

No. 753,986.

PATENTED MAR. 8, 1904.

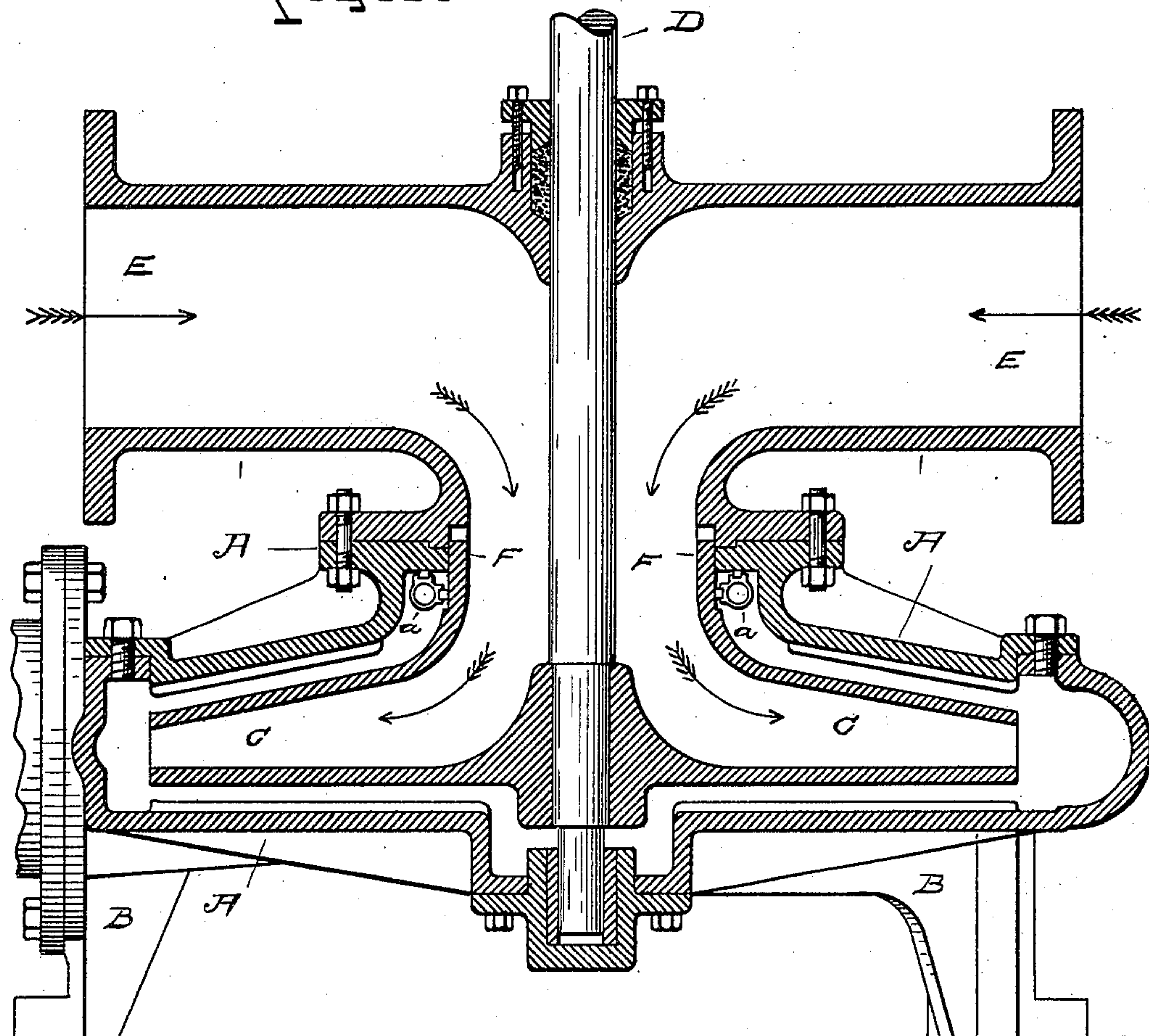
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PUMP.

