

[54] AUTOMATIC CIGARETTE LIGHTER

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219/214

[51] Int. Cl. F23q 7/00

[58] Field of Search ... 219/214, 260, 261, 262, 263,
219/264, 267, 270

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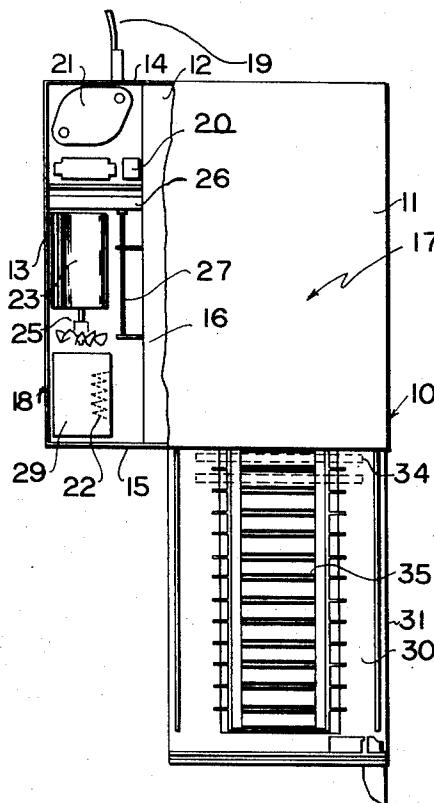
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[57]

ABSTRACT

A tray holding cigarettes on a conveyor is contained within a casing and a lever is movable across the front of the casing. The first cigarette is moved sideways so that the top is adjacent an electric heating element. At the same time the elevator moves the cigarettes in the tray forwardly by one increment so that the next cigarette is in position. As the lever is moved, the element is connected to a source of electrical energy and a small fan blows air passed the tip so that the cigarette lights. The cigarette is being grasped frictionally spaced from the end for pivotal movement and the motor driving the fan also rotates a worm which causes a small jaw or prong to engage the cigarette spaced from the tip and beyond the point of pivotal attachment so that the cigarette is gradually moved through approximately 90° while at the same time the tip remains adjacent the heating element. The speed of the worm is such that the cigarette is fully lighted as the pivotal action of the cigarette is completed so that the user can then grasp the cigarette and pull it from between the jaws at which time the cigarette, of course, is ready for use.

