

(No Model.)

3 Sheets—Sheet 1.

A. MAGINOT.
HELICO-CENTRIFUGAL PUMP.

No. 605,888.

Patented June 21, 1898.

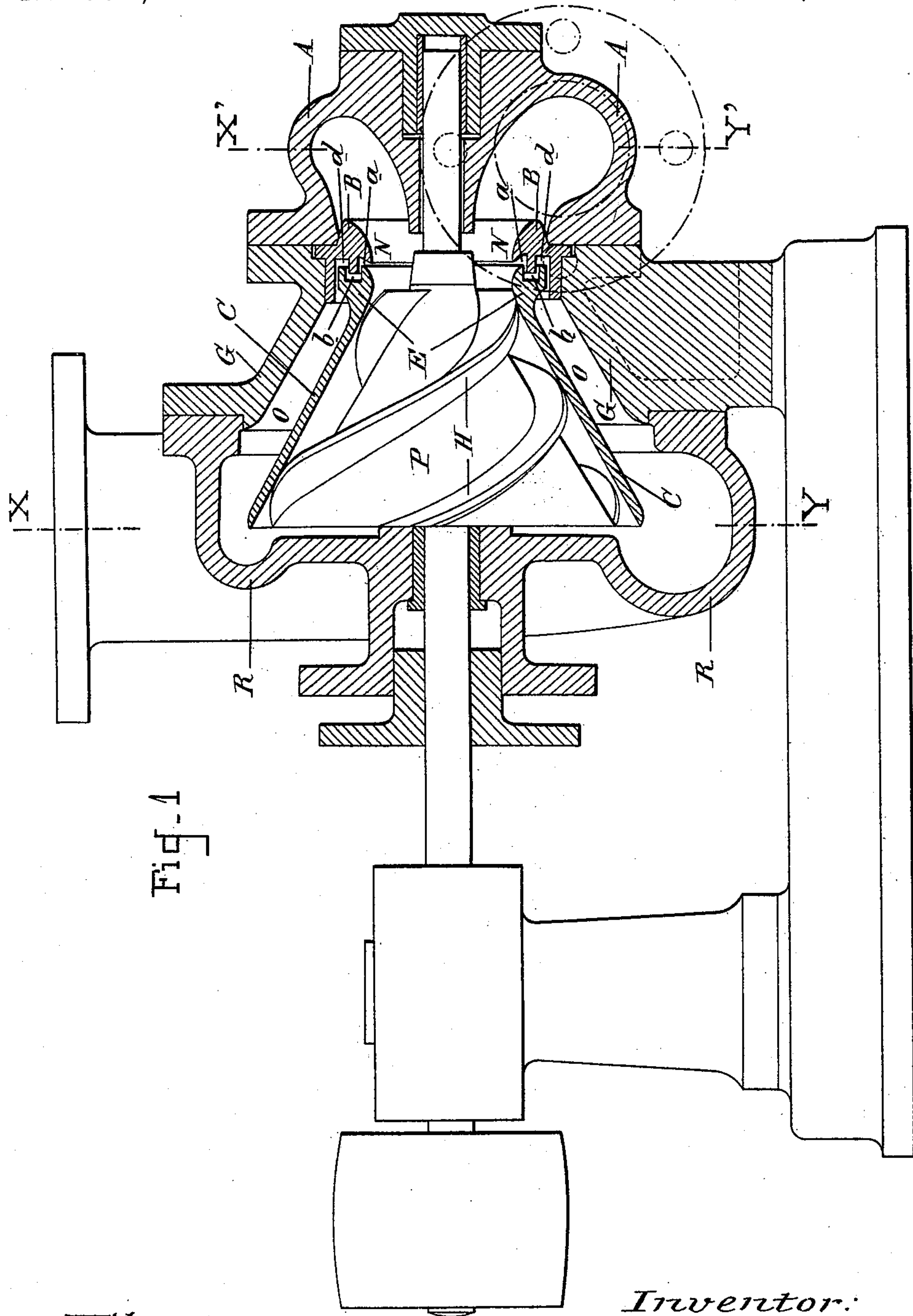


Fig. 1

Witnesses:
E. K. Cotton
O. W. Hunt

Inventor:
Albert Maginot

By *Heuvelink*
his Attorneys

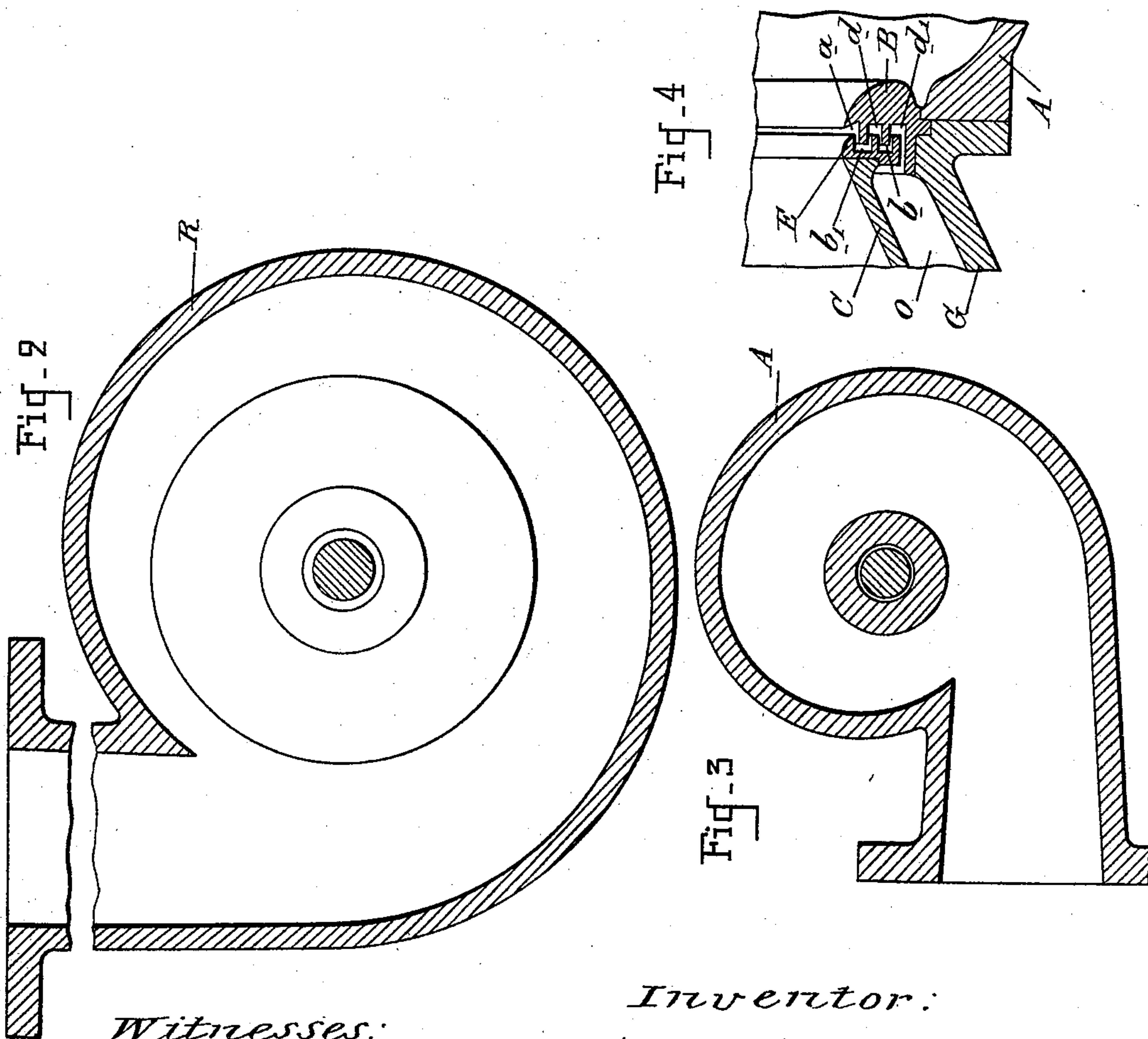
(No Model.)

3 Sheets—Sheet 2.

A. MAGINOT.
HELICO-CENTRIFUGAL PUMP.

No. 605,888.

Patented June 21, 1898.



Witnesses:

C. B. Patton

Old Man

Inventor:

Albert Maginot

By

Richard R

his Attorneys

(No Model.)

3 Sheets—Sheet 3.

A. MAGINOT.
HELICO-CENTRIFUGAL PUMP.

No. 605,888.

Patented June 21, 1898.

