

March 15, 1927.

1,620,867

J. F. BOYLE

COLLAPSIBLE BOAT

Filed June 11, 1925

2 Sheets-Sheet 1

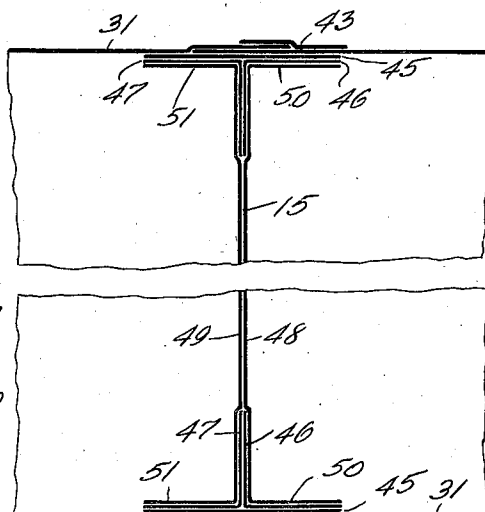
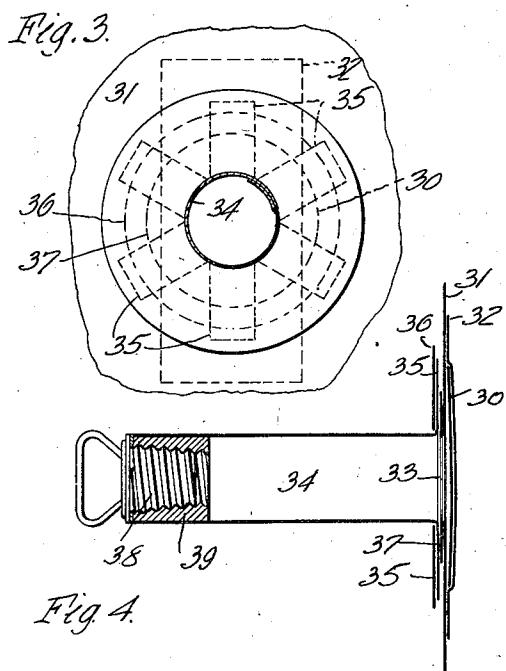
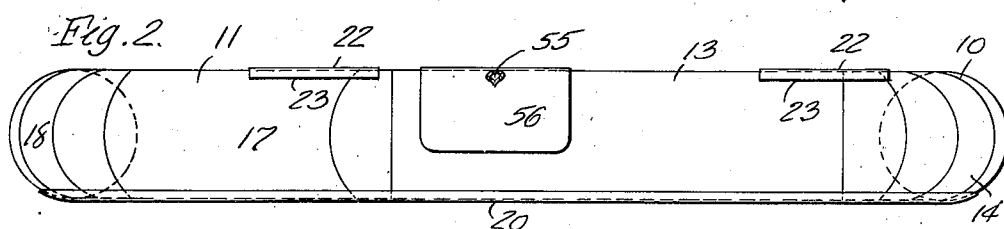
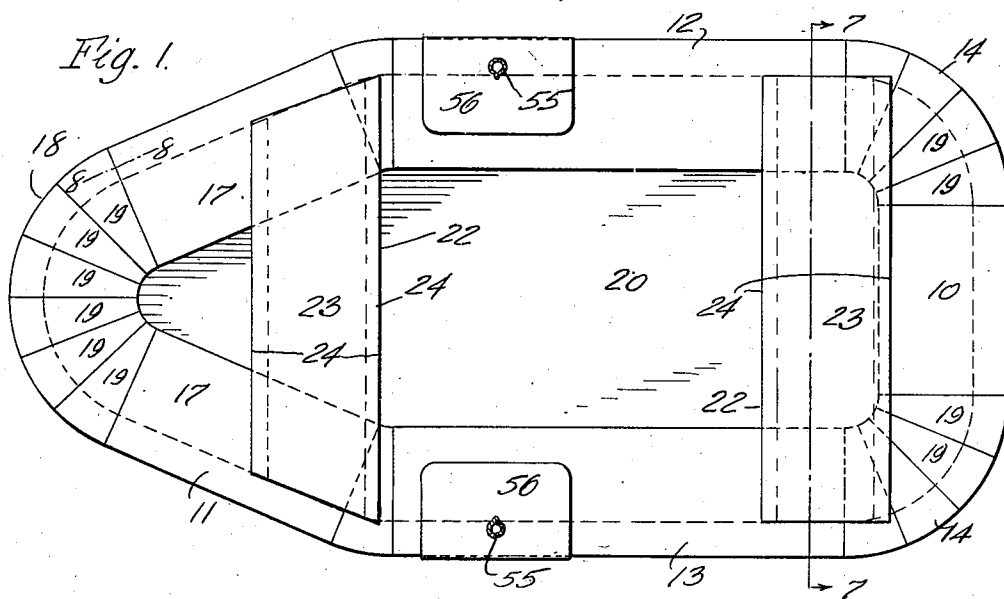


