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(56) Documents Cited
GB 2269003 A GB 1189300 A WO 97/46832 A1
US 5346392 A US 5271731 A US 5217364 A

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(54) Abstract Title
Child resistant gas lighter

(57) A gas fuelled lighter of the roll and press type is provided with a child resistant lighting mechanism. The lighter has an operating lever 20 which pivots below a spark wheel assembly 15, the lever 20 having a fixed end 14 connected to a gas valve 18 and an operable end 20 which can be pressed by the users digit. A spring (30, Fig 6) may also be arranged between the valve 18 and lever 14 to ensure the valve 18 remains closed when the lever 20 is not pressed. A fixed member 22 is provided adjacent the lever 20 to impede operation of the lever 20 and may be formed integral to the lighter body 10. The lever 20 is pressed to a first extent to contact the fixed member 22 without opening the valve. The lever 20 is then depressed to a second extent so as to allow the gas to be released for ignition. The lighter casing 10 may surround the operating lever 20 and extend upwards so that lever and casing are substantially in the same plane.

Fig. 1

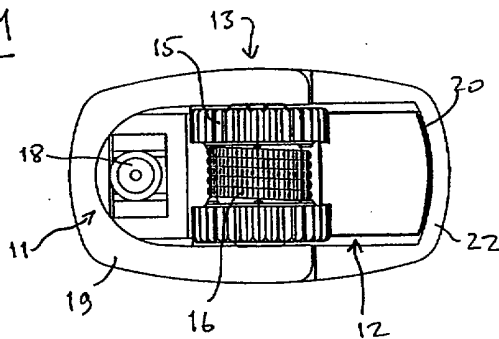
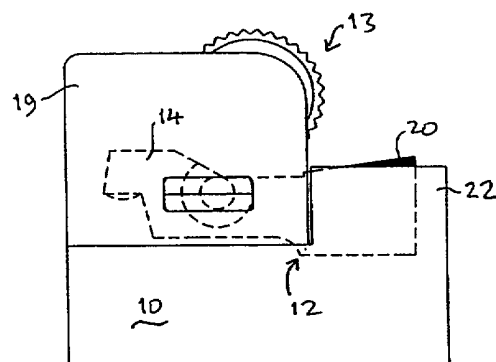


