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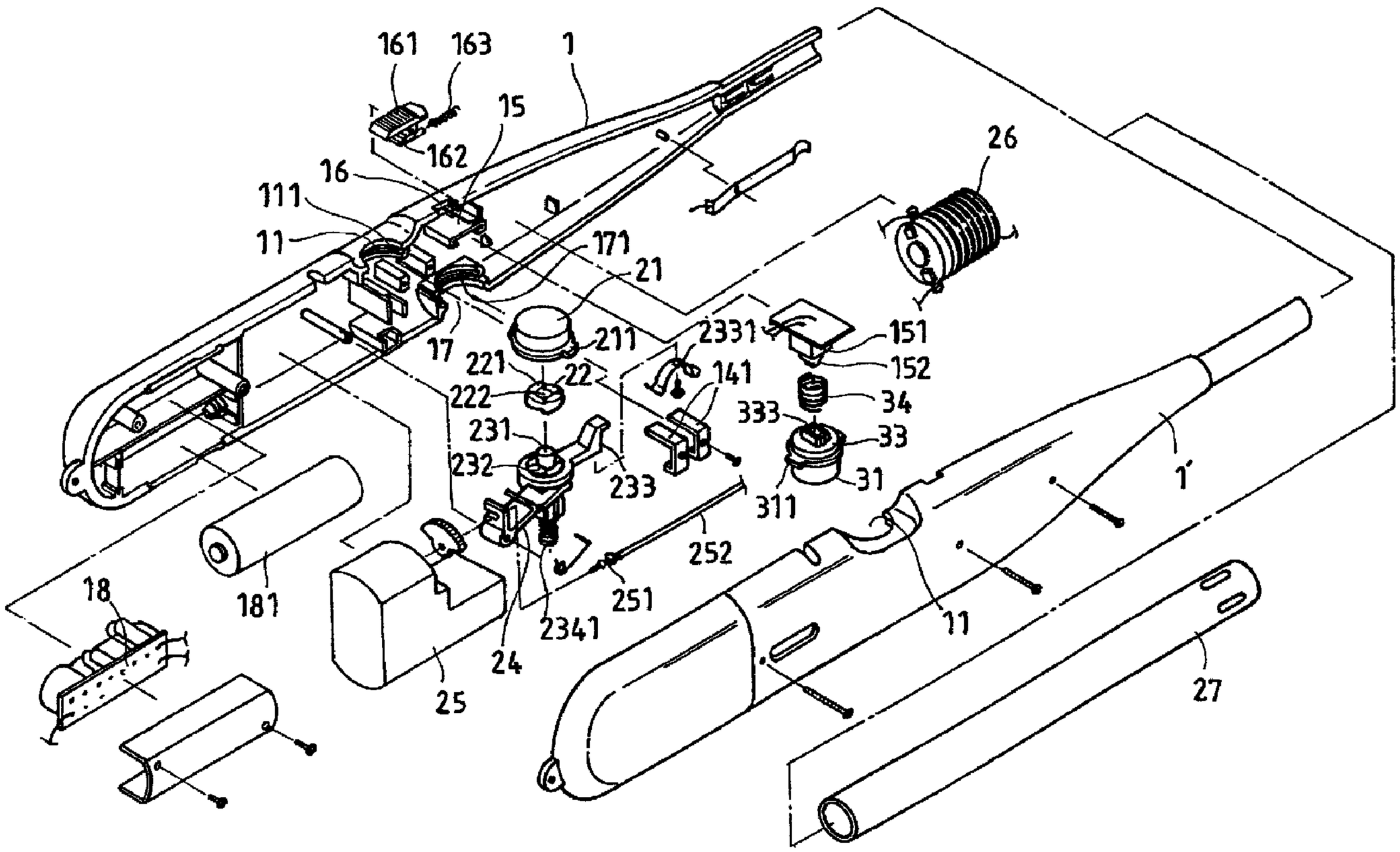
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(54) Titre : BRIQUET ELECTRONIQUE DE SECURITE
(54) Title: SAFETY ELECTRONIC LIGHTER



(57) Abrégé/Abstract:
A safety electronic lighter includes an ignition control switch, which is operated to drive a high voltage coil, causing it to discharge a high voltage in producing sparks, the ignition control switch being rotatable between the operative position and the non-operative position, a safety lock, which is operated to lock the ignition control switch, prohibiting the ignition control switch from operation, a first power control switch, which is operated to switch on/off the power supply circuit of the electronic lighter, a second power

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(57) Abrégé(suite)/Abstract(continued):
control switch adapted to control the operation of the first power control switch and being rotated between the operative position and the non-operative position.

ABSTRACT OF THE DISCLOSURE

A safety electronic lighter includes an ignition control switch, which is operated to drive a high voltage coil, causing it to discharge a high voltage in producing sparks, the ignition control switch being rotatable between the operative position and the non-operative position, a safety lock, which is operated to lock the ignition control switch, prohibiting the ignition control switch from operation, a first power control switch, which is operated to switch on/off the power supply circuit of the electronic lighter, a second power control switch adapted to control the operation of the first power control switch and being rotated between the operative position and the non-operative position.

SAFETY ELECTRONIC LIGHTER

BACKGROUND OF THE INVENTION

The present invention relates to electronic lighters, and more particularly to a safety electronic lighter, which uses two power control switches to double-lock the ignition switch, preventing actuation of the ignition switch accidentally.

U.S. Patent #6,012,916 discloses a safety electronic lighter, which comprises an ignition control switch, which is operated to drive a high voltage coil, causing it to discharge sparks, the ignition control switch being rotatable between the operative position and the non-operative position, a safety lock, which is operated to lock the ignition control switch, preventing the ignition control switch from operation, a first power control switch, which is operated to switch on/off the power supply circuit of the electronic lighter, a second power control switch connected in series to the first power control switch, the second power control switch being mounted inside the housing of the electronic lighter and kept from sight and accessible by a rod member through a hole at the housing of the electronic lighter. This structure of electronic lighter is functional, and safe in use.