4 Claims, 13 Drawing Figures



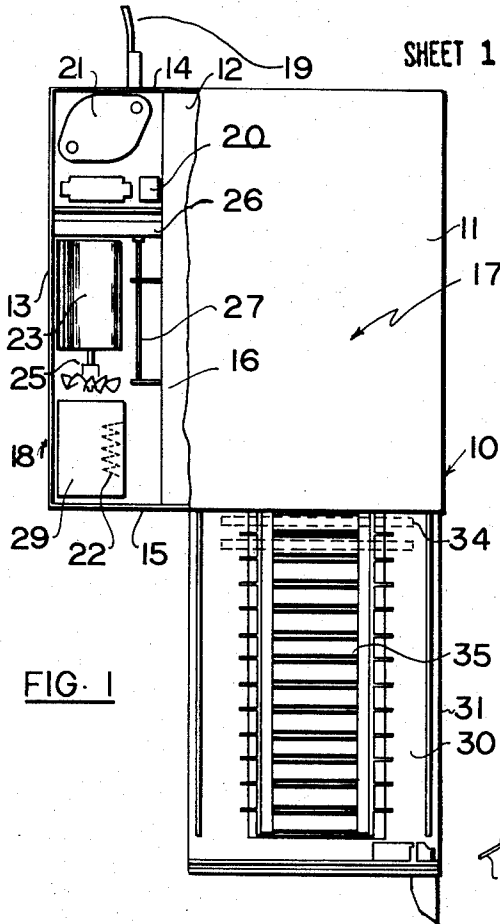


FIG. 1

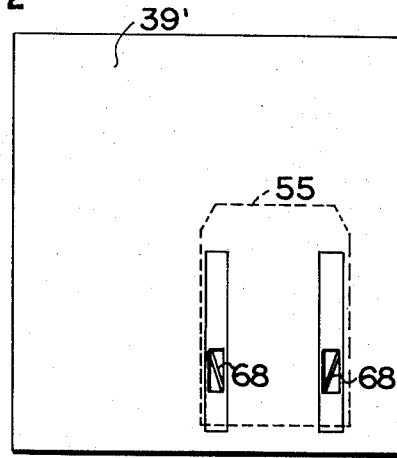


FIG. 2

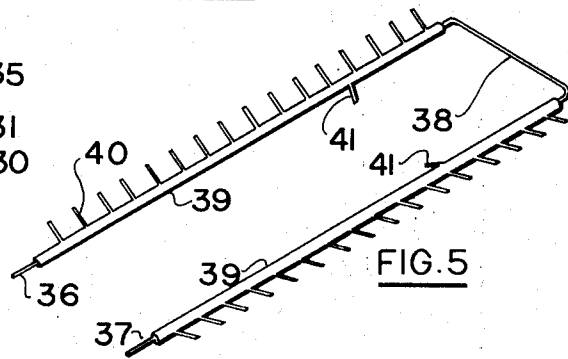


FIG. 5

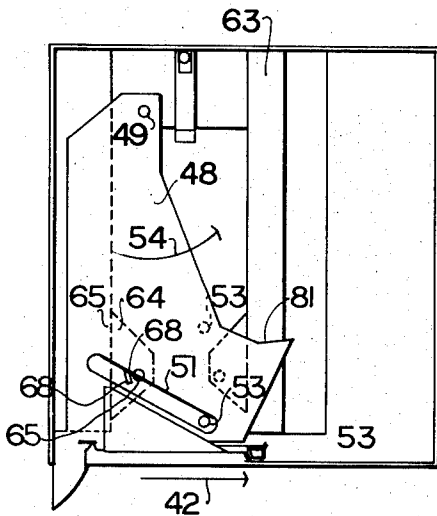


FIG. 4

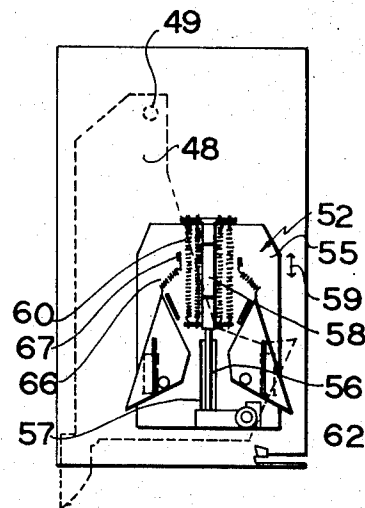
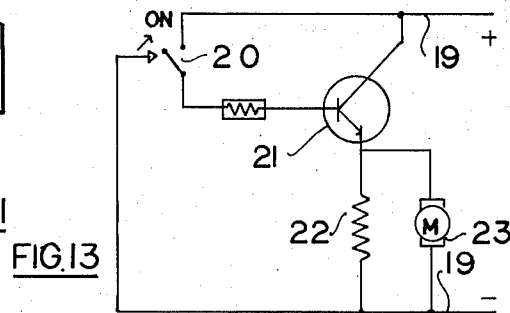
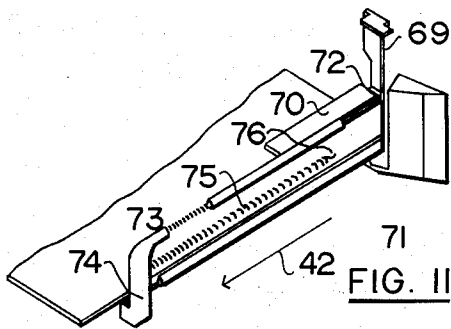
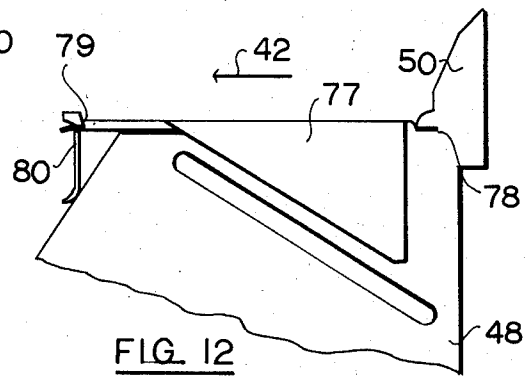
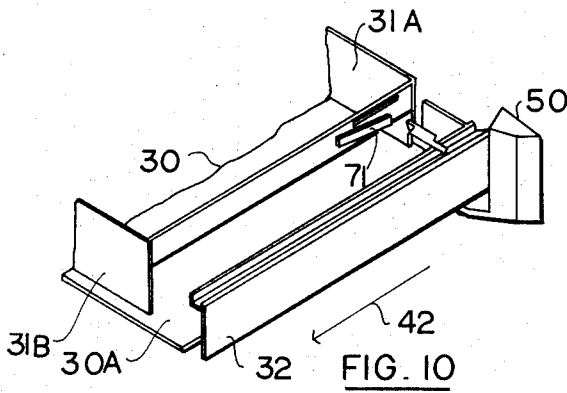
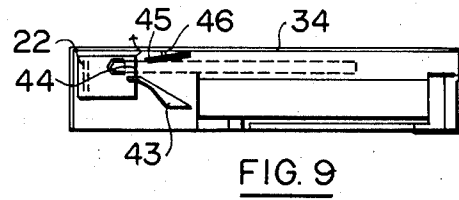
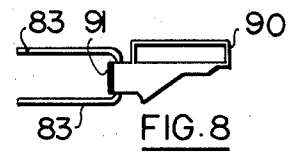
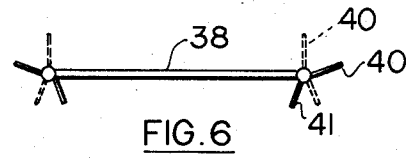
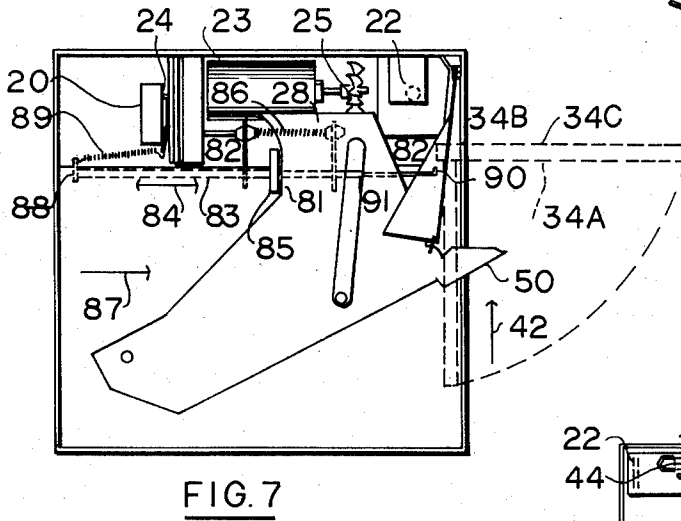


FIG. 3



AUTOMATIC CIGARETTE LIGHTER

BACKGROUND OF THE INVENTION

This invention relates to new and useful improvements in automatic cigarette lighters.

Although it is designed primarily for use in a car, nevertheless it will be appreciated that it can be used in the home or other locations as desired.

However, when driving, the driver must first take a cigarette from a package and depress the cigarette lighter normally provided on the dashboard of a car. When the lighter is heated sufficiently, it must be removed from the dashboard and held to the tip of a cigarette. During this time, of course, the driver is distracted with the consequent danger of accidents occurring.

SUMMARY OF THE INVENTION

The present invention overcomes these disadvantages by providing a tray holding cigarettes and operated by a lever. When the lever is moved to one side, a cigarette is moved in position adjacent a heating element and small fan. The heating element and small fan which are connected to a source of electrical energy, ignite the end of a cigarette and at the same time the cigarette is pivoted outwardly so that the unlit end is presented to the user at the time when the cigarette is lit so that all that has to be done is for the user to remove the cigarette which, of course is in a lit condition.

The principal object and essence of the invention is therefore to provide a device of the character herewithin described which enables a cigarette to be lit and presented to the user simply by moving a single lever located on the front of the casing.

Another object of the invention is to provide a device of the character herewithin described which includes a storage tray and conveyor, said conveyor being operated by the movement of the lever to move the cigarettes upwardly by one increment so that the next cigarette is ready for engagement with the fan and heating element when desired.

