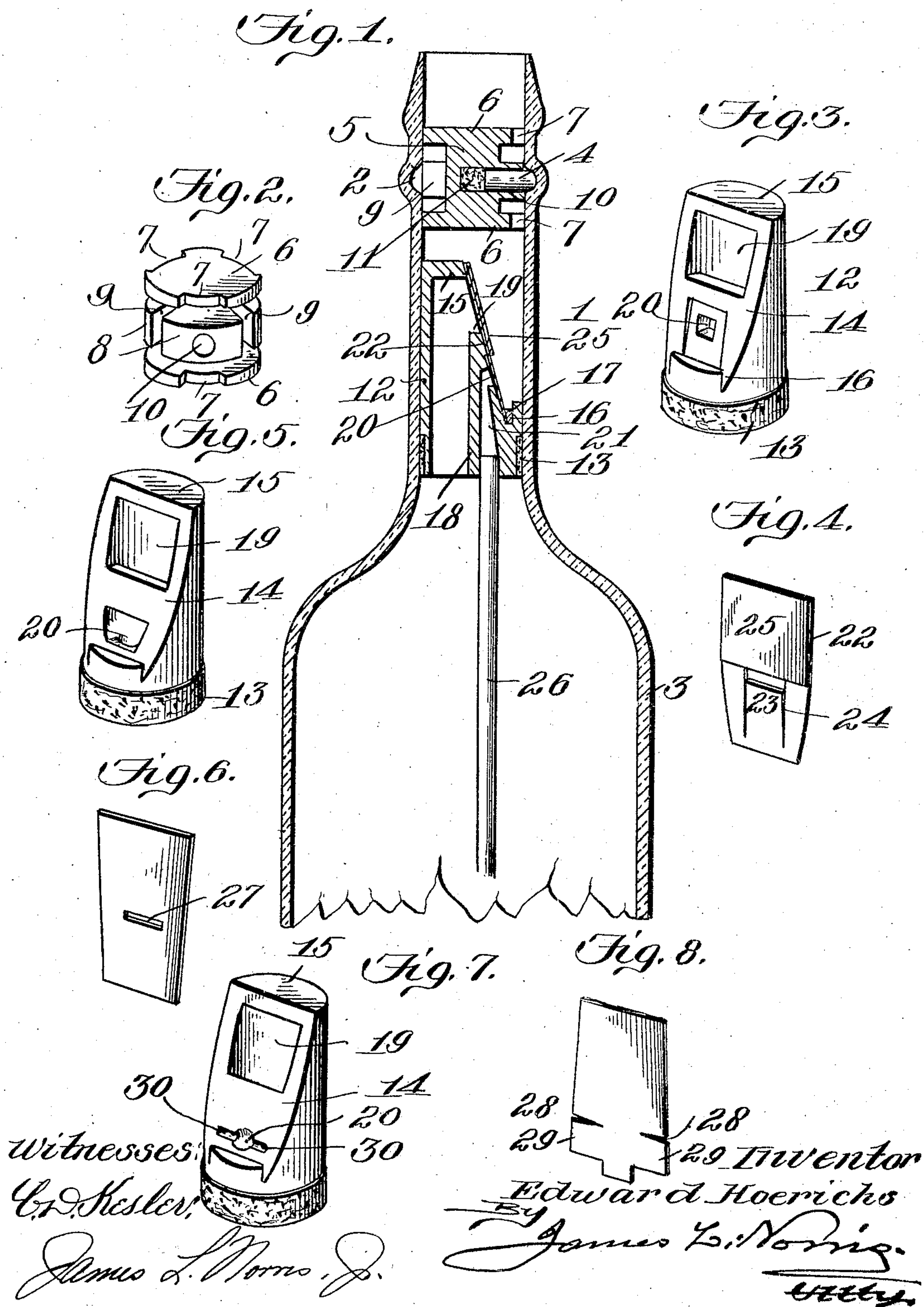


E. HOERICHS.

STOPPER FOR BOTTLES.