SUMMARY OF THE INVENTION

The present invention is based on the aforesaid safety

electronic lighter. According to one aspect of the present invention, the safety electronic lighter comprising:

a housing;

a gas tank mounted in said housing in fluid communication with a flame tube for emitting a flame from said housing;

electrical power supply means for generating electrical sparks at one end of said flame tube, said electrical power supply means including a battery, a high voltage coil, and a battery power supply circuit coupled to said battery;

an ignition control switch mounted on said housing and displaceable for electrical contact to said power supply means; wherein said ignition control switch comprises a control knob, a driving element, a control bar, and a spring, said control bar having a bottom pin downwardly extended from a bottom side thereof, a top pin raised from a top side thereof, a plurality of bevel steps at the top side around said top pin, an extension and a metal strip at said extension, said spring being mounted inside said housing around said bottom pin of said control bar to support said control bar, said driving element comprising a center hole, which receives said top pin of said control bar and

two sets of bevel steps respectively disposed at top and bottom sides thereof around the center hole, said control knob being covered on a part of said control bar, said control knob having a bottom chamber, which receives said driving element, a plurality of bevel steps disposed inside said bottom chamber and meshed with the bevel steps at the top side of said driving element, and two projecting rods raised from the periphery thereof at two opposite sides and respectively inserted in grooves at said housing for enabling said control knob to be rotated clockwise/counter-clockwise within 90° angle between an operative position where said projecting rods are aimed at notches at said housing for enabling said control knob to be depressed to lower said control bar in triggering said control circuit, and a non-operative position where said projecting rods are moved away from said notches into said grooves to stop said control knob from downward movement;

a power control switch mounted to said housing at a location on said housing remote from said ignition control switch and electrically coupled to said electrical power supply means whereby simultaneous actuation of said ignition control switch and said first power control switch discharge said electrical sparks; and

a safety lock member insertable through a housing opening for contacting said ignition control switch and electrically decoupling said ignition control switch from said electrical power supply means and preventing actuation of said ignition control switch,

wherein said safety lock member is supported on a spring and forced by the spring to contact said ignition control switch and to electrically decouple said ignition control switch from said electrical power supply means, said safcty lock member having a bottom stop strip stopped against a rear end of the extension of said control bar to prohibit said control bar from downward movement.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an exploded view of a safety electronic lighter according to the present invention.

FIG. 2 is a sectional assembly view of the safety electronic lighter according to the present invention.

FIG. 3 is an exploded view in an enlarged scale of a part of the present invention, showing the arrangement of the

ignition control switch, the safety lock, and the power control switch.

FIG. 4 is a sectional assembly view of a part of FIG. 3.

FIG. 5 is a sectional view showing the operation of the present invention.

FIG. 6A is a sectional view of a part of the present invention showing the positioning of the control knob in the housing.

FIG. 6B is a schematic drawing showing the control knob rotated counter-clockwise according to the present invention.

FIG. 6C is a schematic drawing showing the control knob rotated clockwise according to the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to Figures from 1 through 4, a safety electronic lighter in accordance with the present invention is generally comprised of a housing, which is formed of two outer shells **1** and **1'**, and an ignition control switch **2** mounted in a hole **11** on the middle of the top side of the housing of the outer shells **1** and **1'**. The ignition control switch **2** is comprised of a control knob **21**, a driving element **22**, and a control bar **23**. The control bar **23** is mounted in an opening **121** at a projecting

frame **12** at one outer shell **1**, having a bottom pin **234** downwardly extended from its bottom, a top pin **231** raised from its top, a plurality of bevel steps **232** at its top side around the root of the top pin **231**, an extension **233**, and a metal strip **2331** at the end of the extension **233**. A spring **2341** is mounted on a substantially U-shaped holder plate **13** at one outer shell **1** around the bottom pin **234** below the projecting frame **12**. The spring **2341** supports the control bar **23** on the holder plate **13**. The driving element **22** comprises a center hole **222**, which receives the top pin **231** of the control bar **23**, and two sets of bevel steps **221** respectively disposed at its top and bottom sides around the center hole **222**. The bevel steps **221** at the bottom side of the driving element **22** are meshed with the bevel steps **232** at the control bar **23**. The control knob **21** is covered on a part of the control bar **23**, having a bottom chamber **213**, which receives the driving element **22**, a plurality of bevel steps **212** disposed inside the bottom chamber **213** and meshed with the bevel steps **221** at the top side of the driving element **22**, and two projecting rods **211** raised from the periphery at two opposite sides and respectively inserted in respective grooves **111** at the bottom side of the hole **11** for enabling the control

knob **21** to be rotated clockwise/counter-clockwise within 90° angle. Stop strips **112** are provided in the grooves **111** to limit the angle of rotation of the control knob **21** within 90° angles, i.e., the control knob **21** is permitted to rotate through 90° angles in clockwise as well as counter-clockwise direction (see also Figures from 6A through 6C). Two metal contacts **141** are respectively mounted on a respective lug **14** at one outer shell, namely, the left outer shell **1**, and connected to power supply by a respective conductor. When the ignition control switch **2** is pressed down, the metal strip **2331** is forced into contact with the metal contacts **141**, thereby causing the electric circuit to be closed. On the contrary, when the ignition control switch **2** is released, the control bar **23** is pushed upwardly back to its former position, and the metal strip **2331** is moved with the control bar **23** from the metal contacts **141** to disconnect the electric circuit.