Still another object of the invention is to provide a device of the character herewithin described which can be connected to a conventional car battery, or alternatively, can be adapted for use with household power.

A still further object of the invention is to provide a device of the character herewithin described which enables a cigarette to be lit and presented to a driver of a car readily and easily thereby preventing distraction of the driver and leading to increased safety.

Yet another object of the invention is to provide a device of the character herewithin described which is simple in construction, economical in manufacture, and otherwise well suited to the purpose for which it is designed.

With the foregoing objects in view, and other such objects and advantages as will become apparent to those skilled in the art to which this invention relates as this specification proceeds, my invention consists essentially in the arrangement and construction of parts all as hereinafter more particularly described, reference being had to the accompanying drawings in which:-

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top plan view of the device with the tray and conveyor in the outermost position and with the top panel broken away to show the interior thereof.

FIG. 2 is a top plan view of the tray per se with the conveyor removed.

FIG. 3 is a top plan view of the actuating mechanism with other parts removed for clarity.

FIG. 4 is a view similar to FIG. 3 but showing the tray in the case which is shown in fragmentary form.

FIG. 5 is an isometric view of the finger units of the conveyor system per se.

FIG. 6 is an end view of FIG. 5.

FIG. 7 is a top plan view of one end of the casing with the cover removed showing the connection between the actuator and the switch means.

FIG. 8 is a fragmentary side elevation of the switch means actuator.

FIG. 9 is a front view of the case partially broken away to show the jaws gripping the cigarette in position.

FIG. 10 is a fragmentary isometric view of the front portion of the tray per se.

FIG. 11 is an isometric view of one end of the actuator per se.

FIG. 12 is a schematic view of a wiring diagram for the device.

In the drawings like characters of reference indicate corresponding parts in the different figures.

DETAILED DESCRIPTION

Proceeding therefore to describe the invention in detail, reference character 10 illustrates generally a rectangular casing having an upper panel 11, a lower panel 12, side walls 13, rear wall 14 and front side 15.

A partition 16 divides the interior of the casing into a tray area collectively designated 17 and the lighting area collectively designated 18.

Dealing first with the lighting area 18, the present embodiment shows a device particularly adapted for use with 12 volt car electrical systems but, of course, it will be appreciated that it is equally applicable and readily adapted for use on household power such as 110 volt A.C.

In conjunction with FIG. 1, FIG. 12 should be referred to. A source of electrical energy enters through the cables 19, one side being grounded in the usual way.

Switch means are indicated by reference character 20 and a transistor by reference character 21. Between the transistor and ground is an electrical heating element taking the form of a filament 22 and also a small electric motor indicated by reference character 23. It will be noted that in this embodiment, the circuit is normally grounded by means of the switch means 20 in view of slight leakage through the transistor 21 and when the switch means operates, current flows from the positive side through the switch means to the transistor in the usual way.

Referring back to FIG. 1, the switch means is a micro-switch 20 operated by a leaf spring 24 (see FIG. 7). The motor 23 is provided with a small fan 25 mounted on one end of the shaft thereof and a small gear box 26 connected to the other end of the shaft and this gear box drives a shaft 27 which is provided with a worm

gear type thread 28, details of which will hereinafter become apparent.

The heating element 22 is conventional and is held within a small casing or box 29 adjacent the front side 15 of the casing, said case or box 29 being open on the side facing the tray portion 17 of the casing.

The tray includes a base 30 and sides 31 together with a front panel 32. Spaced inwardly from this front panel is a mounting bar 33, details of which will be explained later.

The sides 31 include an outer side 31A and an inner side 31B (see FIG. 10) and the inner side 31B of the tray terminates spaced from the front panel 32 a distance sufficient to enable a cigarette 34 to pass thereby as will hereinafter be described.

Mounted on the base 30 of the tray is a plurality of transverse dividers 35 which take the form of small ridges placed in spaced and parallel relationship, the spacing between adjacent dividers being sufficient to store a cigarette 34 as shown in phantom in FIG. 1 and it will be appreciated that the depth of the casing and of the tray will determine the number of cigarettes that can be stored within the tray.

