

Feb. 24, 1942.

O. T. WOOD

2,274,178

FLASHLIGHT

Filed Dec. 21, 1937

FIG. 1.

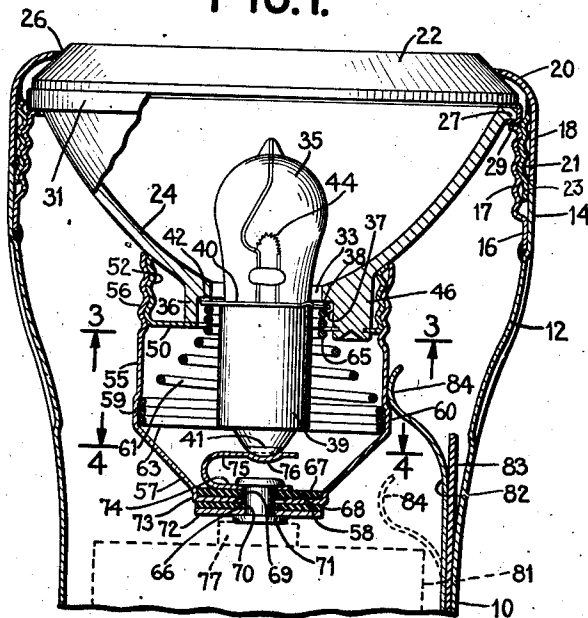


FIG. 3.

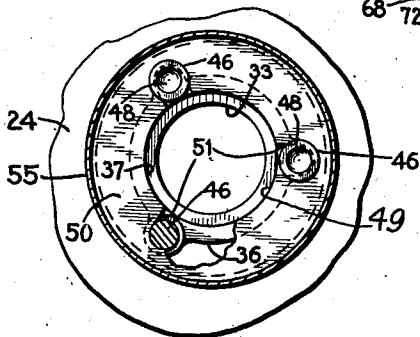


FIG. 2.

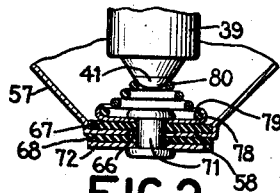


FIG. 4.

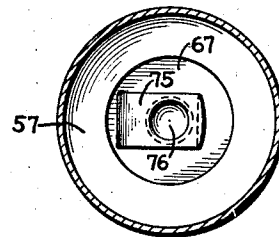
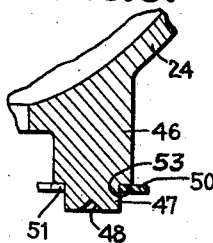


FIG. 5.



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2,274,178

FLASHLIGHT

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Application December 21, 1937, Serial No. 180,949

12 Claims. (Cl. 240—10.6)

This invention relates to flashlights and electric hand lanterns of the kind in which an incandescent lamp is illuminated by one or more dry cells in a circuit therewith controlled by a manually actuated circuit closer. More particularly the invention relates to flashlights and lanterns in which the light source has a fixed position with respect to the focus of a reflector.

One object of the invention is to provide a lamp support particularly adapted to receive and position a lamp whereof the base is provided with a positioning flange. Accordingly, the lamp support is formed, say, axially of the reflector, with a bore or aperture, the diameter of which is preferably sufficient to pass the bulb of an incandescent lamp therethrough. A portion of said bore is of greater diameter, conveniently on the side opposite to the reflector, to receive a peripheral flange on the lamp base and to define a shoulder with which the flange on the lamp base may engage.

Another object of the invention is to removably retain the lamp in position. In accordance with the invention, telescoping members are provided one of which may, if desired, be carried with the apertured lamp support portion while the other member may removably enclose the lamp base.

The invention also seeks an improved lamp support by which a circuit, including the circuit closer and the respective terminals of the lamp and battery, may be completed. To this end, one of the telescoping members may be included in that portion of the circuit including, say, the lamp base shell while another telescoping member may be utilized to support circuit elements in electrical connection with the central lamp terminal.

It is also an object of the invention to protect the fragile lamp filament against damage, as by cushioning the lamp in its proper focal position against shock. Accordingly yielding means, which may take the form of a coil spring, urges the flange on the lamp base against the shoulder in the lamp support. If desired, such coil spring may be utilized as a part of the electrical circuit.