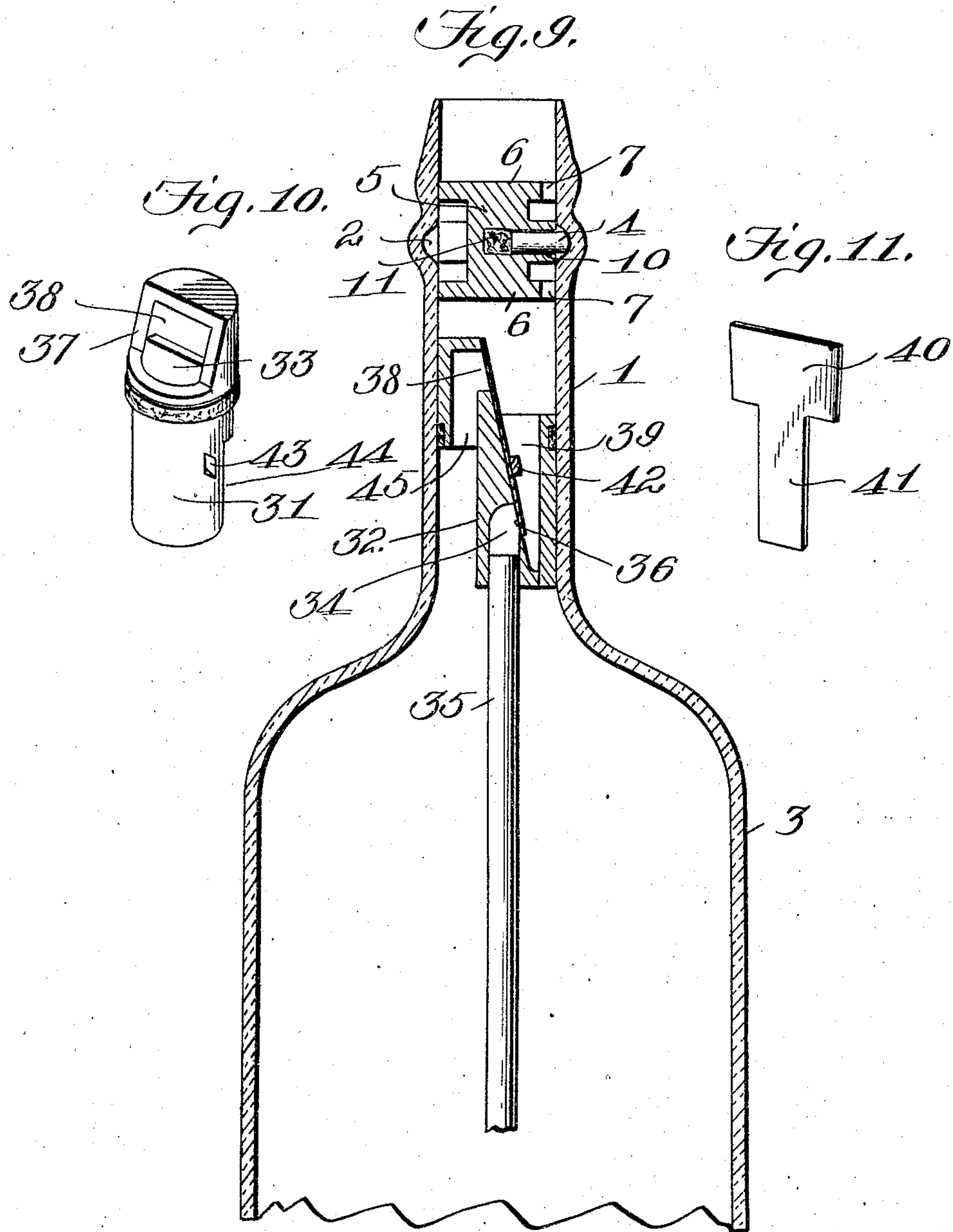
APPLICATION FILED JULY 5, 1904.

2 SHEETS—SHEET 1.



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STOPPER FOR BOTTLES.
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2 SHEETS—SHEET 2.



