July 12, 1966 J. G. PORTTEUS 3,259,977

CAN OPENER

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FIG. 1

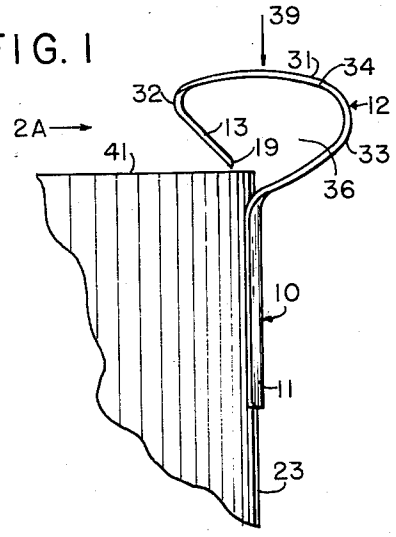


FIG. 2

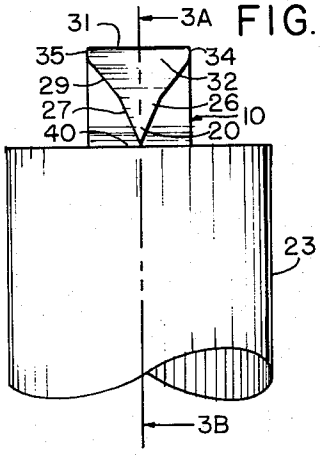


FIG. 3

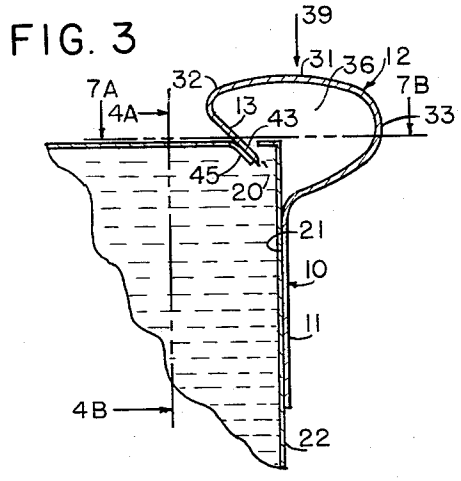
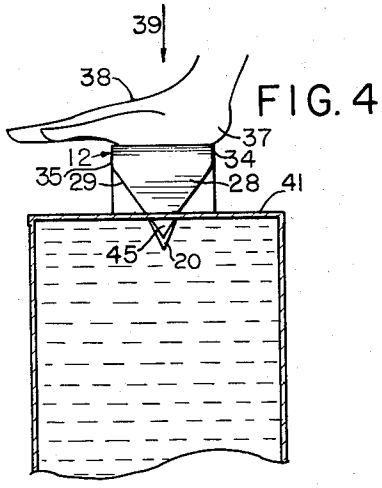


