July 11, 1967 R. G. WORMAN 3,330,489

DISPOSAL DEVICE

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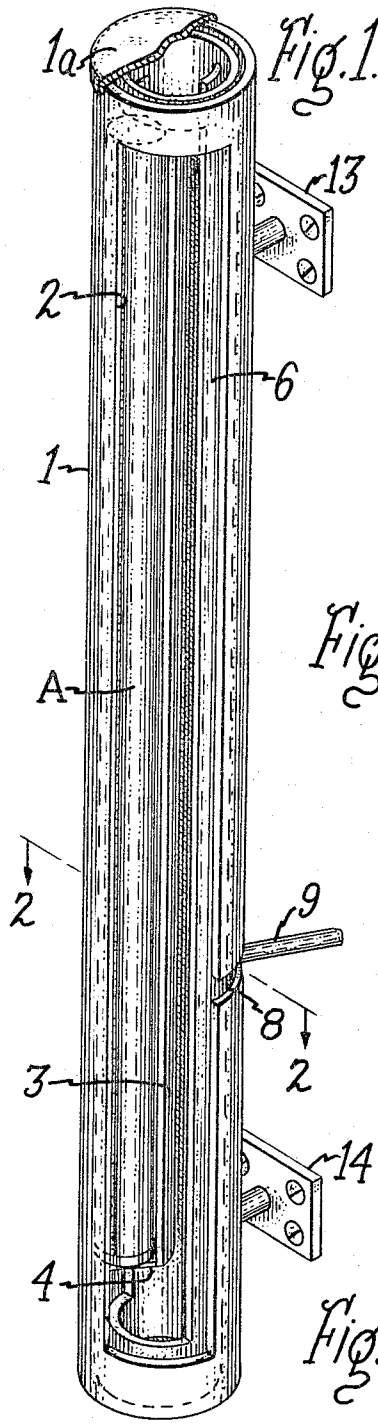


Fig. 1.

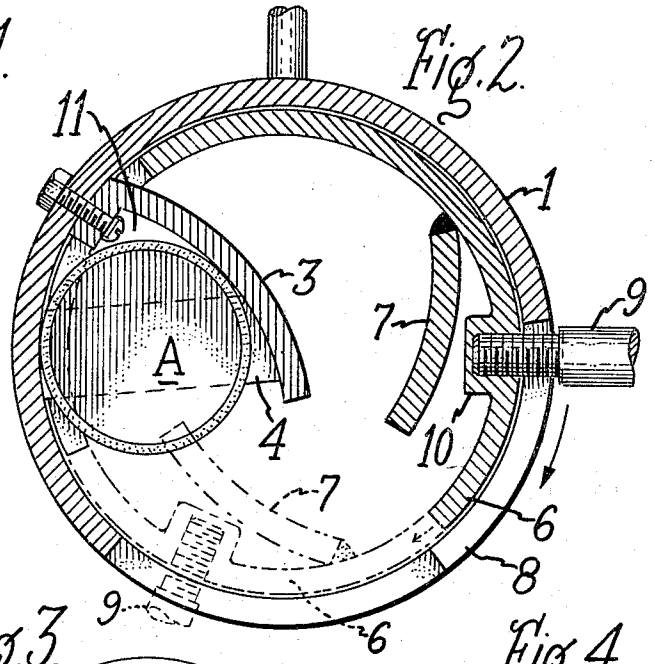


Fig. 2.

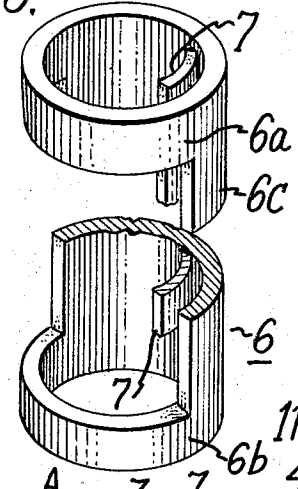


Fig. 3.

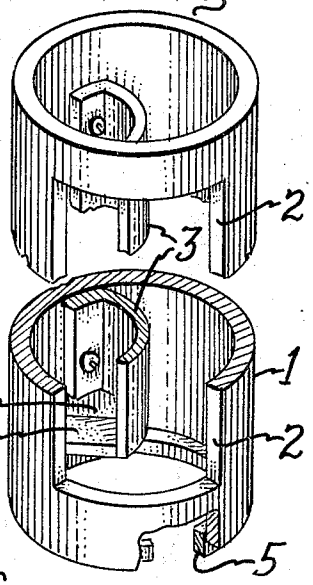


Fig. 4.

