

No. 860,964.

PATENTED JULY 23, 1907.

F. W. E. CLAY.
BOTTLE CLOSURE.

APPLICATION FILED MAY 12, 1906.

2 SHEETS—SHEET 1.

Fig. 1

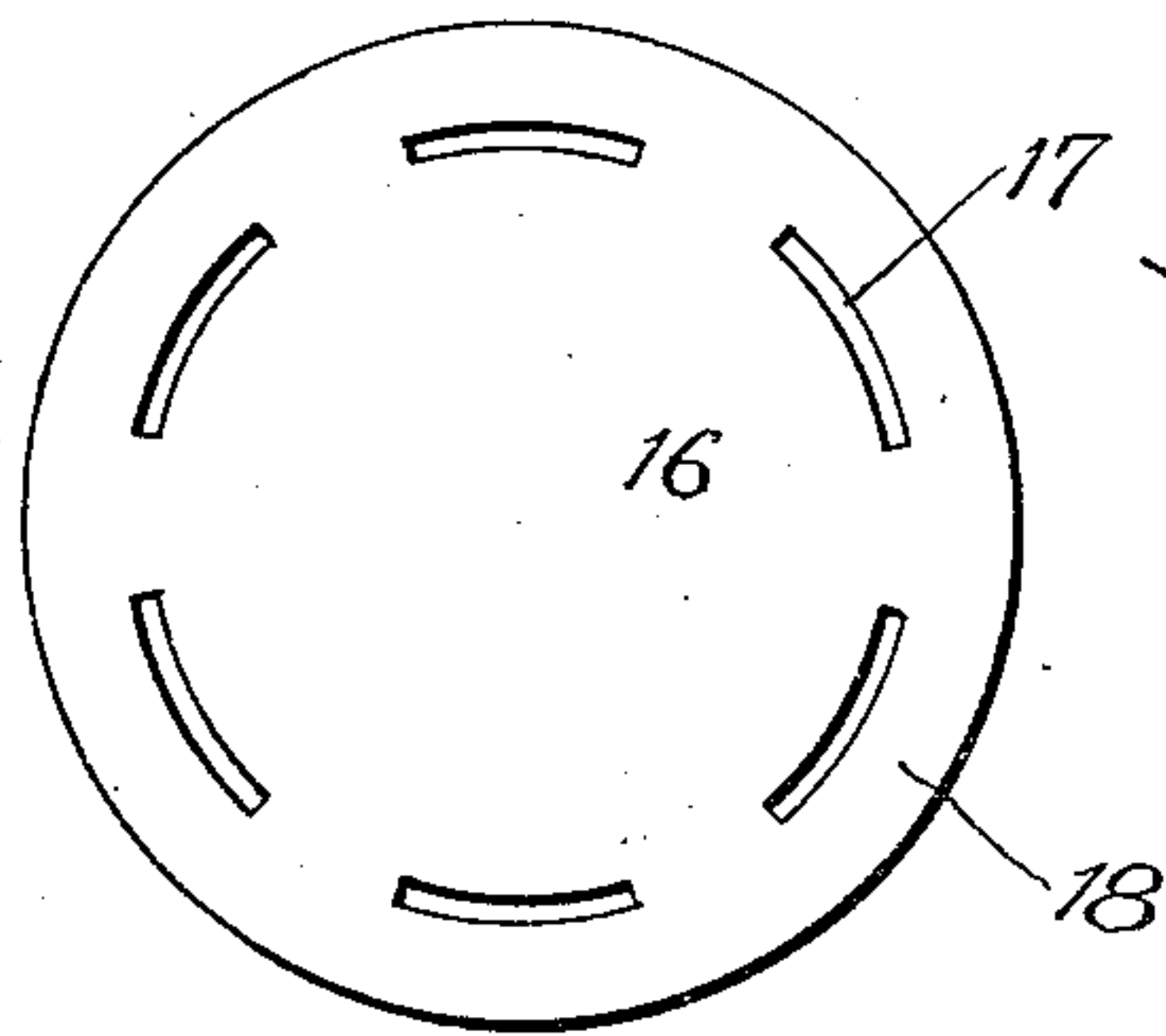


Fig. 2

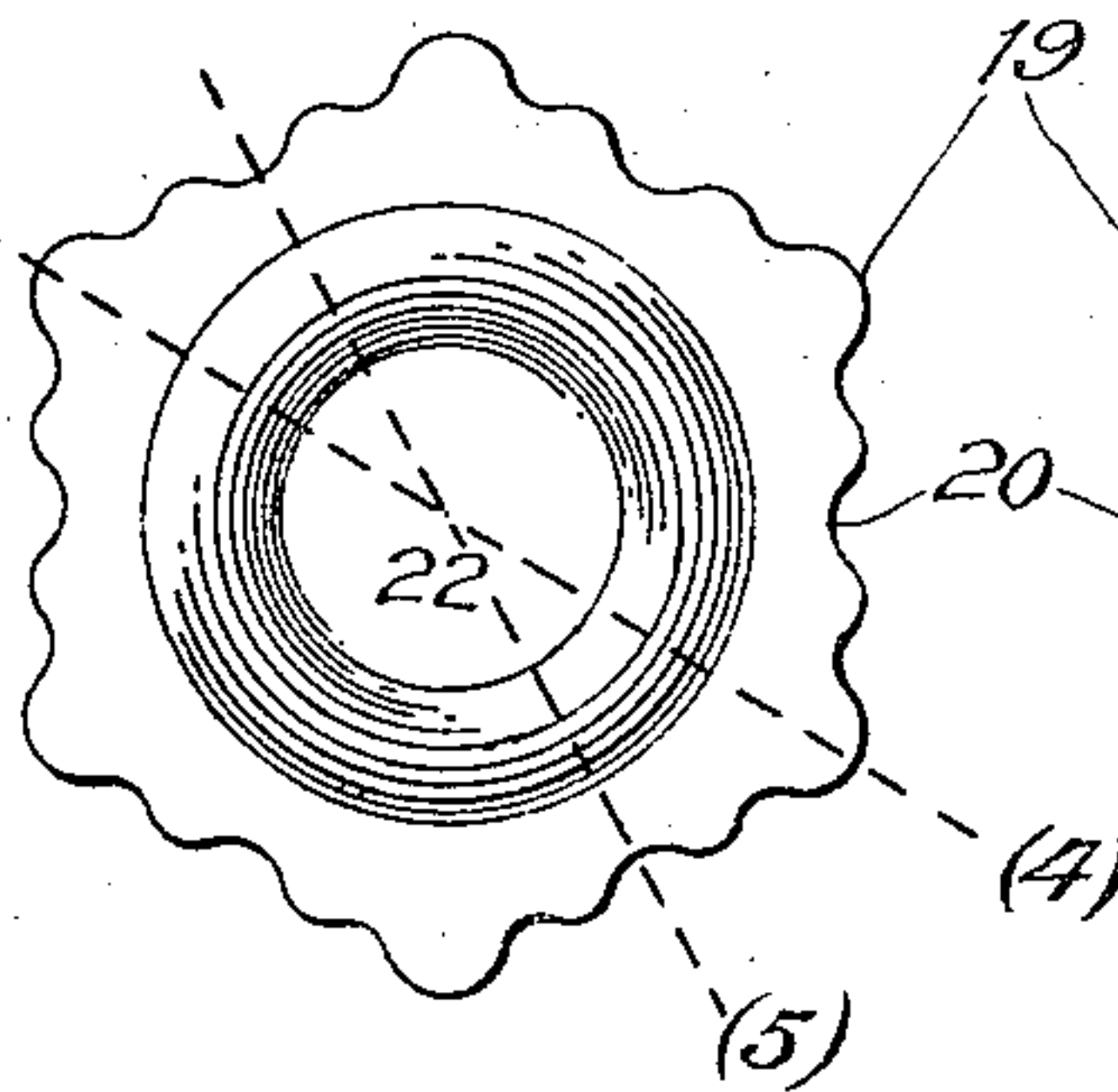


Fig. 3

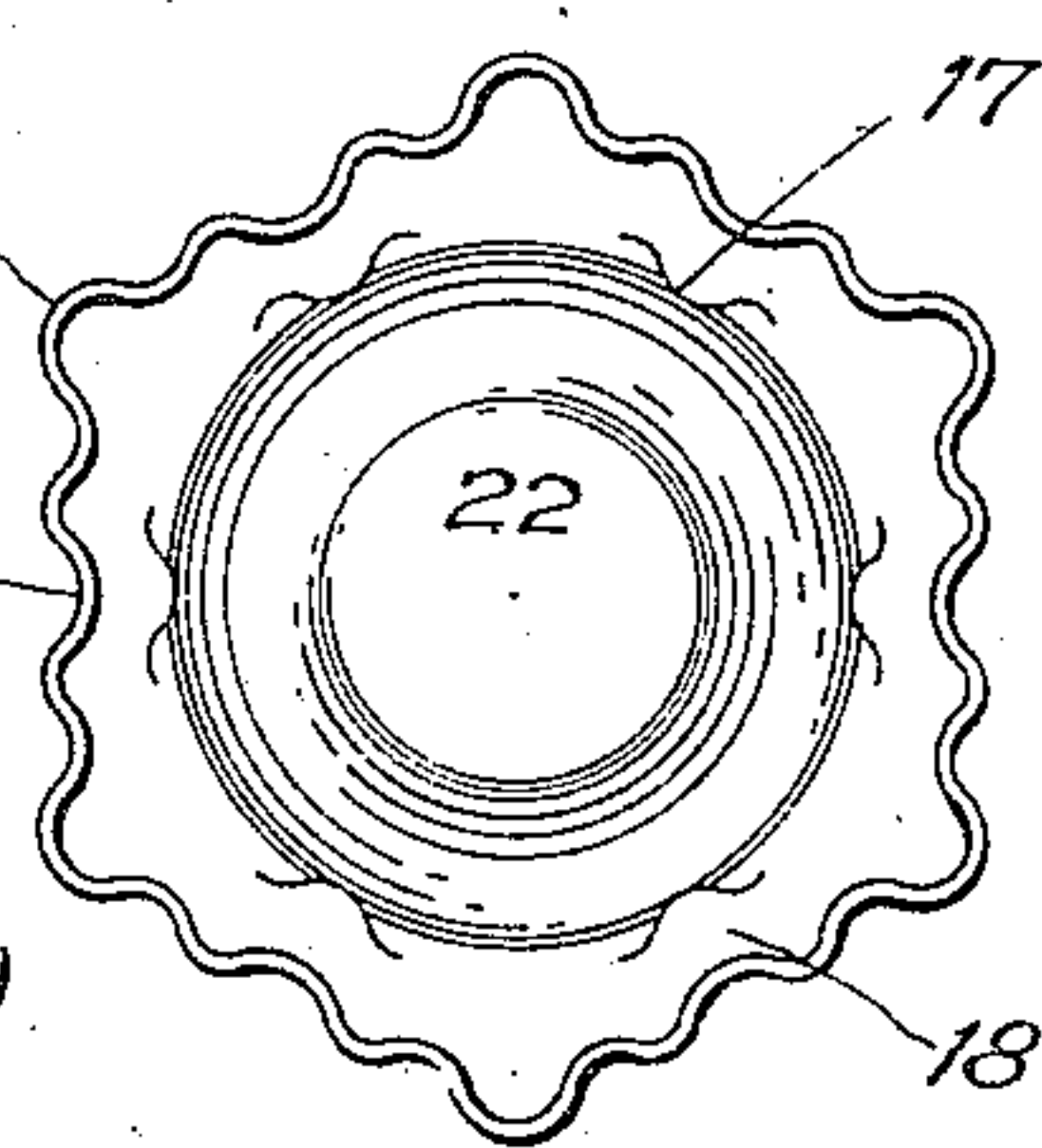


Fig. 6

