

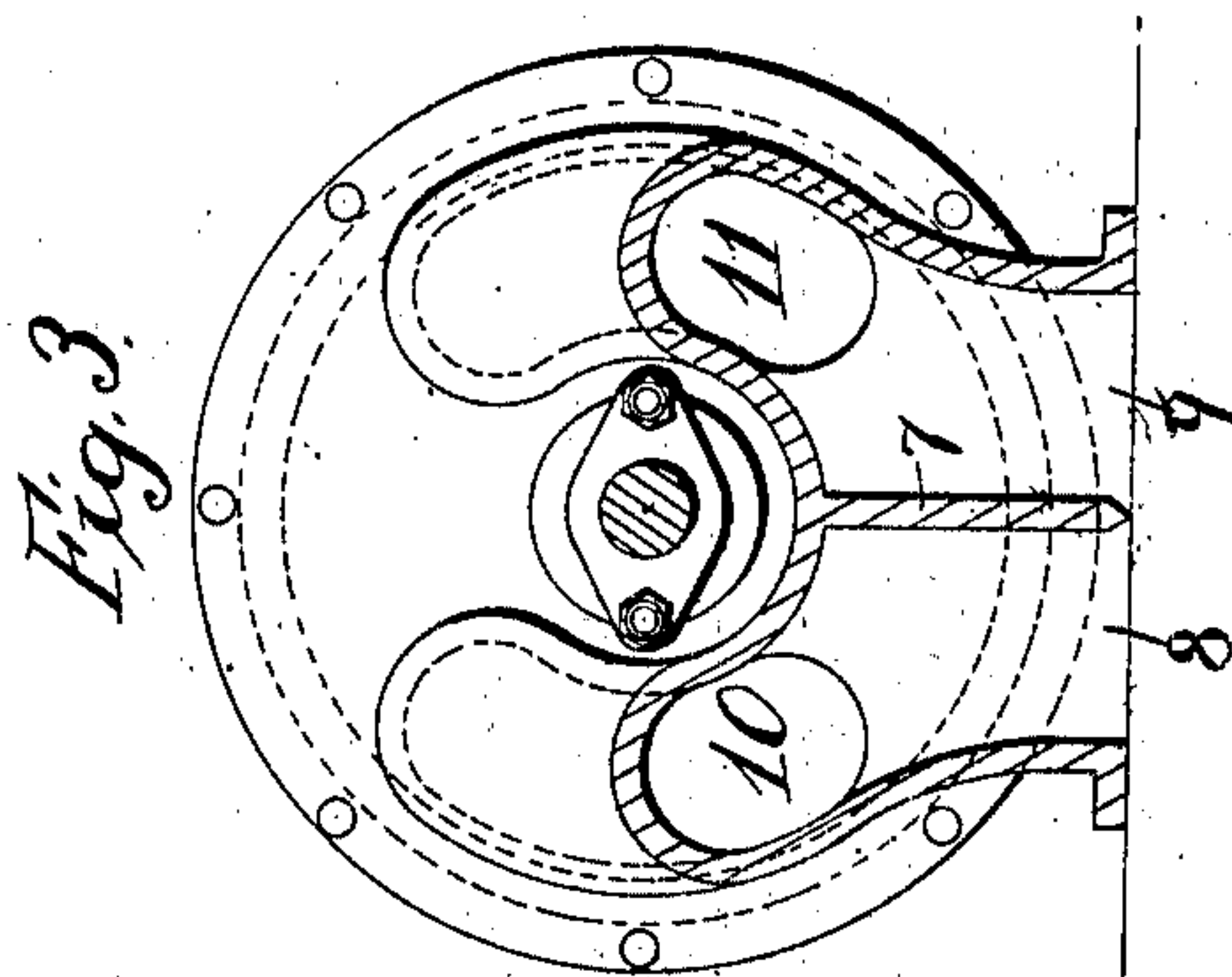
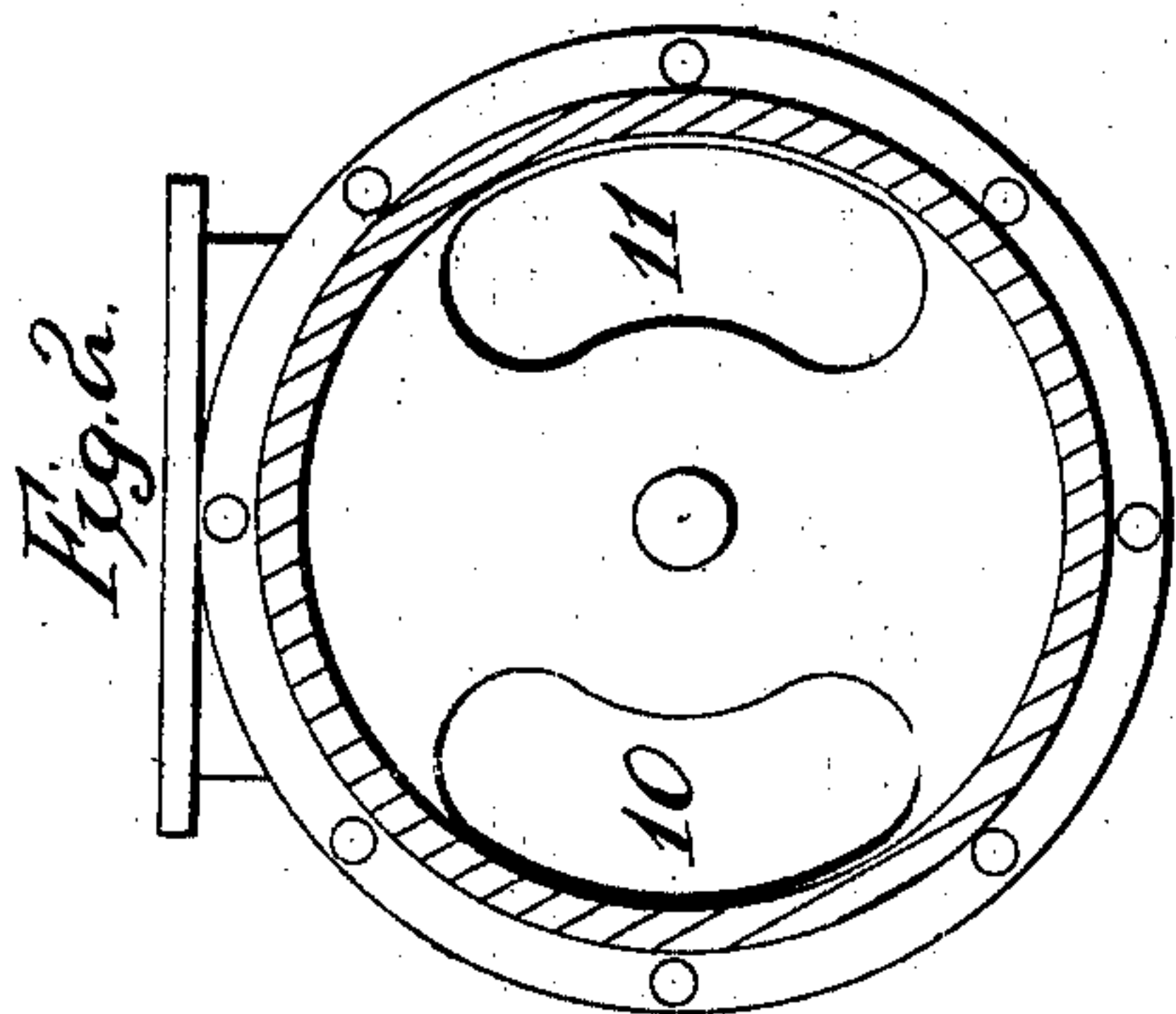
