ABSTRACT

A heavy duty can opener having a base upon which is mounted an operating motor connected to a rotatable feed means which engages the under side of the seam of the can for rotating the can beneath a stationary cutting element wherein the cutting element will engage the top of the can adjacent the inner vertical surface of the seam and opposite the feed wheel for cutting out the top end of the can adjacent the seam for removing the same, including a support for supporting the opposite end of the can during the cutting operation, and a can support adjustment means so that different size cans for which the machine is designed may be freely rotated beneath the cutting element.

1 Claim, 4 Drawing Figures
CAN OPENER WITH AUTOMATIC CUTTER DISENGAGEMENT

The present invention relates to a heavy duty can opener that may be used for opening cans of various sizes.

One object of the invention is to provide a device of this nature capable of removing the top ends of cans of various sizes, which may be quickly and easily adjusted to the various size cans.

Another object of the invention is to provide a device of this character wherein the device itself is simple and easy to operate.

A further object of the invention is to provide a device of this character in which the timing of its operation for different size cans is made by a positively driven timing means.

While several objects of the invention have been set forth, other objects, uses and advantages will become more apparent as the nature of the device is more fully described in the following description with reference to the accompanying drawings, in which:

FIG. 1 is a side elevation view of the device.
FIG. 2 is a top plan view of the same.
FIG. 3 is a mechanical and electrical schematic diagram of the device.
FIG. 4 is an enlarged perspective view of the can supporting means.

Referring to the drawings more in detail, the numeral 10 represents the apparatus as a whole which may take any convenient form. The device is provided with a base 12 for supporting the can operating mechanism 13. The device is operated preferably by an electric motor 22 which operation is transferred to the can opening mechanism 13 by a belt 18, or the motor may be connected directly to the main drive shaft 20. The motor is shielded by a shield 14 and the can opening assembly 13 is shielded by a shield 16. The can opening assembly 13 is supported upwardly from the base by a support 19 having a preferably extended slot 19'. The support 19 also supports a can supporting assembly 17 which is adapted to slide vertically on the support 19 and be held in a predetermined vertical position by a set screw 61" extending within the slot 19'.

The can opening assembly 13 is provided with a main drive shaft 20 which is operated by the motor 22. On one end of the shaft 20 is a can feeding wheel 23 which is adapted to engage the underside of the top seam holding the top portion of the can to the main body portion. The feed wheel 23 also guides the top of the can into proper position to be engaged by a stationary cutting blade 25 when the cutting blade is in cutting position, as shown in FIG. 1.

The cutting blade 25 and the handle 27 are rigidly fixed to each other and are hinged mounted on the end of the shaft 21 in the bearings 29 and 29'. When the handle 27 is raised as indicated by R" in FIG. 3, the cutting blade is rotated out of contact with the top of the can to allow a can to be inserted or removed from the feed roll 23.

The handle 27 is provided with a knob 27' for manually operating the cutting blade in and out of operating position. The handle is normally held in its upright position as shown at R" in FIG. 3, which raises the cutting blade 23 out of cutting position with the can top. When the base of the can is in place on the feed wheel 23, the handle is brought forward, or lowered, as indicated at R in FIG. 3 wherein the cutting element 25 pierces the top of the can and the machine is set in operation. The handle 27 is automatically raised when the cutting operation has continued for a predetermined period which will be referred to more in detail hereinafter.

The time of the cutting period is regulated by a timing wheel 28 which is operated by a gear 24 carried on the drive shaft 20, and an idle gear 26 which in turn operates the timing wheel 28. The timing wheel is rotatable about a shaft 31 and is provided with a plurality of openings 30. Also freely rotatable on the shaft 31 is a bracket 35 having a spring loaded pin 32 which is adapted to extend through and beyond a selected opening 30 in the timing wheel 28. The outer end of the pin 32 is provided with a knob 34 for manually placing the pin in one of the selected holes. The inner end 32' of the pin normally extends through hole 30 to a position to engage the member 37. When the end 32' engages the bracket 37 the handle 27 is rotated upwardly into the position shown at R" whereby the cutting blade 25 is moved out of engagement with the can top when the cutting time has expired. As the handle is rotated upwardly the handle contacts a suitable button 39 of the electric switch 41 breaking the electric circuit to the motor 22 thereby stopping the operation.