A further object of the invention is to prevent displacement of the incandescent filament from the exact focal point of the reflector. In carrying this aspect of the invention into effect, contact means for the central terminal of the lamp is so constructed as to exert a uniform pressure at the base of the lamp, and, desirably, along the axis of the lamp base, but in spaced relation thereto, to counteract any tendency of the lamp

to tip in the socket formed by the shouldered aperture. Also, if desired, uniform and yielding pressure may be exerted, for the same purpose, on the flange of the lamp base to retain all parts thereof in contact with the shoulder in the lamp support.

The invention further seeks a construction by which the lamp socket assembly may be assembled as a unit. To this end, one of the telescoping members, aforesaid, may be integral with or otherwise united with the reflector for the flashlight or hand lantern of this invention.

Upon exhaustion, dry cells often corrode and swell so that they stick in the tubular flashlight casing. It is then desirable to remove the closures at one or both ends of the casing in order to withdraw or push out the exhausted dry cells. In another aspect of the invention, therefore, the lens, reflector and lamp support assembly are desirably capable of removal as a unit to expose one end of the casing.

Yet another object of the invention is a flashlight having the character sought by this invention, in which the lens, reflector and lamp support assembly, as a unit, are removably secured to the flashlight casing by cooperating threads in the coacting parts, which threads are preferably concealed from view.

Still another object of the invention is a flashlight having a lamp support assembly of the character described in which a circuit closer contact strip is slidable into electrical connection with the lamp base enclosure to complete the electrical circuit.

The invention also seeks a flashlight or hand lantern construction which is practical from the standpoint of ease and cheapness of manufacture and practicability and durability in use.

These and other objects of the invention and the means for their attainment will be more apparent from the following detailed description taken in connection with the accompanying drawing illustrating one embodiment by which the invention may be realized and in which:

Figure 1 is a view, in longitudinal section, taken on a diameter and showing the upper end of a flashlight embodying the invention;

Figure 2 is a fragmentary view, similar to Figure 1, but showing a modified lamp positioning contact element;

Figure 3 is a fragmentary transverse sectional view taken in the plane indicated by the line 3—3 of Figure 1 and looking in the direction of the arrows;

Figure 4 is a fragmentary transverse sectional

view taken in the plane indicated by the line 4-4 of Figure 1 and looking in the direction of the arrows; and

Figure 5 is a sectional view on an enlarged scale showing the shape of the coating parts of the reflector and lamp base enclosure before the parts are permanently secured together.

While the invention has been shown as applied to a flashlight it will be obvious, as the description proceeds, that, in many of its aspects, it is applicable in any situation where an incandescent lamp is to be centered at a fixed focus with respect to a reflector.

In the illustrated embodiment, the end of a tubular flashlight casing 10 is of progressively increasing diameter, as at 12, and at its extremity is outwardly offset as a cylindrically shaped open end portion 14. Secured inwardly of the end portion 14 is a portion 16 formed with threads 17 which are shown as extending beyond the rim of the end portion 14 in spaced relation inwardly thereof.

Of the same shape and diameter as the end portion 14 is a lens ring or bezel 18 formed with an inwardly directed portion or curved flange 20 adapted to overlie and retain a lens 22 on the reflector 24. To the inner surface of the lens ring 18 there is secured a threaded member 21 adapted to fit inside the end portion 14 and to have threaded engagement with the threaded part 17. The free edge 23 of the threaded portion 21 is of plane cylindrical construction and is closely positioned with respect to the bezel ring but conveniently projects therebeyond to lie within the portion 14. Thereby is the edge of the bezel guided and both the parts 18 and 14 are held in smooth abutting relation. Conveniently, but not necessarily, the periphery of the lens 22 is beveled, as at 26, so that, as the lens ring 18 is screwed onto the casing end, the edge of the lens ring flange 20 will find a seat on the lens surface and firmly hold the lens in place. The edge of bezel 18, 20 will, when in place, abut the end of the offset portion 14 to give a smooth and unbroken contour, hiding the threads and with the joint scarcely visible.