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Att'y.

UNITED STATES PATENT OFFICE.

EDWARD HOERICHS, OF BALTIMORE, MARYLAND, ASSIGNOR OF TWO-THIRDS TO THOMAS A. BRYAN AND CHARLES H. BOONE, OF BALTIMORE, MARYLAND.

STOPPER FOR BOTTLES.

SPECIFICATION forming part of Letters Patent No. 785,551, dated March 21, 1905.

Application filed July 5, 1904. Serial No. 215,343.

To all whom it may concern:

Be it known that I, EDWARD HOERICHS, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented 5 new and useful Improvements in Stoppers for Bottles, of which the following is a specification.

This invention relates to stoppers for bottles; but the same is applicable in connection 10 with jugs, demijohns, or other vessels for holding liquids.

The invention aims to provide a bottle-stopper which while permitting the free discharge of the contents of the bottle or the like 15 in which the stopper is used will also prevent the refilling of said bottle or the like.

The invention further aims to provide a bottle-stopper with means to prevent the forming of a vacuum within the bottle during 20 the operation of discharging the contents therefrom.

The invention further aims to construct a stopper for bottles, jugs, demijohns, or other liquid-containing vessels of the non-refillable 25 class, said stopper being simple in its construction, strong, durable, efficient in its use, preventing the formation of a vacuum within the vessel during the discharge of the contents therefrom, and comparatively inexpensive 30 to manufacture.

With the foregoing and other objects in view the invention consists of the novel combination and arrangement of parts herein- 35 after more specifically described, illustrated in the accompanying drawings, and particularly pointed out in the claims hereunto appended.

In describing the invention in detail reference is had to the accompanying drawings, 40 forming a part of this specification, and wherein like reference characters denote corresponding parts throughout the several views, and in which—

Figure 1 is a sectional elevation of a bottle 45 broken away at its bottom, showing the adaptation of the stopper constructed in accordance with this invention. Fig. 2 is a perspective view of the resistance member. Fig. 3 is a perspective view of the valved member

with the valve removed. Fig. 4 is a per- 50 spective view of the strip of material which constitutes the outlet-valve and air-valve. Fig. 5 is a perspective view of a modified form of the valved member with the valve removed. Fig. 6 is an elevation of the strip of material 55 constituting the valves for the modified construction shown in Fig. 5. Fig. 7 is a perspective view of another modified form of valved member, and Fig. 8 is an elevation of the strip of material which constitutes the 60 valves shown in the modified construction shown in Fig. 7. Fig. 9 is a sectional elevation of a bottle, showing the adaptation of a modified form of stopper constructed in accordance with this invention. Fig. 10 is a 65 perspective view of the modified form of valved member, as shown in Fig. 9, with the valve removed; and Fig. 11 is a perspective view of the strip of material which constitutes the outlet-valve and air-valve of the modified 70 form of construction shown in Fig. 9.

In the drawings is shown the adaptation of a stopper constructed in accordance with this invention as applied to a bottle; but, as before stated, the stopper is adapted to be used 75 in any liquid-containing vessel wherein said stopper is applicable.

The neck of the bottle is designated by the reference character 1 and is provided at a point removed from the upper end thereof 80 with an annular internal groove 2, the function of which will be hereinafter referred to.

The reference character 3 denotes the body portion of the bottle.

The stopper comprises a resistance member 85 and a valved stopper member. The resistance member is provided to prevent the entrance of any implement liable to tamper with the valve member, and the valved member is adapted to permit of the discharge of the 90 contents from the vessel when the latter is tilted or inverted, and at the same time permitting of a supply of air to the body of the vessel, so as to prevent the formation of a vacuum when the contents of the vessel are 95 being discharged. The resistance member is mounted in the neck of the vessel, near the upper end thereof, and retained in such posi-

