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Emmons et al.

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[54] **CAN OPENER CUTTER ASSEMBLY RELEASE**

[75] Inventors: **Robert J. Emmons**, Collinsville; **Maurice L. Boissonneault**, Newington, both of Conn.

[73] Assignee: **Dynamics Corporation of America**, New York

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[52] **U.S. Cl.** ..... **30/4 R**

[51] **Int. Cl.** **B67b 7/38**

[58] **Field of Search** ..... 30/4 R, 8.5, 9, 15, 30/15.5

[56] **References Cited**

UNITED STATES PATENTS

2,810,952	10/1957	Sundell	30/4 R
3,646,671	3/1972	Scott	30/4 R
3,673,682	8/1969	Yamamoto	30/4 R
3,688,398	9/1972	Aberer	30/4 R

Primary Examiner—Othell M. Simpson
Assistant Examiner—Gary L. Smith
Attorney—Watson D. Harbaugh et al.

[57] **ABSTRACT**

A push-pull latch in a powered household can opener is manually movable between alternate positions in both of which it is subjected to favorable frictional conditions with respect to a pivotally mounted cutter assembly that is removable for cleansing purposes.

9 Claims, 6 Drawing Figures

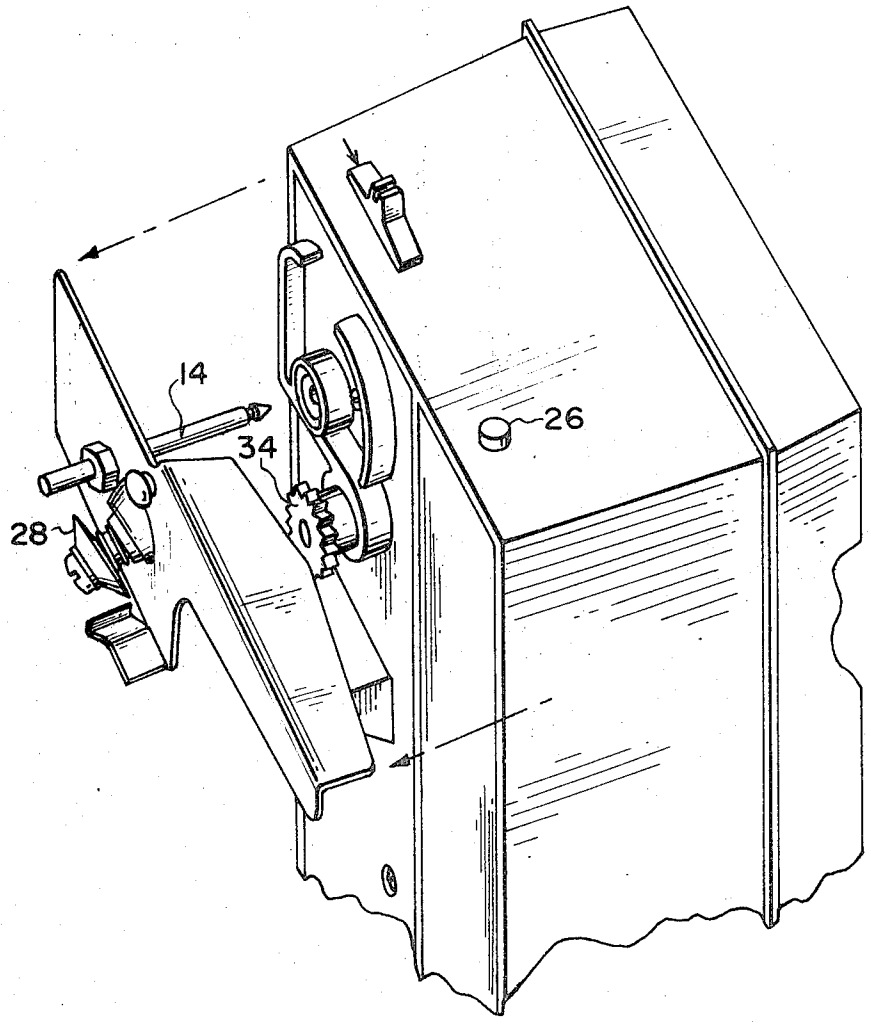


FIG. 1

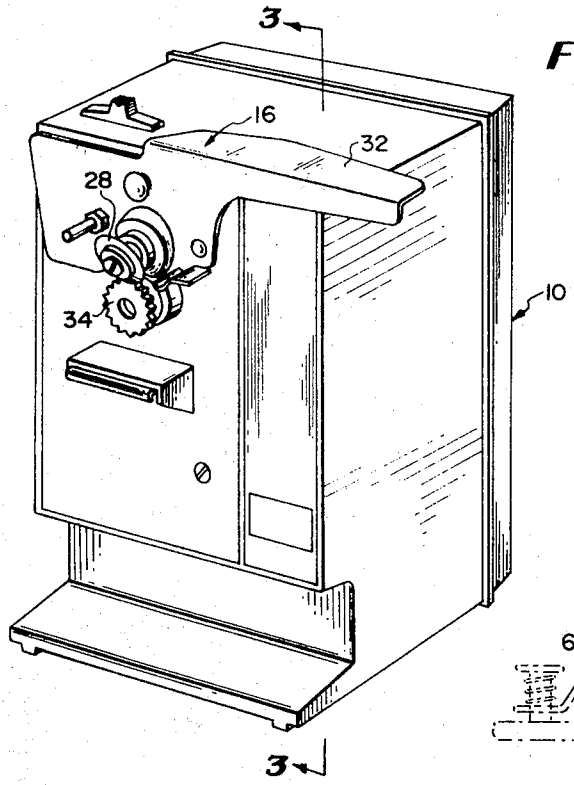


FIG. 3

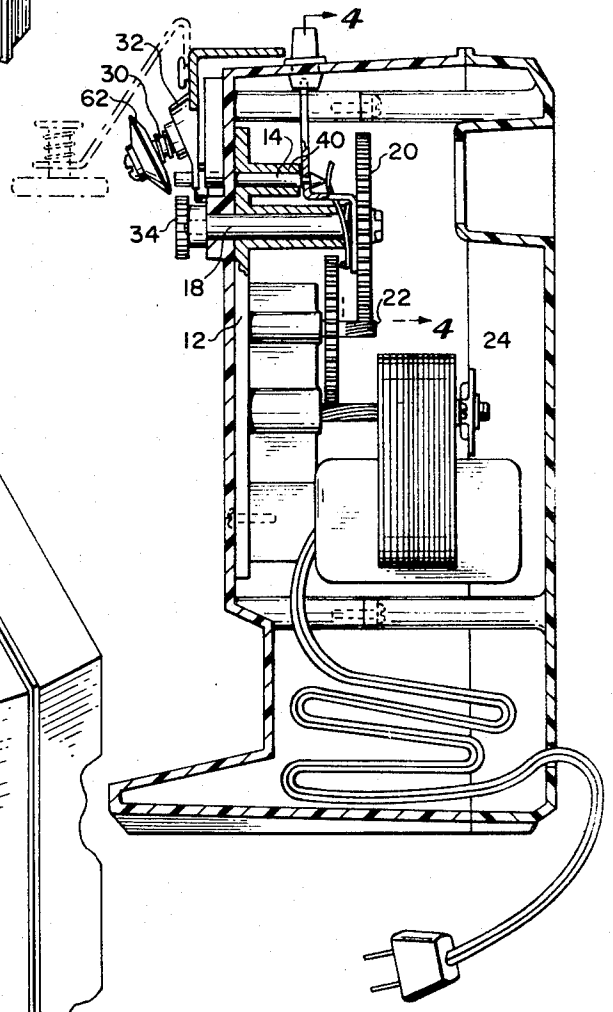
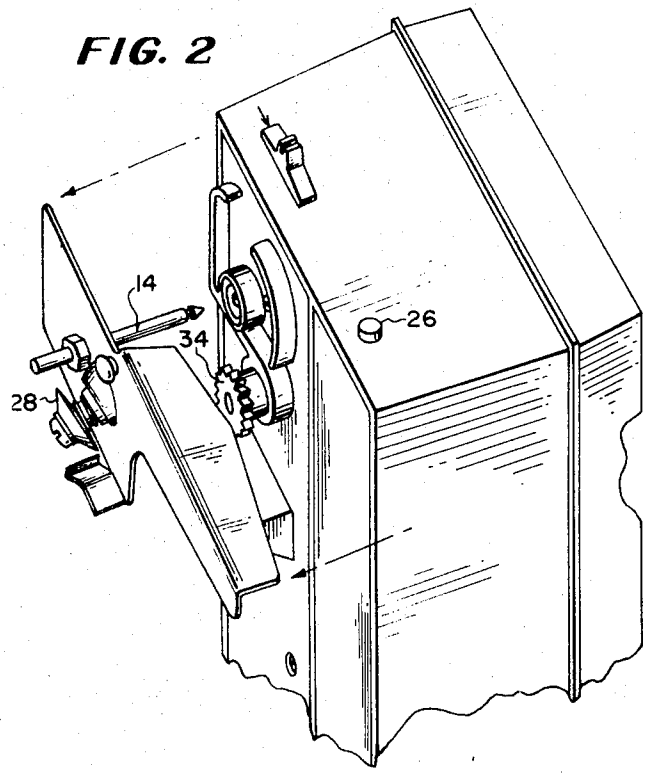


