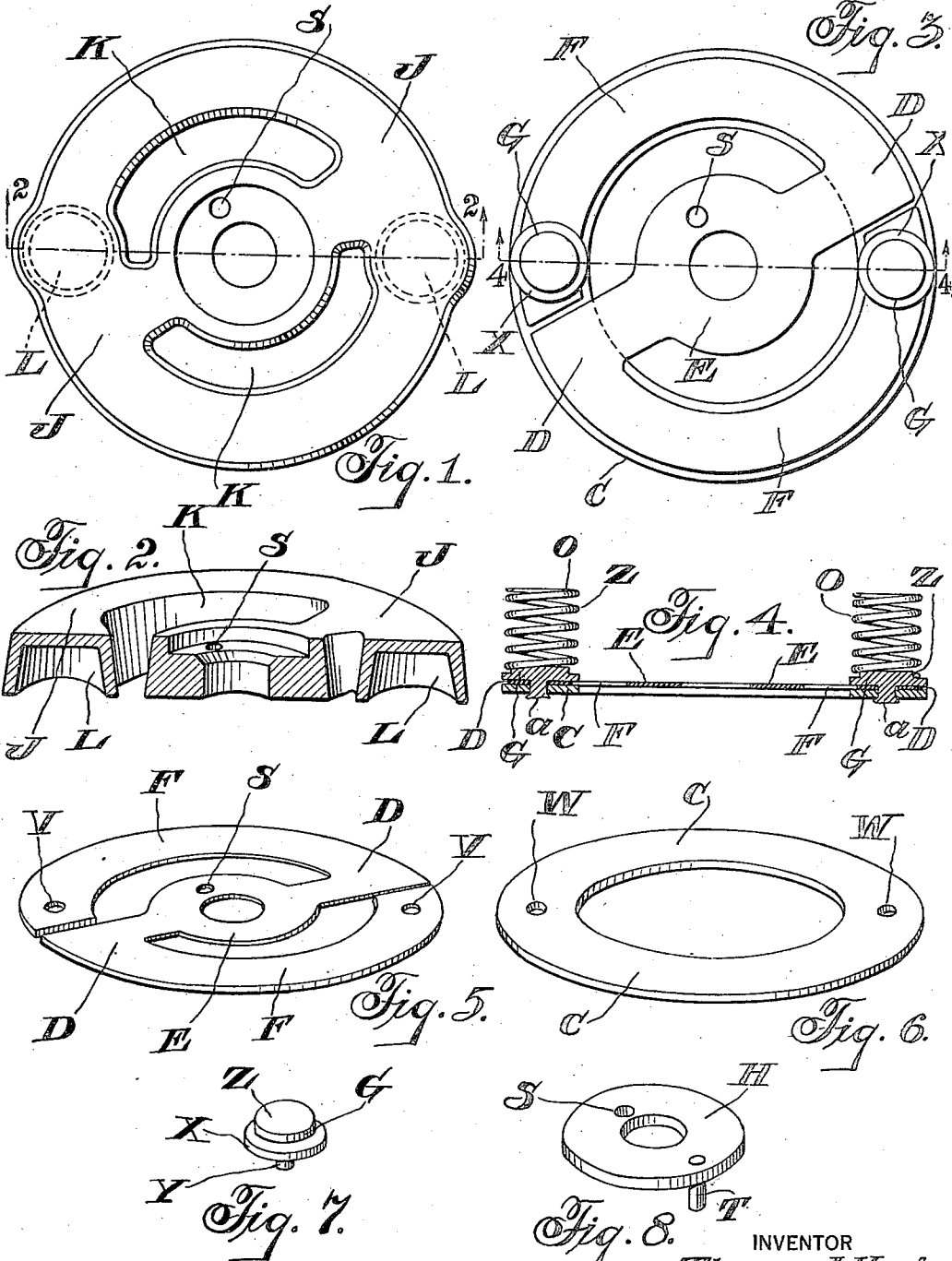


T. J. HART.
PLATE VALVE.
APPLICATION FILED MAR. 29, 1921.

1,416,637.

Patented May 16, 1922.
2 SHEETS—SHEET 1.



INVENTOR
Thomas U. Hart
BY
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ATTORNEY

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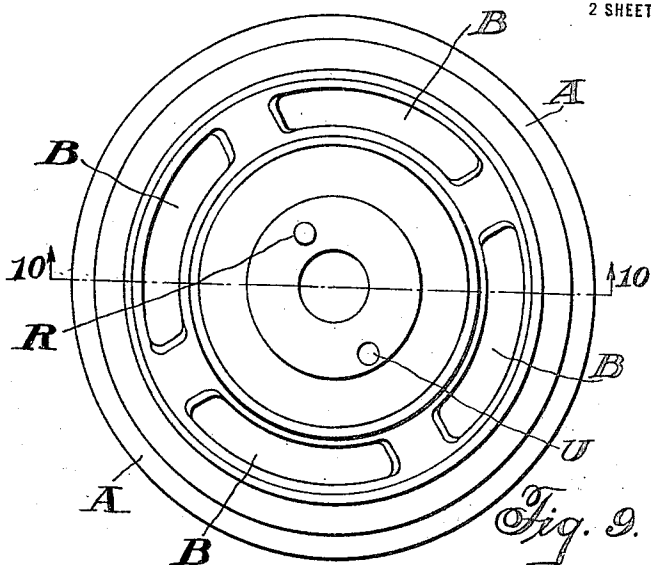


Fig. 9.

