

907,040.

A. E. GUY.
MULTIPLE IMPELLER PUMP.
APPLICATION FILED NOV. 13, 1907.

Patented Dec. 15, 1908.
2 SHEETS—SHEET 1.

Fig. 3.

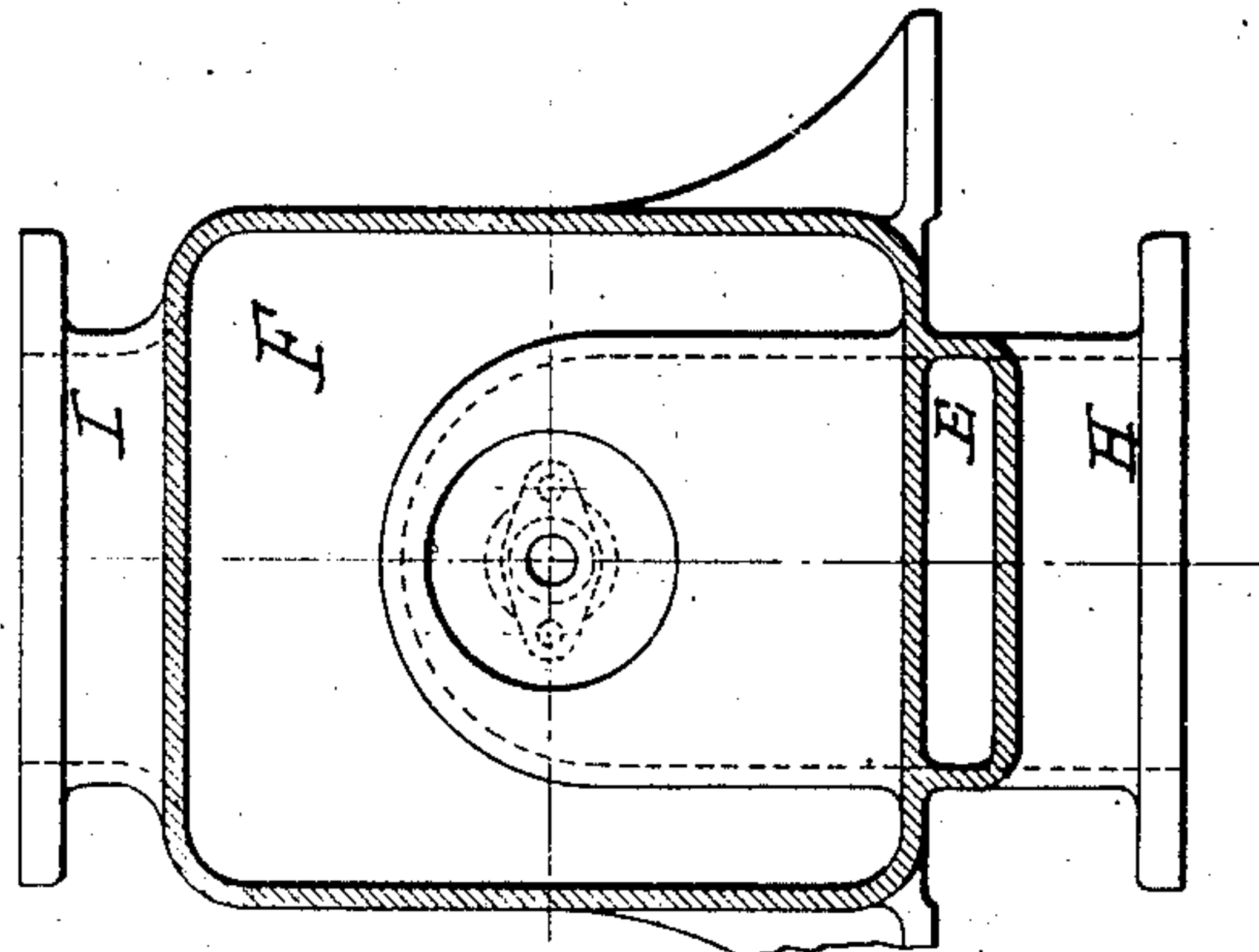


Fig. 2.

