Feb. 22, 1949. A. E. NELSON 2,462,416

CAN OPENER

Filed June 23, 1945

Fig. 1.

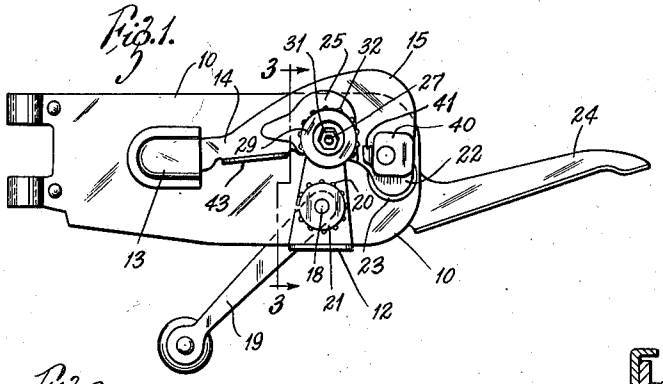


Fig. 2.

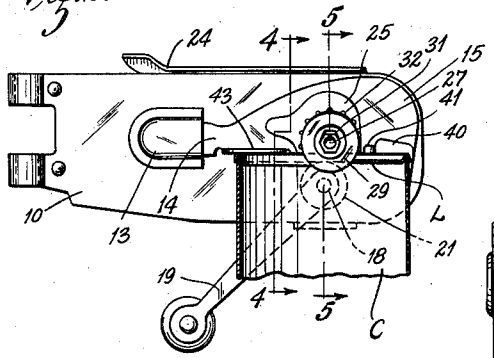


Fig. 5.

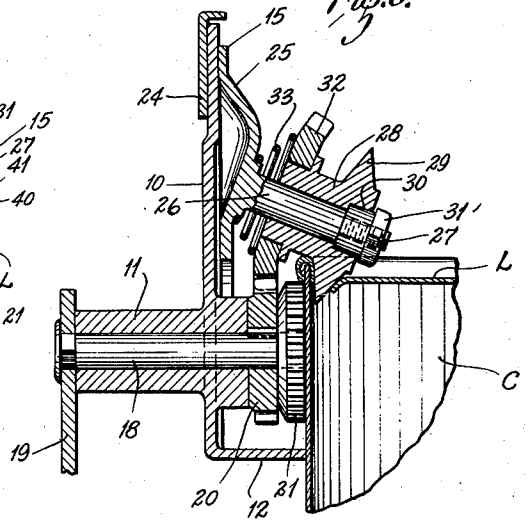


Fig. 3.

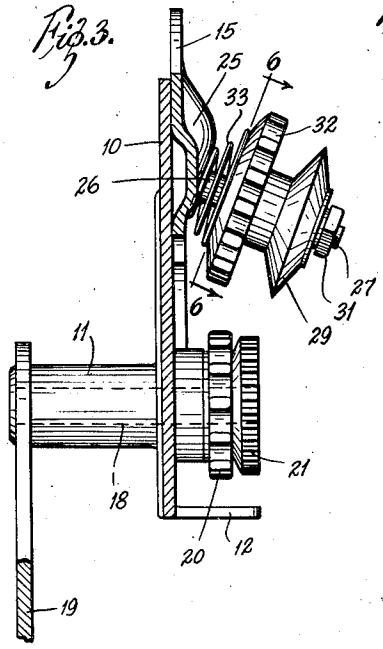


Fig. 6.

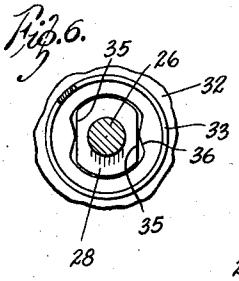


Fig. 4.

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CAN OPENER

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4 Claims. (Cl. 30—9)

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The present invention relates to a can opener. More particularly, it relates to a driving means used for the feed mechanism and the cutter mechanism in a can opener.

It is an object of the invention to provide such a feed means and cutter means, which are both power driven, from a common shaft with gearing between them, together with means to insure that the gears will always readily mesh and that the feed will always operate smoothly, regardless of possible slight irregularities in the gear or of obstructions to their proper mesh.