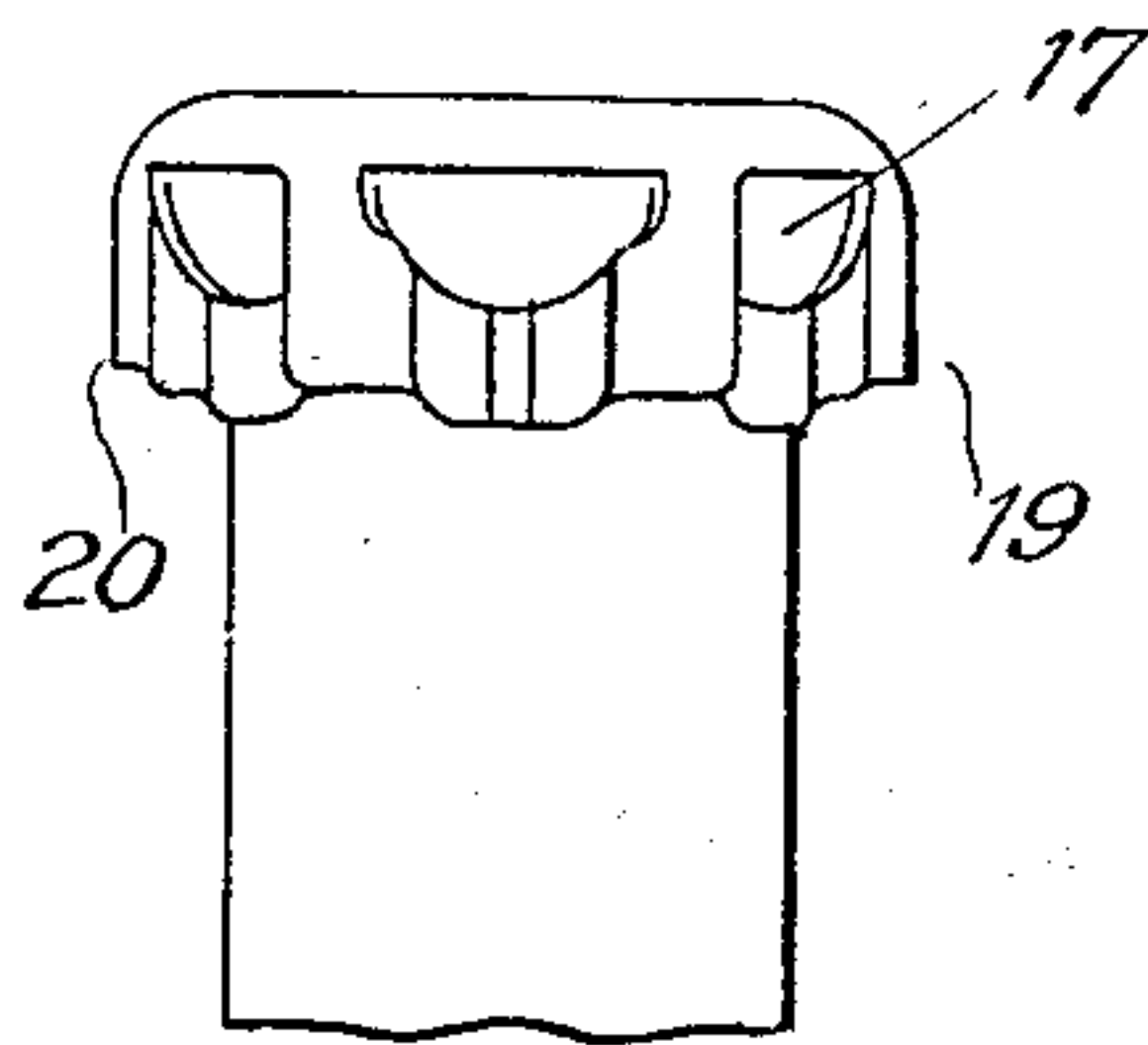


Fig. 4

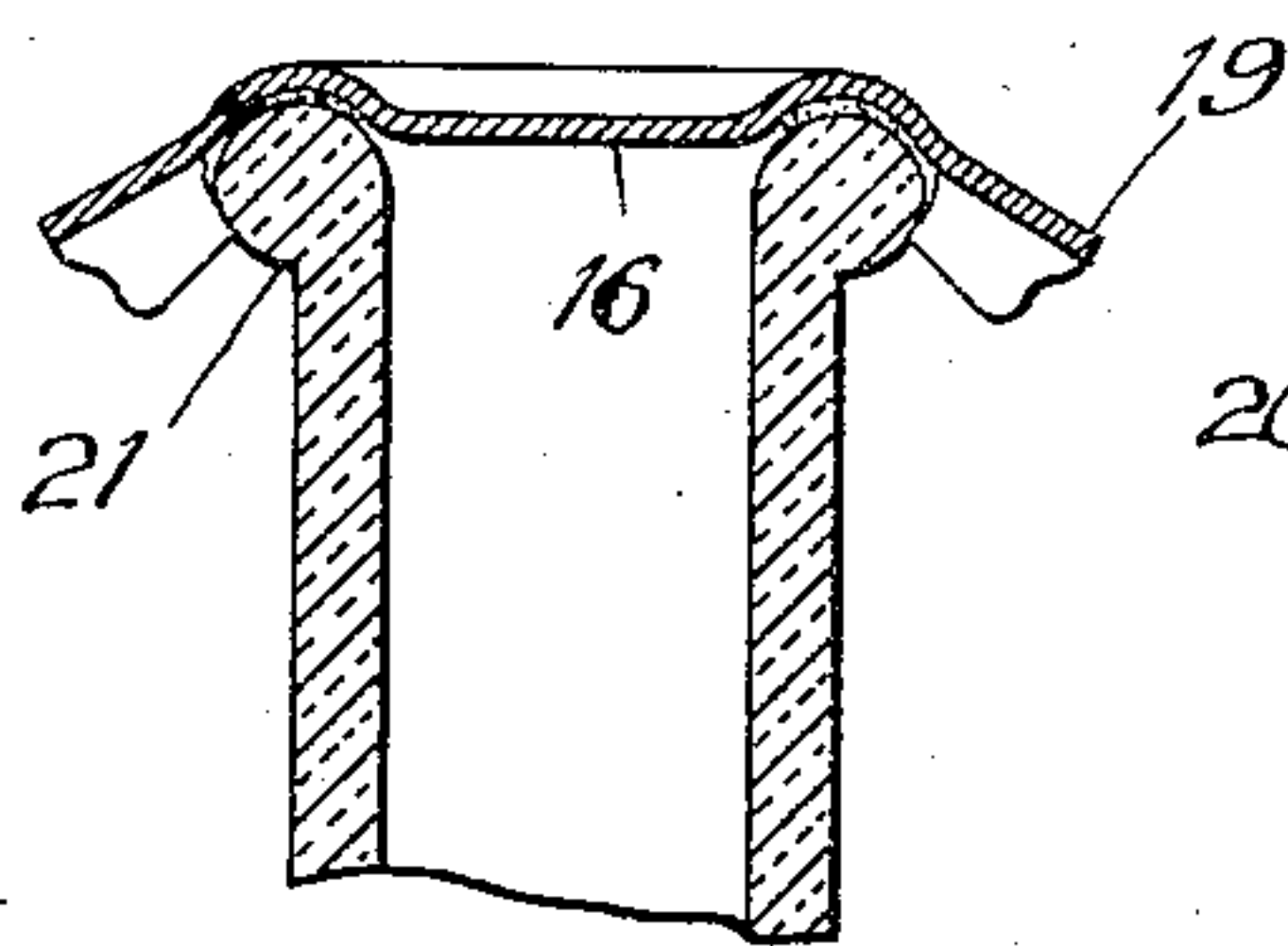


Fig. 5

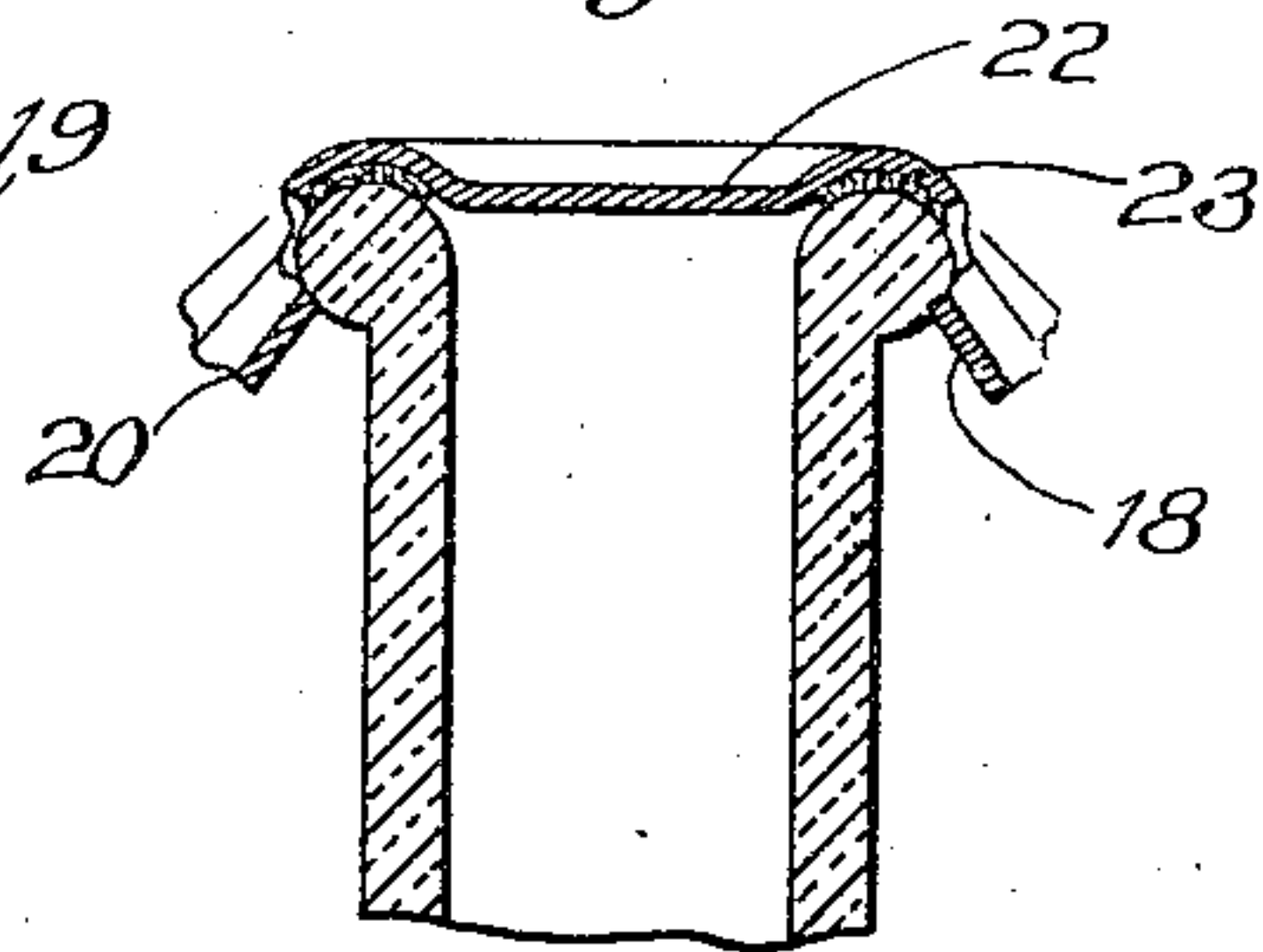


