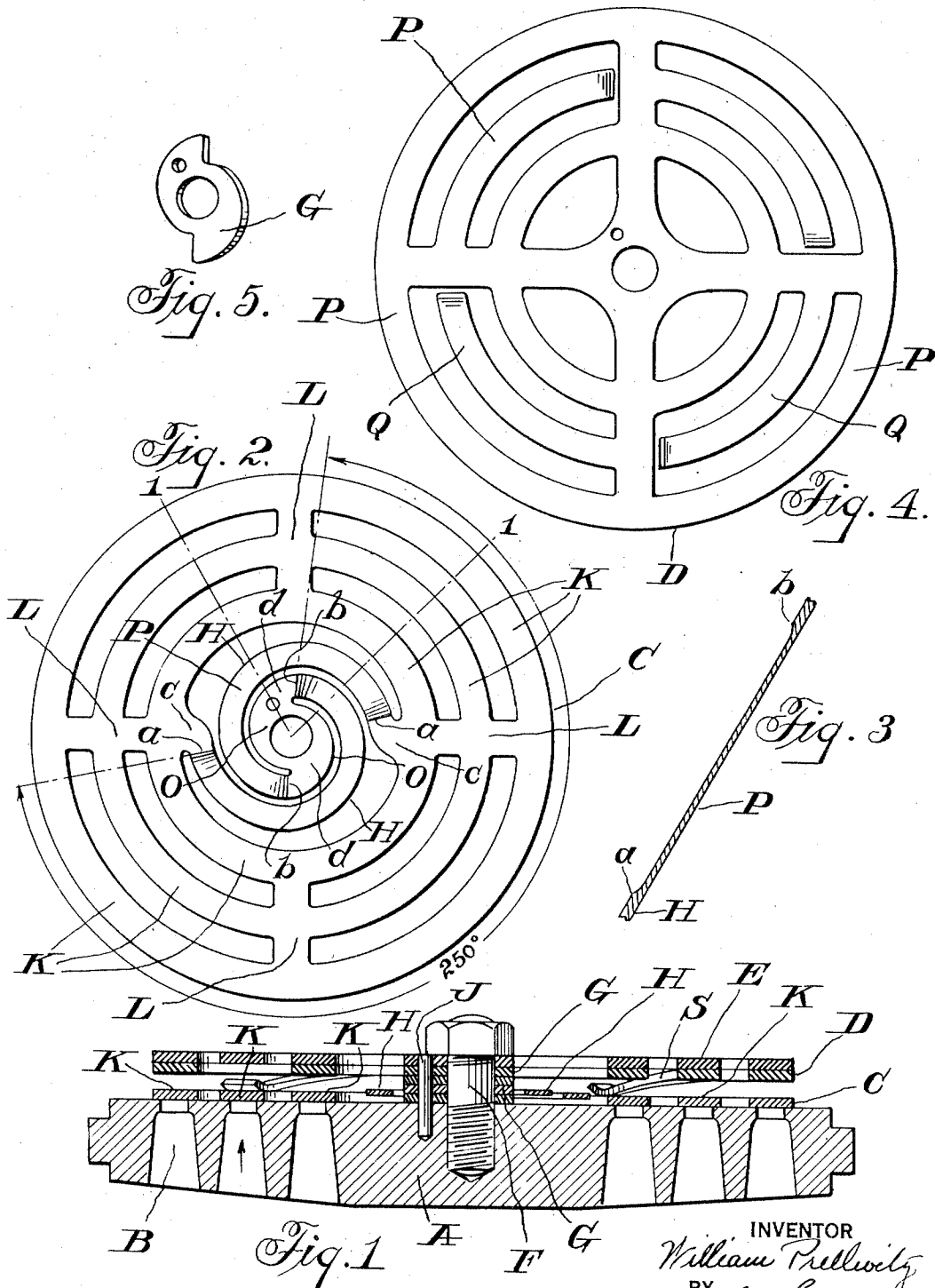


W. PRELLWITZ.
 PLATE VALVE.
 APPLICATION FILED APR. 12, 1920.

1,385,147.

Patented July 19, 1921.



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PLATE-VALVE.

1,385,147.

Specification of Letters Patent.

Patented July 19, 1921.

Application filed April 12, 1920. Serial No. 373,238.

To all whom it may concern:

Be it known that I, WILLIAM PRELLWITZ, a citizen of the United States, residing at Easton, in the county of Northampton and State of Pennsylvania, have invented a certain new and useful Improvement in Plate-Valves, of which the following is a specification.

