R. A. GALLY.

VALVE.

APPLICATION FILED AUG. 14, 1917.

1,255,090. Patented Jan. 29, 1918.

Fig. 1.

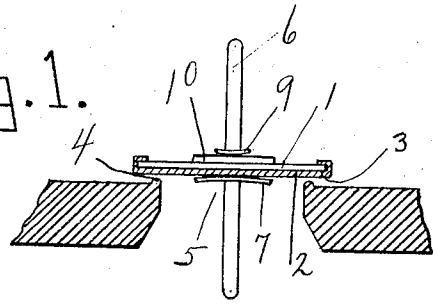


Fig. 2.

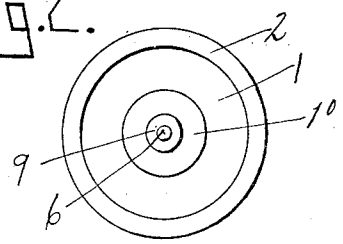


Fig. 3.

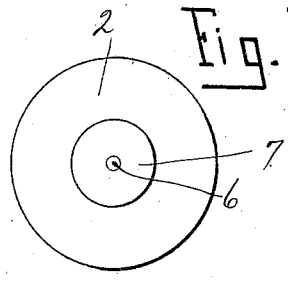
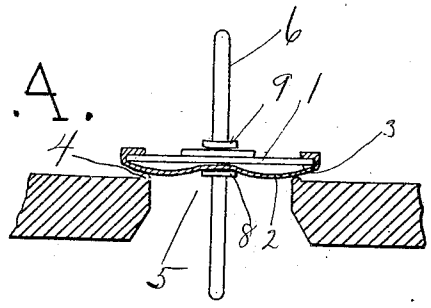


Fig. 4.



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VALVE.

1,255,090. Specification of Letters Patent. Patented Jan. 29, 1918.

Application filed August 14, 1917. Serial No. 186,224.

To all whom it may concern:

Be it known that I, ROBERT A. GALLY, a citizen of the United States, and residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Valves, of which the following is a specification.

Valves have long ago been made with rigid body parts of disk or other shapes, and having a flexible covering or facing on the face of the said body or disk that was toward the port, such flexible material being attached to such body or disk at or near the edge of the said face or on the sides of the body or disk but having a pouch like freedom of that part, of the covering opposite to the port, such structures being used in the organs of J. Peloubet and of this applicant, one such organ built by this applicant in 1894 being now in the Cincinnati Art Museum, Cincinnati, Ohio, and of circular or disk form in the pedal pipe valves of a church organ built by this applicant in 1897 for the Church of Our Father, Reading, Pa., and still in use there, somewhat similar small disk or button valves being shown in patent to Melville Clark #698905, April 29, 1902, but none of these prior valve devices embodied certain improvements of determining a definite amount of flexibility and yielding of the covering toward the port, and the special freedom yet air tight universal action and mounting of such a valve on its rod as is now set forth, such improvements having been devised by this applicant so as to be especially desirable for use in the delicate pneumatic action of player pianos and other musical instruments.

The nearest approach to the present structure is that form of player valve which has a rigid button or disk, and a facing disk of slightly flexible leather disposed against the face of the valve disk that is toward the valve seat and free from the valve disk, and a rigid flat washer slightly smaller than the diameter of the valve and unattached to the said facing, was positioned between the said facing and a collar fixed on the valve rod, such device required a character of leather that is now more difficult to secure than that suitable for the present invention, and the present invention requires only one collar or follower at the seating face of the valve instead of the washer and collar of the last described prior art.

In the drawing, Figure 1 is a view of a valve and its rod, a seat and port being also shown in section, the rod standing in the port, and the valve seated over the port; Fig. 2 is a plan view of the upper face of the valve, and Fig. 3 a plan view of the lower face of the valve; and in Fig. 4 is shown an undesirable form of the valve follower shown from the same view point as the valve of Fig. 1. Figs. 1 and 4 have the lower facing only cut away in section, the disks and rod remaining as solid showing.