FIG. 2



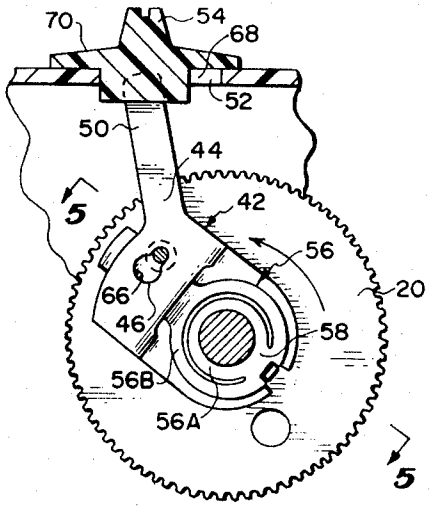


FIG. 4

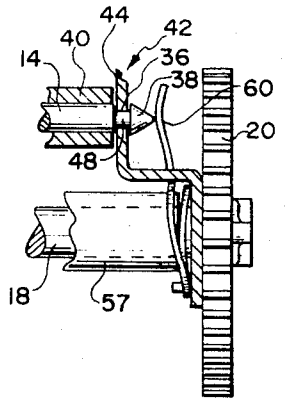


FIG. 5

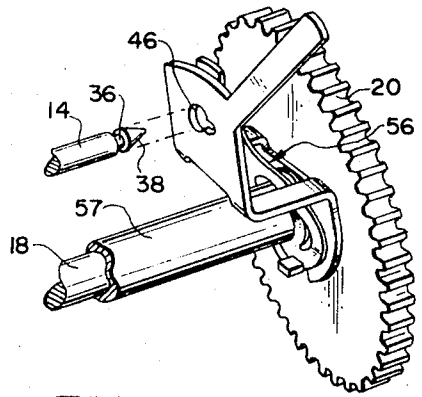


FIG. 6

CAN OPENER CUTTER ASSEMBLY RELEASE

BACKGROUND OF INVENTION

Push button release latches having a spring driven automatic relatching snap action for receiving and holding releasable can opener cutter assemblies in working position require an inherent looseness in their latching cooperation. Due to assembly or wear, this causes faulty operation of the conventional cutter and feed wheel assemblies, particularly with cans having assorted bead tolerances. Under such conditions extra strain and wear is placed upon the latching assemblies that pivotally carry the heavy axial load on the pivot pin and increase the undesirable performances as where an axially removable pivot pin carrying a cutter receives with little overlap a spring closed latch element transversely in a circumferential groove which rotates less than 20° under load with respect to the latch element.