APPLICATION FILED DEC. 4, 1903.

NO MODEL.

3 SHEETS—SHEET 1.

Fig. 1.



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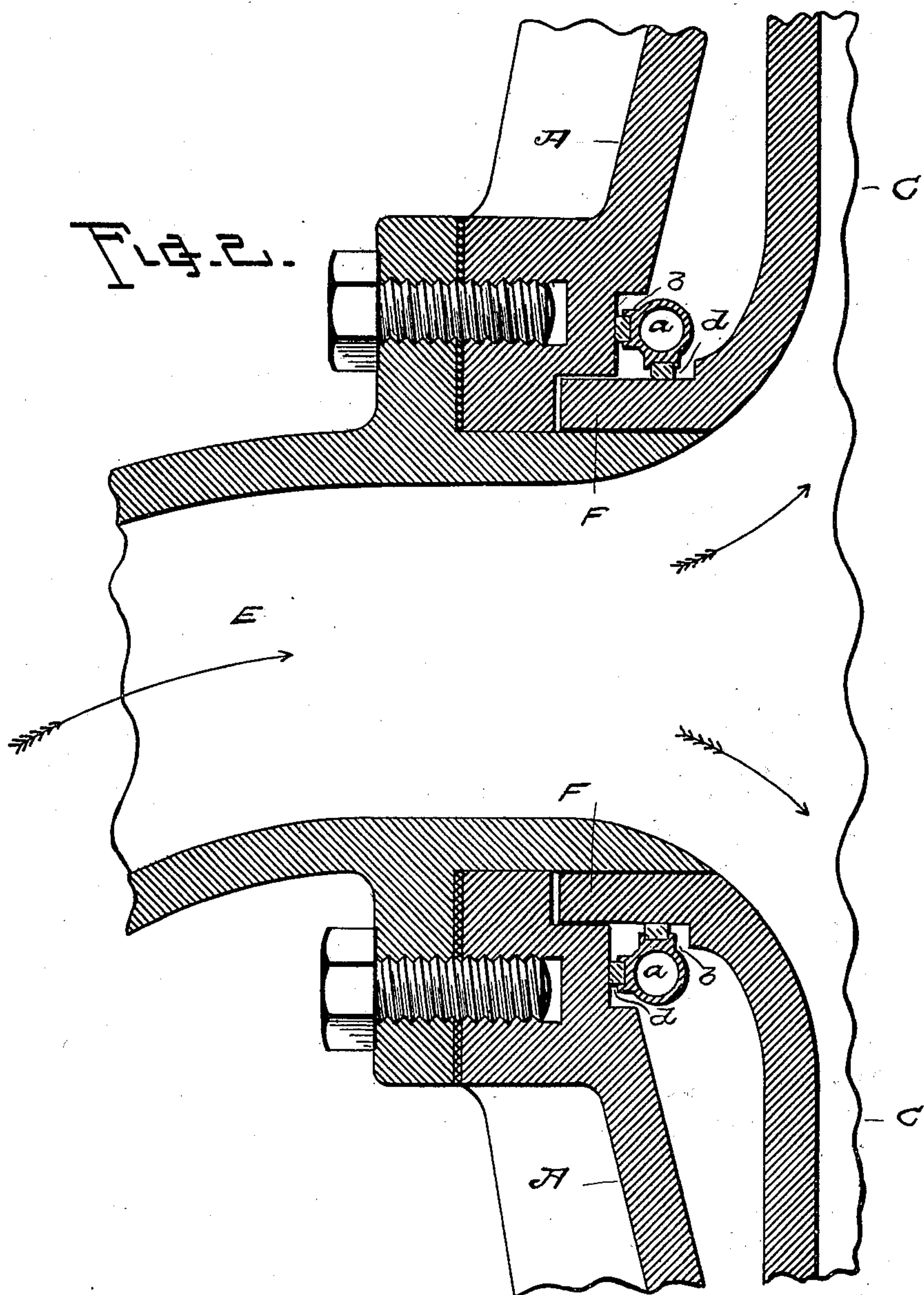
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3 SHEETS—SHEET 2.



