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(54) **Lever-type safety lighter**

(57) A lever-type safety lighter includes a main body, a wheel ratchet, a file wheel, a metal cap, and a lever. The lever further includes a base, a slipping hole, and a pressing part. The lever can have various pivot point structures including a flange, a partitioning-wall, a standing-post, and a salient part. The arm S1 of the exerting force is smaller than the arm S2 of the resisting force, thereby the mechanical advantage is smaller than one, that is the exerting force P is greater than resisting force Q. Consequently, the lever-type safety lighter of the invention has a higher product safety.

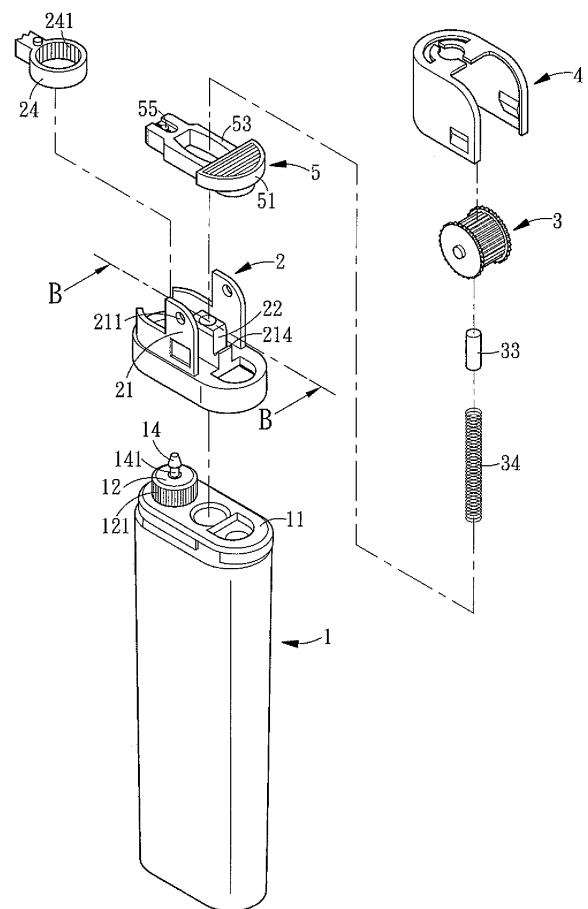


Fig.2

Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The invention relates to a lever-type safety lighter, and more particularly, to a lever-type safety lighter making use of the fact that the arm of exerting force is smaller than the arm of resisting force letting the mechanical advantage be smaller than one, and consequently, the exerting force is greater than the resisting force making the child not easy to play with the lighter and ignite it to accidentally cause fire, nevertheless, the force for filing the filing wheel of the lighter is still within the range of the manipulative force of the user and the mechanical advantage is in the range of 0.3 ~ 0.8 for achieving the efficacy of safety usage of the lighter.

2. Description of the Prior Art

[0002] The simple-type lighter provides consumers with convenience and low cost, and claims to be a great breakthrough in the contemporary era ever since the first use of fire in material civilization of human history. However, the lighter brings forth concerns on safety consideration. Particularly, the child playing with the lighter may result in fire accident. According to an old saying, a tiny spark may spread to become a prairie fire. Therefore, it cannot be too careful to use the lighter.

[0003] FIG. 1 is an exploded view of a simple-type lighter structure of the prior art. The structure of a conventional lighter being a lever-type lighter as shown in FIG. 1 includes a main body (1), a wheel racket (2), a file wheel (3), a metal cap (4), and a lever (5). Among them, the main body (1) being a hollow body is for filling the liquid gas for providing fuel to ignite the lighter. A sealing part (11) secured on top of the main body (1) furnishes a nozzle seat (12) having a plurality of row teeth (121) provided at the periphery thereof, and a nozzle (14) having a neck part (141). The wheel racket (2) is slipped on the top of the corresponding sealing part (11) of the main body (1). Moreover, the wheel racket (2) having a securing seat (22) provided at the center thereof and having a pair of file-wheel seats (21) provided by extending from both sides and standing upright on opposite sides thereof is capable of containing a spring (34) and a flint (33). A securing hole (211) is provided on each of the file-wheel seats (21) near the top end thereof, and a securing hole (212) is also provided on each of the file-wheel seats (21) near the bottom end thereof. Furthermore, the wheel racket (2) also provides an adjusting ring (24) having a plurality of inner row teeth (241) on the inner surface that are capable of meshing with the outer row teeth (121) on the outer surface of the nozzle seat (12). The adjusting ring (24) is used for adjusting the quantity of liquid gas output in the main body (1).

[0004] The lever (5) includes a pressing part (51), a base (53), and a slipping hole (55). Each side of the base (53) furnishes a salient part (532) used to be the pivot point C (see FIG. 6) of the lever (5). The salient parts (532) are fitted in the securing holes (212) near the bottom of the file-wheel seats (21), and the securing holes (212) are used as pivot seat for bearing the salient parts (532). The slipping hole (55) being used as the point of resisting force B (see FIG. 6) passes through the nozzle (14) and slips on the neck part (141) of the nozzle (14) of the sealing part (11). The pressing part (51) provided at an end of the lever (5) is used to be the point of exerting force A (see FIG. 6). A salient shaft (31) furnishes on each side of the file wheel (3) is then slipped in the corresponding securing holes (211) near the top end of the file-wheel seats (21). Finally, the metal cap (4) is slipped on to form the simple-type lighter that is most popular in the market nowadays.

[0005] FIG. 6 is a schematic diagram of the lever action of lever-type safety lighter of the invention. As shown in FIG. 1 and FIG. 6, when it comes to operate the lighter, the user presses the pressing part (51) of the lever (5) by his/her thumb to exert force P at the point of exerting force A, and through the pivot point C make the point of resisting force B generate reacting force Q to let nozzle (14) draw the liquid gas in the main body (1). In the meantime, the thumb plucks the file wheel (3) to make the file wheel (3) rub the flint (31) to generate spark to ignite the liquid gas drawn by the nozzle (14) from the main body (1) to generate fire.

[0006] Referring again to the lever action shown in FIG. 6, the lever (5) is denoted by AB with point C as its pivot point, A as its point of exerting force, and B as its point of resisting force. AC having S_2 in length is its arm of exerting force while BC having S_1 in length is its arm of resisting force. The principle of lever gives

$$\begin{aligned} &(\text{resisting force}) \times (\text{arm of resisting force}) = \\ &(\text{exerting force}) \times (\text{arm of exerting force}) \end{aligned}$$

that is

$$Q \times S_1 = P \times S_2$$

and

$$\text{Mechanical Advantage} = Q/P = S_2 / S_1$$

[0007] FIG. 1A is a half sectional-view at section A-A of the simple-type lighter structure of the prior art shown in FIG. 1. As shown in FIG. 1A, the S_2 is greater than S_1 for all the conventional simple-type lighters. Therefore, the Mechanical Advantage is greater than 1, i.e. the lever is economical in exerting force since the exerting force P is smaller than the resisting force Q . As the lever being economical in exerting force makes the lighter easy to ignite, the child frequently playing with the lighter under the condition without consciousness of hazard is quite possible to cause fire. This is the demerit of the conventional easy-type of lighter.

