

May 28, 1968

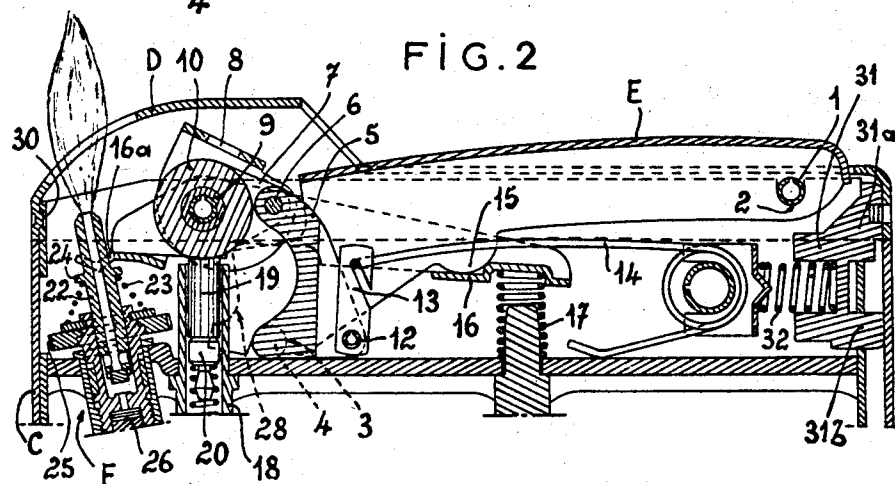
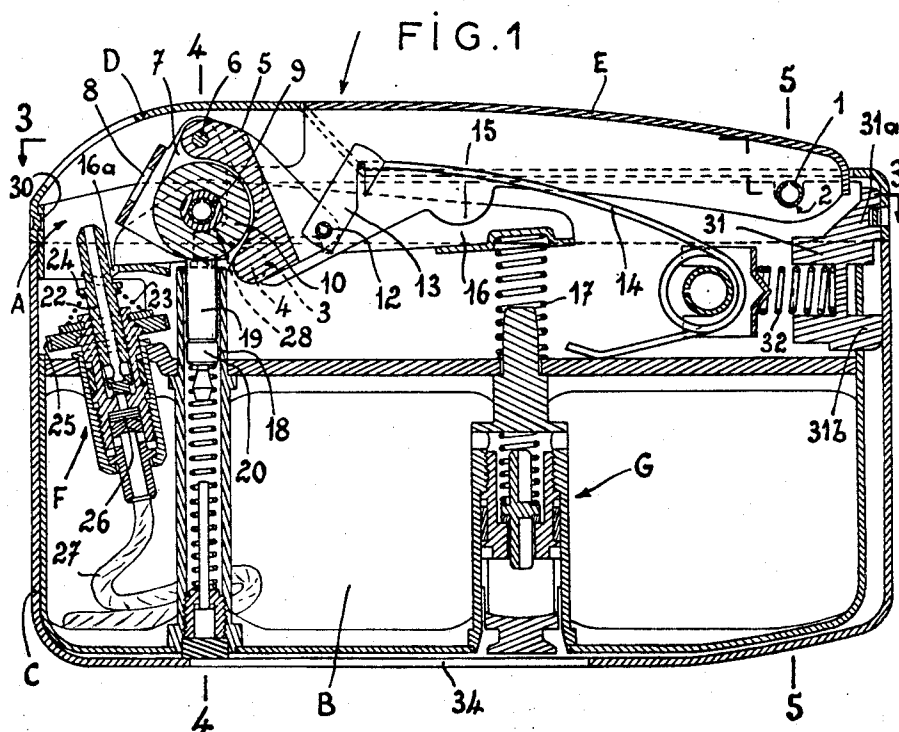
J. GENOUD