Fig. 2



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Fig. 1

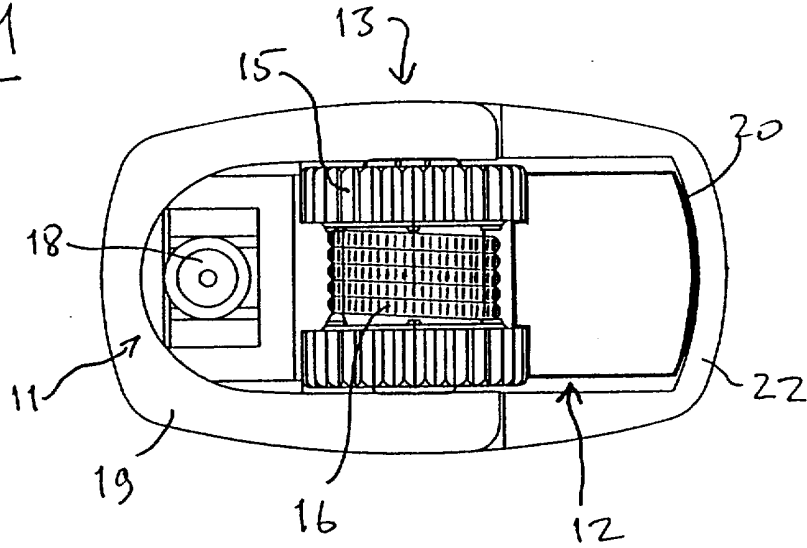


Fig. 2

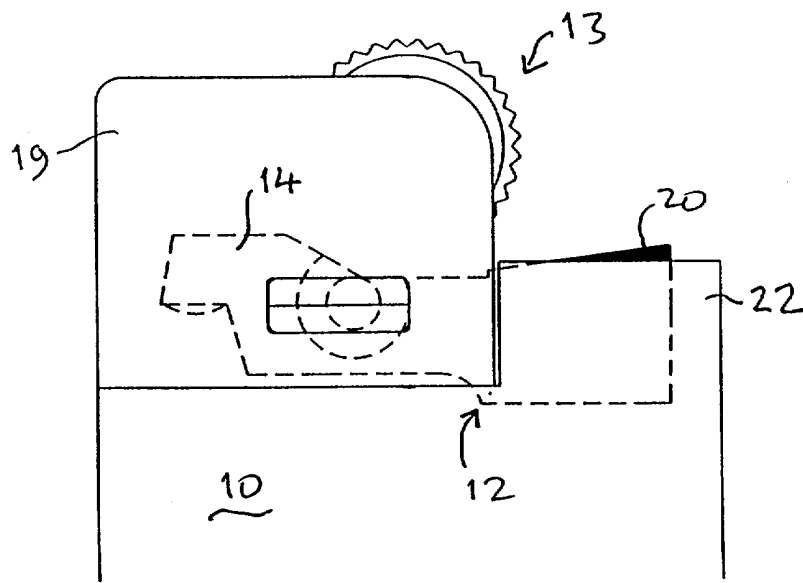


FIG. 3

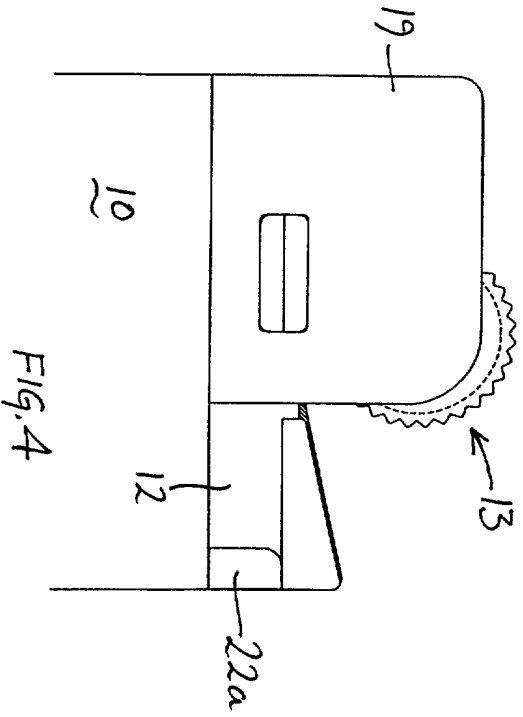
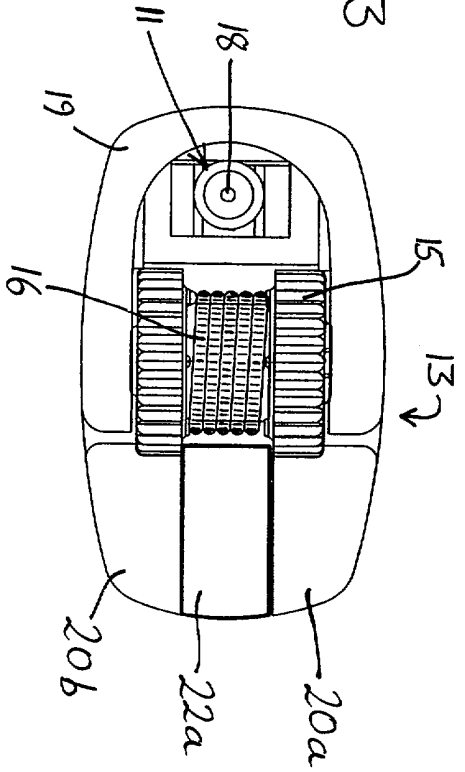