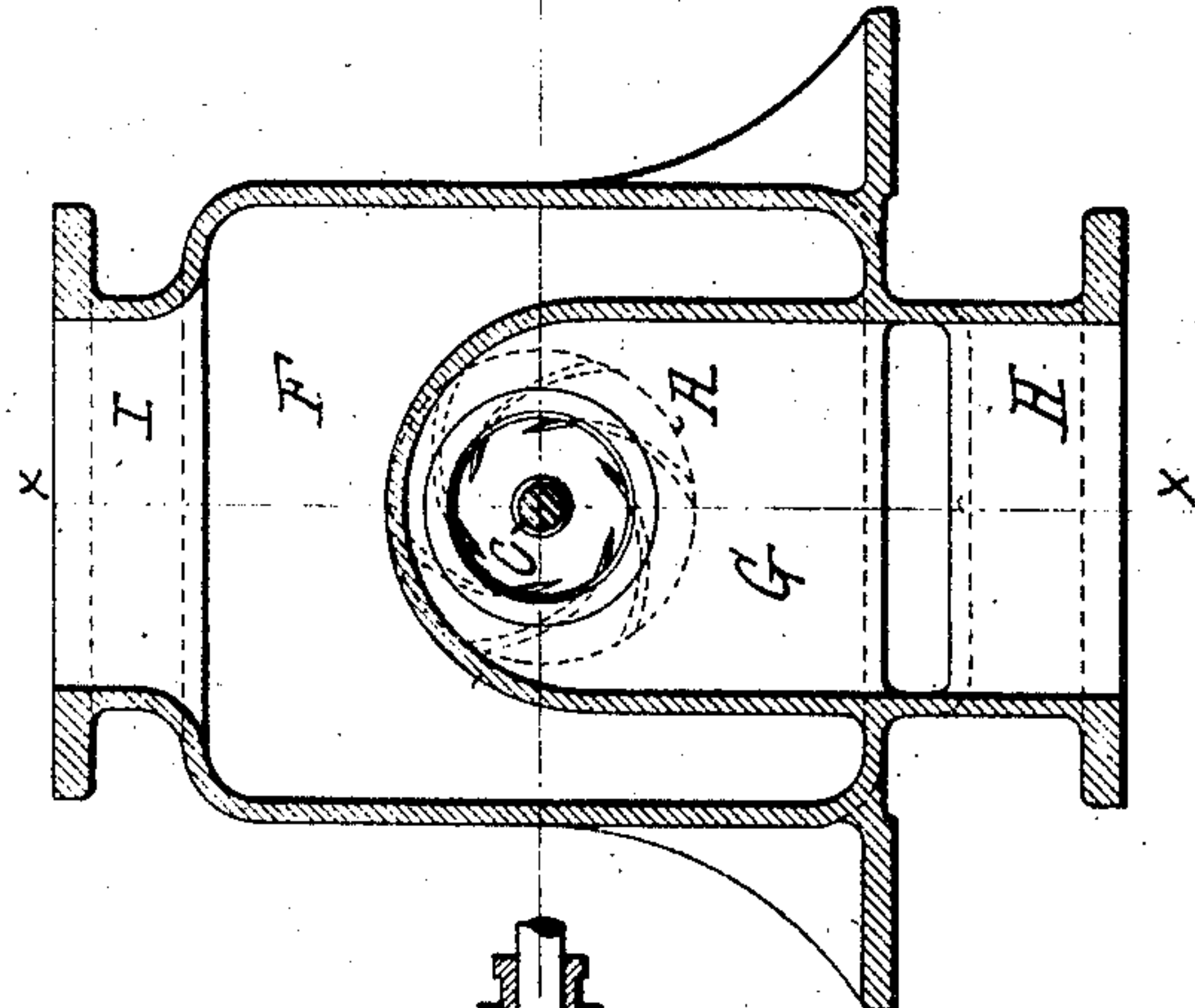
