March 5, 1935. L. D. ROBERTS 1,993,683

CAN OPENER

Filed May 5, 1934

Fig. 1.

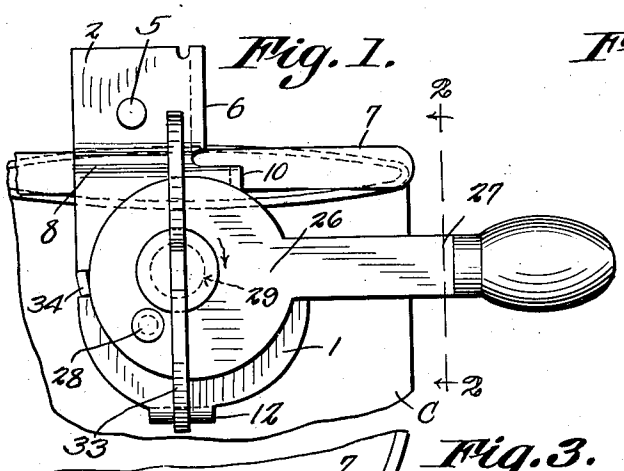


Fig. 2.

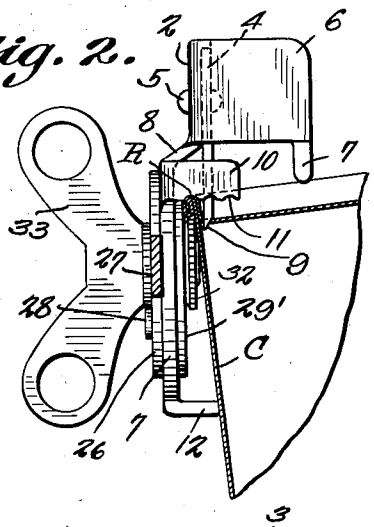


Fig. 3.

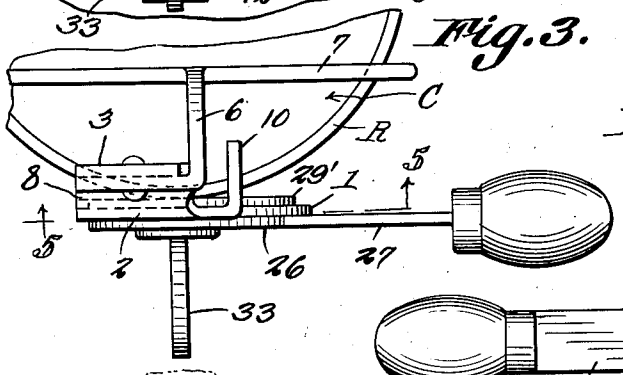


Fig. 4.

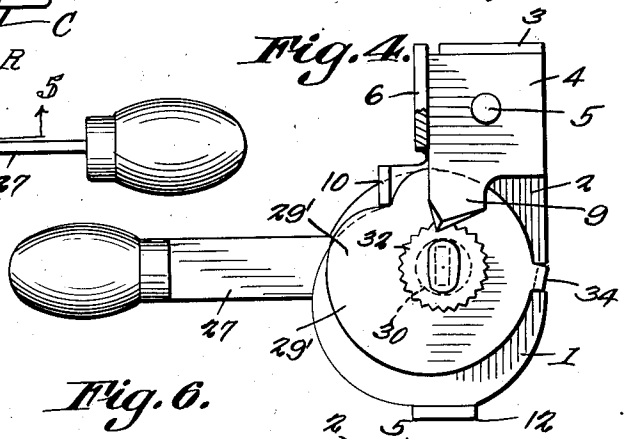


Fig. 6.

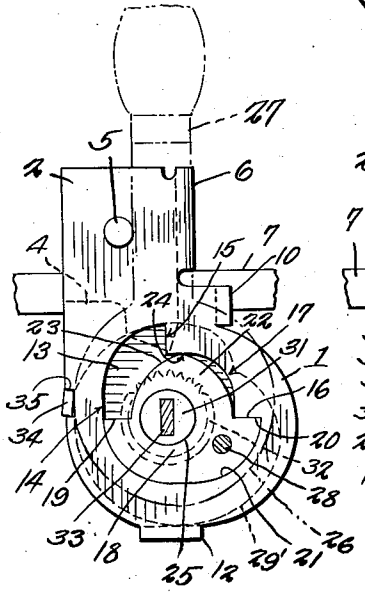


Fig. 7.