The outer edge 27 of the reflector 24 is outwardly directed, as a peripheral flange, adapted to rest on an intumed edge 29 formed on the rim of the threaded ring 17 of the casing. In the illustrated embodiment, the reflector, being of metal, is conductive and is insulated from the casing, which conveniently forms part of the electrical circuit, by a channel shaped member 31 of insulating material which embraces the flange 27 and insulates the conductive reflector 24 from the conductive casing part. Due to the character of the insulation 31, the yielding non-metallic material thereof may fill the space about the periphery of the flange 27 and the inner surface of the lens ring structure 18, 20, 21 so that the reflector 24 may be frictionally held or fit snugly in the lens ring and be removed and replaced therewith, on the head portion 14, 17, as a unit.

In the axis of the reflector 24, there is formed an aperture 33, preferably circular, and of a diameter such as to permit the passage of the bulb 35 of an incandescent lamp. On the outer surface of the reflector 24, there is preferably formed a cylindrical flange 36 concentric with the aperture 33 and defining a passage 37 but of an inner diameter greater than the inner diameter of the aperture 33 so as to define a downwardly or rearwardly facing shoulder 38. Thus

the aperture 33 and the interior of the flange 36 define a bore for the reception of the lamp.

The reflector 24 is also formed with a plurality of bosses 46, three in the illustrated embodiment, which are conveniently formed on the outer surface of the flange 36. These bosses 46 have a reduced and preferably cylindrical end 47 (Figure 4) extending below flange 36 and defining shoulders 53 and indented centrally thereof, as at 48, if desired, to center a spinning tool. A cup shaped member 50, preferably of metal for convenience of manufacture, is formed in its bottom with a central aperture 49 of a diameter substantially equal to the diameter of the bore 37. In the bottom of the male cup member 50 are formed a plurality of apertures 51 equal in number to the bosses 46 and of the same size as the reduced ends 47. The wall 52 of the cup 50 is formed with threads. This cup 50 is telescoped over the flange 36 with the ends 47 passing through the apertures 51 and the rim of the apertures 51 abutting the shoulders 53. The ends 47 of the bosses are then spun over or otherwise upset, securing the threaded cup 50 to the reflector 24.

An incandescent lamp applicable with the lamp support of this invention is provided with a base 39 having a peripheral flange 40 near the globe thereof. The shell of the base 39 and the flange 40 are conductive and constitute one terminal of the lamp. The center or end terminal 41 of the lamp is insulated from shell 39 as will be understood and is somewhat conical or in the form of a rounded tip. The flange 40 may, if desired, be formed with three equally spaced convolutions or indentations 42 forming three high spots affording a three point support or contact. These three upwardly pressed points 42 can be closely controlled in a plane so that the relation of the lamp and shoulder 38 may be constant and exact. The globe 35 of the lamp is passed through the bore 33, 37 until the flange 40 on the base 39 thereof or the three point contact 48 thereon engages the shoulder 38. The shoulder is so positioned with respect to the reflector that the filament 44 is at the focus of the reflector. The lamp is held in position by a cooperating female cup shaped member 55 telescoping over the upper or cylindrical portion of the male member 50 and formed in its upper wall portion with threads 56 to removably engage the threads 52 on the male member 50.

The lower portion, as viewed, of the female cup 55 is constructed, as at 57, into frusto-conical shape and intermediate the cylindrical wall 55 and the tapering portion 57 a peripheral groove 59 is conveniently formed by outwardly pressing a portion of the wall in which is seated the lower end 63 of a coil spring 61. The outwardly pressed wall portion forms an annular bead 60. This coil spring is of reduced diameter at its other end, as at 65, and of a length to engage the flange 40 of the lamp base and yieldingly urge it to its seat on the shoulder 38. As shown, several turns 63 of the spring, at its lower end, are of substantially the same diameter so as to fit within and in expanding have adequate bearing in the substantially rectangular groove 59. Several turns 65 at the upper end of the spring are of the same but of a lesser diameter to encircle the lamp base and fit within or seat in the bore 37. The spring thus exerts a substantially uniform pressure throughout the extent of the flange to hold the flange against the shoulder and prevent tipping

of the lamp which would move the filament away from the focal point of the reflector.