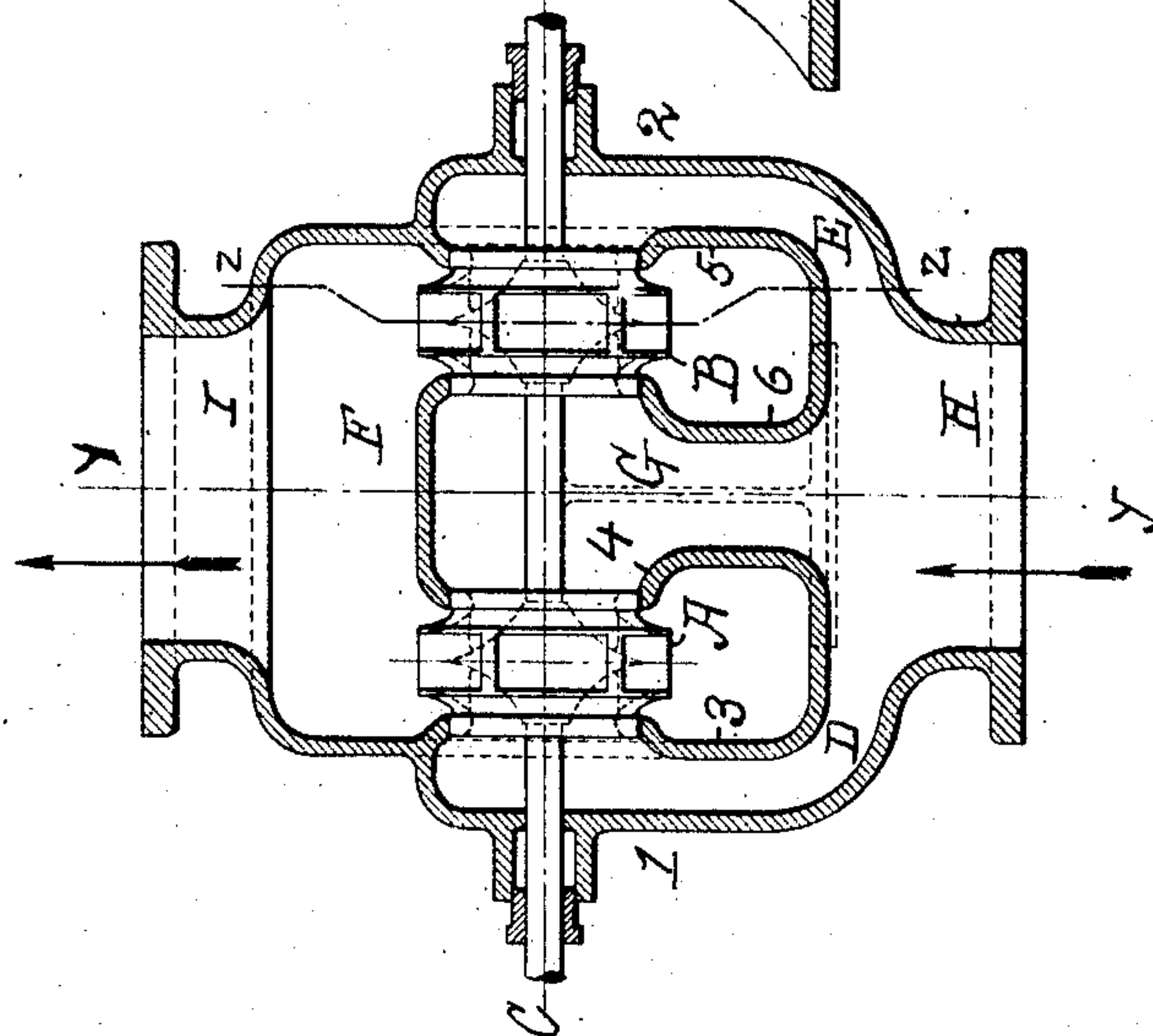