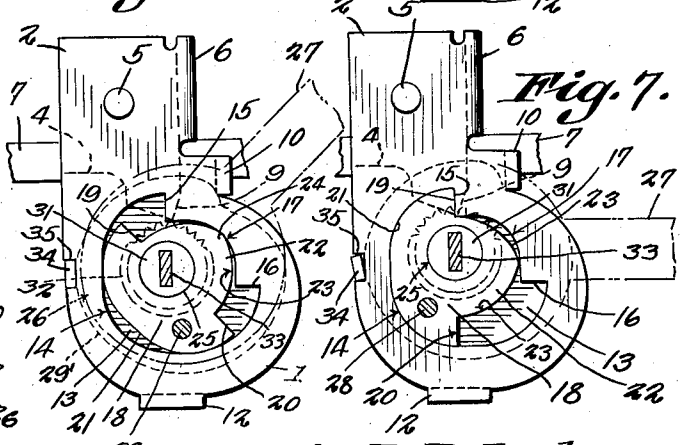


Fig. 5.

Lewis D. Roberts Inventor

By C. A. Snow & Co.

Attorneys.

Patented Mar. 5, 1935 1,993,683

UNITED STATES PATENT OFFICE

1,993,683

CAN OPENER

Lewis David Roberts, York, Pa.

Application May 5, 1934, Serial No. 724,160

5 Claims. (Cl. 30—3)

This invention relates to can openers of that type utilizing a feeding wheel which co-operates with a knife whereby, following the application of the device to a can, the rotation of the wheel will cause the end of the can to be cut out.

In devices of the type mentioned various means have been employed for forcing the knife into the can at the beginning of the operation. This has been accomplished frequently by swinging the wheel against the under-surface of the bead extending around the end of the can, thereby to cause the end of the blade to penetrate the top of the can. Such means has resulted usually in the tilting of the opener relative to the can so that the blade has not been held in proper or most effective position during the cutting action.

It is an object of the present invention to mount the feeding wheel in a new and novel manner whereby it will be moved in a straight line toward the blade so that there will be no tendency of the blade and other parts of the device to rock when applied to a can.

Another object is to employ a new and novel arrangement of co-operating cams whereby the desired relative right-line movement of the wheel and blade is obtained.

A still further object is to employ operating means which are held assembled securely with the other parts of the can opener so that they will not become displaced relative to each other and will be capable of withstanding rough use.

A further object is to provide a can opener which is simple and compact, can be manufactured at low cost and can be handled readily by any one.

With the foregoing and other objects in view which will appear as the description proceeds, the invention consists of certain novel details of construction and combinations of parts hereinafter more fully described and pointed out in the claims, it being understood that changes may be made in the construction and arrangement of parts without departing from the spirit of the invention as claimed.

In the accompanying drawing the preferred form of the invention has been shown.

In said drawing

Figure 1 is a front elevation of the can opener applied to a can, a portion of which has been shown.

Figure 2 is a section on line 2—2, Figure 1, a portion of the can being shown in vertical section at the points where gripped and penetrated.

Figure 3 is a plan view of the structure shown in Figure 1.

Figure 4 is an elevation of the can opener with the parts in the positions illustrated in Figures 1, 2 and 3, and showing that face of the can opener opposite to the one illustrated in Figure 1.

Figure 5 is a section on line 5—5, Figure 3, showing the relative positions of the cooperating cams when the handle is raised to permit application of the device to a can.

Figure 6 is a similar view showing the parts in an intermediate position during the right-line movement of the feeding wheel.

Figure 7 is a view similar to Figures 5 and 6 and illustrating the relative positions of the cams upon the completion of the penetration of the can and during the feeding operation, this position being the same as that shown in Figure 1.

Referring to the figures by characters of reference, 1 designates a stationary cam plate provided with an extension 2 the end of which is bent laterally or off-set as shown at 3 to provide an abutment for one end of a blade 4. This blade is clamped detachably to one side of the extension 2 by a screw or bolt 5 or the like and one side edge of the blade bears against a laterally extended wing 6 which, as shown particularly in Figure 3, may be provided with a rest bar 7 adapted to over-lie and bear downwardly upon spaced portions of the periphery of a can C.

The extension 2 is off-set laterally as indicated at 8 so that the lower end of blade 4 which is reduced to form a sharp, pointed, cutting tongue 9, will be held spaced from the adjacent surface of cam 1 a distance slightly greater than the thickness of the end bead or rim R of the can.