Fig. 5. INVENTOR.
James F. Boyle
Parker & Prochowski
ATTORNEYS.

March 15, 1927.

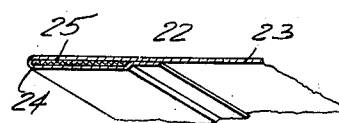
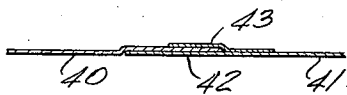
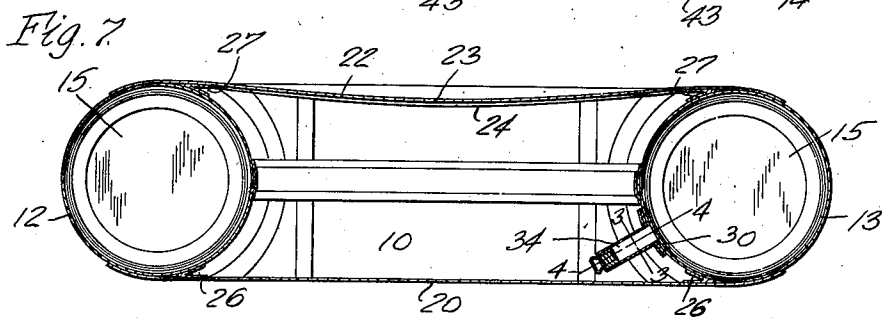
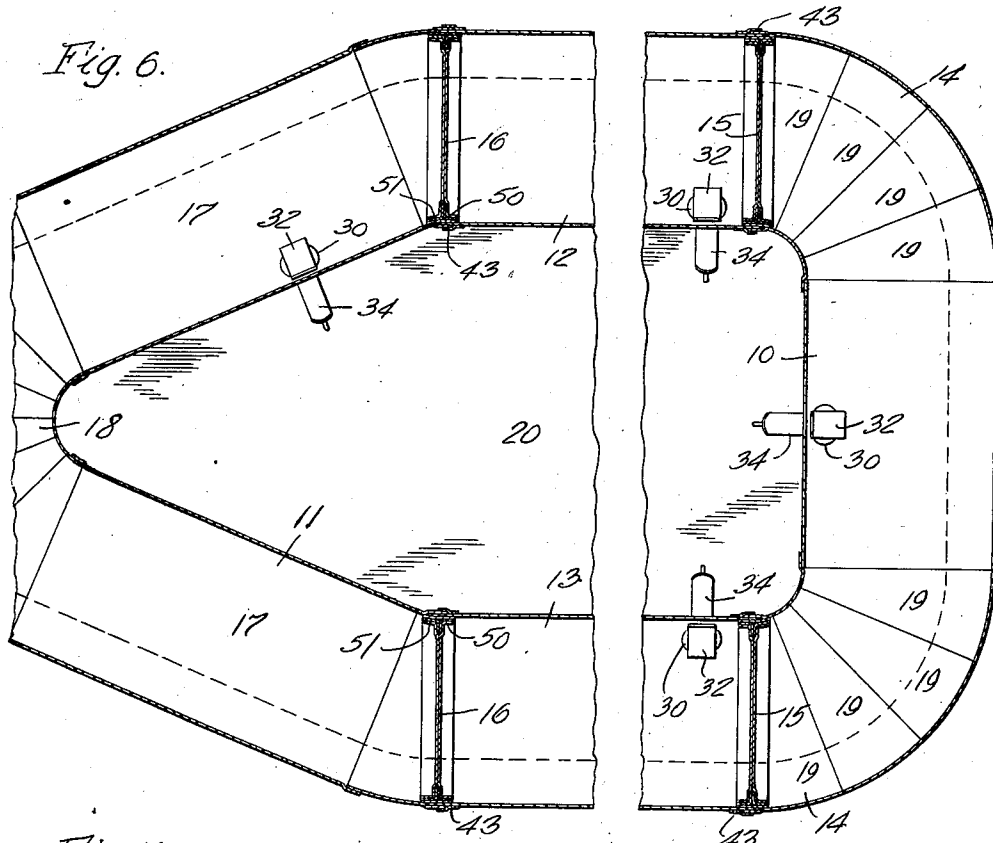
1,620,867