This invention relates to plate valves for pumps, compressors, blowing engines and the like, but more particularly to the type of valve known as the "Rogler" valve patented to F. W. Rogler by U. S. Patent No. 921,892, granted May 18, 1909.

The present invention is an improvement upon the "Rogler" type of valve especially adapted for the larger sizes although the principles of my invention are applicable to the smaller sizes. The primary objects of valves of this type are to insure that the valve lifts an equal distance over all parts of its seat, and returns or seats itself in the same place every time it comes back to its seat. Another object of valves of this type is to have the guide arms sufficiently flexible to enable the body of the valve to move up and down through the required lift without straining the steel and at the same time keep enough rigidity in the guide arms to prevent the valve from having side motion.

The primary objects of this invention are to provide sufficiently long and flexible spring arms so that the lift may be materially increased and with a given diameter of valve, wider ports and higher lifts can be used which will increase the capacity and efficiency of a valve of given diameter. My spring arms also have sufficient rigidity to prevent side motion. Another object of the invention is to provide a spring stop plate having spring arms which bear upon intermediate portions of the valve plate so as to more uniformly distribute the pressure, the continuous outer ring of the stop plate forming a yielding buffer for the outer ring of the valve to strike against and limit its upward movement.

The invention is shown in one of its preferred forms in the accompanying drawings in which—

Figure 1 is a sectional side elevation having the valve plate in section on the line 1—1 of Fig. 2,

Fig. 2 is a top plan view of the valve plate,

Fig. 3 is an enlarged detail longitudinal sectional view broken away through the thinned or reduced portion of one of the guide arms laid out straight instead of in spiral form as shown in Fig. 2.

Fig. 4 is a top plan view of the spring stop plate, and

Fig. 5 is a detail perspective view of one of the valve plate washers for use in assembling the valve parts.

Referring to the drawings, A represents a suitable valve seat for a plate valve of this type, having the passage ways B over which the valve plate C shown in Fig. 2 is adapted to seat. Fig. 1 illustrates the invention as applied to a discharge valve but it may be applied equally well to an inlet valve. A suitable apertured spring stop plate D shown in Fig. 4 is adapted to be mounted over the valve plate and a suitable buffer plate E may, if desired, be placed over the stop plate, if additional stiffness is wanted, the parts being held together as by means of the bolt F. In assembling the parts, washers G shown in Fig. 5 are preferably placed above and below the valve plate C as usual so that the spring guide arms H of the valve plate are in an intermediate position in respect to movement up or down. A dowel pin J is also preferably provided for maintaining the relative position of the parts always the same.

The valve plate C is formed in this instance of sheet metal with a plurality of continuous concentric rings K preferably connected to one another at symmetrically arranged sets of points L and the central portion O is connected to the inner ring K by means of a plurality of nested integral spiral guide arms H, which are adapted to lie wholly within the inner-most concentric ring portion of the valve, over the central unported area of the valve seat A and function solely as guides in contra-distinction to valve plates. These guide arms H are preferably made thinner than the body of the valve as indicated at P in Fig. 3 and the thinned portions extend substantially from the points *a* to the points *b* as indicated by the shading on Fig. 2. This produces increased flexibility of the guide arms H.

The guide arms H preferably join the inner concentric ring K at the points *c* substantially in line with diametrically oppo-

site radial sets of said symmetrically arranged connecting points L, and the guide arms H join the central portion O of the valve at suitable points *d* which are so located as to make the length of the spirals as long as possible. By forming the spiral arms H as described, or in equivalent manner, I am enabled to provide longer arms than heretofore each of which subtends a maximum angle at the center preferably greater than 180° , and in the instance shown in the drawings they subtend the relatively large angles of approximately 250° or greater.

In order to form the relatively long spiral arms H, they are constructed in any suitable and usual manner, in this instance on approximate spiral continuous curves, so that each spiral arm lies partly within the other to a sufficient extent to permit each arm to subtend the desired large angle. The angles subtended should preferably be measured from the points *a* and *b* between which the arms H are made thinner for flexibility, as these thinner portions of the arms are the effective portions for spring purposes.

By making the arms H spiral or approximately spiral relatively to the center, it is possible to nest them in such a way that they each extend around the center more than 180° , while if the arms were circular from the center as in the case of the Rogler valve and others, the limit of the extent of their thinned portions is materially less than 180° around the center.

