

Nov. 17, 1953

YUE SAN FONG

2,659,509

BOTTLE CAP

Filed Sept. 2, 1949

Fig. 1.

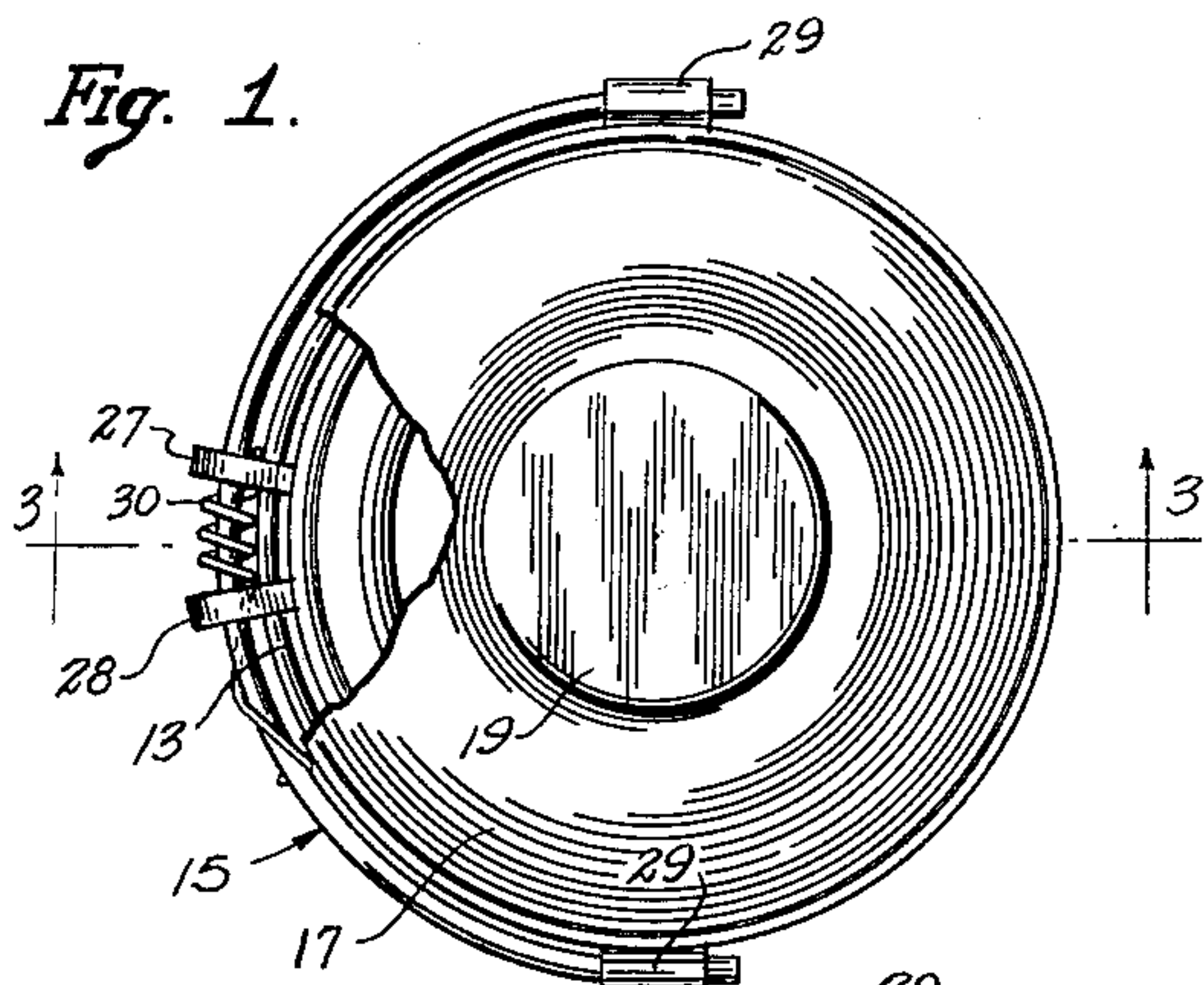


Fig. 2.

