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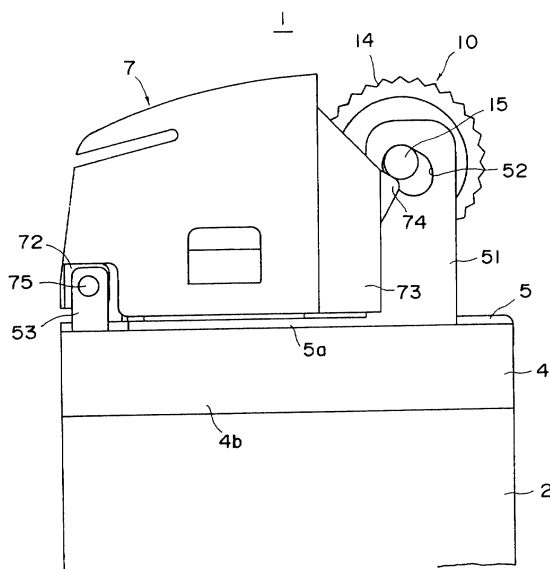
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(54) **Lighter**

(57) In a lighter, fuel is stored in a fuel reservoir. The lighter includes a burner member for burning the fuel, a file wheel provided with side wheels and a flint which is caused to strike the file wheel from below. A support post supports the rotary shaft of the file wheel, and a cap opens and closes the tip of the burner member. The cap is supported for rotation on a support shaft at its end remote from the file wheel, is urged toward its opening position by a spring and is provided on its end near to the file wheel with a stopper portion which is adapted to be engaged with the rotary shaft of the file wheel. The

rotary shaft is mounted on the support post to be movable between its locking position where it is engaged with the stopper member to keep the cap in the closed position and its releasing position where it is disengaged from the stopper portion to permit the cap to be opened under the force of the spring so that the rotary shaft is moved to the locking position when the cap is closed and the stopper portion is brought into abutment against the rotary shaft and to the releasing position when the side wheels are operated to ignite the fuel on the burner member.



F I G . 1

EP 1 106 926 A2

Description

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] This invention relates to a lighter provided with an igniter comprising a flint and a file wheel and a cap for closing the tip of the wick, and more particularly to a structure for opening and closing the cap.

Description of the Related Art

[0002] There has been known a lighter in which liquefied fuel gas or fuel liquid such as alcohol is used and a cap which is pivoted on the lighter to body to open and close the lighter.

[0003] As a mechanism for opening and closing the cap, there has been known that in which the cap is pivoted coaxially with the pivot of a file wheel as disclosed, for instance, in Japanese Unexamined Patent Publication No. 53(1978)-83872.

[0004] However, such a lighter is disadvantageous in that since the cap cannot be wide opened, the tip of the cap apt to be heated by the flame, which is obstructive to closure of the cap, and since the cap is too close to the flame, the cap interferes with lighting a cigarette.

[0005] Further, opening and closing the cap is relatively easy in a lighter where the cap opens and closes the whole upper portion of the lighter including the file wheel, whereas the cap is hard to open in a lighter where the cap only closes a part of the upper portion of the lighter including the burner.

[0006] Further if the cap opening action is not interlocked with the igniting action, the lighter must be ignited in two steps, which is troublesome.

[0007] Further, in a lighter in which liquid fuel is employed, the fuel can be evaporated and consumed when the cap is opened during storage or the like, and accordingly, it is preferred that the cap can be locked in the closed state.

SUMMARY OF THE INVENTION

[0008] In view of the foregoing observations and description, the primary object of the present invention is to provide a lighter in which the cap can be wide opened not to be heated by the flame and the cap can be opened without directly touching the cap and locked in the closed state.

[0009] In accordance with the present invention, there is provided a lighter comprising a fuel reservoir in which fuel is stored, a burner member for burning the fuel, an igniter means including a file wheel provided with side wheels and a flint which is caused to strike the file wheel from below, a support post which supports the rotary shaft of the file wheel, and a cap which opens and closes the tip of the burner member, wherein the improvement

comprises that

the cap is supported for rotation on a support shaft at its end remote from the file wheel, is urged toward its opening position by a spring and is provided on its end near to the file wheel with a stopper portion which is adapted to be engaged with the rotary shaft of the file wheel, and

the rotary shaft is mounted on the support post to be movable between its locking position where it is engaged with the stopper member to keep the cap in the closed position and its releasing position where it is disengaged from the stopper portion to permit the cap to be opened under the force of the spring so that the rotary shaft is moved to the locking position when the cap is closed and the stopper portion is brought into abutment against the rotary shaft and to the releasing position when the side wheels are operated to ignite the fuel on the burner member.