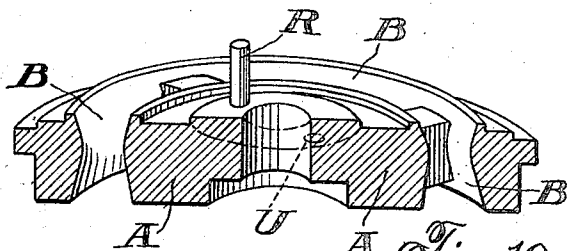


Fig. 10.

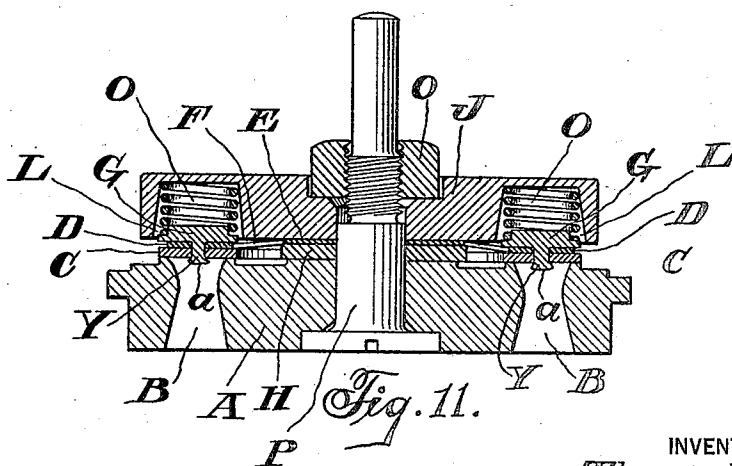


Fig. 11.

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UNITED STATES PATENT OFFICE.

THOMAS J. HART, OF CORNING, NEW YORK, ASSIGNOR TO INGERSOLL-RAND COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

PLATE VALVE.

1,416,637.

Specification of Letters Patent. Patented May 16, 1922.

Application filed March 29, 1921. Serial No. 456,597.

To all whom it may concern:

Be it known that I, THOMAS J. HART, a citizen of the United States, and a resident of Corning, county of Steuben, State of New York, have invented a certain Plate Valve, of which the following is a specification accompanied by drawings.

This invention relates to plate valves for pumps, compressors, blowing engines and the like, but more particularly to the type of plate valve disclosed in United States Patents Nos. 1,244,286 and 1,349,145 granted to J. C. Breinl, in which a valve guide is suitably attached to the valve plate, and a spacing washer is arranged between the valve guide and the valve seat the parts of the valve, including a stop plate being held together by the usual stud or bolt.

Instances have occurred in which an operator or workman unfamiliar with the valve has assembled the parts with the valve guide and valve plate directly on the valve seat, and the spacing washer on top of the guide instead of beneath the guide, resulting in distortion of the valve guide and shattering of the valve. The objects of the present invention are to prevent such occurrence and insure the assembling of the spacing washer between the seat and the valve guide. In accordance with my improved construction of valve, the valve cannot be assembled unless the washer is located in its proper position underneath the valve guide.

One of the preferred forms of my invention is shown in the accompanied drawings, in which I have chosen to illustrate a complete valve assembly of the plate valve type in order to make all details of the invention clear. So much of the drawings and specification as relate to the rivet construction between the valve guide and valve plate are covered by the copending application of Frederick W. Parsons, Serial No. 457186, filed March 31, 1921, but such features are herein shown in order that the valve may be illustrated and described substantially as actually manufactured.

In the drawings Figure 1 is a top plan view of a stop plate.

Figure 2 is a transverse sectional view of the stop plate on the line 2—2 of Figure 1 looking in the direction of the arrows.

Figure 3 is a top plan view of the valve guide and valve plate, with the springs omitted;

Figure 4 is a transverse sectional view of the valve guide and valve plate on line 4—4 of Figure 3 looking in the direction of the arrows with the springs in position over the rivets;

Figure 5 is a detail perspective view of the valve guide;

Figure 6 is a detail perspective view of the valve plate;

Figure 7 is a detail perspective view of one of the rivets for riveting the guide arms to the valve plate;

Figure 8 is a perspective view of the spacing washer showing the safety dowel;

Figure 9 is a top plan view of the valve seat;

Figure 10 is a transverse sectional view of the valve seat on the line 10—10 of Figure 9 looking in the direction of the arrows, and

Figure 11 is a transverse sectional elevation of the valve with the parts assembled taken on the line 10—10 of Figure 9.