SUMMARY OF THE INVENTION

[0008] In light of the above-mentioned demerits of the prior art, the invention provides a lever-type safety lighter that aims to ameliorate at least some of the demerits of the prior art or to provide a useful alternative.

[0009] The primary objective of the invention is to provide a lever-type safety lighter making use of the fact that the arm of exerting force of the lever is small than the arm of resisting force resulting in the fact that the Mechanical Advantage is small than 1 and the exerting force P is greater than the resisting force Q . It makes the child not easy to exert force to ignite the lighter while playing with it but the exerting force P is still within the range of the manipulating force of the user. The Mechanical Advantage is within the range of 0.3 ~ 0.8, thus it is capable of achieving safety efficacy.

[0010] The secondary objective of the invention is to provide a lever-type safety lighter with various types of structural design of the pivot point of the lever.

[0011] In the first embodiment of the invention, the lever-type safety lighter has a flange pivot point structure.

[0012] In the second embodiment of the invention, the lever-type safety lighter has a partition-wall pivot point structure.

[0013] In the third embodiment of the invention, the lever-type safety lighter has a standing-post pivot point structure.

[0014] In the first embodiment of the invention, the lever-type safety lighter has a salient-part pivot point structure.

[0015] In order to achieve the above-mentioned objectives, the invention provides a lever-type safety lighter that includes a main body, a wheel racket, a file wheel, a metal cap, and a lever. The main body being a hollow body for containing liquid gas has a sealing part securing at the top thereof. The sealing part includes a nozzle having a neck part. The wheel racket being slipped on the top of the corresponding sealing part has a securing seat furnished at the center thereof for containing a flint, and has two file-wheel seats furnished by extending thereon up at opposite sides. Moreover, a securing hole is provided near the top end of each of the file-wheel seats. What is more, a plurality of row teeth is provided in axial direction at the circumference thereof for the user to file the file wheel. The metal cap is used to cap on the sealing part. The lever further includes a base, a slipping hole, and a pressing part. The lever can have various pivot point structures including a flange, a partitioning-wall, a standing-post, and a salient part. The arm S_1 of the exerting force is smaller than the arm S_2 of the resisting force, thereby the mechanical advantage is smaller than one, i.e. the exerting force P is greater than resisting force Q . Therefore, the lever is not a force economical but a force wasting one. Nevertheless, the exerting force for pressing the lever and filing the filing wheel is still within the range of the manipulative force of the user. The ratio of mechanical advantage is in the range of 0.3 ~ 0.8. Consequently, the lever-type safety lighter of the invention is capable of achieving the efficacy of product safety.

[0016] The accomplishment of this and other objectives of the invention will become apparent from the following description and its accompanying drawings of which:

BRIEF DESCRIPTION OF THE DRAWINGS

[0017]

FIG. 1 is an exploded view of a simple-type lighter structure of the prior art.

FIG. 1A is a half sectional-view at section A-A of the simple-type lighter structure of the prior art shown in FIG. 1

- FIG. 2 is an exploded view of a lever-type safety lighter having flange pivot point of the first embodiment of the invention.
- 5 FIG. 2A is a half sectional-view at section B-B of the lever-type safety lighter having flange pivot point of the first embodiment of the invention shown in FIG.2.
- FIG. 3 is an exploded view of a lever-type safety lighter having partition -wall pivot point of the second embodiment of the invention.
- 10 FIG. 3A is a half sectional-view at section C-C of the lever-type safety lighter having partition-wall pivot point of the second embodiment of the invention shown in FIG. 3.
- FIG. 4 is an exploded view of a lever-type safety lighter having standing-post pivot point of the third embodiment of the invention.
- 15 FIG. 4A is a half sectional-view at section D-D of the lever-type safety lighter having standing-post pivot point of the third embodiment of the invention shown in FIG. 4.
- FIG. 5 is an exploded view of a lever-type safety lighter having salient-part pivot point of the fourth embodiment of the invention.
- 20 FIG. 5A is a half sectional-view at section E-E of the lever-type safety lighter having salient-part pivot point of the fourth embodiment of the invention shown in FIG.5.
- 25 FIG. 6 is a schematic diagram of the lever action of lever-type safety lighter of the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

30 **[0018]** FIG. 2 is an exploded view of a lever-type safety lighter having flange pivot point of the first embodiment of the invention. As shown in FIG. 2, the lever-type safety lighter having flange pivot point of the first embodiment of the invention includes a main body (1), a wheel racket (2), a file wheel (3), a metal cap (4), and a lever (5). Among them, the main body (1), the file wheel (3), the metal cap (4), and the metal cap (4) are all pretty much similar to those of the simple-type lighter structure of the prior art, thereby it is not necessary to repeat here. The wheel racket (2) having a securing seat (22) provided at the center thereof and having a pair of file-wheel seats (21) provided by extending from both sides and standing upright on opposite sides thereof has a securing hole (211) provided on each of the file-wheel seats (21) near the top end thereof. A flange (214) is furnished in front of the securing seat (22) to act as the pivot point C of the lever (5) (see FIG. 6). The lever (5) includes a pressing part (51), a base (53), and a slipping hole (55). The slipping hole (55) being used as the point of resisting force B (see FIG. 6) passes through the nozzle (14) and slips on the neck part (141) of the nozzle (14) of the sealing part (11). The base (53) leans against the flange (214) directly to form the pivot point C of the lever (5) (see FIG. 6). The pressing part (51) provided at an end of the lever (5) is used to be the point of exerting force A (see FIG. 6).

35 **[0019]** FIG. 6 is a schematic diagram of the lever action of lever-type safety lighter of the invention. As shown in FIG. 2 and FIG. 6, when it comes to operate the lighter, the user presses the pressing part (51) of the lever (5) by his/her thumb to exert force P at the point of exerting force A, and through the pivot point C make the point of resisting force B generate reacting force Q to let nozzle (14) draw the liquid gas in the main body (1). In the meantime, the thumb plucks the file wheel (3) to make the file wheel (3) rub the flint (31) to generate spark to ignite the liquid gas drawn by the nozzle (14) from the main body (1) to generate fire.

40 **[0020]** FIG. 3 is an exploded view of a lever-type safety lighter having partition-wall pivot point of the second embodiment of the invention. As shown in FIG. 3, the lever-type safety lighter having partition-wall pivot point of the second embodiment of the invention includes a main body (1), a wheel racket (2), a file wheel (3), a metal cap (4), and a lever (5). Among them, the main body (1), the file wheel (3), the metal cap (4), and the metal cap (4) are all pretty much similar to those of the lever-type safety lighter having flange pivot point of the first embodiment of the invention, thereby it is not necessary to repeat here.