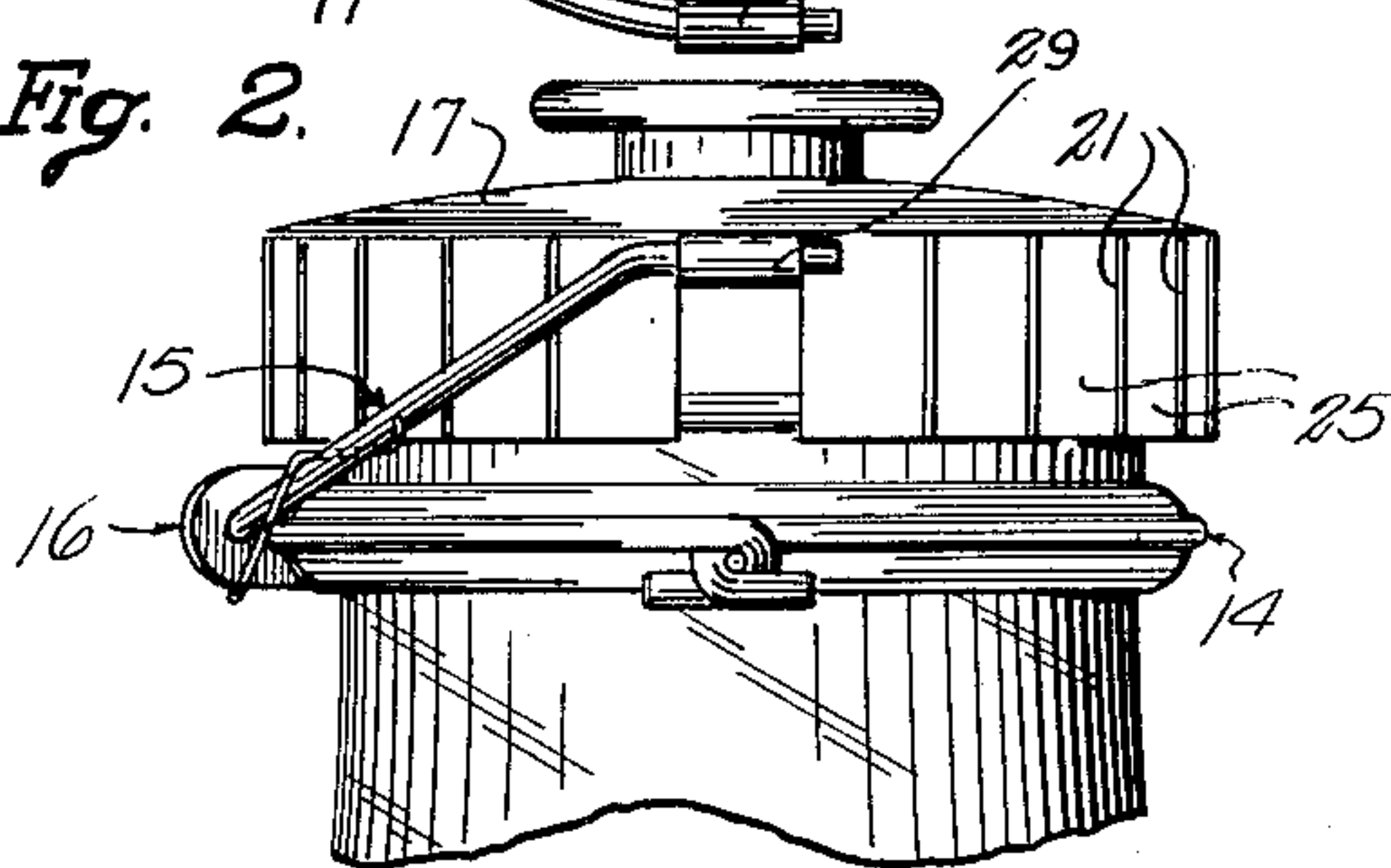


Fig. 3