Witnesses

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3 SHEETS—SHEET 3.

Fig. 3.

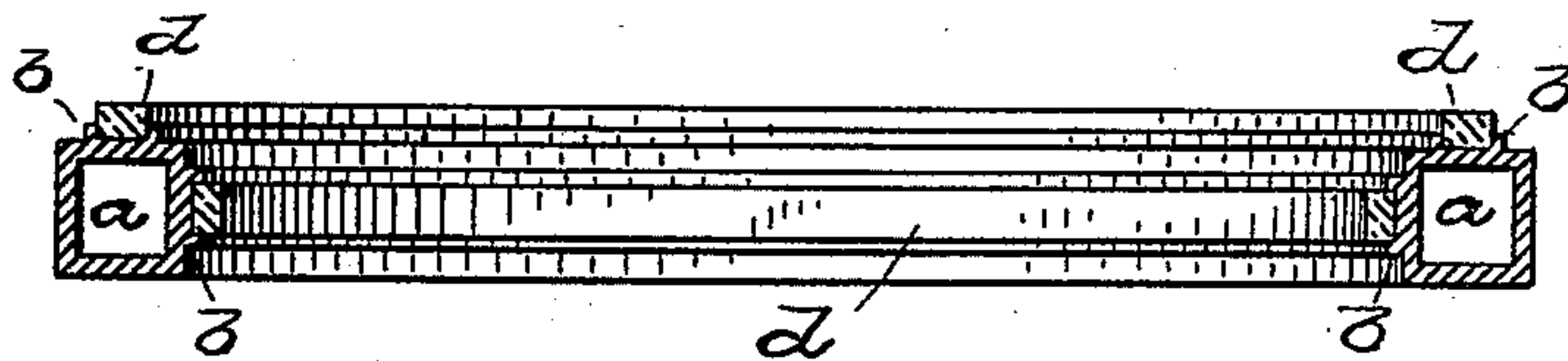


Fig. 4.



Fig. 5.