The base 58 of the female telescoping cup 55 is apertured centrally thereof, as at 66, and carries, above and below, insulating washers 67 and 68. These washers 67 and 68 are apertured, as at 69, 70, to register with the aperture in the bottom of the base 58, but these apertures are of lesser diameter than the aperture 66 so that a rivet or eyelet 71 clamping the three parts together will be held out of contact with the conductive bottom. This rivet serves as a contact with the central terminal 77 of a battery. To hold washer 68 and extend the conductive area, a metallic washer 72 is held by the rivet against the bottom of washer 68. The rivet 71 secures a resilient contact 74—75 within the cup adapted to complete the circuit with the central terminal 41 of the lamp. Conveniently, the upper washer 67 rests in a cylindrical portion 73 formed in the bottom of the female telescoping member 55, among other reasons, for convenience in assembly.

As shown in Figure 1, the contact member 74—75 is U-shaped. One arm 74 thereof is apertured and secured by the rivet 71 above the insulation and out of electrical contact with the female telescoping member 55. The other arm 75 of the U-shaped contact may be formed with a recess or depression 76 to receive and center the terminal tip 41 of the lamp thereby exerting an axial thrust thereon to overcome tendency of the lamp to tip and move the filament out of the focal point of the lens.

In Figure 2, there is illustrated a modified end thrust contact member carried with the female telescoping member. In this modification, a cup shaped conductive member 78 is clamped by the head of rivet 71 against the upper face of the upper insulating washer 67. The rim of the cup is turned in over the lower coil 79 of a coil spring contact member 79—80 to hold it against displacement. The coils of this spring contact decrease progressively in diameter until the diameter of the uppermost coil 80 is substantially just sufficient to encircle the central rounded tip terminal of the lamp, the spring being then partially compressed. This type of contact is particularly adapted to exert a uniform pressure at the base of the lamp and directly along the axis of the lamp so that there is no tendency for the lamp to be tipped and the axis of the lamp is always in the axis of the reflector.

It is, of course, to be understood that, in the illustrated embodiment, the casing is conceived to form part of the circuit between the zinc cup terminal of the battery 81 and the circuit closer although it will be obvious that a conductive strip, insulated from the casing, may complete the circuit to the circuit closer. While it has been indicated hereinbefore that the end of the casing opposite to that shown may be capable of being opened, as by a removable end cap, such end may be permanently closed. In either event, it will be desirable to provide a battery positioning spring between the last named end of the casing and the bottom of the battery, as is common, to yieldingly urge the battery terminal 77 against the contact 71.

Any desired and known form of circuit closer may be used with this invention. In Figure 1, a sliding type of contact strip 82 is illustrated adapted to be reciprocated, as by a thumb piece, not shown, on the side of the flashlight casing and electrically connected in any convenient

manner with the zinc cup terminal of the battery 81. At its upper end, as viewed, the metallic conductive strip 82 is bent toward the female telescoping lamp support member 55 and formed with a curved end 84 whereby, by virtue of its inherent resiliency, it yieldingly engages the lamp support member 55 with a wiping contact tending to keep the coating surfaces clean. In moving from its "off" position below the lamp support, shown in dotted lines, the curved end 84 facilitates the movement into and out of circuit making position and enables it to ride up onto the lamp support member 55 without difficulty. In this connection, it will be noted that the outwardly pressed rib 60 over which the curved end passes and above which it rests assists in retaining the contact end 82 in "closed" circuit position.

The resilient contact strip 82, 84, shown in full lines in Figure 1, is equally illustrative of a fixed or stationary contact strip, suitably insulated by the insulation 83 and electrically connected with a suitable circuit closer on the flashlight casing 10. The resilient end 84 of such a contact strip, when on a stationary strip, yieldingly engages the conductive housing 55, 57 to make contact therewith at all times, but yields to permit the withdrawal and insertion of the reflector assembly.

It will thus be seen that a flashlight construction has been provided in which the lamp may be assembled with the reflector as a unit and thereafter the lens ring and lens assembled with the reflector and the entire assembly may be removed and replaced as a unit with facility.

Various modifications will occur to those skilled in the art in the composition, configuration and disposition of the component elements going to make up the invention as a whole as well as in the selection and/or combination of selected elements for specific purposes and no limitation is intended by the phraseology of the foregoing description or illustrations in the accompanying drawing, except as indicated in the appended claims.