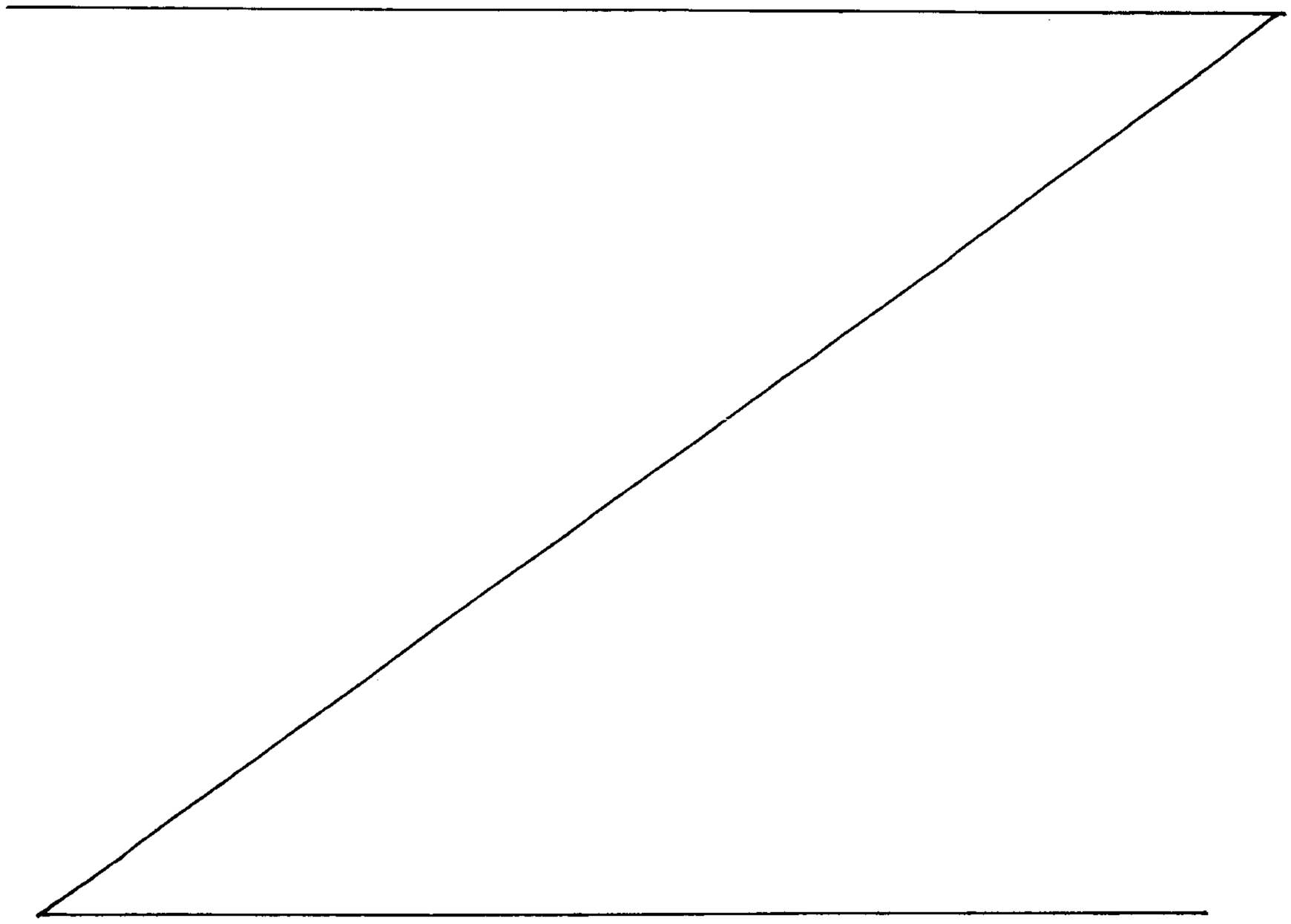
A safety lock **161** is slidably mounted in a sliding slot **16** in one outer shell, namely, the left outer shell **1** of the housing and supported on a spring **163** inside the left outer shell **1**, having a bottom stop strip **162**. The spring **163** imparts a forward pressure to the safety lock **161**. Due to the effect of the spring power of the spring **163**, the safety lock **161** is normally

held in the locking position where the bottom stop strip **162** is stopped against the rear end of the extension **233** of the control bar **23**, preventing the control bar **23** from downward movement. Therefore, the safety lock **161** must be moved backwards from the extension **233** of the control bar **23** to compress the spring **163** before switching on the ignition control switch **2**. Thus, the safety lock member is insertable through a housing opening for contacting the ignition control switch and electrically decoupling the ignition control switch from the electrical power supply means and preventing actuation of the ignition control switch, the safety lock member is supported on a spring and forced by the spring to contact the ignition control switch and to electrically decouple the ignition control switch from the electrical power supply. The safety lock member has a bottom stop strip stopped against a rear end of the extension of said control bar to prohibit the control bar from downward movement.

A high-voltage coil **26** is provided in the housing of the outer shells **1** and **1'** near the front side, and connected to a high-voltage generating circuit **18** and a battery **181**. The

high-voltage generating circuit **18** controls the high-voltage coil **26** to discharge a high voltage in producing sparks for igniting fuel gas. A press-button switch **151** is mounted in a switch holder **15** at one outer shell **1**, and operated to close/open the circuit of the high voltage coil **26**, the high-voltage generating circuit **18** and the battery **181**.

A hole **17** is provided in the housing of the outer shells **1;1'**. An annular groove **171** is provided in the inside wall of the housing of the outer shells **1;1'** around the hole **17**. Two notches **172** are provided in the annular groove **171** at two sides. A power control switch **3** is installed in the hole **17**, and adapted to control the operation of the press-button switch **151**. The



power control switch **3** is comprised of a control knob **31**, a driving element **32**, a follower block **33**, and a compression spring **34**. The control knob **31** comprises a bottom chamber **313**, which receives the driving element **32**, a plurality of bevel steps **312** disposed inside the bottom chamber **313** and meshed with respective top bevel steps **321** of the driving element **32**, and two projecting rods **311** raised from the periphery at two opposite sides and respectively inserted in the annular groove **171** for enabling the control knob **31** to be rotated clockwise/counter-clockwise within 90° angle. The follower block **33** comprises a rectangular coupling hole **333** coupled to the rectangular button **152** of the press-button switch **151**, a top pin **331** inserted into the center hole **322** of the driving element **32**, and a plurality of bevel steps **332** disposed around the top pin **331** and meshed with respective bottom bevel steps **321** of the driving element **32**. When rotating the control knob **31** through 90 angles, the projecting rods **311** are engaged into the annular groove **171** to stop the control knob **31** from axial movement, and therefore the user cannot depress the control knob **31** to switch on the press-button switch **151**.