45 **[0021]** The wheel racket (2) having a securing seat (22) provided at the center thereof and having a pair of file-wheel seats (21) provided by extending from both sides and standing upright on opposite sides thereof has a securing hole (211) provided on each of the file-wheel seats (21) near the top end thereof. A partition-wall (216) is furnished in front of the securing seat (22) on each side thereof to be connected between the two file-wheel seats (21) and the two securing seats (22) respectively to act as the pivot point C of the lever (5) (see FIG. 6). The lever (5) includes a pressing part

(51), a base (53), and a slipping hole (55). The slipping hole (55) being used as the point of resisting force B (see FIG. 6) passes through the nozzle (14) and slips on the neck part (141) of the nozzle (14) of the sealing part (11). The base (53) leans against the partition-wall (216) directly to form the pivot point C of the lever (5) (see FIG. 6). The pressing part (51) provided at an end of the lever (5) is used to be the point of exerting force A (see FIG. 6).

[0022] FIG. 6 is a schematic diagram of the lever action of lever-type safety lighter of the invention. As shown in FIG. 3 and FIG. 6, the operation method and the principle of igniting the lighter to generate flame is pretty much the same as the above-mentioned lever-type safety lighter having flange pivot point of the first embodiment of the invention, thereby it is not necessary to repeat here.

[0023] FIG. 4 is an exploded view of a lever-type safety lighter having standing-post pivot point of the third embodiment of the invention. As shown in FIG. 4, the lever-type safety lighter having standing-post pivot point of the third embodiment of the invention includes a main body (1), a wheel racket (2), a file wheel (3), a metal cap (4), and a lever (5). Among them, the main body (1), the file wheel (3), the metal cap (4), and the metal cap (4) are all pretty much similar to those of the lever-type safety lighter having partition-wall pivot point of the second embodiment of the invention, thereby it is not necessary to repeat here.

[0024] The wheel racket (2) having a securing seat (22) provided at the center thereof and having a pair of file-wheel seats (21) provided by extending from both sides and standing upright on opposite sides thereof has a securing hole (211) provided on each of the file-wheel seats (21) near the top end thereof. An indented hole (218) is furnished in front of the securing seat (22) on each side thereof between the two file-wheel seats (21) and the two securing seats (22) respectively to act as the pivot point C of the lever (5) (see FIG. 6). The lever (5) includes a pressing part (51), a base (53), a slipping hole (55), and a pair of standing posts (57). The slipping hole (55) being used as the point of resisting force B (see FIG. 6) passes through the nozzle (14) and slips on the neck part (141) of the nozzle (14) of the sealing part (11). The pair of standing posts are furnished on the two sides of the bottom side of the pressing part (51) and are fitted in the corresponding indented hole (218) to be the pivot point C of the lever (5) (see FIG. 6). The pressing part (51) provided at an end of the lever (5) is used to be the point of exerting force A (see FIG. 6).

[0025] FIG. 6 is a schematic diagram of the lever action of lever-type safety lighter of the invention. As shown in FIG. 4 and FIG. 6, the operation method and the principle of igniting the lighter to generate flame is pretty much the same as the above-mentioned lever-type safety lighter having flange pivot point of the first embodiment of the invention, thereby it is not necessary to repeat here.

[0026] FIG. 5 is an exploded view of a lever-type safety lighter having salient-part pivot point of the fourth embodiment of the invention. As shown in FIG. 4, the lever-type safety lighter having salient-part pivot point of the fourth embodiment of the invention includes a main body (1), a wheel racket (2), a file wheel (3), a metal cap (4), and a lever (5). Among them, the main body (1), the file wheel (3), the metal cap (4), and the metal cap (4) are all pretty much similar to those of the lever-type safety lighter having standing-post pivot point of the third embodiment of the invention, thereby it is not necessary to repeat here.

[0027] The wheel racket (2) having a securing seat (22) provided at the center thereof and having a pair of file-wheel seats (21) provided by extending from both sides and standing upright on opposite sides thereof has a securing hole (211) provided on each of the file-wheel seats (21) near the top end thereof and a securing hole (212) provided also on each of the file-wheel seats (21) near the bottom end thereof. Each side of the base (53) furnishes a salient part (532) used to be the pivot point C (see FIG. 6) of the lever (5). The salient parts (532) are fitted in the securing holes (212) near the bottom of the file-wheel seats (21), and the securing holes (212) are used as pivot seat for bearing the salient parts (532). The lever (5) includes a pressing part (51), a base (53), and a slipping hole (55). The slipping hole (55) being used as the point of resisting force B (see FIG. 6) passes through the nozzle (14) and slips on the neck part (141) of the nozzle (14) of the sealing part (11). The salient parts (532) are fitted to the securing holes (212) near the bottom end of the file-wheel seats (21). Moreover, the securing holes (212) are used to be the bearing seat to bear the salient part (532). The pressing part (51) provided at an end of the lever (5) is used to be the point of exerting force A (see FIG. 6).

[0028] FIG. 6 is a schematic diagram of the lever action of lever-type safety lighter of the invention. As shown in FIG. 5 and FIG. 6, the operation method and the principle of igniting the lighter to generate flame is pretty much the same as the above-mentioned lever-type safety lighter having flange pivot point of the first embodiment of the invention, thereby it is not necessary to repeat here.

[0029] Referring again to the lever action shown in FIG. 6, the lever (5) is denoted by AB with point C as its pivot point, A as its point of exerting force, and B as its point of resisting force. AC having S_2 in length is its arm of exerting force while BC having S_1 in length is its arm of resisting force. The principle of lever gives

$$(\text{resisting force}) \times (\text{arm of resisting force}) =$$

$$(\text{exerting force}) \times (\text{arm of exerting force})$$

that is

$$Q \times S_1 = P \times S_2$$

and

$$\text{Mechanical Advantage} = Q/P = S_2 / S_1$$

[0030] Summarizing the above-mentioned description, FIG. 6 is a schematic diagram of the lever action of lever-type safety lighter of the invention; FIG. 2A is a half sectional-view at section B-B of the lever-type safety lighter having flange pivot point of the first embodiment of the invention shown in FIG. 2; FIG. 3A is a half sectional-view at section C-C of the lever-type safety lighter having partition-wall pivot point of the second embodiment of the invention shown in FIG. 3; FIG. 4A is a half sectional-view at section D-D of the lever-type safety lighter having standing-post pivot point of the third embodiment of the invention shown in FIG. 4; and FIG. 5A is a half sectional-view at section E-E of the lever-type safety lighter having salient-part pivot point of the fourth embodiment of the invention shown in FIG. 5.

[0031] As shown in FIG. 6, FIG. 2A, FIG. 3A, FIG. 4A, and FIG. 5A, the S_2 is smaller than S_1 for all the lever-type safety lighter of the first, the second, the third, and the fourth embodiments of the invention. Therefore, the Mechanical Advantage is smaller than 1, i.e. the lever is wasting in exerting force since the exerting force P is greater than the resisting force Q . As the lever being wasting in exerting force makes the lighter hard to manipulate, the child is not likely to ignite the lighter to cause fire while he/she is playing with it. Nevertheless, the exerting force for pressing the lever and filing the filing wheel is still within the range of the manipulative force of the user. The Mechanical Advantage is within the range of 0.3 ~ 0.8, thus it is capable of achieving safety efficacy.

[0032] It will become apparent to those people skilled in the art that various modifications and variations can be made to the structure of the invention without departing from the scope or spirit of the invention. In view of the foregoing description, it is intended that all the modifications and variation fall within the scope of the following appended claims and their equivalents.