A conveyor is provided in conjunction with the tray and takes the form of a mounting rod 36 which is substantially U-shaped as shown in FIG. 5 having a pair of spaced and parallel main portions 37 and the transverse portion 38 situated at the forward end thereof. The ends of the rod 36 engage through small apertures (not illustrated) in the rear panel 39 of the tray and the transverse portion 38 may be anchored adjacent to the front of the tray or alternatively, anchored by a separate plate (not illustrated) upon which the dividers 35 may be formed for convenience.

The rods 37 act as mounts for sleeves 39' one upon each side thereof, said sleeves being defined as finger units. A plurality of small prongs 40 extend outwardly from the sleeves in spaced and parallel relationship as clearly shown in FIG. 5 and each pair of prongs is equal in spacing to the distance between adjacent transverse dividers 35 so that cigarettes stored between the dividers are also stored between adjacent pairs of prongs 40.

Actuating levers 41 extend downwardly from the sleeves at an angle as shown in FIG. 5 and means are provided on the underside of the tray to engage these actuators thus rotating the sleeves 39 together with the fingers 40.

Before describing the operation of the last mentioned means, the sequence will first be mentioned. When actuated as will hereinafter be described, the foremost cigarette within the tray is moved in the direction of arrow 42 through the gap between the front panel 32 and the front of the side 31B so that one end of the cigarette 34 moves adjacent to the heating element 22.

The front end of the cigarette rides up a ramp 43 situated adjacent the front of the casing and forming one jaw of a pair of jaws which grasps the cigarette 34 spaced from the end 44 which is to be lit. The upper jaw 45 is pivoted as at 46 and is spring loaded normally to bias same towards the ramp 43. The ramp 43 together with jaw 45 not only holds the cigarette frictionally in this position for pivotal action as will hereinafter be described but also elevates the cigarette from the base of the tray. When the actuating means is operated to move the cigarette sideways as previously mentioned, the fingers or prongs 40 which are normally in a vertical position, are moved to a horizontal position,

they are then moved rearwardly one spacing, (a spacing being defined as the distance between adjacent dividers), and as the actuating means is released, the fingers move back to the vertical position engaging the next cigarette and then they move forwardly taking the cigarettes with them so that the next succeeding cigarette is moved to the front of the tray ready for sideways movement when required.

The mechanism operating the device takes the form of an actuating lever 47 which is in the form of a plate 48 pivoted upon a pin 49 adjacent the underside of the tray. A thumb engaging portion 50 extends forwardly from the plate 48 and is normally situated adjacent one end of the front panel 32 of the tray as clearly shown.

This plate 48 is provided with a diagonal slot 51 formed therethrough as shown in the drawings and the elevator mechanism collectively designated 52 is operated by a pin 53 extending upwardly therefrom and engaging the diagonal slot 51. In other words, as the lever is moved by the thumb portion 50 in the direction of arrow 42, the plate 48 pivots around pin 49 and moves in the direction of arrow 54. This means that the pin 53 moves from a position shown in full line in FIG. 4 to a position shown in phantom in FIG. 4.

The elevator mechanism comprises a slide plate 55 situated between the base of the tray and the lever plate 48. It is mounted by means of a rod 56 running longitudinally of a longitudinal slot 57 and engaging a fixed sleeve 58 which in turn is secured to the underside of the base of the tray thus enabling the plate 55 to move in the direction of double headed arrow 59 (FIG. 3). Tension springs 60 extend between one end 61 of the plate 55 and anchoring points 62 secured to one end of the fixed sleeve 58 so that the plate 55 is normally in the forward position as illustrated in FIG. 3. As the thumb portion 50 of the lever plate is moved across the front panel 32 in the direction of arrow 42, the plate 55 moves towards the rear guided by pin 53 running in diagonal slot 51. This extends spring 60 so that when the thumb portion 50 is released, these spring retract, move the plate 55 towards the front and at the same time return the lever plate 48 to the returned position with the thumb portion 50 in the position shown in FIG. 10.

A pair of slide guide members 63 are secured to the underside of the tray and are spaced slightly therefrom so that the outer sides of these slide guides mount the tray or drawer for in and out movement of the casing (not illustrated). The inner sides act as guides for the finger unit operating plates 64 which are pivoted upon pins 65 to the underside of the tray as will hereinafter be described.

Each of these plates 64 is provided with a substantially straight side edge 65' which engages underneath the inner sides of the slide guides 63 and maintains the plates in substantially the position shown in FIG. 4. Springs 66 tension the plates to this position and react between one end of these plates and anchor points 67 on the base as clearly shown.