3,385,650

AUTOMATIC LIGHTER MECHANISM

Filed Jan. 12, 1966

2 Sheets-Sheet 1



May 28, 1968

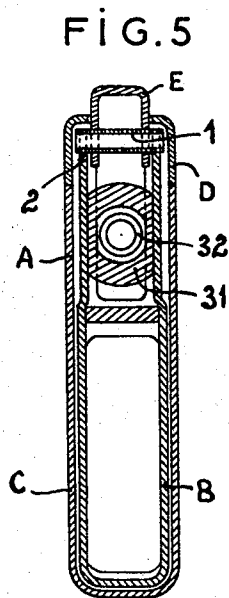
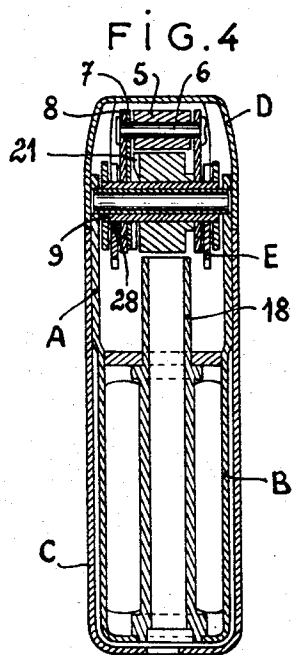
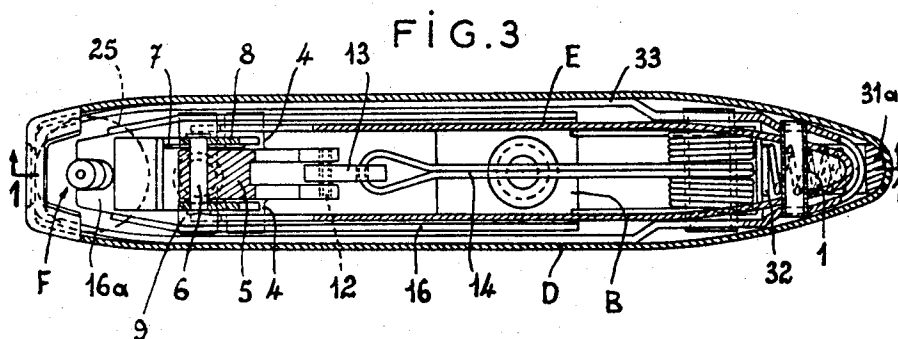
J. GENOUD

3,385,650

AUTOMATIC LIGHTER MECHANISM

Filed Jan. 12, 1966

2 Sheets-Sheet 2



1

2

3,385,650

AUTOMATIC LIGHTER MECHANISM

Jean Genoud, Saint-Cyr-au-Mont-d'Or, France, assignor to Etablissement Genoud & Cie, Venissieux, Rhone, France

Filed Jan. 12, 1966, Ser. No. 520,166

Claims priority, application France, Jan. 20, 1965,

45,534, Patent 1,431,760

8 Claims. (Cl. 431-254)

ABSTRACT OF THE DISCLOSURE

A gas lighter comprising a control lever pivoting at its rear portion and acting through its front portion on a link suspended from a catch support hingedly mounted about the spindle of a knurled wheel, the control lever acting simultaneously upon an intermediate lever hinged around the said spindle and raising the valve of the gas burner, said front portion, the suspension of said link and the axis of said spindle being in substantial alignment in their positions of rest.

The present invention has for its object a lighter provided with an automatic mechanism and wherein the fuel is constituted by a compressed liquefied gas. The mechanisms of such gas lighters used hitherto are of one of the following types:

A mechanism of the rack controlled type, the execution of which is comparatively difficult, but which show the advantage consisting in that the control lever may be easily enclosed inside a hood.

A mechanism of the cam-controlled type, showing the same possibility of enclosing the control lever within a hood, but the operation of which is hard by reason of the friction arising between the parts.

Or else a mechanism of the link-controlled type including a deformable parallel motion and the operation of which is very smooth and reliable, but wherein the rearward movement of the control lever does not allow easily the incorporation of the hood, while it requires a sliding movement which cannot be performed in a natural manner with one's finger.

The present invention relates to an arrangement associating the advantages of these various types of mechanisms without showing any of their drawbacks.