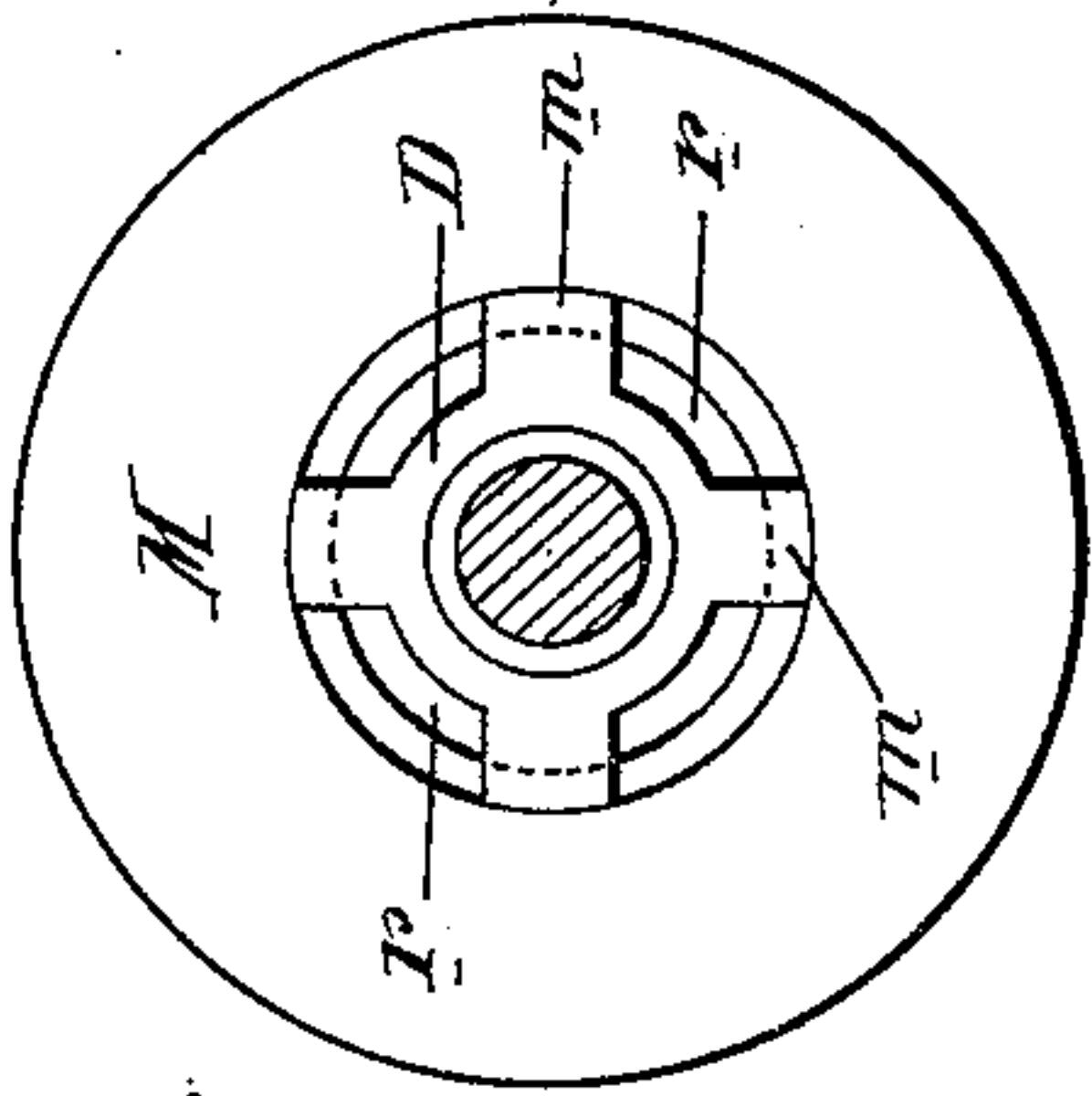
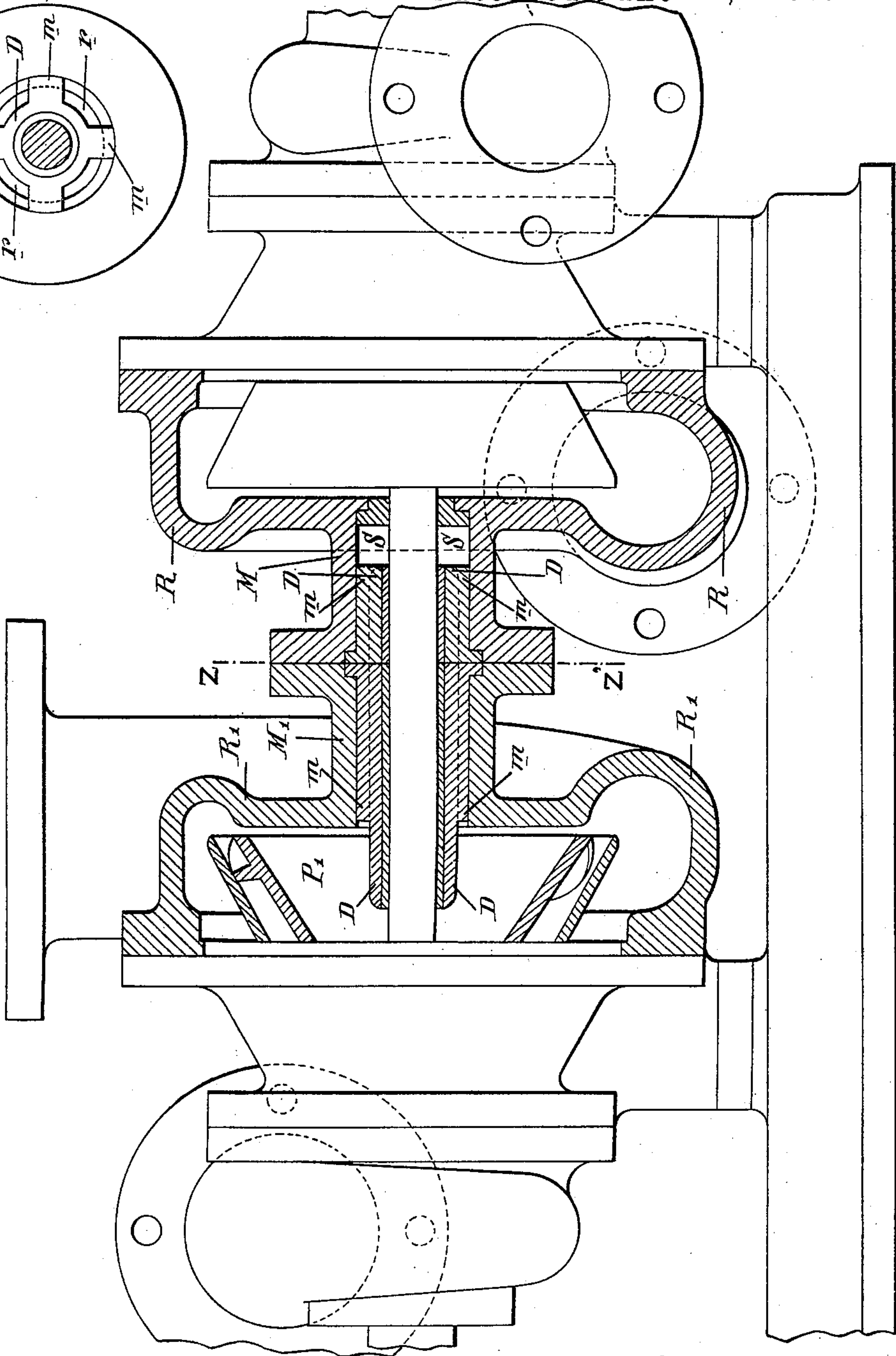