FIG. 4



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FIG. 5

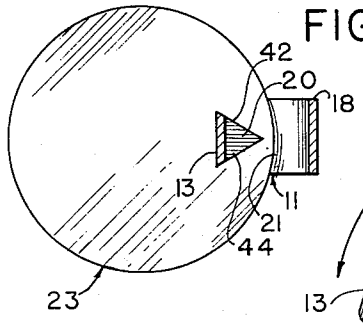


FIG. 6

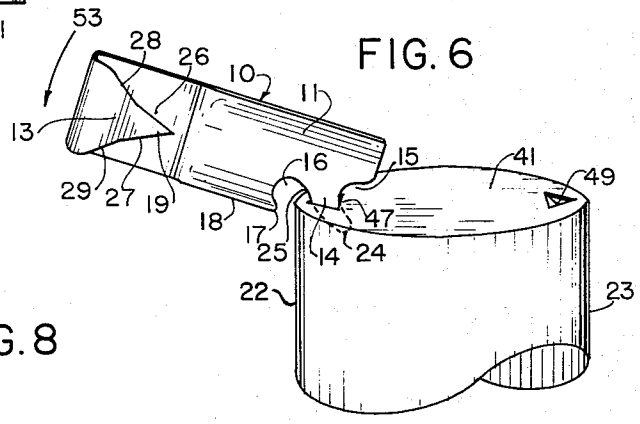


FIG. 8

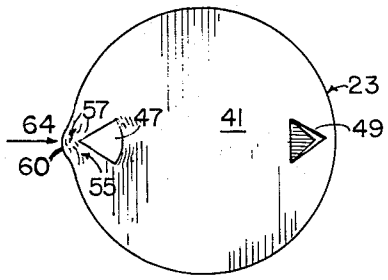


FIG. 7

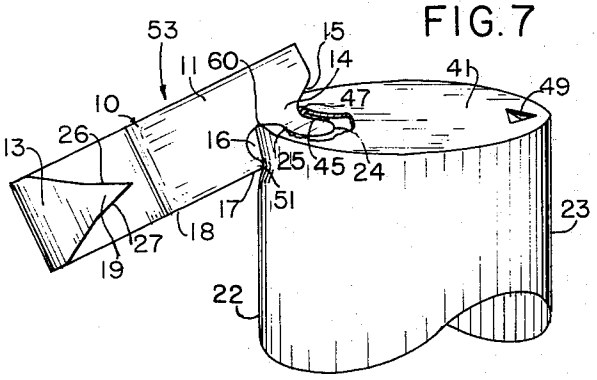
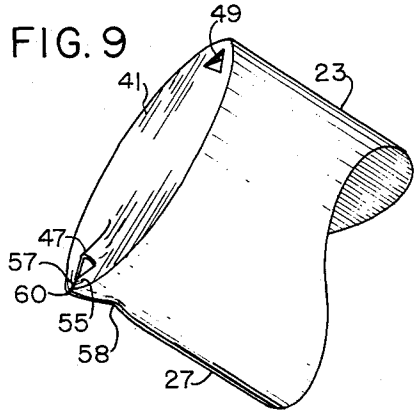


FIG. 9



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CAN OPENER

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Filed Dec. 19, 1963, Ser. No. 333,787
3 Claims. (Cl. 30—16)

This application is a continuation-in-part of my copending application Serial Number 109,649, filed May 12, 1961, and later abandoned. This invention relates to a can opener and a method of forming perforations in containers to improve pouring of liquids therefrom. More particularly, this invention relates to a one-piece can opener especially adapted for use on cans and other containers without lips. Briefly my invention provides a device for perforating a can and forming a non-drip lip therein. The device comprises means for slidably supporting the device on the side of a can, means for perforating said can to a controllable and predeterminable and limited depth at a point spaced slightly interiorly from the side wall of said can while cutting a flap in the roof of said can and forming thereby an orifice of controlled size while partially folding said cutaway portion under the roof of said can and away from said side. The means for slidably supporting comprises a tongue for forming a downwardly and inwardly sloped groove in an outer portion of the roof of said can, said groove extending from a side wall of said can to the orifice made by said perforating means. The means for slidably supporting the device for punching a hole also provides for simultaneously crimping the wall of said can below said orifice in the roof while forming the groove leading to that orifice and opening the hole. The device has only one cutting point, and it is turned inward for safety in handling and storing such a can opener as well as safety during its operation.

One object of this invention is to provide a can opener of improved efficiency and convenience.

Another object of this invention is to provide a can opener of improved convenience, efficiency, and reliability for use with cans having little or no outstanding lip.

Yet another object of this invention is to provide a can opener manufacturable from one piece of metal sheet.

Yet another object of this invention is to provide a can opener with a large handle adapted to effect perforation of a container wall or roof with convenient control of size of opening made.

Yet another object of this invention is to provide an apparatus to perforate and bend the roof of a container in order to improve pouring of liquids therefrom.

Yet another object of this invention is to provide a can opener apparatus adapted for use on the type of cans having little or no lips at the juncture of the roof and the sides of the can to conveniently and reliably create a non-drip groove therein.