FIG. 4

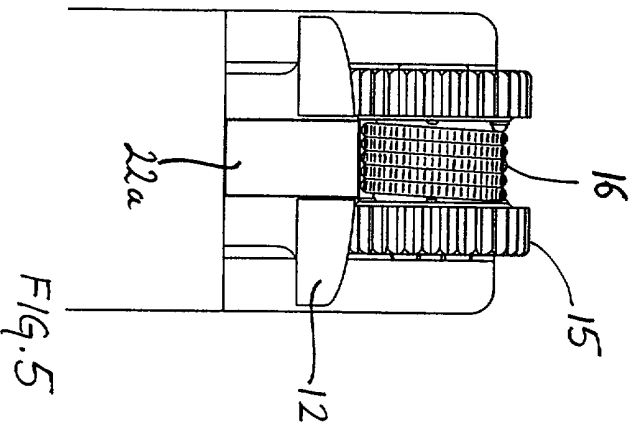


FIG. 5

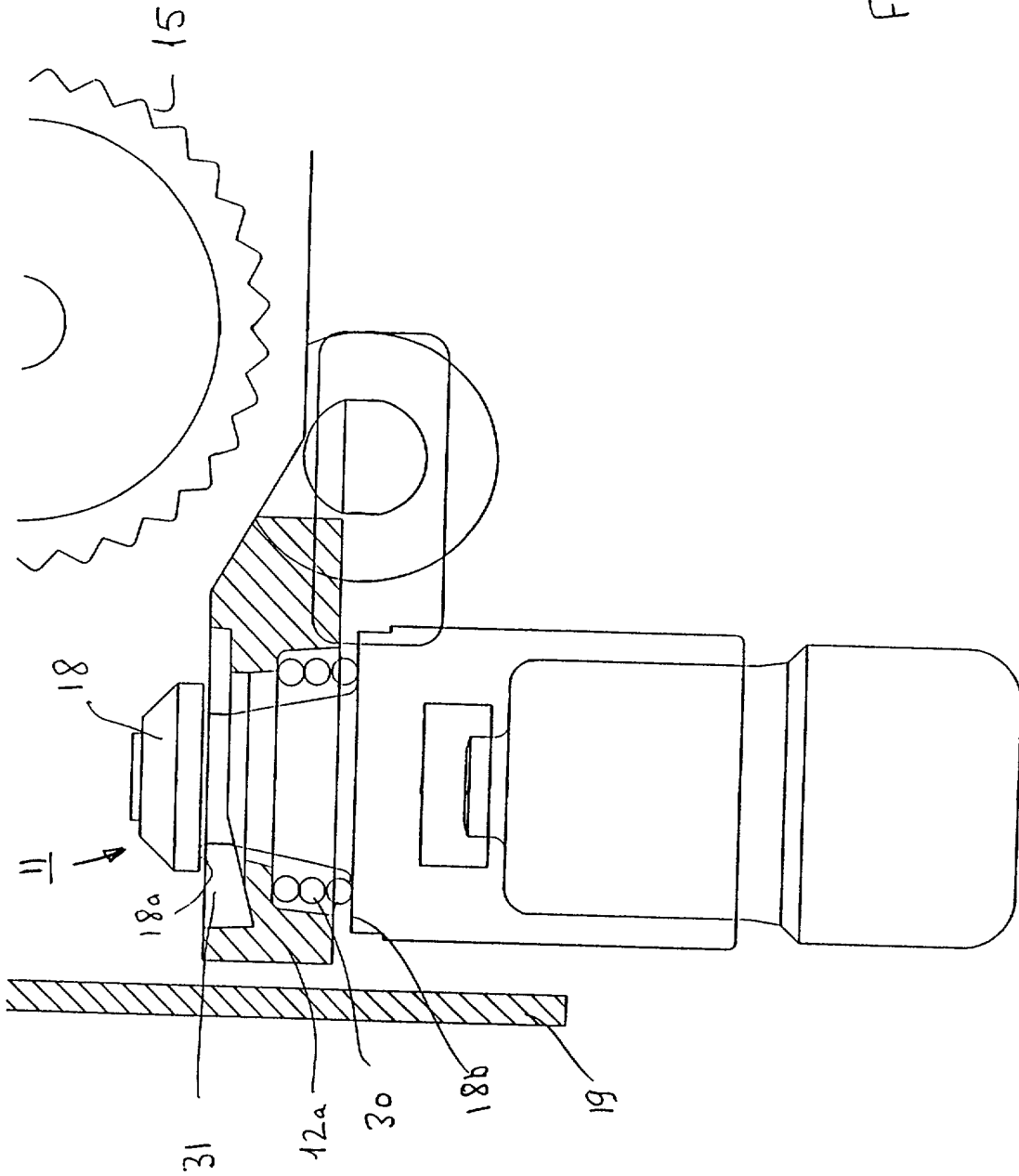


Fig. 6

Fig. 7

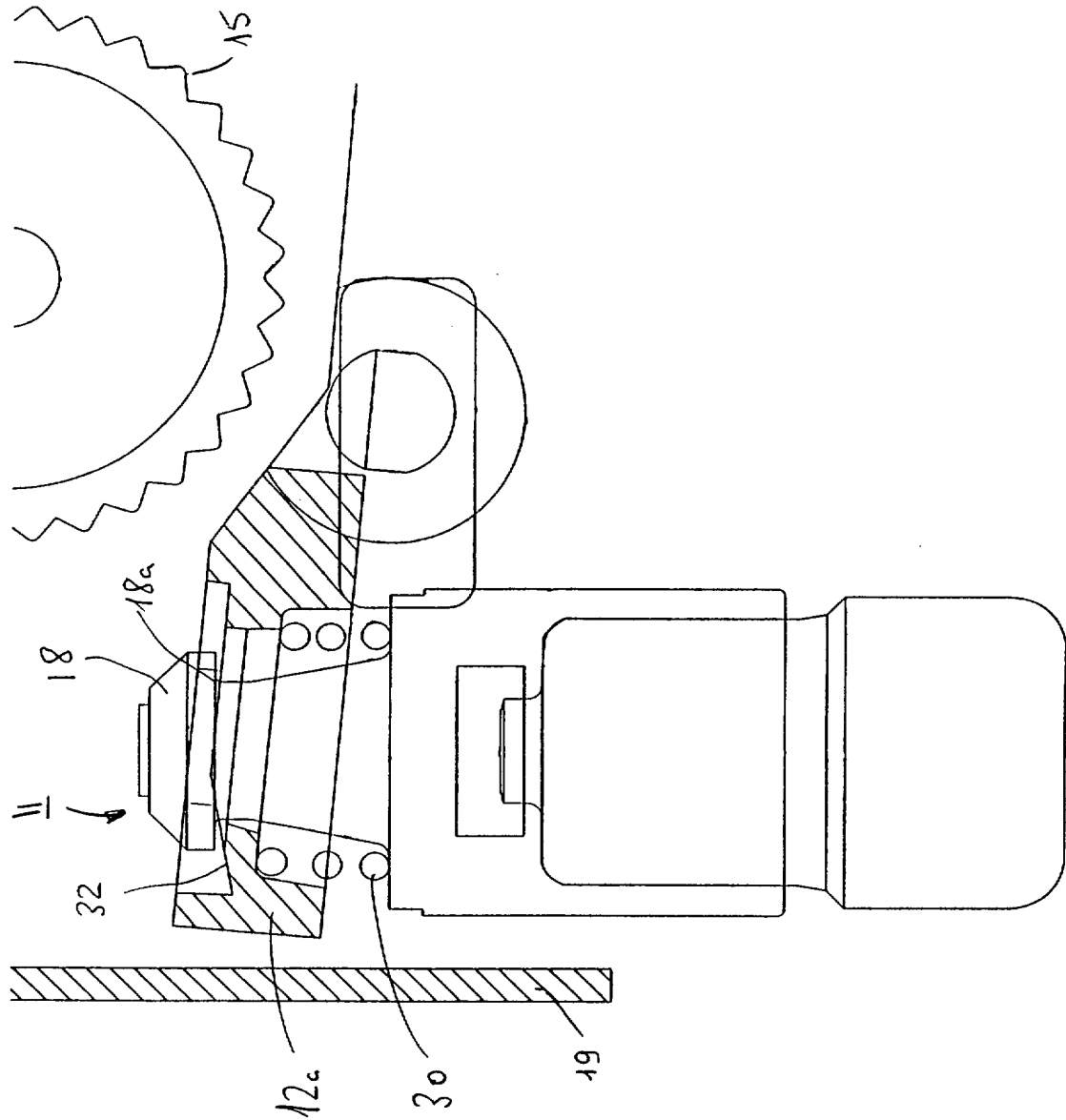
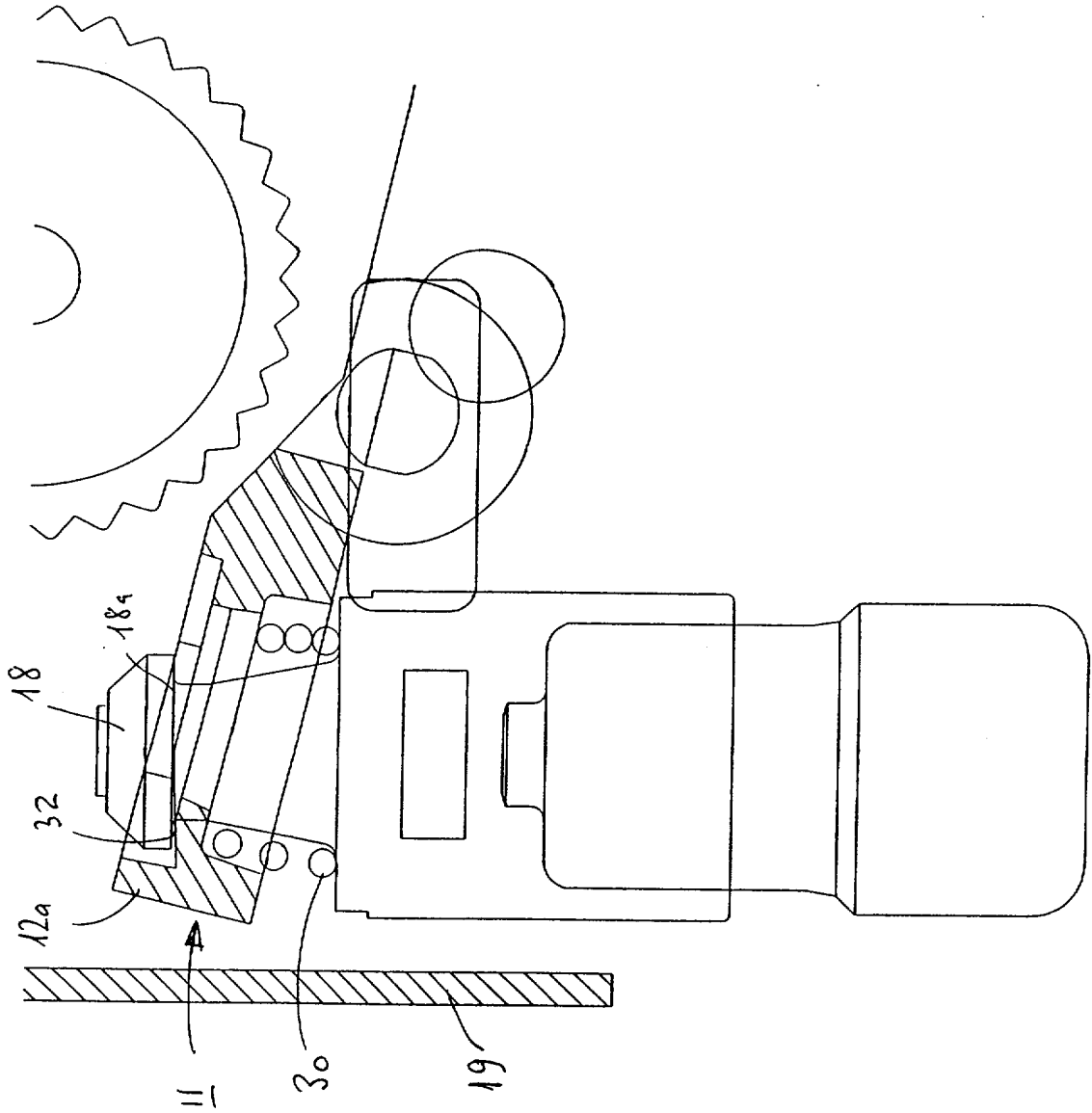


Fig. 8



Child Resistant Gas Lighters

5 The present invention relates to gas lighters of the “roll and press” type, and more specifically to child resistant lighters.

