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DEVICE WITH SUCTION TYPE FASTENER

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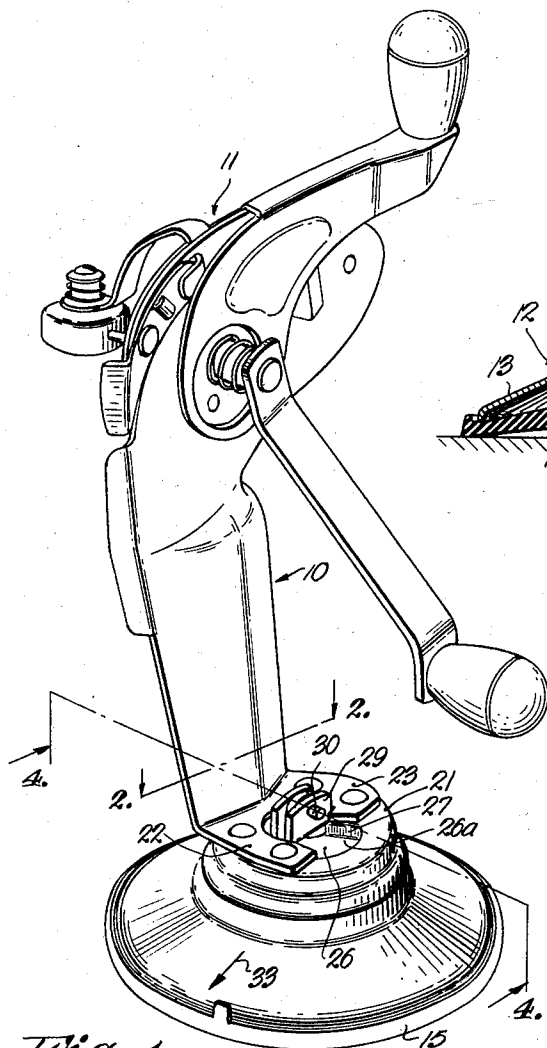


Fig. 1.

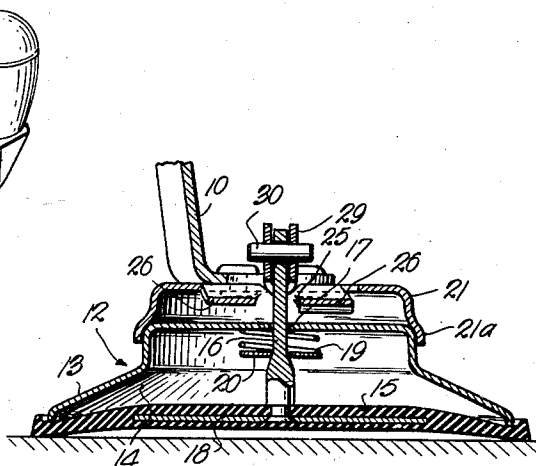


Fig. 4.

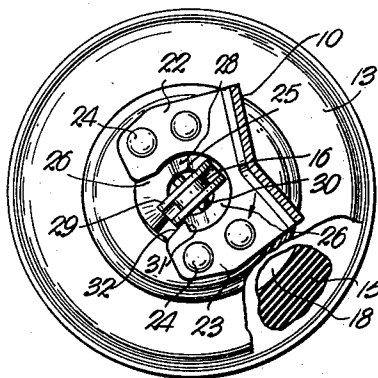


Fig. 3.

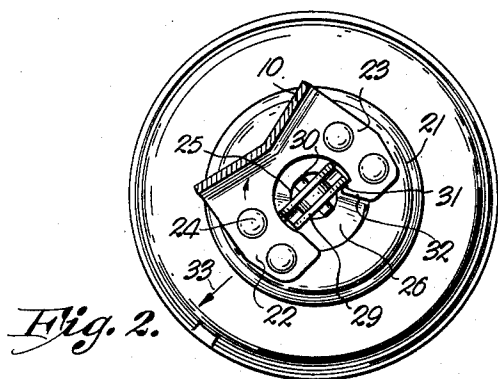


Fig. 2.

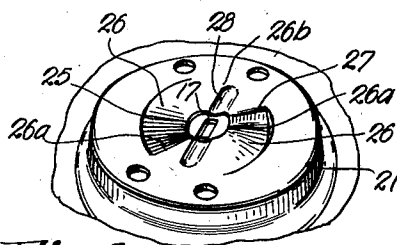


Fig. 5.