Referring to FIG. 5, when in use, the control knob **21** of the ignition control switch **2** and the control knob **31** of the

power control switch **3** must be respectively rotated to such a position that the projecting rods **211;311** are respectively moved to the respective notches **113;172** and the safety lock **161** must be pushed away from the extension **233** of the control bar **23**, so that the control knobs **21;31** can be simultaneously depressed to switch on the ignition control switch **2** and the press-button switch **151**. After depressing of the ignition control switch **2** and the press-button switch **151**, the pull rod **24** is pulled to open the valve **251** of the gas tank **25** for enabling fuel gas to flow through the gas tube **252** to the flame tube **27** for burning by sparks producing due to discharge of a high voltage from the high-voltage coil **26**.

It is to be understood that the drawings are designed for purposes of illustration only, and are not intended as a definition of the limits and scope of the invention disclosed.

WHAT IS CLAIMED IS:

1. A safety electronic lighter comprising:

a housing;

a gas tank mounted in said housing in fluid communication with a flame tube for emitting a flame from said housing;

electrical power supply means for generating electrical sparks at one end of said flame tube, said electrical power supply means including a battery, a high voltage coil, and a battery power supply circuit coupled to said battery;

an ignition control switch mounted on said housing and displaceable for electrical contact to said power supply means;

wherein said ignition control switch comprises a control knob, a driving element, a control bar, and a spring, said control bar having a bottom pin downwardly extended from a bottom side thereof, a top pin raised from a top side thereof, a plurality of bevel steps at the top side around said top pin, an extension and a metal strip at said extension, said spring being mounted inside said housing around said bottom pin of said control bar to

support said control bar, said driving element comprising a center hole, which receives said top pin of said control bar and two sets of bevel steps respectively disposed at top and bottom sides thereof around the center hole, said control knob being covered on a part of said control bar, said control knob having a bottom chamber, which receives said driving element, a plurality of bevel steps disposed inside said bottom chamber and meshed with the bevel steps at the top side of said driving element, and two projecting rods raised from the periphery thereof at two opposite sides and respectively inserted in grooves at said housing for enabling said control knob to be rotated clockwise/counter-clockwise within 90° angle between an operative position where said projecting rods are aimed at notches at said housing for enabling said control knob to be depressed to lower said control bar in triggering said control circuit, and a non-operative position where said projecting rods are moved away from said notches into said grooves to stop said control knob from downward movement;

a power control switch mounted to said housing at a location on said housing remote from said ignition control switch and electrically coupled to said electrical power supply

means whereby simultaneous actuation of said ignition control switch and said first power control switch discharge said electrical sparks; and

a safety lock member insertable through a housing opening for contacting said ignition control switch and electrically decoupling said ignition control switch from said electrical power supply means and preventing actuation of said ignition control switch,

wherein said safety lock member is supported on a spring and forced by the spring to contact said ignition control switch and to electrically decouple said ignition control switch from said electrical power supply means, said safety lock member having a bottom stop strip stopped against a rear end of the extension of said control bar to prohibit said control bar from downward movement.

2. The safety electronic lighter as recited in claim 1 wherein said ignition control switch is mounted on an upper surface of said housing.

3. The safety electronic lighter as recited in claim 1 wherein said power control switch is mounted on a lower surface of said housing.

4. The safety electronic lighter as recited in claim 3 wherein said power control switch comprises a control knob, a driving element, a control bar, and a spring, said control bar having a bottom pin downwardly extended from a bottom side thereof, a top pin raised from a top side thereof, a plurality of bevel steps at the top side around said top pin, an extension and a metal strip at said extension, said spring being mounted inside said housing around said bottom pin of said control bar to support said control bar, said driving element comprising a center hole, which receives said top pin of said control bar and two sets of bevel steps respectively disposed at top and bottom sides thereof around the center hole, said control knob being covered on a part of said control bar, said control knob having a bottom chamber, which receives said driving element, a plurality of bevel steps disposed inside said bottom chamber and meshed with the bevel steps at the top side of said driving element, and two projecting rods raised from the periphery thereof at two opposite sides and respectively inserted in grooves at said

housing for enabling said control knob to be rotated clockwise/counter-clockwise within 90° angle between an operative position where said projecting rods are aimed at notches at said housing for enabling said control knob to be depressed to lower said control bar in triggering said control circuit, and a non-operative position where said projecting rods are moved away from said notches into said grooves to stop said control knob from downward movement.

