G. C. REEVES.

TANK BALL.

APPLICATION FILED OCT. 4, 1915.

Patented Sept. 11, 1917.

1,239,520.

Fig 1

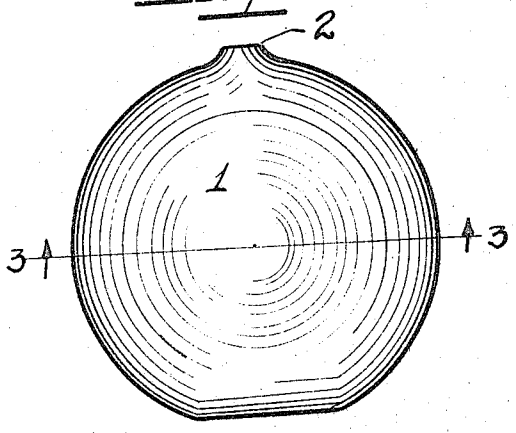


Fig 3

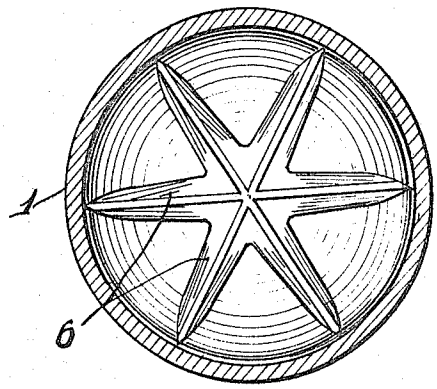


Fig 2

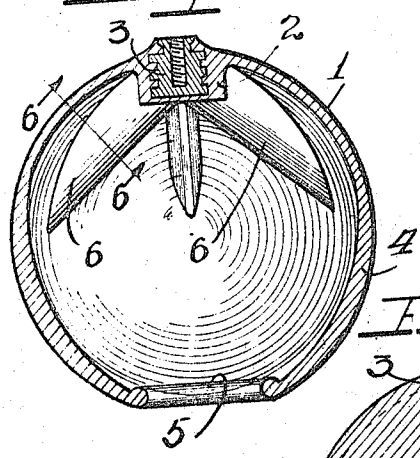


Fig 4

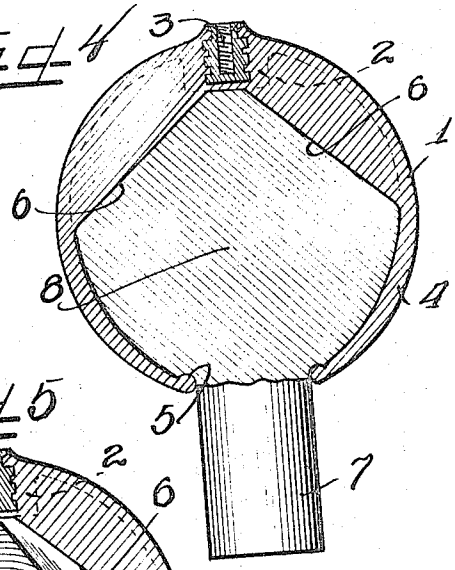


Fig 5

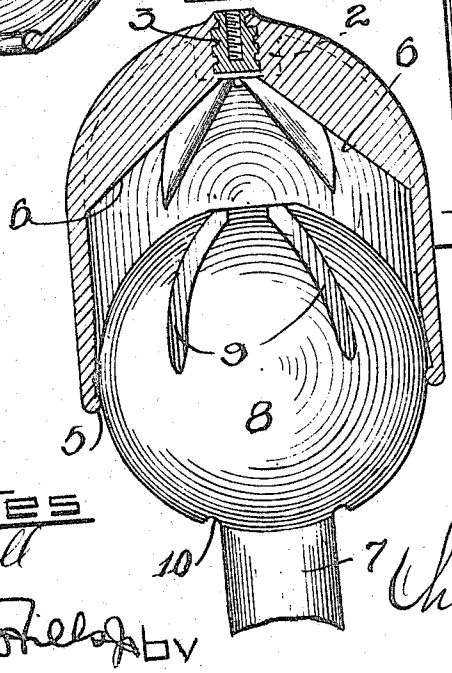
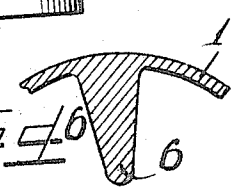


Fig 6



Witnesses

J. W. Angell

Charles W. Hills Jr by

Inventor

George C. Reeves

Charles W. Hills Atty

UNITED STATES PATENT OFFICE.

