G. E. MACK.

PUMP VALVE.

APPLICATION FILED JUNE 11, 1909.

970,249.

Patented Sept. 13, 1910.

2 SHEETS—SHEET 1.

Fig 1.

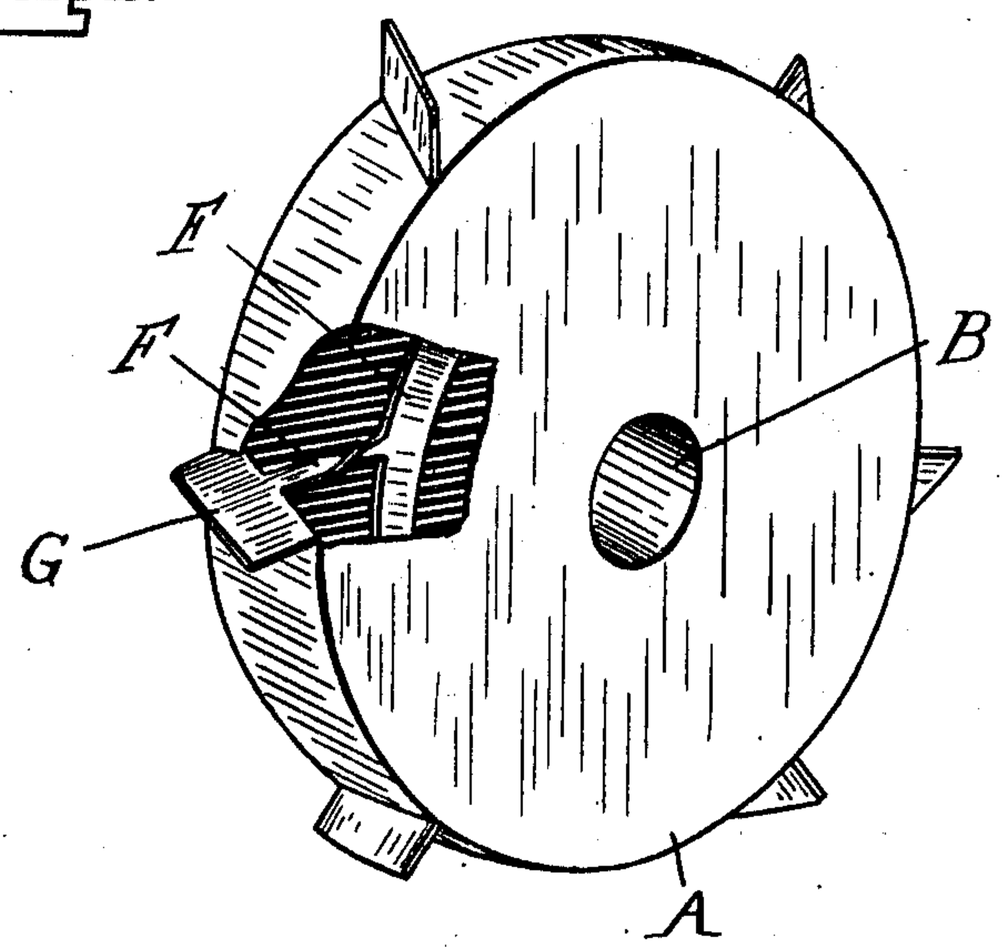
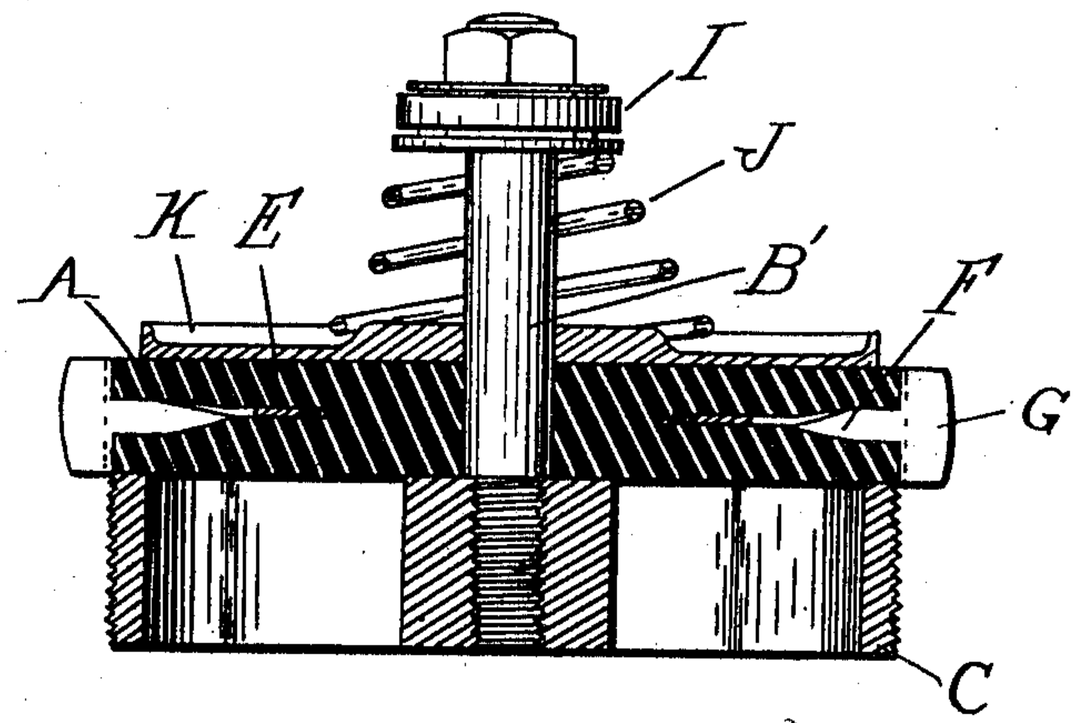