More particularly, it is an object of the invention to provide in a can opener, a feed wheel on a shaft and a cutter wheel on a shaft, with gearing adapted to be meshed to cause the two shafts to rotate together, and means to accommodate for slight obstructions to the proper mesh of the gears, and means to provide slight relative rotation of the two shafts necessary to get the gears in mesh when they otherwise are disposed out of meshing positions.

In the drawings:

Fig. 1 is a side elevation of a can opener embodying the present invention, shown in open position;

Fig. 2 is a similar side elevation of a can opener showing it in engagement on a can;

Fig. 3 is a vertical section through the can opener, taken on the line 3—3 of Fig. 1;

Fig. 4 is a vertical section on the can opener in closed position on a can, taken on the line 4—4 of Fig. 2;

Fig. 5 is another vertical section on the can opener, taken on the line 5—5 of Fig. 2; and

Fig. 6 is a section taken on the line 6—6 of Fig. 3 showing the mounting of one of the gears on the cutter wheel.

The can opener includes a frame 10, adapted to be supported upon a pivot pin or the like. Near its outer end, this frame has a bearing support 11, transversely mounted thereon. Below the bearing support there is a can engaging flange 12. Back of the bearing support 11, there is a socket 13 on the frame 10 that provides a slide bearing for one end 14 of a carrier member 15.

The bearing support 11 contains a driving shaft 18, upon one end of which is mounted a crank 19. This shaft 18 passes through the frame 10, and on its back end has mounted a gear 20. In front of that gear there is mounted a feed wheel 21. The edge of this feed wheel is milled or serrated and is adapted to be disposed under the rim of a can to be opened. It will be understood that rotation of the crank 19 rotates the shaft 18 and both the gear 20 and the feed wheel 21.

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The carrier 15 has an outer end 22 pivotally mounted on an eccentric 23 supported in the frame 10. This eccentric is rotated by a handle 24, shown in open position in Fig. 1 and in closed position in Fig. 2.

The carrier 15 has a backwardly and downwardly stamped portion 25, upon which is mounted a stud shaft 26 having a reduced threaded portion 27 at its outer end. It will be seen that the depressed portion 25 disposes the stud shaft 26 in a direction downwardly inclined toward the center of the can.

The stud shaft 26 receives a hub 28 having thereon a cutter disc 29. This cutter disc has a recess 30 therein that extends inwardly so that the bottom of the recess may be disposed approximately at the outer end of the shaft 26 at the point where the reduced portion 27 begins. A holding nut 31 is adapted to be threaded over the extension 27 and to fit within the recess 30, and to hold the cutter wheel against backward movement.

The hub 28 also has an integral flange thereon, against which a gear 32 is adapted to bear. This gear is urged into such bearing relation by a coil spring 33, which permits some axial movement of the gear 32 on the hub 28.

As shown in Fig. 6, the hub 28 has opposed flat sides 35 oppositely thereon at the area where it passes through the gear 32. The gear has a more or less hour-glass shaped opening 36 therein that engages over the hub 28. This hour-glass shaped opening within the gear permits a limited amount of relative angular movement between the gear 32 and the hub 28.

The frame 15 has also a bracket 40 secured thereto which has an upstanding can engaging deflector 41 thereon. The frame also has a ledge 43 behind the cutting disc that is adapted to overlie a can, as appears in Fig. 2.

The operation of the device is as follows:

The handle 24 is opened to the position of Fig. 1. This opening operation, through the means of the eccentric, lifts the outer end of the carrier 15, separates the gear 32 from the gear 20, and separates the cutting disc 29 from the feed wheel 21. Thereupon, a can C may be inserted into the space between these two with its rim overlying the top edge of the feed wheel 21. The side of the can will engage the inner edge of the ledge 12. Then the handle 24 is swung over to closed position, in which process

the cutter disc 29 is brought down to penetrate the lid L of the can, as shown in Fig. 5. At the same time, the spacer 41 may engage the rim of the can ahead of the cutter disc 29 and the ledge 43 will overlie the top of the rim of the can behind the cutter wheel. In the opening and closing operation produced through the eccentric, the tongue 14 on the bracket slides in the slot of the frame 10 provided by the socket 13.

