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(71) Applicant: **Shenzhen Bailingda Lighters & Electrical Products Co. Ltd.**
Shenzhen, Guangdong (CN)

(72) Inventors:
- **Chan, Tat**
  Fotan, New Territories (HK)
- **Chan, Leung**
  Fotan, New Territories (HK)

(74) Representative: **Howe, Steven**
Lloyd Wise
Commonwealth House,
1-19 New Oxford Street
London WC1A 1LW (GB)

(54) An adapter for a lighter and a lighter incorporating such an adapter

(57) There is disclosed an adapter for a lighter with a button and a body, the adapter including two casing halves engageable with each other for substantially enclosing the lighter while exposing at least part of a first end of the lighter at which a flame is adapted to be produced, and when the casing halves are engaged with each other and enclosing the lighter, the casing halves are movable relative to each other to move the button of the lighter relative to the body of the lighter to produce a flame. A lighter incorporating such an adapter is also disclosed.

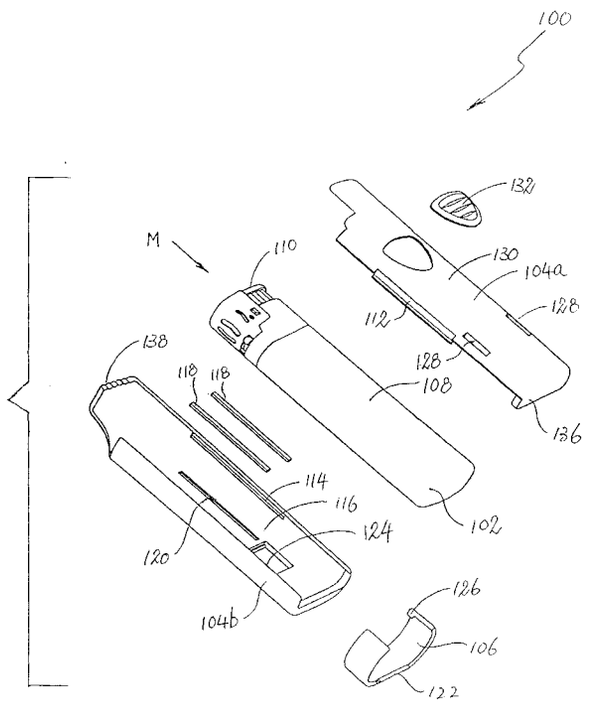

Fig. 1

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Description

[0001] This invention relates to an adapter for a lighter, which may convert a lighter into a child-resistant lighter, and a lighter incorporating such an adapter.

Background of the Invention

[0002] There are in existence a wide variety of lighters. In order to prevent or at least hinder children from operating such lighters, various safety mechanisms have been devised. Such safety mechanisms are usually structurally complicated, and thus costly to manufacture. On the other hand, there are still manufactured lighters which are not child-resistant. There is thus a demand for mechanisms suitable for converting such lighters into ones which are child-resistant.

[0003] It is thus an object of the present invention to provide an adapter for a lighter, and a lighter incorporating such an adapter, for mitigating the aforesaid shortcomings, and/or meeting the aforesaid demand.

[0004] It is a further object of the present invention to provide an adapter suitable for converting an otherwise non-child-resistant lighter to a child-resistant lighter, thus assisting in preventing undesired use of lighters by children.

Summary of the Invention

[0005] According to a first aspect of the present invention, there is provided an adapter for a lighter with an actuator and a body, said adapter including at least first and second body members engageable with each other for substantially enclosing said lighter while exposing at least part of a first end of said lighter at which a flame is adapted to be produced, wherein when said body members are engaged with each other and enclosing said lighter, said body members are movable relative to each other to move said actuator of said lighter relative to said body of said lighter to produce a flame.

[0006] According to a second aspect of the present invention, there is provided a lighter with an actuator, a body, and an adapter, wherein said adapter includes at least first and second body members engageable with each other and substantially enclosing said lighter while exposing at least part of a first end of said lighter at which a flame is adapted to be produced, wherein said body members are movable relative to each other to move said actuator relative to said body of said lighter to produce a flame.

Brief Description of the Drawings

[0007] Embodiments of the present invention will now be described, by way of examples only, with reference to the accompanying drawings, in which:

Fig. 1 is an exploded perspective view of a lighter incorporated with an adapter according to a first embodiment of the present invention;
Fig. 2 is a perspective view of the lighter shown in Fig. 1, in an un-ignited configuration;
Fig. 3 is a perspective view of the lighter shown in Fig. 2, in an ignited configuration;
Fig. 4 is a longitudinal sectional view of the lighter shown in Fig. 2;
Fig. 4A is an enlarged view of the encircled part in Fig. 4A;
Fig. 5 is a perspective view of a lighter incorporated with an adapter according to a second embodiment of the present invention;
Fig. 6 is an exploded perspective view of the lighter shown in Fig. 5;
Fig. 7 is a perspective view of the lighter shown in Fig. 5, partly assembled;
Fig. 8 is a further perspective view of the lighter shown in Fig. 5, partly assembled;
Fig. 9 is a perspective view of the lighter shown in Fig. 5, fully assembled;
Fig. 10 is a back view of the adapter shown in Fig. 5;
Fig. 11 is a side view of the adapter shown in Fig. 10;
Fig. 12 is an enlarged sectional view of the adapter taken along the line A-A in Fig. 10;
Fig. 13 is a sectional view of the adapter taken along the line B-B in Fig. 10;
Fig. 13A is an enlarged view of the encircled part in Fig. 13;
Fig. 14 is a sectional view of the adapter taken along the line C-C in Fig. 11;
Fig. 14A is an enlarged view of the encircled part in Fig. 14;
Fig. 15 is a back perspective view of a lighter incorporated with an adapter according to a third embodiment of the present invention, partly assembled;
Fig. 16 is a front perspective view of the lighter shown in Fig. 15, partly assembled;
Fig. 17 is a front perspective view of the lighter shown in Fig. 15, fully assembled;
Fig. 18 is a back perspective view of the lighter shown in Fig. 15, fully assembled;
Fig. 19 is a front view of the adapter shown in Fig. 15;
Fig. 20 is a sectional view of the adapter taken along the line D-D in Fig. 19;
Fig. 20A is an enlarged view of the encircled part in Fig. 20;
Fig. 21 is a sectional view of the adapter taken along the line E-E in Fig. 19; and
Fig. 21A is an enlarged view of the encircled part in Fig. 21.