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2,908,467

DEVICE WITH SUCTION TYPE FASTENER

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7 Claims. (Cl. 248—206)

This invention relates to devices having suction means integral therewith for fastening them to smooth flat surfaces and refers more particularly to an improved can opener and fastening assembly therefor.

An object of the invention is to provide a can opener device having suction cup fastening means integral therewith, thereby to permit detachable mounting of the can opener on any smooth flat surface, the device being capable of being secured to the surface through the use of one hand alone. While my invention is desirable generally to any person, it has special advantages for handicapped individuals who have only one hand available for manipulation of the device and the fastening means.

Heretofore, various types of suction mountings for can openers and other devices have been provided, all of which, so far as I am aware, require the use of two hands for their successful operation. One hand is required for holding the suction cup in preliminary contact with the mounting surface, while the other is employed in moving the parts necessary to flex the cup the extent required to establish the vacuum within the cup. It is a feature of my invention that the operating parts for the suction cup are so arranged as to make it possible to maintain a firm preliminary pressure on the cup, while at the same time bringing it to the final attached condition, all without any danger of tilting or tipping the rim of the cup away from the attaching surface, thereby to break or render less effective the seal between the cup and the attaching surface.

A further object of the invention is to provide a suction type mounting which employs a circular base member and a rotatable member concentric with the base member, the rotatable member having parts which cooperate with an actuating element attached to the suction cup to displace the actuating element in a direction to establish the vacuum necessary to effect the attachment. The concentric arrangement of the rotatable member with respect to the base member makes it possible to apply the preliminary holding force to the cup while simultaneously rotating the rotatable member to complete the installation.

Another object of the invention is to provide a mounting of the character described in which after installation the rotatable member is releasably locked in the position it assumes at completion of installation, yet in which the lock can be released quickly and easily by applying a counter rotating force to the rotatable member.

Yet another object of the invention is to provide a can opener having a suction mounting integral therewith provided with means for properly indexing the suction means on the attaching surface as the attachment is initiated so that when attachment is completed the can opener will be in proper position for operation.

Other and further objects of the invention together with the features of novelty appurtenant thereto will appear in the course of the following description.

In the accompanying drawing which forms a part of the specification and is to be read in conjunction there-

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with and in which like reference numerals indicate like parts in the various views:

Fig. 1 is a perspective view of a preferred can opener and mounting assembly employing the features of my invention, the various parts shown in the relationship they assume when the unit is attached to a flat horizontal surface;

Fig. 2 is a sectional view taken along the line 2—2 of Fig. 1 in the direction of the arrows;

Fig. 3 is a view similar to Fig. 2, but showing the can opener shank and attached rotatable member rotated clockwise from the Fig. 2 position to the position in which the suction cup is released from the attaching surface;

Fig. 4 is a fragmentary sectional view taken generally along the line 4—4 of Fig. 1 in the direction of the arrows;

Fig. 5 is a perspective view of the rotatable thrust supplying collar and a fragment of the base member, the shank of the can opener, the actuating element and the cross head on the latter having been removed so as to more clearly show the thrust shoes on the collar.

Referring to the drawings, the can opener illustrated in Fig. 1 is of the type disclosed in Patent No. 2,694,855 issued November 23, 1954, inventors Henry J. Talge and Frank E. Aberer. The can opener is equipped with a shank 10 which supports at its outer end a head 11 carrying can severing mechanism of the type shown in the aforementioned patent. As may be determined by reference to the aforementioned patent, the head of the can opener is connected with the shank by means of a swivel connection so that the unit can be adapted for mounting to a vertical wall or to a horizontal surface such as a table or counter top. Since these features play no part in the present invention, they will not be described further in detail.

The base member 12 of the unit comprises a circular shell-like element 13 having a concave or dished inside face as at 14. Positioned below the base member is a flexible rubber suction cup or disk 15 having a central stem 16 that extends through an aperture 17 (see Fig. 4) in the center portion of the base member. The stem 16 will be hereinafter termed the actuating element for the disk. Preferably the actuating element is connected with the suction cup through the medium of a circular plate 18 embedded in the central portion of the disk, the actuating element being riveted or otherwise secured to the plate so as to afford a rigid connection. Adjacent the surface of the suction cup the actuating element may be circular, but above this point it is flattened as indicated in Fig. 3 so as to provide a flat rectangular cross section. The aperture 17 in the base member is of like cross section so that while the actuating element is reciprocable longitudinally through the aperture, relative rotation between the actuating element and the base member is prevented. A helical compression spring 19 encircles the actuating element below aperture 17, the spring bearing at its upper end against the under side of the top of the base member and at its lower end against a retaining collar 20 mounted on the actuating element. As will be evident, the spring serves to continually but yieldably urge the actuating element downwardly with respect to the base member.

