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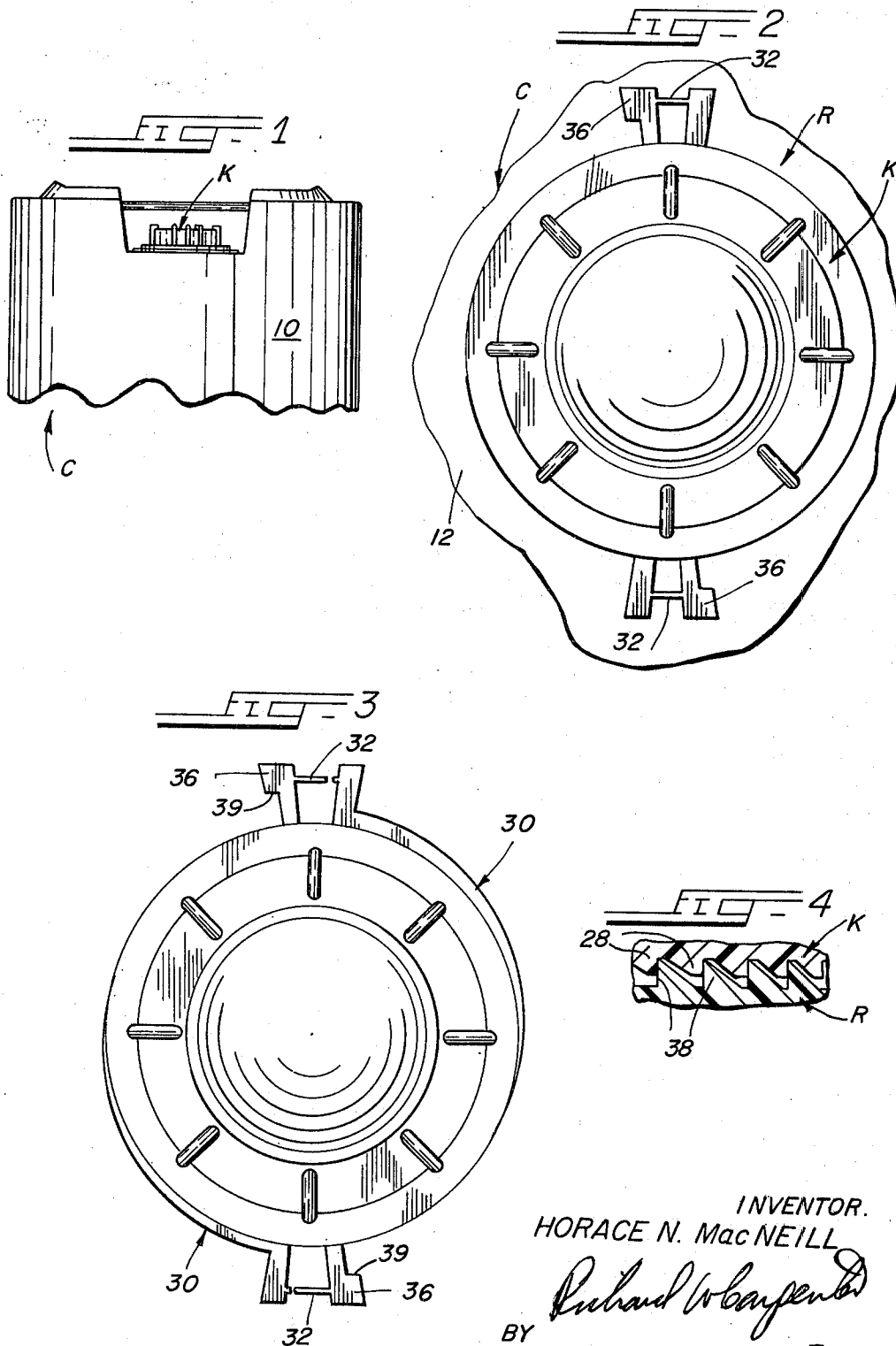
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3,493,140