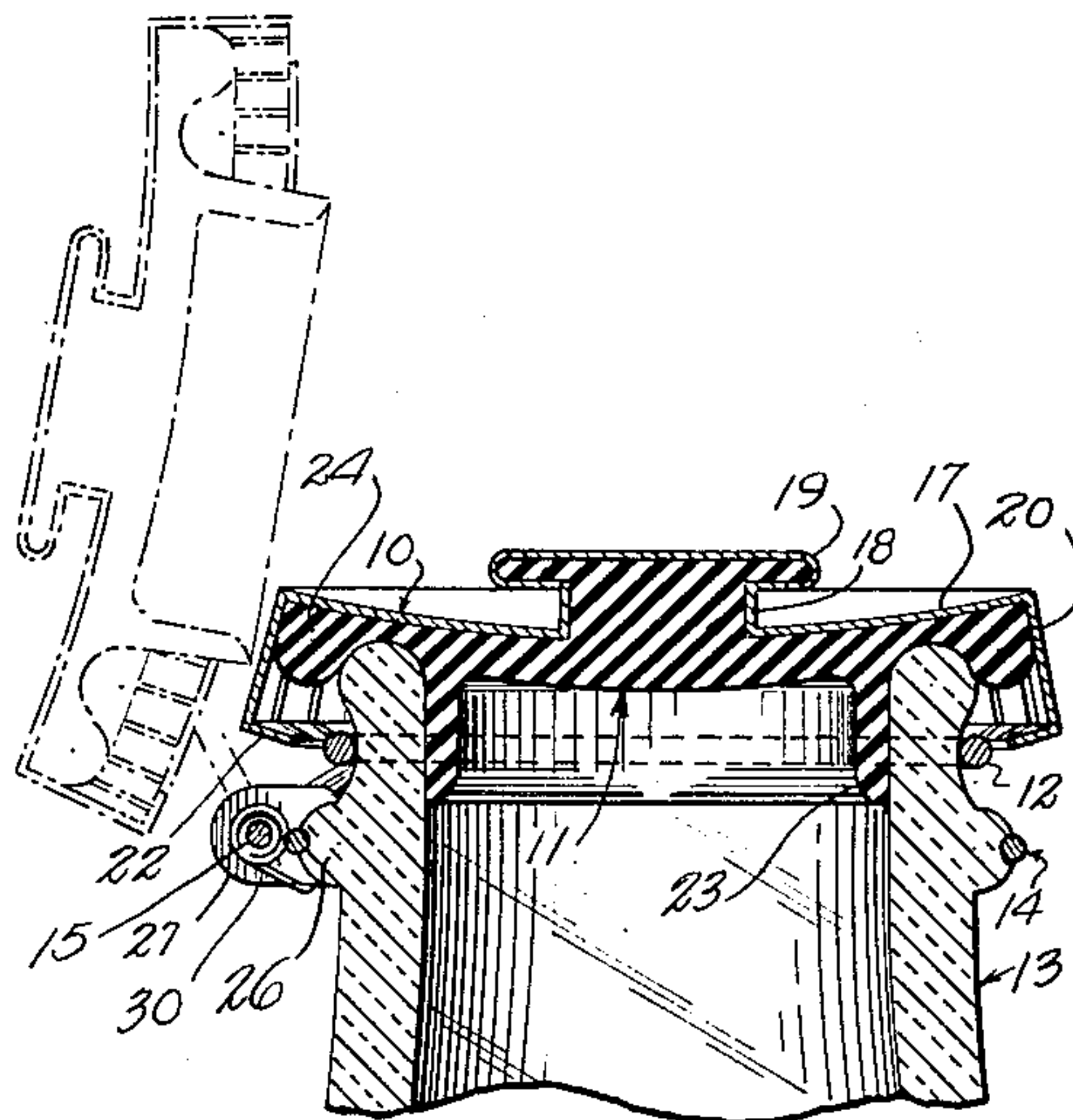


Fig. 4.