Fig. 7

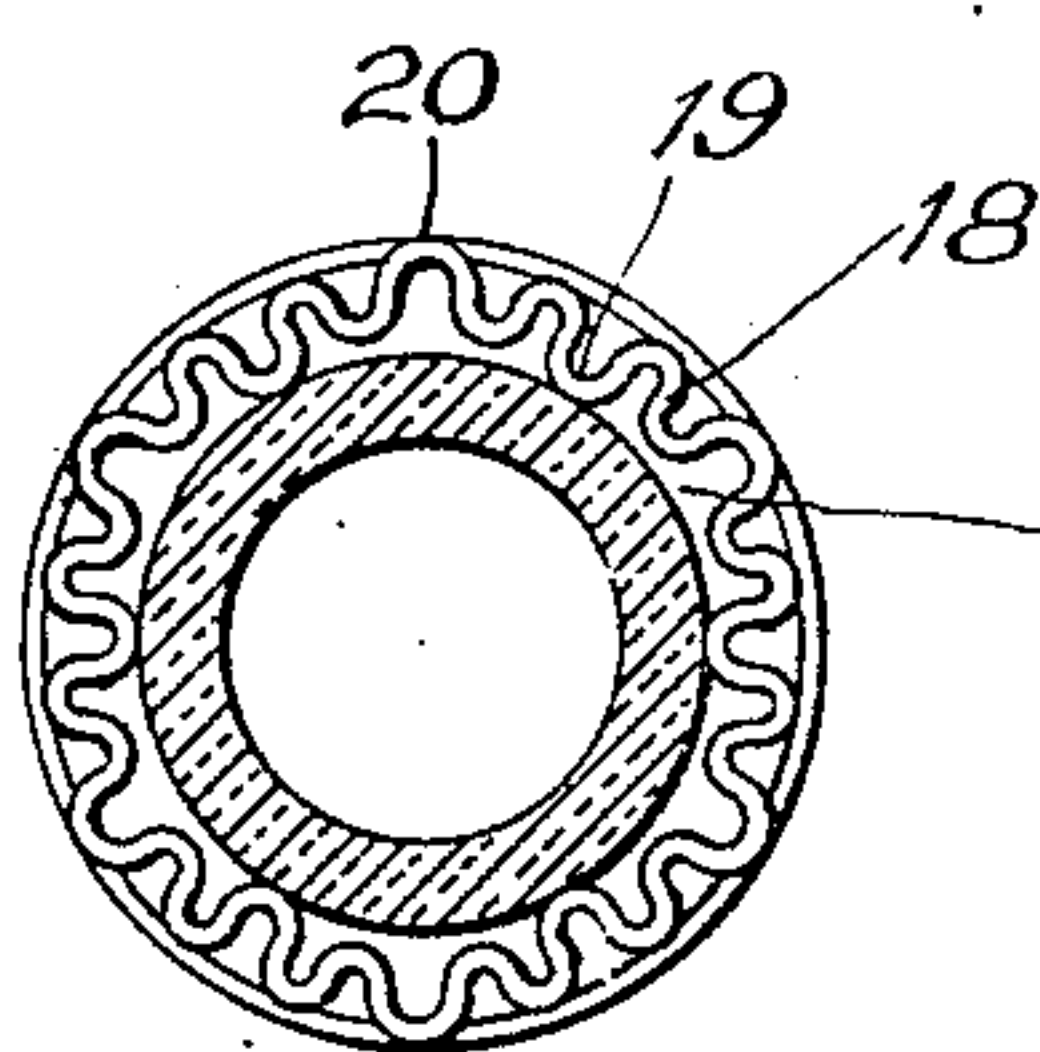


Fig. 8

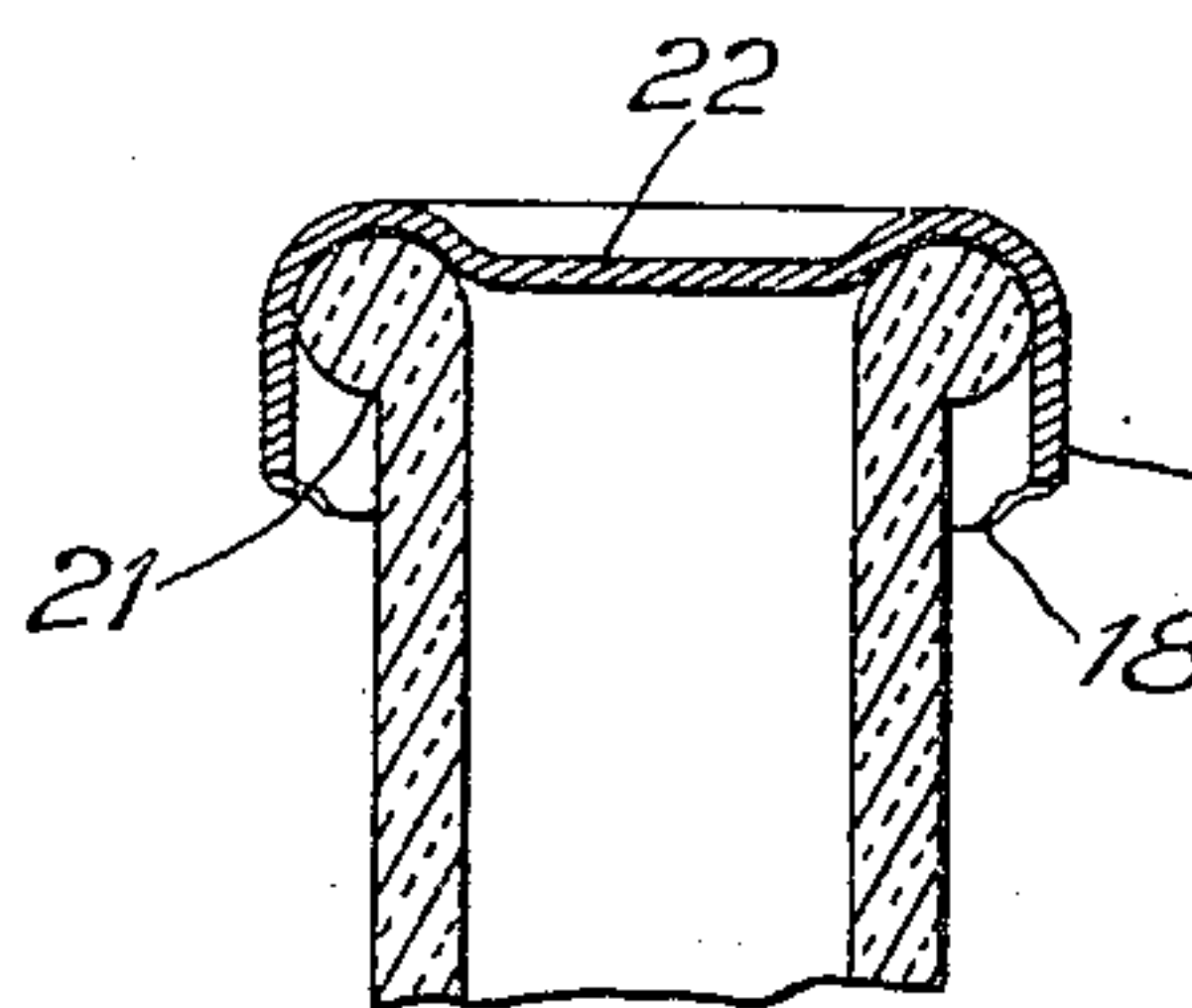
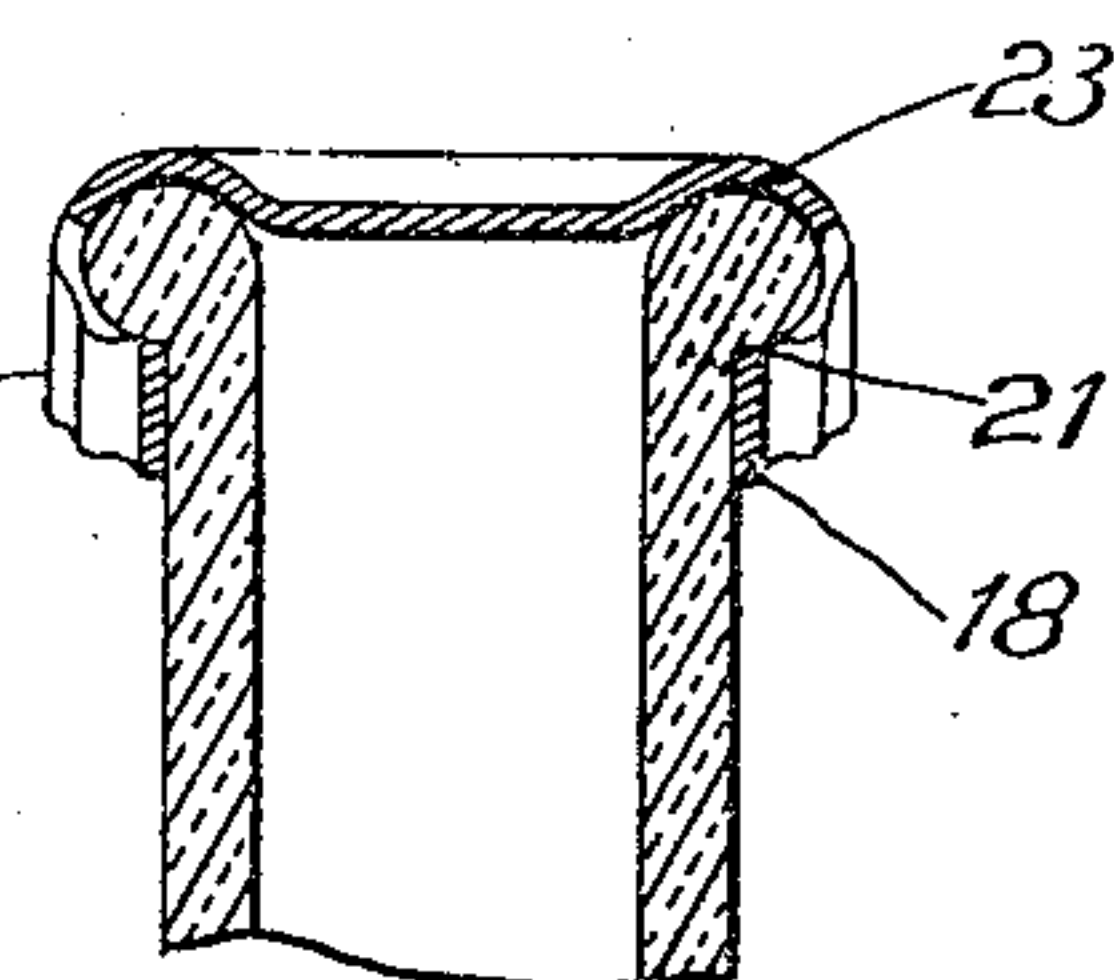