What is claimed is:

1. In a flashlight, the combination with a reflector formed with an aperture axially thereof, a shoulder about the aperture, a lamp in the aperture having a base and peripheral flange on the base in engagement with the shoulder, yielding means urging the flange against the shoulder, means supporting the yielding means comprising a cup shaped conductive male member carried with the reflector, a cup shaped conductive female member removably secured thereto, said yielding means comprising a coil spring whereof lowermost coils of greater diameter are seated in a groove formed in the female member and whereof the upper coils thereof of lesser diameter engage the flange on the lamp base and a central battery contact member carried with the female member but insulated therefrom.

2. In a flashlight, the combination with a reflector formed with an aperture axially thereof, a shoulder about the aperture, a lamp in the aperture having a base and peripheral flange on the base in engagement with the shoulder, conductive yielding means urging the flange against the shoulder, means supporting the yielding means comprising a cup shaped conductive male member carried with the reflector, a cup shaped conductive female member removably secured thereto comprising a cylindrical portion and a tapering portion therebelow and a bead between the cylindrical portion and the tapering portion

therebelow and defining an interior annular groove, said yielding means comprising a coil spring seated in the groove in the female member and whereof the upper coils thereof engage the flange on the lamp base, a central battery contact member carried with the female member but insulated therefrom and a reciprocable circuit closure having an end portion offset toward the female member to engage the tapering portion and ride over the bead to be retained thereby.

3. In a flashlight, the combination with a reflector formed with an aperture axially thereof, a cylindrical flange depending from the reflector concentric with the aperture but in spaced relation thereto to define a shoulder, a lamp in the aperture having a base and peripheral flange on the base in engagement with the shoulder, yielding means urging the flange against the shoulder, means supporting the yielding means comprising a cup-shaped conductive male member secured to the cylindrical flange and formed in its bottom with an aperture in register with the cylindrical flange, a cup shaped female member telescoped over the male member and removably secured thereto, said yielding means being conductive and carried with the female member, a battery terminal contact carried with the female member but insulated therefrom and conductive means between the contact and the central lamp terminal.

4. In a flashlight, the combination with a reflector formed with an aperture axially thereof, a cylindrical flange of a diameter greater than the aperture and depending from the reflector concentric with the aperture but in spaced relation thereto to define a shoulder, a lamp of a diameter less than the aperture having a base and a peripheral flange of a diameter greater than the aperture on the base in engagement with the shoulder on the opposite side thereof from the reflector, yielding means urging the flange against the shoulder, means supporting the yielding means comprising a cup shaped conductive male member secured to the cylindrical flange and formed in its bottom with an aperture in register with a passage defined by the cylindrical flange, a cup shaped female member telescoped over the male member and removably secured thereto, said female member being formed with a cylindrical upper portion and a frusto-conical lower portion and a peripheral groove between said portions, said yielding means comprising a coil spring, the lower coils of which are seated in the groove and the upper coils engage the lamp, a battery terminal contact carried with the female member but insulated therefrom and conductive means between the contact and the central lamp terminal.

5. In a flashlight, the combination with a reflector formed with an aperture axially thereof, a shoulder about the aperture, a lamp in the aperture having a base and peripheral flange on the base in engagement with the shoulder, yielding means urging the flange against the shoulder, means supporting the yielding means comprising a cup shaped conductive male member carried with the reflector, a cup shaped conductive female member removably secured thereto, said yielding means comprising a coil spring seated in the female member and whereof the upper coils thereof engage the flange on the lamp base, a central battery contact member carried with the female member but insulated therefrom and comprising a U-shaped resilient contact member one arm of which is secured to the battery con-

tact member and the other arm is formed with a depression to receive the central terminal of the lamp.

6. In a flashlight, the combination with a reflector formed with an aperture axially thereof, a shoulder about the aperture, a lamp in the aperture having a base and peripheral flange on the base in engagement with the shoulder, yielding means urging the flange against the shoulder, means supporting the yielding means comprising a cup shaped conductive male member carried with the reflector, a cup shaped conductive female member removably secured thereto, said yielding means comprising a coil spring seated in the female member and whereof the upper coils thereof engage the flange on the lamp base, a central battery contact member carried with the female member but insulated therefrom and comprising a coil spring secured to the battery contact member and whereof the uppermost coil encircles the central terminal of the lamp.