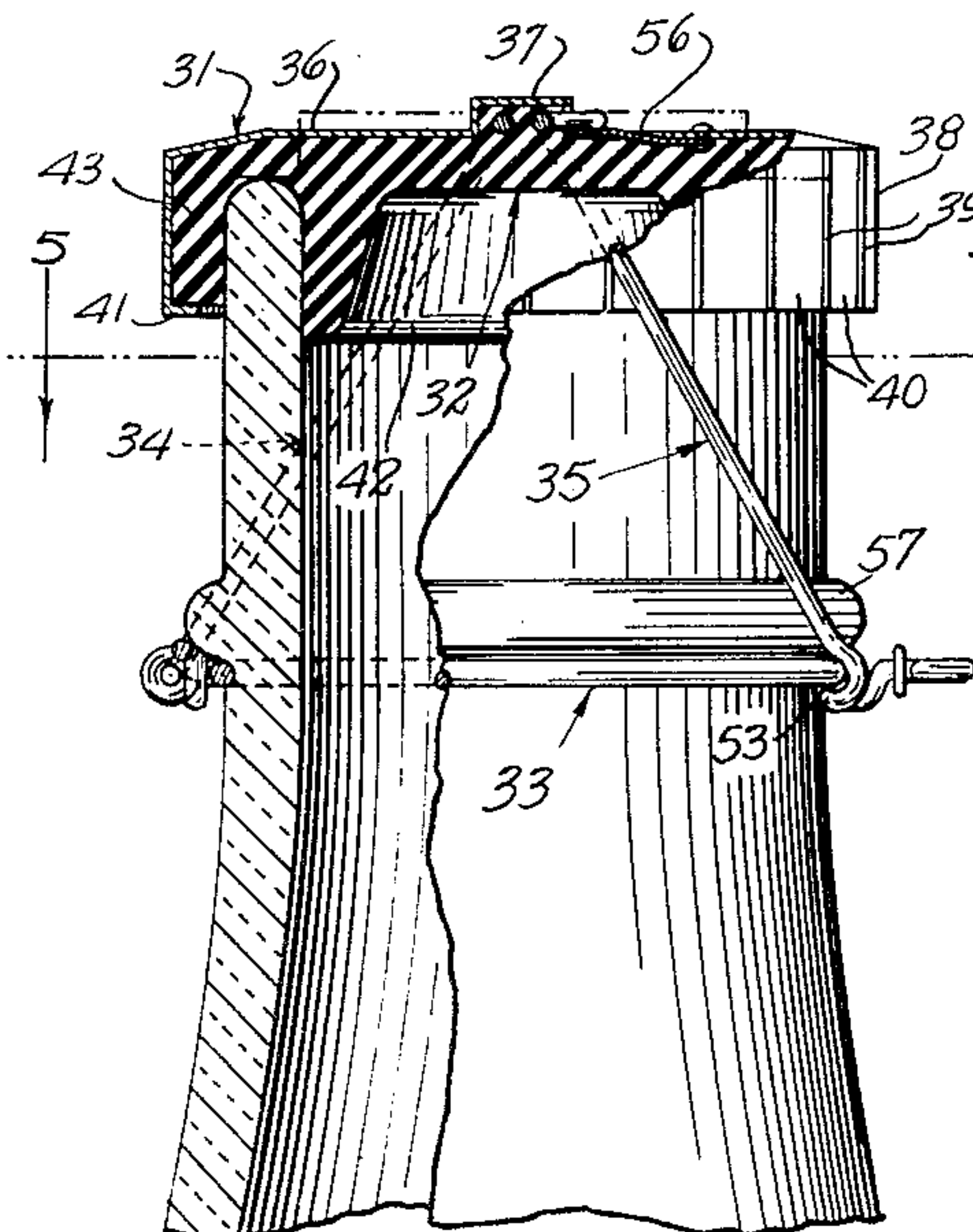
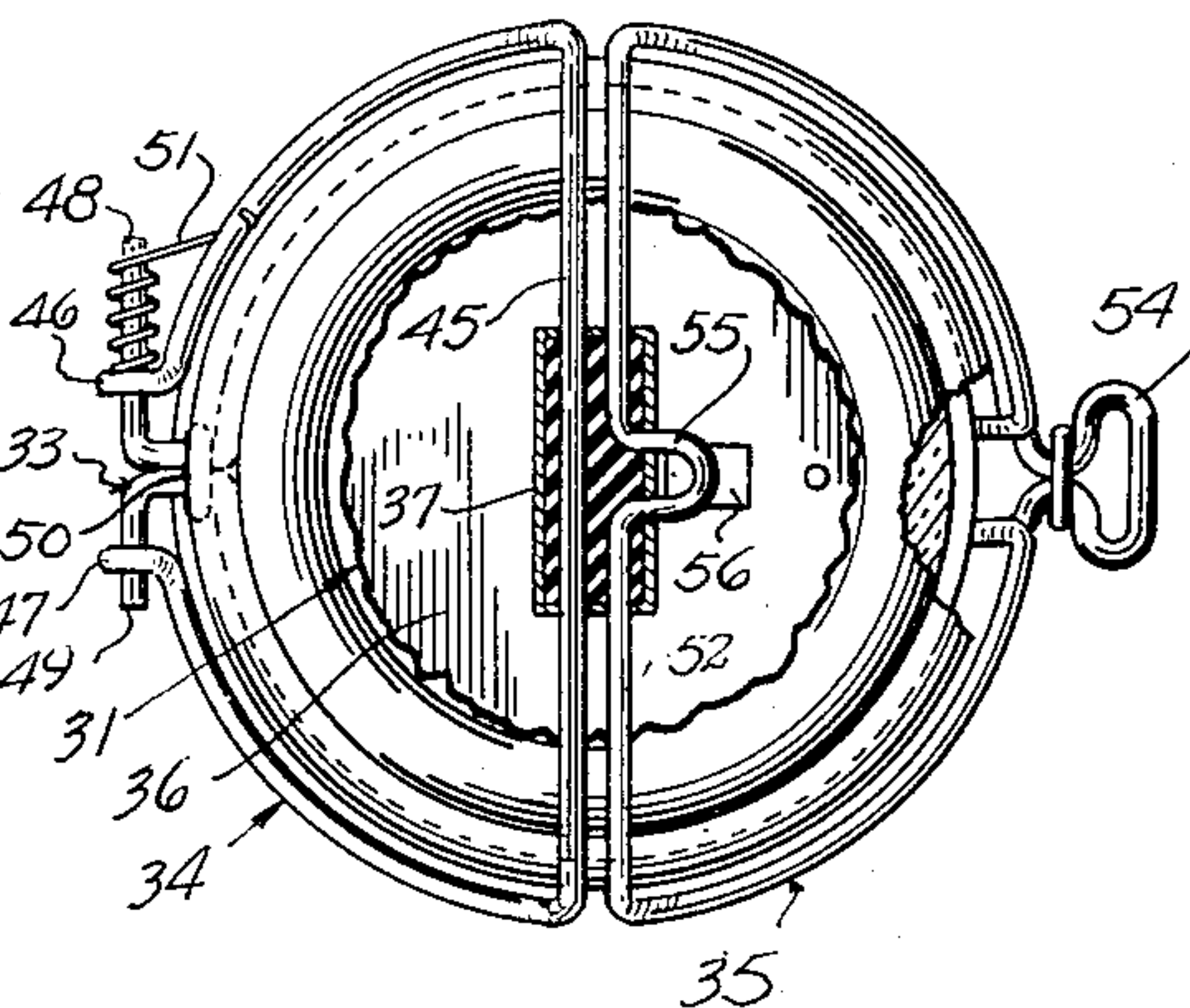


