Apparatus includes a base having an elongated depression formed therein into which a cylindrical can may be laid upon its side. An arm on the base pivots down towards the base and carries a die member for flattening the can body and cutting members to pierce the can body in advance of the die member.

18 Claims, 5 Drawing Figures
Litter of the environment is an increasingly important problem. A significant portion of the litter is comprised of cans, the iron or “tin” cans as well as the newer aluminum cans. In particular, aluminum cans are very slowly degradable by natural erosion, corrosion and like conditions. Atmospheric weathering of aluminum due to exposure to the environment depends upon factors such as prevailing wind, topography, precipitation, nearby industrial plants, and bodies of water. The depth of attack or penetration of corrosion on aluminum by the elements may be one or 2 mil (thousandth of an inch) during the first and second years of exposure, but the rate of depth penetration falls off extremely fast after the first few years. In less severe atmospheric environments, the rate of depth attack may fall to 0.03 mil per year after the first 2 years for unprotected aluminum surfaces. The tendency is for the attack to proceed laterally along a surface rather than to become progressively deeper. In effect, oxidation at the surface of a piece of aluminum protects the aluminum below the surface. Tests conducted by researchers at Alcoa and by the American Society of Testing and Materials showed that at the seacoast, the depth of attack on the average reaches 4 mils after about 52 years, at inland industrial environments the depth of attack on the average reaches only 3.2 mils after 52 years, and the depth of attack for non-industrial environments is even less. The above test results are for unprotected aluminum. Since the wall thickness of a typical aluminum can of the type used for beer or soft drinks is roughly 5 mils, with the tops and bottoms considerably thicker, the time for an aluminum can to be eliminated by corrosion may be several hundred years. When the can has a painted or otherwise protected surface, the can life may go well beyond 200 years. An aluminum can which is carelessly tossed away today may continue to litter the land for scores of generations.

Although first produced in about 1960, aluminum cans are becoming exceedingly plentiful today. In 1960 a method of pulling an aluminum slug through a punch and ring arrangement was devised so that can walls might be made very thin; aluminum cans thus became economical and commercial. In 1968 about 1.5 billion aluminum cans were produced in the United States. Industry has estimated that nearly 5 billion aluminum cans were produced in 1970. In other words, about 2,000 tons of aluminum were used in 1970 for aluminum cans. If only a minute percentage of these cans are carelessly tossed away along highways and in parks each year, the amount of litter which will accumulate over a few years is tremendous.

On the other hand, aluminum is a relatively expensive metal. Currently, aluminum sells at about 27 cents per pound and scrap dealers are willing to pay about 10 cents per pound for aluminum. Since about 25 cans weigh about a pound, each can has a value of about one-quarter cent if sold to a scrap dealer. Roughly speaking, about 1 dollar will purchase six aluminum cans with contents such as beer or soft drinks. Each can has a resale value of about 2 cents. In comparison, trading stamps accumulated on a 1 dollar purchase would have a resale value of less than one cent. Seemingly, householders should be encouraged to save and redeem aluminum cans. To some extent this has been done. For example, about one hundred million aluminum cans were collected in eleven Western states and sold back to a brewery for nearly 500,000 dollars in 1970. However, the typical householder finds it extremely inconvenient to save large numbers of aluminum cans because of the relatively light weight cans each occupy a large amount of storage space. Furthermore, because of the manner in which aluminum cans are formed and because of the softness of the metal, the usual can opener will not operate upon an aluminum can to cut out the top and bottom so that the can may be easily flattened and conveniently stored. Prior devices have been devised to operate upon the entire can in a brute force manner in order to crush it. Such devices are usually large, bulky and require considerable operator strength, as the cylindrical can with both end caps in place has considerable structural strength. The result of these prior crushing methods has only been a space savings of about one-quarter when the crushed cans are closely nested.

Accordingly, it is an object of the present invention to provide an apparatus to flatten cylindrical cans. Another object of the present invention is to provide a device for flattening aluminum cans.

A yet further object is to provide a device usable on a kitchen surface to individually flatten cylindrical aluminum cans of selected size manually.

These and other objects and advantages of the present invention may be readily ascertained by referring to the following description and appended illustrations, in which:

FIG. 1 is a perspective view of the apparatus according to the invention;
FIG. 2 is one embodiment of the details of the apparatus according to the invention;
FIG. 3 is another embodiment of a detail of the apparatus; and
FIG. 4 is another embodiment of a further detail of the apparatus.

FIG. 5 is another embodiment of a further detail of the apparatus, namely of a cutting member viewed from the side, the view being enlarged for purposes of clarity.