Fig. 9



Witness:

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Inventor

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By

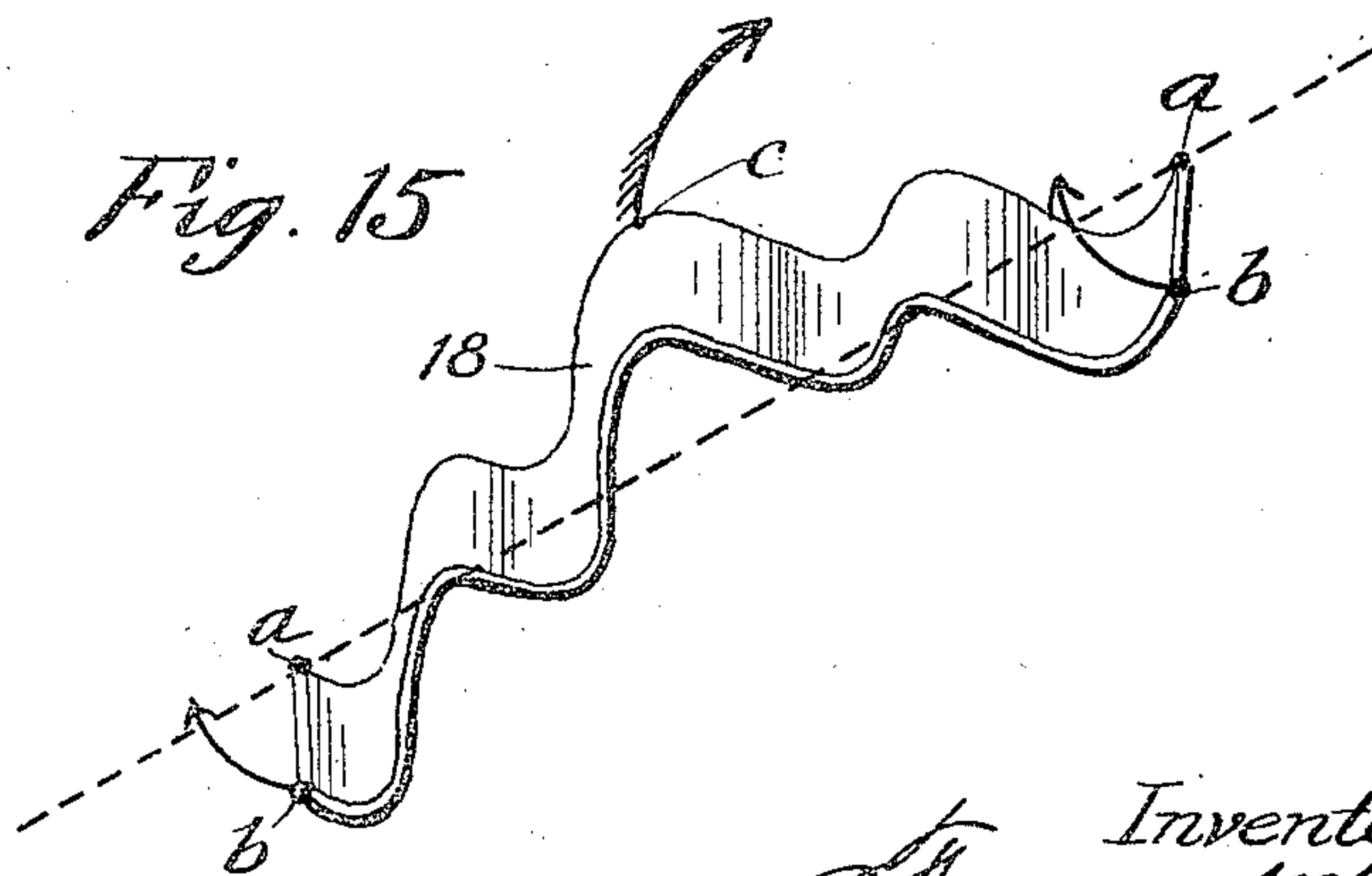
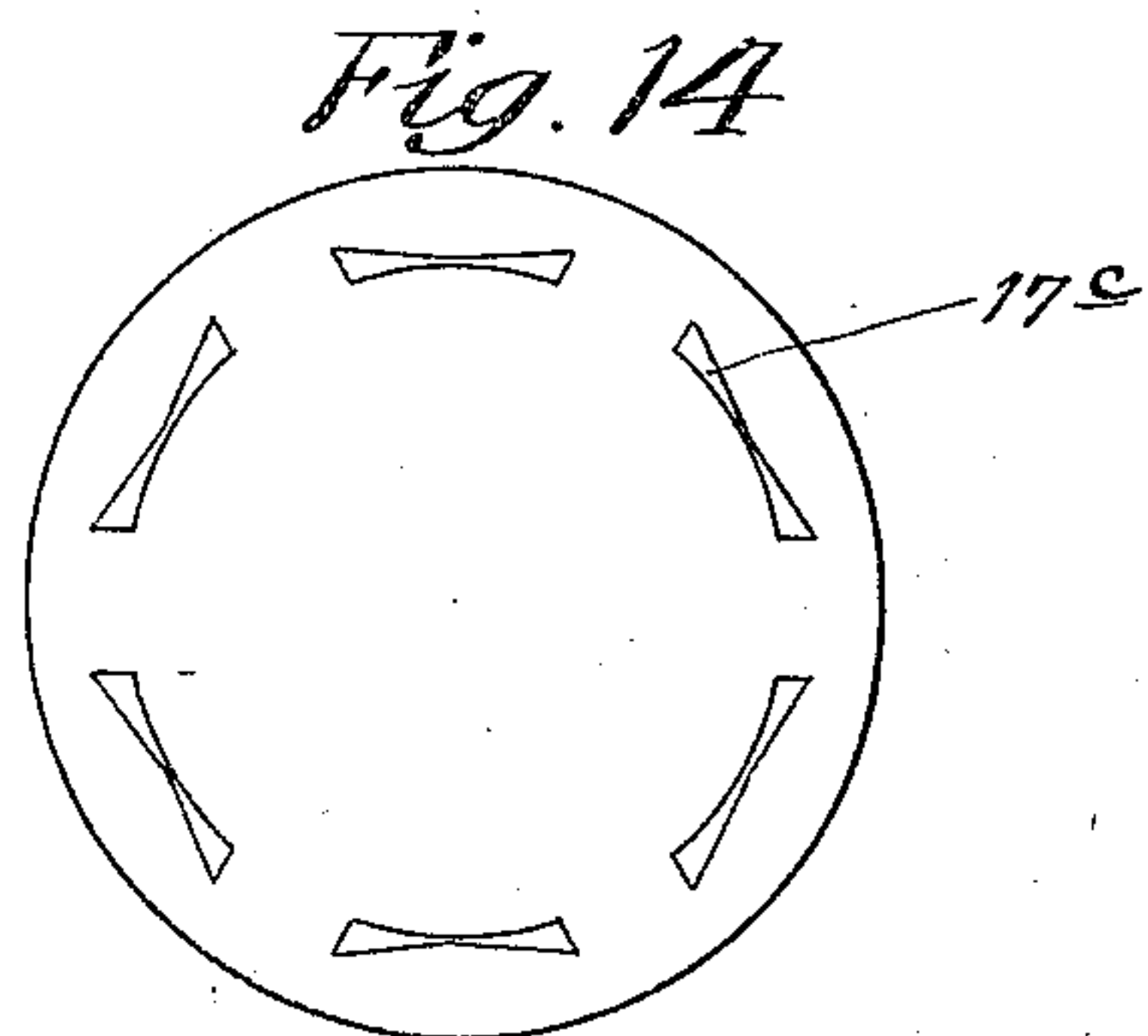
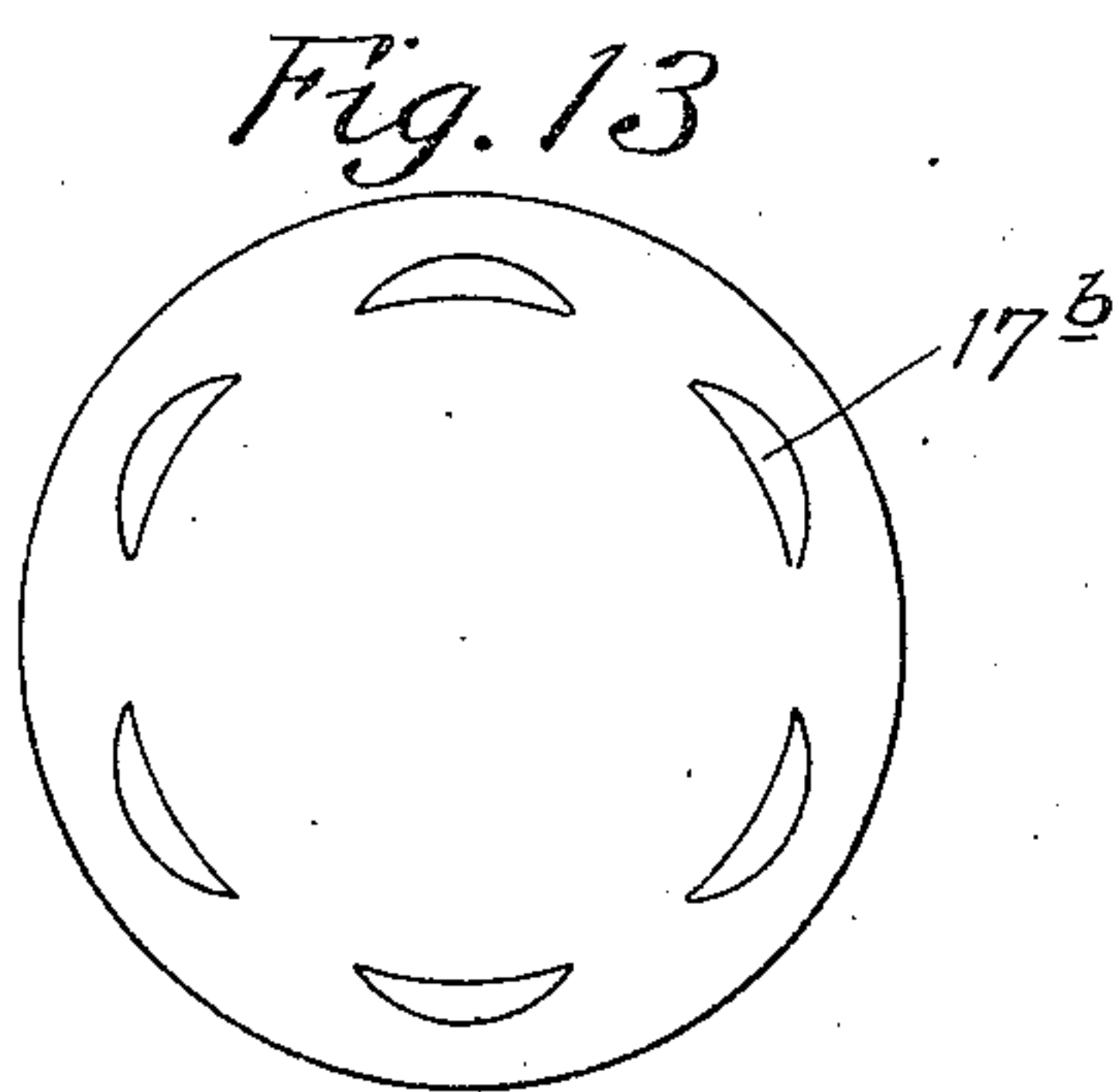
