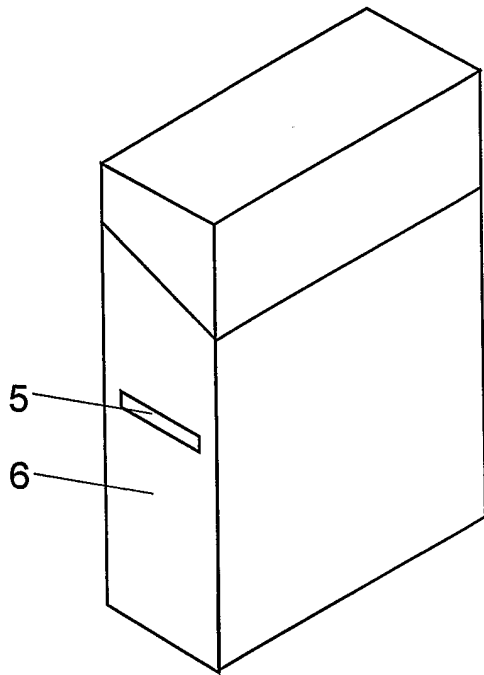


Figure 1

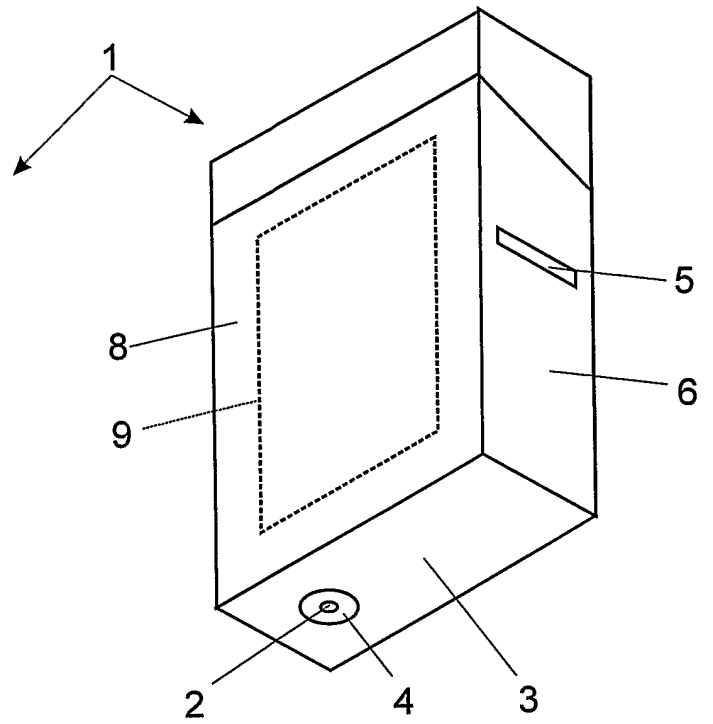


Figure 2

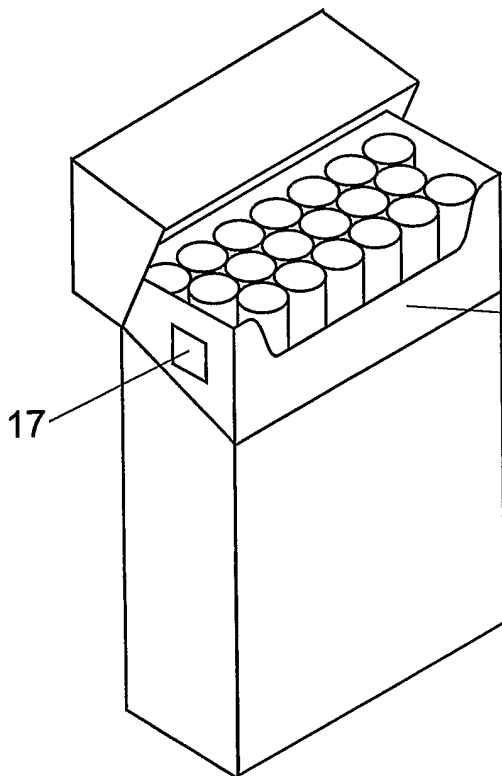


Figure 4