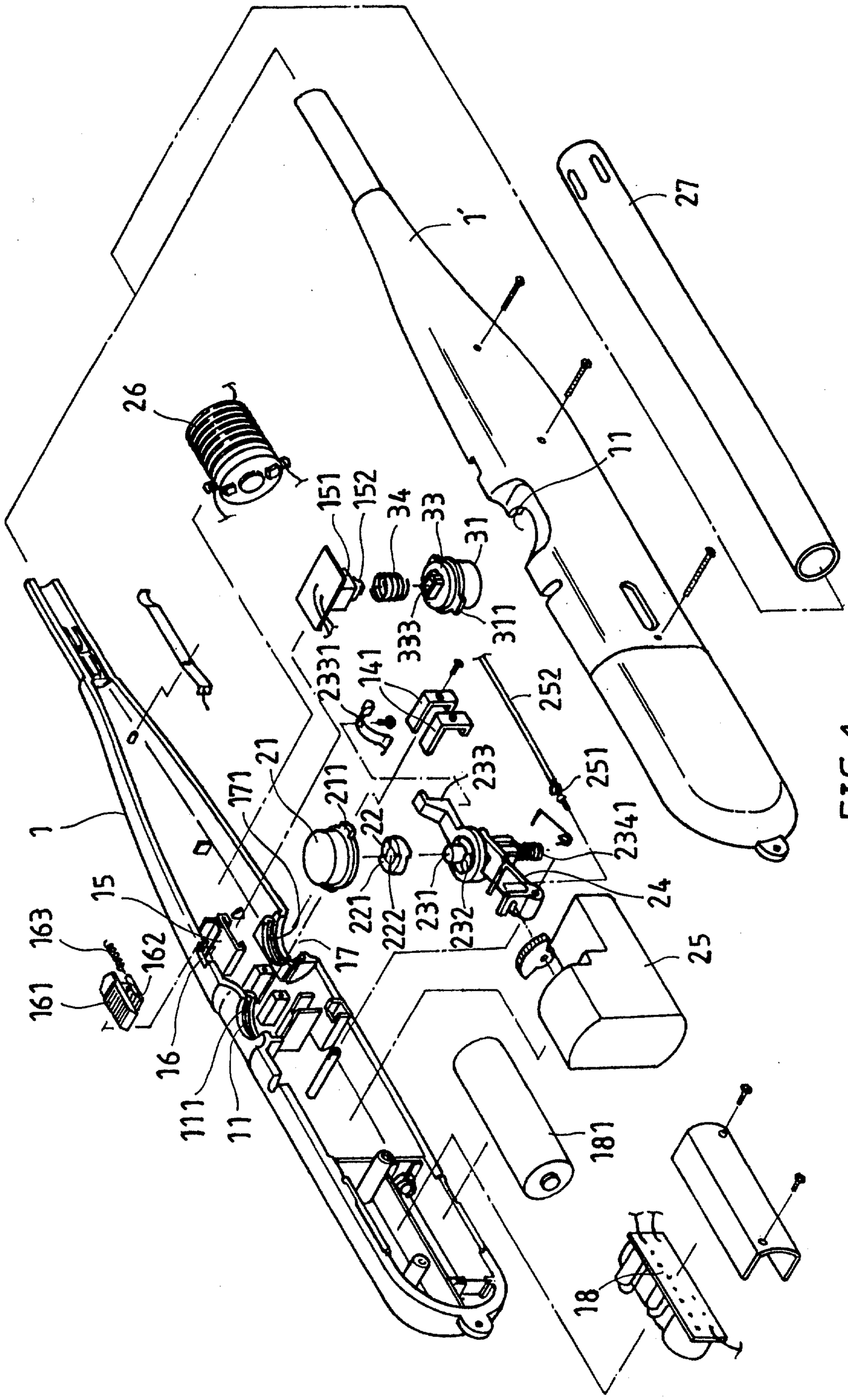

1
27
26
151
152
34
33
31
311
2331
141
333
11
252
251
2341
24
25
21
171
211
22
233
221
222
231
232
17
15
163
162
161
16
11
11-1
181
18