These plates 64 also have relatively small diagonally formed slots 68 which engaged by the aforementioned actuating fingers or prongs 41 of the finger units 39.

It will therefore be seen that as the plate 55 is moved in the direction of double headed arrow 59, the finger units will be partially rotated as aforesaid to give the retraction and extension of the fingers 40 hereinbefore described.

Pivotally secured to the lever plate 48 is the means for urging the foremost cigarette 34 from the front of the tray to one side thereof, said action having previously been described.

Pivotally secured to the lever plate 48 is the means for urging the foremost cigarette 34 from the front of the tray to one side thereof, said action having previously been described.

This last means takes the form of a spring loaded plate 69 secured just forwardly of the thumb portion 50 and behind the front panel 32 of the tray, it being understood that the base 30 of the tray is open at the end 30A thereof. A flat horizontal portion 70 extends forwardly from the lower end of the plate 69 and the other end of cigarette 34 normally rests upon this plate when in the position to be moved to one side. Movement of the lever plate 48 by means of the thumb portion 50 in the direction of arrow 42 urges the cigarette to one side of the tray, up the ramp 43 to the grasp position shown in FIG. 9. A small spring lever 71 extends outwardly from the bar 33 and this is engaged by the plate 69 part way through the travel thereof in the direction of arrow 42. This biases the plate 69 rearwardly and then releases same which gives a flick to the cigarette and urges same into the position shown in FIG. 9 and at the same time permits release of the portions 69 and 70. The connection between the thumb portion 50 of the lever plate 48 is shown in FIGS. 12 and 13. A rod 71 extends forwardly of a downwardly extending projection 72 on the plate 70 and is mounted for sideways sliding movement in a sleeve 73 secured to the underside front edge of the base of the tray. A projection 74 acts as an anchor for a tension spring 75 which extends further anchor point 76 on the tray so that this spring 75 normally maintains the portions 69 and 70 in the position shown in FIG. 10. A triangular plate 77 is pivoted as at 78 to the plate 48 adjacent the thumb portion 50 and this plate is provided with a small trigger portion 79 at the other end thereof which normally engages the portion 74, small tension spring 80 reacting between one side edge of the plate 48 and this portion 79 as shown in FIG. 13. As the lever plate is moved by means of the thumb portion 50, moving in the direction of arrow 42, the rod 71 together with the portions 69 and 70 are urged towards the side 31B of the tray and then released as the plate 69 is engaged by the spring plate 71. This firstly allows the cigarette to be flicked into the jaw engaging position shown in FIG. 9 and then allows the portion 79 to disengage so that the plates 69 and 71 return immediately to the original position thus allowing the next cigarette to be moved up, it being understood that the first cigarette has been elevated prior to engagement between the jaws, due to the ramping action of the lower jaw 43 as hereinbefore described.

A camming edge 81 is formed on the lever plate 48, said edge being towards the section 18 of the casing, and reference should be made to FIG. 7 to show the action of this edge.

Two supports 82 extend from the worm shaft 28 and mount rods 83 for endwise movement in the direction of double headed arrow 84. An actuator 85 is secured to rods 83 and moves with them and this actuator includes an end 86 which engages the worm thread 28 so that if the worm thread is rotated by means of the motor 23, the actuator together with the rods will move in the direction of arrow 87. The tongue 24 of switch 20 is connected to one end 88 of the rods 83 by means

of a tension spring 89 so that as the actuator together with the rods move in the direction of arrow 87, the tension on this spring is released thus releasing the tongue 24 and actuating the switch to the "off" position when the actuator is to the full point of travel in this direction.

When the actuating lever plate 48 is moved in the direction of arrow 42 by means of the thumb portion 50, the camming edge 81 engages the actuator 85 and moves it in the opposite direction of arrow 87, it being understood that the engaging portion 86 of the actuator is in the form of a spring tongue so that it rides over the screw threads. When in the position shown in FIG. 7, the actuator and the rods 83 are in the position at the other end of their travel, thus tensioning spring 89 and actuating switch 20.