tion through the medium of a plurality of securing-pins 4, which are carried by said resistance member. The latter consists of a central core 5, having formed integral with or otherwise secured to each end a disk 6, cut away, as at 7, to permit of the passage of the contents when being discharged from the bottle. Formed integral with or secured to the core 5 intermediate the disks 6 is a plurality of segment-shaped offsets 8, which are suitably spaced apart, so as to form channels 9, said channels 9 being out of alinement with the cut-away portion 7 of the disks 6. The core 5, as well as the offsets 8, is provided with recesses 10, which terminate into each other at their ends, and at the inner ends of the said recesses 10 is arranged a piece of elastic material 11. Three radially-extending recesses 10 are provided, and they are adapted to receive the securing-pins 4. The resistance member is substantially of the same diameter as the inner diameter of the neck of the bottle; but the pins 4 project from said member and are adapted to engage in the groove to secure said member in position within the bottle-neck. Such action is obtained owing to the piece of elastic material, which when the member is inserted in the neck of the bottle will be compressed, owing to the fact that the pins are forced inwardly; but when the pins reach the groove 2 they will be projected outwardly, owing to the expansion of the elastic material, and engage in the groove 2, consequently retaining the resistance member in position. Owing to the arrangement of the cut-away portion 7 of the disk 6 with respect to the channels 9, formed between the offsets 8, it is evident that an implement cannot be inserted past the resistance member, so as to tamper with the valved member now to be referred to. The valved member, as shown in Fig. 1, consists of a hollow plug 12, carrying on its lower end an elastic washer 13, which when the valved member is inserted in the bottle-neck is adapted to engage the inner face of the bottle-neck and frictionally secure said valved member in position. The plug 12 has a portion thereof cut away upwardly and inwardly at an inclination to form a valve-seat 14, said seat 14 starting at a point removed from the lower end of and extending to the upper end of the plug. The plug 12 is closed at its top, as indicated by the reference character 15; but said plug is open at its bottom. At the lower end of that part of the plug 12 which is cut away said plug 12 is formed with a groove 16, which receives a binding-strip 17, formed of elastic material, the function of which will be hereinafter referred to. Extending upwardly in the lower portion of the plug 12 is a semicylindrical partition 18, the partition 18 being of such length as to form the upper portion of the plug 12 with an outlet 19 to permit of the discharge of the contents of the bottle. The partition 18

at its upper portion is cut away, so as to conform to the cut-away portion of the plug 12, and is provided near its upper end with an air-inlet 20, which communicates with an air-channel 21, formed in said partition 18. The outlet 19 is closed through the medium of a flap-valve 22, and the air-outlet 20 closed through the medium of a flap-valve 23. The valves 22 and 23 are constructed from a single piece of material, and in this connection it will be stated that the material consists of an elongated piece of mica or other suitable flexible material and which is placed against the valve-seat 14 and extends at its lower end in the groove 16 and is connected to the plug 12 through the medium of the binding-strip 17. The flap-valve 23 is formed in the strip of material through the medium of a U-shaped slit 24, and the flap-valve 22 is weighted by the employment of an additional strip of material or other suitable means, 25, which is secured to said valve 22. By weighting the valve 22 the same is normally retained in position to close the outlet 19. Extending into the air-channel 21 in the partition 18 is an air-tube 26, which depends into the body portion of the bottle. When the contents of the bottle are being discharged, and as the same passes through the plug 12, the valve 22 is caused to move away from its seat, carrying the valve 23 therewith. When the valve 23 is carried away from its seat, air is supplied to the body portion of the bottle through the medium of the air-inlet 20, channel 21, and air-tube 26, and consequently the formation of a vacuum within the bottle is prevented during the operation of discharging the contents therefrom. When the bottle is brought to an upright position, the valve 22 automatically resumes its seat, owing to the fact that the upper portion of the piece of flexible material is weighted, and such action of the valve 22 causes the valve 23 to close the air-inlet 20. If an attempt should be made to fill the bottle, it is evident the slightest pressure upon the outer face of the strip of material which constitutes the valves 22 and 23 will cause the valves to retain their normal position, which is closing the outlet 19 and inlet 20.

