April 18, 1967 S. BAYLIN 3,314,145

ELECTRICALLY POWERED CAN OPENER

Filed March 30, 1966 2 Sheets-Sheet 1

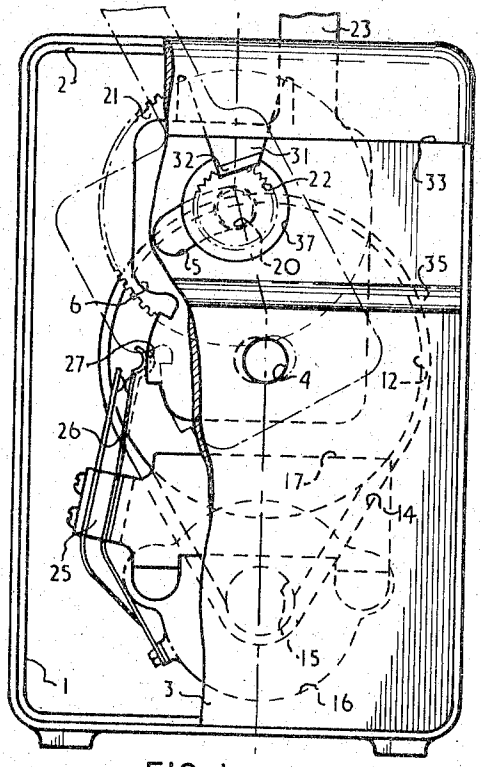

FIG. 1

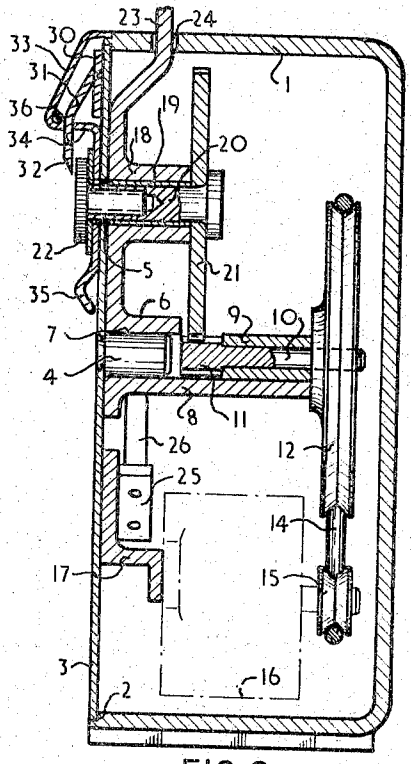

FIG. 2

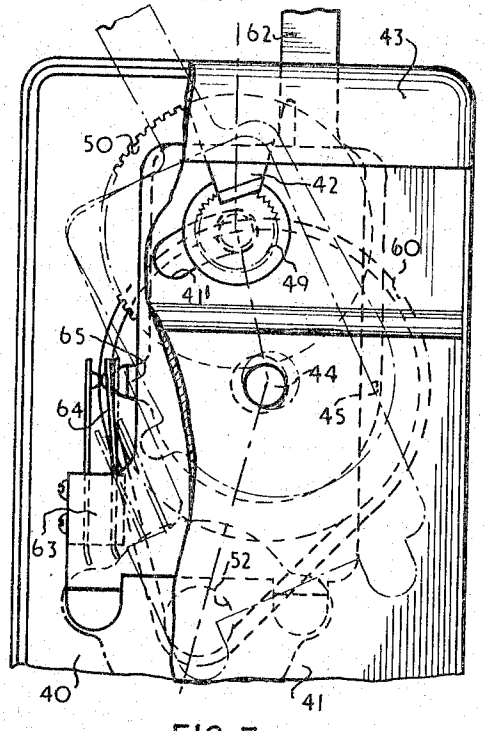

FIG. 3

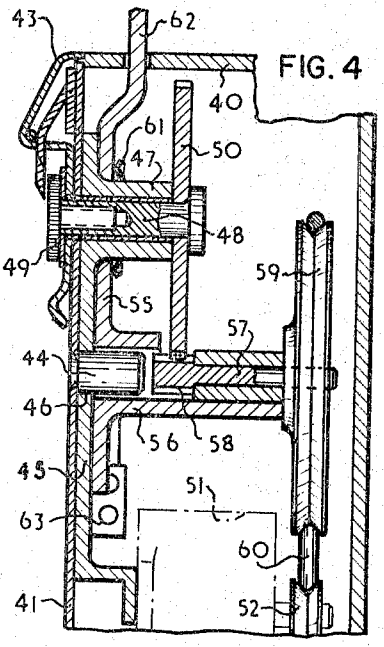

FIG. 4

INVENTOR
SAMUEL BAYLIN
W. Irwin Haskett
ATTORNEY

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ELECTRICALLY POWERED CAN OPENER

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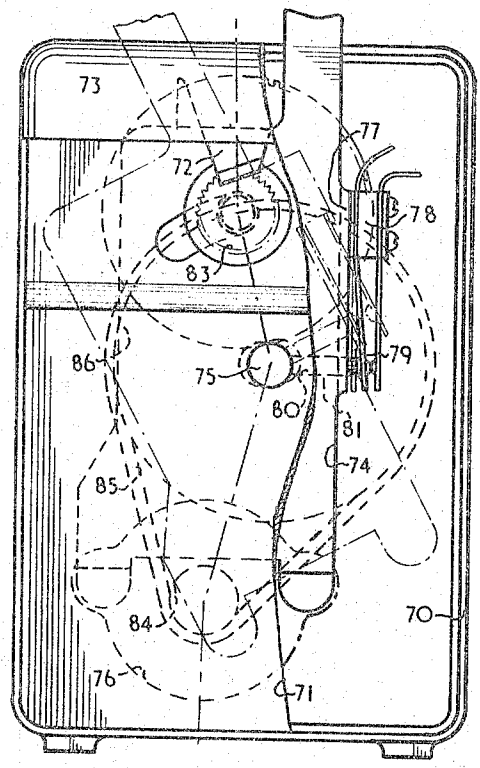