Referring to the drawings and at first more particularly to the assembly shown in Figure 11, a discharge valve is illustrated, although the invention applies equally to an inlet valve, and the valve comprises a valve seat A having the ports B, a valve plate C, a valve guide D having a central body portion E and curved guide arms F attached to the valve plate C by means of the rivets G, a spacing washer H adapted to be arranged beneath the valve guide D and between the valve guide and the valve seat A, a stop plate or guard J having apertures K, and recesses L for the reception of springs O preferably adapted to be seated upon the rivets G, so that the springs do not bear directly upon the valve guide and any wear occurs upon the rivet heads rather than upon the metal of the guide. A suitable stud or bolt P having a nut Q is provided for holding the parts together.

A centering or aligning dowel R preferably secured to the valve seat A is provided for insuring the proper angular adjustment of the parts as assembled, and the washer H, the valve guide D, and the stop plate J are each provided with an aperture

S through which the dowel R passes in assembling the parts. The washer H is also provided with a safety dowel T on one side adapted to enter the dowel hole U in the valve seat so that if the washer H should be placed over the valve guide, the safety dowel T would interfere with the proper assembly and indicate that the washer was in the wrong place.

10 In a valve of the type illustrated and described, it has been found desirable to make the valve guide D of thinner and more resilient material than the metal of the valve plate C and preferably construct the guide arms F narrower than the width of the valve plate. By such relative difference in the thickness and quality of the metal of the two parts and the narrower width of the guide arms, better results are obtained, especially in cooperation with the form of rivet construction shown.

In riveting the guide arms F and the valve plate C together the rivets are preferably placed at the ends of the guide arms and for this purpose rivet holes V are provided in the guide arms adapted to register with the rivet holes W in the valve plate. A substantial bearing surface should be provided between the valve guide or guide arms and the valve plate, which insures a more uniform bending action in the guide arms and body portion of the valve guide as the valve lifts and seats and tends to prevent breakage of the valve guide. In order to produce this substantial bearing surface between the guide arms and the valve plate, the heads X of the rivets are made materially larger in diameter than the body portions or shanks Y of the rivets. The rivet heads X are preferably made substantially equal to or greater in diameter than the width of the guide arms F as illustrated particularly in Figures 3 and 11 in which the rivet heads X are substantially equal in diameter to the width of the valve plate C and project slightly beyond the edges of the guide arm F. This construction as illustrated and described need not be followed in exact detail, since equivalent constructions may be devised for accomplishing the same objects.

The guide arms and valve plate are riveted together with the rivet heads on the guide arm side of the valve and the rivet shanks Y are preferably upset sufficiently at a to hold the rivets in position, without, however, appreciably expanding the said rivet shanks in the rivet holes in order to

avoid initial strain on the metal of the guide arms and valve plate. The heads of the rivets are also preferably provided with reduced cap portions Z affording means for seating the coiled springs O over the rivet heads on said reduced cap portions. By this means the springs are centered and may be retained on the rivet heads.

I claim:—

1. A valve comprising a seat, a valve plate, a valve guide, a spacing washer adapted to be assembled between the seat and guide, means connected to the seat and passing through the washer and guide for aligning the parts of the valve, safety devices cooperating between the washer and seat for insuring the assembling of the washer between the seat and guide and means for holding the parts of the valve together.

2. A valve comprising a seat, a valve plate, a guide secured to the valve plate, a spacing washer adapted to be assembled between the seat and guide, a dowel pin on the seat adapted to pass through apertures in the washer and guide for aligning the parts of the valve, a safety dowel on the washer adapted to enter an aperture in the seat for insuring the assembling of the washer between the seat and guide and a central bolt for holding the parts of the valve together.

3. A valve comprising a seat, a valve plate, a valve guide, a stop plate for the valve and guide, a spacing washer adapted to be assembled between the seat and guide, means connected to the seat and passing through the washer, guide and stop plate for aligning the parts of the valve, safety devices cooperating between the washer and seat for insuring the assembling of the washer between the seat and guide, and means for holding the parts of the valve together.

4. A valve comprising a seat, a valve plate, a guide secured to the valve plate, a stop plate for the valve and guide, a spacing washer adapted to be assembled between the seat and guide, a dowel pin on the seat adapted to pass through apertures in the washer, valve guide and stop plate for aligning the parts of the valve, a safety dowel pin on the washer adapted to enter an aperture in the seat for insuring the assembling of the washer between the seat and guide and a central bolt for holding the parts of the valve together.

In testimony whereof I have signed this specification.

THOMAS J. HART.