The construction of valve member as shown in Figs. 5 and 6 is substantially the same as that shown in Fig. 1, with the exception that the strip of flexible material is not provided with a slit to form a second valve, but is provided with an opening 27, so that when the strip of material is moved away from the outlet-opening in the plug air will be admitted through the opening 27 into the air-inlet and thence through the medium of the tube 26 into the body of the bottle, consequently preventing the formation of a vacuum.

The construction of valved member as shown in Figs. 7 and 8 is substantially the same as that shown in Fig. 1, with the exception that

the strip of material is slitted at each side, near the lower end thereof, as at 28, forming what may be termed a "valve" 29 for the air-inlet 20. At each side of the air-inlet 20 grooves 30 are provided. These grooves enable the entrance of air to the inlet 20 if the sides of the valve 29 are moved away from the valve-seat.

The construction of valve member as shown in Figs. 9, 10, and 11 consists of a hollow plug 31, in which is secured a partition 32, one side of which is beveled, as at 33, forming a valve-seat, to be hereinafter referred to, and said partition has its lower portion semicylindrical in contour. The lower portion of the partition 32 is provided with an air-passage 34, in which extends an air-tube 35, and said partition is further provided with an air-outlet 36. The upper portion of the plug 31 is cut away at one side to form a beveled valve-seat 37. The partition 32 projects up into the plug 31, but not the entire length thereof, thereby forming an outlet 38 for the contents of the bottle. The contour of the cut-away portion 33 of the partition 32 is the same as the valve-seat 37. Extending within the recess (designated by the reference character 39) which is formed between the partition 32 and the inner face of the plug 31 is a T-shaped strip of flexible material, preferably mica, and which constitutes an outlet-valve 40, adapted to rest against the seat 37, and an air-inlet valve 41, which is adapted to find a seat against the cut-away portion 33 of the partition. The valve 40 is adapted to close the outlet 38, and the valve 41 is adapted to close the inlet 36. The strip of flexible material is retained in position through the medium of a transversely-extending strip 42 of suitable material which extends across the plug 31, suitable openings 43 being provided for this purpose. The plug 31 is cut away at its lower portion opposite to the cut-away portion at its upper end, as at 44, said cut-away portion forming a passage for the outgoing contents of the bottle and which communicates with the passage 45, formed in the upper part of the plug 31, through the medium of the upper portion of the partition 32. The passage 45 communicates with the outlet 38. The operation is such that when the contents of the bottle are to be discharged they force the valve 40 from the outlet 38, at the same time moving the valve 41 so that air will be admitted to the air-tube 35, or, in other words, the strip of material which constitutes the valves 40 and 41 is moved bodily away from the partition sufficiently to allow the contents of the bottle to be discharged through the outlet 38 and the entrance of air into the passage 34. In the structure shown in Fig. 9 the resistance member is of the same construction as that shown in Fig. 1, the same reference characters being applied thereto.

It is thought the many advantages of a

stopper for bottles and the like constructed in accordance with the foregoing description, taken in connection with the accompanying drawings, can be readily understood, and it will, furthermore, be evident that changes, variations, and modifications can be resorted to without departing from the spirit of the invention or sacrificing any of its advantages, and I therefore do not wish to restrict myself to the details of construction hereinbefore described, and as shown in the accompanying drawings, but reserve the right to make such changes, variations, and modifications as come properly within the scope of the protection prayed.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A stopper involving a hollow plug provided with an outlet for the contents of a vessel and an inlet for supplying air to the body of the vessel, and a strip of flexible material secured to said plug and adapted to normally close said outlet and inlet.

2. A stopper involving a hollow plug closed at its top and open at its bottom and provided with an outlet for the contents of a vessel and with an inlet for supplying air to the interior of the vessel, and a strip of flexible material suitably secured to said stopper and adapted to normally close said outlet and said inlet.

3. A stopper involving a hollow plug provided with an outlet for the contents of a vessel and an inlet for supplying air to the interior of the vessel, and a strip of suitable material secured to said plug and adapted to normally close said outlet and inlet.