FIG. 5

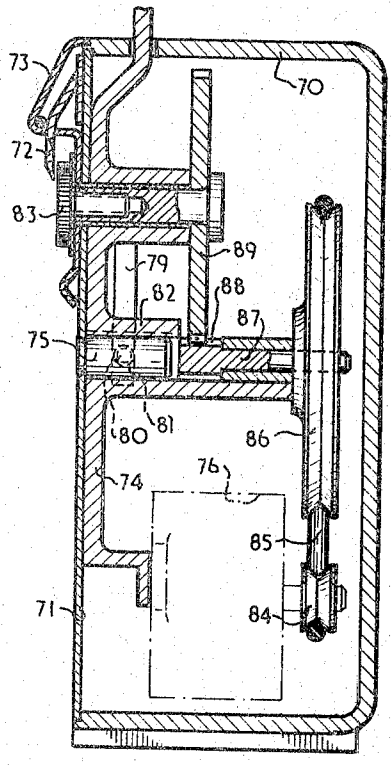

FIG. 6

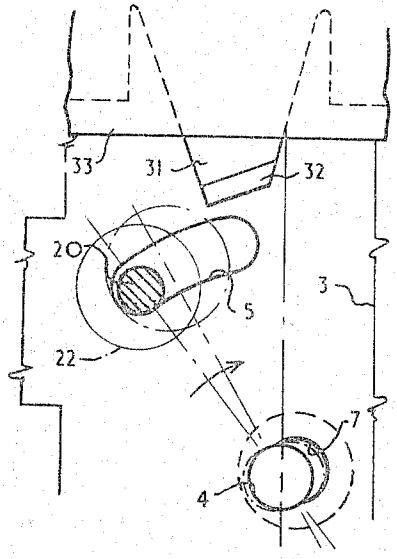

FIG. 7

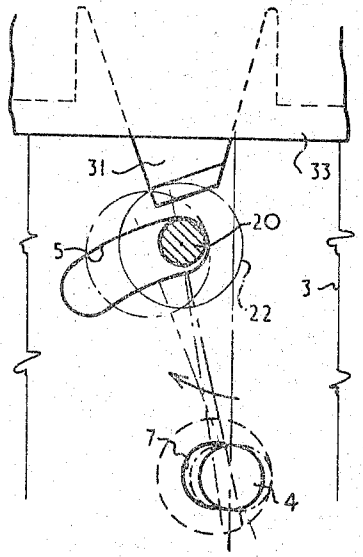

FIG. 8

INVENTOR
SAMUEL BAYLIN
W. Irwin Hackett
ATTORNEY

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ELECTRICALLY POWERED CAN OPENER

Samuel Baylin, St. Laurent, Quebec, Canada, assignor to Aviation Products Company, Montreal, Quebec, Canada, a Canadian corporation

Filed Mar. 30, 1966, Ser. No. 538,662
8 Claims. (Cl. 30—4)

This invention relates to improvements in an electrically powered can opener and appertains particularly to one in which the resistance offered by an inserted can effectuates a unique interaction between the movable chassis and motor control.

It is an object of the invention to provide a motor driven can opener in which a manual lever is employed to convey an inserted can into pressure contact with the cutter and actuate the motor control, and the succeeding can opening cycle is accomplished entirely by power-actuated mechanism in response to the resistance of the can to the piercing and subsequent can severing action of the cutter.

A further object of the invention is to provide an improved electric can opener in which a can supporting traction wheel is afforded a novel range of movement vis-a-vis the cutter to cause successively the piercing, cutting and retraction of the can.

A further object of the invention is to provide an improved electric can opener in which the traction wheel mechanism is carried by a floating chassis so mounted as to be able to impart different separate and successive movements to the wheel supported mechanism.

A still further object of the invention is to provide an electrically powered can opener having a sturdy, compact and simplified mechanism, an efficient sequence of operative actions and a fast acting, more positive control for the driving motor.

To the accomplishment of these and related objects as shall become apparent as the description proceeds, the invention resides in the construction, combination and arrangement of parts as shall be hereinafter more fully described, illustrated in the accompanying drawings and pointed out in the claims hereunto appended.