The speed of the timing wheel and the hole in which the pin 32 is deposited determine the timing of the operation.

It will be noted that the bracket 35 is also provided with an arm 36 having one end freely hinged to the bracket at a point 35" and having a slot 36' extending part way through the arm at its opposite end, the arm being so positioned on the bracket that the slot 36' will be in line with the pin 32. The pin 32 has fixed to its outer end a knob 34 by which the pin may be retracted by pulling outwardly on the knob. The arm 36 may then be swung around so that the slot 36' engages the pin 32 between the inner surface of the knob and the outer surface of the shoulder 34'. This will withdraw the inner end 32' of the pin 32 to a predetermined position. The arm 36 will be held in place beneath the knob 34 by the pressure of the spring located in the pin 32.

The timing of the operation of the machine is controlled by the timing wheel 28 which is provided, as previously stated, with a plurality of holes 30 into which the pin 32 is manually inserted for different periods of operating time. The timing is also controlled by the size and speed of the timing wheel as sufficient time must be had for the feeding wheel 23 to encircle the can top. The speed of the timing wheel may be stepped up or down depending on the gear chain operating the wheel. If the size and speed of the timing wheel is not sufficient to allow the feeding wheel to encircle the can top, the timing wheel may be made to make a second revolution which is shown in the present embodiment of the invention.

In order to cause the timing wheel 28 to make a second revolution, the pin 32 is withdrawn as previously described, then the hinged arm 36, carried by the bracket 35, is manually rotated until the slot 36 engages the spring loaded pin 32 between the knob 34 and the shoulder 34' preventing the inner end 32' of the pin 32 from extending through the hole 30 in the timing wheel 28 to the point where the member 37 carried on the handle 27. However, the pin 32 must extend far enough through the hole 30 in the timing wheel to cause both the pin and the bracket 35 to be rotated by the timing wheel. While the pin 32 is so with-
drawn and held by the arm 36 the pin 32 will not engage the member 37 for disengaging the cutting element 25 and stopping the operation of the machine. Therefore, the pin 32 must be released to its normal operating position after the timing wheel has made its first revolution.

In order to release the arm 36 from the pin 32 so that the pin will extend through the hole 30 a sufficient distance to engage the member 37, there is provided a vertical movable post 47 slidably mounted in the bracket 43 fixed to the frame of the machine having a pin extending laterally from the top of the post 47 of such length and so positioned as to engage the arm 36 as it is being rotated by the timing wheel after the timing wheel has made a single revolution. The pin 38 will contact the arm 36 and move the arm to a point where the slot 36' is moved out of engagement with the pin 32 allowing the pin 32 to advance through the hole 30 to its normal position to engage the member 37 attached to the arm 27 raising the arm on the second revolution of the timing wheel to disengage the cutting element and stop the machine. In order to hold the post 47 in adjusted position there is a spring loaded pin 43'. If it is not necessary to have the timing wheel make a second revolution then the post 47 is lowered to a point where the pin 38 is out of position to contact the arm 36.

Referring again to the can opening assembly 13 there is provided on the cutting element unit a shoulder 25' immediately above the feed wheel 23 which, when the cutting element 25' is not in cutting position, is spaced away from the feeding wheel the approximate distance of the height of the seam of the can for holding the seam in contact with the feeding wheel. When the cutting element is rotated out of cutting position the shoulder 25' is also rotated out of position over the feed wheel to allow for easy placing or removing the can seam over the feed wheel.