FIG.1

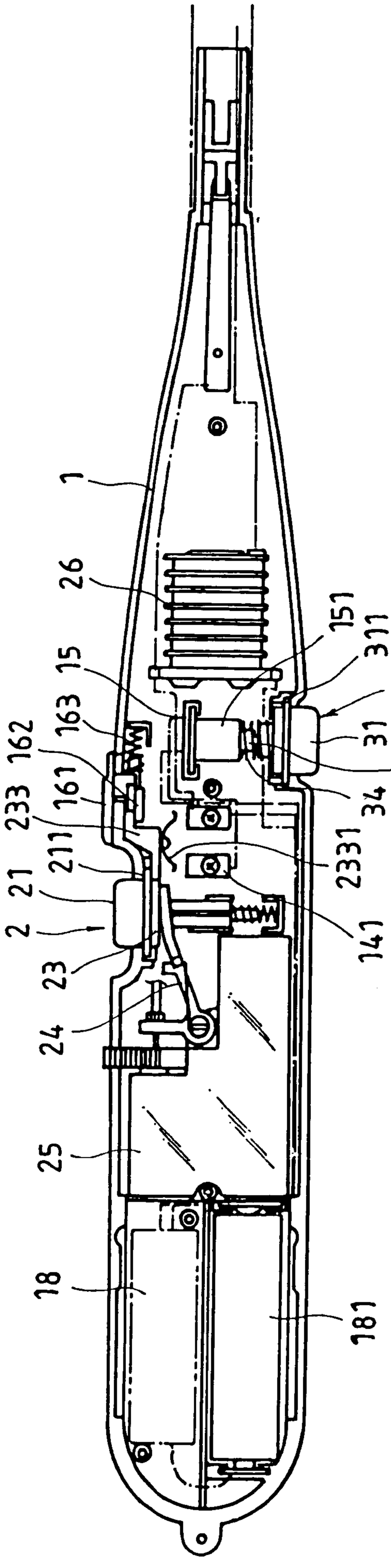

1
26
151
311
15
3
163
162
31
161
152
233
34
211
2331
21
141
2
23
24
25
18
181

FIG.2

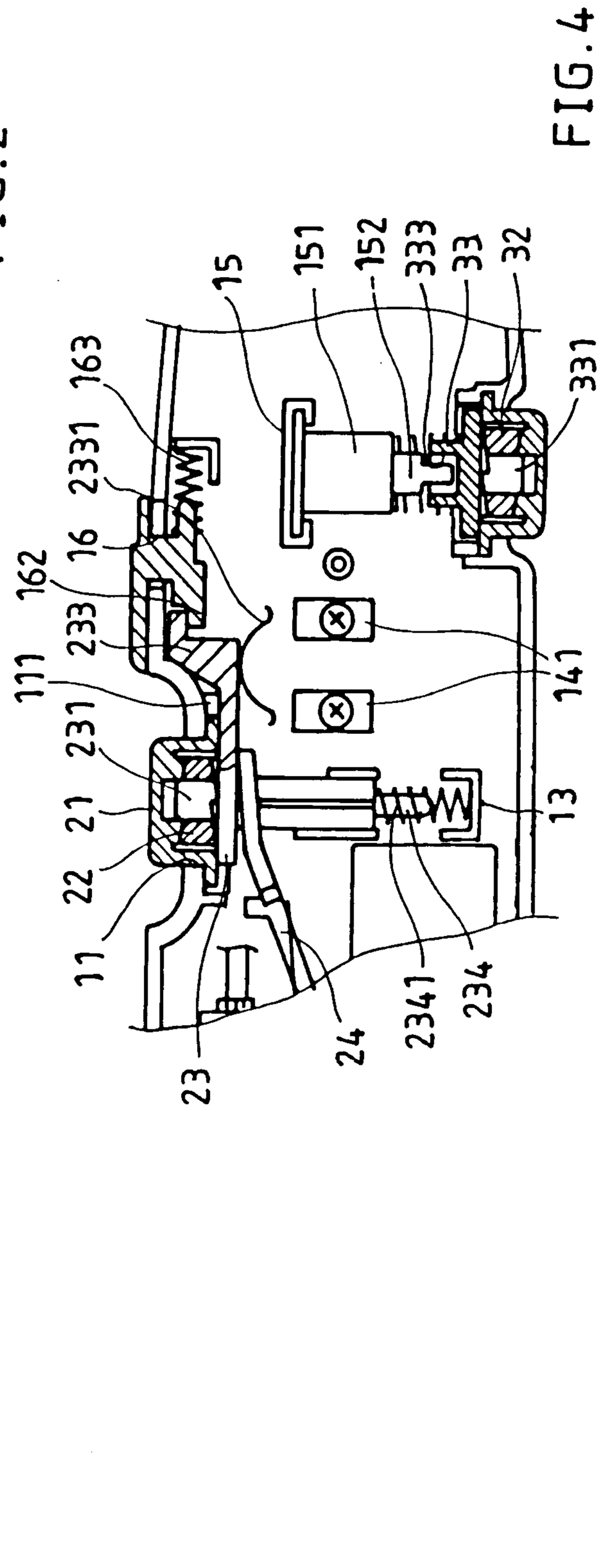

15
151
152
333
33
32
331
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2331
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162
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231
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22
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141
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2341
234
23

FIG.4

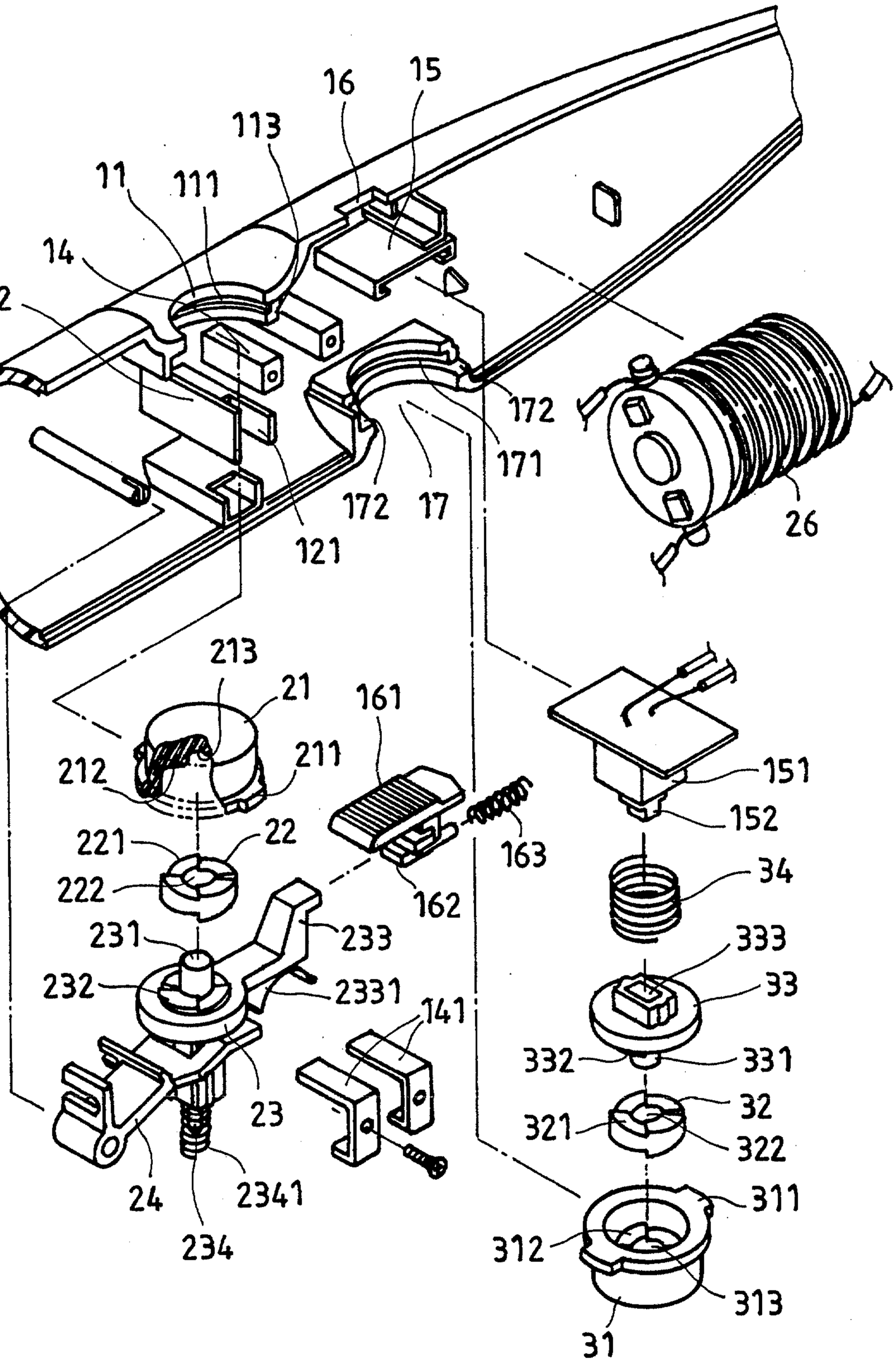

16
15
113
11
111
14
12
172
171
172
17
121
26
213
21
161
212
211
151
152
163
221
22
34
222
162
231
233
333
33
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2331
141
332
331
23
321
32
322
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2341
311
312
234
313
31

