

H. E. HONEYWELL.

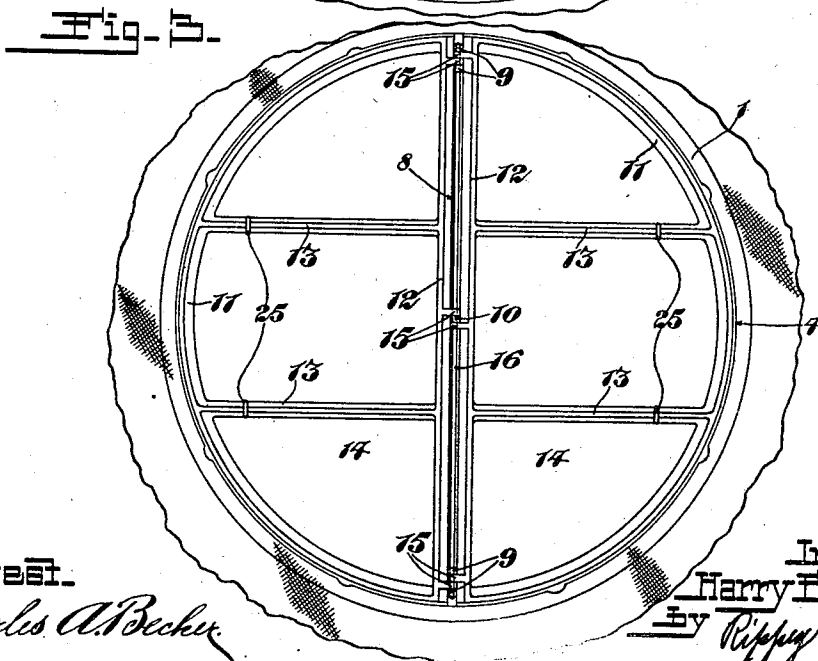
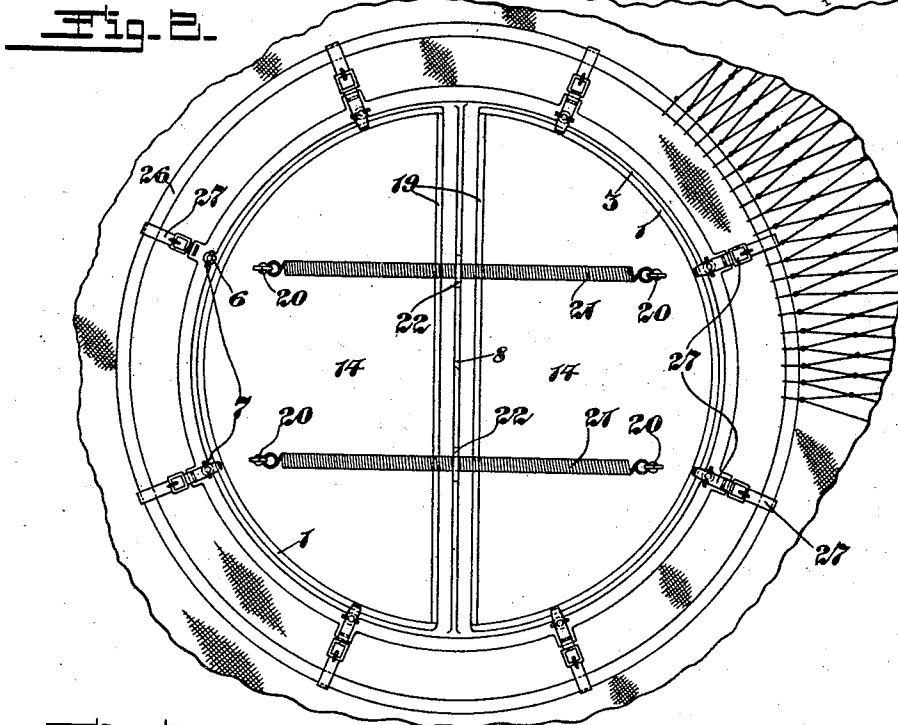
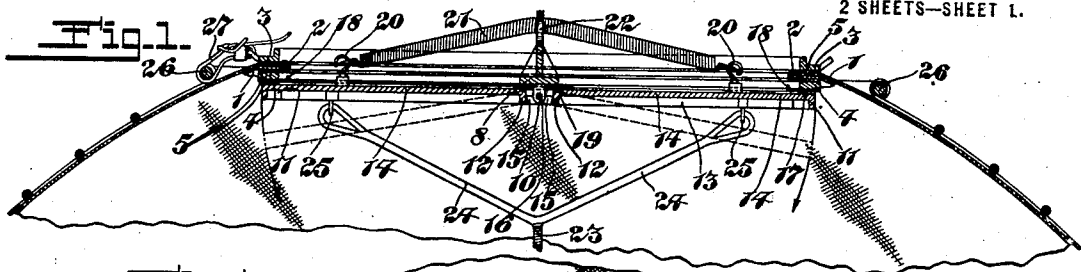
BALLOON.