Other objects of this invention will be apparent to those skilled in the art on a study of the below description and drawings. In the drawings, which form a part of this description and wherein like numerals refer to like parts in all figures;

FIGURE 1 is a side view of the device of this invention shown in juxtaposition to a can on which it is to operate;

FIGURE 2 is a front view of the device shown in FIGURE 1 as seen in the direction indicated by the arrow 2A in FIGURE 1;

FIGURE 3 is a view of the can opener device in a position whereat it has perforated the roof of the can shown in FIGURE 1, this view being taken along the plane 3A–3B of FIGURE 2;

FIGURE 4 is a cutaway view of the device as seen along the section 4A–4B in FIGURE 3;

FIGURE 5 is a top view, partly in section along the plane indicated as 7A–7B in FIGURE 3, of the can and can opener after the action shown in FIGURES 3 and 4;

FIGURE 6 is a perspective view showing the beginning of the prying operation effected by the device of this invention;

FIGURE 7 is a perspective view, partly broken away, of the can and can opener shown in FIGURE 6 near the termination of the prying operation effected with the device of this invention;

FIGURE 8 is a top view of the can following the operation of the device of this invention as shown in FIGURE 7; and

FIGURE 9 is a perspective view of the can following the operation of the device of this invention, said can being shown in its operative pouring position.

Generally, the device of the invention comprises a unitary can opener **10** comprising a shaft portion, generally shown as **11**, continuous and integral with and cooperating with a handle portion **12**, this portion **12** having a perforating punch plate portion **13**.

The shaft portion **11** is provided at its free end with a diagonally projecting prying tongue **14** located between free end recess **15** and a side recess **16**; recess **16** is adjacent to grasping hook **17** formed in one, lower, side **18** of shaft **11**. The punch plate **13** is tapered and provides a sharp strong point **19** with its tip **20** spaced a definite distance from the interior surface **21** of the shaft **11**. This distance is at least as great as the thickness of the wall **22** of the can **23**.

The tip **24** of the tongue **14** is located in line with the edge **18** of shaft **11**. The tongue **14** has a curved bottom edge with an upwardly convex shoulder the edge **25** of which is at an angle of about 25° to the edge of side **18**; this angle may vary from about 20° to 30°. Cutting edges, as **26**, **27**, **28**, **29**, on punch plate **13** spread from the point **19** to the top of the plate **13** whereat the handle, **12**, is formed with a rounded handle top, **31**, having a rounded front edge **32**, a rounded rear edge **33**, a rounded left side edge **34**, and a rounded right side edge **35**. The handle **12** connects by its curved rear edge **33** to the shaft portion **11**. The space **36** between the punch plate point **19**, the handle top **31** and the rear edge **33** of the handle **12** is large enough to permit ready insertion of a large man's middle or index finger for convenient handling of the device. In the preferred embodiment this space is 1" high and 1½" wide.

In operation shaft portion **11** is placed against a can **23** and held in place, as by the operator's one hand, in the position shown in FIGURES 1 and 2. Heel **37** of the operator's other hand **38** then presses down on the top of handle **12** in the direction of the arrow **39** in FIGURES 1 and 4. The sharp point **19** ruptures the top of the can at its point of contact **40** therewith and cuts the roof **41** along the lines of contact **42** and **44** of the cutting edges **26** and **27** therewith. Plate **13** then serves to form a triangular shaped orifice **43** by forcing downwards the thus separated V-shaped flap portion **45** of the can roof **41**.

The size of the opening **43** thus created by the action of the can opener device of this invention is controlled by means indicating to the operator when point **19** has traveled a certain distance downward through the roof **41**. In the preferred embodiment there is a distinct gradient of slope of the lower cutting edge portions **26** and **27** and the upper cutting edge portions **28** and **29**, respectively. These cutting edge portions meet at points at a height over the tip **20** at which the desired depth of perforation by the cutting blade **13** has been achieved. This provides for a convenient or semi-automatic control of the size of

orifice 43. Of course, the operator may further perforate the roof 41 by further downward motion of the handle 12 to any desired depth and size of the opening 43. In the preferred embodiment this juncture of these edges is ¼" above the height of the tip 20. As described below the cooperation of the rear or inner edge 47 of the hole 43 with the prying tongue 14 in order to make a non-drip groove is a feature of this invention; accordingly the control of the size of the hole 43 which provides this cooperation of size and can opener component dimension relative thereto is a feature of this invention.