Fig. 1.



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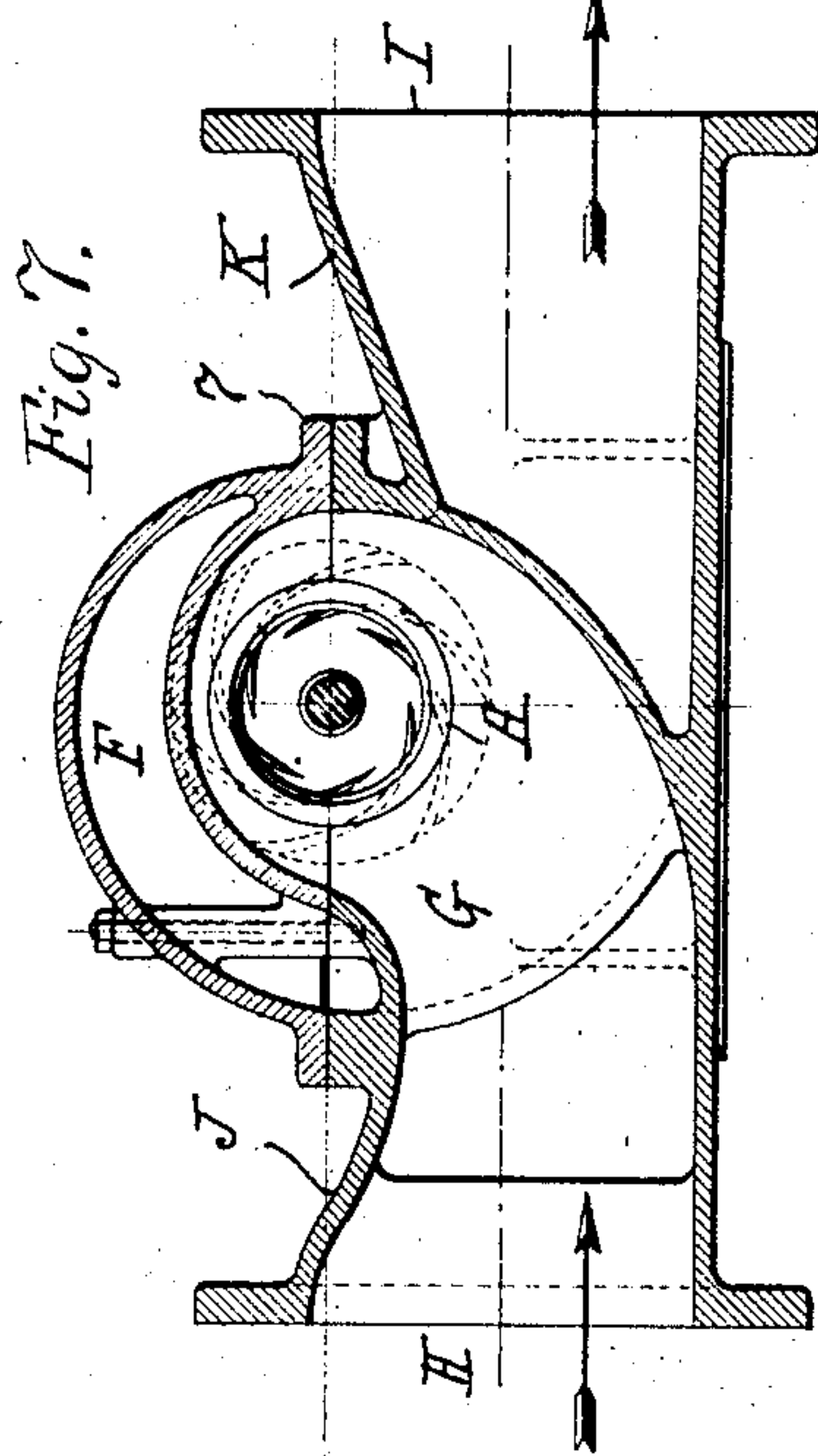
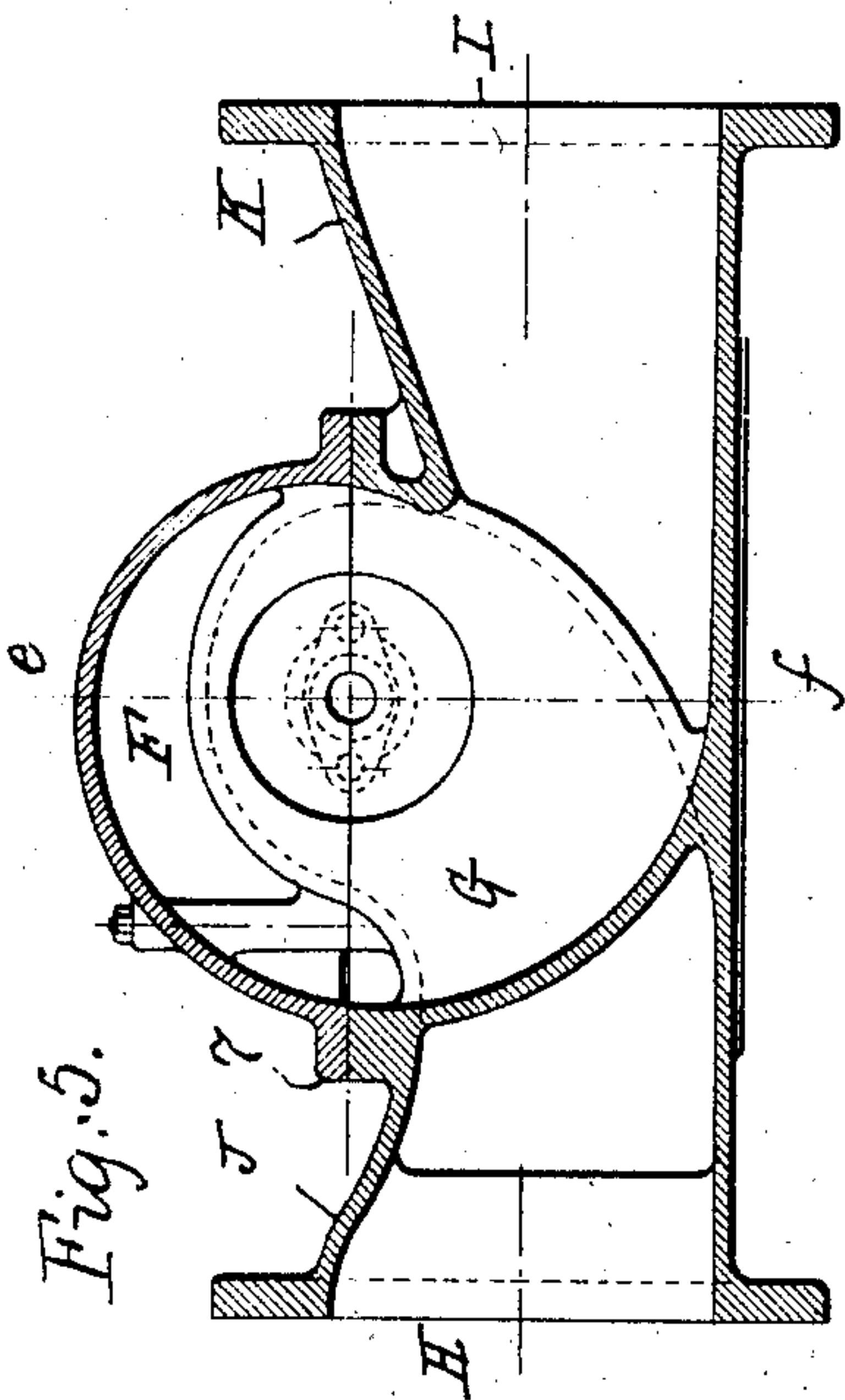