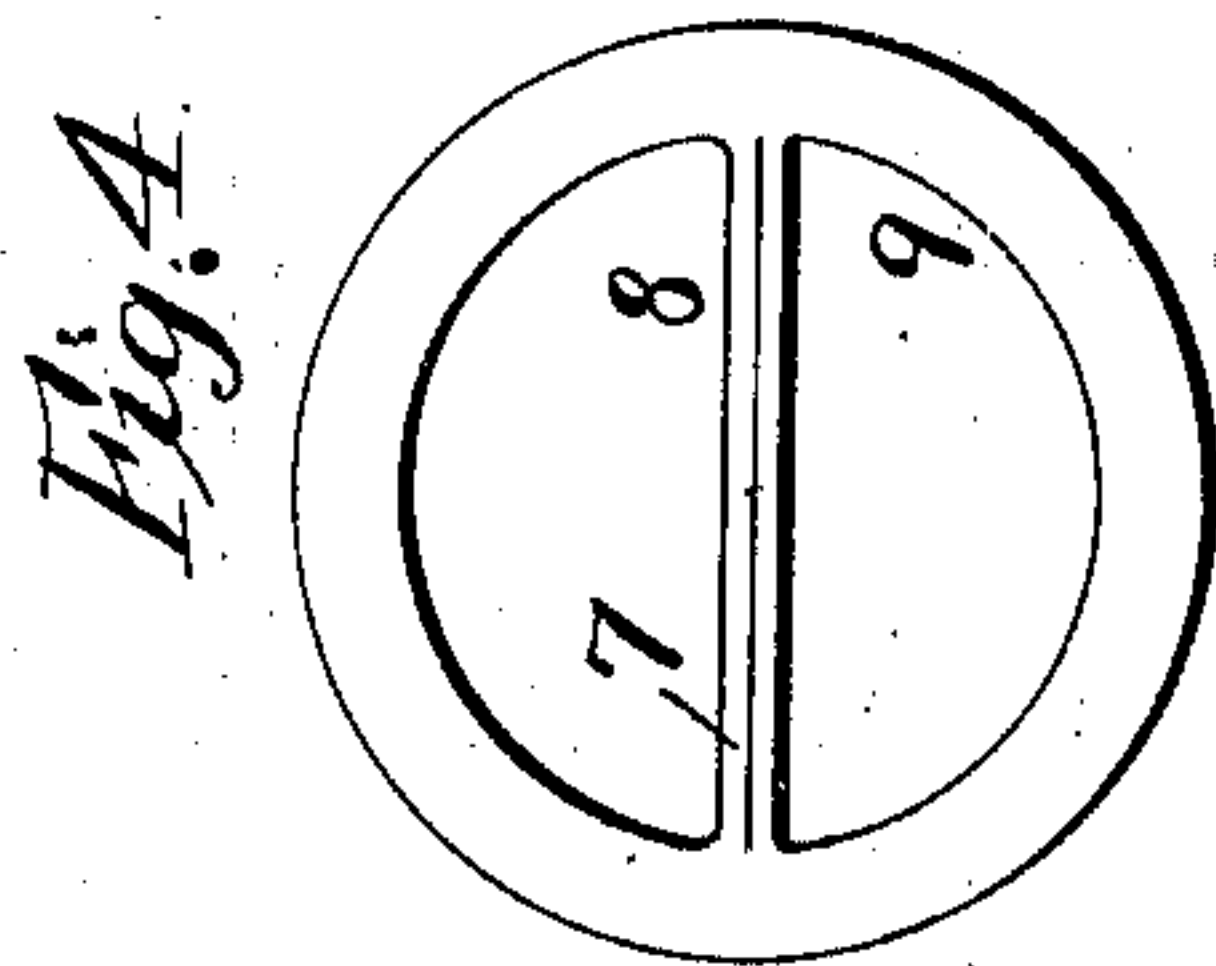
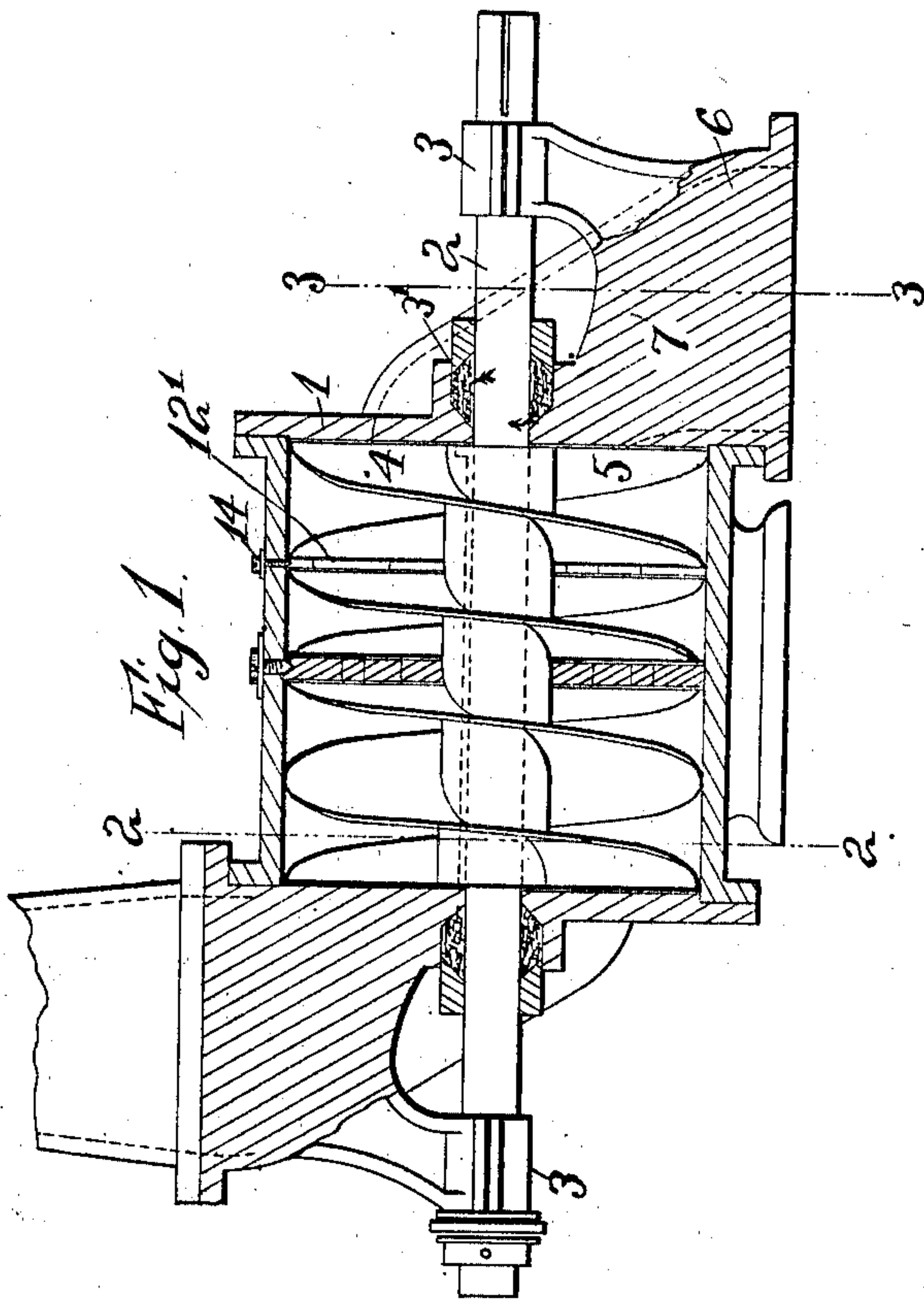
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SCREW PUMP.