Fig 2.



Witnesses
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2 SHEETS—SHEET 2.

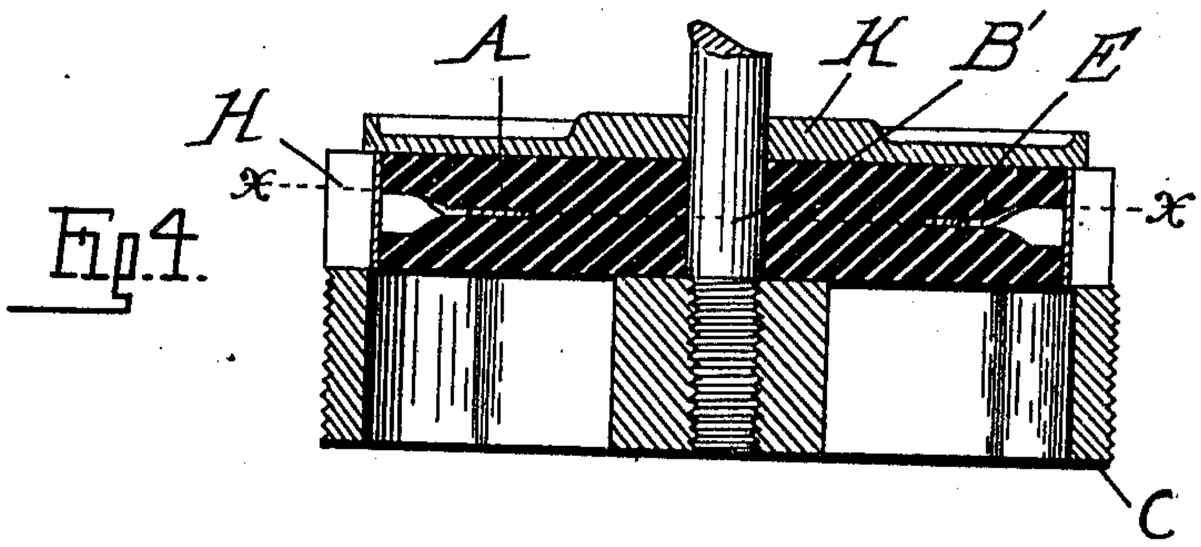


Fig. 4.

Fig. 3.