After forming a first hole 43 on one side of the can, the same perforating operation is repeated to provide a vent hole 49 on the other side of the can 23. The large surface of the handle top of handle 12 permits the user to exert his full weight, as through his hand 38, to force the tip 20 against the can top and effect a ready, reliable perforation without need of a can lip for leverage without danger of tipping the can, and further with a positive and safe control of the size and dimensions of the hole.

The shaft portion 11 is, in the preferred embodiment, a slightly curved sheet of metal having a radius of curvature preferably the same as or no greater than that of the surface of the cylindrical can to which it is to be applied: this relationship provides a parallel orientation of the longitudinal axis and direction of the perforating point 20 of the can opener device 10 parallel to the axis of the cylindrical surface of the cylindrical can. It is of course within the scope of my invention to use this device on non-cylindrical cans, but this description is of the preferred embodiment.

Following completion of the vent hole, the prying tongue 14 is inserted into the orifice 43 made as above described with the punch plate point 19. The prying tongue is inserted into the hole 43 as shown in FIGURES 6 and 7, with the hook 17 pivoting at its point of juncture 51 with the wall 22 of the can 23. This point of juncture acts not only as a pivot for the below described prying operation but, also, as a sliding support for the operation, below described, of the can opener 10. Forceful rotation of the can opener 10 as per arrow 53 not only presses upwardly the inner edge 47 in the roof 41 of the can but, also, the tongue acts as a lever fulcrum pivoted at its point of contact with the inner portion of the roof and its shoulder edge 25 so forces down the portion 55 of the roof 41 while hook 17 slides downward on the outside of can wall 23. The shoulder edge 25 thus forms a downward and inwardly sloped groove 57.

The side recess 16 is sufficiently deeply curved out to permit the hook 17 to be forced into the wall 22 of the can 30 and so crimp said wall, as at 58, to provide a sharp edge, as at 60, to limit the probability of dripping of liquid accumulated on the top of the roof 41 of the can 23 at the intended end of pouring of fluid therefrom.

For this purpose the depth of hole 43 is controlled, as above described, so that the edge 24 of the tongue 14 may reach to and pivot below the edge 47 of orifice 43, as shown in FIGURE 7.

Notwithstanding this crimping action, the groove 57 slopes downwardly and inwardly from the edge 60 to the orifice 43 and so excess liquid otherwise on the roof flows in the direction of arrow 64 providing thus a drip-free pouring spout rather than permitting a dripping downward over and making unsightly and unsanitary the outside wall of the can 23.

Also, the upward motion of the free end of the prying tongue which results from the rotary motion along arrow 53 as shown in FIGURE 6 to the position shown in FIGURE 7 provides for raising the portion of the can roof 41 in contact with the prying tongue and folds inwardly the V-shaped flap portion 45 as shown in FIGURE 7. This improves the flow of air to and from the interior of the can 23 immediately adjacent to the point of pouring and thereby improves the smoothness of pouring of liquid from the orifice 43 made as above described.

According to this invention, the initial downward pressure on the can opener 10 as above described provides a hole of deliberately limited size in order to effect the cooperation of the shaft 11 and shoulder of the tongue 14 and edges of the hole 43 to form groove 57 in the top of the can to improve the flow of fluid out of the hole 43 made by the device. The exact size of the inwardly sloped area around the groove 57 to provide a sufficiently large and inwardly sloped area to prevent outward dripping may be varied by those skilled in the art.

In the preferred embodiment above described the length of the grooves 57 is ⅛ inch. The size of the hole 43 is ⅜" along the edge 47 and ⅜" along the edges 42 and 44. These dimensions are given for a can opener to be used with a can of 2 5/16" in height and 2½" in diameter and 1/100–1/50" in wall thickness. In the preferred embodiment the overall length of the device 10 from the tip of the prying tongue 14 to the top of handle 12 is 2⅞": the width of the handle 12 is 1" and the length of the front edge 32 to the rear edge 34 of the handle is 1½ inches. FIGURES 1, 2, 6 and 7 are drawn to scale to illustrate the above described relations.