Also, during the operation of closing the handle 24, the gear 32 will be brought down to mesh with the gear 20. Thereafter, when the crank 19 is rotated, the gear 20 will drive the gear 32 and hence the cutter disc 29 at the same time that the feed wheel 21 is rotated. As noted in a co-pending application of this inventor, it is preferable that the peripheral speed of the wheel be slightly slower than and at least no faster than the peripheral speed of the feed wheel. This rotation of the crank arm will move the can C around its axis, feeding the lid against the rotating cutter disc 29. The cutter disc will sever the lid and, by the close contact with the side of the can of one of its faces as shown in Fig. 5, it will smooth any edge of the lid down against the inner surface of the can.

In bringing the gear 32 into mesh with the gear 20 it is necessary that a tooth on one be presented opposite a space on the other. Sometimes, when the cutter disc is introduced into the can top, it will meet sufficient friction to prevent it from rotating. If the cutter disc should be thus held in an angular position wherein the gear 32 is caused to present a tooth against a tooth on the gear 20, mesh would be impossible but for the fact that there is a lost motion of limited extent between the gear 32 and the cutter disc 29. This lost motion is provided by the hour-glass shaped opening 36 in the gear 32. Consequently, as the two gears approach, they may have some relative movement to assure mesh, despite the fact that both the feed wheel and the cutter disc are held against rotation.

Furthermore, should there be any small obstruction to the intermeshing of the gears, no deleterious effects will occur because the spring 33 will permit a slight axial movement of the gear 32 upwardly along the sloping stud shaft 26. This movement increases the distance between the centers of the gears. Then, as further rotation of the gear 20 is effected, the obstruction will be overcome and the spring 33 will throw the gears into full mesh.

The foregoing also permits the use of gears that are made of stampings without the necessity of a final high finishing operation of the gears. If the gears have burrs on them, they will nevertheless operate smoothly, because the spring 33 will permit the aforesaid axial movement of the gear 32 which increases the distance between centers of the gears without destroying their inter-operation. It has been found that gears with some irregularities on them actually will work quite smoothly for all present purposes with this construction. In the case of the worst burrs that would occur or the worst obstructions that might get into the gears, such as dirt particles or the like, no bad results come in the operation, and after a short time these obstructions are completely eliminated by the continued operation of the can opener.

What is claimed is:

1. In a can opener, a first shaft, a first gear thereon, a can engaging feed means on the first shaft, a second shaft disposed at an angle to the first shaft, a cutter wheel on the second shaft, a gear on the second shaft having limited rotation relative to the second shaft, means to drive one of said shafts, and means mounting one of said gears for limited axial movement on its shaft to permit increase of the distance between the centers of the gears.

2. In a can opener, a frame, a drive shaft mounted thereon, a first gear on the drive shaft, a feed disc on the drive shaft, a bracket movably mounted on the frame, a shaft on the bracket extending downward at an angle toward the drive shaft axis, a hub on the angularly extending shaft, a cutter wheel on the hub to rotate therewith, a flange on the hub, a second gear on the hub mounted for axial movement, a spring urging the gear downward on the hub toward the flange, and means for moving the bracket to bring the gears into mesh.

3. In a can opener, a frame, a drive shaft mounted thereon, a first gear on the drive shaft, a feed disc on the drive shaft, a bracket movably mounted on the frame, a shaft on the bracket extending downward at an angle toward the drive shaft axis, a hub on the angularly extending shaft, a cutter wheel on the hub to rotate therewith, a flange on the hub, a second gear on the hub mounted for axial movement, a spring urging the gear downward on the hub toward the flange, and means for moving the bracket to bring the gears into mesh, said second gear and the hub being shaped to provide limited relative movement between the gear and the hub.

4. In a can opener, a frame, a drive shaft mounted thereon, a first gear on the drive shaft, a feed disc on the drive shaft, a bracket movably mounted on the frame, a shaft on the bracket extending downward at an angle toward the drive shaft axis, a hub on the angularly extending shaft, a cutter wheel on the hub to rotate therewith, a flange on the hub spaced from said cutter wheel, a second gear on the hub bearing against said flange, and means for moving the bracket to bring the gears into mesh, said second gear and the hub being shaped to provide limited relative movement between the gear and the hub.

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