Fig. 5.



INVENTOR.
YUE SAN FONG
BY

McMorrow, Burman + Davidson
ATTORNEYS.

UNITED STATES PATENT OFFICE

2,659,509

BOTTLE CAP

Yue San Fong, Hong Kong, China

Application September 2, 1949, Serial No. 113,743

1 Claim. (Cl. 215—40)

1

This invention relates to bottle caps, and more particularly to a resilient, spring-locking cap which can be applied to and removed from the neck or spout of a bottle or other container, as may be desired.

It is among the objects of the invention to provide an improved bottle cap having a metallic shell and a bottle-contacting lining of resilient material which will provide a tight seal with the bottleneck without damage to the bottle, which cap is released by pressure manually applied to the top near the center thereof and engaged with a bottle by pressure applied to the rim portion thereof, which is permanently connected to the bottle or other container against accidental loss or misplacement, and which is simple, strong and durable in construction, economical to manufacture, neat and attractive in appearance, and easy to use.

Other objects and advantages will become apparent from a consideration of the following description and the appended claim in conjunction with the accompanying drawing, wherein:

Figure 1 is a top plan view of a bottle cap illustrative of the invention, a portion being broken away to better illustrate the construction thereof;

Figure 2 is a side elevation of the cap illustrated in Figure 1 showing the cap operatively mounted on a bottleneck;

Figure 3 is a cross-section on the line 3—3 of Figure 1, the cap being shown in open position in broken lines;

Figure 4 is a view similar to Figure 3 showing a somewhat modified form of bottle cap; and

Figure 5 is a cross-section on the line 5—5 of Figure 4.

With continued reference to the drawing, the cap comprises, in general, an outer shell 10 of thin sheet metal, a lining 11 of resilient material, such as natural or synthetic rubber or cork, a locking ring 12 adapted to be mounted on the neck 13 of the bottle near the open end of the latter, a clamp ring 14 also mountable on the bottleneck, a bracket 15 connected to the cap, and a hinge construction 16 pivotally connecting the bracket 15 to the clamp ring 14.