According to the invention, the control key or lever pivotally secured to the rear of the lighter round a stationary axis shifts, when depressed, on the one hand, a link connected with a member carrying a catch engaging the knurled ignition wheel and, on the other hand, an intermediate lever pivotally secured round the spindle carrying the knurled igniting wheel, so as to release the valve closing the output provided for the gas in the container. The three pivotal points connecting the control lever with the link, the link with the catch-carrying member and said member with the spindle carrying the knurled wheel are substantially aligned when inoperative, which produces at the start a slight resistance against movement and consequently leads to a storing of energy, whereas, as the movement progresses, the lengths of the lever arms increase, so as to ensure a maximum efficiency at the end of the operative stroke.

The user's finger executes thus of necessity a complete stroke for each actuation of the mechanism, which ensures during the forward movement a clean sparking and during the return movement a reliable reengagement of the parts.

Such an improved lighter is furthermore of the type including a casing enclosing the gas container over the bottom of the latter, while the upper section of the

mechanism is covered by a hood enclosing its head and out of which the control lever projects.

According to a particularly advantageous feature of said invention, the control lever is carried in open bearings provided both at the rear on the casing and to the front on the link, said control lever being held in position by the hood so as to allow said control lever to be released upon removal of said hood, whereby it may be removed instantaneously without any further dismantling. Said arrangement is of interest since it allows, in the case of a damage to the brittle parts of the mechanism, such as the catch and the knurled wheel, an easy replacement of such parts alone, while retaining in position the outer parts such as the hood, the control lever and the casing, which may be of a costly ornamented type.

To further the removal of the hood, the latter is advantageously fitted on the mechanism head through a mere elastic snapping in position.

On the other hand, according to a preferred embodiment, the spring returning the control lever into position does not act directly on the latter but only through an intermediate link.

Furthermore, a pivotal connection is inserted between the point at which the spring acts and said link, so as to ensure a maximum smoothness in operation.

As to the spring returning the intermediate lever into position, it acts on the rear end of the latter and consequently at a somewhat considerable distance from the point of its pivotal connection round the spindle carrying the knurled wheel, which ensures an excellent closing and simultaneously allows the use of a spring of a reduced power, which cooperates in providing a very smooth opening movement.

According to a still further feature of the invention, the front end of the control lever engages in its inoperative position the spindle of the knurled wheel against which it abuts. The connection between the control lever and the link is thus held fast and the return spring raises the lower pivotal connection of the said link, so that the upper pivotal connection of said link urges forwardly the catch-carrying member with a maximum efficiency and this allows resorting to a return spring of a reduced power, while ensuring a perfectly reliable reengagement of the parts. Such a mechanism may obviously be incorporated both with a lighter provided with a removable container or refill and with a lighter provided with a container adapted to be reloaded through a valve fitted on it.

The accompanying drawings illustrate by way of example the application of the invention to a lighter of the type incorporating its gas container. In said drawings:

FIG. 1 is a general view of the lighter in its closed position, said figure being a vertical elevational sectional view through line 1-1 of FIG. 3.

FIG. 2 is a view similar to FIG. 1, showing however the upper part of the lighter in its open condition, i.e. ready for ignition.

FIG. 3 is a horizontal sectional view through line 3-3 of FIG. 1.

FIGS. 4 and 5 are transverse sectional views respectively through lines 4-4 and 5-5 of FIG. 1.

In said drawings, A designates the head carrying the mechanism, B the container for liquefied gas adjacent said head, C the casing enclosing the container and a portion of the head, D the hood forming a continuation of said casing and covering the upper end of said head, E the control lever pivotally secured to the rear of said head in registry with said hood, F the actual valve controlling the flow of gas out of the container and G the valve through which the container B may be filled. The control lever E having an inverted U-shaped cross-section carries at its rear end a tubular rivet 1 which forms a

pivot resting in bearings 2 fitted in the head A, said bearings opening in an upward direction. The flanges of the opposite free end of the control lever are provided with semi-circular recesses 3 opening downwardly and inside which is freely fitted a pivot 4 carried by the lower end of a link 5.

Said link 5 is carried at its other upper end 6 by a member 8 carrying a catch 7 adapted to rock round the spindle 9 of the ignition-producing knurled wheel 10. Said link 5 carries furthermore a pivot 12 for a small bar 13 provided with a notch in which is engaged one end of a spring 14 in the shape of a hair pin, said spring abutting through its other end over the upper stationary wall of the container B.