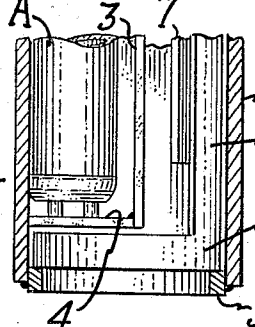


Fig. 5.

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Fig. 7.

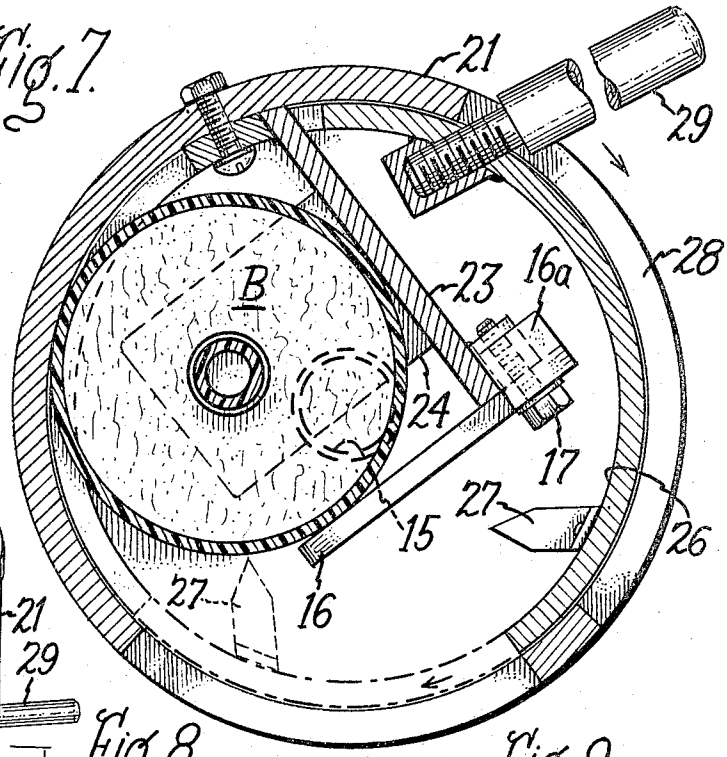


Fig. 6.

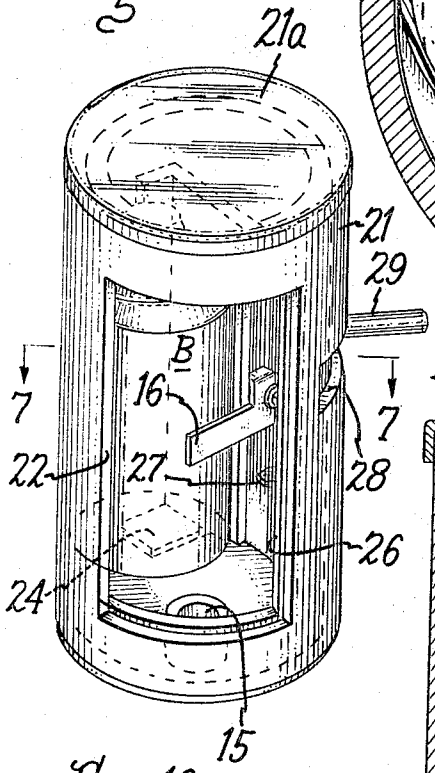


Fig. 8.

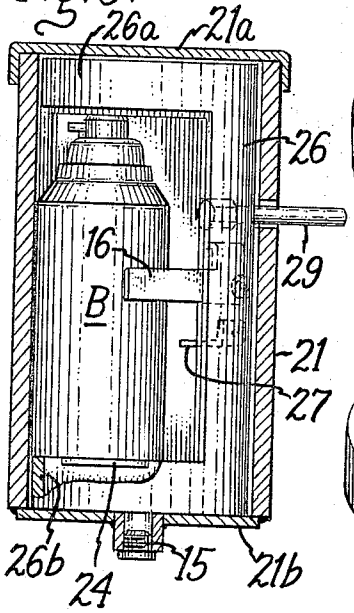


Fig. 9.