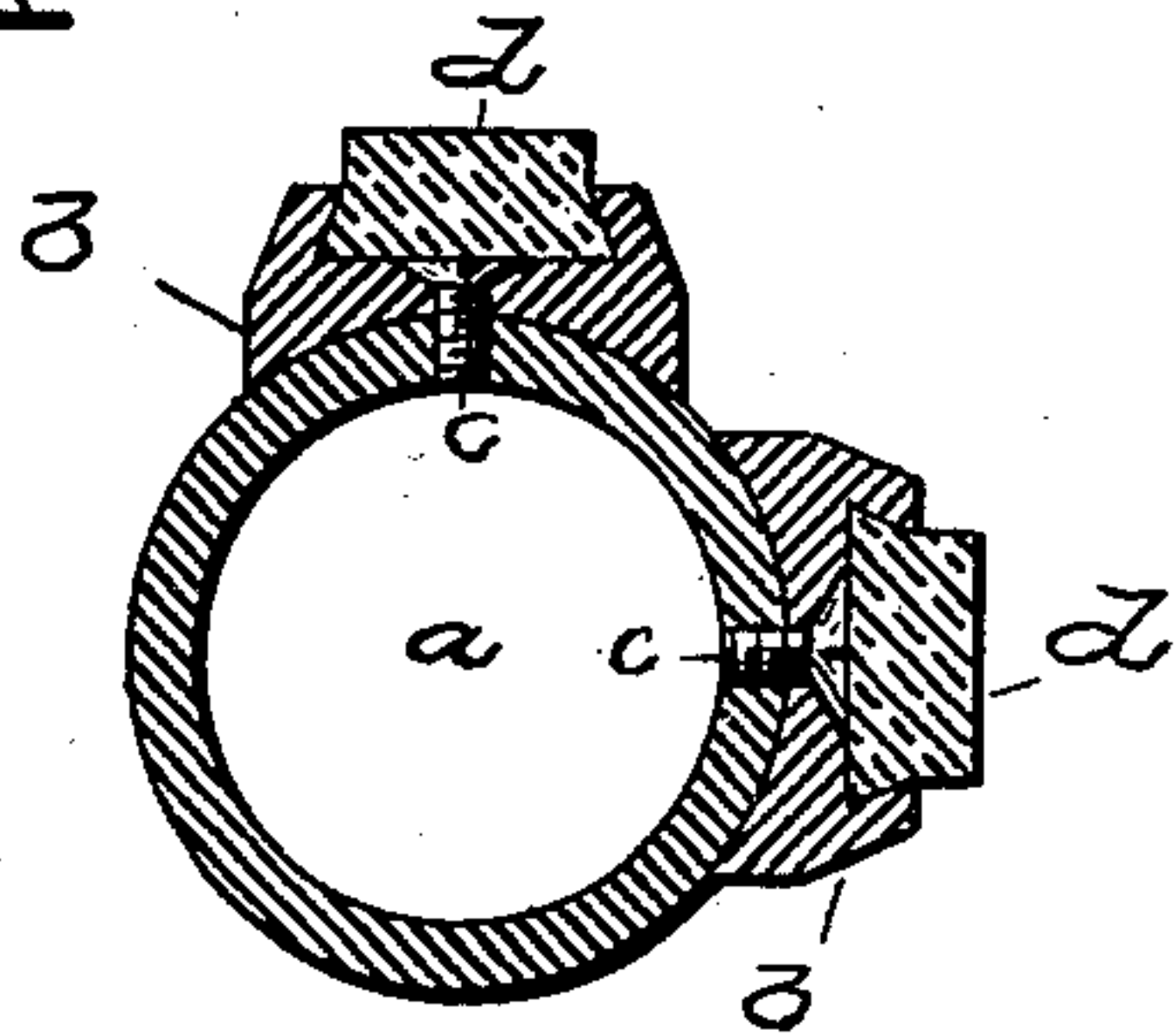
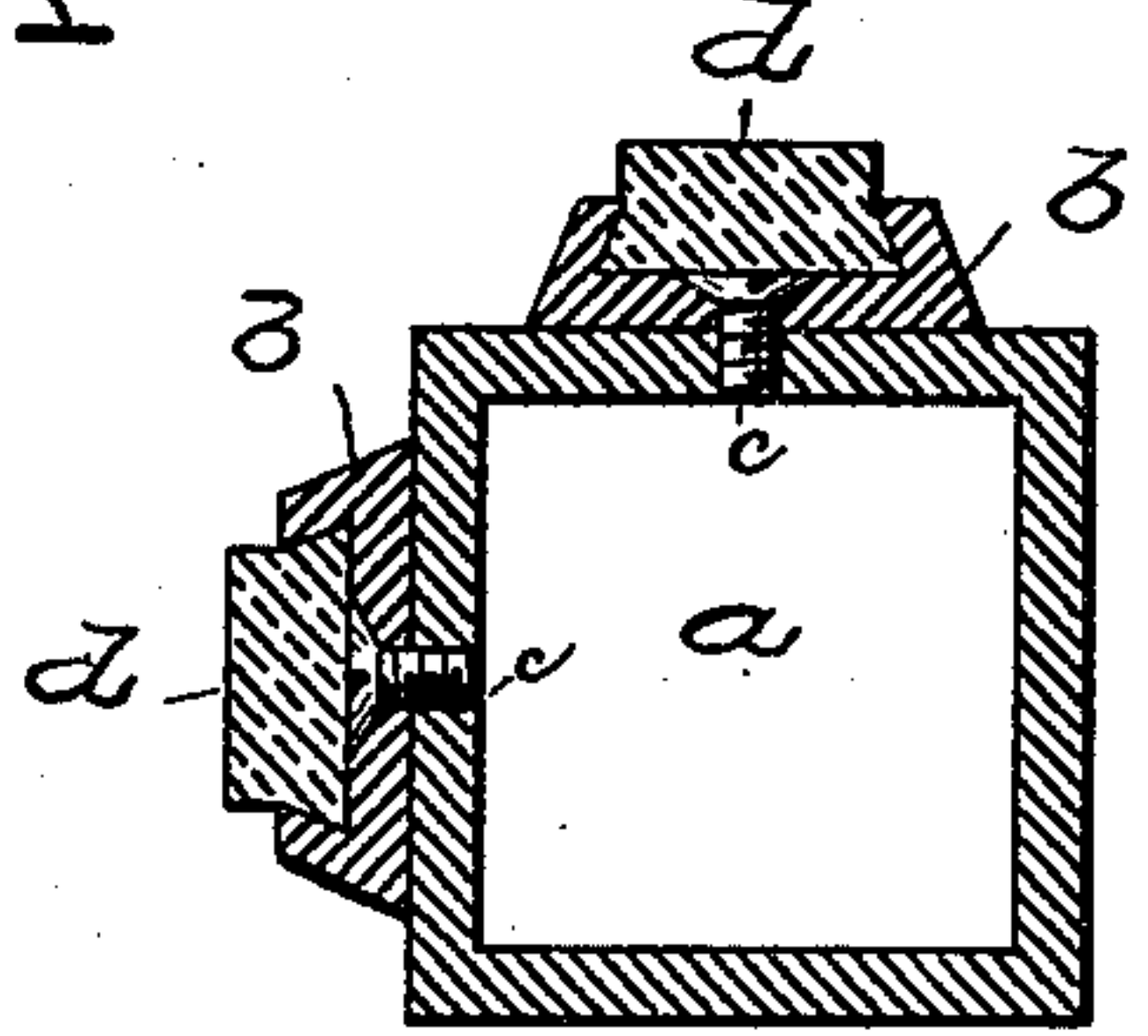


