

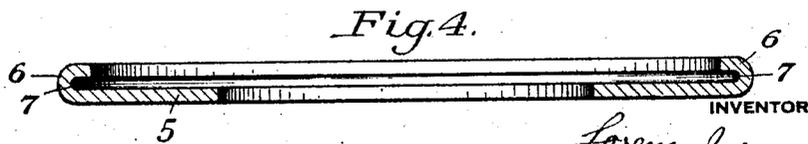
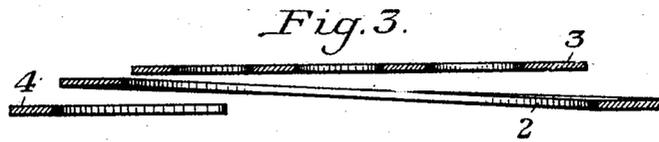
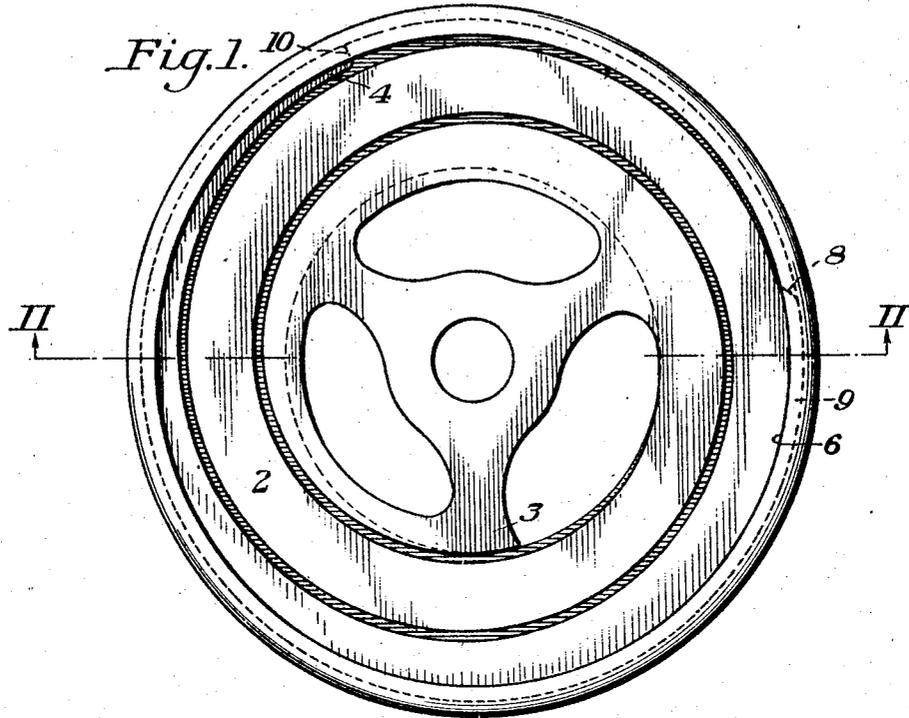
Jan. 25, 1927.

L. IVERSEN

1,615,279

VALVE

Filed Jan. 23, 1924



INVENTOR

*Lorenz Iversen,  
by Cyner, Robbins & Carmelle,  
his attys.*

# UNITED STATES PATENT OFFICE.

LORENZ IVERSEN, OF PITTSBURGH, PENNSYLVANIA.

## VALVE.

Application filed January 23, 1924. Serial No. 637,970.

The present invention relates broadly to valves, and more particularly to valves and valve springs of the character adapted for use with fluid compressors and pumps.

5 It has heretofore been proposed in the art to which this invention relates to construct valves of this general character with a separate valve plate and a spring of either circular or rectangular cross section secured  
10 thereto.

It has also been proposed to construct valves for this purpose in which the valve plate and the spring are integral.

15 In order to secure proper operation of the valve, it is desirable to have a spring of such cross sectional shape that sufficient area is provided in a direction at substantially right angles to the axis of the spring to resist lateral deflection, the spring in valves of  
20 this character usually serving as the only guiding means for the valve. Due to the rapidity with which valves of this character frequently operate, it is essential that the union between the spring and the valve  
25 plate be as secure as possible, while enabling the valve plate to be removed and a new plate substituted as may be required. In accordance with the present invention, there are obtained all of the advantages inherent  
30 in the use of a spring of the character referred to, together with the detachable valve plate having such a connection with the spring that substantially the strength of unitary construction is obtained.

35 In the accompanying drawings, there is shown, for purposes of illustration only, a preferred embodiment of the present invention, it being understood that the drawings do not define the limits of my invention, as changes in the construction disclosed  
40 may be made without departing from the spirit of the invention or scope of my broader claims.