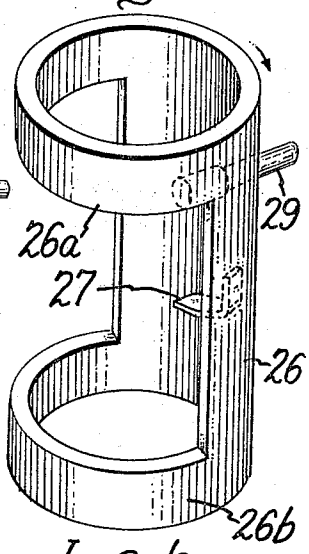
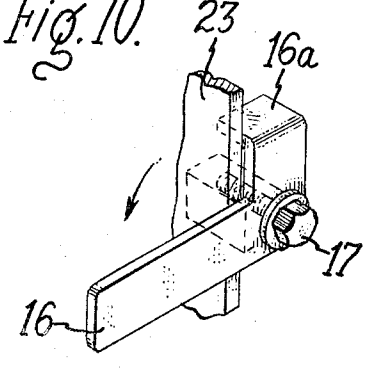


Fig. 10.



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3,330,489

DISPOSAL DEVICE

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10 Claims. (Cl. 241—99)

The present invention relates to disposal devices, and more particularly concerns devices for crushing, puncturing or otherwise treating articles such as glass lamp bulbs, metal cans and the like in disposing of such articles after their useful life.

It is an object of the invention to provide a disposal device of the above type which effectively crushes, breaks, punctures or otherwise destroys various types of articles to render them unusable and safe for further handling, and to convert them to better form for final disposal.

It is another object to provide a portable, easily manually operable device of the above type which is safe in operation, rugged in construction, simple and compact in form, and readily and economically manufactured.

It is a particular object of the invention to provide a device of the above type which is especially suited for use in crushing elongated fluorescent light bulbs.

It is another particular object of the invention to provide a device of the above type which is especially suited for puncturing metal cans of the aerosol type.

Other objects and advantages will become apparent from the following description and the appended claims.

With the above objects in view, the present invention relates to a disposal device comprising an outer elongated tubular member having an inner elongated tubular member arranged therein in nested concentric relation, the tubular members having axially extending openings intermediate their ends, support means secured to the outer member extending inwardly through the opening in the inner member for holding an object to be disposed of, and contact means secured to the inner member and projecting inwardly therefrom, the inner member being rotatable within the outer member for closing the opening therein and thereafter bringing the contact means into destructive penetration of the object to be disposed of.

The invention will be better understood from the following description taken in conjunction with the accompanying drawings, in which:

FIGURE 1 is a perspective view of an embodiment of the invention adapted for crushing elongated fluorescent light bulbs;

FIGURE 2 is a cross-sectional view in enlarged scale of the FIGURE 1 device taken along the line 2—2;

FIGURE 3 is a fragmentary view in perspective of the inner crushing member of the FIGURE 1 device;

FIGURE 4 is a similar view of the outer housing member of the FIGURE 1 device;

FIGURE 5 is a partly sectional view in elevation of the lower portion of the FIGURE 1 device;

FIGURE 6 is a perspective view of another embodiment of the invention which is adapted for puncturing aerosol cans;

FIGURE 7 is a cross-sectional view in enlarged scale of the FIGURE 6 device taken along the line 7—7;

FIGURE 8 is an elevational view partly in section of the FIGURE 6 device;

FIGURE 9 is a perspective view of the inner tubular member of the FIGURE 6 device; and

FIGURE 10 is an enlarged detail view of the can retainer bar of the FIGURE 6 device.

Referring now to the drawings, and particularly to FIGURES 1 and 2, there is shown a disposal device adapted for crushing elongated glass articles such as fluorescent light bulbs which comprises an outer elongated

tubular housing 1, such as a metal pipe, which is open at top and bottom and in the wall of which is an elongated axially extending opening 2, extending nearly to the opposite ends of housing 1. The top is preferably provided with a cover 1*a* (shown in fragmentary form) which may simply be a cap frictionally engaging the housing. Curved retainer plate 3 is secured along the inner surface of housing 1, such as by bolts, welding or other suitable means, and is provided at its bottom with a support plate 4 extending between retainer plate 3 and the wall housing 1. Retainer plate 3 serves to hold in position a used fluorescent light bulb A which is inserted into the housing through wall opening 2 and placed with its lower end resting on support plate 4. The upper and lower ends of retainer plate 3 are spaced a substantial distance inwardly from the corresponding ends of housing 1 for reasons apparent hereinafter. Ring member 5 fits into the open bottom end of housing 1 (see FIGURES 4 and 5) and is secured thereto by welding, by threaded engagement, or by any other suitable means.