The shell 10 is formed of thin sheet metal of a resilient character and comprises a top disc 17 having at its center an upstanding boss 18 on the outer end of which is formed an annularly-projecting knob or button 19. The shell also includes an annular flange 20 peripherally surrounding the disc 17 and extending therefrom in a direction opposite the boss 18. This flange

2

20 is severed by substantially parallel cuts 21 spaced apart at substantially equal intervals around the flange to provide a plurality of spring fingers surrounding the top wall or disc 17 of the cap, and each of these fingers is provided, at its end opposite the top wall 17, with an inwardly-projecting, upset portion 22 providing a detent engageable under the locking ring 12.

The disc or top wall 17 has a somewhat dome-shaped formation and, because of its resiliency, will assume a concave or a convex condition disposed at respectively-opposite sides of a plane, including the rim of the cap, somewhat in the manner of a Bellville spring.

The liner 11 is provided with a concentric flange or boss 23 which is dimensioned to fit closely in the neck 13 of a bottle and with a circumferential bead or flange 24 which exteriorly surrounds the bottleneck at the open end thereof. This liner includes a thickness disposed between the end of the bottleneck and the cap disc 17 and also fills the boss 18 and the knob 19.

When pressure is exerted on the top of the knob 19, the top wall or disc 17 is sprung downwardly to a concave condition and the flange fingers 25 are swung outwardly at their ends opposite the disc 17 removing the detents 22 from engagement with the locking ring 12, so that the cap is released and can be removed from the bottleneck. By applying pressure to the outer portion of the top wall or disc 17, or to the rim of the cap, the top wall is sprung from its concave position, illustrated in Figure 3, to its convex position, illustrated in Figure 2, and the spring fingers 25 are moved inwardly to engage the detents 22 under the locking ring 12 to lock the cap in closing position on the neck of the bottle.

The locking ring 12 may be a piece of wire of proper diameter and preferably of corrosion-resisting material, such as stainless steel, drawn around the neck of the bottle near the open end of the bottleneck and preferably seated in a shallow groove provided in the exterior surface of the bottleneck near the open end of the latter.

The clamp ring 14 may also be a piece of wire of suitable diameter and also preferably of corrosion-resisting material seated in an annular groove provided in the outer surface of the bottleneck, the groove being illustrated as provided in the outer side of an annular bead 26 surrounding the bottleneck adjacent the shallow groove in which the locking ring 12 is seated.

3

A structure including a pair of spaced-apart, apertured ears 27 and 28 is secured to the bottleneck by the clamping ring 14 and the bracket 15 comprises a piece of wire of substantially semi-circular shape curved on a radius slightly greater than the radius of the top wall 17 of the cap shell. This bracket is passed through the apertured lugs 27 and 28 and is attached at its opposite ends to the flange of the cap shell at diametrically-opposed locations on such flange by having its ends projected through beads 29 formed in the spring fingers 25 at such locations. The bracket 15 pivotally connects the cap to the bottle against accidental loss or misplacement, and a torsion spring 30 surrounding the bracket between the lugs 27 and 28 is inter-connected between the lugs and the bracket in a manner to resiliently urge the cap to a position in which it covers the open end of the bottleneck.

In the somewhat modified arrangement illustrated in Figures 4 and 5 the cap assembly comprises, in general, a thin metal shell 31, a liner 32 of resilient material in the shell, a locking ring 33 adapted to surround the bottleneck near the open end of the latter, a hinge bracket 34 connected between the cap and this locking ring, and a locking bracket 35 pivotally connected to the cap and releasably engageable with the locking ring to releasably lock the cap in bottle-closing position.

The cap shell 31 is made of thin, somewhat resilient sheet metal and has a somewhat convex top wall or disc 36 provided at its center with a raised boss 37 of elongated, rectangular shape. A cylindrical flange 38 peripherally surrounds the top wall 36 and extends to one side thereof and this flange is divided by substantially parallel cuts 39 spaced apart at substantially equal angular intervals into an annular series of spring fingers 40 having inwardly-directed upset portions 41 at their ends opposite the top wall 36.

The liner 32 is formed of resilient material, such as rubber, synthetic rubber or cork, and has an inner cylindrical boss or flange 42 which closely fits the inside of the bottleneck at the open end of the neck and an outer flange 43 which fits in the annular flange 38 of the cap shell and closely surrounds the outer surface of the bottleneck near the open end of the latter.