Detailed Description of the Preferred Embodiments

[0008] A lighter assembly incorporated with an adapter according to a first embodiment of the present invention is shown in Fig. 1, and generally designated as 100.

The lighter assembly 100 includes a lighter 102, two plastics casing halves 104a, 104b, and a clip 106. The lighter 102 is a conventional lighter with a body 108 for containing fuel under pressure. A flame is produced when a button 110 is pressed to move in the direction indicated by the arrow M, which is parallel to the longitudinal axis of the lighter 102, relative to the body 108 of the lighter 102.

[0009] On the lateral edges of the casing half 104a are two narrow protruding rims 112 (of which only one is shown in Fig. 1), which co-operate with two troughs 114 (of which, again, only one is shown in Fig. 1) along two lateral edges of the casing half 104b, to allow the casing halves 104a, 104b to slide relative to each other when they are engaged with each other. In particular, the protruding rims 112 are received in the respective trough 114 for relative sliding movement. The rim 112 is shorter than the trough 114, at least by the distance required to be travelled by the button 110 for producing a flame. To enhance sliding movement of the body 108 of the lighter 100 relative to the inner surface 116 of the casing half 104b, two elongate smooth pieces 118 are fixed to respective correspondingly shaped and sized parallel recesses 120 (of which only one is shown in Fig. 1) in the inner surface 116.

[0010] As shown in Fig. 4, and more clearly in Fig. 4A, the clip 106 has two oppositely spaced ledges 122 (of which only one is shown in Fig. 1) received within a rectangular aperture 124 of the casing half 104b, for fixing the clip 106 to the casing half 104b. The clip 106 also has two hooks 126 (of which only one is shown in Fig. 1) which, when the casing halves 104a, 104b are engaged with each other, are received within a respective channel 128 on an outer surface 130 of the casing half 104a, thus effecting engagement between said casing halves 104a, 104b, while allowing relative lengthwise sliding movement between the casing halves 104a and 104b.

[0011] In order to enhance, during use, gripping of a user's finger of the outer surface 130 of the casing half 104a, a corrugated finger pad 132 is provided on the outer surface 130 of the casing half 104a, for frictional engagement with the user's finger, e.g. thumb.

[0012] The casing half 104a has a bent lower end 136 which, when the lighter assembly 100 is properly assembled, constitutes a stopper that acts on a lower end of the body 108 of the lighter 102. The casing half 104b also has a bent upper end 138 which, when the lighter assembly 100 is properly assembled, constitutes a stopper that acts on an upper surface of the button 110 of the lighter 102.

[0013] Turning now to Figs. 2 and 3, it can be seen that when the casing halves 104a, 104b and the lighter 102 are assembled to form the lighter assembly 100, most of the lighter 102 is enclosed by the casing halves 104a, 104b, except that an end 134 of the lighter 102 at which a flame is produced is exposed to the outside environment. When the casing half 104a is pushed upwardly relative to the casing half 104b, because of the stopping function of the bent lower end 136 of the casing half 104a and the bent upper end 138 of the casing half 104b, the bent lower end 136 and the bent upper end 138 will be moved towards each other, such that the button 110 of the lighter 102 will be pushed downwardly relative to the body 108 of the lighter 102, along a path parallel to the longitudinal axis of the body 108, to produce a flame, as shown in Fig. 3.

[0014] A lighter assembly incorporated with an adapter according to a second embodiment of the present invention is shown in Figs. 5 and 6, and generally designated as 200. The lighter assembly 200 includes a lighter 202, two casing halves 204a, 204b, and an engagement member in the form of a closed loop 206. The lighter 202 is a conventional lighter with a body 208 for containing fuel under pressure. A flame is produced when a button 210 is pressed to move downwardly relative to the body 208 of the lighter 202, and parallel to the longitudinal axis of the lighter 202.

[0015] As can be seen in Fig. 7, on an outer surface 210 of the casing half 204a are a number of short protrusions 212 for enhancing frictional engagement of a user's finger with the casing half 204a. Similarly, as can be seen in Figs. 8 and 9, an outer surface 214 of the casing half 204b is corrugated, again for enhancing frictional engagement of a user's finger with the casing half 204b. Figs. 7 to 9 also show the way in which the lighter assembly 200 is assembled.

[0016] The lighter 202 is firstly placed in the cavity of the casing half 204b, as shown in Fig. 7. The casing half 204a is then engaged with the casing half 204b, as shown in Fig. 8. The engagement loop 206 is then placed over the engaged casing halves 204a, 204b until the engagement loop 206 is engaged with the casing half 204b, as shown in Fig. 9, in a manner to be discussed below.

[0017] Figs. 10 to 14A show various views of the casing halves 204a, 204b and engagement loop 206 as engaged with one another, in the absence of the lighter 202, for clarity purpose. As can be seen in Fig. 12, when the engagement loop 206 is engaged with the casing halves 204a, 204b, a protrusion 218 of a lip portion 220 of the engagement loop 206 is received within a hole 222 of the casing half 204b. Figs. 13 and 13A show the dovetail engagement between the engagement loop 206 and the casing half 204b. Figs. 14 and 14A show the engagement between the casing halves 204a, 204b, which allow the casing halves 204a, 204b to exhibit relative sliding movement.