Tubular inner door member 6 is formed with an elongated opening intermediate its ends, so that it has an annular top portion 6*a*, an annular bottom portion 6*b*, and an intermediate portion 6*c* of elongated semi-circular form. Door member 6 nests concentrically within outer tubular housing 1 (see FIGURE 2) as it rests with its annular bottom end on the upper surface of support ring 5, and is rotatable thereon about the housing axis between a position which uncovers housing opening 2 and a position closing the opening. The upper and lower annular portions 6*a*, 6*b* serve as bearings in slidable contact with housing 1 to guide the rotation of door 6 and to retain it in proper position in housing 1. The axial dimensions of upper and lower rings 6*a*, 6*b* are limited so as to clear the upper and lower ends, respectively, of retainer plate 3 in the assembly of door 6 within housing 1.

Secured along the inner surface of rotatable door 6, as by welding or other suitable means, is an elongated crusher member 7 of curved form projecting inwardly into the housing interior. The arrangement of door 6 and its attached crusher member 7 is such that upon rotation of door 6 in a clockwise direction as viewed in FIGURE 2, door 6 fully closes opening 2 as shown by the interrupted lines in FIGURE 2, and crusher member 7 after further rotation of door 6 contacts and crushes fluorescent bulb A along substantially the entire length thereof. As seen in FIGURE 5, the bottom end of crusher 7 is above support plate 4 to avoid hindrance to the glass crushing action of projection 7.

Housing 1 is further provided with a slot 8 extending partly around its circumference through which handle 9, secured to rotatable door 6, freely passes for movement along the length of the slot. The inner end of handle 9 is preferably threaded for engagement in the threaded socket 10 fixed to the interior surface of door 6. Handle 9 may thereby be readily removed for preventing operation of the device or for purposes of convenient packaging of the device for shipment. The length of slot 8 is such as to permit handle 9 to move door 6 in one direction to a completely open position uncovering housing opening 2 as shown in FIGURE 2, and in the opposite direction to a completely closed position covering opening 2 and with crusher member 7 projecting into the bulb to be crushed. The arrangement of slot 8 is such that with door 6 in closed position the latter also closes the slot so as to prevent crushed particles from entering the slot.

Brackets 13 and 14 are advantageously secured to upper and lower portions of housing 1 for attaching the device to a wall or other support. While shown in a vertical position, the device may be operated while horizontal or in other positions, as found convenient.

In the operation of the described device, door **6** is swung open by handle **9**, a discarded light bulb is inserted through aperture **2** in the outer housing but possibly also through the open top of housing **1**, and arranged with the bottom end of the bulb resting on support plate **4**. Handle **9** is then grasped and pulled around in slot **8**, so that door **6** rotates, closing aperture **2** and then crushing glass bulb A by means of the impact of crusher member **7**. The broken particles of glass then fall through the open bottom of housing **1**, from which they can be collected for discarding.

The shape and size of support plate **4** (see FIGURE 2) is such as to provide a space **11** between itself and the inner wall of housing **1** through which debris from the crushed article may pass and fall out of the device.

As will be understood, crusher member **7** may have various other forms and arrangements than that shown. For example, it may consist of a short bar extending radially inwardly from door **6**, in which case it would be secured to door **6** at a point substantially closer to the latter's leading edge than is the crusher member **7** to ensure proper impact with the glass bulb.

In a construction where retainer plate **3** is bolted to housing **1**, it would be attached thereto after inner door **6** is assembled within housing **1**. Where retainer plate **3** is fixed permanently to the housing, as by welding, inner door **6** would initially have a separate ring portion **6***a* or **6***b* which would be welded in place on door **6** after the latter is inserted into housing **1**.

If desired, the upper surface of support ring **5** and/or the inner walls of housing **1** may be suitably provided with anti-friction means such as graphite, Teflon, or roller or ball bearing assemblies, on which the bottom or sides of ring **6***b* may easily slide or roll. Bearing surfaces may also or alternatively be provided at the top annular portion **6***a*, if desired.

In a different embodiment of the invention, as shown in FIGURE 6, the device is adapted for puncturing cans, especially aerosol-type cans containing fluids under pressure, for rendering them harmless and unfit for further use. In this device, a rotatable door **26** with attached handle **29** is arranged within housing **21** having an aperture **22** and a slot **28**, the parts operating substantially as described in connection with the FIGURE 1 device, but usually being substantially shorter in length. Housing **21** is provided with top and bottom covers **21***a*, **21***b* respectively, of which top cover **21***a* may simply be a cap member frictionally engaging the housing, whereas bottom cover **21***b* is preferably secured by welding or like permanent means to the housing, or by threaded engagement therewith. Bottom cover **21***b* is further provided with a drain opening **15** to permit draining of any liquid material which may escape from the punctured can B. In this embodiment, lower ring **26***b* rests on the upper surface of bottom cover **21***b* for rotation thereon.