APPLICATION FILED JAN. 18, 1918.

1,283,773.

Patented Nov. 5, 1918.

2 SHEETS—SHEET 1.



Attest.
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2 SHEETS—SHEET 2.

Fig. 4.

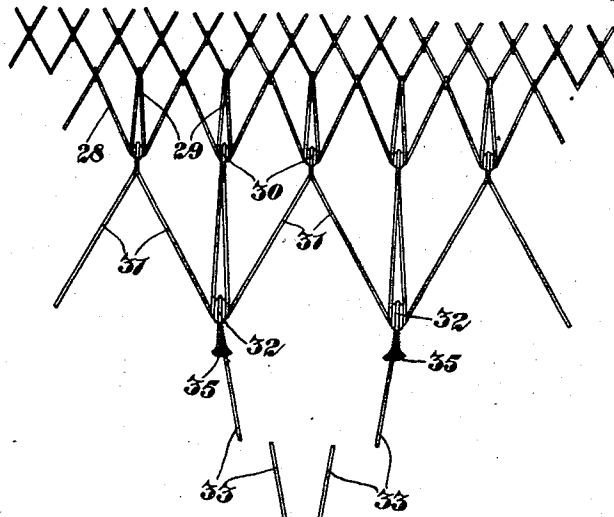


Fig. 5.

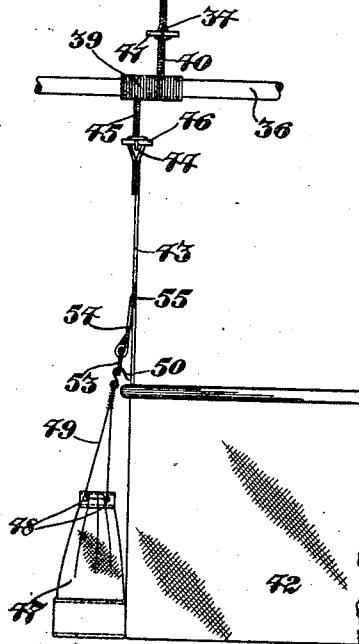
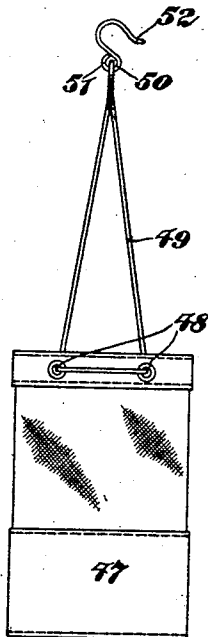


Fig. 6.

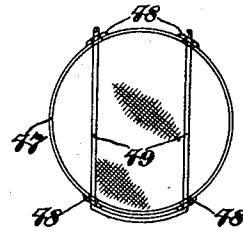


Fig. 7.