[0018] A lighter assembly incorporated with an adapter according to a third embodiment of the present invention is shown in Figs. 15 and 18, and generally designated as 300. The lighter assembly 300 includes a lighter 302, two casing halves 304a, 304b, and two engagement members, each in the form of a closed loop 306. The lighter 302 is a conventional lighter with a body 308 for containing fuel under pressure. A flame is produced

when a button 310 is pressed to move downwardly relative to the body 308 of the lighter 302, and parallel to the longitudinal axis of the lighter 302. As can be seen in Fig. 16, there are two pairs of holes 312 on the casing half 304b, each pair to be engaged with one of the loops 306, in a manner to be discussed below.

[0019] Figs. 19 to 21A show various views of the casing halves 304a, 304b and the loops 306 as engaged with one another, in the absence of the lighter 302, for clarity purpose. As can be seen more clearly in Figs. 20A and 21A, each of the loops 306 has two protrusions 316, each to be received within one of the hole 312 on the casing half 304b, for engaging the casing halves 304a, 304b.

[0020] It is found in practice that the movement of the hand and fingers required to effect relative movement between, respectively, the casing halves 104a and 104b, 204a and 204b, and 304a and 306b cannot be performed by small children, e.g. ones under the age of three. The lighter assemblies 100, 200 and 300 are thus effectively child-resistant lighters at least hindering unwanted operation by small children. The casing halves 104a and 104b, 204a and 204b, and 304a and 304b also respectively collectively act as adapters suitable for converting an otherwise non-child-resistant lighter into a child-resistant lighter.

[0021] It should be understood that the above only illustrates examples whereby the present invention may be carried out, and that various modifications and/or alterations may be made thereto without departing from the spirit of the invention.

[0022] It should also be understood that certain features of the invention, which are, for clarity, described in the context of separate embodiments, may be provided in combination in a single embodiment. Conversely, various features of the invention which are, for brevity, described in the context of a single embodiment, may also be provided separately or in any appropriate sub-combinations.

Claims

1. An adapter for a lighter with an actuator and a body, said adapter including at least first and second body members engageable with each other for substantially enclosing said lighter while exposing at least part of a first end of said lighter at which a flame is adapted to be produced, wherein when said body members are engaged with each other and enclosing said lighter, said body members are movable relative to each other to move said actuator of said lighter relative to said body of said lighter to produce a flame.

2. An adapter according to Claim 1 wherein when said body members are engaged with each other and enclosing said lighter, said body members are movable relative to each other lengthwise.

3. An adapter according to Claim 1 wherein when said body members are engaged with each other and enclosing said lighter, said body members are slidably movable relative to each other.

4. An adapter according to Claim 1 wherein said first body member includes a stopper for acting on said actuator of said lighter, and said second body member includes a stopper for acting on a second end of said lighter.

5. An adapter according to Claim 3 wherein said stoppers of said body members are movable towards each other for moving said actuator of said lighter to produce a flame.

6. An adapter according to Claim 1 wherein a first finger-engagement surface is provided on an outer surface of said first body member.

7. An adapter according to Claim 5 wherein a second finger-engagement surface is provided on an outer surface of said second body member.

8. An adapter according to Claim 1 wherein said first body member includes at least one engagement member for engaging said first and second body members.

9. An adapter according to Claim 7 wherein said first body member include a plurality of engagement members for engaging said first and second body members.

10. An adapter according to Claim 7 wherein said engagement member comprises a closed loop.

11. An adapter according to Claim 7 wherein at least a recess is provided in said second body member for receiving a protrusion of said engagement member for engaging said first and second body members.

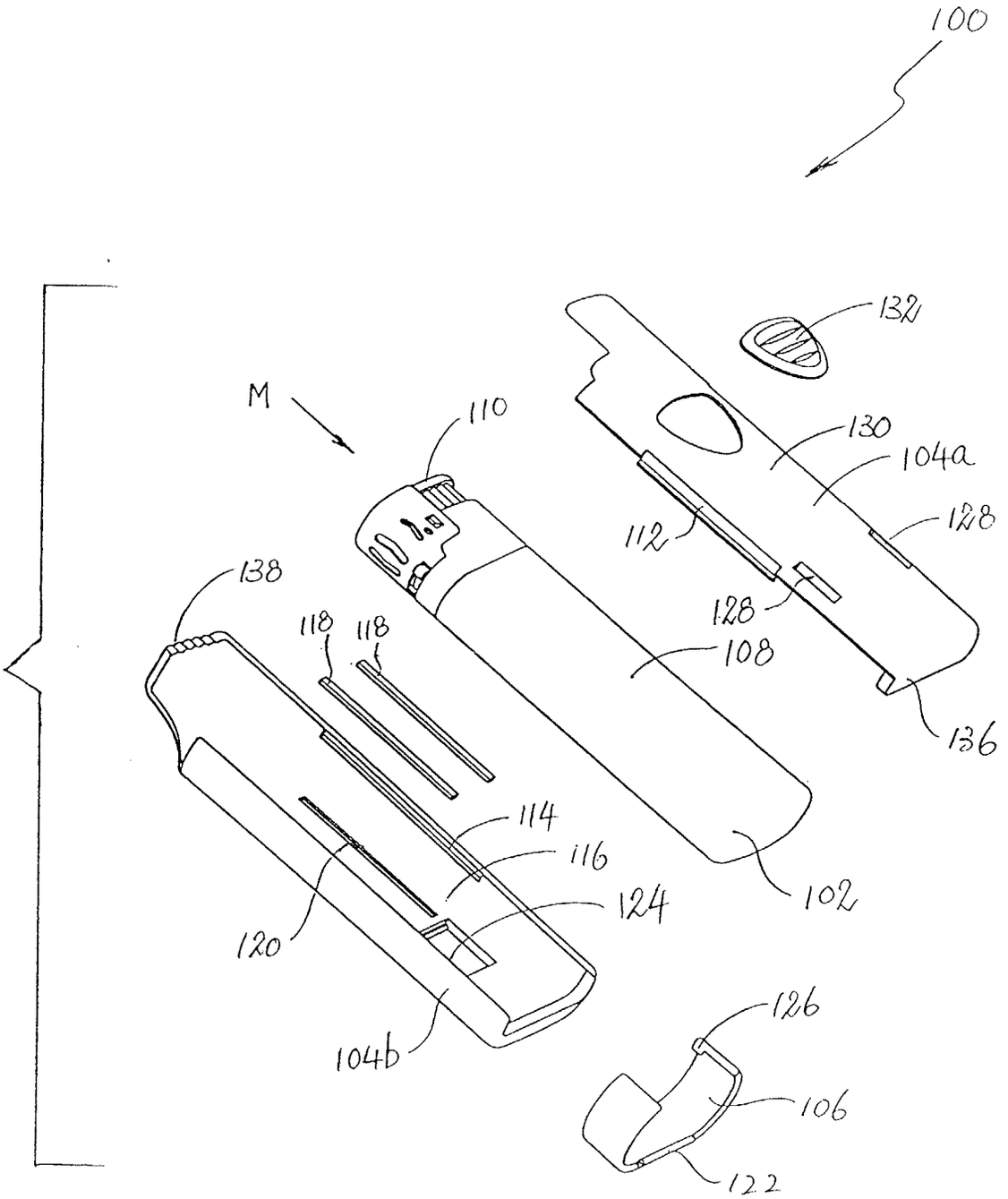
12. An adapter according to Claim 11 wherein said protrusion of said engagement member is movable relative to said recess.