As shown in FIGURE 7, a puncturing member **27** having a sharp point is secured to the inside surface of door **26** and positioned thereon to come into contact with and puncture the side wall of can B upon rotation of door **26** to closing position.

Retainer plate **23**, similarly to previously described plate **3**, is bolted or otherwise secured along one longitudinal edge to the interior surface of housing **21** and is provided at its bottom end with a support plate **24** on which can B rests. An auxiliary retainer bar **16** is pivotally secured to retainer plate **23** at its projecting edge, as by a bolt **17**, for movement between an inoperative position extending along the edge of plate **23** and an operative position (as shown in FIGURES 7 and 8) extending transverse the long axis of plate **23** so as to assist in retaining can B in position when inserted in housing **21** and to hold the can in position when door **26** is opened to permit puncturing member **27** to be withdrawn from the can after piercing its wall. As seen in FIGURE 10, retainer bar **16** is provided with a transverse tab portion **16***a*, which, by abutting plate **23**, serves to stop the pivotal movement of bar **16** when it is in proper operative position.

In the operation of the FIGURE 6 device, inner door **26** is moved by handle **29** to open position, and with retainer bar **16** in upright inoperative position, can B is inserted through opening **22** and placed on support plate **24** against retainer plate **23**. Auxiliary retainer bar **16** is then moved downwardly to operative position to securely hold can B in position. Door **26** is then rotated by handle **29** to closed position as shown by interrupted lines in FIGURE 7 and further rotated until puncturing member **27** pierces the wall of can B. Door **26** is then opened, and with bar **16** pivoted to raised position, can B is removed and discarded.

It will be evident that retainer plate **3** of the FIGURE 1 device may also be provided with one or more auxiliary retainer bars similar to retainer bar **16** shown in the FIGURE 6 puncturing device, if desired. Chains (which are removable from hooks), clips, and other retaining devices may also be used. It is also possible to provide mechanical linkages or other arrangements which would prevent the door being closed until the retainer bar is in the lowered (operative) position. This would preclude operation of the device if the object to be destroyed were not correctly seated against the retainer plate.

There is thus provided by the invention a compact and rugged disposal device which may easily and economically be made of readily available inexpensive materials, which is useful as a portable or fixed device for disposing of a wide variety of used articles in addition to those already mentioned (such as incandescent light bulbs, bottles, and the like), and which is capable of prolonged trouble-free operational life without the need for frequent maintenance and repair.

While the present invention has been described with reference to particular embodiments thereof, it will be understood that numerous modifications may be made by those skilled in the art without actually departing from the scope of the invention. Therefore, the appended claims are intended to cover all such equivalent variations as come within the true spirit and scope of the invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A disposal device comprising, in combination, an outer tubular member having an inner tubular member arranged therein nested concentric relation, said members having axially extending openings intermediate their ends, support means secured to said outer tubular member extending inwardly through said opening in said inner tubular member for holding an object to be disposed of, and contact means secured to said inner tubular member and projecting inwardly therefrom, said inner tubular member being rotatable within said outer tubular member for closing said opening therein and thereafter bringing said contact means into impact against and penetration into the article to be disposed of.

2. A device as defined in claim **1**, wherein said outer tubular member is formed with a slot transverse its axis, and manually operable means are arranged extending through said slot and secured to said inner tubular member for rotating the same.

3. A device as defined in claim **2**, wherein said outer tubular member is provided with circular bearing means at one end and said inner tubular member rests with one end on said bearing means for rotation thereon.

4. A device as defined in claim **3**, wherein said outer tubular member is provided with an opening at said one end thereof for passage of debris from the article after impact by said contact means.

5. A device as defined in claim **4**, wherein said support means comprises an elongated member extending axially along said outer member and a transverse plate member projecting from one end of said elongated support member.

6. A device as defined in claim **5**, wherein said contact

means comprises an elongated fin member secured along one longitudinal edge to said inner tubular member and extending with its opposite longitudinal edge in the direction of forward rotational movement of said inner tubular member for crushing the article held by said support means.

7. A device as defined in claim 5, wherein said contact means comprises pointed puncturing means.

8. A device as defined in claim 5, wherein said elongated support member is provided at its inner edge with an auxiliary retainer member pivotally secured thereto for movement between an inoperative axial position and an operative transverse position.

9. A device as defined in claim 3, wherein said circular bearing means is annular.

10. A device as defined in claim 3, wherein said circular bearing means is a disc-shaped cover closing said end of said outer tubular member, said cover having a drain opening passing therethrough.

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