The flanges of the control lever E furthermore carry a projection 15 facing downwardly and extending over an intermediate lever 16 pivotally secured round the above-mentioned spindle 9 carrying the knurled wheel said lever 16 including a fork-shaped extension 16a acting on the movable member of the valve F controlling the flow of gas. Furthermore, said lever 16 is subjected to the action of the coil spring 17.

The spindle 9 carrying the knurled wheel is fitted in the lighter head, above the output end of a tube 18 carrying the flint 19 subjected to the action of a spring-urged push member 20.

The gas-controlling valve F includes conventionally a movable member 22 constituted by a hollow rod, so that it may act both as a valve and as a burner. Said movable member is subjected to the action of a light spring 23 which engages the underside of a collar 24 on said movable member 22, so as to produce the opening of the valve in association with the thrust exerted by the gas itself. Said valve furthermore includes a striated wheel 25, the rotation of which allows adjusting the height of the flame through action of the closing means 26 providing a throttling or an expansion of the gas, while a wick 27 dipping inside the container B feeds the burner with gas.

As to the catch 7, it drives the knurled wheel 10 in the conventional manner, by engaging the ratchet teeth 21 formed on one of the lateral surfaces of the wheel (FIG. 4). During its return movement, said catch slides over the teeth without driving the wheel.

The operation of said mechanism is as follows, as will be readily understood:

The operator depresses with his thumb the control lever E which moves in the direction of the arrow illustrated in FIG. 1 and rocks thus round its rear tubular pivot 1. During said movement, the bearings formed by the semi-circular recesses in the control lever depress the link 5 which in its turn drives the catch-carrying member 8 and the catch 7; the catch 7 urges thus the knurled wheel 10 into rotation, which results in the projection of a shower of sparks.

At the same time, the projection 15 on the control lever E engages the intermediate lever 16 and causes it to rock round the spindle 9 and to compress the spring 17. This raises the opposite forked end 16a of the intermediate lever, which allows the burner-forming part 22 of the valve F to rise and thus to allow the gas to escape and to be inflamed, as illustrated in FIG. 2.

It should be remarked that at the beginning of the movement the pivotal axes 4, 9 and 6 are substantially in alignment, which constrains the operator's thumb acting on the control lever to exert a somewhat substantial pressure on said control lever, which requires some energy, whereas, as the movement continues, said pivotal axes are angularly shifted out of alignment, which leads to a gradual increase of the lever arms. The movement becomes thus smoother and the energy stored at the start is opposed by a resistance which decreases gradually, so that the control lever is pushed energetically down to the end of its stroke, which ensures an excellent ignition.

When the operator's thumb releases the control lever, the latter is returned into its inoperative position by the

spring 14 which acts on said lever through the agency of the small bar 13 and of the link 5.

During the return movement of the control lever, the intermediate lever 16 is released and urged by its spring 17 upwardly, so that its forked end 16a closes again the gas valve.

It should be remarked that the control lever includes a front extension 28 which, at the end of the return stroke, abuts against the spindle 9 carrying the knurled wheel.

The connection between the control lever and the link is thus held fast in a stationary position, while the spring 14 exerts a vertical tractional stress on the rear pivotal connection 12 of said link and urges consequently the latter into rotation round its lower pivotal connection 4 which is now stationary. The upper pivot 6 urges thus the member 8 carrying the catch forwardly with a maximum efficiency. This arrangement allows thus resorting to a spring 14 which, although of a reduced power, may provide however reliably an excellent return on the parts into their inoperative positions.

The hood D is held over the head A at its front end and through a snap system 30 and at the rear end through a sliding bolt 31 subjected to the transverse thrust of a helical spring 32. Said bolt projects beyond the head A at superposed points 31a and 31b. The upper projection 31a engages the hood D and urges it rearwardly so as to ensure the permanent engagement provided to the front by the snap system 30. Said upper portion of the bolt projects beyond the lower end of the hood, so that it may be easily engaged by one's nail after removal of the casing C. When the hood D has been removed, the bearings 2 which open upwardly, are released so that the control lever E may be removed through a mere lifting thereof, without this requiring any further dismantling, since its recesses 3 engaging the link 5 open in a downward direction and allow an immediate release. The lower rear projection 31b on the bolt 31 bears against the inner surface of the casing C and ensures a frictional fitting of the casing with reference to the container B and to the head A. The thrust exerted by the bolt both on the hood and on the casing furthermore ensures the desired red alignment between the different parts.