TAMPER-PROOF CLOSURE ARRANGEMENT

Filed Nov. 29, 1968

2 Sheets-Sheet 1



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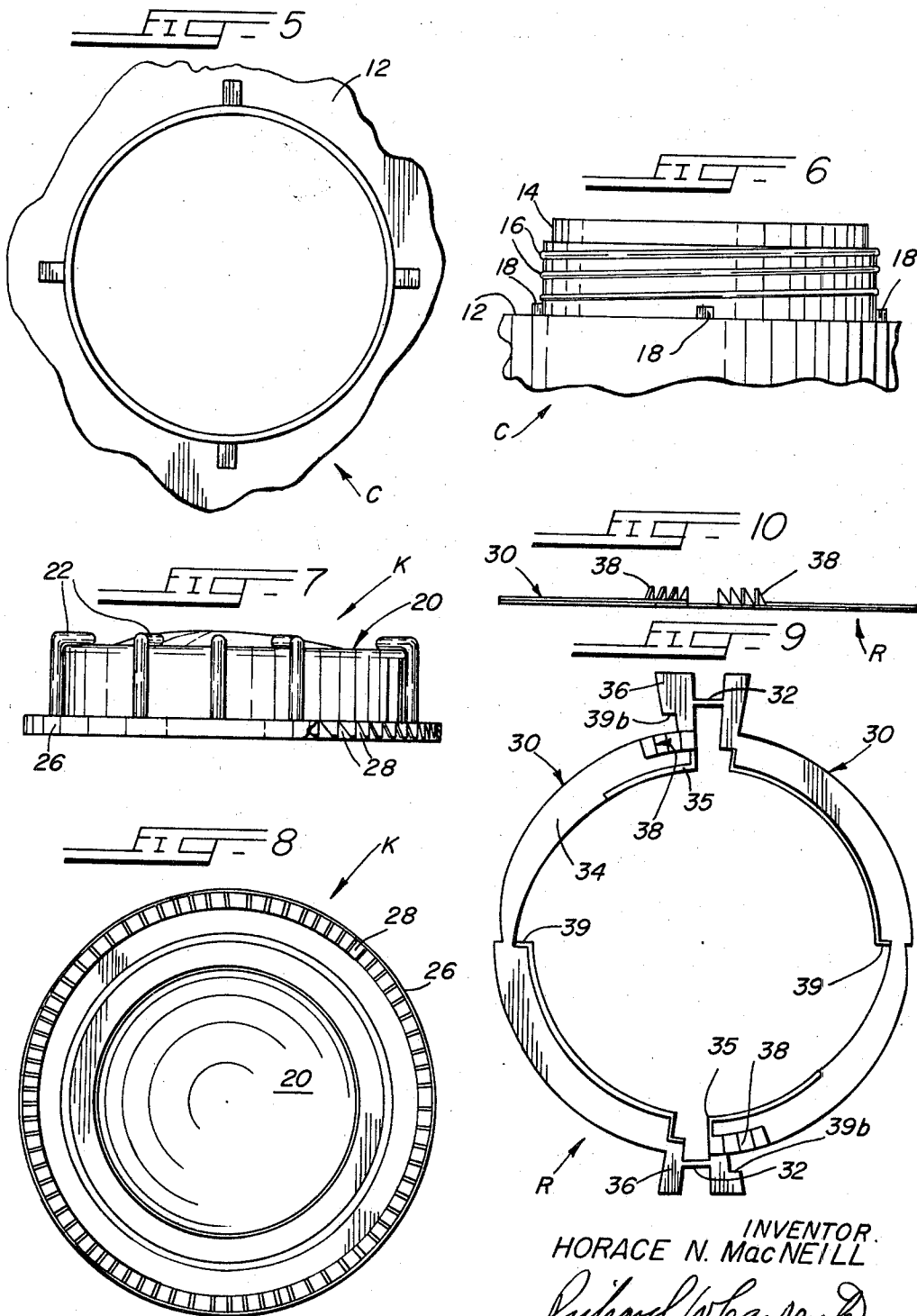
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2 Sheets-Sheet 2



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1

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TAMPER-PROOF CLOSURE ARRANGEMENT

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7 Claims

ABSTRACT OF THE DISCLOSURE

A tamper-proof closure arrangement for a container and related cap including a locking ring interposed therebetween and adapted to break apart when the cap is first loosened after it has been initially applied to the container.