In many cases the interengaged overlapping contact area of the latching relationship area is limited to a crescent of a length less than the diameter of the pivot pin and less than half the pin radius in depth. If a greater contact area is sought, difficulty is experienced in camming the snap action with the tapered head on the pin engaging the keyhole opening in the latch. In order to provide a maximum end thrust contact area between the narrower portion of the keyhole opening and a groove shallow enough to leave sufficient neck stock to withstand the axial thrusts, the narrow portion of the slot must be elongated a distance equal to the sum of the pin and neck radii whereupon automatic camming relatching tolerances become critical. The problem may also include a latch stop that is not spaced sufficiently so that it does not interfere with the fullness of the contact for the contact area designed.

Moreover, there is deleterious wear occurring if the latch pressure is made great enough to prevent the thrust pressure from loosening the latch and the wall of the groove may develop a lateral thrust component enough to displace the latch, even slightly, which could cause progressive deterioration. This can occur even if close manufacturing tolerances have been held. Otherwise more expensive metals and production techniques may be required to provide expected longevity and continuous good performance of a power driven can opener.

In this connection a snap latch, particularly if it has a keyhole opening, must be limited in its closing movement by other than the groove for the tapered head to be operatively received. Otherwise, the latch overshoots a desirable relatch ready position and has to be manually assisted in order to receive the pin in whole or in part therethrough for ultimate relatching purposes. Also, for the latch to be loose enough to operate with a snap action the axial working tolerances for the pin and cutter assembly have to be substantial, which contributes to wear and the faulty operation in opening cans.

SUMMARY OF INVENTION

In the present invention the manual throw of the latch by a frictionally supported push-pull slide button may be either unlimited, or limited only by the full depth of the latch engagement, and, the cutter pin receiving opening can be as large or small as desired. The latch member is pivoted on the feed wheel shaft for concentric movement with an already determined fixed

radius between the latch portion and the cutter pin as the latch is manually moved to its alternate positions.

Moreover, between the end of the feed wheel shaft bearing and the latch is provided a dual spring element, one portion of which is disposed between the frame and latch member with the latch member engaging against the transmission gear wheel carried by the feed wheel shaft to hold the feed wheel at its working position tolerance at all times and avoid any possibility of interference with a can bead being inserted in place between the cutter and feed wheel.

The keyhole opening on the latch is oriented with the large portion thereof leading in the direction of rotation of the feed wheel shaft and any friction developed therebetween is not adverse but favorable to the latch in either of its positions. The spring frictionally engages the frame and tends to hold the latch in its open position when unlatched, and any friction between the latch and transmission gear when running is favorable to the retention of the latch in its engaging position. In both instances the frictional manual positioning of the slide button is supplemented by any friction developed when the transmission gear is stationary or turning.

The other spring engages the end of the cutter pin not only to hold the cutter assembly at its working position tolerances but also partially ejects the assembly when unlatched. In remounting, the cutter pin assembly is then manually returned and the pin pressed axially into the path of latch engagement whereupon the slide button is manually actuated to move the latch back into pin engaging position and the springs take up all pin and shaft tolerances.

IN THE DRAWINGS

FIG. 1 is a perspective view of a powered can opener embodying the invention;

FIG. 2 is a top perspective of the can opener shown in FIG. 1 with the cutter assembly released and removed for cleaning;

FIG. 3 is a vertical sectional view taken on line 3—3 in FIG. 1;

FIGS. 4, 5 and 6 are side, edge, and perspective views, respectively, taken on lines 4–4 and 5–5 in FIGS. 3 and 4 of the latching relationship embodying the invention.