Fig. 6.

Fig. 5.



Witnesses:
E. R. Bolton
O. D. Munk

Inventor:
Albert Maginot

By

Richard R.

his Attorneys.

UNITED STATES PATENT OFFICE.

ALBERT MAGINOT, OF VESOUL, FRANCE.

HELICO-CENTRIFUGAL PUMP.

SPECIFICATION forming part of Letters Patent No. 605,888, dated June 21, 1898.

Application filed December 14, 1897. Serial No. 661,823. (No model.) Patented in France February 12, 1897, No. 263,860.

To all whom it may concern:

Be it known that I, ALBERT MAGINOT, a citizen of the French Republic, and a resident of Vesoul, in the Department of the Haute-Saône, France, have invented certain new and useful Improvements in Helico-Centrifugal Pumps, (for which I have obtained a patent in France, No. 263,860, dated February 12, 1897,) of which the following is a specification.

My invention has for its object further improvements in single or connected helico-centrifugal pumps of the kind for which a patent, No. 576,870, of February 9, 1897, has been granted.

In order to allow of these improvements being better understood, reference will be made to the accompanying drawings, in which—

Figure 1 is an elevation in longitudinal section along the axis of a single pump fitted with my improvements. Figs. 2 and 3 are transverse sections on the lines X Y and X' Y', respectively, of Fig. 1. Fig. 4 is a detailed view of a modification of construction relating to Fig. 1. Fig. 5 is an elevation in longitudinal section along its axis of connected pumps arranged on the same principles. Fig. 6 is a transverse section on the line Z Z' of Fig. 5.

The same letters of reference represent the same parts in the various figures.