It is within the scope of this invention that other shapes of grooves other than those particularly shown which provide the same action in cooperation with the lever action which pries upward the distant edge 47 of the hole 43 may be used.

The device of this invention, above described in its preferred embodiment, is particularly adapted for the convenient perforation of cans having little or no lip in the area of juncture of the cylindrical side walls and top of metal cans; such cans are used for evaporated milk and fluid baby foods and drinks as well as desirable for industrial uses. The device of this invention provides a clean cut orifice with a V-shaped weir and a V-shaped flap portion 45 which is, as above described, rotated about the line of juncture with the roof located at inner edge 47 of the flap 45 and orifice 43 so that said flap is finally located as shown in FIGURE 7 adjacent the lower surface of roof 41 of the can. In this position the flap provides a minimum interference with the flow of fluid from the can.

According to my invention there is thus provided a device 10 for perforating a can as 23 and forming a non-drip lip therein. The device comprises shaft means 11 for slidably supporting on the side of said can means 13 for perforating said can to a controllable and predeterminable and limited depth at a point spaced slightly interiorly from the side wall of said can while cutting a flap 45 in the roof of said can and forming thereby an orifice 43 of controlled size while folding said cut away portion under the roof of said can and away from said side. The means for slidably supporting comprises a means as tongue 14 for forming an inwardly sloped groove 57 in the portion of the roof of said can, said groove extending from the side walls of said can to the orifice 43 made by said perforating means 13 and said means 17 for slidably supporting, also providing for simultaneously crimping the wall of said can below said orifice while forming groove 57.

The one-piece device 10 is formed of a single metal strip. This device is, accordingly, easily cleaned. Also, this structure avoids the expense in manufacture of joining various parts and also avoids bothersome and undesirable accumulation of food particles along such joints necessary in multiple-piece articles.

In the device 10 there is only one cutting point, and it is turned inward. This provides a novel feature of safety in handling and storing such a can opener as well as during its operation. In the event of slipping of the operator's hand during operation there is no outwardly pointed cutting point on which the operator's hand might be hurt and there are also no protruding sharp edges as might hurt a housewife's hand while rummaging through the usual kitchen drawer-full of kitchen utensils. In this

simple, and yet sturdy and safe, structure **10** the curved shaft **11** keeps the puncturing point **19** aligned with a cylindrical can on which the tool is operated to directly apply the force of the operator's hand (as in FIGURE 4) without the necessity of the operator holding the can and an intermediate shaft to apply the puncturing force from the hand to the surface of the can top to effect a puncture as needed. This is accomplished because the means, **19**, for cutting a portion of the roof of the can is located quite near the curved shaft **11**, which shaft is composed in large part of the crimping and groove forming means **14**, **15**, **16** and **24**. As shown in FIGURES 1 and 4, the handle **12** provides a horizontal portion **31** for the operator's hand as **38** to contact and press downwards at a point peripheral to the sides of the can of which the roof is to be punctured. This structural feature of locating the "pushing" or pressing the handle top **31** with its longitudinal axis peripheral or lateral to the shaft or support member **11** and its components **14**, **24** and **51** which contact the can slidably, and having the curved slidable shaft **11** extend vertically below and beyond the cutting point **19**, positively guides the inwardly directed cutting point **19** into operative position on a curved can whose radius of curvature is greater than that of the curved shaft **11** reliably, easily and safely, and permits and facilitates that the device **10** reliably and safely perforate a can without a roof lip. The effective curvature of the shaft **11** is determined in large part by the location of its corner elements of which the end of the tongue **24** is one. The position of the shaft **11**, and its components as **14**, **24** and **51** relative to the point **19**, i.e.—spaced away therefrom and interiorly thereof—especially in combination with the position of the weight-bearing surface **31**, provides that the device of this invention reliably and safely operates on a can whether or not there is a lip on its roof.