This invention relates to closure arrangements having locking rings of the general type disclosed in U.S. Letters Patent No. 2,980,275, but is more particularly concerned with a tamper-proof closure arrangement which includes means for indicating visually that a container cap has been loosened after it has been initially applied to a container.

It is an object of this invention to provide a closure arrangement including a necked container, a threaded cap, and a locking ring adapted to be interposed between the cap and neck which ring will fracture upon initial loosening of the cap.

A more specific object of the invention is the provision of a locking arrangement including a locking ring interposed between a container and container cap and having ratchet teeth engaging ratchet teeth of the cap to prevent the cap from being loosened without rotation of the ring and having other connection with the container to prevent rotation of the ring relative to the container without fracturing the ring to provide visual evidence of tampering.

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

FIGURE 1 is a side elevation of a container having a closure arrangement embodying features of the invention;

FIGURE 2 is a fragmentary top plan of the structure illustrated in FIGURE 1, as seen before the cap is initially loosened;

FIGURE 3 is a view similar to FIGURE 2, but showing the structure after the cap has been initially loosened;

FIGURE 4 is a side elevation showing portions of the ratchet teeth of the cap and ring members in engagement with each other;

FIGURE 5 is a top plan of a portion of the container as seen without the cap in position;

FIGURE 6 is a side elevation of the structure shown in FIGURE 5;

FIGURE 7 is a side elevation of the cap;

FIGURE 8 is a top plan of the structure illustrated in FIGURE 7;

FIGURE 9 is a top plan of the locking ring; and

FIGURE 10 is a side elevation of the structure illustrated in FIGURE 9.

It will be understood that, for purposes of clarity, certain elements have been intentionally omitted from certain view 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, it will be seen in FIGURE 1 that the novel closure arrangement embodying the invention is illustrated as applied to a necked container, indicated

2

generally at C, having threadably received thereon a closure cap, indicated generally at K, and a fracturable or breakaway locking ring, indicated generally at R, interposed between the cap and the container.

It will be understood that the closure arrangement embodied herein may be applied to various types of containers, but, for illustrative purposes, the closure arrangement is shown herein as applied to a container having a body 10 with a top wall 12 from which projects a neck 14 having external threads 16. Top wall 12 of the container includes a plurality of upwardly extending retaining lugs 18, as best seen in FIGURES 5 and 6, the purpose of which is described later in the specification.

Cap K, as best seen in FIGURES 7 and 8, includes a cylindrical body or skirt 20, preferably having a plurality of outer ribs 22 formed thereon to facilitate grasping and turning of the cap, and having inner threads (not shown) adapted for threadable engagement with corresponding external threads 16 on container neck 14. At its lower portion cap body 20 has integrally formed therewith and projecting radially outwardly therefrom a generally flat annular flange 26 which is provided on its underside with a plurality of downwardly facing ratchet teeth 28.

Locking ring R, as best seen in FIGURES 9 and 10, includes a pair of generally similar ring sections 30 which are interconnected at their ends with integrally formed fracturable or breakaway connecting elements 32. Each of the ring sections includes a generally flat, semi-circular main portion 34 having adjacent the ends thereof outer projections 36 to which the breakaway elements 32 are connected. Main portion 34 also presents at least adjacent one end thereof a plurality of upwardly facing ratchet teeth 38 adapted to interlock with corresponding ratchet teeth 28 on the underside of the cap body flange 26.