7. In a flashlight, the combination with a reflector formed with an aperture axially thereof, a cylindrical flange depending from the reflector concentric with the aperture but in spaced relation thereto to define a shoulder, a lamp in the aperture having a base and peripheral flange on the base in engagement with the shoulder, yielding means urging the flange against the shoulder, means supporting the yielding means comprising a cup shaped conductive male member secured to the cylindrical flange and formed in its bottom with an aperture in register with the cylindrical flange, a cup shaped female member telescoped over the male member and removably secured thereto, said female member being formed with a cylindrical upper portion and a frusto-conical lower portion and a peripheral groove between said portions, said yielding means comprising a coil spring, the lower coils of which are seated in the groove and the upper coils are seated within the cylindrical flange, a battery terminal contact carried with the female member but insulated therefrom, conductive means between the contact and the central lamp terminal and comprising a U-shaped resilient contact member one arm of which is secured to the battery contact member and the other arm is formed with a depression to receive the central terminal of the lamp.

8. In a flashlight, the combination with a reflector formed with an aperture axially thereof, a cylindrical flange depending from the reflector concentric with the aperture but in spaced relation thereto to define a shoulder, a lamp in the aperture having a base and peripheral flange on the base in engagement with the shoulder, yielding means urging the flange against the shoulder, means supporting the yielding means comprising a cup shaped conductive male member secured to the cylindrical flange and formed in its bottom with an aperture in register with the cylindrical flange, a cup shaped female member telescoped over the male member and removably secured thereto, said female member being formed with a cylindrical upper portion and a frusto-conical lower portion and a peripheral groove between said portions, said yielding means comprising a coil spring, the lower coils of which are seated in the groove and the upper coils are seated within the cylindrical flange, a battery terminal contact carried with the female member but insulated therefrom, conductive means between the contact and the central lamp terminal and comprising a coil spring secured to the battery contact member

and whereof the uppermost coil encircles the central terminal of the lamp.

9. In a flashlight, the combination with a reflector formed with an aperture axially thereof, a shoulder about the aperture, a lamp in the aperture having a base and peripheral flange on the base in engagement with the shoulder, yielding means urging the flange against the shoulder, means supporting the yielding means comprising a cup shaped conductive male member carried with the reflector, a cup shaped conductive female member removably secured thereto, said yielding means comprising a coil spring seated in the female member and whereof the upper coils thereof engage the flange on the lamp base, the bottom of said female member being formed with a cup shaped apertured depression axially thereof, an insulating washer in said depression, an insulating washer beneath the bottom of said depression, a metallic washer beneath the last named washer, a yielding lamp contact above the first named insulating washer and a rivet secured to the lamp contact and clamping the washers to the bottom of the female member.

10. In a flashlight, the combination with a reflector formed with an aperture axially thereof, a cylindrical flange depending from the reflector concentric with the aperture but in spaced relation thereto to define a shoulder, said flange being formed with spaced bosses, a lamp in the aperture having a base and peripheral flange on the base in engagement with the shoulder, yielding means urging the flange against the shoulder, means supporting the yielding means comprising a cup shaped conductive male member secured to the cylindrical flange and formed in its bottom with an aperture in register with the cylindrical flange, and spaced apertures through which the bosses extend and are upset to secure the cup

shaped male member to the reflector, a cup shaped female member telescoped over the male member and removably secured thereto, said yielding means being conductive and carried with the female member, a battery terminal contact carried with the female member but insulated therefrom and conductive means between the contact and the central lamp terminal.

11. In a flashlight, the combination with a reflector formed with an aperture axially thereof, a lamp, means supporting the lamp comprising a cup-shaped female member formed with a frusto-conical end and a peripheral bead, a battery terminal contact carried with the female member but insulated therefrom, and a circuit closer comprising a resilient contact strip formed with a curved end adapted to ride up the frusto-conical surface and over the bead to be retained in electrical contact with the female member.

12. In a flashlight, the combination with a reflector formed with an aperture axially thereof, a lamp in the aperture, means enclosing the base of the lamp comprising a tubular conductive member carried with the reflector, a cup-shaped conductive coating member formed with a bead and removably secured thereto, means to electrically connect a conductive member with a lamp terminal, a central battery contact member carried with the member formed with the bead but insulated therefrom, means to electrically connect said contact member with the other lamp terminal, a circuit closer comprising a resilient reciprocable contact strip formed with a curved end and movable from a position spaced from the enclosing means to a position in contact with the member formed with the bead above the bead, said bead retarding accidental movement of the strip off the last mentioned member

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