J. F. BOYLE

COLLAPSIBLE BOAT

Filed June 11, 1925

2 Sheets-Sheet 2



INVENTOR.
James F. Boyle
BY *Parker & Prochard*
ATTORNEYS.

Patented Mar. 15, 1927.

1,620,867

UNITED STATES PATENT OFFICE.

JAMES F. BOYLE, OF HAMMONDSPORT, NEW YORK.

COLLAPSIBLE BOAT.

Application filed June 11, 1925. Serial No. 36,377.

This invention relates to boats of the kind which are made of flexible air-tight material and which are adapted to be inflated for use, and which may be deflated to permit the boat to be folded and stored in a small space, and the invention relates more particularly to boats of this kind comprising one or more tubes or cylinders which are inflatable and which form the sides of the boat and which are connected at their lower portions by means of a sheet of waterproof material so that the water may be kept out of the interior of the boat.

The objects of this invention are to improve in general the construction of boats of this kind so that these boats will be of extremely light weight without sacrificing strength or durability; also to provide a boat of this kind with seats of improved construction, which form a part of the boat itself; also to provide means of improved construction for securing the seat to the inflatable tubes or cylinders of the boat; also to provide a boat of this kind of improved and novel form whereby the bow of the boat when in use will be raised or elevated to prevent splashing of the interior of the boat and to render the boat more seaworthy; also to provide a boat of this kind with valves of improved construction which facilitate the inflation and deflation of the boat; also to improve the construction of boats of this kind in other respects hereinafter specified.

In the accompanying drawings,
Fig. 1 is a top plan view of a boat showing one embodiment of my invention.

Fig. 2 is a side elevation thereof.

Fig. 3 is a fragmentary section thereof on an enlarged scale on line 3—3, Fig. 7, showing an inflation and deflation valve.

Fig. 4 is a fragmentary section thereof on line 4—4, Fig. 7.

Fig. 5 is a fragmentary longitudinal section showing the bulkheads between two adjacent inflatable tubes or cylinders of the boat.

Fig. 6 is a fragmentary sectional plan view of the boat.

Fig. 7 is a transverse section thereof on line 7—7 Fig. 1.

Fig. 8 is a fragmentary, longitudinal section on line 8—8 Fig. 1 showing a joint or seam between adjacent pieces of material.

Fig. 9 is a fragmentary, perspective view partly in section showing the edge portion of a seat.

The boat comprises a back cylinder or tube 10, a front tubular end or bow section 11 and two side cylinders or tubes 12 and 13. The back cylinder or tube 10 has rounded end or corner portions 14, which extend substantially at right angles to the main or body portion of the back cylinder and terminate in bulkheads 15, and the side cylinders or tubes extend from the bulkheads 15 to bulkheads 16. The front end of the boat, in the particular construction shown, consists of two converging tubes or cylinders 17 which are connected by a rounded nose portion 18, but it will be understood that the boat may be substantially rectangular in form, if desired, in which case the front piece would be similar in construction to the rear tube or cylinder 10, or if desired, the rear tube or cylinder of the boat may be replaced by a cylinder or section similar to the bow section 11 shown in the drawings, in which case a boat with two sharp or converging ends would be formed. A boat of any other shape may be used without departing from my invention.