To describe the operation of the invention, it will be understood that before the cap is initially applied to the container, after the container has been filled and is ready for sealing and shipment, the locking ring is placed over the neck of the container so as to lie against the top wall 12 of the container with the locking ring ratchet teeth 36 facing in an upwardly direction. It will be noted that the main portion of each section of the locking ring is provided with recesses 39 contoured to fit related lugs 18 of the top wall of the container to prevent the rotation of the ring relative to the container top wall. Main portions 34 of each section may also be provided with integral ribs 35 at certain edges thereof adjacent recesses 39 to reinforce said sections in the areas of the recesses and thereby provide greater areas of abutment surface between the ring and lugs 18.

At this point the cap is threaded onto the container in the conventional clockwise direction, and, as the cap approaches the locking ring, the ratchet teeth on the ring and cap pass over each other to permit the cap to be tightly applied to the container neck. After the cap has been tightened onto the container neck the related pitches of the ratchet teeth of the ring and cap, as best seen in FIGURE 4, engage to prevent the rotation of the cap in a counter clockwise or loosening direction relative to the locking ring.

The locking ring is made of a frangible material and has weakened areas in connecting elements 32, which interconnect the projections 36 at opposite ends of the ring sections. As the cap is rotated and pressure is applied the ring, being unable to rotate because of the connections between recesses 39 and container lugs 18, will fracture causing the ring sections to break apart as shown in FIGURE 3.

Once this happens, of course, the cap may be readily removed from the container neck, but it will be apparent

3

to any observer that the ring has been broken into two pieces, and this indicates to the observer that the cap has been initially loosened or tampered with.

Thus, there has been provided in the invention a simple and inexpensive tamper-proof arrangement which may be applied to a container in such a way as to indicate to an observer when the container has been tampered with. It is to be understood, of course, that after the cap has been opened initially it may be reapplied and re-opened numerous times and the locking ring may be discarded, because its usefulness has ceased after the initial opening of the container.

It will also be understood that the cap and container of this invention may be used together without the locking ring where it is not required to have a tamper-proof closure.

What is claimed is:

1. In a tamper-proof closure arrangement for a necked container with threaded cap, the combination of:

- (a) a hollow container including a wall with a neck projecting therefrom;
- (b) a removable cap presenting a plurality of downwardly extending ratchet teeth;
- (c) a breakaway locking ring surrounding said container neck and interposed between said container and said cap;
- (d) said ring comprising at least two detachably interconnected sections, each of which includes:
 - (i) a plurality of upwardly extending ratchet teeth engageable with said cap teeth to permit rotation of the cap in a tightening direction but to prevent rotation of said cap in a loosening direction, relative to said ring, after said cap has been initially applied to said container neck;
 - (ii) detachable means interconnecting said ring sections and adapted to fracture upon the application of pressure thereon for indicating that said cap has been loosened on said container neck after its initial application thereto;
 - (iii) means engageable with said container for preventing relative rotation between said ring

4

and said container without causing said detachable means to fracture when said cap is loosened.

2. A closure arrangement according to claim 1, wherein said cap includes a cylindrical body having projecting radially outwardly therefrom a lateral flange which presents on its underside said ratchet teeth.

3. A closure arrangement according to claim 1, wherein said locking ring comprises a pair of generally similar sections having semi-circular main portions interconnected at their ends by a pair of relatively thin, frangible connecting strips.

4. A closure arrangement according to claim 3, wherein said ring section main portions have at opposite ends thereof radially outwardly projecting tabs which are joined to said connecting strips.

5. A closure arrangement according to claim 3, wherein the main portions of said ring sections present surfaces adapted to engage complementary surfaces on said container to prevent relative rotation therebetween.

6. A closure arrangement according to claim 3, wherein said ring section main portions present recesses adapted to receive complementary lugs on said container to prevent relative rotation therebetween.

7. A closure arrangement according to claim 6, wherein each of said ring section main portions is relatively thin and generally flat and presents along its edge adjacent said recesses at least one upstanding rib for providing abutment surfaces engageable with the lugs of said container.

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GEORGE T. HALL, Primary Examiner

U.S. Cl. X.R.

215—7; 220—27