[0010] It is preferred that the side wheels be pushed and rotated to ignite the fuel on the burner member and the rotary shaft be moved to the releasing position in response to the igniting action of the side wheels.

[0011] It is preferred that the rotary shaft of the file wheel be supported in an inclined groove formed on the support post to be inclined rearward downward so that the rotary shaft is moved downward and away from the cap along the inclined groove from the locking position to the releasing position when the side wheels are pushed down and rotated to ignite the fuel on the burner member and so that, when the cap is closed, the rotary shaft is once moved from the locking position to the releasing position pushed by the stopper portion and then moved to the locking position where it is engaged with the upper side of the stopper portion to prevent the cap from being opened.

[0012] It is preferred that the rotary shaft be moved from the releasing position to the locking position under the force of a flint urging spring which presses the flint against the file wheel.

[0013] It is preferred that the fuel be fuel liquid and the burner member be a wick which sucks up the fuel liquid in the reservoir and burns the fuel liquid on its tip.

[0014] In the lighter of the present invention, since the cap is rotated to the opening position on a pivot disposed on the side of the flame opposite to the file wheel, the cap can be wide opened and be remote from the flame, whereby the cap cannot be heated to a high temperature and can be closed by a finger without any trouble. Further, since the cap is locked in the closed position by engagement between the stopper portion on the cap and the rotary shaft of the file wheel, the cap can be surely kept closed, whereby the problem that the cap is accidentally opened during storage or the like and the fuel is evaporated can be avoided. Further since the cap is opened by operation of the side wheels, opening of the cap is facilitated even if the cap is small.

[0015] When the side wheels are pushed and rotated to ignite the fuel on the burner member and the rotary

shaft is moved to the releasing position in response to the igniting action of the side wheels, the lighter can be handled very easily.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016]

Figure 1 is a side view of an upper part of a lighter in accordance with an embodiment of the present invention,

Figure 2 is a cross-sectional view of the part of the lighter shown in Figure 1,

Figure 3 is a side view of an upper part of the lighter for illustrating the state of the lighter at the beginning of the igniting/cap opening operation,

Figure 4 is a side view of the upper part of the lighter for illustrating the state of the lighter at the end of the igniting/cap opening operation,

Figure 5 is a side view of the upper part of the lighter for illustrating the state of the lighter at the beginning of the quenching/cap closing operation,

Figure 6 is a side view of the upper part of the lighter for illustrating the state of the lighter in the course of the quenching/cap closing operation, and

Figure 7 is a side view of the upper part of the lighter for illustrating the state of the lighter at the end of the quenching/cap closing operation.

DESCRIPTION OF THE PREFERRED EMBODIMENT

[0017] In the following description, the left side as seen in Figure 1 is expressed as the front of the lighter and the right side as seen in Figure 1 is expressed as the rear (back) of the lighter.

[0018] In Figures 1 and 2, a lighter 1 in accordance with an embodiment of the present invention is provided with a fuel reservoir 2 in the form of a bottomed tubular member formed of paper, plastic or the like. The fuel reservoir 2 is filled with stuffing (not shown) of fuel absorbent fiber which occludes fuel liquid. The open upper end of the fuel reservoir 2 is closed by a reservoir upper lid 4 formed of resin or metal. A bracket 5 is fixed to the upper lid 4, and a burner member 6 for burning the fuel liquid, a cap 7 for opening and closing the tip of the burner member 6 and an igniter means 10 for igniting the fuel liquid on the burner member 6 are mounted on the bracket 5.