Claims

1. A lever-type safety lighter comprising:

a main body for filling liquid gas, the main body being a hollow body having a sealing part furnished on top of the main body and the sealing part furnishing a nozzle with a neck part;
a wheel racket disposing on the top of the sealing part, having a securing seat furnishing at the center for containing a flint, and two opposite file-wheel seats that are extended up therefrom with a securing hole provided on each side near the top end of the file-wheel seats, and having a flange disposing in front of the securing seat;
a file wheel having row teeth on the peripheral thereof for the user to pluck;
a metal cap for slipping on the wheel racket; and
a lever having a flange pivot point further comprising:

a base directly lean against the flange to act as the pivot point C of the lever;
a slipping hole passing through the nozzle and slipping on the neck part thereof for acting as the point of resisting force B of the lever, the distance between the point of resisting force B and the pivot point C being the arm of resisting force is S_1 ; and
a pressing part acting as the point of exerting force A, the distance between the point of exerting force A and the pivot point C being the arm of exerting force is S_2 ;

wherein, the arm of exerting force S_2 is smaller than the arm of resisting force S_1 for the lever-type safety lighter, i.e. the Mechanical Advantage is smaller than 1, and the lever is wasting in exerting force since the exerting force P is greater than the resisting force Q that makes the lighter hard to manipulate, hence the child is not likely to ignite the lighter to cause fire while he/she is playing with it, however, the exerting force P is still within the range of the manipulating force of the user; the Mechanical Advantage is within the range of 0.3 ~ 0.8, thus the lighter is capable of achieving safety efficacy.

2. The lever-type safety lighter as claimed in claim 1, wherein a partition-wall is disposed in front of the securing seat on both sides thereof to replace the flange, the partition-wall being connected between the securing seat and the file-wheel seats to replace the flange is to act as the pivot point C of the lever to replace the lever having flange pivot point C, the lever having partition-wall pivot further comprises:

a base directly lean against the partition-wall to act as the pivot point C of the lever;
 a slipping hole passing through the nozzle and slipping on the neck part thereof for acting as the point of resisting force B of the lever, the distance between the point of resisting force B and the pivot point C being the arm of resisting force is S_1 ; and
 a pressing part acting as the point of exerting force A, the distance between the point of exerting force A and the pivot point C being the arm of exerting force is S_2 ;

wherein, the arm of exerting force S_2 is smaller than the arm of resisting force S_1 for the lever-type safety lighter, i.e. the Mechanical Advantage is smaller than 1, and the lever is wasting in exerting force since the exerting force P is greater than the resisting force Q that makes the lighter hard to manipulate, hence the child is not likely to ignite the lighter to cause fire while he/she is playing with it, however, the exerting force P is still within the range of the manipulating force of the user; the Mechanical Advantage is within the range of 0.3 ~ 0.8, thus the lighter is capable of achieving safety efficacy.

3. The lever-type safety lighter as claimed in claim 1, wherein an indented hole is furnished in front of the securing seat on each side thereof between the two file-wheel seats and the two securing seats respectively to act as the pivot point C of the lever to replace the flange, and a pair of standing posts are furnished on the two sides of the bottom side of the pressing part and are fitted in the corresponding indented hole to act as the pivot point C of the lever, the lever having a standing-post pivot point further comprises:

a base;
 the standing-post having their bottom portions fit in the corresponding indented holes to act as the pivot point C of the lever;
 a slipping hole passing through the nozzle and slipping on the neck part thereof for acting as the point of resisting force B of the lever, the distance between the point of resisting force B and the pivot point C being the arm of resisting force is S_1 ; and
 a pressing part acting as the point of exerting force A, the distance between the point of exerting force A and the pivot point C being the arm of exerting force is S_2 ;

wherein, the arm of exerting force S_2 is smaller than the arm of resisting force S_1 for the lever-type safety lighter, i.e. the Mechanical Advantage is smaller than 1, and the lever is wasting in exerting force since the exerting force P is greater than the resisting force Q that makes the lighter hard to manipulate, hence the child is not likely to ignite the lighter to cause fire while he/she is playing with it, however, the exerting force P is still within the range of the manipulating force of the user; the Mechanical Advantage is within the range of 0.3 ~ 0.8, thus the lighter is capable of achieving safety efficacy.

4. The lever-type safety lighter as claimed in claim 1, wherein a securing hole is disposed near the bottom end of the file-wheel seats on each side thereof, and a salient part is provided on each side of the base, the securing holes are to act as the pivot point C of the lever to replace the lever having flange pivot point, the lever having salient part pivot point further comprises:

a base having the salient parts fit in the securing holes to act as the pivot point C of the lever;
 a slipping hole passing through the nozzle and slipping on the neck part thereof for acting as the point of resisting force B of the lever, the distance between the point of resisting force B and the pivot point C being the arm of resisting force is S_1 ; and
 a pressing part acting as the point of exerting force A, the distance between the point of exerting force A and the pivot point C being the arm of exerting force is S_2 ;

wherein, the arm of exerting force S_2 is smaller than the arm of resisting force S_1 for the lever-type safety lighter, i.e. the Mechanical Advantage is smaller than 1, and the lever is wasting in exerting force since the exerting force P is greater than the resisting force Q that makes the lighter hard to manipulate, hence the child is not likely to ignite the lighter to cause fire while he/she is playing with it, however, the exerting force P is still within the range of the manipulating force of the user; the Mechanical Advantage is within the range of 0.3 ~ 0.8, thus the lighter is capable of achieving safety efficacy.

