

No. 711,780.

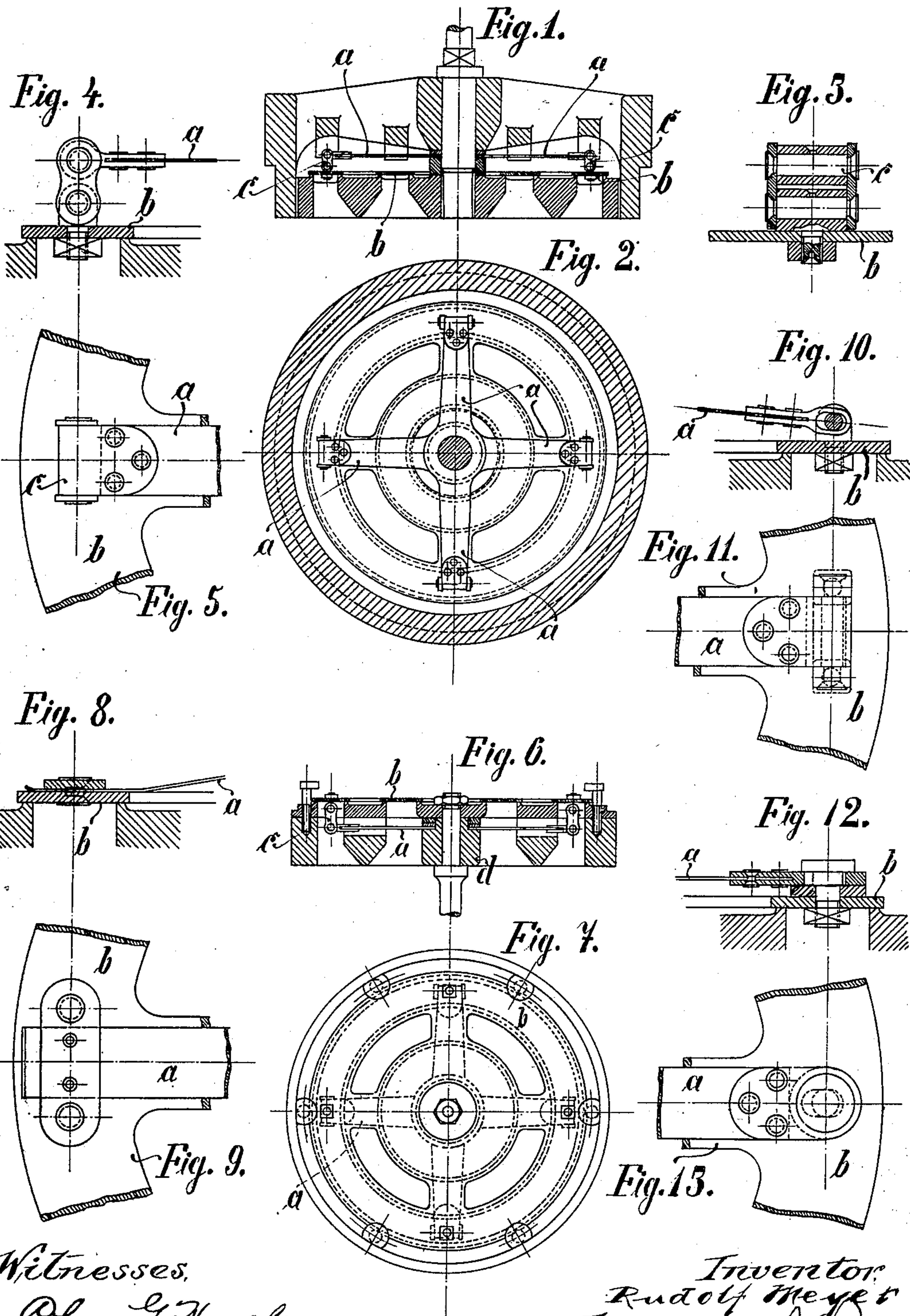
Patented Oct. 21, 1902.

R. MEYER.

VALVE.

(Application filed Sept. 11, 1901.)

(No Model.)



Witnesses,
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UNITED STATES PATENT OFFICE.