[0019] The upper lid 4 comprises a horizontal wall 4a, and a peripheral wall 4b which extends along the edge of the horizontal wall 4a and conforms to the outer contour of the fuel reservoir 2. A joint wall portion 4c extends downward from the lower surface of the peripheral wall 4b at a slight distance from the outer edge of the peripheral wall 4b and is fitted in the open upper end of the fuel reservoir 2. A tubular burner holding portion 41 extends upward from a front portion of the horizontal wall 4a of the upper lid 4. The upper end of the tubular burner

holding portion 41 projects upward beyond the upper end of the peripheral wall 4b. A rod-like burner member 6 held in the burner holding portion 41. The burner member 6 is a wick the lower end portion of which projects into the fuel reservoir 2 and is in contact with the stuffing to suck up the fuel liquid and the upper end portion of which projects upward from the upper end of the burner holding portion 41 to burn the fuel liquid.

[0020] A flint holder portion 42, which is in a tubular space extending up and down, is provided on a rear portion of the upper lid 4. The flint holder portion 42 extends upward higher than the upper end of the peripheral wall 4b and downward to the lower end of the joint wall portion 4c. A flint 11 and a flint urging spring 12, which are components of the igniter means 10, are contained in the flint holder portion 42.

[0021] The aforesaid bracket 5 is formed of a metal plate and is mounted on the top of the reservoir upper lid 4. The bracket 5 includes a flat plate portion 5a, and a first window 5b, through which the burner holding portion 41 extends upward, is formed in the flat plate portion 5a. A pair of support posts 51 are erected from the flat plate portion 5a at a rear portion thereof laterally spaced from each other. Each support post 51 is provided with an inclined groove 52 for supporting for rotation a pivot of a file wheel 13 of the igniter means 10. A pair of bearing portions 53 for supporting for rotation the cap 7 are erected from the flat plate portion 5a at a front portion thereof laterally spaced from each other. Further, a second window 5c, through which the flint holder portion 42 extends upward, is formed in the flat plate portion 5a between the support posts 51.

[0022] A side wheels 14 are fixed to opposite sides of the file wheel 13 of the igniter means 10 so that the file wheel 13 is rotated together with the side wheels 14. The side wheels 14 are provided with serration on their outer peripheral surfaces and are rotated when the lighter 1 is to be ignited. Opposite end portions of a rotary shaft 15 project outward from the left and right side wheels 14 and are supported for rotation on the support posts 51. The flint 11 contained in the flint holder portion 42 is pressed against the surface of the file wheel 13 under the force of the spring 13 and sparks are thrown toward the burner member 6 in response to rotation of the side wheels 14.

[0023] The aforesaid cap 7 covers a front half of the upper part of the lighter 1 except the igniter means 10, and an inner cap 71 for closing the tip of the burner member 6 is mounted inside the cap 7. The cap 7 is supported for rotation on the bearing portions 53 by way of support shaft 75 at its front end remote from the file wheel 13, and is urged toward its opening position by a spring 76. That is, the cap 7 is provided with a pair of mounting portions 72 on opposite sides of the front end portion thereof, and the support shaft 75 extends through the mounting portions 72 with its opposite end portions supported for rotation on the bearing portions 53. The spring 76 is in the form of a torsion spring and is mounted on

the support shaft 75 with its one end in abutment against the inner side of the cap 7 and its the other end in abutment against the flat plate portion 5a of the bracket 5, whereby the cap 7 is urged toward its opening position.

[0024] The lower peripheral edge of the inner cap 71 is pressed against the upper surface of an annular member 21 fitted on the burner holding portion 41 on the upper lid 4 to close in an air-tight fashion the tip of the burner holding portion 41 together with the tip of the burner member 6.

[0025] A pair of extensions 73 extend rearward from the rear end of the cap 7 on opposite sides of the support posts 51 and a pair of stopper portions 74 are provided on the rear ends of the respective extensions 73. Each of the stopper portions 74 has a tip positioned between a pair of inclined surfaces, and the tip is adapted to be engaged with the end portion of the rotary shaft 15 projecting outward from the inclined groove 52 of the support post 51.

[0026] The rotary shaft 15 is supported in the inclined grooves 52 of the support posts 51 to be movable between a locking position and a releasing position. The inclined grooves 52 are higher on the side near the cap 7 than on the side remote from the cap 7. In the locking position, the rotary shaft 15 is held in the upper front portions of the inclined grooves 52 as shown in Figure 1 and in the releasing position, the rotary shaft 15 is held lower rear portions of the inclined grooves 52 as shown in Figure 3. The flint 11 is centered with respect to the file wheel 13 when the rotary shaft 15 is in the releasing position.