In the drawings:

45 Figure 1 is a top plan view of the valve spring and valve plate in assembled relationship;

Figure 2 is a vertical transverse sectional view on the line II—II of Figure 1;

50 Figure 3 is a view similar to Figure 2, illustrating the valve spring removed from the plate; and

Figure 4 is a view similar to Figure 2, illustrating the plate apart from the spring.

55 In accordance with the present invention, there is provided a valve spring 2 of sub-

stantially the construction disclosed in my earlier United States Patents Nos. 1,201,826 and 1,201,827 of October 17, 1916. This spring comprises a plurality of convolutions  
60 adapted, when the spring is compressed, to nest, as will be clearly understood. The end convolutions 3 and 4 are substantially flat, the convolution 4 being constructed for attachment to a plate 5 and the convolution  
65 3 being adapted to be attached to a support, as well understood in the art. The spring is of substantially rectangular cross section, being preferably constructed of relatively  
70 thin flat metal with a sufficient cross sectional area throughout its length in a direction at right angles to the axis of the spring to resist lateral deflection. By reason of this shape, sufficient rigidity is provided to accurately guide the valve during  
75 its opening and closing movements without the provision of any auxiliary means. The valve plate 5 preferably comprises an annulus of sheet metal having its outer peripheral edge 6 turned upwardly and inwardly,  
80 thereby providing a peripheral recess 7. The diameter of the recess is preferably substantially equal to or slightly less than the external diameter of the larger end of the convolution 4. In order to permit this larger  
85 end convolution to be inserted in the recess, it is provided with a shoulder 8, forming a projecting portion 9, adapted to underlie the inturned edge 6 and is preferably of gradually decreasing width from the  
90 shoulder to the end 10. By reason of this decrease in the cross sectional area, the end convolution may be compressed radially to an extent to permit its being slipped into position through the inturned edge 6 of the  
95 valve plate and into the recess 7. It will be apparent that immediately upon coming opposite the recess, the convolution expands outwardly into tight frictional engagement with the walls thereof and forms a firm connection between the valve spring and the  
100 valve plate.

By having the inturned edge 6 around the outer periphery of the valve plate, a point of attachment for the spring adjacent the  
105 maximum diameter of the valve is provided.

This effectively holds the valve against any twisting tendency. At the same time, the construction is such that either the valve spring or the valve plate may be independ-  
110 ently renewed at will.

In my copending application, Serial No.

687,971, filed of even date herewith, I have disclosed and claimed a method of forming a valve plate around a spring, whereby the necessity of compressing the spring for the original assembly is obviated.

The advantages of the present invention arise from the provision of a valve of the character described, in which either the valve plate or the valve spring may be individually renewed. Still further advantages arise from the provision in a valve of this character of a spring comprising a series of nesting convolutions and so constructed that lateral deflection is effectively resisted.

I claim:

1. As an article of manufacture, a valve having an inturned peripheral flange with a receiving recess between the flange and the body of the valve, a tapered convolute spring formed of flat metal, the outermost convolution of the spring having a free end and an abrupt shoulder intermediate the length of said convolution, the said outermost convolution of the spring being detachably secured in position in the recess in the valve between the end of said convolution and said shoulder, substantially as described.

2. As an article of manufacture, a valve having an inturned peripheral flange with a spring receiving recess between the flange and the body of the valve, a tapered convolute spring formed of flat metal, the outermost convolution of the spring having a free end and an abrupt shoulder intermediate the length of said convolution, the major portion of the said outermost convolution being

detachably secured in position in the recess of the valve between the end of the convolution and said shoulder, substantially as described.

3. As an article of manufacture, a valve having an inturned peripheral flange with a spring receiving recess between the flange and the body of the valve, a tapered convolute spring formed of flat metal, the outermost convolution of the spring having a free end and an abrupt shoulder intermediate the length of said convolution, the said outermost convolution being detachably secured in position in the recess in the valve between the end of the convolution and said shoulder, and means for securing the inner convolution to a seat for the valve, substantially as described.

4. As an article of manufacture, a valve having an inturned peripheral flange with an annular spring-receiving recess between the flange and the body of the valve, a tapered convolute spring formed of flat metal, the outermost convolution of the spring having a free end and an abrupt shoulder intermediate the length of said convolution, the outer edge of said convolution between the end and the shoulder being substantially concentric with the wall of the recess and detachably secured in position in said recess, while the inner edge of said convolution is spirally arranged relative to the valve, substantially as described.

In testimony whereof I have hereunto set my hand.

LORENZ IVERSEN.