The top of the can when severed from the can body is supported by a magnet 70 which is arranged to contact the can top during the cutting operation when the arm is in its lowered position. The magnet is supported by the arm 72 which is turn is fixed to a toothed rack 74. The toothed rack is carried and supported upon an arm 76 which in turn is fixed to a sleeve 78 which is slidable along the horizontal arm 80 and held in adjusted position by a spring loaded pin 82. On the arm 76 there is also mounted a gear wheel 84 and fixed to the gear wheel 84 is a slotted arm 86 and fixed to the arm 27 is an elongated pin 88 which is adapted to operate within the slotted arm 86. This arrangement is to give the magnet more travel for the limited movement of the arm 27. As the magnet should be adjacent the center of the top of the can the adjustment of the position of the magnet along the arm 80 will provide this means. When the handle 27 is raised the gear wheel 84 is rotated by the pin 88 secured to the handle 27. As the gear wheel 84 is engaged with the rack 74 the magnet will be moved upwardly removing the can top to a substantial distance above the upper edge of the can.

Referring again to the can supporting assembly the can support per se is preferably in the form of a freely rotating disk 60 mounted on a bearing 60', the disk and bearing being mounted on a sleeve 65 adapted to be adjustable on the member 61 and held in position by the thumb screw 65' all of which is supported on the main supporting element 19 previously referred to. The disk may be of any convenient size and may be readily removable and replaced by different size disks to accommodate different size cans.

Referring again to the power unit, electric current is introduced through the electric conduits 48 and 49, switch 41 and the cord 50 to the motor 22. The switch 41 is provided with a circuit breaker button 39 which when depressed by the handle member 27 will interrupt the electric current to the motor stopping the operation of the machine. The switch 41 is further provided with a starting button 41' which is operable from the front of the machine by the button 53' and the extension rod 52'.

In operation, a can to be opened is placed upon the rotatable disk 60 of the can supporting assembly 17 and in a position to place the side of the can in line with the feed wheel 23 in which the uppermost portion of the feeding wheel rests against the under side of the seam of the can and beneath the shoulder 25'. The handle 27, which is normally in its uppermost position at R', is moved downwardly to the position as shown at R in FIG. 3 which moves the cutting blade 25 into cutting position through the top of the can adjacent the inside portion of the seam. At the same time the shoulder 25' is moved into position above the feeding wheel to contact the upper edge of the can seam for supporting the seam against the pressure of the feeding wheel. The pin 32 is placed into one of the selected holes 30 beyond the arm 37 in the direction of the rotation of the feed wheel setting the timing of the operation for completely severing the top from the can. The switch 41 is operated by manually operating the button 41' which will close the electric circuit to the motor 22. However, the motor may be automatically operated by the movement of the handle 27 or other suitable means, if desired.

When the selected timing period is ended as previously described, the handle 27 will be raised by the pin 32 engaging the bracket 37 moving the handle to its upper position as shown at R' in FIG. 3 which also rotates the cutting element 25 from its cutting position to a position above the top of the can whereby the severed top may be removed. The bracket 37 will engage the switch member 39 breaking the electric circuit and stopping the operation.

The improved can opening machine is unique in its construction and simple in its operation and is constructed to open most metal cans used in the packaging of food and other products. While a single form of the machine is shown and described, it is not intended as a limitation and the scope of the invention is best described in the appended claims.

1. A can opening machine comprising in combination:
   a. a base;
   b. a can opening mechanism including a frame for said mechanism and a single support member for said frame having one end of the support fixed to the base and its opposite end fixed to the said frame;
   c. a vertically adjustable can support table for said can carried on said frame supporting member and means for securing the can supporting table in adjustable position thereon;
   d. said can opening mechanism having a horizontal rotatable drive shaft in said frame and an electric
motor connected to said shaft for rotating the
same;
e. a can feed wheel fixed adjacent one end of the
drive shaft;
f. a hinged top cutting element hingedly connected to
the frame above the can feeding wheel, the hinge
point of the cutting element being such that when
in one position the cutting element is in position to
engage the can top for cutting the same and when
in another position is out of contact with the can
top and out of cutting position with the top, and a
handle means for rotating the cutting element in
and out of cutting and noncutting positions;
g. a timing wheel rotatable by the drive shaft at a pre-
determined lower speed than the drive shaft and a
releasable selecting means adapted to rotate with
the timing wheel for operating the handle means to
move the cutting element out of cutting position.

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