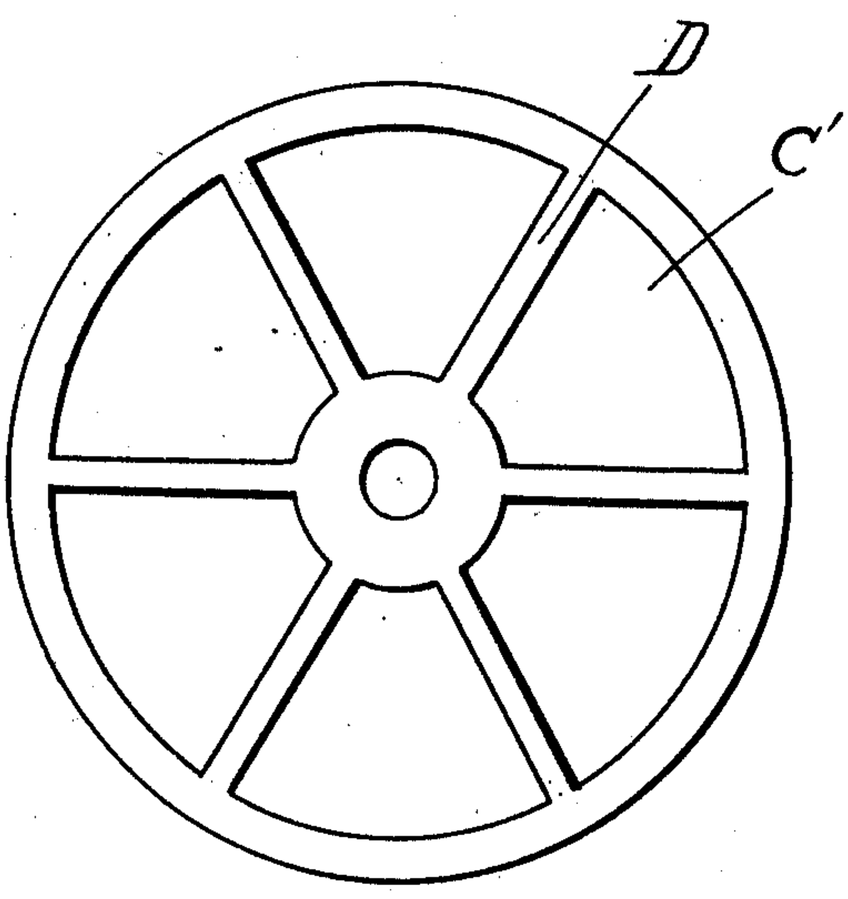
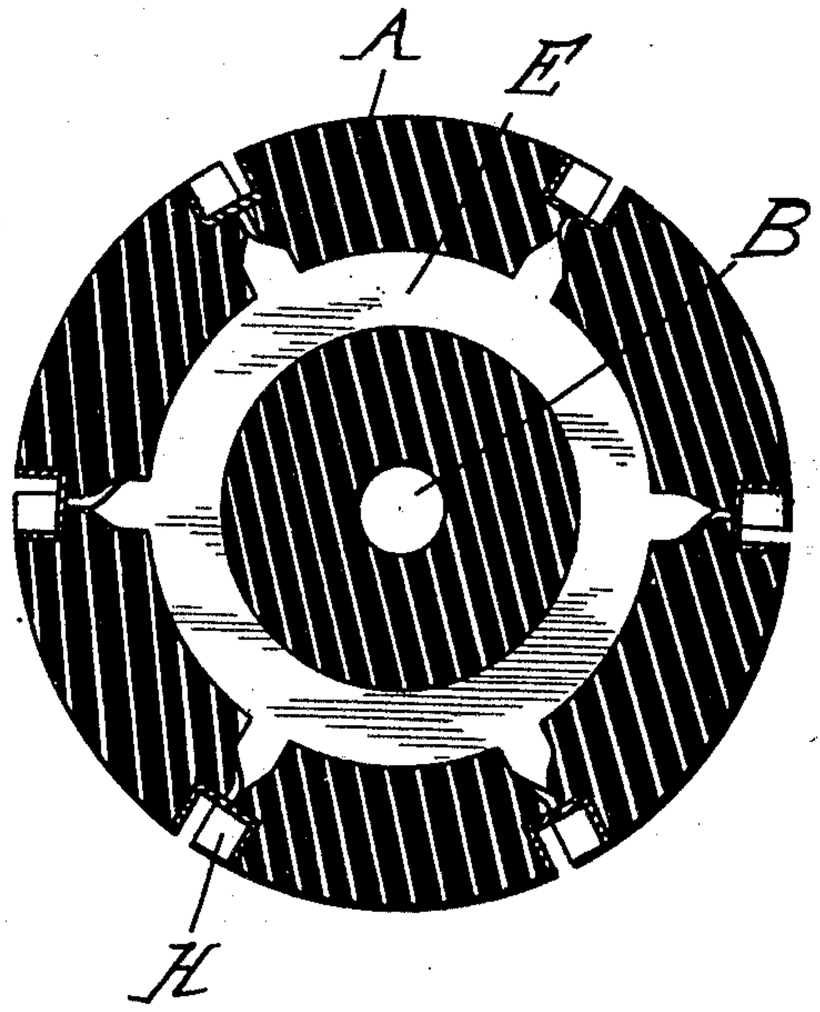


Fig. 5.



Witnesses

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UNITED STATES PATENT OFFICE.

GEORGE E. MACK, OF DETROIT, MICHIGAN.

PUMP-VALVE.

970,249. Specification of Letters Patent. Patented Sept. 13, 1910.

Application filed June 11, 1909. Serial No. 501,631.

To all whom it may concern:

Be it known that I, GEORGE E. MACK, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Pump-Valves, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention consists in the construction of a rubber pump valve having a reinforcement which spans the valve seat ports to prevent the pressure on the valve from forcing portions of the same into the ports between the radial bars of the seat, which action tends to cut the rubber and destroy the valve; also in providing marginal wings or passages with inclined surfaces whereby the passage of the fluid through the pump when the valve is lifted from its seat rotates the valve and presents a new surface for each seating, thus preventing the cutting of the cross-bars into the valve along a constant line, whereby the life of the valve is greatly increased, with maintenance at all times of a perfect seat; all as more fully hereinafter described and particularly pointed out in the claims.