The bracket or bail 34 is substantially semi-circular in shape and has a substantially straight bight portion 45 which extends through and is pivoted in the boss 37 on the cap top wall 36. The arcuately-shaped legs of this bracket extend around the bottleneck and from the cap to the locking ring 33 and are respectively provided at their ends with eyes 46 and 47.

The locking ring 33 has its end portions directed outwardly away from each other to provide pins 48 and 49 respectively received in the eyes 46 and 47 to pivotally connect the bail 34 to the locking ring 33. The two ends of the locking ring are secured together by a wrap or ring 50 of wire secured around the outwardly-projecting end portions of the ring.

A torsion spring 51 surrounds the longer pin 48 and is connected at one end to the locking ring, and at its other end to the bail 34 to resiliently urge the bail in a direction to remove the cap from the neck of the bottle.

The locking bracket or bail 35 is also of semi-circular shape and has a substantially straight bight 52 extending through and pivoted in the boss 37. Two arcuately-shaped legs extend from

4

the respectively-opposite ends of the bight 52 around the bottleneck and toward the locking ring 33, and each of the legs is formed, near its distal end, with a hook 53 which engages under the locking ring, as illustrated in Figure 4, to secure the cap in bottle-closing position. Between the hooks 53 the two legs of the bail 35 are joined together and shaped to provide a loop or tab 54 which provides a finger grip for removing the hooks 53 from engagement with the locking ring 33.

Substantially at its mid-length position the bight 52 is provided with a U-shaped formation 55 which is located in a cut-away portion of the boss 37, and a small, flat spring 56 is secured to the top wall 36 of the cap shell and underlies the U-shaped formation 55 to resiliently urge the bail 35 in a direction to displace the hooks 53 outwardly from the locking ring 33. Thus, pressure may be applied to the top of the cap to relieve the force between the hooks 53 and the locking ring 33, whereupon the spring 56 will move the bracket or bail 35 in a direction to dis-engage the hooks 53 from the locking ring and free the cap for removal from the end of the bottle. When the cap is freed, the torsion spring 51 will move the bail 34 in a direction to carry the cap to its open position.

The locking ring 33 may be secured in a shallow groove formed in the outer surface of the bottleneck, but is preferably located at the side of an annular bead 57 remote from the open end of the bottleneck which bead holds the locking ring against movement relative to the neck of the bottle.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claim rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claim are, therefore, intended to be embraced therein.

What is claimed is:

A bottle cap comprising an outer shell of resilient sheet material including a top disk of concavo-convex shape and a skirt including a plurality of spring fingers extending marginally around said disk and substantially perpendicularly from one side thereof, said skirt being circumferentially contracted when the convexity of said disk extends in a direction away from said skirt and circumferentially expanded when the convexity of said disk extends in a direction toward said skirt and said disk being deflected from its skirt contracting to its skirt expanding shape by pressure on the central portion of the side thereof remote from said skirt and from its skirt expanding to its skirt contracting shape by pressure on the marginal portion of the side thereof remote from said skirt, a hollow knob projecting from the central portion of the side of said disk remote from said skirt to facilitate application of skirt expanding pressure to said disk, and a liner of elastic material secured in said outer shell and including a wall disposed against the side of said top disk from which said skirt extends, an annular boss extending from the side of said wall remote from said top disk and adapted to fit into the open end of an associated bottle neck, an annular flange projecting from said wall and circumspatially surrounding

5

said annular boss in engagement with the inner side of said skirt, said flange being adapted to fit around the end portion of a bottle neck disposed between said boss and said flange, and an extension on said top wall filling said hollow knob and securing said liner in said outer shell.

YUE SAN FONG.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,074,907	Spengler	Oct. 7, 1913

Number
1,131,544
1,237,761
1,296,959
1,346,510
1,937,271
2,010,037
2,069,093
2,157,937
2,217,765
2,238,722
2,387,955

6

Name	Date
Parr	Mar. 8, 1915
Dwyer	Aug. 21, 1917
Holdsworth	Mar. 11, 1919
Roberts	July 13, 1920
Garcia	Nov. 28, 1933
Schulman	Aug. 6, 1935
Leahey	Jan. 26, 1937
Koscherak	May 9, 1939
Murdock	Oct. 15, 1940
Fender	Apr. 15, 1941
Tilson	Oct. 30, 1945