GEORGE C. REEVES, OF OAK PARK, ILLINOIS.

TANK-BALL.

1,239,520. Specification of Letters Patent. Patented Sept. 11, 1917.

Application filed October 4, 1915. Serial No. 54,087.

To all whom it may concern:

Be it known that I, GEORGE C. REEVES, a citizen of the United States, and a resident of the village of Oak Park, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Tank-Balls; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the numerals of reference marked thereon, which form a part of this specification.

More or less trouble has been experienced in the past due to the short life of the usual type of flexible tank ball used with the valve for flushing or supply tanks. Many expedients have been devised in the construction of this type of tank ball to secure the desired sealing effect and at the same time strengthen the ball to prevent breakage and deformation thereof after constant use. It has been the practice in some instances to construct the ball valve closure in two parts, making the upper half of a relatively stiff indurated fiber or the like, and the lower half of a flexible ball or spherical portion secured thereto in any suitable manner, so that the thrust of the rod to which the ball is connected and by which it is guided and actuated, is received by the stiff upper half of the ball. Other types of tank balls have been made wherein a reinforcing body not integral with the ball is placed in and connected with the interior of the ball upon final assembly of the parts, which are made separate and then united in a final vulcanizing operation. In such cases the structure has rapidly deteriorated with tendency of the separately constructed parts to separate under the action of water and constant use. Such constructions, moreover, are objectionable due to the expense of manufacture and time and labor required to construct the same.

The tank ball constructed according to my invention is made integral throughout with reinforcing ribs formed on the interior of the upper portion of the ball to stiffen the same against breakage and deformation. The tank ball is adapted to be formed by a single molding operation, and of such a shape that the upper portion on which the actuating rod or other means is attached, is well capable of withstanding the thrust and tensile stresses imparted thereto, while on the other hand the lower portion of the ball at the part at which the same contacts its seat, is thickened to prevent undue wear or deformation thereof.

It is an object therefore of this invention to construct a tank ball consisting of a unitary piece of material molded into proper form and provided with internal integral reinforcing means molded thereinto and radially disposed in the upper portion of the closure.

It is also an object of this invention to construct a tank ball formed of one piece of material with the material formed to afford reinforcing ribs to withstand the stresses imparted to the ball, and with the lower portion of the ball of special section to insure long life in use as a valve closure, and to resist undue deformation or breaking thereof.

It is also an object of this invention to provide a means for molding a one piece rubber tank ball provided with reinforcing means on the interior and so constructed as to permit ready withdrawal of the core from the formed ball without necessitating a rearrangement of the parts or permanent alteration in the form of the ball.

It is also an important object of this invention to construct a tank ball with a bead formed on the lower portion thereof to strengthen the ball and resist deformation thereof.

It is furthermore an important object of this invention to construct a tank ball of such design as to permit molding thereof in a single operation and withdrawal of the core therefrom without necessitating rearrangement of the mold or permanent alteration in the ball so formed, and said ball valve provided with reinforcing means acting to retain the ball in shape during use thereof with the walls of the ball thickened at the portion receiving the most wear to insure long life of the ball when in use.

It is finally an object of this invention to provide an improved type of tank ball structure which, due to its unitary construction and design, can be more cheaply and easily manufactured than has heretofore been possible, and is capable of continued use without deformation, and, being unitary, is entirely free from separation of component parts commmon in tank balls as heretofore constructed.

The invention (in a preferred form) is illustrated in the drawings and hereinafter more fully described.

In the drawings:

Figure 1 is an exterior view of a tank ball embodying the principles of my invention.

Fig. 2 is a central vertical section taken therethrough.

Fig. 3 is a detail section taken on line 3—3 of Fig. 1.

Fig. 4 is a central vertical section taken through the tank ball, showing the same associated with the core on which it is formed.

Fig. 5 is a view similar to Fig. 4, illustrating the relation of the parts during withdrawal of the core of the mold.

Fig. 6 is a detail section taken on line 6—6 of Fig. 2.