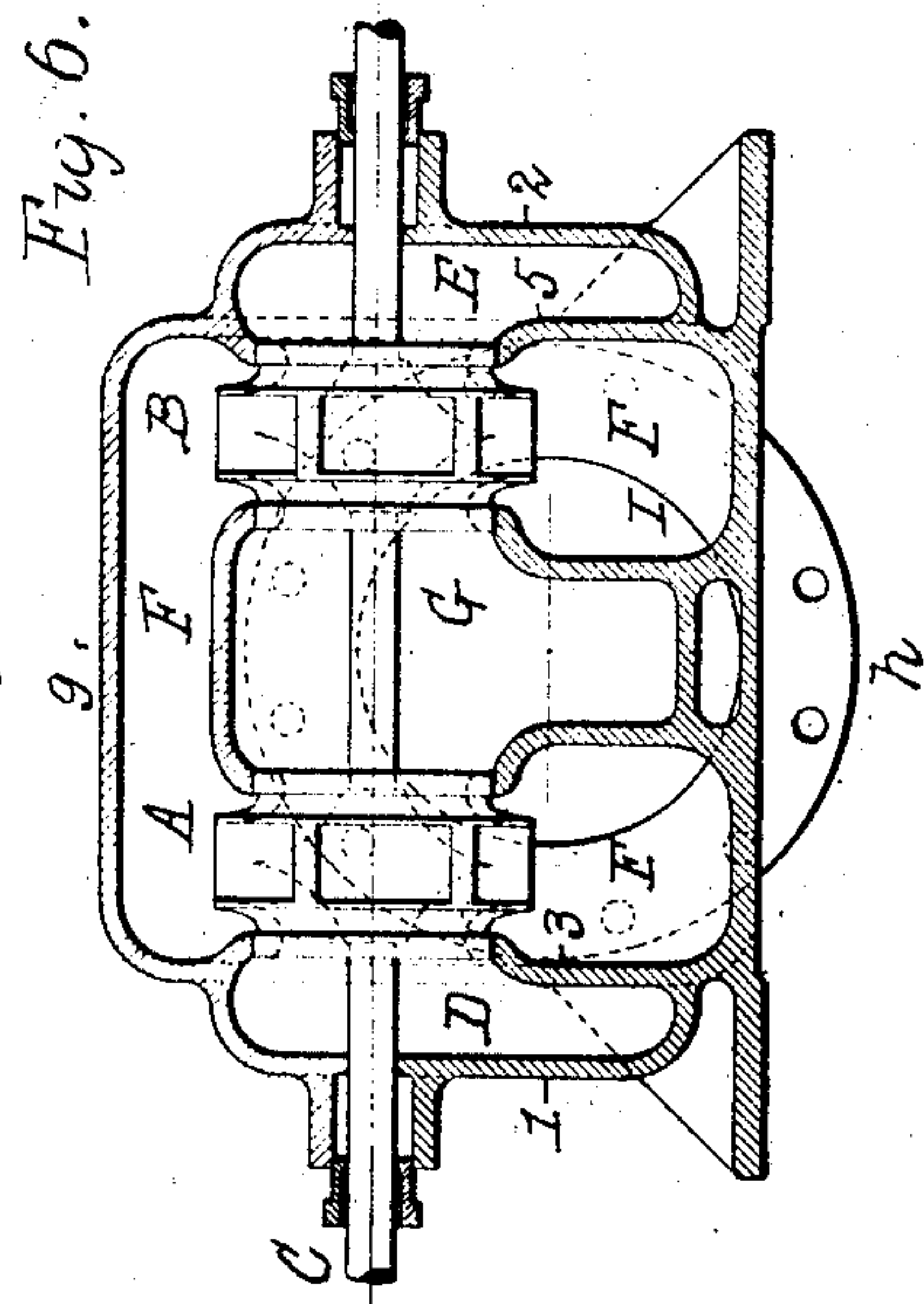
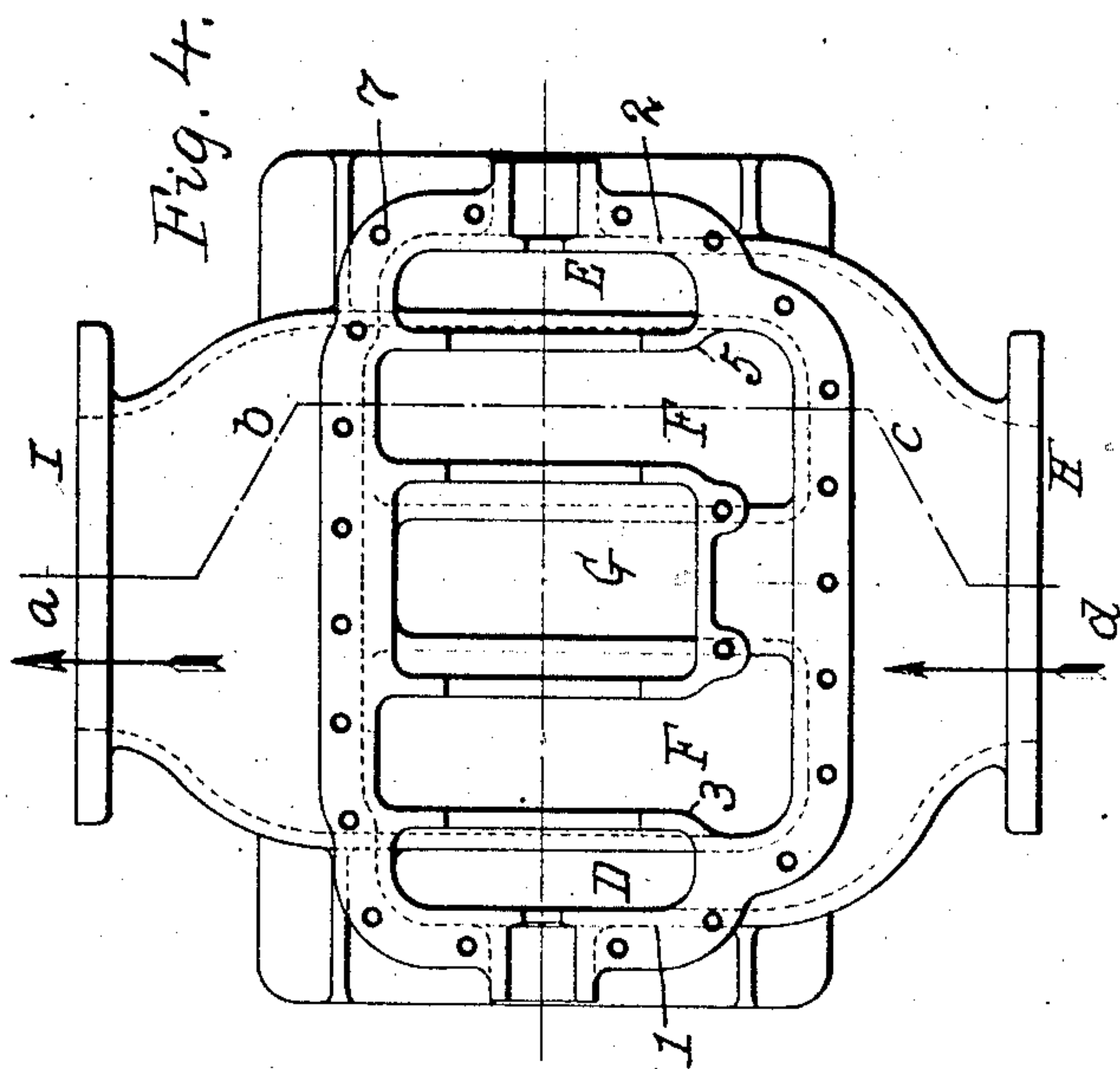
INVENTOR