13. An adapter according to Claim 12 wherein said protrusion of said engagement member is slidably movable relative to said recess.

14. An adapter according to Claim 11 wherein a plurality of recesses are provided in said second body member each for receiving a protrusion of said engagement member for engaging said first and second body members.

15. A lighter with an actuator, a body, and an adapter, wherein said adapter includes at least first and second body members engageable with each other and substantially enclosing said lighter while exposing at least part of a first end of said lighter at which a flame is adapted to be produced, wherein said body members are movable relative to each other to move said actuator relative to said body of said lighter to produce a flame.

16. A lighter according to Claim 15 wherein said actuator is movable relative to said body of said lighter along a path substantially parallel to a longitudinal axis of said body.


100
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122

Fig. 1

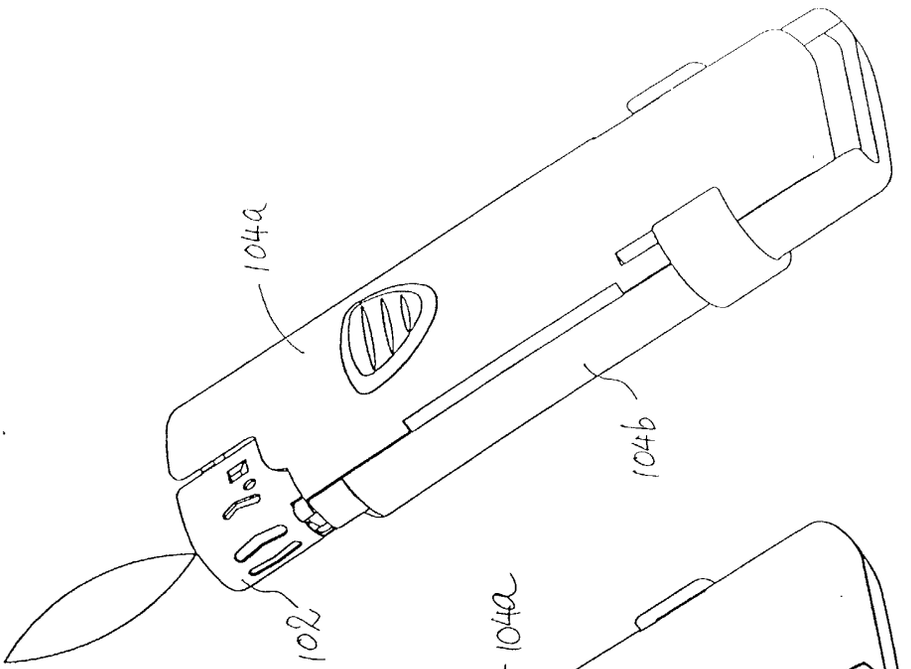

Fig. 3

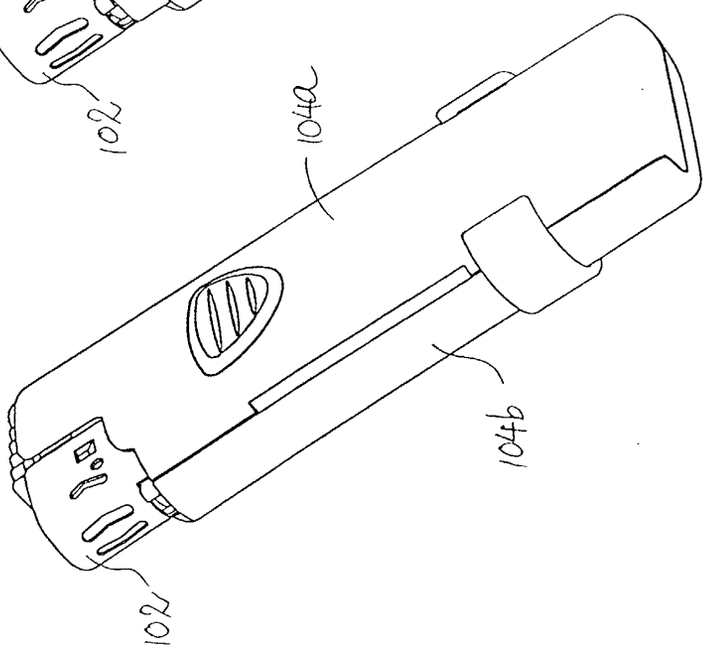

Fig. 2

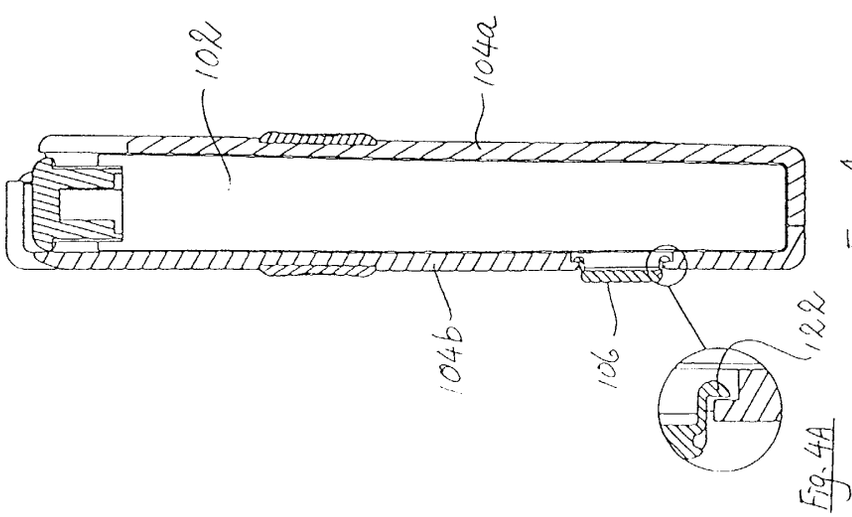

Fig. 4

Fig. 4A

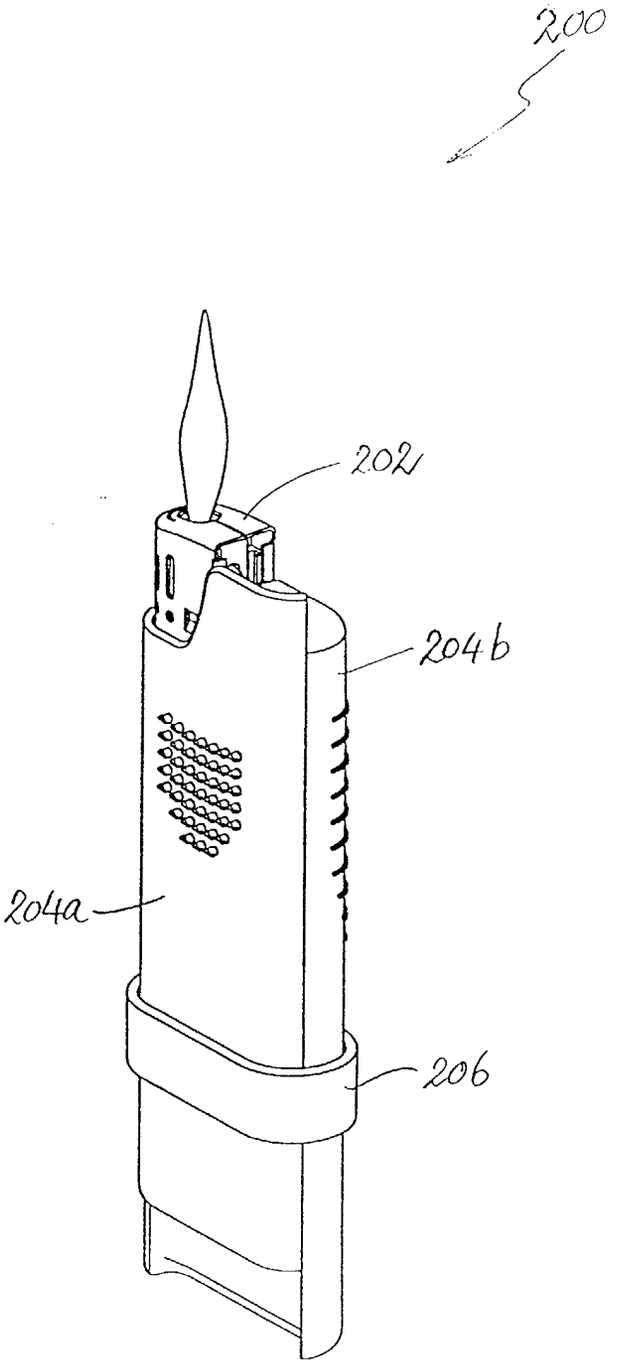

Fig. 5