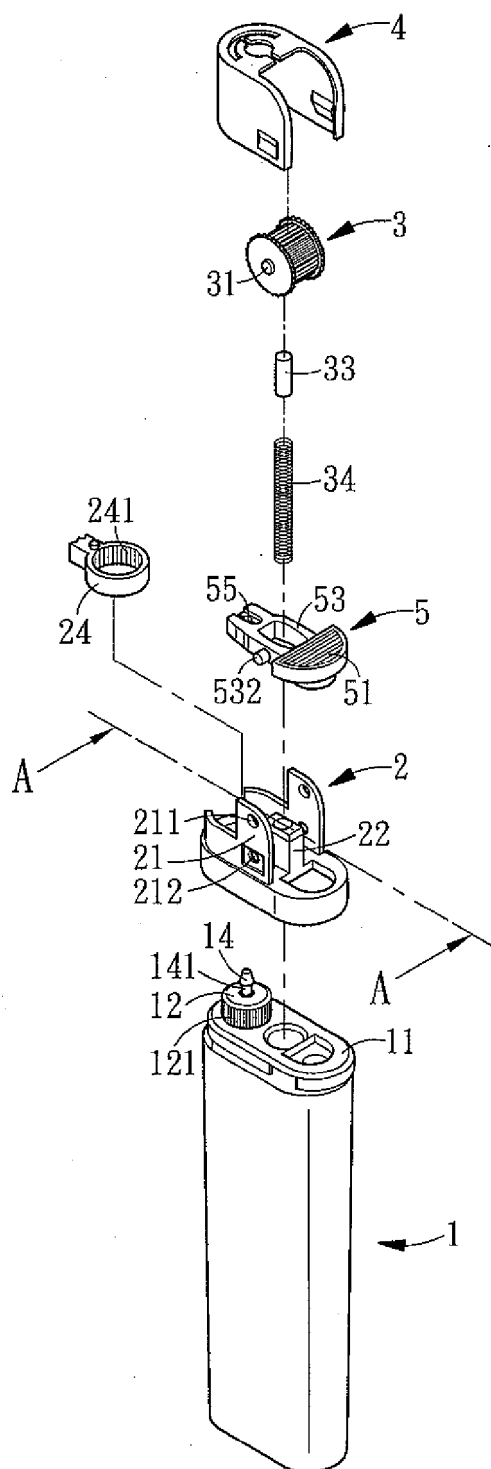
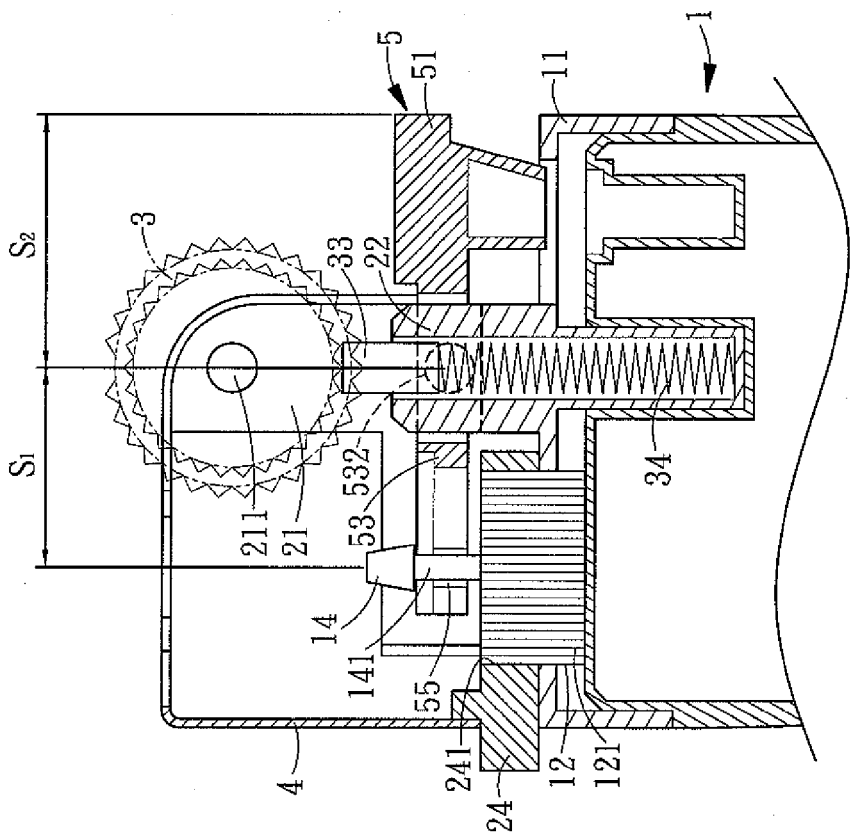


Fig.1
(Prior Art)



Sec:A-A

Fig. 1A
(Prior Art)

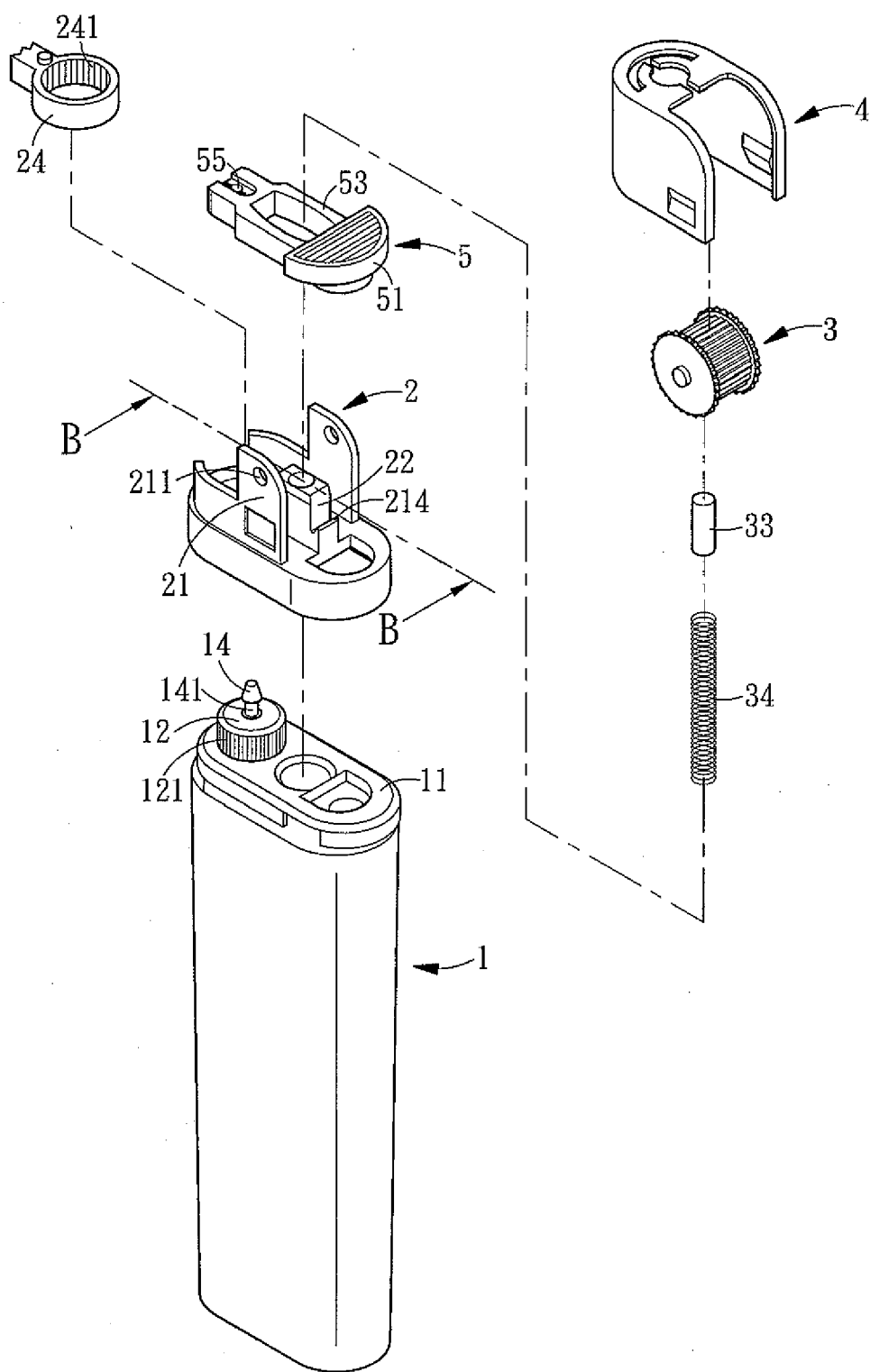
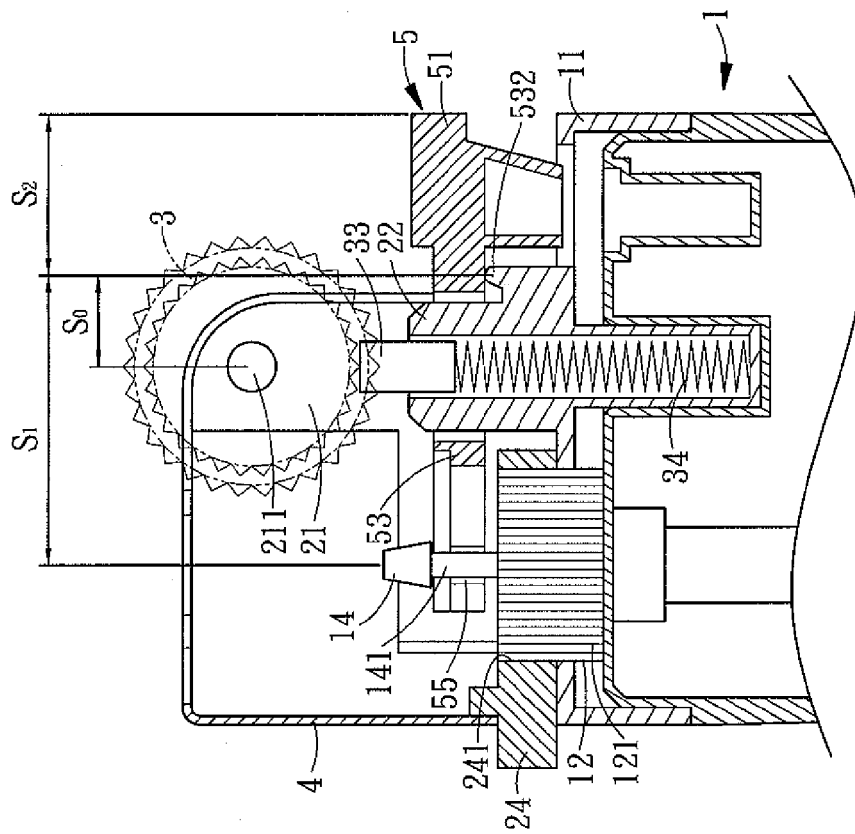