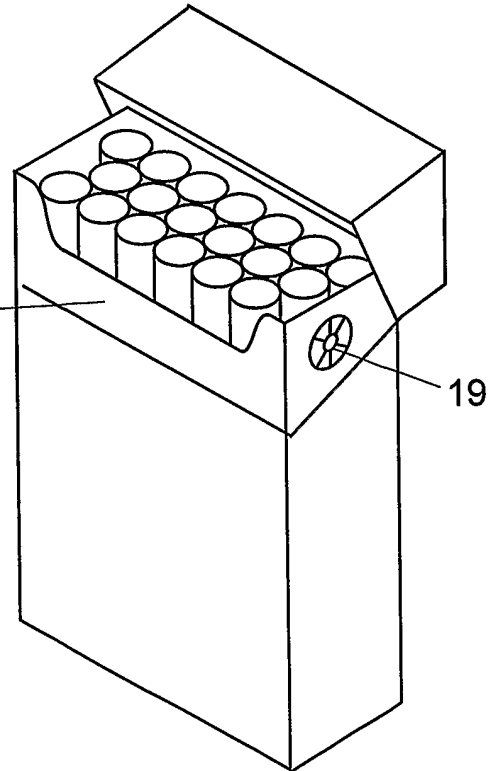


Figure 5

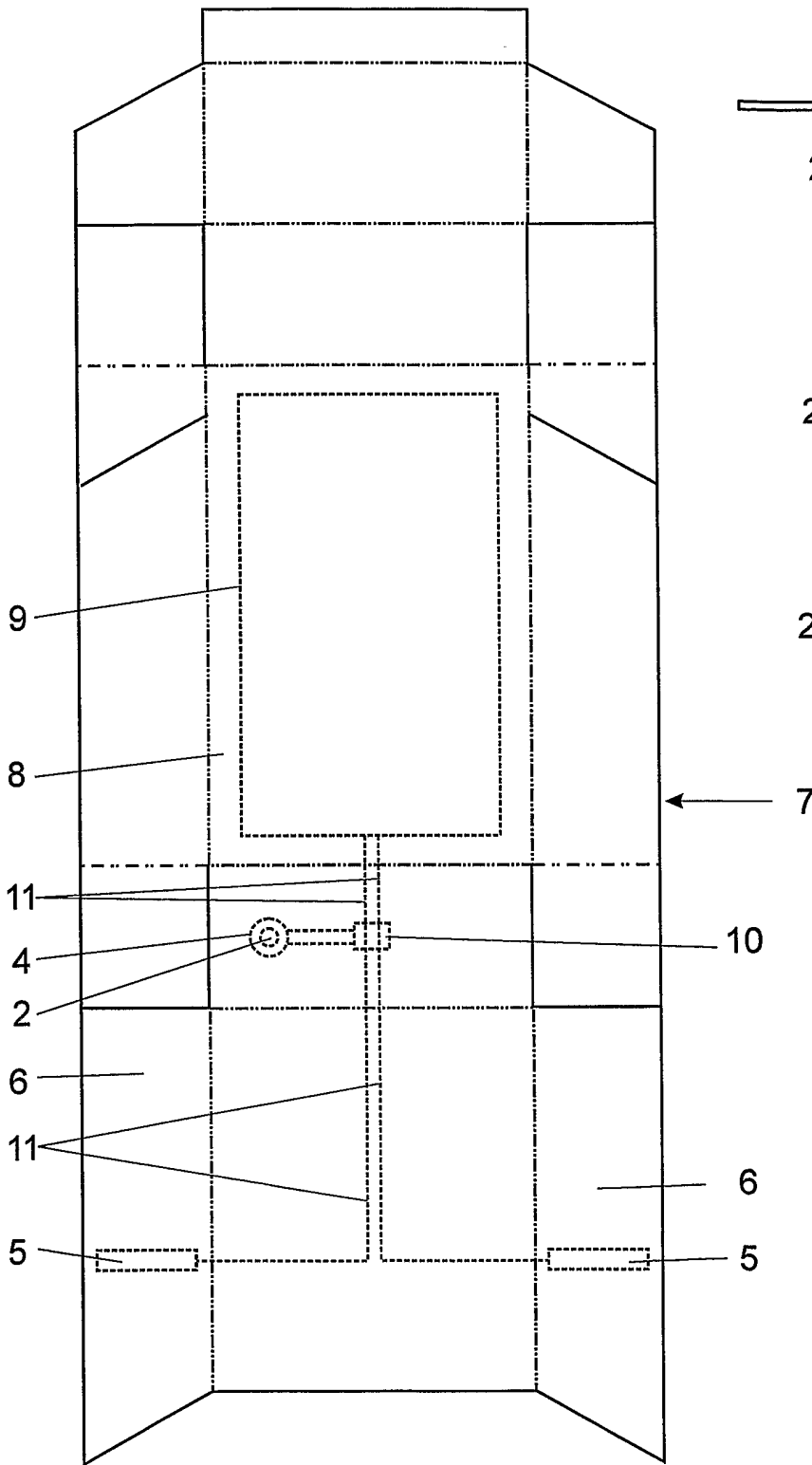


Figure 3

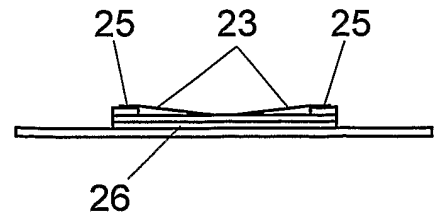


Figure 9