DESCRIPTION OF PREFERRED EMBODIMENT:

Referring to the drawings the frame of a household can opener **10** is indicated at **12** and journals both a pin **14** of a cutter-handle assembly **16** that is removable axially for cleansing (FIG. **2**), and the shaft **18** of a feed wheel assembly which includes a stamped gear wheel **20** on the inner end thereof meshing with a speed reducing gear **22** that is powered by a motor **24** under the control of a pressure switch **26** located at the top of the frame.

The cutter assembly **16** includes a can head piercing cutter wheel **28** journalled at **30** as canted at an angle on a handle **32** to shear the can head close to the bead. The handle in turn is secured to the pin **14** for pivotal movement of the cutter towards and away from a peripherally toothed feed wheel **34** on the shaft **18**. When the handle **32** forces the cutter and feed wheels into overlapping relation the switch **26** is closed by the handle and power is applied to sever a can head (not shown) in a well known manner from the rim bead of conventional cans having edibles in them that are pur-

chased for household consumption. The axes of rotation of the cutter wheel **28,** the pin **14,** and the feed wheel shaft **18** preferably are in essentially vertical alignment in operation for the reaction of the feed wheel and cutter to be in a direction holding them in cutting position and the handle in a position maintaining the switch **26** closed during the cutting operation, but works with other arrangements, one of which is shown.

The inner end of the pin **14** is circumferentially grooved at **36** beyond which a head **38,** preferably tapered, extends into the space behind its journal **40.** A latch mechanism **42** coacting with the groove **36** and head **38** is mounted on the rear exposed end of the feed wheel shaft **18** and includes a latch plate **44** journalled on the shaft **18** next to the reduction gear **20.** The upper end of the plate **44** has a latch slot **46** in it to receive the neck **48** defined by groove **36** behind the head **38** when the plate is moved in the direction of rotation of the gear **20.** A finger **50** extends through a slot **52** in the top of the frame **12** to receive a push-pull button **54** that is frictionally mounted to manually reciprocate the plate for engagement and disengagement of the slot **46** and groove **36.**

Also journalled on the feed wheel shaft is a dual spring element **56** in which concentric portions **56A** and **56B** are canted with respect to each other as integrally joined at **58** at their lower edges from which they diverge. The inner circular portion **56A** exerts a pressure between the bearing **57** in the frame **12** and the plate **44** for the latter to engage the gear wheel **20** and urge the feed wheel shaft **18** inwardly. The outer portion **56B** urges the cutter assembly pin **14** outwardly so that the full working space between the cutter and feed wheel is maintained at all times when the can opener is ready for receiving and cutting the can top. For this latter purpose the outer spring **56B** has an upwardly extending finger **60** biased to engage the inner end of the pin **14.** The spring **56B** also serves to eject the pin **14** and the cutter assembly **16** when the latch is released. The pin **14** being urged outwardly carries the latch member **44** against the frame portion **40** in collapsing all clearances and thus permits sufficient tolerances to be provided for the easy relatching of the outer assembly after cleansing. The springs are held in proper position against rotation with respect to the plate **44** by the sides **72** in the plate through which it extends and by the interlock between the notch **74** in the spring and tongue **76** on the plate **44** as shown in FIGS. **4** and **6.**

Thereby the ultimate relative resting positions of the cutter and feed wheel are held in their working positions to assist in easily receiving the rim of a can between them as they are advanced, and, as noted in FIG. **3** the cutter wheel **28** has a slight squeeze at contour **62** on the rim side that takes up any tolerances that it may have on its journal when it is advanced to sever the can top along the rim.

During the severing operation, the gear wheel **20** is turning and any friction developing between it and the latch plate **44** is favorable expended in a direction that does not disturb the latch plate having its slot **46** in engagement with the groove **36** of the pin **14.** After a can opening operation is completed the latch continues to remain engaged until manual movement of the push-pull button **54** moves it to its latch release position whereupon the spring finger **60** ejects the cutter assembly. Then the expanding spring **56A** frictionally disposed against the frame on one side tends to hold the latch against reengagement until the push-pull button **54** is manually moved to its latching position.