The embodiment of the invention chosen for illustration in FIGS. 1 through 4 includes a base, indicated in general by numeral 1, of generally rectangular shape with planar upper surface 2 having elongated shallow depression 3 formed therein for supporting a cylindrical metal can of selected size lying on its side therein. That is, a cylindrical can of selected length and radius may lie stably in depression 3 with the longitudinal axis of depression 3 coaxial with the cylindrical axis of the can, the length of the elongated depression 3 being longer than the selected can length. In general, base 1 may be fabricated from any non-deforming material capable of supporting compressive loads; materials such as wood or stamped metal are equally effective. Clearly, base 1 may have shapes other than rectangular, for example oval. Likewise, base 1 may have wide variety of depths with a minimum depth accommodating depression 3. Base 1 may be utilized on kitchen countertops and like surfaces, and may be provided with rubber supporting pads 4 or feet as are conventionally found upon appliances.

A moment arm 5 having an integral handle portion 6 is pivotally attached to said base by hinge 7 and carries die member 8. Hinge 7 may be any of numerous well known hinge means and may include an integral
spring to maintain arm 5 in the open position relative to base 1 as shown in FIG. 1. Arm 5 may be of any rigid material and may have numerous decorative configurations. Die member 8 includes planar surface or face 9 facing base 1 and is elongated in the direction of the longitudinal axis of depression 3 to a length which is slightly less than the length of the selected size can. The width of face 9 may be substantially greater than the diameter of the selected can size. In general, die member 8 may be any rigid material and the thickness of the member 8 depends upon the properties of the material. Die member 8 is arranged on arm 5 so that when arm 5 pivots downward to base 1, die face 9 will substantially cover depression 3. It is suggested that member 9 be an iron, rectangular plate.

Cutting members 10 and 11, respectively, are fixed at each end of die member 8 transverse to the longitudinal axis of depression 3 and protruding past face 9 of die member 8. Members 10 and 11 are essentially cutting blades, and typically their thickness should be small compared to their length and width. The cutting edges may be sharpened or serrated as desired. Each of the cutting members 10 and 11 taper towards a point 12 and 13, respectively, about medially of the width of face 9; that is, points 12 and 13, respectively, are arranged to pierce the body of a selected size can lying in depression 3 so that the piercing force is generally directed to the bottom of depression 3. When the cutting members are so tapered, a can body will be initially pierced by points 12 and 13 before members 10 and 11 begin to shear through the can walls. Furthermore, points 12 and 13 aid in finally severing the can ends from the body as the points may pierce the last remaining bit of metal holding the end of the body or the tapered blade easily slices through that last remaining bit; were the cutting members non-tapered, the end caps are not so cleanly cut, particularly if the die member has been skewed through use.

Base 1 may further include parallel cutting member receiving slots 14 and 15 formed near each end of depression 3 and perpendicular thereto. While in one embodiment, FIG. 5, cutting members 10 and 11 have an arcuate cutting edge 18 so that slots 14 and 15 are unnecessary, receiving slots are suggested with tapered cutting members.

Cutting members 10 and 11 may be canted inwardly on die member 8 (FIG. 2); that is, cutting members 10 and 11 are arranged such that the planes of the members, if extended, would converge below base 1. When so canted, the length of die member 8 may be chosen such that cutting member points 12 and 13 pierce a can body only slightly back from the ends. Then, the outer surfaces of the descending cutting members 10 and 11 pierce the can ends outwardly as the die member 8 descends.

In another embodiment, FIG. 3, the outwardly canted cutting members 10a and 11a, otherwise the same as cutting members 10 and 11, are arranged on die member 8 and have points 12a and 13a, respectively.

A further arrangement for pivotally mounting pivot arm 6 to base 1 includes, FIG. 4, a hinge 24 attached to base 1, as by screws 25, having a raised portion, denoted as distance d, for raising the pivot point 26 of arm 5 above base 1. With such an arrangement, die member 8 will be more nearly parallel to surface 2 of base 1 when initially striking the can, and the can is consequently flattened with increased ease.

In operation a cylindrical aluminum can of selected size is horizontally laid in depression 3 and arm 5 carrying die member 8 is pivoted downwardly by grasping handle 6. Cutting members 10 and 11 will initially pierce the can body and die member 8 will subsequently flatten the same as cutting members 10 and 11 prise the can ends downwardly. In the final condition, the can ends may be sheared from the can body. However, if the can ends are not sheared from the can body, they may be easily bent back by hand over the then flattened can body with little loss of compactness. Touching the sheared or torn edges of an aluminum can is quite safe; there is little danger of cutting oneself as with an iron can.