10 Roll and press gas lighters of the type used for lighting cigarettes are well known. A lighter of this type has a gas reservoir, a gas regulation system including a valve open/close system lifted and closed by a lever, and a wheel ignition mechanism. The ignition mechanism preferably comprises a spark-wheel disposed midway between two thumb-wheels whose diameter is larger than the spark-wheel. The spark-wheel rubs frictionally against a flint when rotated, in order to project sparks above the opened burner and therefore to
15 produce a flame.

 It is important to prevent the use of such lighters by children under the age of 5 years. Since 1994, the US authorities have specified the test for whether a lighter is child resistant by the CPSC Rules & Regulations.

20

 Many child resistant lighter mechanisms have been proposed. There are two broad techniques for child resistance. Most systems use a lever mechanism having two positions; one where the mechanism is prevented from working (the lighter cannot function properly), and a second where the
25 mechanism is manipulated (by displacement, pivoting, etc) to a position where the lighter can function and produce a flame. The mechanism resets automatically to its original position after the lighter has been used. In the other type of mechanism, the unlocking system is in the wheel assembly area in order to minimize the time the user takes to learn how to operate it. Usually,
30 these systems do not use purely mechanical interlocking means as described

above, but rather involve properties or parts which make the operation difficult for children while still easy to operate by adults.

5 There are many examples of the latter type of system. There is, for instance, US 5 096 414, Zellweger/Parnet, in which the thumb-wheels are freely rotatable relative to the spark-wheel and the user has to press on the wheel assembly hard enough for the pulp of their thumb to bulge down between the thumb-wheels and engage with the spark-wheel.

10 Similarly in US-A-5897307 the shield is extended around the spark wheel of the lighter so that direct access to the spark wheel to rotate it to operate the lighter is difficult, whereas operation of the lighter is possible by normal use by an adult by means of the pulp of the users thumb extending between the sides of the shield member to contact the spark wheel.

15 However both of these two types of lighter require the user to grip the spark wheel itself which can be uncomfortable and cause dirt to adhere to the users thumb.

20 WO-A-99/46539 discloses a lighter with an ignition resistance button B which is biased upwardly by a spring S and which hinders the child's ability to engage the lever by means of the spring force provided by the spring S. This lighter has the disadvantage that some adult users may have difficulty providing sufficient force to depress the resistance button if the spring force is
25 too great. Also some children may have sufficient strength to operate the lighter and also use different methods of igniting the lighter by sliding the head of the lighter against a surface of a table or floor which would enable a child to apply sufficient force against the resistance button B to ignite the lighter.

These and other systems are costly to manufacture and/or can too readily catch the eyes of children and induce them to try to find the trick of operating them too easily.

5 The object of the present invention is to provide an improved gas lighter which alleviates or overcomes these problems.

It is also an object of the present invention to provide an effective child resistant lighter which can be manufactured cheaply in large volumes.

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Accordingly the present invention provides a child resistant lighter of the roll and press type, having a lighter body and an operating lever comprising an operating end and pivoted beneath a spark wheel assembly, characterized in that the operating end of the lever comprises a fixed part and a movable part,
15 said movable part being depressible by a digit of a user to operate the lever to release the gas required to ignite the lighter.

According to a further aspect of the invention, a child resistant lighter of the roll and press type is provided, having a lighter body and an operating lever
20 comprising an operating end and pivoted beneath a spark wheel assembly, characterized in that a fixed impeding member is arranged adjacent to the operating end of the operating lever.

According to a further aspect of the invention, a child resistant lighter of
25 the roll and press type is provided, having a lighter body and an operating lever comprising an operating end and pivoted beneath a spark wheel assembly, and comprising a compensating spring arranged at the valve end of the lever, characterized in that the operating lever is impeded by an impeding member and the operating end of the lever and the impeding member are so mutually
30 arranged that the lever may be depressed to a first extent without being impeded by the impeding member, to cause the gas to be released.

Preferably the impeding member is fixed with respect to the body of the lighter. The impeding member may surround the operating end of the lever.

5 Preferably the operating end of the lever is depressed by deformation of a users digit.

Preferably the impeding member extends to a level which corresponds approximately to the plane of the operating surface of the lever.

10

Preferably the lighter comprises a compensating spring arranged at the valve end of the lever to maintain the burner/valve closed, and that such that the impeding member and the operating end of the lever are so mutually arranged that the lever may be depressed to a first extent without being
15 impeded by the impeding member, without causing the burner/valve to open, and depression of the lever to a subsequent extent is impeded by the impeding member and is achievable only by deformation of an adult user's digit.

According to a further aspect of the invention a child resistant lighter of
20 the roll and press type is provided, having a lighter body and an operating lever comprising an operating end and pivoted beneath a spark wheel assembly, characterized in that the operating end of the lever comprises a fixed part and a movable part, said movable part being depressible by the pulp of a digit of a user to operate the lever to release the gas required to ignite the lighter.