Fig. 2



Sec: B-B

Fig. 2A

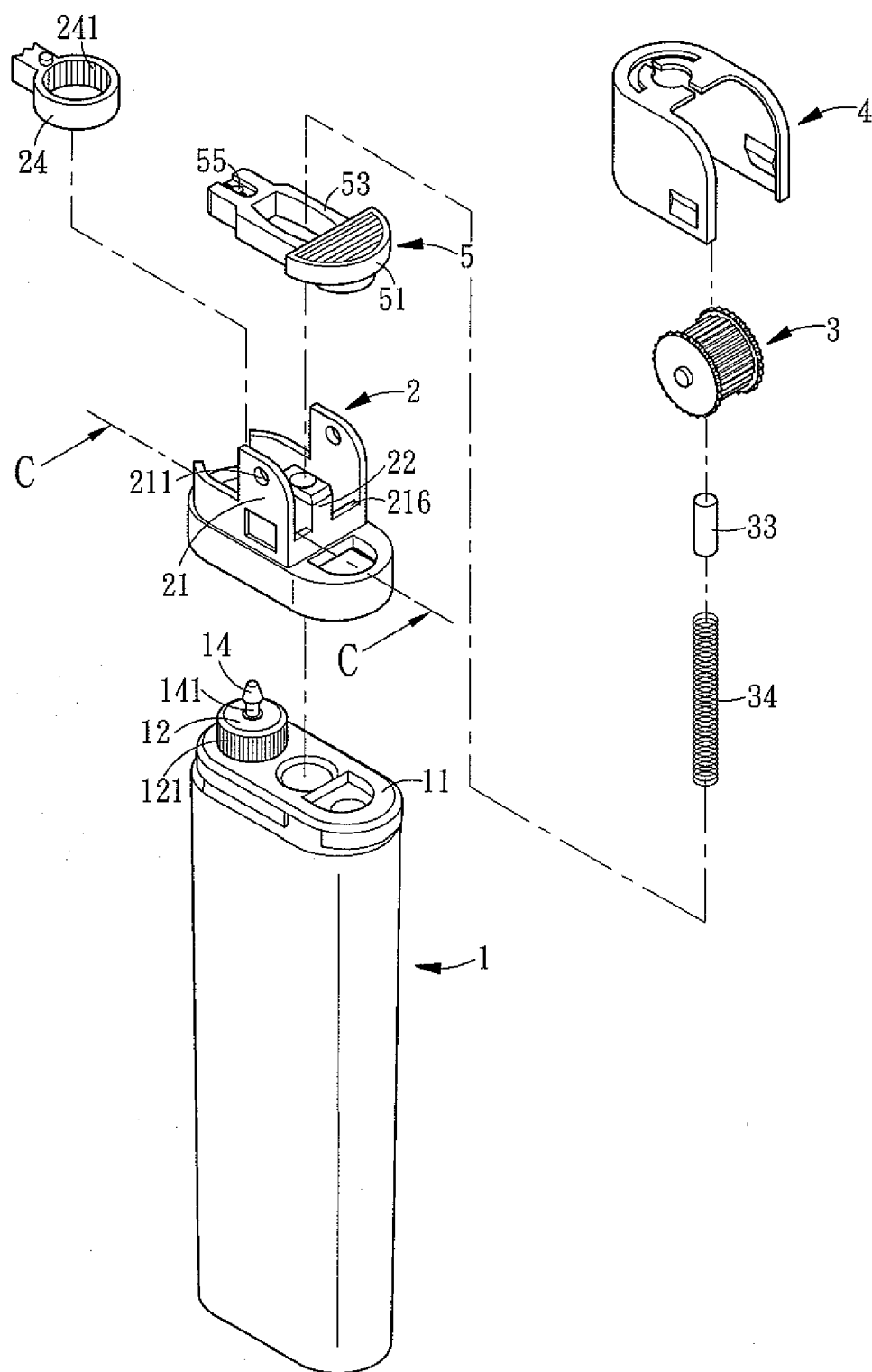
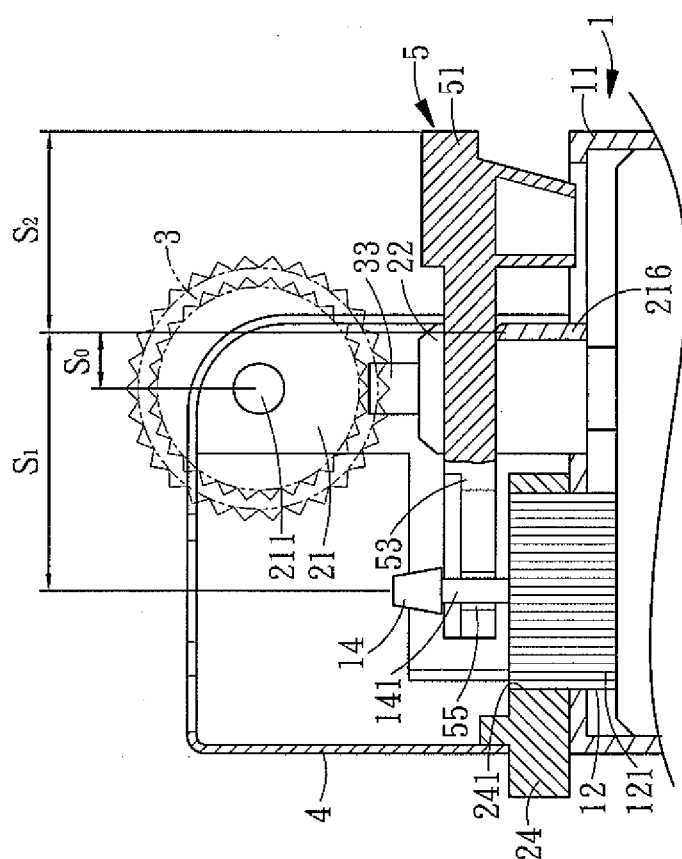