We claim:
1. Apparatus for individually flattening selected size cylindrical metal cans comprising:
   a. a base having a shallow elongated depression formed in the upper surface thereof for supporting a cylindrical can of the selected size lying in said depression;
   b. a moment arm;
   c. hinge means hinging said arm to said base for pivotal movement of said arm downward toward said base transverse to said depression;
   d. a die member fixed to said arm presenting a generally flat face towards said base, said face having length in a direction parallel to the longitudinal axis of said depression, about the same as the axial length of the selected size cylindrical can and having width greater than the diameter of the selected size of cylindrical can, said die member being arranged on said moment arm to cover the body of a can lying in said depression when said moment arm is pivoted downwardly to said base;
   e. two tapered cutting members, one said member arranged along each end of said die member protruding beyond said face, for simultaneously shearing into a can slightly back from both of the ends thereof in advance of said die member when said moment arm pivots said die member downwardly to press flat the body of a can lying in said depression in said base.
2. Apparatus according to claim 1 wherein said die member is a plate.
3. Apparatus according to claim 1 wherein both said cutting members are canted inwardly towards the face of said die member.
4. Apparatus according to claim 1 wherein both said cutting members are canted outwardly away from the face of said die member.
5. Apparatus according to claim 1 wherein both said cutting members taper towards a point about medial of the width of said die member for initially piercing the body of a can.
6. Apparatus according to claim 1 wherein hinge means hinges said moment arm above said base for having said die member face parallel to said upper surface of said base when said die member contacts said can.
7. Apparatus according to claim 1 wherein the upper surface of said base further includes an elongated slot therein at each end of said elongated depression, the axis of each said elongated slot being perpendicular to the longitudinal axis of said depression for accommo-
3,804,004

dating said cutting members as said die member pivotally reaches said base.
8. Apparatus according to claim 1 including a handle integral with said moment arm.
9. Apparatus for individually flattening selected size cylindrical metal cans comprising:
a. a base having a shallow elongated depression formed in the upper surface thereof for supporting a cylindrical can of the selected size lying in said depression;
b. a moment arm;
c. hinge means hinging said arm to said base for pivotal movement of said arm downward toward said base transverse to said depression;
d. a die member fixed to said arm presenting a generally flat face towards said base, said face having length in a direction parallel to the longitudinal axis of said depression about the same as the axial length of the selected size cylindrical can and having width greater than the diameter of the selected size of cylindrical can, said die member being arranged on said moment arm to cover the body of a can lying in said depression when said moment arm is pivoted downwardly to said base;
e. two tapered cutting members, one said member arranged along each end of said die member protruding beyond said face and canted therefrom, for simultaneously shearing into a can slightly back from both of the ends thereof in advance of said die member when said moment arm pivots said die member downwardly to press flat the body of a can lying in said depression in said base.
10. Apparatus according to claim 9 wherein said cutting members taper towards a point about medial of the width of said die member for initially piercing the body of a can.
11. Apparatus according to claim 9 wherein the upper surface of said base further includes an elongated slot therein at each end of said elongated depression, the axis of each said elongated slot being perpendicular to the longitudinal axis of said depression for accommodating said cutting members as said die member pivotally reaches said base.
12. Apparatus for individually flattening selected size cylindrical metal cans comprising:
a. a base having a shallow elongated depression formed in the upper surface thereof for supporting a cylindrical can of the selected size lying in said depression;
b. a moment arm;
c. hinge means hinging said arm to said base for pivotal movement of said arm downward toward said base transverse to said depression;
d. a die member fixed to said arm presenting a generally flat face towards said base, said face having length in a direction parallel to the longitudinal axis of said depression about the same as the axial length of the selected size cylindrical can and having width substantially greater than the diameter of the selected size of cylindrical can, said die member being arranged on said moment arm to cover the body of a can lying in said depression when said moment arm is pivoted downwardly to said base;
e. two tapered cutting members, one said member arranged along each end of said die member protruding beyond said face and canted therefrom, for simultaneously shearing into a can slightly back from both of the ends thereof in advance of said die member when said moment arm pivots said die member downwardly to press flat the body of a can lying in said depression in said base, said cutting members tapering towards a point about medial of the width of said die member for initially piercing the body of a can.
16. Apparatus according to claim 15 wherein both said cutting members are canted inwardly towards the face of said die member.
17. Apparatus according to claim 15 wherein both said cutting members are canted outwardly away from the face of said die member.
18. Apparatus according to claim 15 wherein the upper surface of said base further includes an elongated slot therein at each end of said elongated depression, the axis of each said elongated slot being perpendicular to the longitudinal axis of said depression for accommodating said cutting members as said die member pivotally reaches said base.

* * * * *