[0027] The rotary shaft 15 is urged upward by the flint urging spring 12 and normally held in the locking position. When the cap 7 is closed, the rotary shaft 15 is first brought into abutment against the lower inclined surface of the stopper portion 74 to be pushed toward the releasing position, and when the cap 7 is fully closed, the rotary shaft 15 slides on the upper inclined surface of the stopper portion 74 to the locking position to keep the cap 7 closed. In this state, when the side wheels 14 are rotated in the clockwise direction to ignite the lighter 1, the rotary shaft 15 is moved to the releasing position and the stopper portions 74 are disengaged from the rotary shaft 15, whereby the cap 7 is opened in response to the igniting action.

[0028] Operation of the lighter 1 of this embodiment will be described with reference to Figures 3 to 7, hereinbelow. When the lighter 1 is not being used, e.g., is being stored, the lighter 1 is in a state shown in Figures 1 and 2. In this state, the cap 7 is fully closed and the rotary shaft 15 is in the locking position where it engages with the upper inclined surface of the stopper portions 74 of the cap 7 to keep the cap 7 closed.

[0029] When the lighter 1 is to be used or ignited, the side wheels 14 are pushed downward and rotated, whereby the side wheels 14 are moved to depress the flint 11 and the rotary shaft 15 in the inclined grooves 52 is moved to the releasing position so that the stopper

portion 74 of the cap 7 is disengaged from the rotary shaft 15 as shown in Figure 3, and at the same time, the file wheel 13 is rotated to strike the flint 11 and sparks are generated.

[0030] As shown in Figure 4, when the stopper portion 74 of the cap 7 is disengaged from the rotary shaft 15, the cap 7 is opened under the force of the spring 76 to expose the burner member 6 and the sparks ignite the fuel on the burner member 6. When the side wheels 14 are released, the rotary shaft 15 is moved upward to the locking position under the force of the flint urging spring 12.

[0031] When the cap 7 is closed, the flame is quenched. As the cap 7 approaches its closed position, the lower inclined surface of the stopper portion 74 is brought into abutment against the rotary shaft 15 and begins to push the rotary shaft 15 toward the releasing position as shown in Figure 5.

[0032] As the cap 7 further approaches its closed position, the stopper portion 74 moves the rotary shaft 15 downward rearward toward the releasing position along the upper edges of the inclined grooves 52 as shown in Figure 6. When the cap 7 reaches its closed position as shown in Figure 7, the rotary shaft 15 is disengaged from the lower inclined surface of the stopper portion 74 and comes to be moved to the locking position under the force of the flint urging spring 12. In the locking position, the rotary shaft 15 is pinched between the upper inclined surface of the stopper portion 74 and the upper edges of the inclined grooves 52 and keeps the cap 7 closed.

[0033] In the lighter 1 of this embodiment, the lighter 1 can be ignited only by rotating the side wheels 14 without opening the cap 7. Further, after the cap 7 is closed, the cap 7 is locked in the closed position by engagement between the stopper portion 74 and the rotary shaft 15 and the cap 7 is prevented from being accidentally opened.

[0034] In addition, all of the contents of Japanese Patent Application No. 11(1999)-346093 are incorporated into this specification by reference.

Claims

1. A lighter comprising a fuel reservoir in which fuel is stored, a burner member for burning the fuel, an igniter means including a file wheel provided with side wheels and a flint which is caused to strike the file wheel from below, a support post which supports the rotary shaft of the file wheel, and a cap which opens and closes the tip of the burner member, wherein the improvement comprises that

the cap is supported for rotation on a support shaft at its end remote from the file wheel, is urged toward its opening position by a spring and is provided on its end near to the file wheel with a stopper portion which is adapted to be

engaged with the rotary shaft of the file wheel,
and
the rotary shaft is mounted on the support post
to be movable between its locking position
where it is engaged with the stopper member 5
to keep the cap in the closed position and its
releasing position where it is disengaged from
the stopper portion to permit the cap to be
opened under the force of the spring so that the
rotary shaft is moved to the locking position 10
when the cap is closed and the stopper portion
is brought into abutment against the rotary
shaft and to the releasing position when the
side wheels are operated to ignite the fuel on
the burner member. 15

