This invention relates to closures, and more particularly to a captive dispensing closure arrangement suitable for use on containers such as plastic bottles or tubes.

The invention comprehends an improvement in a one-piece closure which includes a nozzle and integrally hinged, replacement hinge.

It is object of the invention to provide, in a closure arrangement of the type described, a concealed hinge formed entirely of the cap side wall material.

Another object of the invention is the provision of a simple means for orienting a closure in pre-determined position on the neck of a container.

Yet another object of the invention is the provision of an improved sealing means for a closure arrangement.

A more specific object of the invention is the provision, in a closure arrangement of the type described, of a concealed hinge formed by a pair of parallel cuts in the side wall of the cap which extend inwardly from the end edge of the cap side wall.

These and other objects of the invention will be apparent from an examination of the following description and drawings, wherein:

FIGURE 1 is a front elevational view of a portion of a container and closure arrangement embodying features of the invention;

FIGURE 2 is a transverse vertical section of the structure illustrated in FIGURE 1, with the cap shown in open position by imaginary lines;

FIGURE 3 is a transverse section taken on line 3—3 of FIGURE 1:

FIGURE 4 is a plan view of the closure, with the cap shown in open position; and

FIGURE 5 is an inverted view of the structure of FIGURE 1, with the cap shown in open position.

It will be understood that, for purposes of clarity, certain elements have been intentionally omitted from certain views where they are believed to be illustrated to better advantage in other views.

Referring now to the drawings for a better understanding of the invention, and particularly to FIGURES 1 and 2, it will be seen that the novel closure assembly, indicated generally at C and embodying features of the invention, is shown as applied to the neck end of a container such as a plastic tube or bottle, indicated generally at B.

The closure itself comprises an inner closure member or nozzle body 20 to which is attached an outer closure member or cap 12 by means of an integral hinge 14.

As best seen in FIGURE 2 the nozzle includes a tubular body 20 having a cylindrical side wall 22, with a bore 24, and a circular end wall 26 attached integrally to one end of the side wall and having an opening 28 extending therethrough in communication with the bore 24, which in turn communicates with the throat of the container neck.

Still referring to FIGURE 2, it will be seen that one end, the lower end as illustrated, of nozzle body 20 is adapted to be received within the neck of the container, while the other, or upper end, of the nozzle body is adapted to be received within the pocket of the cap, in a manner hereinafter described.

The body is provided inwardly adjacent its lower and upper ends with a pair of outer annular sealing beads 30 and 32, respectively, which are adapted to be received within complementary recesses 90 and 92 in the container neck and cap, respectively, as hereinafter described, to provide liquid tight seals.

Formed integrally with, and projecting outwardly from, a medial portion of nozzle body 20 is a generally L-shaped flange 34 which forms with the nozzle body itself an annular groove or channel 36 adapted to receive the free outer end portion of the container neck, as shown in FIGURE 2.

As best seen in FIGURES 2 and 4, there is formed integrally with, and projecting radially outwardly from, flange 34 a relatively narrow flange ledge 40 which is attached to the hinge means integrally in a manner hereinafter described. Extending upwardly from the flange ledge and formed integrally with the flange are a pair of outside ribs 42, generally triangular in shape, and a preferably rectangular center rib 44 which projects a slight distance beyond the outside ribs 42 in parallel relation therewith.

On the opposite side of flange 34, at 180° from ledge 40, are a pair of axially disposed ridges 44 extending parallel to each other and spaced a slight distance apart to form a groove 48 therebetween, the purpose of which is described later in the specification.

In a closure arrangement of this type it is highly desirable to provide a means for orienting the closure on the bottle in a pre-determined position relative to the front or rear of the container. As best seen in FIGURE 3, nozzle flange 34 is provided with an orienting notch or lug 50 projecting radially inward into groove 36 for mating engagement with a complementary recess 52 formed in the outer surface of the container neck. Thus, when the closure is placed on the container neck it can be rotated until notch 50 engages in recess 52, and the closure is thereby permanently positioned in proper position on the container neck.

Referring again to FIGURE 2 of the drawing, it will be seen that the cap 12 includes a generally flat arcuate end wall 60 having depending from the peripheral edge thereof a cylindrical side wall or skirt 62 which defines with the end wall a cavity 64 adapted to receive an upper portion of nozzle 10, including nozzle flange 34.