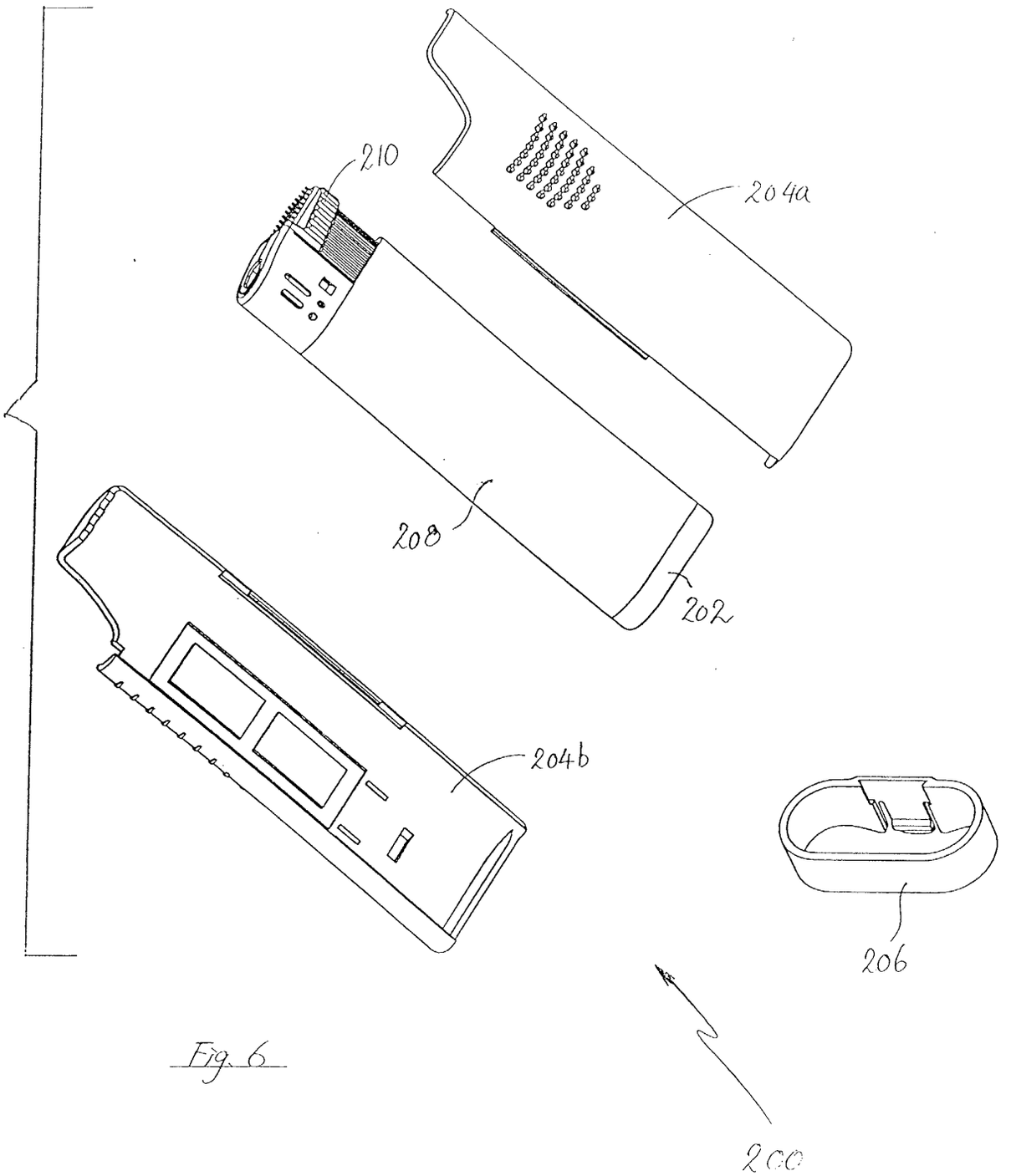

Fig. 6

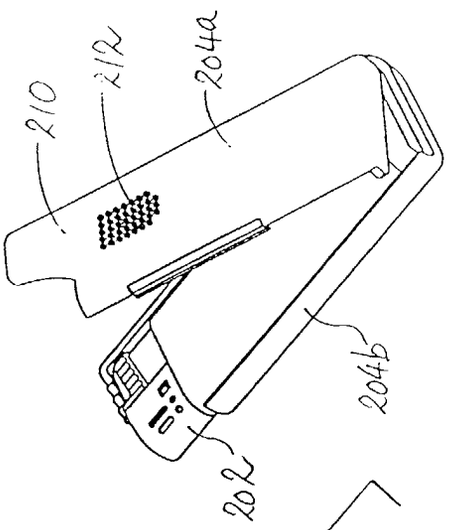

Fig. 7

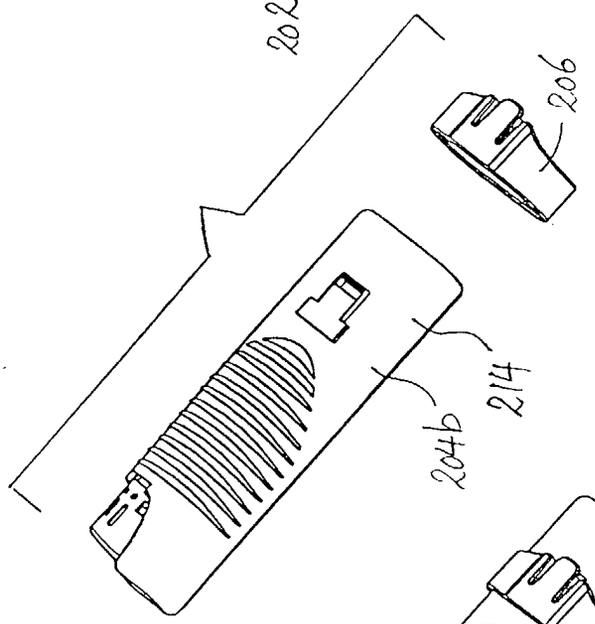

Fig. 8

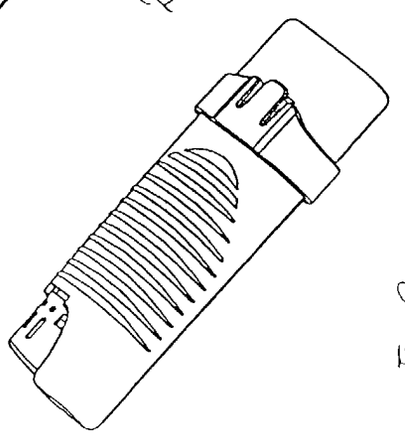

Fig. 9

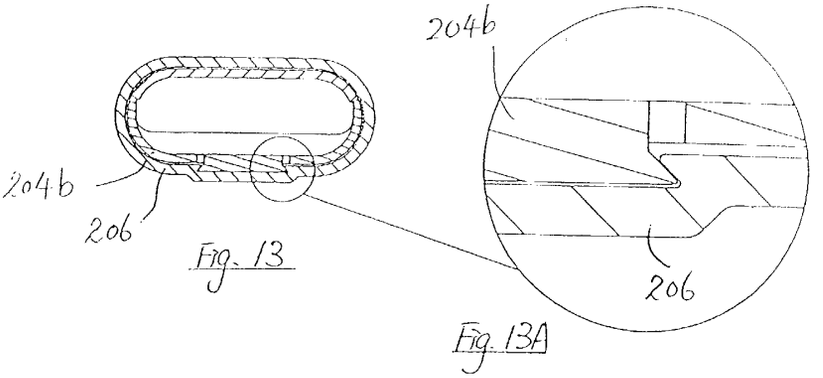

Fig. 13

Fig. 13A

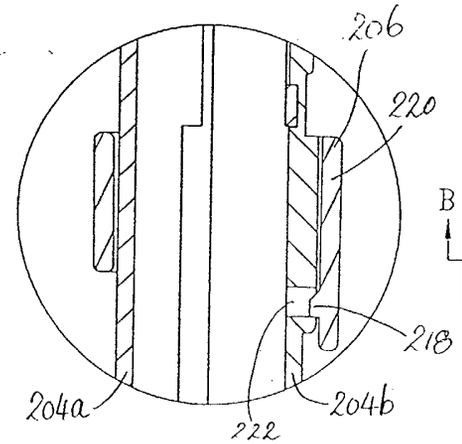

Fig. 12

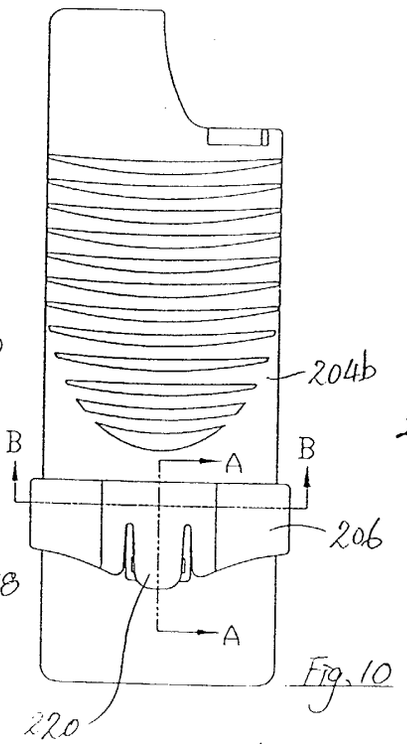

Fig. 10

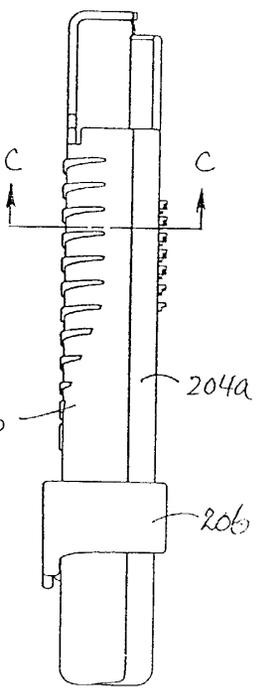

Fig. 11