2. A lighter as defined in Claim 1 in which the side
wheels are pushed and rotated to ignite the fuel on
the burner member and the rotary shaft is moved to
the releasing position in response to the igniting ac- 20
tion of the side wheels.
3. A lighter as defined in Claim 1 in which the rotary
shaft of the file wheel is supported in an inclined
groove formed on the support post to be inclined 25
rearward downward so that the rotary shaft is
moved downward and away from the cap along the
inclined groove from the locking position to the re-
leasing position when the side wheels are pushed
down and rotated to ignite the fuel on the burner 30
member and so that, when the cap is closed, the
rotary shaft is once moved from the locking position
to the releasing position pushed by the stopper por-
tion and then moved to the locking position where
it is engaged with the upper side of the stopper por- 35
tion to prevent the cap from being opened.
4. A lighter as defined in Claim 1 in which the rotary
shaft is moved from the releasing position to the
locking position under the force of a flint urging 40
spring which presses the flint against the file wheel.
5. A lighter as defined in Claim 1 in which the fuel is
fuel liquid and the burner member is a wick which
sucks up the fuel liquid in the reservoir and burns 45
the fuel liquid on its tip.

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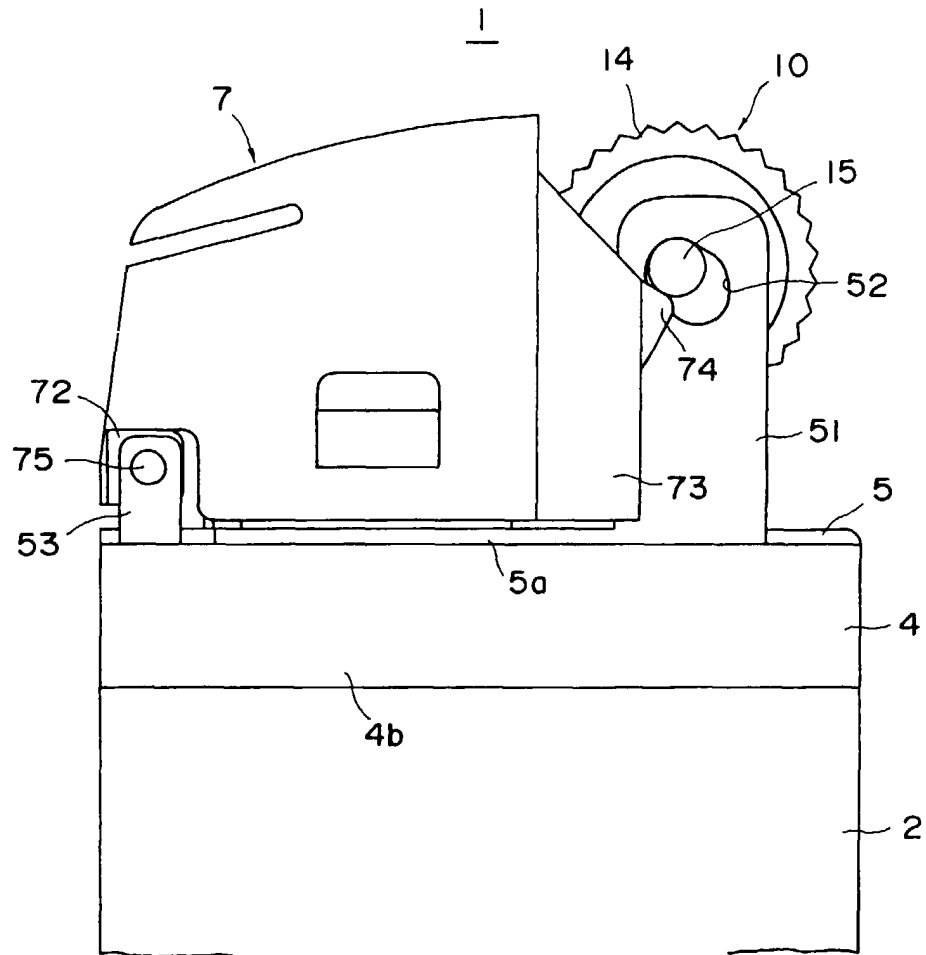
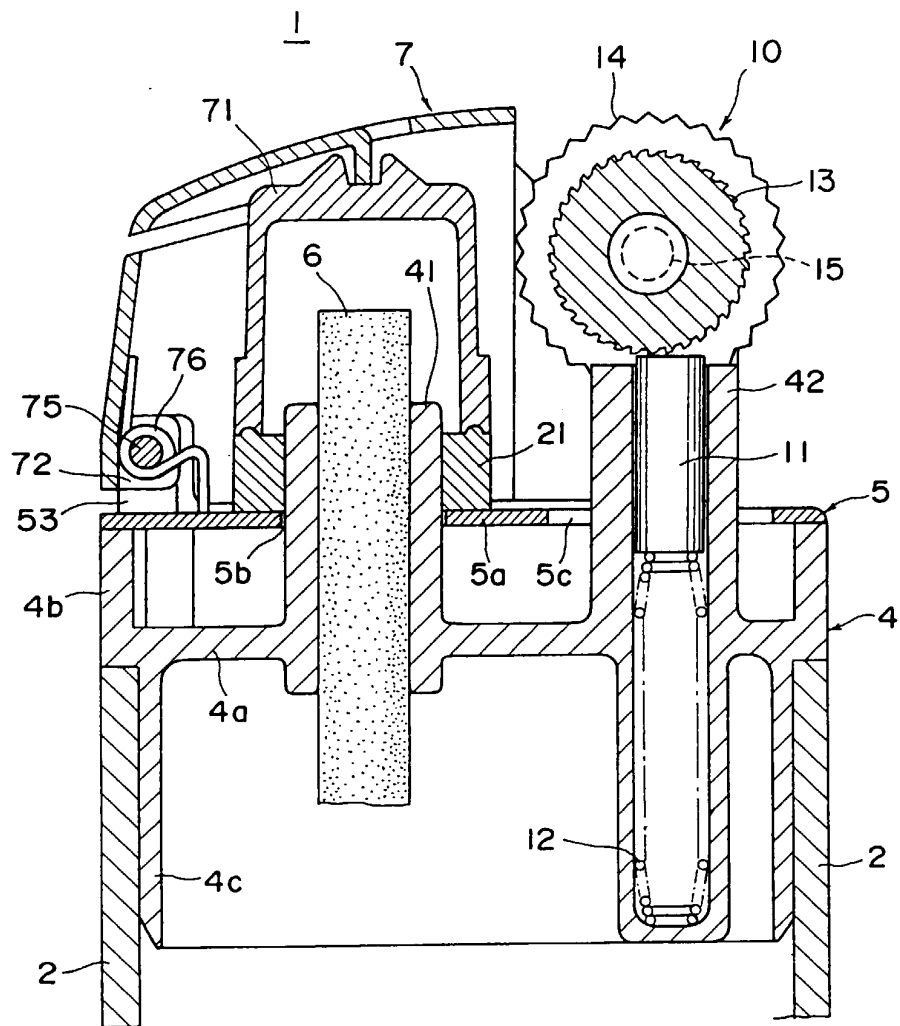
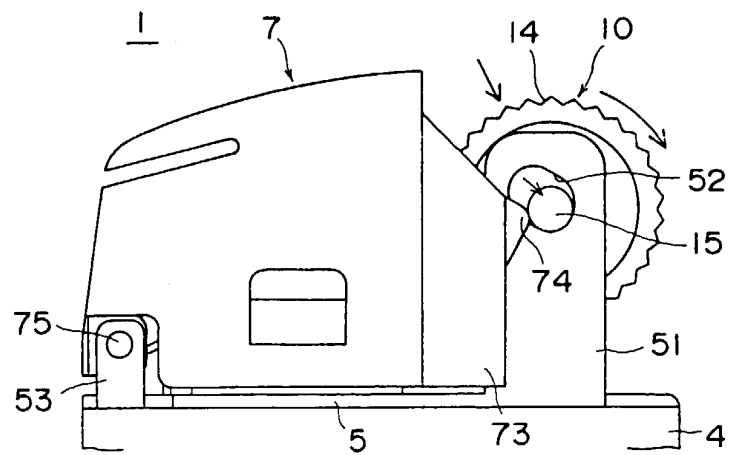