In the drawings: Figure 1 is a perspective view of a valve showing the preferred form of my invention, part being broken away to illustrate the construction of the reinforcement wings; Fig. 2 is a vertical central section through my improved valve, of the construction shown in Fig. 1, applied to an ordinary form of valve seat in a pump; Fig. 3 is a plan view of the valve seat; Fig. 4 is a section through the valve-seat and valve embodying my invention in a modified form; Fig. 5 is a horizontal section on line *x*—*x* of Fig. 4.

A is a rubber valve of circular form, of the general shape and construction as now ordinarily in use in pumps for both high and low pressure. This valve has a central aperture B for the spindle B′ which projects from the valve seat C. In making this valve I provide, preferably interiorly thereof, a reinforcement which will span the valve seat ports C′ which are formed between the cross-bars D of the valve-seat, as such valve-seats are ordinarily formed. This reinforcement may take various forms, but the construction which I prefer is a thin flat metallic ring E (clearly shown in Fig. 1), embedded about midway of the height of the valve and approximately half way from the center to the edge thereof. This ring stiffens the valve so that when used—for instance in high pressure pumps—that portion of the valve which overlies the port C′ will not be forced into the ports, and thus by such bulging action tend to cut the valve upon the edges of the radial bars D of the valve-seat. Making this reinforcement of thin flat metal enables me to incorporate it in the body of the valve without materially lessening the amount of rubber and the flexibility of the valve and with least danger of separation of the rubber from the metal, and the cracking of the valve where hard rubber is used. While some advantage accrues from the use of this reinforcement I prefer to use it in connection with means which will rotate the valve upon its seat; thus presenting a new surface of the valve to the seat at each seating thereof. The rotation of the valve I accomplish by having inclined passages or wings at the margin of the valve itself, so that when the valve is lifted from its seat the fluid passing up beside the edge of the valve will give it a rotational movement. One manner of applying these wings is shown in Fig. 1, in which I make the arms F integral with the ring E and provide at the outer end the vanes or wings G extending in a plane transverse to the plane of the ring E and inclined thereto.

In the construction shown in Fig. 1, the ring E, arms F and wings G are shown as made of sheet metal, the arms being twisted intermediate their length to give the desired arrangement of the wings in relation to the valve. These wings project from the margin of the valve and, as described, are inclined so that as the fluid passing upward through the valve ports C′ impinges thereon, they will give the rotational movement to the valve.

In Fig. 4 I have shown a modified form of these wings, the ring E and arms F being the same as described in the construction shown in Fig. 1. At the end of the arms F I attach, as by soldering, the inclined channels H, set into the margin of the valve, these channels forming inclined passages for the fluid and effecting the same rotational movement of the valve as described for the construction shown in Fig. 1.

Instead of lining the inclined channels in the margin with metal, as shown in Fig.

4, I may make these same channels in the rubber itself without the metalic lining.

The pump valves ordinarily employed are used in connection with such valve seat as shown in Fig. 2, having a central ring I in which the spindle B′ is secured, the spindle having at its top a head I′ and a spring J interposed between the head I′ and the metallic disk K resting upon the top of the valve. This disk is not attached to the valve, for if it were the valve could only be used upon one side and it is desirable to reverse the valve so as to use both sides thereof, and thus obtain a double length of life therefrom. When thus unattached, as ordinarily employed, it does not act as a reinforcement to the valve because the fluid will get under it and the bulging of the valve at the port C′ will not be decreased—in fact, it will be increased by the pocketing of the water between the valve and the disk.

With the construction described, I find from practical use that the lower face of the valve, which rests upon the valve-seat, will wear with substantial uniformity at all points, instead, as heretofore has been the experience, of wearing in grooves along the line of the bars D; and that, therefore, the life of the valve will be very greatly increased.

While I have shown the wings or marginal passages combined with the reinforcement, and believe this to be desirable, the wings alone, without the reinforcement, may be employed, either by the metallic or other inclined projections, or, as before described, by making inclined marginal passages between wings formed in the valve itself.

What I claim as my invention is:

1. A pump valve comprising a body of rubber, or similar material, inclined wings projecting from the margin of the body and an anchor or holding means for said wings, embedded in the body of the valve.

2. In a rubber pump valve, the combination of a reinforcement spanning the valve seat ports, and marginal inclined wings integral with the reinforcement.

3. In a rubber pump valve, a metallic circular interior reinforcement spanning the valve seat ports and inclined marginal wings integral with said reinforcement.

4. In a rubber pump valve, a metallic, annular, interior reinforcement, radial arms thereon, and wings on the arms, the plane of the wings bisecting the plane of the reinforcement and inclined thereto.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE E. MACK.

Witnesses:
JOHN J. GABRIEL,
ADELAIDE F. ADAMS.