Albert E. Guy

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2 SHEETS—SHEET 2.



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ALBERT E. GUY, OF TRENTON, NEW JERSEY, ASSIGNOR TO DE LAVAL STEAM TURBINE COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

MULTIPLE-IMPELLER PUMP.

No. 907,040.

Specification of Letters Patent.

Patented Dec. 15, 1908.

Application filed November 13, 1907. Serial No. 401,929.

To all whom it may concern:

Be it known that I, ALBERT E. GUY, a citizen of the United States, residing at Trenton, in the county of Mercer and State of New Jersey, have invented a certain new and useful Improvement in Multiple-Impeller Pumps, of which the following is a specification.

The invention relates to multiple rotary pumps, and consists in the construction of the stationary portion of the machine whereby the same is cheapened and simplified and rendered capable of receiving impellers of different proportions and hence of different capacity. And I do assert this invention to be broadly new and pioneer in that for the first time in the art of multiple rotary pump building it makes possible for manufacturers to provide themselves with said stationary parts in standard size and, by simply inserting in the seats therein formed, impellers of different proportions, to produce pumps of different capabilities or suited to different conditions of pressure.

In the accompanying drawings—Figures 1, 2 and 3, represent a simple form of my improved pump; Fig. 1, being a vertical section on the line *x x* of Fig. 2; Fig. 2, a vertical section on the line *y y* of Fig. 1, and Fig. 3 a section on the line *z z* of Fig. 1, the impellers being removed. Figs. 4 to 7 inclusive show a modified and commercially preferable form of the pump; Fig. 4 is a plan view of the stationary parts, the upper separable portion and the impellers being removed; Fig. 5 is a section on the line *a, b, c, d,* of Fig. 4; the impeller being removed; Fig. 6 is a section on the line *e, f,* of Fig. 7, and Fig. 7 is a section on the line *g, h,* of Fig. 6.

Similar numbers and letters of reference indicate like parts.