This action of course has moved cigarette 34 in the position shown in FIG. 9 and switch 20 connects the source of electrical energy to the motor 23 and also to the heating element 22 and it will be observed that the end of the cigarette to be lighted is adjacent the heating element when in the position shown in FIG. 9. This heating element in conjunction with the fan 25, causes the end of the cigarette to be ignited.

The motor 23 also rotates the worm gear shaft 28 and moves the actuator in the direction of arrow 87, it being understood that the lever plate 48 has been released at this time and has returned to its original position. A small jaw 90 is secured to the other end 91 of the rods 83 and extends forwardly to engage the cigarette 34 just rearwardly of the point of frictional engagement between the jaws 45 and 43 and as the actuator moves further to the right, the cigarette is pivoted outwardly through approximately 90° to take up the position shown by reference character 34A in FIG. 7, it being understood that the end 34B being lit, remains adjacent the heating element 22. The device is timed so that the cigarette is fully extended when the end 34B has become ignited due to the heating element 22 and the fan 25 at which time switch 20 is de-activated and the cigarette can be grasped by the user and withdrawn from between the jaws 43 and 45 at which time the cigarette is ready for smoking.

Due to the action of the conveyor the next cigarette has moved upwardly and forwardly into position with the end 34C engaging upon plate 70 and against plate 69 and ready for sideways movement when next the lever plate 48 is actuated by the thumb portion 50.

Since various modifications can be made in my invention as hereinabove described, and many apparently widely different embodiments of same made within the spirit and scope of the claims without departing from such spirit and scope, it is intended that all matter contained in the accompanying specification shall be interpreted as illustrative only and not in a limiting sense.

What I claim as my invention is:-

1. An automatic cigarette lighter in conjunction with a source of electrical energy comprising in combination a casing, a cigarette storage tray in said casing, a conveyor unit in said tray, means to move a cigarette from said tray to one side thereof, a heating element and a fan in said casing, a motor to operate said fan, switch means connected between said source of electrical energy and said element and said motor, said switch means connecting said source of electrical energy to said motor and said element when a cigarette is moved

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to one side as aforesaid, means to grasp said cigarette frictionally for pivotal action, the location spaced from the end of said cigarette is moved to one side as aforesaid, and means operating by said motor to pivot said cigarette around said location through approximately 90° whereby the other end of said cigarette is presented to the user, said last means also disconnecting said switch means from element and motor when said cigarette has been pivoted as aforesaid.

2. The device according to claim 1 in which said tray includes a base, said conveyor being situated upon said base, said conveyor including a plurality of spaced and parallel transverse dividers between adjacent pairs of which a cigarette may rest, a pair of endwise shiftable finger units one upon each side of said dividers, each of said finger units including a plurality of prongs extending outwardly therefrom and adapted to engage one upon each side of the cigarettes resting between said dividers, said finger units being rotatable by the action of said lever, whereby said finger units move first to the retracted position, then rearwardly within said tray, then to the cigarette engaging position, and then forwardly within said tray thereby moving the cigarette progressively forwardly when said lever is operated.

3. The device according to claim 1 in which said means to grasp said cigarette includes a pair of spring

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loaded plates forming jaws between which said cigarette is urged, said means to pivot said cigarette including a screw threaded worm connected to said motor, an actuator, means mounting said actuator for lengthwise movement by said worm, said actuator engaging said worm, means operated by said lever to return said actuator to one end of said worm, said actuator also being connected to said switch means whereby said switch means is disconnected when said actuator is at one end of the worm and connected when said actuator is at the other end of the worm.

4. The device according to claim 2 in which said means to grasp said cigarette includes a pair of spring loaded plates forming jaws between which said cigarette is urged, said means to pivot said cigarette including a screw threaded worm connected to said motor, an actuator, means mounting said actuator for lengthwise movement by said worm, said actuator engaging said worm, means operated by said lever to return said actuator to one end of said worm, said actuator also being connected to said switch means whereby said switch means is disconnected when said actuator is at one end of the worm, and connected when said actuator is at the other end of the worm.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,789,187 Dated January 29, 1974

Inventor(s) Jan Brezina

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 7, line 2, "the" should read -- at a --; line 3, "the" should read -- one --; same line 3, "of" should read -- thereof when --; line 4, "operating" should read -- operated --.

Signed and sealed this 27th day of August 1974.

(SEAL)
Attest:

McCOY M. GIBSON, JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents

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