While a valve of some thickness may be used with the flexible facing features of the present invention, and other forms than circular valves may be employed, the best results are to be obtained with circular valves, and such are preferable if of little thickness, and best if of some material that can be secured of perfectly flat surface and certain to remain so at all times and in all conditions, and yet as thin as possible, as for instance half-hard brass, of which it is to be understood the valves of the present drawings are supposed to be made.

Such a valve disk 1 is now shown with a flexible pouch like covering or facing 2, which is free from attachment to the face 3 of the valve disk 1 which is toward the seat 4 of the port 5, which port 5 and seat 4 are in a board or other part of an air flow apparatus. The facing 2 is made from an original circular punching of flexible material of somewhat greater diameter than the disk 1, and the marginal part of the said facing 2 is turned up around the edge of the disk 1 and over on to the upper face of the disk 1 and there attached by any suitable cement, as French varnish. Through a central hole in the disk 1 is extended a valve rod 6 of a diameter enough smaller than that of the central hole of the disk 1 as to allow a free rocking of the disk 1 on the said rod 6. The facing 2 has the rod 6 snugly passed through a hole in the center of the facing 2 so that no air may leak past that point.

A button, collar or follower 7 is fixed on the rod 6 adjacent the facing 2, which follower 7 is adapted to force the valve disk 1 away from the seat 4 of port 5 whenever the said valve rod 6 is moved upward. Were such a follower made of little diameter compared to that of the seat 4 of port 5, as shown by the improperly small follower 8 of Fig. 4, the flexible facing 2 would be

drawn down into a bag like shape as shown in said Fig. 4 when the rod 6 started to move the valve disk from its seat 4, thus causing a lost motion of valve action which would prevent a desirable operation of the valve. Therefore, the follower 7 is made of a considerable diameter as compared to the valve seat 4, and the face of the follower which is toward the facing 2 of the valve 1 is made to closely conform to the plane of that face of the said valve disk 1, to prevent the bagging of the facing 2, although it is desirable that the said face of the follower 7 should be slightly tapered or crowned to allow a proper rocking or universal movement of the valve disk 1 to insure a perfect seating of the valve to its seat even though the rod 6 should be somewhat out of true right angle to the plane of the face of the seat 4.

If no preventive means were employed, the air admitted around the rod 6 through the hole in the center of the disk 1 would cause two troubles; a leakage of such air through the facing 2, which is usually of a porous material like skived leather, and the false motion of the rod 6 and its follower 7 being drawn down and the follower 7 thus pulled away from the disk 1 by the bagging of the facing 2 as said air would enter from above at the said center hole of the disk 1. While a stop or collar 9 will prevent the pulling down of the rod 6, the air loss would still remain, and a punching placed on the rod 6 and resting on the disk 1 but not attached to the disk would be liable to allow some leakage, yet if such a punching were gummed entirely across its surface next to the disk 1 the fixed condition of the said punching would prevent very free rocking or universal motion of the valve on the rod. Therefore the collar 9 is used, preferable small and slightly tapered or crowned at its face toward the disk 1, and a thin flexible circular punching 10 as of skived leather is placed snugly on the rod 6 and gummed to the disk 1 at a distance from the said rod 6 and the central hole in the disk 1, but completely around the said punching 10 so that no air can enter under the punching to reach and pass the hole in the disk 1, yet the punching 10 has a freedom from the disk 1 at the central port of the punching 10 which engages the rod 6, so that the rod 6 and disk 1 are sufficiently free acting for an easy universal motion and seating of the valve to its seat. The punching 10 shown is of moderate size, but can be larger, and even extend to the edge of the disk 1, thus covering the drawn over margin of the facing 2.

Irrespective of the many variations of detail that may be made, what I claim as my invention is:—

1. A port and a circular seat surrounding the port; a rod extended through the said port and seat in the axis thereof; a valve disk of greater diameter than the diameter of the said seat and which disk is centered on the said rod, and a flexible sheet-like facing over one entire face of the said valve disk, and which face is toward the said port, and which said facing is attached to the said disk adjacent the edge of said disk, but free from attachment to the major part of the said one face of the said disk; and a follower on the said rod and contacting the said facing of the disk which is faced toward the said port, the said follower being of less diameter than the said port but of a sufficient diameter to prevent bagging of said flexible facing.