A slot 34 provided at the lower end of the casing allows pushing upwardly by means of a coin for instance the container with its mechanism, in the case for instance of a wedging by dust, sand or waste tobacco.

Lastly, as obvious and apparent from the preceding disclosure, the invention is by no means limited to the embodiment disclosed hereinabove and it covers all the modifications thereof falling within the scope of the accompanying claims.

What I claim is:

1. In a lighter, the combination of a stationary section including a fuel container, a control lever pivotally journaled at its rear end through bearing means engaging upwardly open bearing surfaces in the upper portion of the stationary section and adapted to be shifted between an upper inoperative and a lower operative position, a link pivotally secured at its lower end to a point of said control lever, a rotatable spindle, a carrier member turnably journaled on said spindle and pivotally secured to the upper end of the link, a catch carried by the carrier member, a knurled ignition wheel secured to said spindle and provided laterally with an annular series of ratchet teeth adapted to be engaged by the catch upon depression of the control lever into its operative position, an intermediate lever pivotally carried by said spindle and located in the path of angular displacement of said control lever and a container closing valve, the opening of which is provoked by the depression of the control lever into its operative position through the intermediary of said intermediate lever, the three pivotal connections respectively between the control lever and the link, between the link and the carrier member and on the axis of the spindle being in approximate alignment when the

control lever is in its inoperative position and becoming progressively displaced out of alignment upon depression of the control lever.

2. The combination as claimed in claim 1, comprising independent springs urging respectively the control lever into its upper operative position and the intermediate lever into the position corresponding to the closing of the valve.

3. The combination claimed in claim 1, comprising upwardly open bearings rigid with the stationary section and forming the means pivotally securing the rear end of the control lever to the stationary section.

4. The combination claimed in claim 1, comprising a head fitted over the stationary section, carrying the spindle and through which the control lever is pivotally secured at its rear end to the stationary section and a hood extending over the knurled wheel, carrier member, link and valve and fitted elastically between the front and rear ends of the head.

5. The combination claimed in claim 1, comprising a spring acting on the link to urge the control lever into its inoperative position.

6. The combination claimed in claim 1, comprising a small bar pivotally secured to the link and a spring acting on said bar to urge the control lever into its inoperative position.

7. The combination claimed in claim 1, comprising an extension of the control lever forming an abutment cooperating with the spindle when the control lever is in its inoperative position.

8. In a lighter, the combination of a stationary section including a fuel container, a control lever pivotally journaled at its rear end through bearing means engaging upwardly open bearing surfaces in the upper portion of the stationary section and adapted to be shifted be-

tween an upper inoperative and a lower operative position, a link pivotally secured at its lower end to a point of said control lever, a rotatable spindle, a carrier member turnably journaled on said spindle and pivotally secured to the upper end of the link, a catch carried by the carrier member, a knurled ignition wheel, secured to said spindle and provided laterally with an annular series of ratchet teeth adapted to be engaged by the catch upon depression of the control lever into its operative position, an intermediate lever pivotally carried by said spindle and located in the path of angular displacement of said control lever and a container closing valve the opening of which is provoked by the depression of the control lever into its operative position through the intermediary of said intermediate lever, a hood extending over the knurled wheel, carrier member, link and valve and fitted removably between the front and rear ends of said upper portion of said stationary section, the three pivotal respectively between the control lever and the link, between the link and the carrier member and on the axis of the spindle being in approximate alignment when the control lever is in its inoperative position, and becoming progressively displaced out of alignment upon depression of the control lever.

References Cited

UNITED STATES PATENTS

2,022,227	11/1935	Aronson	67—7.1
2,164,872	7/1939	Evans	67—7.1
2,530,328	11/1950	Fortin	67—7.1
2,591,189	4/1952	Nordenstam	67—7.1
2,743,597	5/1956	Newman	67—7.1
3,164,976	1/1965	Segawa	67—7.1

EDWARD J. MICHAEL, *Primary Examiner*.