Referring first to the form shown in Figs. 1, 2 and 3, the impellers A, B, are mounted upon the shaft C which is journaled in the walls 1, 2, of the suction ducts D, E. Said impellers deliver fluid directly from their circumferential peripheries into the delivery box F. The suction ducts D, E, are disposed on each side of said box, and between the impellers and entering said box is a third suction duct G. The three suction ducts D, E, G, form a suction chamber which communicates with the source of supply by the common inlet H. The impeller A is seated and

rotates in circular openings formed respectively in the wall 3 of duct D and one wall 4 of duct G. The other impeller B is seated and rotates in circular openings formed respectively in the wall 5 of duct E and the opposite wall 6 of duct G. The fluid entering at H passes through the three suction ducts to both inlet passages of each impeller and thence to the delivery box F and outlet I thereof, as shown by the arrows in the drawings.

It will, of course, be understood, that the stationary portion of the machine may be made in removable sections, so as to permit of introduction of the impellers to the seats, and one way of doing this is shown in Figs. 4, 5, 6 and 7, which illustrate also a preferable form of the apparatus. In this form, the suction ducts D, E, G, communicate with the inlet duct J, which is here horizontally disposed on one side of the box F, while the outlet duct K is similarly disposed on the opposite side. The various fluid passages are curved to reduce friction and direct the flow without shock, and the middle suction duct G is cast integrally with the box F. Said box with the suction ducts may be divided horizontally into two flanged parts, united by bolts as shown at 7, in order to permit introduction of the impellers.

Especial attention is called to the following advantages incident to the present construction.

Inasmuch as both of the impellers discharge directly from their peripheries into the same box and have no individual casings it is possible to change the impellers to suit varying desired capacities of the pump without in any way altering the delivery box or suction ducts. Or to put it another way the delivery box and suction ducts may be made in standard size and impellers put therein in accordance with the requirements of the user. All that is needed is that the impeller rings shall properly fit their seats in the walls of the box and duct. The diameters or the widths of the impellers between the seated rings can be made larger or smaller, as desired, to suit conditions of low pressure and large quantity of flow, or high pressure and small quantity. So far as I know, therefore, this construction makes it possible, for the first time in the art of multiple centrifugal pump building, for the manufacturer to keep in stock the stationary parts of the

pump, and use them for producing pumps of widely different capacities by inserting in them impellers of correspondingly different proportions. This is manifestly impracticable where each impeller has its own casing having passages designed for that particular impeller and cooperating therewith, for then the individual casings as well as the impellers must be changed, or what is the same thing, for different capacities different machines must be built.

The simplicity of the present construction, its large free passages and the ease and cheapness with which it can be cast will also be apparent.

I claim:

1. A multiple impeller pump comprising in combination a plurality of double suction impellers constructed to operate in parallel, and a box having supply passages for said impellers, and having also a single discharge chamber inclosing all of said impellers and into which they discharge directly and simultaneously, said discharge chamber having a free space beyond the peripheries of said impellers into which said impellers may discharge in a direction normal to the axis of each, said box adapted to receive interchangeably impellers of different design and different diameters to suit different conditions.

2. A multiple impeller pump comprising in combination a plurality of double suction impellers constructed to operate in parallel, and a box having supply passages for said impellers and having also a single discharge chamber inclosing all of said impellers and into which they discharge directly and si-

multaneously, said discharge chamber having a free space beyond the peripheries of said impellers into which said impellers may discharge in a direction normal to the axis of each, the width of the portions of said chamber immediately beyond the peripheries of said impellers being materially greater than the peripheral width of said impellers, said box adapted to receive interchangeably impellers of different design and different diameters to suit different conditions.

3. A multiple impeller pump comprising in combination a plurality of double suction impellers constructed to operate in parallel, and a box having a single discharge chamber inclosing all of said impellers and into which they discharge directly and simultaneously, said discharge chamber having a free space beyond the peripheries of said impellers into which said impellers may discharge in a direction normal to the axis of each, said box having a supply passage projecting into said discharge chamber intermediate two impellers into connection with one intake of each, and having also other supply passages outside of said impellers and each connected to an intake of a corresponding impeller, said box adapted to receive interchangeably impellers of different design and different diameters to suit different conditions.

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

ALBERT E. GUY.

Witnesses:

GERTRUDE T. PORTER,
WM. H. SIEGMAN.