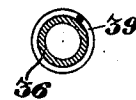
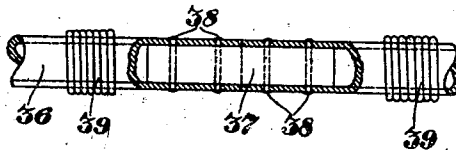


Fig. 8.



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UNITED STATES PATENT OFFICE.

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BALLOON.

1,283,773.

Specification of Letters Patent.

Patented Nov. 5, 1918.

Application filed January 18, 1918. Serial No. 212,463.

To all whom it may concern:

Be it known that I, HARRY E. HONEYWELL, a citizen of the United States, residing at the city of St. Louis and State of Missouri, have invented a new and useful Balloon, of which the following is a specification.

This invention relates to balloons.

An important feature of the invention has reference to the balloon valve and consists in the provision of a metallic valve of improved construction which is not subject to the objections of the usual wooden valves and in which the springs controlling the closing of the valves remain permanently in position and are not detached when they are packed for shipment.

The valve is comparatively very shallow and does not permit the accumulation of a large quantity of water thereon as in the wooden valves now in general use. The accumulation of large quantities of water on the valve is highly objectionable for the reason that it forces itself through the valve and into the balloon permitting the gas to leak or escape through the valve.

Other important features of the invention relate to the devices for suspending the load ring from the net and also include the provision of a metallic load ring in the place of the usual laminated wooden rings.

Other important features of the invention relate to the devices for suspending the ballast without subjecting the walls of the basket to the inward pressure to which the basket walls are usually subjected by the ballast bags in ordinary use.

Various other important features of the invention will appear from the following description, reference being made to the accompanying drawings, in which—

Figure 1 is a sectional view of the valve in connection with the balloon.

Fig. 2 is a plan view.

Fig. 3 is a view showing the inner side of the valve.

Fig. 4 is a view illustrating the improved connections between the net and the suspending cords with which the load ring is connected.

Fig. 5 is a side elevation of one of the ballast bags.

Fig. 6 is a plan view of the same.

Fig. 7 is a sectional view of the load ring illustrating the cord wound thereon.

Fig. 8 is a view illustrating additional details of the construction of the load ring.

The balloon fabric is doubled under itself as illustrated at 1 and in the fold thereof a cord 2 is held. The doubled end portion of the balloon fabric is tightly clamped between an upper ring 3 and an inner ring 4, the cord filling the fold of the fabric and preventing the same from slipping from between the rings. Layers 5 of fabricated material are secured to the faces of the rings 3 and 4 and constitute cushions for clamping the interposed portion of the balloon. The inner ring 4 has a series of threaded projections 6 passing through appropriate openings or eyelets in the interposed portion of the balloon and through holes in the upper ring 3, and upon said projections clamping nuts 7 are screwed to clamp the rings 3 and 4 upon the interposed edge portion of the balloon.

The inner ring is provided with an integral diametrically disposed hinge supporting member 8, the same having near each end thereof a pair of depending projections 9, and at least one projection 10 between the pairs of projections.

The valves are in the form of doors pivotally supported in connection with the member 8, each door including an arcuate portion 11 having its ends connected by a transverse portion 12, and parts 13 connecting the portions 11 and 12. The frames thus constituted are very strong and will not warp or bend under the variable conditions to which the balloon is subjected and will remain unchanged in wet and dry weather, and also in variations of temperature. The frames are duplicates of each other and are interchangeable, both patterns or designs being the same so that the manufacture and construction thereof is simple. A metallic plate 14 is rigid with each frame so that when the valves are mounted in position, as shown, they will constitute a hermetic clo-

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sure for the opening in the top of the balloon.