Projecting inwardly from the inside surface of cap end wall 60 is an annular flange 66 disposed in concentric relation with and spaced radially inward from the cap side wall 62. Flange 66 forms with the central portion of cap end wall 60 a circular pocket 68 which is disposed within the larger cavity 64 and which is adapted to receive the upper end of nozzle body 20 when the cap is in closed position.

The inner surface of cap end wall 60 may be provided with a preferably conical shaped inwardly projecting boss 70 adapted to seat within the bore or opening 28 of the nozzle end wall 26 to effect a closure when the cap is in closed position.

As best seen in FIGURE 4, side wall 62 of the cap is provided with an inwardly projecting axially extending ridge or bead 72 which is adapted to be received within the groove 48 between the beads 46 on the nozzle, when the cap is in closed position, to prevent the cap from rotating on the nozzle. Also, cap side wall 62 may be provided with an outwardly extending flange or lip 74 adapted to facilitate grasping of the cap to lift it from the nozzle.

Still referring to FIGURE 4, it will be seen that the hinge which integrally connects the nozzle and cap portions of the closure is formed entirely from material cut from the side wall 62 of the cap by a pair of parallel spaced cuts 80 which extend inwardly from the free edge of the side wall 62. At one end, as seen in FIGURE 2, the hinge 14 is formed integrally with the cap, as at 82; whereas, at the other end hinge 14 is formed integrally
with the nozzle body flange ledge 40, as at 84. Thus, because the hinges formed entirely from material taken from the side wall of the cap, the hinge is entirely concealed when the cap is in closed position.

Once the closure has been applied to the neck of the container, by inserting the lower end of the nozzle body within the neck until nozzle sealing bead 30 is received within neck recess 92 and nozzle flange positioning lug 80 is received with neck recess 52, the closure is permanently affixed to the container.

In order to dispense liquid or powder from the container, the lip or handle 74 of the outer cap is grasped and the cap is lifted up so that the material can pass from the container through the container neck throat, through the bore 24 of the nozzle, and out of the nozzle through the passageway 28. To reclose the container the cap is merely snapped back in place with the cap end wall boss 70 being received in the nozzle end wall opening 28 and with the sealing bead 32 at the upper portion of the nozzle being received within complementary recess 90 of the cap end wall flange 66 to insure a liquid tight seal between the outer cap and the nozzle.

Also, as best seen in FIGURE 5, the dimensions of the cap cavity and hinge length can be arranged so that when the cap has been removed from the nozzle, the container can be inverted and a pre-determined quantity of liquid poured into the cap which will act as a measuring device.

We claim:

1. A unitary, captive, dispensing closure arrangement for attachment to the neck of a container comprising:

   (a) a dispensing nozzle including a cylindrical body having one end adapted to be received within the open end of a container neck, and having another end adapted to be received within a pocket of a cap; and

   (b) a removable cap integrally hinged to said nozzle and including:

      (i) an end wall;

      (ii) a side wall projecting from said end wall and forming therewith a cavity for receiving a portion of said nozzle;

      (iii) an annular flange projecting from said end wall in concentric relation with said side wall to form with said end wall in said cavity a pocket for receiving a portion of said other end of the nozzle; and

      (c) a strap hinge connecting the side wall of the cap to the flange of the nozzle;

   (d) said hinge being formed entirely from material cut from the cap side wall and being disposed to lie between the inner and outer surfaces of the cap side wall when the cap is in closed position, so that no portion of the hinge projects beyond the outer periphery of the cap side wall;

   (e) said hinge being defined by a pair of spaced parallel cuts in the cap side wall which extend inwardly from the edge thereof.

2. A unitary, captive, dispensing closure arrangement for attachment to the neck of a container comprising:

   (a) a dispensing nozzle including:

      (i) a cylindrical body having one end adapted to be received within the open end of a container neck, and having another end adapted to be received within a pocket of a cap; and

      (ii) a generally L-shaped, annular, peripheral flange projecting outwardly from a medial portion of said body and forming with said one end of the body an annular groove facing the same direction as said one end of the body and adapted to receive an end portion of the container neck; and