The invention will be best understood and can be more clearly described when reference is had to the drawings forming a part of this disclosure wherein like characters indicate like parts throughout the several views.

In the drawings:

FIGURE 1 is a front elevation of a preferred embodiment of my can opener, with part of the front plate broken away;

FIGURE 2 is a vertical transverse section thereof;

FIGURES 3 and 4 are similar front elevation and vertical transverse section respectively of a modified form of my can opener;

FIGURES 5 and 6 are also similar front elevation and vertical transverse section respectively of a further modified form of the can opener;

FIGURE 7 is an enlarged diagrammatic view of the initial travel motion of the can-supporting, traction wheel chassis; and

FIGURE 8 is a similar enlarged diagrammatic view of the ensuing travel motions thereof.

The preferred embodiment of my can opener, shown in FIGURES 1 and 2, will be seen to include a substantially rectangular housing 1 enclosed at the back, both sides, top and bottom and having an open front whose perimeter is formed with rabbet 2 to receive a mounting plate 3. A pivot pin 4 projects inwardly from the plate, being disposed approximately at the center thereof. About half way between the pin 4 and the top of the plate, an arcuate slot 5 is provided to one side of the plate's vertical median and in an arc described from the centre of the pivot pin 4.

The pin 4 that is rigidly secured to the mounting plate 3 pivotally supports a chassis 6 of generally flat plate form that is provided with a pin-accommodating bore 7 in an integral rearwardly extending cylinder 8. It is to be noted here that there is a freedom of movement between the chassis bore 7 and pivot pin 4 to which specific reference will be made hereafter, when attention will be directed to FIGURES 7 and 8. The inner part of the cylinder is open to the top and nests a bushing 9 that carries a pulley wheel shaft 10. A small pinion 11 on the forward end of the shaft 10 in advance of the bushing 9 has its upper segment exposed. There is a pulley 12 on the rear of shaft 10 designed to be driven by a resilient belt 14 from a small pulley wheel 15 powered by an electric motor 16 carried by a bracket 17 mounted on the front plate 3.