A guide ear or rest 10 is extended laterally from one edge of cam 1 and its lower edge is provided preferably with notches 11 any one of which is designed to receive the top surface of the bead R as shown, for example, in Figure 2.

A spacing foot 12 is extended laterally from the lower portion of cam 1 and is adapted to bear against the side wall of the can C to which the opener is applied so as to hold cam 1 at an acute angle to the can.

Cam 1 is provided with an opening 13 of peculiar configuration the walls of which constitute cam surfaces.

One cam surface 14 follows an irregular curvature through approximately 270°, there being inwardly extended shoulders or abutments 15 and 16 at the ends of this cam surface and which extend to the ends of another irregularly curved cam surface 17 extending through approximately 90°.

Movably mounted within the opening 13 is a

floating or movable cam 18 having alining oppositely extending shoulders 19 and 20. That portion of the periphery of cam 18 connecting the outer ends of shoulders 19 and 20, is extended along an irregular curve as shown at 21, this curvature being such that when the cam 18 is in one extreme position with its shoulder 20 in contact with shoulder 16, the peripheral portion 21 of cam 18 will fit snugly against the adjacent irregularly curved portion of the cam surface 14 as shown in Figure 5. When cam 18 is in its other extreme position with shoulder 19 bearing against shoulder 15, the cam surface 14 will again be snugly engaged by the peripheral portion 21 of cam 18 as shown in Figure 7. A rotation of cam 18 through 90° is necessary to bring said cam into one or the other of its extreme positions, as will be apparent by referring to Figures 5 and 7.

It will be noticed that the peripheral portion 21 of cam 18 is slightly flat between its ends and as the cam surface 14 is shaped for snug engagement with this peripheral portion, the co-operating cams tend to maintain their relative extreme positions unless forcibly moved therefrom.

Cam 18 has a reduced portion 22 extending from the inner ends of shoulders 19 and 20. This reduced portion has its periphery made up of opposed arcuate portions 23 which come together to provide a bearing 24. This bearing works upon the cam surface 17 and is located at all times between the shoulders 15 and 16.

A circular opening 25 is provided in the cam 18 at a point off center, the center of the opening being in line with the shoulders 19 and 20.

By providing co-operating cam faces as illustrated and described it becomes possible, by the rotation of cam 18 from one extreme position to the other, to move the center of the opening 25 along a straight line toward and from the cutting point of the tongue 9. This will be obvious by reviewing Figures 5, 6 and 7. Figure 5 shows the opening 25 spaced its maximum distance from tongue 9. Figure 6 shows the opening moved part way toward the tongue and Figure 7 illustrates the position of the opening upon the completion of its movement in one direction. In all of these positions the center of the opening occupies the same line of movement.

For the purpose of rotating the movable or floating cam 18 there is provided an outer cover plate 26 which constantly conceals the outer side of opening 13 and has an operating lever or handle 27 extending therefrom. This plate may be attached to cam 18 by a rivet 28 and has an opening 29 which registers with opening 25.

An inner cover plate 29' is provided on the inner face of cam 1 and constantly closes the inner side of opening 13. This inner cover plate is also provided with an opening 30 constantly registering with the opening 25. A cylindrical pin 31 is mounted for rotation in the coaxial openings 25, 29 and 30 and the inner end of this pin carries a feeding wheel 32. The wheel is formed with a toothed periphery and is of a thickness slightly less than the thickness of bead R. This will be noted by referring to Figure 2. The outer end of the pin has any suitable means for rotating it and the wheel. For example a turn button or key 33 can be used.

The inner cover plate can be held in any suitable manner against rotation. For example it can be formed with a laterally extended lug 34 seated loosely in a notch 35 in cam 1 so that it will not interfere with the right-line movement of the pin 31 and wheel 32.

In practice the user grasps the wing 6 in one hand and raises handle 27 to the position shown in Figure 5. The cams thus co-operate to move wheel 32 along a straight line away from tongue 9, leaving a sufficient space between the tongue and wheel 32 to permit the out-turned bead R on can C to be inserted between the tongue and the wheel and to rest on the periphery of the wheel.

With the can C resting on a table or the like the user now thrusts handle 27 downwardly whereupon it moves through the position shown in Figure 6 to the position shown in Figure 7. During this operation the cams coact to pull the point of tongue 9 downwardly along a straight line toward the center line or axis of wheel 32 with the result that said point will penetrate the top of the can close to the inner side of bead R and bind the bead upon the periphery of wheel 32. By providing foot 12 the device is held at a correct angle to the can.