25

Child resistant lighters of the roll and press type, having a lighter body and an operating lever comprising an operating end and pivoted beneath a wheel assembly, characterized in that the lighter body forms a wall which extends upwardly and surrounds the operating end of the lever, thereby partially
30 enclosing the lever.

The result is a child resistant lighter which can conveniently be operated which requires no significant learning effort on the part of the user, in which the possibility of inadvertent ignition other than by the correct specified method is small, and which is relatively cheap and easy to manufacture.

5

A lighter embodying the invention will now be described, by way of example, with reference to the drawings, in which:

Fig. 1 is a top view of a first embodiment of the lighter;

10

Fig. 2 is a side view of the lighter of fig. 1;

Fig. 3 is a top view of a second embodiment of the lighter;

Fig. 4 is a side view of the lighter of fig. 3;

Fig. 5 is an operating end view of the lighter of fig. 3;

15

Fig. 6 is an enlarged view of the valve end of the lever of a lighter according to the invention in a first position of the lever;

Fig. 7 is the same view as fig. 6 in a second position of the lever, and

Fig. 8 is the same view as fig. 6 in a third position of the lever.

20

Referring to fig. 1 and fig. 2 of the drawings, the lighter has a gas reservoir 10, a gas regulation system including a valve open/close system 11 lifted and closed by a lever 12, and a wheel ignition mechanism 13. The ignition mechanism comprises a spark-wheel 16 disposed midway between two thumb-wheels 15 whose diameter is larger than the spark-wheel. The spark-wheel rubs frictionally against a spring-loaded flint (not shown) located

25 beneath it when rotated, in order to project sparks above the opened burner or jet 18 and therefore to produce a flame which forms above the shield or cap 19 around the jet 18.

25

The lever 12 passes beneath the wheel assembly 13 and is pivoted

30 beneath the wheel assembly 13. The end 14 towards the front of the lighter operates the valve open/close mechanism 11; the other end comprises an

operating portion 20 which is pressed down by the user as the user's thumb slides around the wheel assembly and then downwards. To ignite a lighter of this type successfully requires a two-step movement, which has to be achieved in a fraction of second. The first step requires rotating the ignition mechanism (wheel assembly) with enough speed to produce enough sparks in front of the burner. This operation is immediately followed by the depression of the right-hand end of the lever 12.

In the embodiment shown in figures 1 and 2, the rear or back side of the lighter has a shroud or wall 22 extending upwardly from the main body of the lighter whose height matches the height of the operating portion 20 of the lever 12, thereby partially enclosing it. During operation of this lighter, the user will contact the thumb wheel and rotate it in the usual way and follow this immediately with a pressing action on the operating portion 20 of the lever 12. The user's thumb will be inhibited from further progress by the wall 22 and will deform around the wall 22 such that the pulp of the user's thumb continues to act against the operating portion 20 of the lever 12 to a sufficient extent to cause the lever to be depressed.

The pressure on the lever 12 to lift the burner in order to release gas is achieved by the user carrying out the same pressing down action with their thumb. A child's thumb is however smaller and will have difficulty in reaching the portion to be depressed; the child's thumb will press on the wall, which will not lift the burner control. Since the lever is smaller than or not protruding sufficiently above the walls of the lighter, this is much more difficult for children as they have less force, less pulp on the fingers, and smaller thumbs. However, nothing really changes for adult, as the pulp on their thumbs is sufficient to depress the lever.

Although other embodiments may be envisaged, in this embodiment the wall 22 is formed as an integral part of the body of the lighter and moulded in a

single piece with the body of the lighter. Thus the costs of the lighter are maintained equivalent to those of a conventional lighter.

5 Figs 3 to 5 show a further embodiment of the lighter of the invention in which corresponding parts are shown with the same identifying numerals. In this embodiment however the lever is split into three separate parts at the operating region so that there are two operating surfaces 20a, 20b. These operating surfaces 20a, 20b are arranged on either side of an impeding portion 22a which extends upwardly from the wall of the lighter and is fixed with respect to the lighter body. Thus during use of this lighter the users thumb
10 operates the thumb wheel in the usual way followed by a pressing action on the lever. However this pressing action is impeded by the impeding portion 22a and the user's thumb or digit is able to depress the lever only by the extent to which the user's thumb or digit can deform on either side of the impeding member by a sufficient extent. In the preferred embodiment the height of the
15 impeding member 22a will be arranged so that the large majority of adult users are able to operate the lighter by means of their thumbs being sufficiently large to deform around the impeding member 22a to depress the operating surfaces 20a, 20b of the lever 12 to a sufficient extent to release the gas to operate the
20 lighter.

Notwithstanding that the lever has two operating surfaces, it may be made from a single moulding of the lever component as a whole as is the case with conventional lighters and similarly the impeding member may be formed
25 integrally with the body of the lighter as a single moulding. Thus the number of components used is no different to a conventional lighter and the manufacturing costs are therefore comparable.

It will be appreciated that the operating surfaces 20a, 20b of the thumb
30 wheel may be arranged in different orientations with respect to the impeding member 22a. For example it would also be possible for the impeding member

to be arranged in two parts rather as the operating members 20a, 20b in fig. 3 on either side of a central operating member of the lever 12. In this possible alternative the thumb of the user would deform into the space between the two impeding members to depress the centrally located lever.