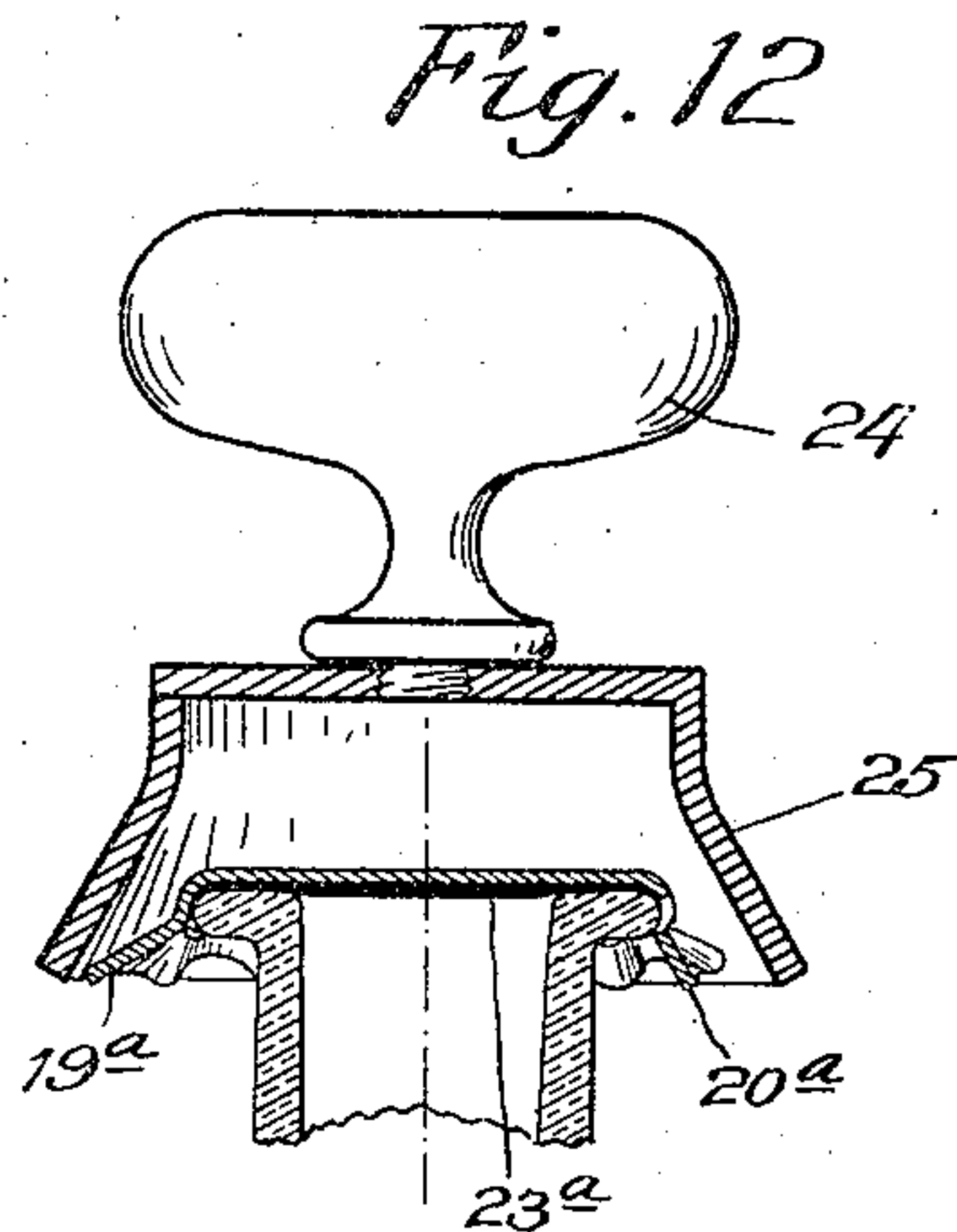
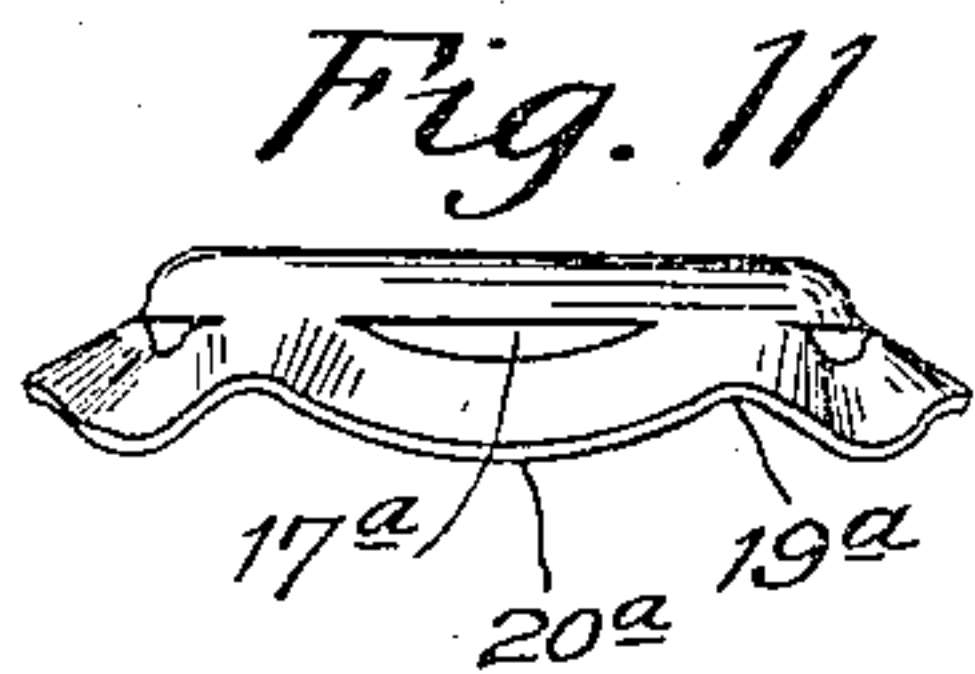
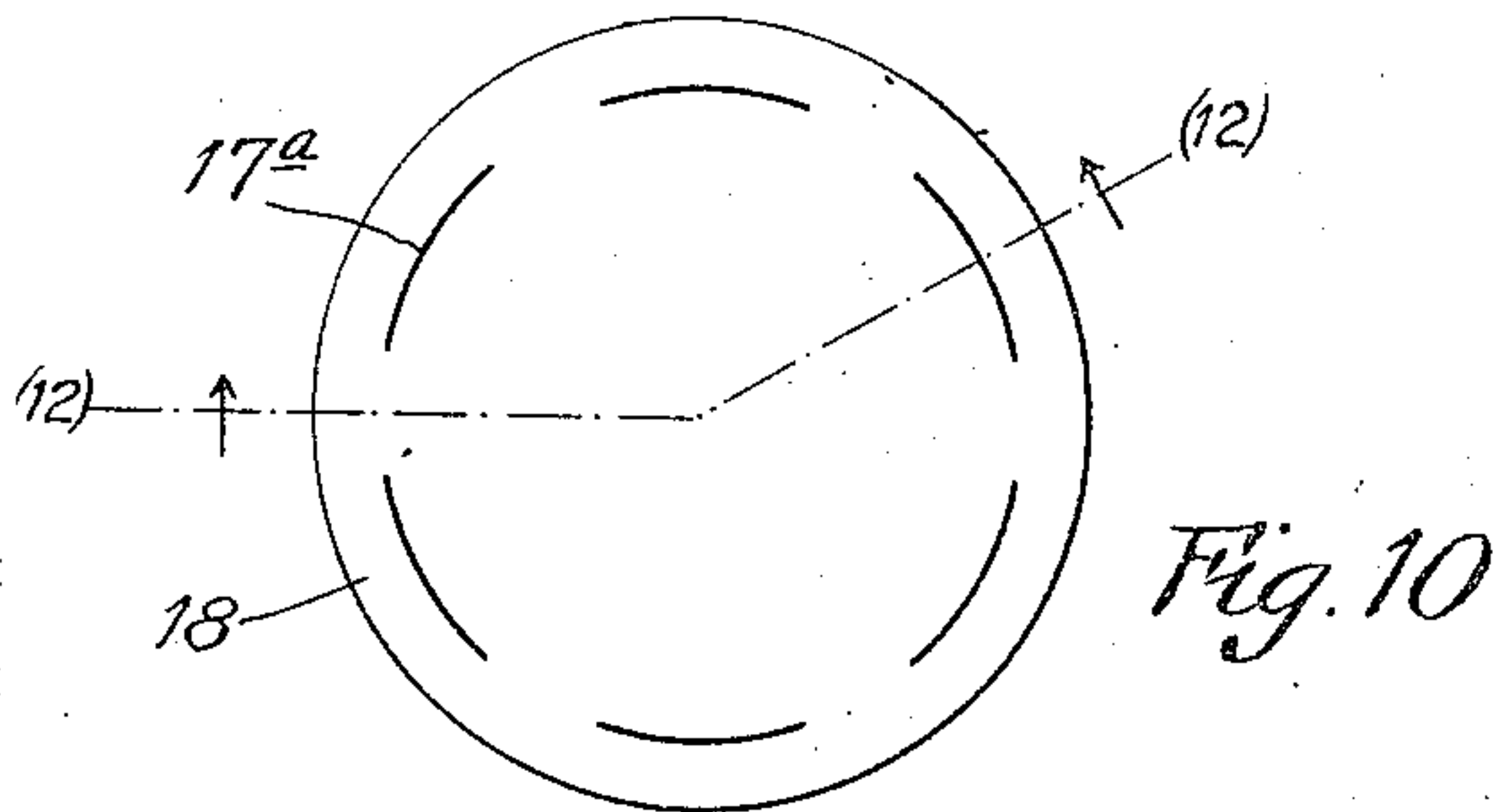
C. M. Clarke
Atty