APPLICATION FILED AUG. 28, 1908. RENEWED JULY 21, 1909.

950,564.

Patented Mar. 1, 1910.



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UNITED STATES PATENT OFFICE.

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SCREW-PUMP.

950,564.

Specification of Letters Patent.

Patented Mar. 1, 1910.

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To all whom it may concern:

Be it known that I, ERASTUS S. BENNETT, a citizen of the United States, residing at New York, N. Y., have invented certain new and useful Improvements in Screw-Pumps, of which the following is a specification.

My invention relates to screw pumps of the general form disclosed in an application for Letters Patent of the United States filed by me April 6, 1908, No. 425502. In said application I disclose a pump comprising a cylinder having a plurality of inlet openings in one of its heads and a plurality of outlet openings in the other head, a screw within the cylinder having a plurality of threads which are displaced circumferentially in respect to each other, one thread acting in connection with one inlet and outlet, while simultaneously the other thread acts in connection with the other inlet and outlet, the ends of the screw threads working close against the said heads.

My present invention includes in connection with the above features means within the cylinder of the pump for eliminating the effects of skin friction of the blades upon the body of water to be forced, said means consisting of a diaphragm or diaphragms which are interposed in the screw blades, the said diaphragms having openings of an aggregated area, approximating to the area of the inlet or outlet opening of the cylinder.