Each of these cylinders or tubes is preferably made of a piece of material which has been suitably treated or coated to make the same impervious to air or gas, a balloon cloth consisting of several plies of material with the threads running in different directions and cemented or vulcanized together being preferably employed. It will be understood, of course, that each of the sections of the boat is provided with an air inflation tube, so that the several sections are separately deflatable and inflatable, whereby a puncture or damage to one of the sections causing a leak of air would not interfere seriously with the manipulation or buoyancy of the boat. The corner portions and the nose of the boat may be made of a plurality of separate sections 19 suitably cemented together in any desired manner. The lower portions of the various cylinders or tubes of the boat are connected by means of a bottom 20, which is made of waterproof material, and the edge portions of which are cemented or otherwise suitably secured to the bottom portions of the cylinders or tubes, so as to form a watertight joint therewith. The outer edges of the bottom 20 of the boat extend upwardly slightly beyond the extreme lower portion of the tubular sides of a boat, so as to protect the tubular sides against abrasion when the bottom of the boat strikes the

shore or when the boat is resting on the ground, and to afford a secure joint between the bottom and the cylinders or tubes. By means of this arrangement the bottom of the tubular sides of the boat are afforded protection against the usual wear and at the same time the weight of the boat is not excessively increased.

The boat may be provided with one or more seats or thwarts 22 extending transversely of the boat and which are made of flexible material and secured to the tubular sides of the boat, so that when the boat is folded, the seats, as well as the bottom of the boat, may be folded together with the tubular sides. The seats in the particular construction shown are secured to the upper edges of the tubular sides of the boat, preferably by cementing, vulcanizing, or in any other suitable manner, and the ends of the seat extend preferably slightly beyond the upper portions and around the outer faces of the tubular sides of the boat. The seats may be made of the same material as the balance of the boat or of canvas or the like, but preferably the seats are made of a piece 23 the same light and strong material of which the tubular sides of the boat are made, so as not to materially increase the weight of the boat. In order to enable the seats to maintain their correct shape and to avoid stretching of the same due to the weight of a person, one or both of the edge portions 24 of each seat 22 are reinforced by means of a canvas strip 25, which is preferably covered by the material of the seat by folding the edge portion of the piece 23 of the seat around the reinforcing canvas strips 25. This canvas strip 25 should be made of sufficient strength so that it will not stretch during the ordinary use to which it is put. By reinforcing the seats in this manner, the weight of the seat is not materially increased, and the canvas strips of the seat are protected against moisture by the waterproof material which encloses the same and prevents them from becoming soaked with water and deteriorating or rotting when the boat is stored away.

In order to prevent the portions of the seats and the bottom of the boat which are secured to the tubular sides of the boat from pulling away from the sides, for example, when the boat is folded, the construction which is illustrated in Fig. 7 is preferably employed. According to this construction, a strip of material 26 is cemented or otherwise secured into the angle shaped recess formed by the securing of the bottom to the tubular sides of the boat, this strip conforming to the angle between the tubular side and the bottom when the boat is in use, and extending to a short distance along the inner side face of the tubular structure, so that one flange or side of each strip is se-

cured to the inner face of the tubular side of the boat and the other side or strip to the bottom of the boat. A similar strip 27 is secured in the acute angled recess formed by the seat and the inner side of the tubular structure. These strips 26 and 27 increase very greatly the resistance to separation of the seam or cemented connection between the seat or the bottom of the boat from the tubular sides thereof. By arranging the seats across the top faces of the tubular structure and the boat bottom across the lower faces of the tubes, the tubular structure is braced so that it will retain its correct shape under different load conditions, and the strength of the boat is also increased.

The arrangement of the seats in the boat is of importance. The front or bow seat is preferably located a considerable distance aft of the bow of the boat as clearly indicated in Fig. 1, and the result of this arrangement of the seat with reference to the nose of the boat is that when a person is seated on the front or bow seat, the bow of the boat will be bent upwardly forward of the seat, due to the upward pressure exerted by the water acting on the bottom of the front portion of the boat, and due to the elasticity of the tubular sections of the boat. This curving up of the bow of the boat is important in that it renders the boat more seaworthy, and also prevents splashing of the water against the back of the person rowing in the front seat. The rear seat is preferably arranged to extend toward opposite sides of the two rear bulkheads 15 and by this arrangement of the rear seat, a puncture of the two side tubular sections or of the rear section of the boat will not impair the use of the seat, since each end of the rear seat is supported by two different tubular sections of the boat.