2. A port and a circular seat surrounding the port; a rod extended through the said port and seat and in the axis thereof; a valve disk of greater diameter than the diameter of the said seat and which disk is centered on the said rod and a flexible sheet-like facing over one entire face of the said valve disk, and which face is toward the said port, and which said facing is attached to the said disk adjacent the edge of said disk, but free from attachment to the major part of the said one face of the said disk; and a follower on the said rod and contacting the said facing of the disk which is faced toward the said port, the said follower being of less diameter than the said port but of sufficient diameter to check the inflation of the said facing.

3. A port and a circular seat surrounding the port; a rod extended through the said port and seat and in the axis thereof; a valve disk of greater diameter than the diameter of said seat and which disk is centered on the said rod, and a flexible sheet-like facing over one entire face of the said valve disk, and which face is toward the said port, and which said facing is attached to the said disk adjacent the edge of said disk, but free from attachment to the major part of the said one face of the said disk; and a follower on the said rod and contacting the said facing of the disk which is faced toward the said port, the said follower being of less diameter than the said port but of a sufficient diameter to prevent bagging of said flexible facing, the face of the said follower toward the said sheet-like facing substantially conforming to the surface of the said facing.

4. A port and a circular seat surrounding the port; a rod extended through the said port and seat and in the axis thereof; a valve disk of greater diameter than the diameter of the said seat and which disk is centered on the said rod, and a flexible sheet-like facing over one entire face of the said valve disk, and which face is toward the said port, and which said facing is attached to the said disk adjacent the edge of said

disk, but free from attachment to major part of the said one face of the said disk; and a follower on the said rod and contacting the said facing of the disk which is faced toward the said port, the said follower being of less diameter than the said port but of a sufficient diameter to prevent bagging of said flexible facing, the face of the said follower toward the said facing being slightly convex.

5. A port and a circular seat surrounding the port; a rod extended through the said port and seat and in the axis thereof; a valve disk of greater diameter than the diameter of the said seat and which disk is centered on the said rod, and a flexible sheet-like facing over one entire face of the said valve disk, and which face is toward the said port, and which said facing is attached to the said disk adjacent the edge of said disk, but free from attachment to the major part of the said one face of the said disk; and a follower on the said rod and contacting the said facing of the disk which is faced toward the said port, the said follower being of less diameter than the said port but of a sufficient diameter to prevent bagging of said flexible facing, and the said free part of the said facing substantially conforming to the face of the said follower that is toward the said facing.

6. A valve disk; a flexible facing over one face of the said disk; a circular valve seat less in diameter than the said disk and normally contacting the said facing, the said facing being free from attachment to the said face opposite to the said seat but attached to the said disk at a part beyond that opposite to the circumference of the said seat; a valve rod extended loosely through the center of the said disk and extending through the said facing and in snug engagement therewith, and a circular follower on the said rod and contacting the said facing and adapted to prevent an undesirable amount of inflation of the said facing.

7. A valve disk; a flexible facing over one face of the said disk; a circular valve seat less in diameter than the said disk and normally contacting the said facing, the said facing being free from attachment to the said face opposite to the said seat but attached to the said disk at a part beyond that opposite to the circumference of the said seat; a valve rod extended loosely through the center of the said disk and extending through the said facing and in snug engagement therewith; a circular follower on the said rod and contacting the said facing and adapted to prevent an undesirable amount of yielding of the said facing away from the said disk.

8. A valve disk; a flexible facing on each face of the said disk and extended from the center of the said disk outwardly of the said disk without attachment to the said disk at the center or for some distance therefrom, but each said facing attached to the said disk at a distance from the said center and completely around on a circular line on the said disk, each said circular line being substantially concentric with the said center of the said disk; and a rod extended loosely through the center of the said disk and snugly through both the said facings.

9. A valve disk; a flexible facing on each face of the said disk and extended from the center of the said disk outwardly of the said disk without attachment to the said disk at the center or for some distance therefrom, but each said facing attached to the said disk at a distance from the said center and completely around on a circular line on the said disk, each said circular line being substantially concentric with the said center of the said disk; and a rod extended loosely through the center of the said disk and snugly through both the said facings; one of the said facings being of greater diameter than the other said facing.