Supported on top of the base member and concentric therewith is a dished annular collar or ring 21. Preferably the collar is provided with a slightly outwardly bulged flange 21a which rides on the rim of the top portion of the base member. The collar member is freely rotatable about the common axis of the base member and rotatable member, that is, the longitudinal axis of the actuating element 16. It will be noted that the shank 10 of the can opener is secured to the collar, the connection being effected by means of two lateral extending ears

22 and 23 which are riveted as at 24 to the collar member. The collar member as shown in Fig. 5 is provided with a central opening 25 through which the upper portion of the actuating element extends.

Around the opening in the collar member are provided a pair of spiral or helical shoes or camming surfaces 26 which extend approximately 180° each. Each shoe is provided with a bottom end 26a and an upper end 26b. The upper end of one shoe connects with the lower end of the other shoe through a connecting piece forming a substantially vertical wall 27. Just short of the upper terminus of each shoe there is provided a lateral depression or groove 28, the purpose of which will be explained at a later point herein.

The shoes on the collar member cooperate with a cross head 29 which is secured to the upper end of the actuating element. Preferably the cross head is of U-shaped construction, the upper portion of the actuating element extending through an aperture (see Fig. 4) in the web of the U and the legs of the U being disposed parallel with the opposite faces of the actuating element. The cross head is secured to the actuating element by means of a cross pin 30. The opposite ends of the cross head extend laterally from the actuating element so that they are in position to be engaged by the shoes.

It will be noted that the ear 23 is so formed at its outer ends as to provide stop surfaces 31 and 32 which limit the permissible rotation of the collar relative to the base member. Preferably the surfaces are formed as part of a sharp hook-like barb on the inside and outer edge of one ear. The inner surface 31 of the hook engages cross member 29 at the extreme counterclockwise limit of rotation (see Fig. 2) and the other surface 32 engages the cross member at the extreme clockwise point of rotation (see Fig. 3).

The operation of the unit is as follows. Preparatory to attaching the unit to the particular surface selected, the collar and attached can opener shank is positioned in the extreme position shown in Fig. 3, that is, with the stop surface 32 engaging the cross head 29. In this position the suction surface of the disk is substantially flat and the lower edges of the projecting portions of the cross head lie at the lower ends of the helical shoes. By grasping the head or shank the entire unit is then placed in a position in which the suction face of disk 15 lies flat against the mounting surface. To activate the suction disk the operator, while still maintaining a slight pressure in a direction normal to the disk and against the mounting surface, turns the shank and head unit relative to the base member in a direction to move the limiting surface 32 away from its engagement with the cross head, or counter-clockwise as viewed in Fig. 3. The base member 13 is held against movement by the frictional engagement of the disk with the surface, and thus the actuating element is also prevented against rotation due to the non-rotatable connection between it and the base member. By virtue of the inclined shoes 26, rotation of the collar 21 causes a lifting or outward displacement of the actuating element 16, thus drawing the center of the disk away from the mounting surface and creating a vacuum which serves to firmly hold the disk to the mounting surface.

Rotation of the can opener and attached collar is continued until such time as the limiting surface 31 on ear 23 engages the cross head as shown in Fig. 4. Just prior to the engagement the undersides of the projecting portions of the cross head drop into the depressions 28 whereby are releasably held by the inherent resistance to deformation possessed by the suction cup and by the effect of spring 19. Thus, the can opener is releasably held against further rotation and the suction cup maintained in its effective vacuum gripping relationship.

When it is desired to detach the unit from the mounting surface, it is necessary only to grasp the head or shank of the unit and turn it back to the original position rela-

tive the base (Fig. 3). Enough initial rotative force must be applied to slip the cross head out of the depression after which the cross head will ride down the shoes and permit the suction disk to again flatten out. This destroys the vacuum seal and the unit can be removed from the mounting surface.

The action of spring 19 assists in assuring return of the actuating element and suction disk or cup to the original non-active condition. It also serves to maintain the collar in the Fig. 3 position during storage so that the unit is immediately ready for attachment to a suitable surface at any time.

To aid in properly orienting the plane of the head of the opener relative to the base when the unit is attached to its mounting surface, there may be inscribed on the base a suitable indexing marker such as arrow 33. Preferably this arrow is so located as to lie in the plane which is parallel with the head portion of the can opener when installation or attachment is completed. In the illustrated embodiment the normal procedure would be to place the unit on a table or counter top with the arrow pointing toward the user. As the can opener body is then rotated relative to the base member, the head will move into the position illustrated in Fig. 1 or substantially parallel with the arrow. Where the unit is to be mounted on a vertically disposed surface, the arrow should point straight down which will result in the head moving into the desired vertical plane.