Fig.3



Sec: C-C

Fig. 3A

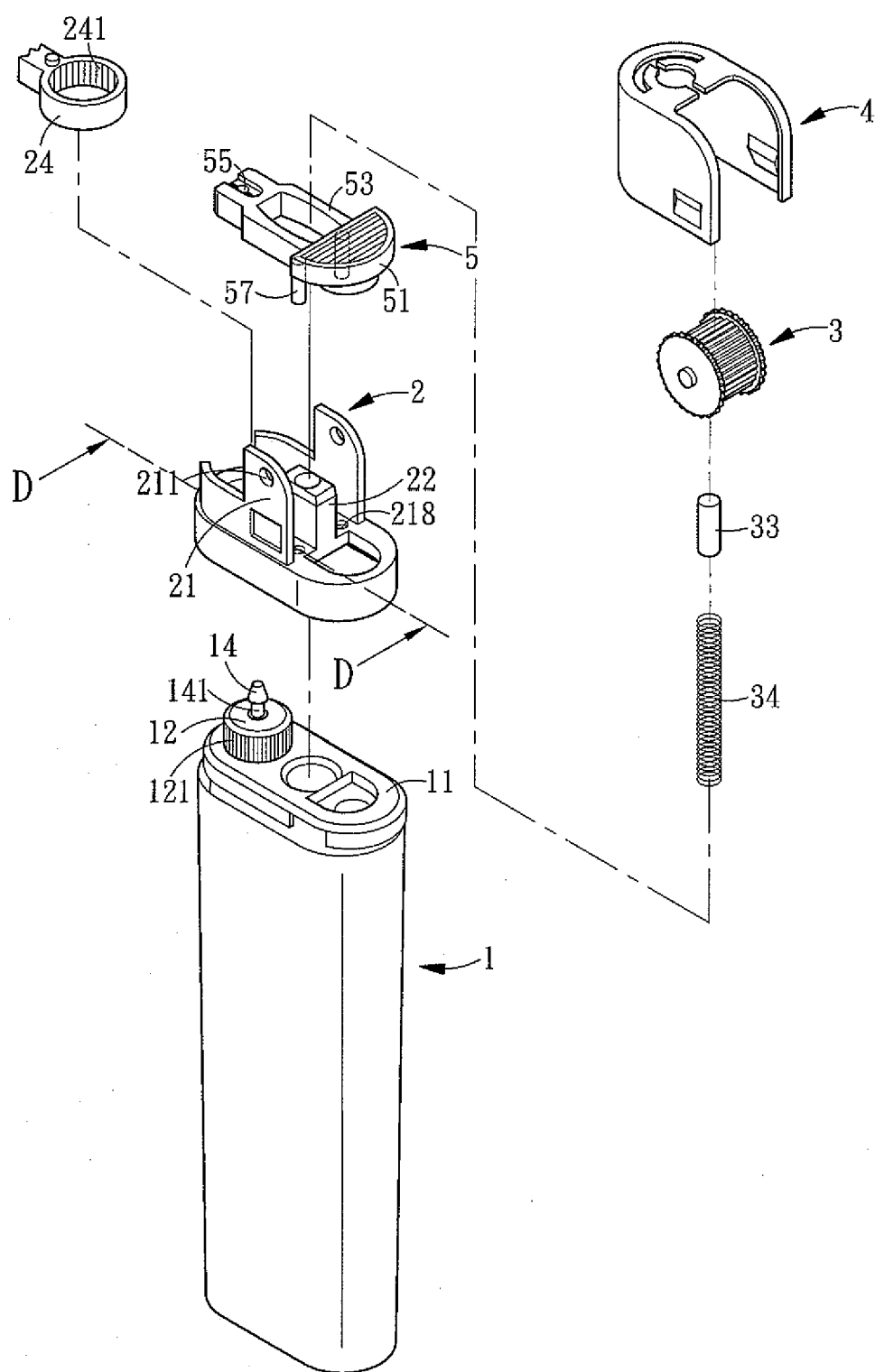
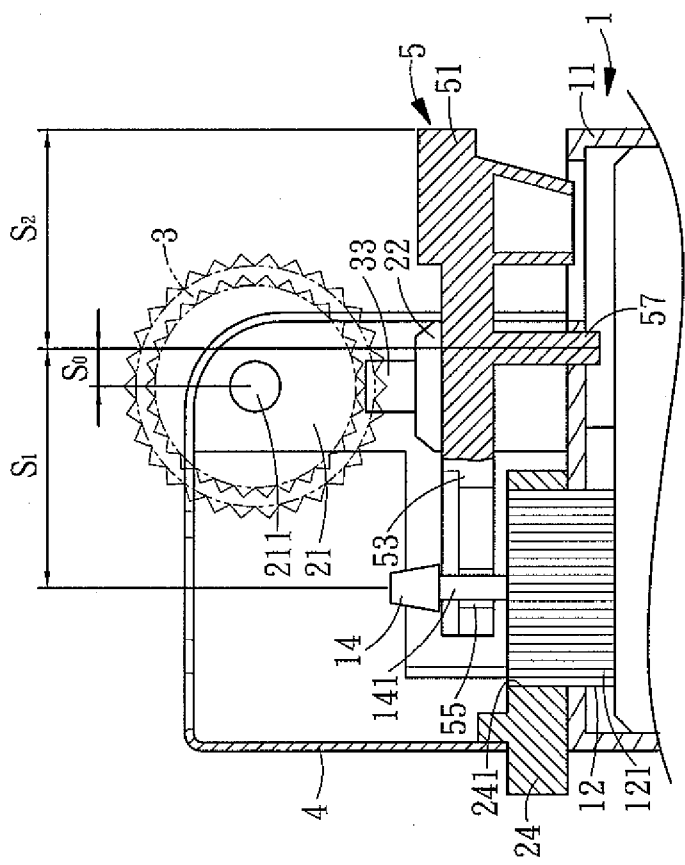