The propeller P, Fig. 1, is here provided with a casing C, arranged, adjusted, and fixed on the edge of the helix H. This casing therefore revolves with the propeller. It is also as thin as possible and has in its smallest diameter a projection or flange E, provided with a deep groove *b*. The water-port of the propeller P in the helical suction or force chamber A consists of a ring B in the form of a bell-mouthed spout, the larger portion of which penetrates into the chamber A, the ring being held in place between the flange of chamber A and the flange of casing G. This ring has two deep grooves *a* and *b* opposite the flange E of the casing of the propeller, said grooves being arranged in such a way that the ring and the flange engage reciprocally with as slight a lateral play as possible and a longitudinal play allowing sufficient margin for the shaft of the propeller to have, if required, a reciprocating movement of a

few millimeters, and this without the reciprocal engagement being destroyed. The flange or shoulder E may also be arranged on the casing C of the propeller, as shown in Fig. 4, and have several deep grooves *b b'* instead of a single one. By increasing the number of deep grooves *d d'* in the ring B multiple reciprocal engagements may be obtained. The revolving casing C also penetrates as much as possible, Figs. 1 and 5, into the interior of the forcing-body R, and, further, I arrange between this casing and the casing G a large space O, enabling water contained in this space to assume by influence a speed of rotation little inferior to that of the revolving casing C. The improvements hereinbefore specified may be applied equally well to single or connected pumps.

In connected pumps mounted on the same frame I have simplified as follows the arrangement of the central coupling M M', connecting the two pumps, mention of which was made in my previous patent: This coupling is formed simply by bolting together the flanges of the central boxes M M' of the forcing-bodies R R' of each pump, Fig. 6. The shaft is guided by a central sleeve D, having longitudinal ridges or ribs *m*, leaving between them wide passages *r r*, Figs. 5 and 6, which allow water contained in the interior of the propeller P' to reach the chamber S and to establish there the same pressure as in the interior of this propeller.

The advantages of my improved construction are as follows:

First. Very slight longitudinal encumbrance, the length of the casing G being reduced by the quantity by which the propeller and its casing penetrate the body of the forcing apparatus R.

Second. A reduction of reaction or longitudinal thrust on the shaft, the pressure in the interior of the propeller having as counterpart the pressure on the exterior surfaces of the revolving sleeve D.

Third. The removal or dispensing with the regulating of the play of the spiral as regards the casing of the propeller, the last adjustment being indispensable when the propeller is not provided with a casing revolving with it. It is, in fact, evident that the working of the pump cannot be effected in consequence

of a more or less considerable variation in the longitudinal play allowed between the flange E and the ring B.

Fourth. A considerable diminution of the passive resistance due to friction of the external surface of the revolving casing C upon the surrounding water, because this casing revolves on the one hand in the water contained in the space O and on the other hand in the water in circulation in the forcing-body—that is to say, in water having itself a considerable speed of rotation in the same direction.

Fifth. An important diminution in the loss of discharge resulting from the return toward the suction of water contained in the space, because such water having no other issue than narrow passages and interrupted passages profiled on the line *d b a*, Fig. 1, will experience such loss of power that it can only circulate at a very slow speed. This result is therefore constant whatever may be the longitudinal play between the flange E and the projection B, provided the parts E and B do not cease to engage reciprocally.

Sixth. A great facility of inspection of the grooves *a b d*. It is, in fact, sufficient to remove the suction-body A in order to have access to the said grooves.

Seventh. The capability of adapting a similar pump-body A G R to propellers having a different delivery without other change than the replacement of the ring B by another ring suited for the new propeller.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. In a helico-centrifugal pump, in combi-

nation, the casing, the helical chamber removably bolted thereto, the propeller within the casing, the jacket fitted to the propeller and turning with the same, and the ring B removably clamped between the casing and helical chamber and having a bell-mouth projecting into said chamber, substantially as described.

2. In a helico-centrifugal pump, in combination, the casing, the helical chamber removably bolted thereto, the propeller within the casing, the jacket fitted to the propeller and turning with the same, and the ring B removably clamped between the casing and helical chamber and having a bell-mouth projecting into said chamber and the removable flange plate or ring E carried by the jacket and coacting with the ring B, substantially as described.

3. In a helico-centrifugal pump, in combination, the casing, the helical chamber removably bolted thereto, the propeller within the casing, the jacket fitted to the propeller and turning with the same, and the ring B removably clamped between the casing and helical chamber and having a bell-mouth projecting into said chamber and a ring E removably connected to the jacket, said rings E and B having interlocking tongues and grooves adapted to form a packing and also permit a slight lateral play, substantially as described.

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

ALBERT MAGINOT.

Witnesses:

EDWARD P. MACLEAN,
JULES FAYOLLET.