Fig. 6.



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UNITED STATES PATENT OFFICE.

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PUMP.

SPECIFICATION forming part of Letters Patent No. 753,986, dated March 8, 1904.

Application filed December 4, 1903. Serial No. 183,808. (No model.)

To all whom it may concern:

Be it known that we, FERDINAND W. KROGH and CARL A. KROGH, citizens of the United States, and residents of San Francisco, in the county of San Francisco and State of California, have invented new and useful Improvements in Pumps; and we do hereby declare that the following is a full, clear, and exact description of said invention, such as will enable others skilled in the art to which it most nearly appertains to make, use, and practice the same.

Our invention relates particularly to that class of pumps which are provided with incased wheels or impellers, mounted either vertically or horizontally, as the case may be; and its object is to provide self-adjusting means for preventing leakage of water between the connecting parts of the impeller to the casing.

To this end our invention consists in the construction and arrangement of an annular floatable packing-ring provided with bearing faces or means engaging seats formed upon the casing and the axis of the impeller, as will be fully described hereinafter, and pointed out in the claims.

Referring to the herewith annexed drawings, consisting of three sheets, which form a part of this specification, Figure 1 represents a central vertical section of a vertical centrifugal pump provided with our improved packing-ring in position. Fig. 2 is an enlarged fragmentary sectional view of a horizontal centrifugal pump, showing particularly our improved packing-ring applicable thereon. Figs. 3 and 4 are cross-sections showing various modifications in the general construction of our packing-ring, and Figs. 5 and 6 are cross-sections showing particularly a method of fastening the bearing-faces to the ring.

Like letters of reference made use of in the several figures indicate like parts wherever employed.

A represents the casing, B the base upon which the casing is mounted, C the impeller, secured to the driving-shaft D, and E the suction-inlets, all of which constitute the main body of an ordinarily-constructed centrifugal

pump to which our improved packing-ring is applicable.