4. A stopper involving a hollow plug having a cut-away portion and provided with a partition having an air-inlet adapted to communicate with the interior of a vessel, said partition closing a part of said cut-away portion and forming in said plug an outlet for the contents of a vessel, and a strip of material secured to the plug and adapted to simultaneously close said outlet and inlet.

5. A stopper involving a hollow plug having a cut-away portion and provided with a partition having an air-inlet adapted to communicate with the interior of a vessel, said partition closing a part of said cut-away portion and forming in said plug an outlet for the contents of a vessel, and a strip of material having its lower end secured to said plug and constituting a valve for closing said outlet and a valve for closing said inlet.

6. A stopper involving a resistance member and a member having an outlet and an inlet, and a strip of material secured to said last-mentioned member and constituting a valve for normally closing said outlet and a valve for normally closing said inlet.

7. A stopper for vessels involving a hollow plug closed at its top and open at its bottom and having a portion cut away at an inclina-

tion, said cut-away portion extending from a point removed from the lower end of said plug to the top thereof, a partition secured in said plug and having the upper portion cut away
 5 to conform to the cut-away portion of said plug, said partition forming said plug with an outlet for the contents of a vessel, said partition provided with an air-inlet and an air-channel, and a strip of suitable material secured to said plug and constituting a valve for
 10 closing said outlet and inlet.

8. A stopper for vessels involving a hollow plug closed at its top and open at its bottom and having a portion cut away at an inclination, said cut-away portion extending from a
 15 point removed from the lower end of said plug to the top thereof, a partition secured in said plug and having the upper portion cut away to conform to the cut-away portion of
 20 said plug, said partition forming said plug with an outlet for the contents of a vessel, said partition provided with an air-inlet and an air-channel, and a strip of material having a weighted upper end and a slitted lower portion,
 25 said weighted upper end constituting the valve for closing said outlet and said slitted lower portion constituting a valve for closing said inlet.

9. A stopper for vessels comprising the
 30 combination with a resistance member adapted to be mounted in the neck of a vessel, of a plug secured within the neck of the vessel and having one side cut away, said plug provided in its cut-away side with an outlet for the
 35 contents of the vessel and an air-inlet for supplying air to the interior of the vessel, an air-tube connected to said plug and communicating with said inlet and a strip of flexible material secured to said plug and constituting a
 40 valve for closing said outlet and a valve for closing said inlet.

10. A stopper involving a hollow plug closed at its top and open at its bottom and provided with an outlet for the contents of a
 45 vessel and with an inlet for supplying air to the interior of the vessel, and a T-shaped

strip of flexible material suitably connected to said stopper and adapted to normally close said outlet and said inlet.

11. A stopper involving a plug closed at its
 50 top and open at its bottom and provided with an outlet for the contents of a vessel, a partition extending upwardly into said plug and provided with an inlet for supplying air to the interior of the vessel, and a T-shaped strip of
 55 material bearing against said plug and said partition and adapted to normally close said outlet and said inlet.

12. A stopper involving a hollow plug provided with an outlet for the contents of a vessel and an inlet for supplying air to the interior of the vessel, and a T-shaped strip of
 60 suitable material secured to said plug and adapted to normally close said outlet and inlet.

13. A stopper involving a hollow plug having a cut-away portion and provided with a partition having an air-inlet adapted to communicate with the interior of a vessel, said
 65 partition closing a part of said cut-away portion and forming in said plug, an outlet for the contents of the said vessel, and a strip of material secured within said plug and constituting a valve for closing said outlet and a
 7 valve for closing said inlet.

14. A stopper involving a hollow plug having a cut-away portion and provided with a partition having an air-inlet adapted to communicate with the interior of a vessel, said
 80 partition closing a part of said cut-away portion and forming in said plug, an outlet for the contents of the said vessel, and a T-shaped strip of material secured within said plug and constituting a valve for closing said outlet and
 8 a valve for closing said inlet.

In testimony whereof I have hereunto set
 my hand in presence of two subscribing witnesses.

EDWARD HOERICHS.

Witnesses:

N. LOUIS BOGAN,
 GEO. W. REA.