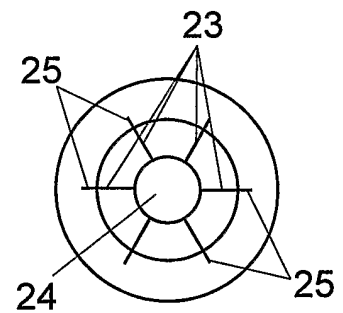


Figure 8

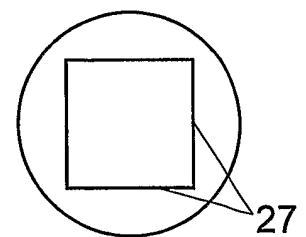


Figure 8

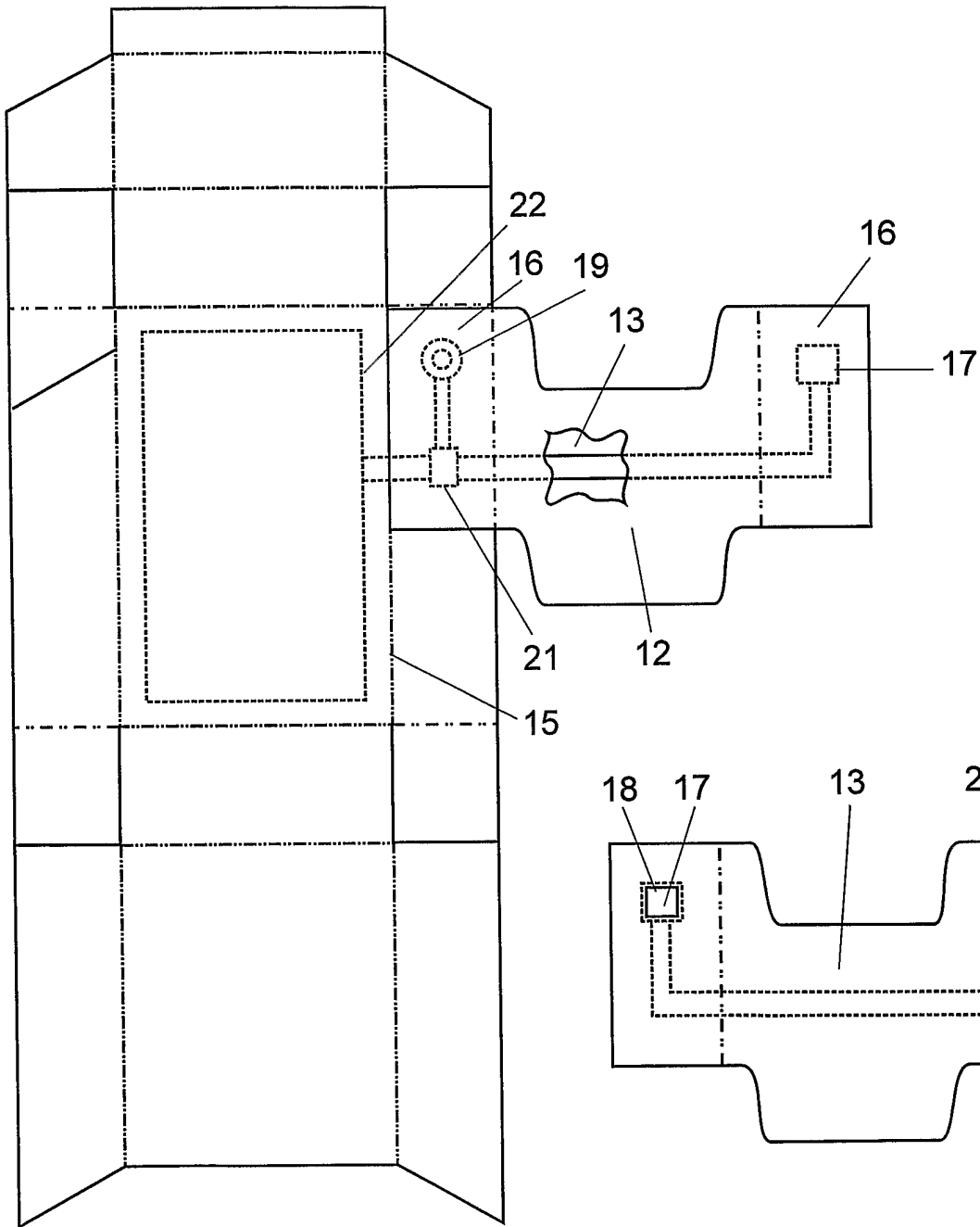


Figure 6

Figure 7