Although the latch slot portion **46A** may open on the edge of the plate **44** it is shown as part of the keyhole slot **46** shown which provides best strength and shear tolerances for the latch and also the large portion **66** of the slot cooperates with the tapered head **38** to some degree to assure the release position of the latch to receive the pin **14** after the cutter assembly has been cleansed. Thereupon the latch is manually moved by the push-pull button **54** to its latching position.

The push-pull button **54** loosely receives the upper end of the finger **50** when snapped into the frictional track **68** on the frame and terminal shrouds **70** overlie the slot **52.** Suitable indicia on the housing at opposite ends of the shrouds indicate the respective positions of the button described.

What is claimed is:

1. In a can opener having a frame and prime mover, the combination of

a rotatable feed wheel assembly including a shaft journalled in the frame and an element rotatable therewith having a surface engageable on the shaft side thereof,

a cutter assembly including a cutter movable in and out of co-action with said feed wheel in axially offset relationship and a mounting pin pivotally journalled in the frame for axial removal for cleansing of the cutter,

manually reciprocated latch means carried by said frame coacting with said mounting pin to secure and release said pin with respect to its journalled working position,

said pin having a headed end portion engaged by said latch, and

means on said latch engaging said surface during rotation of said shaft, the direction of rotation at said engagement being in the direction of latch movement in latching said cutter assembly in its working position.

2. The can opener defined in claim **1** including,

spring means between said frame and latch holding said latch in engagement with said surface to hold said feed wheel in its working position continuously.

3. The can opener defined in claim **1** including,

a stamping carried by said shaft urging said latch in engagement with said surface and having a spring element engaging the end of the pin to partially eject the pin when said latch means is manually actuated in a direction opposite to the direction of feed wheel rotation.

4. The can opener defined in claim **1** including,

a spring metal stamping having two spring portions journalled onsaid feed wheel shaft, one spring portion enterengaging latch means and frame to urge said contacting relationship, and the other spring portion engaging said mounting pin to partially eject said mounting pin upon release of said latch means.

5. The can opener defined in claim **1** in which

said element comprises a wheel gear meshing with a spur gear driven by said prime mover.

6. The can opener defined in claim **1** including,

a pressure sensitive normally OFF switch supported in the frame for controlling said motor, and

said cutter assembly including a handle engaging said switch to close it when the cutter is moved into said coaction with said feed wheel by said handle,

said axes of said pin shaft and cutter wheel being in predetermined orientation for the cutting reaction to assist holding said handle in position closing said switch.

7. The can opener defined in claim **2** in which,

said spring means comprises a central portion normally canted in part in an axial direction to the axis of said shaft located under compression between said means and said frame, and

a portion secured to one side of said central portion and canted to engage said pin to eject it when free to do so.

8. In a can opener having a frame, a rotatable feed wheel assembly including a shaft journalled in the frame and an element thereon having a rotatable frictional surface, a cutter assembly including a cutter to releasably coact with said feed wheel and a mounting pin pivotally journalled in the frame for movement of the cutter and axial removal of the assembly for cleansing of the cutter,

a prime mover carried by said frame for rotating said shaft,

means to energize said prime mover actuated by said cutter assembly when said cutter is moved into coaction with said feed wheel, and

manually reciprocated latch means coacting with said pin to secure and release said pin, said pin having a headed end portion engaged by said latch means and said latch means frictionally engaging said frictional surface favorable to maintaining said latching position during rotation of said shaft.

9. The can opener defined in claim **8** in which,

said latch means comprises a member movable in a plane transverse to said pin and having a keyhole slot therein where minor width extends a distance greater than the radius of said pin in the direction of rotation of said feed wheel.

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