During the application of the can opener the rest 10 will come into contact with the bead. Thus the parts are ready to operate and the user rotates key 33 in a clockwise direction as indicated by the arrow in Figure 1. This maintains the two cams in the relative positions shown in Figure 7 and causes the wheel 32 to roll along the bottom surface of bead R, causing the bead to move backwardly under the rest 10 and forcing the sharp pointed portion of the tongue 9 forwardly within the top of the can. By continuing the rotation until the can has made a complete revolution the entire top will be removed.

Should bar 7 be used so as to rest on the can in front of and in back of the blade and wheel, any tendency of the device to tilt during the cutting operation will be overcome.

Importance is attached to the fact that the co-operating cams produce a right-line movement of the blade or tongue 9 relative to wheel 32 or vice versa and to the further fact that the co-acting portions of these cams are concealed and protected at all times by the cover plates. The cams are also advantageous because of the powerful leverage resulting from their use and consequent ease in effecting penetration of the can. By moving the parts in a right-line the bead will be tightly gripped so that the opener cannot become separated therefrom inadvertently. A further advantage is found in the fact that the cams co-operate to limit their relative movement and no special stops are necessary. Furthermore all of the parts can be stamped readily from sheet metal and, therefore, the article may be produced at low cost.

Obviously changes can be made within the scope of the invention as claimed. For example the rest bar 7 might be dispensed with; a crank arm could be used in lieu of the key or button 33; and the cover plate 26 might be formed integral with the cam 18.

What is claimed is:

1. A can opener including a cam having an opening the walls of which constitute cam faces of irregular curvatures, portions of the walls providing stop shoulders between the cam faces, a cam mounted for rotation within the opening and having stop shoulders for co-operation with the first named shoulders to limit the movement of the rotatable cam, a feeding element carried by the rotatable cam, a cutting element carried by the other cam, means for rotating the feeding element, and means for rotating the rotatable cam, said cams being proportioned for constant en-

gagement one with the other and being so shaped as to impart a right-line movement to one of the elements relative to the other element when the rotatable cam is actuated.

2. A can opener including a cam having an opening the walls of which constitute cam faces of irregular curvatures, a cam mounted for rotation within the opening, a feeding element carried by the rotatable cam, a cutting element carried by the other cam, means for rotating the feeding element, means for rotating the rotatable cam, co-operating means on the cams for limiting said rotation, said cams being proportioned for constant engagement one with the other and being so shaped as to impart a right-line movement to one of the elements relative to the other element when the rotatable cam is actuated.

3. A can opener including a cam having an opening the walls of which constitute cam faces of irregular curvatures, a cam mounted for rotation within the opening, a feeding element carried by the rotatable cam, a cutting element carried by the other cam, means for rotating the feeding element, means for rotating the rotatable cam, co-operating means on the cams for limiting said rotation, said cams being proportioned for constant engagement one with the other and being so shaped as to impart a right-line movement to one of the elements relative to the other element when the rotatable cam is actuated, and means shiftable with the rotatable cam and movably contacting with the other cam for constantly closing the opening and concealing the rotatable cam.

4. A can opener including a cam having an opening the walls of which constitute cam faces of irregular curvatures, a cam mounted for rotation within the opening, a feeding element carried by the rotatable cam, a cutting element carried by the other cam, means for rotating the feeding element, means for rotating the rotatable cam, co-operating means on the cams for limiting said rotation, said cams being proportioned for constant engagement one with the other and being so shaped as to impart a right-line movement to one of the elements relative to the other element when the rotatable cam is actuated, and a rest fixed relative to the cutting element for sliding engagement with the top surface of the bead of a can being opened.

5. A can opener including a cam having an opening the walls of which constitute cam faces of irregular curvatures, a cam mounted for rotation within the opening, a feeding element carried by the rotatable cam, a cutting element carried by the other cam, means for rotating the feeding element, means for rotating the rotatable cam, co-operating means on the cams for limiting said rotation, said cams being proportioned for constant engagement one with the other and being so shaped as to impart a right-line movement to one of the elements relative to the other element when the rotatable cam is actuated, and a rest fixed relative to the cutting element, said rest being notched for sliding engagement with the bead of a can being cut.

LEWIS DAVID ROBERTS.