As shown in the drawings:

The device is substantially of spherical shape and consists of a ball of rubber or elastic composition denoted by the reference numeral 1, having an enlarged portion 2, at the upper end thereof in which is molded or embedded a metal ferrule 3, to receive attaching or actuating means for the device. The lower half of the ball 1, is thickened at the portion denoted by the reference numeral 4, and an opening or aperture is formed in the lower end of the ball, and the edge at said aperture may or may not have a small bead 5, formed therearound. However, the bead is an important consideration, inasmuch as it forms substantially a reinforcing ring which resists expansion of the lower portion of the ball and thereby acts to prevent elongation or similar deformation of the ball after continued use. Of course, the bead may be formed on the interior or exterior of the ball, or on both the interior and exterior, and may be at the mouth or removed a distance therefrom, acting in any event for the purpose pointed out, and also stiffening the lower portion of the structure.

Formed on the interior of the ball 1, and disposed radially around the enlarged portion 2, and merging integrally into the same, are integral reinforcing ribs 6, which act to stiffen the upper portion of the ball to resist breaking and deforming stresses imparted thereto by the attaching means connected in the metal ferrule 3.

The mold core for forming the interior of the ball consists of a stem 7, having a ball shaped head 8, and with recesses disposed radially in the upper portion thereof denoted by the reference numerals 9, by which the ribs 6, of the ball are formed. A curved recess 10, is also provided around the upper end of the stem 7, in the lower portion of the ball 8, to form the rib 5, around the lower portion of the ball formed from the core when such bead is desired. When the ball is first formed, the position thereof upon the core 8, is as shown in Fig. 4, and the core may then be easily withdrawn from the ball. As shown in Fig. 5, the lower portion of the ball 4, stretches to permit withdrawal of the core 8, and then again springs inwardly into the position shown in Fig. 2. It is this simple manner of forming the ball which admits of making the same in one piece and operation and which thereby effects a great saving in the cost of manufacture thereof.

The integral reinforcing ribs 6, formed on the interior of the ball serve effectually to stiffen the upper portion thereof to resist the tension and compression stresses transmitted thereto through the ferrule 3, which is connected to the attaching means for the ball. These ribs, owing to their integral and continuous connection with the interior of the ball, permit the upper portion of the ball therebetween to be made relatively thin, if desired. The thickened wall portion 4, of the ball is well adapted to resist appreciable wear or deformation due to contact with the seat provided in the mechanism in which the ball is connected for use and the bead 5, acts to prevent deforming the ball by elongation when subjected to the suction of the outlet pipe which it closes.

I am aware that various details of construction may be varied through a wide range without departing from the principles of this invention, and I therefore do not purpose limiting the patent granted otherwise than necessitated by the prior art.

I claim as my invention:

1. A one-piece tank ball of the class described, comprising a rounded hollow member of elastic material having an opening in its bottom, reinforcing ribs formed integrally on the interior upper portion thereof, and a bead formed around the lower portion thereof.

2. A one-piece tank ball of the class described, comprising an elastic hollow rounded member, an enlargement formed at the upper end thereof, a ferrule disposed in said enlargement, and reinforcing ribs formed integrally on the upper inner portion of said member and radiating from said enlargement.

3. A one-piece tank ball of the class described, comprising an elastic hollow rounded member, an enlargement formed at the upper end thereof, a ferrule disposed in said enlargement, and reinforcing ribs formed integrally on the upper inner portion of said member and radiating from said enlargement, said ribs being tapered and terminating at substantially the middle of said member.

4. A one-piece tank ball of the class described, comprising an elastic hollow rounded member having an aperture in the lower portion thereof, an enlargement formed at the upper end thereof, a ferrule disposed in

said enlargement, reinforcing ribs formed integrally on the upper inner portion of said member and radiating from said enlargement, and a bead formed around the aperture in said member.

5. A one-piece tank ball of the class described, comprising an elastic hollow rounded member having an aperture in the lower portion thereof, an enlargement formed at the upper end thereof, a ferrule disposed in said enlargement, reinforcing ribs formed integrally on the upper inner portion of said member and radiating from said enlargement, and a bead formed around the aperture in said member, said member being thickened intermediate its upper and lower portions.

In testimony whereof I have hereunto subscribed my name in the presence of two subscribing witnesses.

GEORGE C. REEVES.

Witnesses:

CHARLES W. HILLS, Jr.

EARL M. HARDINE.