The invention is disclosed in the accompanying drawing, in which,—

Figure 1 is a vertical sectional view taken longitudinally through the pump. Fig. 2 is a vertical sectional view taken transversely through the pump on the line 2—2. Fig. 3 is a cross sectional view on the line 3—3 of Fig. 1. Fig. 4 is a face view of one of the inlet or outlet openings of the pump. Fig. 5 is a face view of one of the diaphragms.

In these drawings, 1, indicates the cylinder, 2, the shaft, turning in bearings 3 on the heads of the cylinders outside the same, and 4 and 5 indicate the screw blades carried by the said shaft and working within the cylinder. The inlet opening is formed in a casing 6, formed or cast with the cylinder head, the said inlet having a web 7 extending across the same dividing the inlet into two openings 8 and 9, which lead to the arc shaped inlet openings 10 and 11 of

the cylinder head. The screw blades are so arranged that one is acting in connection with one of the inlet openings, while the other screw blade is simultaneously acting in connection with the other inlet opening, both blades working close against the inner face of the head of the cylinder and serving to force the water longitudinally of the cylinder to the discharge end. The discharge openings in the cylinder head, together with the outlet pipe from the casing are counterparts of the arc-shaped inlet openings 10 and 11 and the inlet 6.

In order to prevent the back drag of the water which results from the skin friction existing between the surface of the screw blade and the body of water, I provide means whereby the body of water having been forced longitudinally of the cylinder will be separated from the screw blade which has propelled it so that it will be relieved of the skin friction and may be acted on anew by a second blade forming in effect a continuation of the first blade section. These means consist of a diaphragm 12 secured to the cylinder of the pump and extending transversely across the same, it having a central opening for the passage of the shaft and having a plurality of openings 12 and 13, the aggregated area of which is approximately equal to the aggregated area of the inlet openings 10 and 11 or of the discharge openings leading from the pump. This diaphragm or diaphragms may be secured in place in any suitable manner. I have shown, however, screws at 14, passing through the casing into the said diaphragm. It will be seen from Fig. 1 that each of the screw blades 4—5 works closely against both the inner surface of the head of the cylinder and against the face of the diaphragm 12 so that in the revolution of the screw the blades will cut off the water at the inlet openings and press this cutoff portion forward through the openings in the diaphragm, and immediately upon its passage through the diaphragm the effect of skin friction will be eliminated and the body of water which has just passed through the diaphragm will be subjected to the action of the next section of screw blades and so on throughout the cylinder.

It will be noticed from Fig. 1 that the sections of the blade 4 form in effect a continuous screw from end to end of the cylinder,

the diaphragms as it were occupying the space left by the cut out portions of the said screw blades, and extending transversely of the axis of the blade. Any desired number of diaphragms may be used.

I claim as my invention:—

1. A pump comprising a cylinder having a head at each end, a shaft passing through the same, a plurality of inlet openings in one head, a plurality of outlet openings in the other head, a screw within the cylinder having a plurality of threads displaced circumferentially in respect to each other, one thread acting in connection with one inlet and outlet while simultaneously the other thread acts in connection with the other inlet and outlet, and a diaphragm extending transversely of the cylinder and between the sections of the screw threads which work closely thereagainst, said diaphragm having openings aggregating in area the area of the plurality of inlet openings or outlet openings, substantially as described.

2. In combination in a screw pump, a cylinder, a shaft extending therethrough, a screw thread on said shaft, a diaphragm extending transversely of the cylinder, and be-

tween the sections of the screw, which sections work closely against the face of the diaphragm, said screw also working closely against the inner face of the heads of the cylinder, substantially as described.

3. In combination in a screw pump, a cylinder, a diaphragm extending across the same at a point intermediate of its inlet and outlet, and a screw working within the cylinder on each side of the diaphragm, the thread on one side of the diaphragm forming practically a continuation of the thread upon the other side of the diaphragm, said thread working closely against the diaphragm, substantially as described.

4. In combination in a screw pump, a cylinder having an inlet and an outlet, a helically bladed member arranged to rotate therein and a perforated diaphragm inserted in the said helical blade, substantially as described.

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

ERASTUS S. BENNETT.

Witnesses:

GEO. H. LIGHTFOOT,
M. L. JUSTIN.