Above its pivot, the chassis 6 has a rearwardly extending cylindrical boss 18, normally registering with the arcuate slot 5, lined with a bushing 19 that supports a rotatable shaft 20 with a gear wheel 21 that meshes with pinion 11 and projecting through the slot 5 has a knurled traction wheel 22 on its forward end exterior of the front plate 3. Above the boss 18, the wide plate-like chassis 6 narrows into an upwardly extending and rearwardly offset lever arm 23 that projects through a transversely elongated slot 24 in the top of the housing 1.

A normally open circuit closer 25 for the electric motor current is mounted on the side of bracket 17 and includes a spring arm 26 engageable by a cam formation 27 on the confronting edge of the chassis 6, at substantially the same horizontal level as the pivot-accommodating bore 7.

The can-cutting blade 30 is mounted on the front face of the mounting plate 3 near the top, having its cutting tooth 31 outwardly offset and provided with a sharpened bevel edge 32 disposed at an incline of approximately 15°–23° to the horizontal, and the bevel being preferably in the range of 0°–15°. An overhanging cap 33 rabbeted in the top of housing 1 slopes angularly out from and extends across the front of the can opener mounting plate to enclose the cutter except for its depending tooth 31 that projects downwardly through an aperture in a rearwardly offsetting step 34, below which the cap continues down to the front of plate 3 beyond the traction wheel 22 to terminate in a horizontal ridge or heel 35. Between the cutting tooth 31 and the inside of the cap 33, a resilient cushion member 36 is inserted.

A washer 37 on shaft 20 lies between the rear of traction wheel 22 and the front of the downwardly extending skirt of cap 33.

In FIGURES 3 and 4 there is shown a modified form of the can opener in which a similar housing 40, front mounting plate 41, cutting tooth 42 and cap 43 are employed. On a similar pivot pin 44, a main chassis plate 45 is mounted by means of a bore 46. The upper part of the chassis likewise has a cylindrical boss 47, aligned with the arcuate slot 41' in the front 41, that carries the shaft 48 for driving the traction wheel 49 by the gear wheel 50. In this form of the invention, however, the chassis 45 supports the electric motor 51 with its small pulley wheel 52. In addition, this form of cutter provides a secondary chassis part 55 pivoted on the cylindrical boss 47 and including at its lower end a rearwardly extending cylinder 56 of larger bore than pin 44 to loosely surround the same but otherwise designed as cylinder 8 of the preferred form to rotatably carry a shaft 57 with a small gear pinion 58 meshing with the gear 50 and a large pulley wheel 59 connected by a resilient belt 60 with the motor pulley 52. A spring washer 61 may be provided on the boss 47 behind the secondary chassis part 55 to urge the same forwardly against the main chassis plate 45. Above the boss 47 on which it pivots, this secondary chassis part 55 is narrowed and offset rear-

wardly to project through a slot in the top of the housing 40 as a normally operable lever arm 62. Furthermore, in this modified form, the circuit closer 63 is mounted on the front plate 41, having a spring contact arm 64 for engagement and flexing by a projection 65 on the secondary chassis part 55.

A further modified form of can opener illustrated in FIGURES 5 and 6 has the same general form of housing 70, front mounting plate 71, cutting finger 72 and cap 73. The chassis 74 however that pivots on pin 75 carries the motor 76 on its lower end and additionally on a rearwardly directed flange 77 it supports the circuit closer 78 whose spring arm 79 is engaged and actuated by a sliding bar 80 passing through a horizontal bore 81 in the pin-accommodating cylinder 82 of the chassis. Elsewhere, the chassis has the same arrangement of power drive running from the motor 76 to the traction wheel 83, consisting of a motor small pulley wheel 84, belt 85, large pulley wheel 86, with its shaft 87 journalled in the cylinder 82 and a pinion 88 on such shaft meshing with a gear wheel 89 that turns the traction wheel 83. Though the three forms of the invention illustrated in FIGURES 1–2, 3–4, and 5–6 respectively, may differ structurally from each other, the novel operation of the device is substantially the same in the several arrangements.