FIG. 1

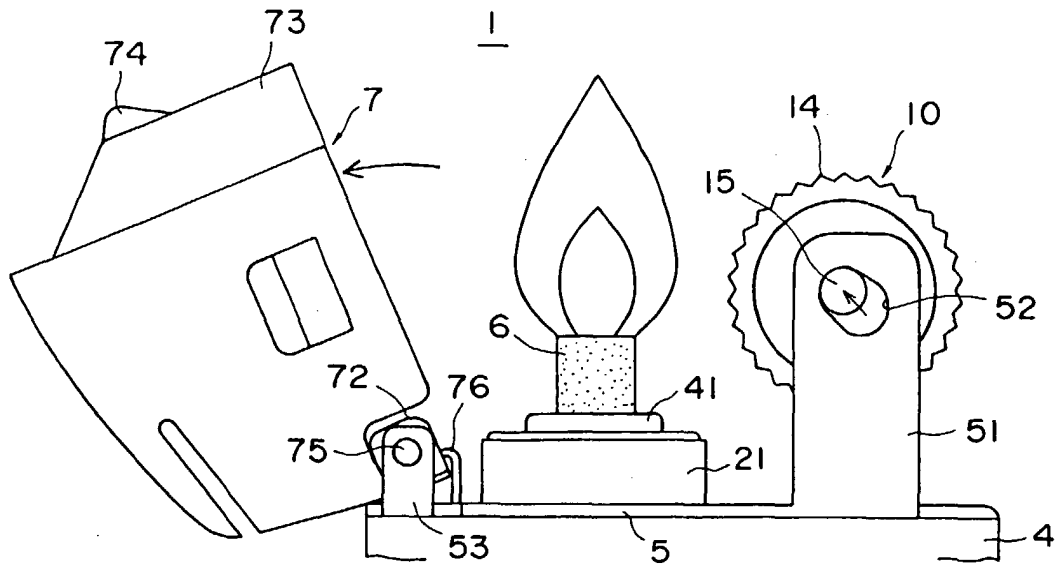
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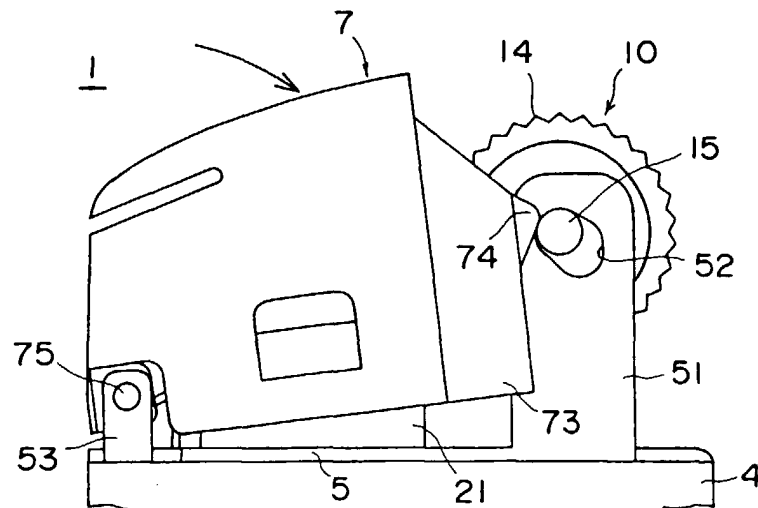
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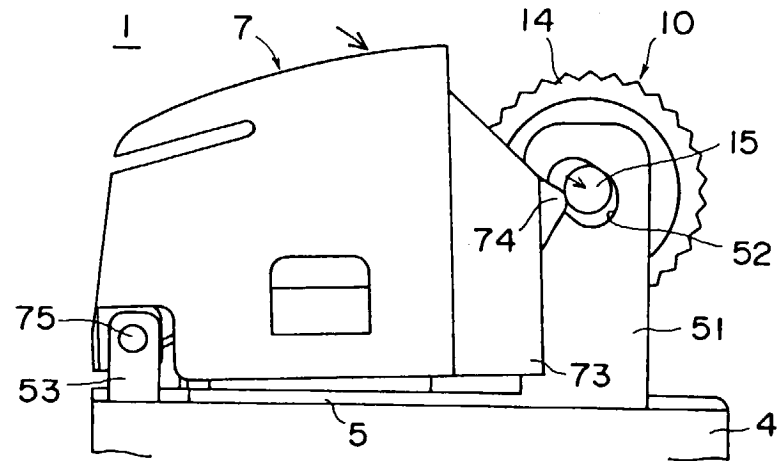
F I G . 4



F I G . 5



F I G . 6



F I G . 7