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2 SHEETS—SHEET 2.



Witness:
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Inventor,
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UNITED STATES PATENT OFFICE.

FRANCIS W. H. CLAY, OF PITTSBURG, PENNSYLVANIA.

BOTTLE-CLOSURE.

No. 860,984.

Specification of Letters Patent.

Patented July 23, 1907.

Application filed May 12, 1906. Serial No. 316,466.

To all whom it may concern:

Be it known that I, FRANCIS W. H. CLAY, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Bottle-Closures, of which the following is a specification.

My invention relates to means for sealing bottles, jars and the like, and particularly to metallic bottle closures.

10 The primary objects are, to provide a resilient pressure on the packing between the cap and the bottle head, to provide a leverage device for inducing such pressure, to render easier the placing of a metallic cap and more secure the fastening of the same; and to avoid
15 the necessity of making the bottle head perfectly regular.

These objects, and other advantages which will hereinafter appear, I attain by means of the devices illustrated in the accompanying drawings forming part of
20 this specification.

Figure 1 is a plan of the preferred blank. Figs. 2 and 3 are respectively a top plan and an under plan of the cap in its initial position. Figs. 4 and 5 are vertical
25 central sections taken on the lines (4) and (5) in Fig. 2, showing the cap in position on an ordinary form of bottle ready to be closed. Fig. 6 is a side elevation of the cap as closed on the bottle, and Fig. 7 is an under plan view of the cap and a section of the bottle neck. Figs.
30 8 and 9 are respectively vertical central sections corresponding to Figs. 4 and 5, but showing the cap closed. Fig. 10 shows another form of blank, and Fig. 11 a side elevation of a simple form of the cap. Fig. 12 shows another form of bottle with the cap of Fig. 11 being placed thereon by a convenient tool. Figs. 13 and 14
35 show other forms for perforating the cap for different purposes. Fig. 15 is a diagram of a part of the corrugated engaging ring, to show the theoretical action of the same.

In patents heretofore granted to me I have pointed
40 out the desirability of providing the resiliency necessary to maintain a seal, not in a packing but in the cap itself. In the present instance, (referring first to Figs. 1 to 9 showing a preferred form of the cap), it will be seen that the blank 16 is provided with slits or slots 17
45 and the metal is given an initial position as shown in Figs. 2 and 3, wherein the separated members or partial rings 18 formed by slotting the blank, are each bent into such a shape that a portion of it, 19, projects outwardly at a wide vertical angle and the central portion 20 is
50 downwardly and inwardly indented to engage the underside of the head 21 of the bottle and the side of the neck (see Fig. 5). In this form the cap may be snapped over the outside flange of the bottle head, and now when the projections 19 are pressed downwardly and in-
55 wardly, the thrust on the two sides of the partial ring 18

will cause the latter to swing in an inward and upward direction, which will bring the point 20 in contact first with the underside of the bottle head and then with the neck, thereby drawing down the cover or flat disk 22 of the closure, compressing the packing 23 upon the bot- 60 tle head.

It will be seen that by reason of the flexibility of the partial ring members 18 they will be enabled to find their own seat and conform both to the side of the bottle neck and to the surface of the underside of the 65 bottle head, yielding in whatever place is necessary for such conformity. Furthermore, it will be seen that the metal between the points 19 and 20 forms essentially a resilient lever beam under stress, and therefore the pressure on the cap is resilient and constantly exerted by the strained metal. This dispenses with the necessity of any elasticity in the packing, and the packing 23 may be totally inelastic. I prefer to use a loosely woven paper impregnated with paraffin, and it may either be in the form of a ring engaging only the 75 top of the bottle head, or may be a disk extending over the whole surface of the cap.

It will be understood that in bottling beer, for example, a stopper is subjected to considerable heat in the sterilizing process and at such times the paraffin 80 in the paper softens and molds itself to the bottle head so that when the stopper is cooled again there is an absolutely air tight seal held down by the resiliency of the cap. The packing may be made of any fibrous material impregnated with any kind of gum or wax 85 which may best suit the particular purpose to which the stopper is put.

One bend on the partial ring 18 is often sufficient, as shown in Fig. 11, and the metal may be simply divided by slit 17^a as shown in Fig. 10, in order to allow 90 of displacement of the engaging bars or partial rings. In Figs. 13 and 14 I have shown other forms for making the slots so that the cap may be made to fit any imaginable shape of bottle head having an outside annular projection.

It will also be understood from the drawings that when 95 the top is a simple flat disk and the bend in the separated member 18 is a simple bend as shown in Fig. 11 this bend may be made when the disk is on the bottle itself; that is the disk in flat condition may be placed 100 on the bottle and a tool which engages only the separated portions 18 may be forced down on it to make the bend as shown in Fig. 11. The tool shown in Fig. 12 will afterwards be employed to engage the projecting edges.

In Fig. 12 I have shown a flat topped cap, as that of 105 Fig. 11, applied to a peculiar form of bottle head in which the engaging portion 20^a of the cap cannot reach the neck of the bottle but takes effect only on the underside of the head. Also in this figure I show a simple 110

tool, 24, for putting on the cap: its essential part is a hollow cone 25 which is pushed down on the stopper and simultaneously compresses the packing disk 23^a and engaging the outwardly projecting points 19^a of the cap pushes them downwardly and inwardly so as to provide the upward thrust on the parts 20^a of the arched ring, as before described.

In Fig. 15 I have shown a diagram showing the stresses in the separated partial ring or corrugated member 18. It will be seen that the action above described is in theory the same as if this beam were pivoted at the points *a, a*, and the points *b, b*, are turned in the direction shown by arrows which will cause an upward and inward movement of the point *c*. Thus a very slight movement at *b* will cause a large movement at *c*; and the member acting as a beam is resilient in a vertical direction as well as horizontally. It will also appear plain from this figure that the member 18 can conform itself under the pressure to any size and shape of either the neck or head of the bottle.

Heretofore great difficulty has been experienced in making a seal with metallic caps, as well as in placing such caps on bottles, by reason of the necessity of having the metal take some exact form, both before and after bending. These defects are cured by the resiliency and adaptability of the engaging members in my device.

Other advantages will readily occur to those familiar with the art.

While I have illustrated and described constructions which are well adapted to perform the desired functions of the invention, it will be obvious that various changes or variations may be made by the skilled mechanic, and all such changes are to be considered as within the scope of the following claims.

Having thus described my invention and illustrated its use, what I claim is new and desire to obtain by Letters Patent is the following:

1. A bottle closing cap comprising a covering disk, provided with severed portions connected to the disk at intervals and having a downwardly arched form, whereby when the attached ends are pushed downward and inward the arch is forced up to engage underneath the head of a bottle, substantially as described.
2. A bottle closure of sheet metal having a holding portion composed of an external alternately severed and connected peripheral ring, the connected portions being arched upward and the severed portions arched downward substantially as set forth.
3. A bottle closure of sheet metal having a series of outwardly and upwardly bowed peripheral projections and intervening annularly severed downwardly bowed portions adapted to exert resilient pressure upwardly against the head of the bottle, substantially as set forth.
4. A bottle closing cap having an undulating partly disconnected flange to engage the bottle, a portion of said

flange constituting a lever adapted, when depressed to force other portions upwardly into engagement, substantially as set forth.

5. A bottle closing cap comprising a cover and a fluted skirt or flange with downward bends severed from the cover, substantially as described.

6. A bottle closure of sheet metal having a continuous outer rim partially severed from its inner portion by a series of slots with intervening integral portions, said severed portions being downwardly arched, substantially as set forth.

7. A bottle closure of sheet metal having a continuous outer portion partially severed from its inner portion by a series of slits with intervening inclined integral portions, and the severed portion being downwardly arched, substantially as set forth.

8. A bottle closure of sheet metal having a continuous outer portion partially severed from its inner portion by a series of slits with intervening integral portions, said severed portion being depressed and radially corrugated, substantially as set forth.

9. A bottle closure of sheet metal having its outer portion partially severed from its inner portion by a series of slits with intervening upwardly arched integral portions, the severed portions being radially corrugated and depressed below the integral portions to provide engaging arches, substantially as set forth.

10. A sheet metal bottle closure having a middle sealing portion a series of upwardly arched flange portions and outer depressed partially severed holding portions, substantially as set forth.

11. A sheet metal bottle closure comprising a middle sealing portion and an outer intermittently arched flange having intervening partially severed inwardly bent engaging portion, substantially as set forth.

12. A sheet metal bottle closure comprising a middle sealing portion and a continuous outer depressed rim having partially severed inwardly bent radially corrugated holding elements, substantially as set forth.

13. The combination with a shouldered bottle neck, of a sheet metal closure comprising a middle sealing portion and a continuous outer depressed holding rim having severed inwardly bent holding arches, substantially as set forth.

14. The combination with a shouldered bottle neck, of a sheet metal closure comprising a middle sealing portion and an outer intermittently arched skirt and alternating severed inwardly bent holding portions, substantially as set forth.

15. The combination with a shouldered bottle neck, of a sheet metal closure having a middle sealing portion and an outer depressed annular flange provided with partially severed inwardly bent sections adapted to engage the bottle shoulder, and intervening connected upwardly arched portions.

16. A bottle closing cap comprising a disk and a corrugated ring attached thereto at intervals, the separated parts of the ring forming levers to engage the bottle head when the integral parts are depressed.

In testimony whereof I affix my signature in presence of two witnesses.

FRANCIS W. H. CLAY.

Witnesses:

CHAS. S. LEPLEY,
E. R. RODD.