5

It will be appreciated that many other physical constructions of the relative operating surfaces of the lever on the one hand and the impeding member on the other could be imagined within the scope of the present invention.

10

Different geometries can be used to achieve the best compromise between child resistance and user friendliness, by varying the shape of the lever, the shape of the walls of the lighter, and the extent to which the walls of the lighter protect or shroud the lever. Protrusion of the walls above the lever is not absolutely required; the lever can slightly protrude by a certain pre-defined distance in order to allow for the release of the gas when the lever reaches a certain extent of depression.

15

A compensating spring can be added to provide an improved valve operation by more accurate control of the release of gas and is usually arranged between the underneath of the valve end of the lever and the burner/valve body. The compensating spring has the effect of taking up any play between the lever and the valve which improves the open/close function of the valve and lever operation and in particular ensures that the valve shuts off properly when the lever is released.

20
25

As with the first embodiment the operating surface of the lever may protrude beyond the impeding member to such an extent that permits the lever to be depressed by an amount which causes the compensating spring at the valve end of the lever to be released, but beyond this point at least the further

30

movement of the lever, which would result in the release of gas, is impeded by the impeding member.

In both of the described embodiments of the present invention, when the operating surface 20 of the lever 12 is depressed by a certain initial amount, this causes the play between the lever and the valve to be taken up before the valve actually starts to open. This is shown in figures 6 to 8. The actuating end 12a of the lever 12 is arranged to engage the valve/burner 18 to pull the valve/burner upwards to open the valve. The actuating end 12a thus has an upper surface 32 which acts against a downwardly facing ledge 18a of the valve burner 18 when the lever is depressed. In the rest position as shown in fig. 6 there is a gap or play 31 between the upper surface 32 and the downwardly facing ledge 18a. A compensating spring is arranged on the underside of the actuating end 12a and acts against an upwardly facing ledge 18b of the valve/burner 18 biasing it to the closed position.

Fig. 7 shows the arrangement of the parts after an initial movement of the lever 12 during the initial stage of its depression in normal use. In this position the play 31 has been taken up and the upper surface 32 is just about to make contact with the downwardly facing ledge 18a of the valve/burner 18 but is not yet pressing the valve/burner 18 upwards. The compensating spring 30 is extended but still acts against the upwardly facing ledge 18b of the valve/burner 18 to maintain the valve/burner closed. This initial movement of the lever is therefore permitted without the emission of gas and without the lighter being able to be operated. Finally in fig. 8 the lever 12 is depressed to its fullest extent and the contact between the upper surface 32 and the ledge 18a causes the valve/burner to move upwards and therefore annuls the action of the compensating spring 30 and opens the valve. This is taken into account when varying the shape of the lever, the shape of the walls of the lighter, and the extent to which the walls of the lighter protect or shroud the lever, to

achieve the right balance between child resistancy on the one hand and adult usability on the other. The lever may protrude beyond the wall 22.

5 It will be appreciated that there are a number of alternative embodiments which would fall within the scope of the present invention described above and defined in the attached claims.

Claims

- 1 A child resistant lighter of the roll and press type, having a lighter body
5 and an operating lever comprising an operating end and pivoted beneath
a spark wheel assembly, characterized in that the operating end of the
lever comprises a fixed part and a movable part, said movable part being
depressible by a digit of a user to operate the lever to release the gas
required to ignite the lighter.
- 10 2 A child resistant lighter of the roll and press type, having a lighter body
and an operating lever comprising an operating end and pivoted beneath
a spark wheel assembly, characterized in that a fixed impeding member
is arranged adjacent to the operating end of the operating lever.
- 15 3 A child resistant lighter of the roll and press type, having a lighter body
and an operating lever comprising an operating end and pivoted beneath
a spark wheel assembly, and comprising a compensating spring
arranged at the valve end of the lever, characterized in that the operating
20 lever is impeded by an impeding member and the operating end of the
lever and the impeding member are so mutually arranged that the lever
may be depressed to a first extent without being impeded by the
impeding member, to cause the gas to be released.
- 25 4 A child resistant lighter according to claim 3, characterized in that the
impeding member is formed integrally with the body of the lighter.
- 5 A child resistant lighter according to any preceding claim, characterized
in that the impeding member surrounds the operating end of the lever.
- 30

- 6 A child resistant lighter according to any preceding claim, characterized in that operating end of the lever is depressed by deformation of a users digit.
- 5 7 A child resistant lighter according to any preceding claim, characterized in that impeding member extends to a level which corresponds approximately to the plane of the operating surface of the lever at the point at which further movement of the lever will cause the valve/burner is about to open.
- 10 8 A child resistant lighter according to claim 1, 2 or 4, characterized in that the lighter comprises a compensating spring arranged at the valve end of the lever to maintain the burner/valve closed, and that such that the impeding member and the operating end of the lever are so mutually arranged that the lever may be depressed to a first extent without being impeded by the impeding member, without causing the burner/valve to open, and depression of the lever to a subsequent extent is impeded by the impeding member and is achievable only by deformation of an adult user's digit.
- 15 9 A child resistant lighter according to claim 8, characterized in that the movable part comprises an operating surface which is depressible be deformation of a digit of a user.
- 20 10 A child resistant lighter of the roll and press type, having a lighter body and an operating lever comprising an operating end and pivoted beneath a wheel assembly, characterized in that the lighter body forms a wall which extends upwardly and surrounds the operating end of the lever, thereby partially enclosing the lever.
- 25 30

11 A child resistant lighter according to an preceding claim, characterized
in that the lighter body extends to a level which corresponds
approximately to the plane of the operating surface of the lever.