10. A valve disk; a flexible facing on each face of the said disk and extended from the center of the said disk outwardly of the said disk without attachment to the said disk at the center or for some distance therefrom, but each said facing attached to the said disk at a distance from the said center and completely around on a circular line on the said disk, each said circular line being substantially concentric with the said center of the said disk; and a rod extended loosely through the center of the said disk and snugly through the said facings at the unattached parts of the said facings.

11. A valve disk; a flexible facing on each face of the said disk and extended from the center of the said disk outwardly of the said disk without attachment to the said disk at the center or for some distance therefrom but each said facing attached to the said disk at a distance from the center and completely around on a circular line on the said disk, each said circular line being substantially concentric with the said center of the said disk; and a rod extended loosely through the center of the said disk and snugly through both the said facings; one of the said facings being of greater diameter than the other said facing, and the said extension of the said rod through the said facing being through the unattached parts of the said facings.

12. A valve disk; a flexible facing on each face of the said disk and extended from the center of the said disk outwardly of the said disk without attachment to the said disk at the center or for some distance therefrom, but each said facing attached to the said disk at a distance from the said center and completely around on a circular line of the said disk, each said circular line being substan-

tially concentric with the said center of the said disk; and a rod extended loosely through the center of the said disk and snugly through both the said facings, one of the said facings being of greater diameter than the other said facing; and a circular valve seat less in diameter than the unattached part of the said facing of the greater diameter and normally contacting the said unattached part of the said facing of the greater diameter.

13. A valve disk; a flexible facing on each face of the said disk and extended from the center of the said disk outwardly of the said disk without attachment to the said disk at the center or for some distance therefrom, but each said facing attached to the said disk at a distance from the said center and completely around on a circular line on the said disk, each said circular line being substantially concentric with the said center of the said disk; and a rod extended loosely through the center of the said disk and snugly through the said facings at the unattached parts of the said facings; a circular valve seat less in diameter than the unattached part of the said facing of the greater diameter and normally contacting the said unattached part of the said facing of the greater diameter.

14. A valve disk; a flexible facing on each face of the said disk and extended from the center of the said disk outwardly of the said disk without attachment to the said disk at the center or for some distance therefrom but each said facing attached to the said disk at a distance from the center and completely around on a circular line of the said disk, each said circular line being substantially concentric with the said center of the said disk; and a rod extended snugly through both the said facings; one of the said facings being of greater diameter than the other said facing, and the said extension of the said rod through the said facings being through the unattached parts of the said facings; a circular valve seat less in diameter than the unattached part of the said facing of the greater diameter and normally contacting the said unattached part of the said facing of the greater diameter.

15. A valve disk; a flexible facing on each face of the said disk and extended from the center of the said disk outwardly of the said disk without attachment to the said disk at the center or for some distance therefrom, but each said facing attached to the said disk at a distance from the said center and completely around on a circular line on the said disk, each said circular line being substantially concentric with the said center of the said disk; and a rod extended loosely through the center of the said disk and snugly through both the said facings; and two followers on the said rod, one follower contacting one of the said facings, and the other follower contacting the other of the said facings.

16. A valve disk; a flexible facing on each face of the said disk and extended from the center of the said disk outwardly of the said disk without attachment to the said disk at the center or for some distance therefrom, but each said facing attached to the said disk at a distance from the center and completely around on a circular line of the said disk, each said circular line being substantially concentric with the said center of the said disk; and a rod extended loosely through the center of the said disk and snugly through both the said facings; one of the said facings being of greater diameter than the other said facing, and the said extension of the said rod through the said facings being through the unattached parts of the said facings; a circular valve seat less in diameter than the unattached part of the said facing of the greater diameter and normally contacting the said unattached part of the said facing of the greater diameter; a circular follower on the said rod and contacting the facing of lesser diameter and adapted to restrict the major amount of inflation of the said facing; a follower on the said rod and contacting the said facing of the disk which is faced toward the said port, the said follower being of lesser diameter than the said seat, but of a sufficient diameter to prevent bagging of said flexible facing.

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Witnesses:
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