From the foregoing it will be evident that I have accomplished all of the ends and objects of the invention hereinbefore set forth.

It will be understood that certain features and sub-combinations are of utility and may be employed without reference to other features and subcombinations. This is contemplated by and is within the scope of the claims.

As many possible embodiments may be made of the invention without departing from the scope thereof, it is to be understood that all matter herein set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, I claim:

1. A mounting assembly for can openers of the type having a support shank and can lid severing means at one end of said shank, comprising a resilient suction cup having a suction face and a back face, a base member having a dish face adapted to enclose the back face of said suction cup, the central portion of said back face being normally spaced away from the central portion of said dish face, an elongate actuating element attached centrally to said suction cup and extending through a central aperture in said base member, means on said actuating element and said base member cooperating to prevent rotation of said actuating element about its longitudinal axis and relative to the base member, a rotatable member adapted to be connected with said shank support and supported on said base member for rotation substantially about the longitudinal axis of said actuating element, laterally extending follower means carried by said actuating element, and cam means carried by said rotatable member and arranged to engage said follower means upon rotation of the shank support in one direction about said axis relative to the base member to displace said actuating element outwardly thereby to pull the central portion of said suction cup toward said base member.

2. A mounting assembly as in claim 1 including releasable locking means associated with said cam means and operable to releasably lock said shank against rotation in the other direction about said axis following a predetermined arc of rotation in said one direction, thereby to releasably hold said actuating element in its displaced condition.

3. A suction type fastener comprising a resilient suction cup having a suction face and a back face, a circular base member having a dish face confronting the back face of said suction cup, the central portion of the back

face of said suction cup normally spaced away from the dished face of said base member, an actuating element secured at one end centrally to the suction cup and extending from the back face thereof through an aperture in the central portion of said base member, said actuating element and aperture having cross sections permitting sliding movement of the actuating element away from and toward the suction cup, but preventing relative rotation between the actuating element and base member, a cross head secured to the other end of said actuating element and projecting laterally in opposite sides thereof, and an annular collar surrounding the extending portion of said actuating element and supported for rotation relative said base member about a central axis normal to said faces of said cup, said collar including a pair of similar spiral shoe portions underlying respectively the laterally projecting portions of said cross head and operable upon rotation of said collar in one direction about said axis to displace said actuating element relative said base member in a direction to draw the center portion of said suction cup toward the dished face of said base member.

4. A suction cup fastener as in claim 3 wherein the ends of said spiral shoe portions terminate in transverse depressions in which said projecting portions of said cross bar seat to releasably lock said collar against further rotation in any direction.

5. A suction cup fastener as in claim 3 including stop means carried by the collar and engageable with said cross member to define the limits of rotation of said collar relative the base member.

6. In a can opener, a circular base, a collar positioned on one face of the base, means supporting said collar on said base for rotation relative said base about an axis normal to the base, a shank extending from and connected with the collar and terminating in a head spaced away from the base, can lid severing mechanism on said head including means for gripping the upper flange of the can and holding same during the severing operation, a cavity in the other face of the base, a resilient suction cup positioned within said cavity and having a suction face and a back face, the back face confronting the cavity and normally spaced at its center portion therefrom, an actuating element secured to the central por-

tion of said suction cup and extending through an aperture in the base toward said head, and cooperating means on said actuating element and rotatable collar operable to flex the central portion of said suction cup inwardly in said cavity upon rotation of said shank and collar relative said base in one direction.

7. A mounting assembly for can openers of the type having a support shank and can lid severing means at one end of said shank, comprising a circular base member having a dished face, a rotatable member adapted to be connected with the other end of said shank and supported on said base member for rotation relative said base member about a central axis normal to said face, a resilient suction cup having a suction face and a back face and disposed with its back face confronting the dished face of said base member but normally spaced therefrom, an actuating element attached centrally to said suction cup and projecting from said back face through an opening in said base member, means on said base member and said actuating element operable to prevent rotation of said actuating element about its longitudinal axis relative the base member but permit longitudinal movement of the actuating element, cooperating parts on said rotatable member and said actuating element operable upon rotation of said rotatable member in one direction about said central axis to displace said actuating element outwardly thereby to pull the central portion of said suction cup toward said base member, and cooperating elements on said rotatable member and actuating element operable to releasably lock said rotatable member against counter-rotation about said central axis following a selected displacement of said actuating element.

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