Each of the valve frames has a plurality of projections 15, said projections on the two doors being arranged to overlap, and the same having alined holes therethrough which are also in alinement with similar holes through the projections 9 and 10. A hinge rod 16 passes through the holes in the projections on the support 9 and also through the projections on the valve frames, thus constituting a single pivot or hinge upon which both of the valves are mounted, and dispensing with the use of several hinges used in balloon valves of ordinary construction. The arcuate portions 11 of the valves match and underlie similar portions of the inner ring 4 and on their upper surfaces have sections 17 of fabricated material arranged to bear against sections 18 of similar material secured to the inner side of the ring 4 so that when the valves are closed hermetic joints are formed. Appropriate fabricated packing material 19 is secured to the adjacent portions of the valves and the hinge supporting member 8, and forms a hermetic joint at those points.

Each of the valves has one or more hooks 20 to which are connected the ends of springs 21, each spring extending entirely across the central portions of the valves from one valve to the other, and being retained in proper position by spring seats 22 in connection with the hinge supporting member 8. As shown two springs are used, but it is obvious that the number may be varied without departing in the least from the principle of the invention.

The device for opening the valves in opposition to the power of the springs 21 includes a connection 23 passing through the balloon to convenient position relative to the basket and having branches 24 connected with loops 25 on the valves, so that by drawing the connection 23 downwardly the valves will be moved to open position in opposition to the springs.

The net around the balloon is suspended from a ring 26 supported by straps 27 connected with the upper ring 3.

In Fig. 4 I have illustrated a novel form of connection by which the load ring is suspended from the net. As shown the lower part of the net is finished by a cord 28 tied to each mesh of the net and diverging downwardly singly from each alternate mesh and extending downwardly doubled from each intermediate mesh of the net as shown at 29. This formation is produced by passing the single line of the cord through a spool 30, thence upwardly to a point of connection with the intermediate mesh of the net to which it is tied, thence downwardly and again through the spool 30 and thence upwardly to form a single line of cord in con-

nection with another mesh of the net from which a single line of the cord passes downwardly and through another spool 30, and so on.

From the spools 30 another cord connection is formed in a similar manner including a cord passing around and tied to each alternate spool 30 and diverging downwardly therefrom to form single lines of cord 31. Each single line of cord 31 passes through a spool 32 and thence upwardly around and in secure connection with the spool 30 next adjacent to the one from which the single lines of cord diverged as stated, and thence downwardly and again through the spool 32 and upwardly over and in secure connection with the next adjacent spool 30 to form the two diverging lines 31 of cord therefrom; and so on entirely around the net. This construction equalizes and distributes the strains to all parts of the net so that no excess of strains is thrown upon any part of the net, thus greatly reducing the labor in construction and the weight of the finished net.

From the spool 32 the suspending cords 33 are supported, each suspending cord having two diverging lines thereof extending upwardly and secured to adjacent spools 32 while the apex or fold of the cord is formed into a loop 34 above which for some distance the two lines of the cord are wound or bound together, as shown. As shown the cords 33 are tied around the spools 32 and the ends of the cords are opened to form flaring rain deflectors or drips 35 which serve to deflect the rain and water and prevent the same from running down on the cords 33.

The load ring in my improved balloon differs from the usual laminated wooden rings in that I have provided a light and very strong metallic ring 36 comprising a tube bent into annular form and having its ends connected or secured together in some appropriate manner. As shown in Fig. 8, the ends of the ring are connected by a plug 37 within the abutting ends of the ring and fastened by rivets 38. The plug 37 may also be welded in connection with the ends of the ring, or otherwise appropriately secured, it only being essential that a strong and rigid connection be provided. The ring is wound in cord 39 which constitutes a complete cover for the ring and which prevents the suspension members 40 from slipping on the ring. The suspension members consist of short flexible connections secured to the ring 36 and arranged to pass through the loops 34 and having toggles 41 which engage the loops and thereby suspend the load ring from the cords 33. This ring is very light, strong and will bend or yield instead of breaking when subjected to great strains or shocks, thus eliminating the faults and frailties of the usual wooden rings.

The basket 42 has supporting cords 43 provided with loops 44 engaging suspension members 45 in connection with the load ring, the suspension members having toggles 46 holding the same in connection with the loops 44.