For a basic description of the operation, reference may again be had to FIGURES 1 and 2, together with the enlarged schematic views of FIGURES 7 and 8. Assuming that the motor 16 is connected with an appropriate electric circuit, save only that circuit is normally broken by the circuit closer 25, a standard type can to be opened is applied to the device with the side wall of the can engaging the horizontal ridge 35 and the bead at the top of the can resting on the knurled traction wheel 22, that in initial position is to the left. The lever 23 is then swung to the right causing the traction wheel carrying chassis 6 to pivot on pin 4 and carry the can upwardly in an arc until its top comes into engagement with the point of the cutting tooth 31. Here the can meets resistance and the further swinging of the lever 23 sees the chassis pivot briefly on traction wheel axle 20, as the chassis slides to the left on pin 4 because of the freedom provided by the bore 7. This bore could merely be of larger diameter than the pin 4 but in this case is elongate and inclined as seen in FIGURE 7. The lateral shifting of the chassis 6 on pin 4 brings the chassis cam 27 against the spring arm 26 to close the circuit and start the motor 16. The anti-clockwise motion imparted to the traction wheel 22 acts to swing the chassis as far to the left as the bore 7 will allow, see FIGURE 8, and as it is inclined as well as elongated this causes the chassis to ride up on the pin 4 while at the same time the knurled traction wheel engaging the bead of the restrained can draws the axle 20 further up the slot 5, whereby both actions serve to quickly and easily puncture the can top as it is forced against the penetrating cutting tooth 31. Continuing rotation of the traction wheel turns the can to completely sever the lid, that all the while offers resistance to the cutter, providing sufficient torsion to hold the chassis against the spring arm 26 in circuit closing position. The instant the lid is severed and the resistance to the cutter is terminated, the chassis swings back on the pin 4 under action of the spring finger 26 to break the circuit and stop the motor. This circuit breaking action is assisted and accelerated by the retraction of the drive belt 14 that was stretched while under load.

The can still supported by its bead resting on the traction wheel and entrapped behind the depending cutter tooth 31, may be left, i.e., back to starting position when the traction wheel axle 20 travelling down the arcuate slot 5 causes the can to drop clear of the cutter.

In the modified form shown in FIGURES 3–4, the action is basically the same except that on the initial actuation of the lever 62, both the main chassis 45 and secondary chassis part 55 swing in unison on the pin 44 until

the can on traction wheel 49 engages the cutting tooth 42, then upon the further swinging of the lever, the secondary chassis part 55 pivots on the chassis boss 47 to move laterally on pin 44 as allowed by its larger diameter bore 46 to cause actuation of the spring contact arm 64 by the projection 65.

In the further modified form illustrated in FIGURES 5–6, the separate movements of the chassis are similar to that described for FIGURES 1–2. In this case, however, the secondary pivoting movement of the chassis as it slides to the left on pin 75 does not press a swinging cam against the spring arm of a fixedly mounted circuit closer but causes the radial thrust of sliding bar 80 as its inner end engages the pin 75 so that its outer end presses against and actuates the spring arm 79 of the circuit closer 78 that is carried on the chassis.

In each case, it will be noted that the circuit closers are so adjusted that the primary pivoting of the chassis on the pivot pin is insufficient to close the motor circuit and that the secondary pivoting action on or about the traction wheel axle, whereby the chassis shifts left across the pivot pin, is the critical one.