In the structure **10** the curved portion **12** serves as a handle and control for the manipulation of the tongue **14** in the hole **43** during the prying operation. The shaft **11** of which the tongue **14** forms a significant and co-planar critical terminal part, serves to steady and to locate the handle **12** and its punch point tip **20** as the shaft **11** is, in the preferred embodiment, a slightly curved sheet of metal and the tongue **14** forms a lateral and longitudinal extremity thereof: tongue **14** extends to a corner which is situated in line with the end edge of the shaft, i.e. the lower end thereof as shown in FIGURES 1 and 3, and the inner and outer surfaces of that tongue as well as its extremity are co-planar, respectively with the curved inner and outer surfaces, respectively, of the remainder of the shaft **11**. The extremity of the tongue thereby forms a bottom outside corner support for the remainder of the shaft **11** and this corner support cooperates with the other portions of the shaft **11** to positively orientate the longitudinal axis of the shaft **11** (and direction of the perforating point of the can opener device **10**) parallel to the axis of the cylindrical surface of a cylindrical can as **23** which is to be punched. The handle portion **12** and the tongue **24** thus function dependent on each other on the same tool during the punching operation and also during the prying operation.

The foregoing description of the invention is explanatory and illustrative rather than limiting and changes in the detail of the particular constructions illustrated may accordingly be made by those skilled in the art: having thus described the particular means by which the objects of this invention are obtained, in the form at present preferred, modifications thereof within the skill of the art are intended to be included within the scope of the appended claims.

I claim:

1. A one-piece can opener comprising a shaft elongated in a first vertical direction and having a top part, a bottom end, a front concave surface and a rear convex surface, said shaft being joined firmly at its top part to a handle, said handle comprising a top surface projecting to the rear of the rear surface of said shaft as a portion substantially normal to said first vertical direction, said top surface having a front part above and extending forwardly of the top part of the front surface of said shaft, and a bottom portion of said handle being firmly joined to the top part of said shaft, a pointed plate having a base portion and a pointed portion, a rear part of said base portion being joined to a front part of said pointed portion, said pointed plate base portion having a rear part, said rear part being firmly joined to said front part of said handle, said pointed portion having a tip directed toward the front surface and bottom end of said shaft, said tip being spaced away from said front surface of said shaft and longitudinally spaced closer to the top than the bottom end of said shaft, said shaft having two side edges, one side edge having a vertically extending recess therein extending transversely in the direction toward the other side edge for the full thickness of said shaft, an elongated tongue of lesser width than the length of the pointed plate, one edge of said tongue extending from said shaft and being integral with and extending from said shaft along the edge of said side recess distant from said handle and the length of said tongue being at an angle to said first vertical direction of elongation of said shaft, and another edge of said tongue bounding an extremity thereof and extending to a corner in line with a side and the bottom end of said shaft, said tongue extremity having inner and outer surfaces respectively co-planar with the inner and outer surfaces of said shaft.

2. A device as in claim **1** wherein each of the side edges of said pointed plate of said handle are each formed of two straight edges, each of the straight side edges immediately adjacent to tip of said point being at an angle to each other less than the angle between the portions of the straight side edges more distant from said tip, and the point where the adjacent straight side edge portions on each side meet on each edge forms a distinct angle.

3. A device as in claim **2** wherein a first, upper, edge of said tongue bounds the lower edge of said recess in said shaft and said first, upper, edge is parallel to a lower, second, edge of said tongue, and an upper end of said recess opposite to said lower edge presents a downwardly directed projection adjacent the first side edge of said shaft, and said tongue projects downwardly from said projection at least as great a distance as the minimum distance from the front surface of said shaft to the point in said pointed plate at which one straight side edge immediately adjacent the tip meets an adjacent straight side edge of the plate at an angle thereto.

References Cited by the Examiner

UNITED STATES PATENTS

1,814,487	7/1931	Mueller	30—6.3
2,009,779	7/1935	Kronquest	30—16
2,163,301	6/1939	Will	30—6.1
2,216,110	10/1940	Hothersall	30—16 X
2,364,219	12/1944	Johnson	30—16
2,411,344	11/1946	Singer	30—6.1
2,649,989	8/1953	Urbano	30—16 X

FOREIGN PATENTS

345,287	11/1904	France.

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