RUDOLF MEYER, OF MULHEIM-ON-THE-RUHR, GERMANY.

VALVE.

SPECIFICATION forming part of Letters Patent No. 711,780, dated October 21, 1902.

Application filed September 11, 1901. Serial No. 75,003. (No model.)

To all whom it may concern:

Be it known that I, RUDOLF MEYER, a subject of the King of Prussia, German Emperor, residing at Mulheim-on-the-Ruhr, in the Kingdom of Prussia, Germany, have invented certain new and useful Improvements in Valves, of which the following is a specification.

My present invention relates to improvements in non-controlled or self-acting valves for gas or liquid pumps in which the valve-piece having the form of a thin annular plate is not guided by cylindrical projections, but by flat springs arranged at right angles, which likewise effect the closing of the valve. The springs are not rigidly attached to the annular plate, for example, by rivets, but by means of a pivoted link, forming a kind of hinge, or by some similar means.

In the accompanying drawings, Figure 1 is a diametric section of a pressure-valve constructed in accordance with my invention. Fig. 2 is a cross-section showing the springs and valve-plate in elevation. Figs. 3, 4, and 5 represent a section, side elevation, and plan, respectively, of the link connecting the springs to the valve-plate; Fig. 6, the diametric section of a suction-valve constructed in accordance with my invention; Fig. 7, a plan of the same valve; and Figs. 8, 9, 10, 11, 12, and 13 represent details hereinafter described.

The springs *a*, which may be composed of a single piece of sheet metal or other suitable material, may when several such are provided be arranged crosswise or in the form of a star and are rigidly secured at the middle point. The ends of these springs can only move at right angles to the valve-plate and in consequence of their relatively large breadth are not capable of any movement in the plane of said plate. When the ends of the springs are secured to the valve-plate *b* by pivoted links *c* of the kind shown in Figs. 3, 4, and 5, the valve-plate could, if only one spring were used—that is, two radial arms—vibrate or tilt about these arms. Such a tilting movement of the valve-plate is, however, excluded if a second pair of arms is used at right angles to the first pair. When two springs are arranged crosswise in this manner, the valve-plate *b* when exposed to a uniform pressure throughout its entire surface will move parallel to its seat without any lateral displacement, and consequently without friction. The same effect is also pro-

duced, although not with the same certainty, with three radial arms fastened at the middle and connected to the valve-plate by links in the manner above described. Of course for large valves a larger number of springs may be used than above set forth; but two single springs arranged crosswise or four radial arms, as shown in Fig. 2, will be found sufficient for the largest valves. It is, however, in every case necessary to provide at least three or four radially-arranged springs.

In Figs. 6 and 7 one method of applying this invention to a suction-valve is shown. As will be evident from these figures, the springs can be conveniently secured in the valve-seat *d*, so that the whole space occupied by the valve is extremely small, a fact of great importance for gas-pumps and such like.

Instead of connecting the springs *a* to the plate *b* by pivoted links, as shown in Figs. 3, 4, and 5, they may be connected in the manner of a buckle-strap, as shown in Figs. 8 and 9, or in the form of an eyelet-piece, as shown in Figs. 10 and 11 or 12 and 13.

The valve-plate *b* is guided with such certainty by the springs *a*, arranged in the manner described, that the former may be so situated as to move either vertically, as shown in Figs. 1 and 6, or horizontally, or, indeed, in any desired direction.

Instead of circular valve-plates polygonal or oval plates may be used—as, for example, for pumps, condensers, and the like.

What I claim, and desire to secure by Letters Patent of the United States, is—

1. A valve comprising in combination a valve-plate, a valve-seat, a four-arm spring pressing on said valve-plate at points equidistant from each other, and articulated connections between the said arms and valve-plates.

2. The combination of a valve-plate, a valve-seat, radially-disposed springs to press against said valve-plate, and articulated connections of the ends of said springs and valve-plate whereby said valve-plate is guided.

In testimony whereof I have hereunto set my hand in the presence of two witnesses.

RUDOLF MEYER.

Witnesses:

CHARLES L. SEMPLE,
CARL SCHMITT.