Particular attention should be paid to the sophisticated articulation of the floatingly suspended chassis that is free to both turn on and slide transversely of the pivot. This unique mounting of the chassis enables its can carrying traction wheel to convey a can mounted thereon into contact with the point of the cutter as the chassis swings naturally on its pivot and when this resistance is encountered the axis of the chassis movement changes to the point of contact at the cutter tooth so that it then pivots in effect on the traction wheel shaft, causing the chassis to slide sideways across the pivot and thus bring it into engagement with the circuit closer to bend the spring finger into actuating contact. Powered by the motor, the traction wheel climbs to the top limit of its permitted travel, puncturing the can top by the cutter and rotating the same, its torsion meanwhile retaining the chassis in its sideways shift to engage the circuit closer finger with sufficient pressure to overcome the spring tension thereof. Once the resistance of the can top ceases, the torsion drops and thus enables the spring action of the contact finger to press the chassis away and break the motor circuit.

From the foregoing description taken in connection with the accompanying drawings, it will be manifest that an electrically powered can opener is provided that will fulfil all the necessary requirements of such a device, but as many changes could be made in the above description and many apparently widely different embodiments of the invention may be constructed within the scope of the appended claims, without departing from the spirit or scope thereof, it is intended that all matters contained in the said accompanying specification and drawings shall be interpreted as illustrative and not in a limitative or restrictive sense.

What is claimed as new is:

1. An electric can opener comprising a housing; an electric motor; a circuit closer therefor; a pivot in said housing; a chassis floatingly suspended on said pivot to both turn on and slide across the pivot; a fixed cutter; a can carrying traction wheel mounted on said chassis and operatively connected to said motor; and means for moving said chassis, causing it first to turn on its pivot and then to slide sideways on its pivot to engage said circuit closer.

2. An electric can opener comprising a housing having an arcuate slot in the face thereof; an electric motor; a circuit closer therefor; a pivot in said housing; a chassis floatingly suspended on said pivot to both turn on and slide across the pivot; a fixed cutter mounted on said housing above said arcuate slot; a can carrying traction wheel disposed exteriorly of said housing; a drive shaft therefor extending through said arcuate slot being rotatably supported by said chassis and operatively con-

nected to said motor; and manually operable means for said chassis causing it first to turn on its pivot to advance said wheel toward said cutter and then to slide sideways on the pivot to engage and actuate said circuit closer.

3. The can opener according to claim 2, wherein the circuit closer has a yielding spring finger normally acting to press the chassis sideways.

4. The can opener according to claim 2, wherein the drive shaft for the traction wheel is of smaller diameter than the accommodating arcuate slot in the face of the housing thereby allowing the chassis a measure of radial movement useable at the time of puncturing the top of an inserted can.

5. The can opener according to claim 2, wherein the chassis has a pivot accommodating bore substantially larger than the pivot to allow the chassis the freedom of movement to slide sideways thereon.

6. The can opener according to claim 2, wherein the chassis has an elongated inclined bore to loosely accommodate said pivot.

7. The can opener according to claim 2 wherein the circuit closer has a yielding spring finger normally active to press said chassis sideways and said chassis has a pivot accommodating bore substantially larger than the pivot to allow the chassis to slide sideways thereon; said chassis

on being manually operated swinging on its pivot until a can applied on its traction wheel is conveyed into contact with said cutter where-upon the resistance of the cutter causes the axis of the chassis' movement to change to the traction wheel shaft and the chassis slides sideways on the pivot to engage the yielding spring finger of said circuit closer and actuate said motor to drive said traction wheel, setting up torsion to hold said chassis against the yielding spring finger with sufficient pressure to keep the same operative whilst the traction wheel is under the load of the cutter's resistance to an engaged can.

8. A can opener according to claim 7, wherein the operative connection between the motor and the traction wheel drive shaft includes a resilient drive belt that stretches under load and that on termination of resistance of the cutter to an engaged can retracts to accelerate the circuit breaking action of the spring finger of the circuit closer in displacing the chassis relieved of torsion.

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WILLIAM FELDMAN, *Primary Examiner.*

G. WEIDENFELD, *Assistant Examiner.*