In view of the fact that comparatively low air pressure is sufficient to inflate the boat and to keep the same in an operative condition, means are preferably provided whereby the air may be rapidly pumped into the various tubular sections of the boat or discharged therefrom and preferably the air is pumped into the tubular sections by means of an ordinary hand operated bellows, which is capable of delivering a large quantity of air at low pressure. In order to make possible the use of a hand operated bellows for this purpose, each of the tubular sections of the boat is provided with a valve capable of operating under the low pressure delivered by the hand operated bellows. In the particular construction shown, see Figs. 3 and 4, this valve is made of a disk 30 of relatively soft rubber or rubberized fabric which is held in place against the inner face of the fabric 31 of which the tubular sections are made by means of a tape or strip 32, the

ends of which are suitably cemented to the inner face of the fabric 31 so that this strip serves to loosely hold the valve in its operative position over the hole or opening 33 in the tubular section, and the sides of the valve which are not covered by the tape can readily be lifted by air pressure from a pump or bellows, and are held in seated or closed position by the air in a tubular section when the section is inflated. A valve of other construction may be used if desired. On the outer portion of the fabric 31 an inflation sleeve 34 is secured to which the hand operated bellows or other inflation device may be connected. This sleeve may be made in any suitable or desired manner, and is provided at its inner end with a plurality of outwardly flaring strips or portions 35, which are secured between two annular fabric or rubber pieces 36 and 37, which are in turn secured to the outer face of the fabric 31 of the tubular section, and surrounding the inflation opening 33.

The outer end of the sleeve may be provided with a suitable stopper 38 for closing the end of the sleeve to prevent escape of air through the valve, the stopper shown being adapted to be secured into a threaded bushing 39 secured in the outer end of the inflation tube 34. When it is desired to inflate the boat, it is only necessary to insert the nozzle of the hand operated bellows into the end of the inflation tube 34 and then to operate the bellows. When it is desired to discharge the air from the interior of the boat, it is only necessary to insert a pencil or small stick against an edge portion of the valve 30 to move the valve from its seat and thus permit the air to discharge. The valve is made of very flexible material so that very little air pressure is necessary to raise the same from its seat.

The seams between adjacent pieces of material which are in the nature of lap seams are preferably made as shown in Fig. 8, in which 40 represents one piece of material and 41 another strip, the edges of which are overlapped and secured together as shown at 42. A strip of tape 43 is then secured over the edge of the outer piece of the lap joint, for example, the outer edge of the piece 40 in the construction shown in Fig. 8, and this strip 43 is cemented or otherwise secured over the outer edge of the piece 40 so that separating of the seam or leaks in the seam are prevented. Seams of this kind are employed wherever two edges of material overlap and are not illustrated in Figs. 1, 2 and 6 because of the smallness of the scale on which these figures are drawn.

The bulkheads are preferably formed at the joints between adjacent tubular sections of the boat, and a construction is illustrated in detail in Fig. 5 in which the overlapping portions are secured by means of a joint

closed by a tape 43, as indicated in Fig. 8. Another strip of material 45 is then secured over the inner face of the lap joint. A pair of annular bulkhead holding members 46 and 47 of angle shape are secured to the strip 45 in such a manner that inwardly extending flanges of the annular members extend into contact with each other, these flanges forming the securing means for the bulkheads themselves. These bulkheads are made of a pair of disk shaped pieces of material 48 and 49 arranged face to face and having their outer edges extending in opposite directions to form flanges as indicated at 50, 51, the portions of the disks 48 and 49 adjacent to the edges thereof being secured on the outer faces of the inwardly extending flanges of the bulkhead holding members 46, 47. The bulkhead described is of light construction and readily foldable and at the same time possesses ample strength and is easily constructed. Bulkheads of any other construction may, however, be employed if desired.

55 represent car locks made of loops of rope or other flexible material, the ends of which are suitably secured to the side tubular sections, preferably by means of cover pieces 56. Car locks of other suitable construction may be employed if desired.

Boats of this kind can be folded in compact form so that they can be readily carried in a comparatively small hand bag. By means of the structure described a boat capable of carrying two or three men, including paddles, bellows and carrying case, weighs approximately ten pounds, and can be inflated and made ready for use in two or three minutes. It will be obvious that the boat may also be used as a mattress or cushion when inflated and inverted.

I claim as my invention:—

1. An inflatable and collapsible boat including an inflatable tubular structure forming the sides of the boat, a foldable bottom made entirely of flexible material and secured at its edge portions to the bottom faces of said tubular structure and forming angle shaped recesses with said tubular structure, and an angle shaped strip of material arranged in said recesses and secured to said bottom and said tubular structure.