The axis F of the impeller projects outwardly and fits into an annular recess formed within the inner side of the casing. This arrangement, however, may be changed, if desired, and is immaterial for the purpose we have in view, which is to provide means for preventing leakage of water between the connecting parts of the impeller to the casing no matter how they may be constructed or arranged. Thus with this purpose in view we place at that particular portion that is around the axis of the impeller our improved annular packing-ring, which consists of a cylindrical hollow light shell *a*, adapted to float and adjust itself against the inner side of the casing by the pressure of water circulating between the wall of the impeller and the casing, and also by the suction, which forces its way through the various joints tends to draw the packing-ring in position. Constructed in this manner it will be readily seen that the packing-ring being light in body and adapted to float and is adjusted automatically and held to its seats largely by the water flowing through the pump and is efficient in use and operates with a minimum of friction around the axis of the impeller, particularly when used in connection with horizontal pump.

Secured to the packing-ring at right angle and cast integrally thereon are two bearing-faces *b*, engaging suitable seats made for that purpose upon the casing and the impeller, and, if desired, the bearing-faces may be removably secured in position by screw *c*, as shown in Figs. 5 and 6, so as to be interchanged when worn out. Each bearing-face preferably comprises a packing *d* to form a perfect joint.

The packing may be secured in position in any suitable manner. However, we have shown a simple method of fastening, as particularly illustrated in Figs. 5 and 6, in which they are shown as dovetailed to the bearing-faces, whereby they are securely held and may be easily and quickly replaced when desired.

The packing-ring may be of any suitable shape, several of which are shown in the draw-

ings, one in Figs. 3 and 6 being square in cross-section and another, Fig. 5, being circular in cross-section. In the two forms referred to the body of the ring is hollow, while
 5 in Fig. 4 a construction is shown wherein the body is composed of cork *e* or other floatable and porous material partially inclosed in a metal rim or body *b'*.

Believing we have produced a simple and
 10 effective means for preventing leakage between the connecting parts of the impeller to the casing and reduce the friction thereon and having described same,

What we claim as new, and desire to secure
 15 by United States Letters Patent, is—

1. A centrifugal pump having a non-secured packing-ring placed between its stationary and running parts and provided with detachable means for preventing leakage between said
 20 parts.

2. A centrifugal pump having a non-secured packing-ring placed between its stationary and running parts and provided with detachable means arranged at an angle with each other
 25 and respectively engaging the stationary and running parts and adapted to prevent leakage between the same.

3. In a centrifugal pump provided with a casing and an impeller rotating therein, the
 30 combination therewith of a floating packing-ring having bearing-faces engaging said casing and the impeller and preventing leakage of water between said casing and the impeller.

4. In the class of machinery described a
 35 floating packing-ring placed between the stationary and running parts and having faces secured at right angle thereon engaging seats formed on said stationary and running parts for preventing leakage.

40 5. In the class of machinery described a floating packing-ring placed between the stationary and running parts and having remov-

able bearing-faces engaging seats formed on said stationary and running parts and preventing leakage of water between said faces and
 45 seats.

6. In the class of machinery described a packing-ring placed between the stationary and running parts, consisting of a hollow shell hermetically closed and having faces engag-
 50 ing seats formed on said stationary and running parts for the purpose of preventing leakage between said parts.

7. In the class of machinery described a packing-ring placed between the stationary
 55 and running parts consisting of a cylindrical floating shell having faces engaging said stationary and running parts and adapted to prevent leakage of water between said faces and the stationary and running parts. 60

8. In the class of machinery described, the combination with stationary and moving parts, of a floating packing-ring having bearing-faces respectively engaging seats on said stationary
 65 and moving parts and adapted to prevent leakage of water between said seats and faces.

9. In the class of machinery described, the combination with the casing and the impeller, of a floatable packing-ring encircling said im-
 70 peller and provided with bearing-faces arranged at an angle with each other and respectively engaging seats on said impeller and casing and adapted to prevent leakage of water between said seats and faces, substantially as described and for the purposes set forth. 75

In testimony whereof we have affixed our signatures, in the presence of two witnesses, this 7th day of November, A. D. 1903.

FERDINAND W. KROGH.
 CARL A. KROGH.

In presence of—

J. CORINSON,
 JULIUS H. SMITH.