5 12 A lighter substantially as herein described and illustrated.

13 Any novel and inventive feature or combination of features specifically
disclosed herein within the meaning of Article 4H of the International
Convention (Paris Convention).

Amendments to the claims have been filed as follows

1 A child resistant lighter of the roll and press type, having a lighter body and
5 an operating lever including an operating end and pivoted beneath a spark
wheel assembly, the operating end of the lever being depressible by a digit
of a user to operate the lever to release the gas required to ignite the lighter,
characterized in that the said operating end is adjacent to a fixed impeding
10 member, the said impeding member impeding the user's digit in depressing
the said operating end.

2 A child resistant lighter of the roll and press type, having a lighter body and
an operating lever including an operating end and pivoted beneath a spark
wheel assembly, and having a compensating spring arranged at the valve end
15 of the lever, characterized in that the required movement of a user's digit in
operating the said operating end is impeded by an impeding member, the
operating end of the lever and the impeding member being so mutually
arranged that the lever may be depressed to a first extent without the user's
digit being impeded by the impeding member, without causing the gas to be
20 released.

3 A child resistant lighter according to any preceding claim, characterized in
that the impeding member is formed integrally with the body of the lighter.

25 4 A child resistant lighter according to any preceding claim, characterized in
that the impeding member partially surrounds the operating end of the lever.

5 A child resistant lighter according to any of claims 1 – 3, characterized in
that the operating end of the lever partially surrounds the impeding member.

30

6 A child resistant lighter according to any preceding claim, characterized in
that the impeding member extends to a level which corresponds
approximately to the plane of the operating surface of the lever at the point
at which further movement of the lever will cause the burner valve to open.

5

7 A child resistant lighter of the roll and press type, having a lighter body and
an operating lever including an operating end and pivoted beneath a wheel
assembly, characterized in that the lighter body forms a wall which extends
upwardly and surrounds the operating end of the lever, thereby partially
10 enclosing the lever so as to impede the required movement of a user's digit
in operating the operating end.

8 A child resistant lighter according to any preceding claim, characterized in
that the lighter body extends to a level which corresponds approximately to
15 the plane of the operating surface of the lever which is engaged by a user's
digit.

9 A child resistant lighter according to any preceding claim, characterized in
that the operating end of the lever is depressed by deformation of a user's
20 digit.

10 A child resistant lighter according to any of claims 1-8, characterized in that
the lighter includes a compensating spring arranged at the valve end of the
lever to maintain the burner valve closed, and in that the impeding member
25 and the operating end of the lever are so mutually arranged that the lever
may be depressed to a first extent without being impeded by the impeding
member, without causing the burner valve to open, and depression of the
lever to a subsequent extent is impeded by the impeding member and is
achievable only by deformation of an adult user's digit.

30

- 11 A child resistant lighter according to claim 10, characterized in that the operating end comprises an operating surface which is depressible by deformation of a digit of a user.
- 5 12 A lighter substantially as herein described and illustrated.
- 13 Any novel and inventive feature or combination of features specifically disclosed herein within the meaning of Article 4H of the International Convention (Paris Convention).



INVESTOR IN PEOPLE

Application No: GB 0005852.9
Claims searched: 1-11

17. Examiner: Nigel Hanley
Date of search: 25 July 2000

Patents Act 1977 Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:
UK CI (Ed.R): F4F (FBB, FCB, FDC, FEA, FFD, FFE, FFX)
Int CI (Ed.7): F23Q 2/16, 2/36
Other: ONLINE: WPI, EPODOC, JAPIO

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2269003 A CLI-CLAUQUE - Note Figure 1 particularly the lever 9 pressed down to operate valve 12.	1, 6, 9
X	GB 1189300 EATON YALE - Note operation of lever in Figure 1 and use of compensating spring on valve assembly. Note also arrangement of operating lever end in same plane as surface of the lighter.	1, 3, 6-11
X	WO97/46832 A1 CRICKET - Note use of a lever on a movable pivot and fixed impeding member formed as part of the lighter case in Figs 5 -8. Note also first movement in Figure 8 does not release gas.	All
X	US 5346392 JONG-IL KIM - Note use of lever operation in Fig 2 & 3 and compensating spring in valve assembly in Figs 4-6B.	1
X	US 5271731 PAN HSIN-CHUNG - Note lever in Figs 1-3 operating the valve having two pivot positions and impeded in first position by casing of the lighter	All
X	US 5217364 CRICKET - Note use of lever and compensating spring around valve in Figs 5 & 6.	All

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.