The ballast bags 47 have eyelets 48 through which pass a suspension cord 49, the ends of which converge and are secured together in connection with a hook 50. When the ballast bag is filled with sand the upper end of the bag is closed by the weight of the ballast when in suspension and will remain closed when resting upon the ground so that it is practically impossible for the sand to be spilled by overturning the bag. The hook 50 is composed of a single piece of metal bent substantially to U-shape having on one end a loop 51 engaged with the cord 49 and having on the other end an outwardly curving portion 52. The hook thus constructed is arranged to engage with a ring 53 by which the ballast is supported. The ring 53 is in connection with a supporting cord 54 having woven or plaited connection 55 with the supporting cords 43. The suspension connections for the ballast bags are arranged so that the inward pressure of the bags is directly against the bottom of the basket and so that the bags are prevented from bearing against the side wall of the basket above the bottom. This feature of relieving the side walls of the basket of the weight of the ballast bags and causing the inward pressure of the bags to be sustained by the bottom of the basket is of considerable importance, because in balloon baskets of the type now in general use the baskets are often damaged by the pressure of the ballast bags against the side walls of the baskets.

The widely open hook 50 having the outwardly curving portion 52 may be very conveniently and rapidly engaged with the meshes of the net during inflation of the balloon. It is well understood that when a balloon is being inflated, the same is held upon the ground by the ballast bags being engaged with the net and that as the balloon becomes inflated the ballast bags are engaged successively with lower meshes of the net so as to permit inflation to continue. The hook arranged as illustrated and described may be easily engaged with the meshes of the net successively with certainty and accuracy which is not true of the ballast supports heretofore in general use. In addition, the hook constitutes a proper support for the ballast bag in connection with the ring 53.

Moreover, the provision of the flexible connections 54 having woven or tied connection with the cords 43 dispense with the necessity of engaging the hooks of the ballast bags directly with the cords. This is also a feature of importance because the cords 43

are interwoven with the basket material, and it is impossible to replace the cords when they become worn, so that it is necessary to discard the entire basket when any one or more of the cords become weakened, and this situation often arises in balloons now in general use. By utilizing a tied or plaited connection between the members 54 and the cords 43 the wear upon the latter is entirely obviated and should the members 54 become worn or damaged from any cause they may be readily replaced without throwing away the entire basket.

From the foregoing description it will be understood that my improvements relate generally to the entire balloon construction, beginning with the valve mechanism and extending down to the basket and ballast, involving improvements in various parts of the balloon structure.

It will be understood that variations may be made in the construction and arrangement of the various parts without departing from the principle and scope of the invention, and that I do not limit myself to identical or unnecessary features, but what I claim and desire to secure by Letters Patent is:—

1. In a balloon, a valve comprising a metallic frame secured within an opening in the balloon, means for suspending the balloon net from said frame, two metallic doors having their adjacent edges hinged to the frame, a spring having one end connected to one of said doors and having its opposite end connected to the other door for holding the two doors closed, and a support above the hinged edges of the doors across which said spring extends from one door to the other.

2. In a balloon, a valve comprising a metallic frame secured within an opening in the balloon, means for suspending the balloon net from said frame, a cross member in said frame, a rod supported by said cross member, two metallic doors hinged to said rod and extending therefrom to opposite sides of said cross member, a spring having one end connected to one of said doors and having its opposite end connected to the other door for holding said doors closed, and a stationary spring seat supported by said cross member close to the cross member in which the intermediate portion of said spring bears.

3. In a balloon, a valve comprising two metallic rings clamping between them the edge of the balloon around the valve opening, means for suspending the balloon net from one of said rings, a cross member supported by the inner ring, a hinge rod supported by the under side of said cross member, two doors hinged upon the same hinge rod, spring seats on the upper side of said cross member, in stationary position, close

to the cross member, a spring seated in each of said spring seats extending across said cross member and having one end connected to one of said doors and having the opposite end connected to the other door for holding the doors closed.