I claim:

1. A sheet metal valve comprising a central portion, a continuous ring portion forming a valve plate adapted to seat over ports in a valve seat, and a plurality of nested integral spiral guide arms connecting said central and ring portions and adapted to lie wholly within the ring portion of the valve over the central unported area of a valve seat and function solely as guides in contradistinction to valve plates, the spiral curve of each of said guide arms being of sufficient length to subtend angles greater than 180° at the center of the valve.

2. A sheet metal valve comprising a central portion, a continuous ring portion forming a valve plate adapted to seat over ports in a valve seat, and a plurality of nested spiral guide arms connecting said central and ring portions and adapted to lie wholly within the ring portion of the valve over the central unported area of a valve seat and function solely as guides in contradistinction to valve plates, each of said spiral guide arms having a thinned portion of sufficient length to subtend an angle greater than 180° at the center of the valve.

3. A sheet metal valve comprising a central portion, a continuous ring portion forming a valve plate adapted to seat over ports

in a valve seat, and a plurality of nested integral spiral guide arms connecting said central and ring portions and adapted to lie wholly within the ring portion of the valve over the central unported area of a valve seat and function solely as guides in contradistinction to valve plates, each of said spiral guide arms having a thinned portion of sufficient length to subtend an angle greater than 180° at the center of the valve.

4. A sheet metal valve comprising a plurality of continuous concentric rings connected to one another at sets of symmetrically arranged points and forming valve plates adapted to seat over ports in a valve seat, a central portion, and a plurality of nested integral spiral guide arms connecting the inner concentric ring with the central portion of the valve and adapted to lie wholly within the inner concentric ring portion of the valve over the central unported area of a valve seat and function solely as guides in contradistinction to valve plates, each of said guide arms having a thinned portion of sufficient length to subtend an angle greater than 180° at the center of the valve.

5. A sheet metal valve comprising a plurality of continuous concentric rings connected to one another at sets of symmetrically arranged points and forming valve plates adapted to seat over ports in a valve seat, a central portion, and a plurality of nested integral spiral guide arms joining the inner concentric ring substantially in line with diametrically opposite radial sets of said connecting points and joining the central portion of the valve at positions substantially in line with radial sets of said connecting points at right angles to said first named sets of points, each of said spiral guide arms thereby subtending an angle greater than 180° at the center of the valve, and said guide arms being adapted to lie wholly within the inner concentric ring portion of the valve over the central unported area of a valve seat and function solely as guides in contradistinction to valve plates.

6. A sheet metal valve comprising a plurality of continuous concentric rings connected to one another and forming valve plates adapted to seat over ports in a valve seat, a central portion, and a plurality of nested integral spiral guide arms connecting the inner ring and said central portion and adapted to lie wholly within the inner ring portion of the valve over the central unported area of a valve seat and function solely as guides in contradistinction to valve plates, said guide arms having portions thinner than the rings subtending angles greater than 180° at the center of the valve.

7. A valve comprising a seat, a sheet metal valve having continuous concentric

5 rings forming valve plates adapted to seat
over ports in said seat, a central portion for
the valve and a plurality of nested integral
spiral guide arms connecting the inner con-
centric ring with the central portion of the
valve and adapted to lie wholly within the
inner concentric ring portion of the valve
over the central unported area of the said
valve seat and function solely as guides in
10 contra-distinction to valve plates, each of
said spiral guide arms having a thinned por-
tion of sufficient length to subtend an angle
greater than 180° at the center of the valve,
a stop plate having spring arms bearing on
15 the valve plate and means for holding the
parts of the valve together.

8. A sheet metal valve comprising a seat,
a valve plate having a central portion and
concentric ring portions and spiral arms
20 connecting said central portion to the inner
ring portion, each of said spiral arms hav-

ing a thinned portion of sufficient length to
subtend an angle greater than 180° at the
center of the valve, a stop plate having a
plurality of concentric rings connected to- 25
gether and spring arms intermediate the
rings, and means for holding the parts of
the valve together.

9. A sheet metal spring stop plate for a
plate valve, comprising a plurality of con- 30
centric ring portions connected together at
symmetrically arranged points, the interme-
diate rings being cut to form spring arms.

10. A sheet metal spring stop plate for a
plate valve, comprising a plurality of con- 35
centric ring portions and intermediate con-
centric spring tongues cut from the metal
of the plate.

In testimony whereof, I have hereunto set
my hand.

WILLIAM PRELLWITZ.