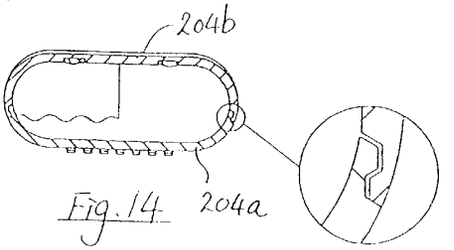

Fig. 14

Fig. 14A

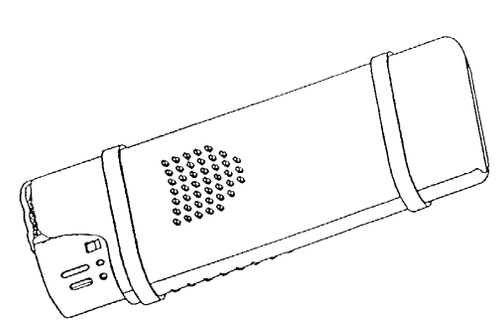

Fig. 18

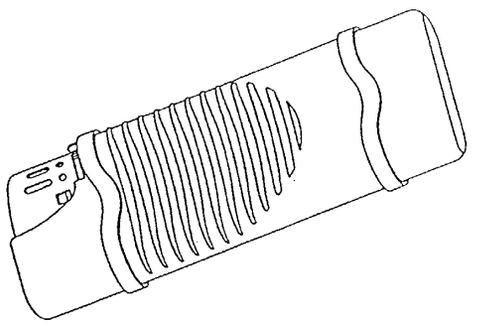

Fig. 17

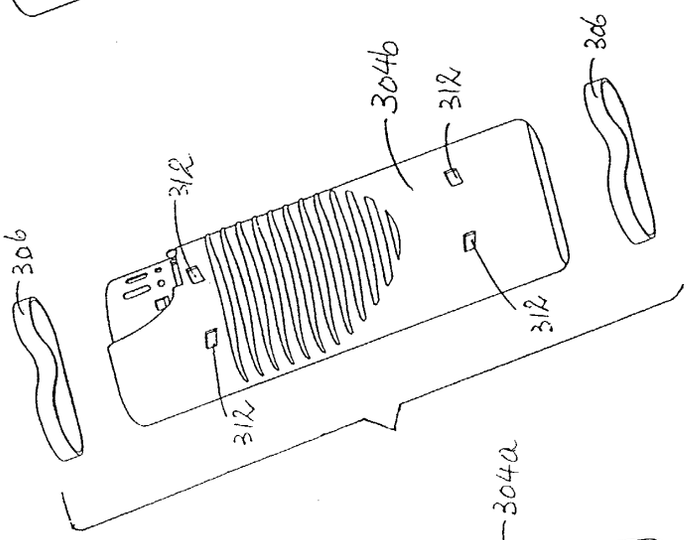

Fig. 16

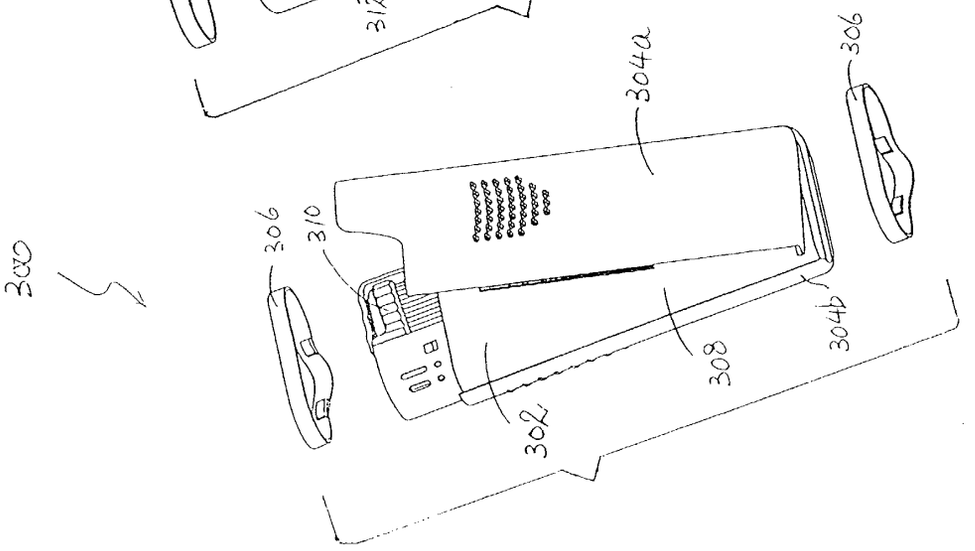

Fig. 15

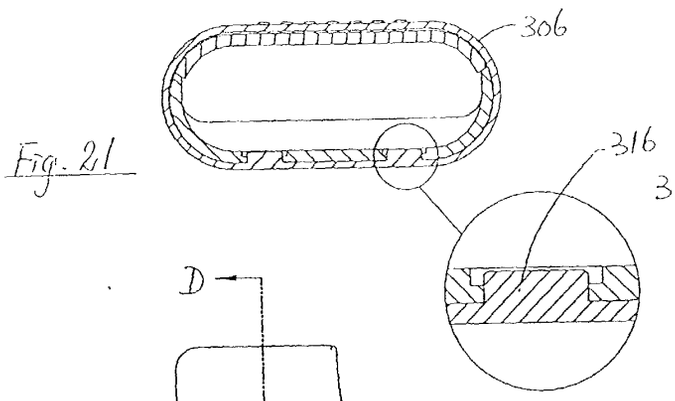

Fig. 21

Fig. 21A

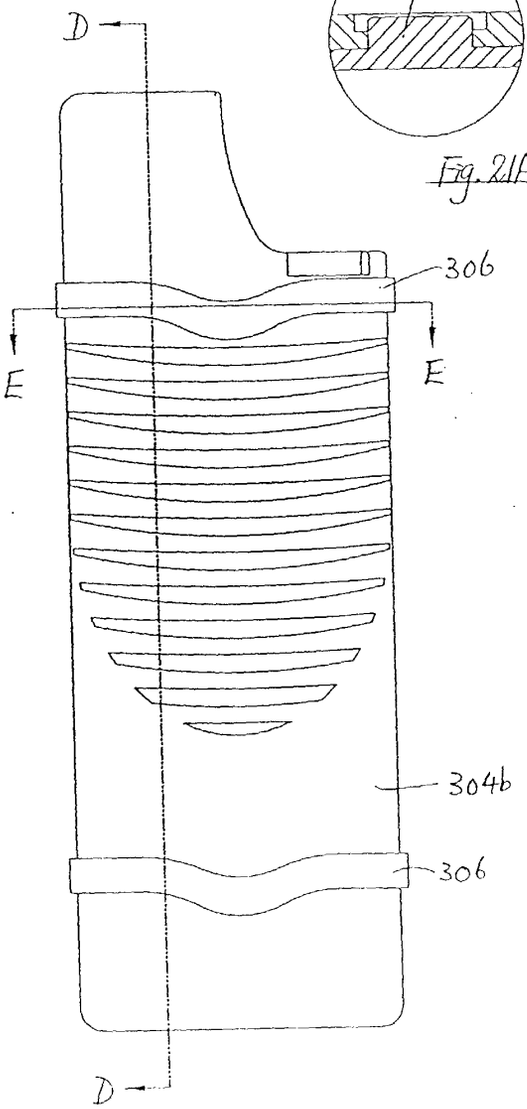

Fig. 19

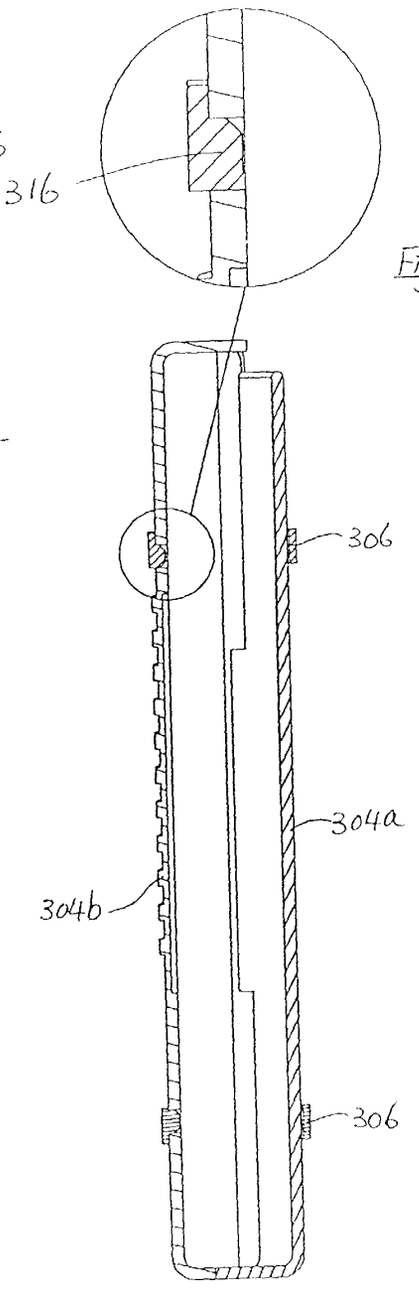

Fig. 20

Fig. 20A