Fig.4



Sec:D-D

Fig. 4A

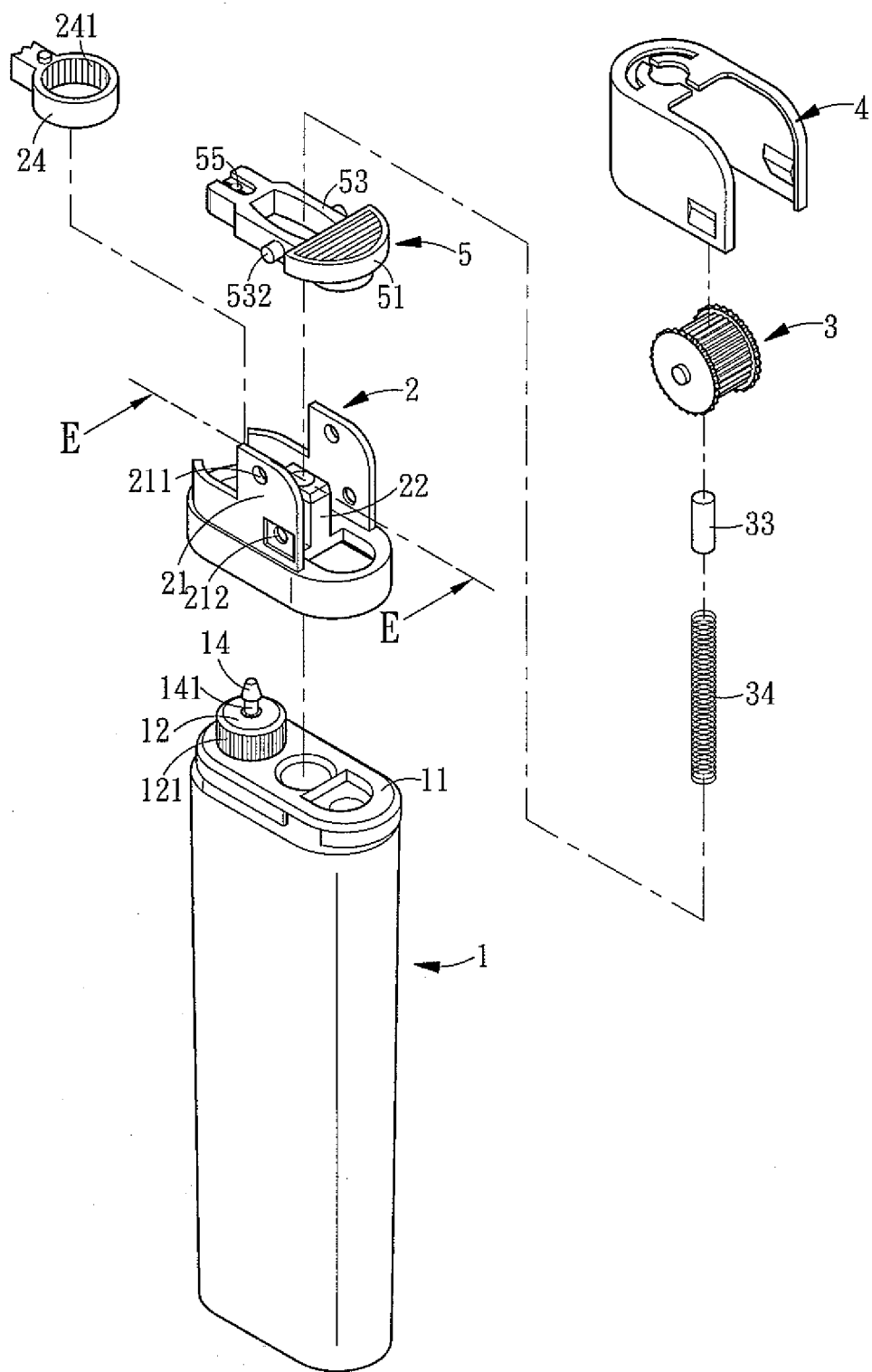
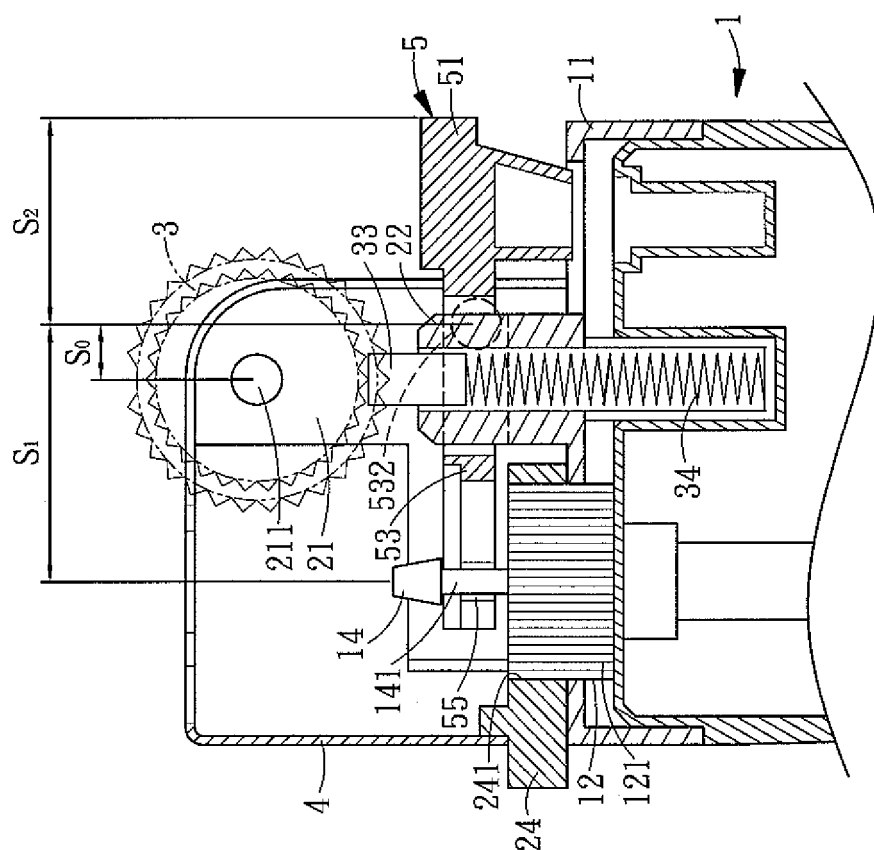


Fig. 5



Sec: F-F

Fig. 5A

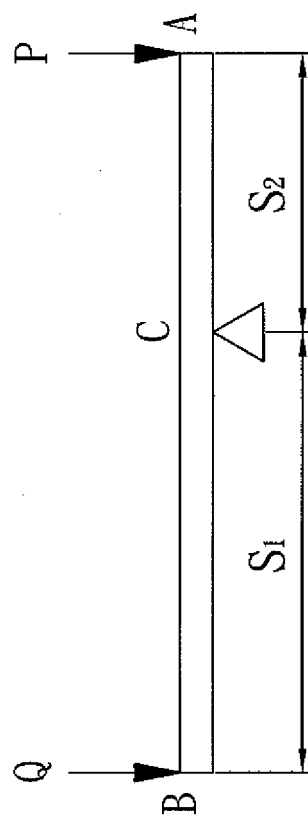


Fig.6



EUROPEAN SEARCH REPORT

Application Number
EP 08 15 7429

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