FIG.3

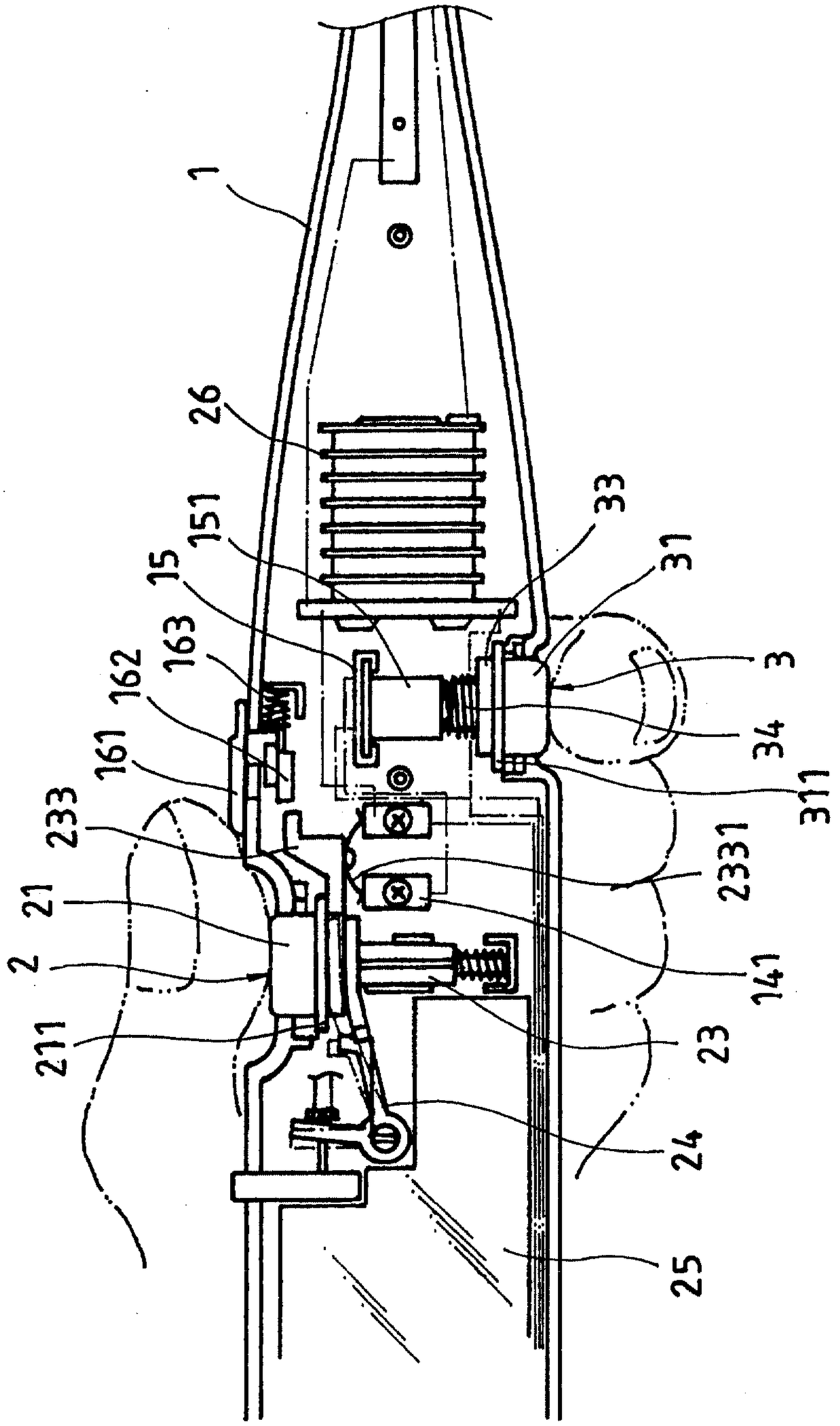


FIG.5

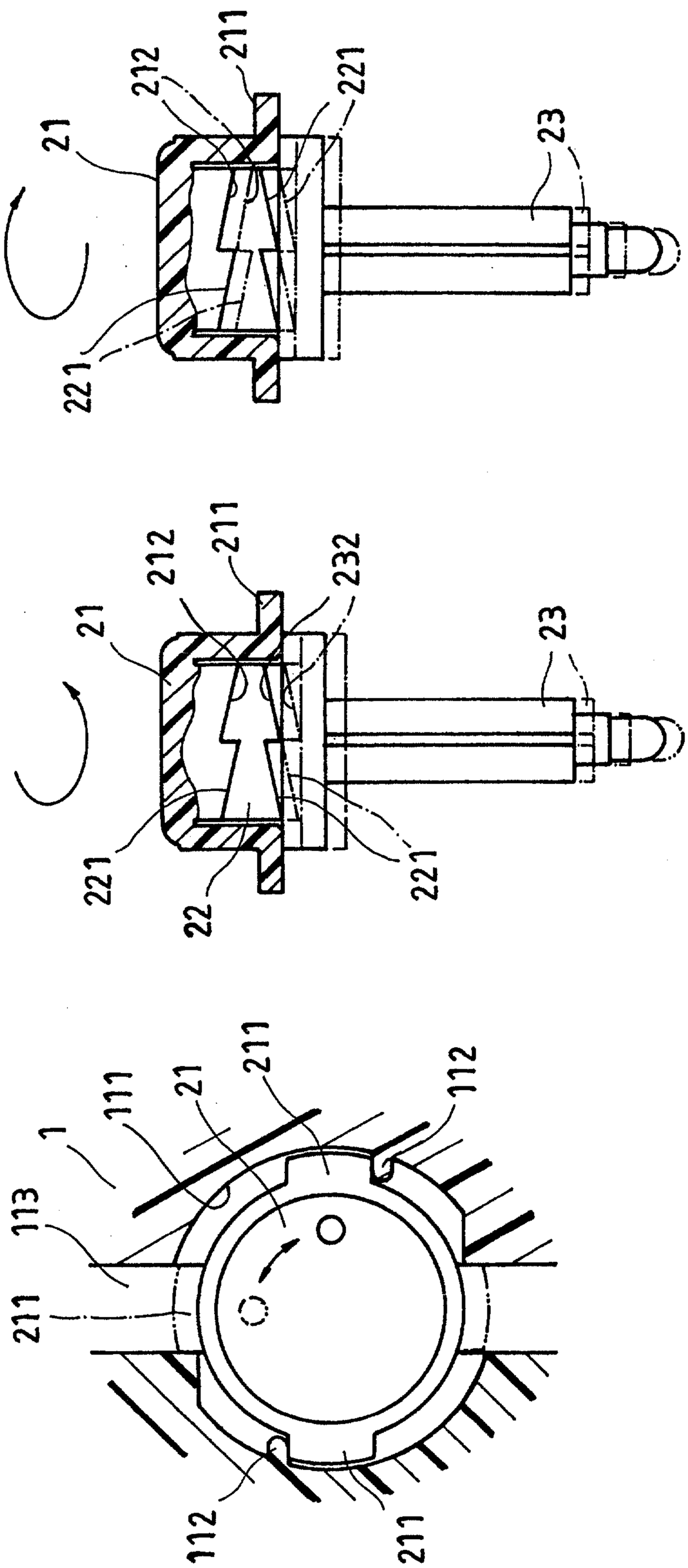
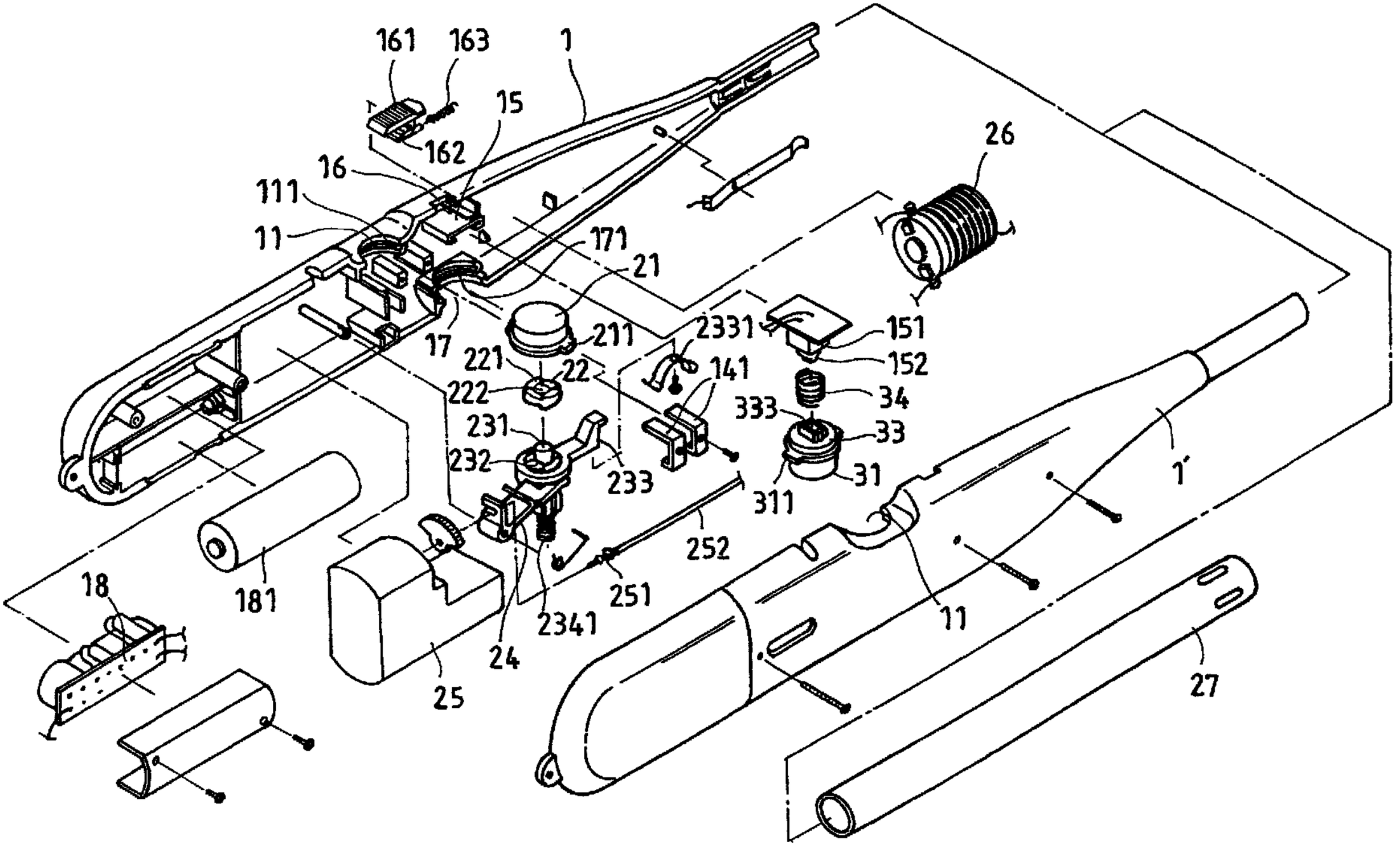


FIG.6C

FIG.6B

FIG.6A


161
163
1
15
162
16
111
11
171
21
211
17
221
22
222
231
232
233
181
18
25
24
2341
251
252
2331
141
151
152
34
333
33
31
311
26
1'
11
27