2. An inflatable and collapsible boat including an inflatable tubular structure forming the sides of the boat, a foldable bottom secured at its edge portions to the bottom faces of said tubular structure and extending around said tubular structure toward the outer side faces thereof, and an angle shaped strip of material secured to said bottom and extending upwardly toward the inner side faces of said structure and secured thereto.

3. An inflatable and collapsible boat including an inflatable tubular structure

forming the sides of the boat, a bottom secured to said tubular structure, a seat made of flexible material and secured at its ends to the upper faces of the tubular structure, and reinforcing strips connecting the under face of said seat and said tubular structure.

4. An inflatable and collapsible boat including an inflatable tubular structure forming the sides of the boat, a foldable bottom secured at its edge portions to the bottom faces of said tubular structure, a seat made of flexible material and secured at its opposite ends to the upper faces of the sides of the tubular structure, and angle shaped strips of material secured to the lower faces of the seat and extending downwardly toward the inner faces of said tubular structure and secured thereto.

5. An inflatable and collapsible boat including an inflatable tubular structure forming the sides of the boat, a bottom of flexible material secured to said tubular structure, a seat of flexible material secured to the upper portion of the sides of said tubular structure and supported solely by said sides, said bottom and said seat forming angular recesses with said tubular structure, and angle shaped reinforcing strips secured in said angular recesses and connecting respectively said bottom and said tubular structure, and said seat and said tubular structure.

6. An inflatable and collapsible boat including an inflatable tubular structure forming the sides of the boat, a bottom of flexible material secured to said tubular structure, and a seat of flexible material secured to the upper portion of the sides of said tubular structure, said seat being made of light weight material and having a flexible reinforcing web extending lengthwise thereof to prevent stretching of said seat.

7. An inflatable and collapsible boat including an inflatable tubular structure forming the sides of the boat, a bottom of flexible material secured to said tubular structure, and a seat of flexible material secured to the upper portion of the sides of said tubular structure said seat being made of light weight waterproof material and having a reinforcing web of flexible material extending lengthwise thereof and enclosed by said waterproof material.

8. In an inflatable and collapsible boat having sides, a seat made of flexible waterproof material of light weight, and strips of heavier flexible material secured to the edges of said seat to hold the same against stretching.

9. An inflatable boat including an inflatable tubular structure forming the sides of the boat and a normally flat bottom, said sides converging toward the bow of the boat,

and a seat arranged at a distance from the bow, whereby the weight of a person in the seat will cause the bow and the portion of the flat bottom connected therewith to be bent upwardly when the boat is in use.

10. A boat including an inflatable tubular structure forming the sides of the boat and converging at an end of the boat and a normally flat bottom, and a seat formed of flexible material and arranged at a distance from said end of the boat and connecting the upper faces of said tubular structure, whereby a weight on said seat will cause a change in shape of the boat whereby said end will be bent upwardly.

11. An inflatable and collapsible boat including a tubular inflatable structure forming the sides and ends of the boat and provided at intervals with bulkheads dividing said tubular structure into a series of independent air containing compartments, and a seat of flexible material secured at its opposite sides to the upper portion of the tubular structure and arranged so that each end of the seat is secured to two separate compartments at opposite sides of a bulkhead.

12. An inflatable and collapsible boat including an inflatable tubular structure forming a part of the boat and having an inflation opening, a flat valve of flexible material arranged across said opening, and a strip of material extending crosswise of said valve and secured at its end to said tubular structure, said strip of material leaving the sides of said valve free to move toward and from a seating position around said inflation opening.

13. An inflatable and collapsible boat including an inflatable tubular structure forming a part of the boat and having an inflation and deflation opening, a flat valve of flexible material arranged on the interior of said tubular structure and covering said opening, and means for securing portions of said valve to said tubular structure and leaving other portions of said valve free to move toward and from said structure to open or close said inflation and deflation opening.

14. An inflatable and collapsible boat including an inflatable tubular structure forming a part of the boat and having an inflation and deflation opening, a check valve mounted on said tubular structure on the inner side of said opening for normally closing said opening, an inflation tube secured around the outer side of said inflation opening and made of flexible material, a bushing in the end of said tube and a stopper adapted to be secured to said bushing to prevent the escape of air through said tube.

JAMES F. BOYLE.