4. In a balloon, a valve comprising an inner ring, an outer ring, means for clamping said rings upon the edge of the balloon around the valve opening, said rings being shallow and designed to prevent accumulation of excessive quantities of water, means for suspending the balloon net from one of said rings, a cross member supported by one of said rings, a hinge rod supported at the under side of said cross member, two doors hinged upon said rod and arranged to close the opening through said rings, springs extending across said cross member having their one end connected to one of said doors and having their opposite end connected to the other door, means in connection with said cross member to prevent lateral displacement of said springs, and means for opening said doors.

5. In a balloon, a valve comprising an inner ring, an outer ring, means for clamping said rings upon the edge of the balloon around the valve opening, doors hinged in connection with one of said rings, springs connecting said doors and holding them in closed position, means for opening said doors, and means for suspending the balloon net from one of said rings.

6. In a balloon, a valve comprising an inner ring, an outer ring, means for clamping said rings upon the edge of the balloon around the valve opening, doors hinged in connection with one of said rings, springs connecting said doors and holding them in closed position, means for opening said doors, means for suspending the balloon net from one of said rings, a basket, and means for distributing the weight of the basket uniformly to all circumferential parts of the net.

7. In a balloon, a valve comprising an inner ring, doors hinged in connection with said ring, springs connecting said doors and holding them in closed position, means for opening said doors, an outer ring attached to the inner ring, means for suspending the balloon net from the outer ring, a basket, and means for distributing the weight of the basket uniformly to all circumferential parts of the net.

8. In a balloon, a valve comprising an inner ring, a series of projections on the upper side of the inner ring, an outer ring having a series of openings through which said projections extend, means cooperating with said projections for clamping said rings upon the edge of the balloon around the valve opening, doors hinged in connection with one of said rings for opening and closing

the opening through said rings, springs for holding said doors in closed position, means for opening said doors, and means in connection with the outer ring for suspending the balloon net therefrom.

9. In a balloon, a valve comprising an inner ring, an outer ring, projections on one of said rings extending through the other ring, releasable elements on said projections for clamping said rings upon the edge of the balloon around the valve opening, a door hinged in connection with one of said rings, a spring connected to said door for holding it in closed position, and means for opening said door in opposition to said spring; an annular element supported by one of said rings, and a balloon net in connection with said annular element.

10. In a balloon having a valve opening, an outer ring having holes therethrough, an inner ring, projections on the inner ring extending through the balloon material around the valve opening and through the holes in the outer ring, releasable clamping devices in connection with said projections for clamping said rings upon the edge of the balloon material around the valve openings, means for suspending the balloon net from said outer ring, a door hinged in connection with one of said rings, and a spring for holding said door in closed position and arranged to yield to permit the door to be opened.

11. In a balloon having a valve opening, an outer ring having holes therethrough, an inner ring, projections on the inner ring extending through the balloon material around the valve opening and through the holes in the outer ring, devices in connection with said projections for clamping said rings upon the balloon material around the valve opening, means for suspending the balloon net from said outer ring, a cross member in connection with one of said rings, a rod supported by said cross member, two metallic doors hinged to said rod and extending to opposite sides of said cross member to close the opening through said rings, a spring having one end connected to one of said doors and having its opposite end connected to the other door for holding said doors closed, a stationary spring seat supported by said cross member for holding said spring from lateral movement on the cross member, and means for opening said doors.

12. In a balloon having a valve opening, an outer ring having holes therethrough, an inner ring, projections on the inner ring extending through the balloon material around the valve opening and through the holes in the outer ring, devices in connection with said projections for clamping said rings upon the edge of the balloon around the valve opening, a cross member supported by one of said rings, a hinge rod supported at

the under side of the cross member, two doors hinged upon said rod and arranged to close the opening through said rings, springs extending across said cross member and having their inner end connected to one of said doors and having their opposite end connected to the other door, means in connection with said cross member to prevent lateral displacement of said rings, means for opening said doors, an annular element for supporting the balloon net, and means in connection with the outer ring for supporting said annular element. 10

HARRY E. HONEYWELL.