No. 773,953. PATENTED NOV. 1, 1904.

A. MAGINOT.

POLYCELLULAR CENTRIFUGAL PUMP.

APPLICATION FILED APR. 14, 1904.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

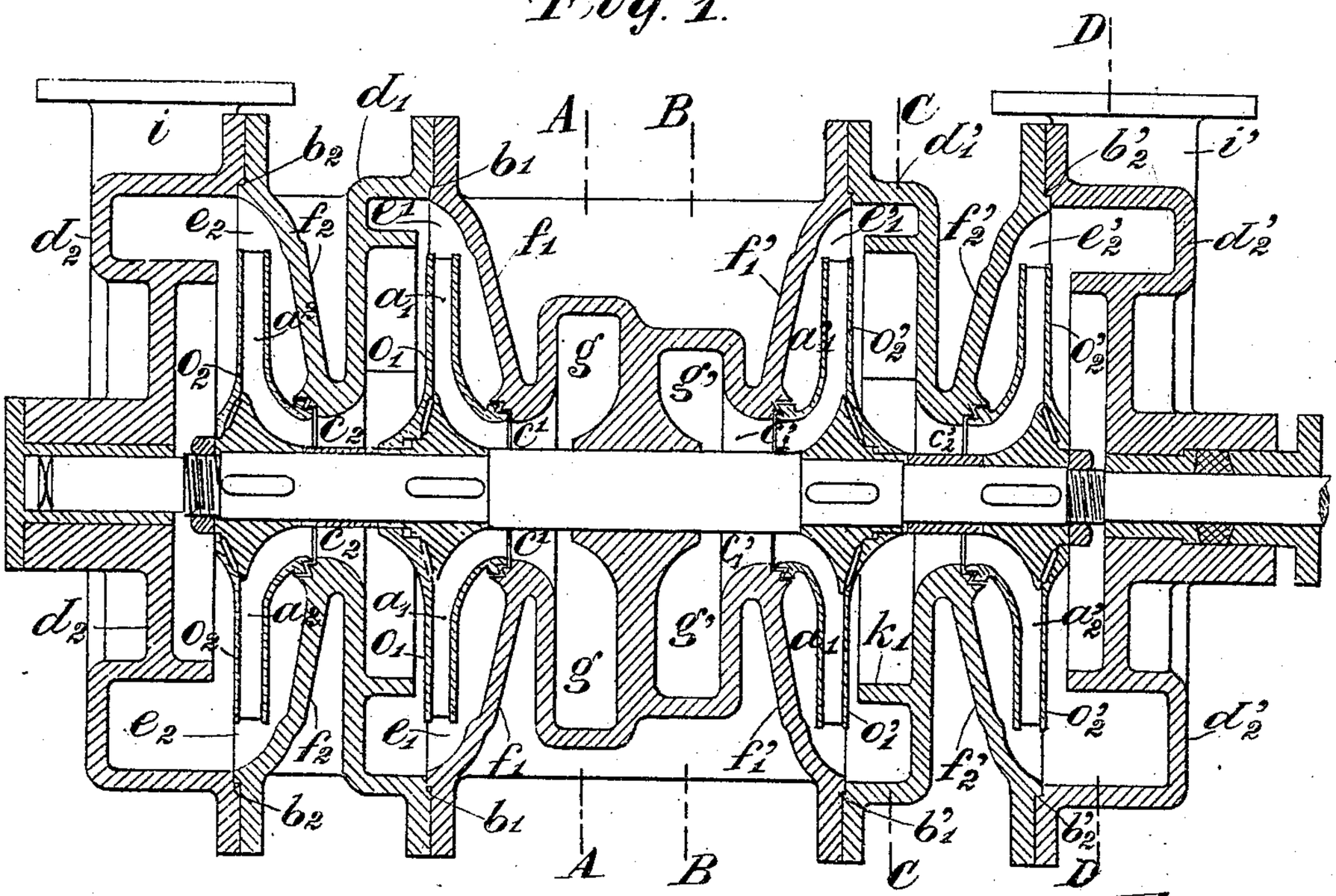


Fig. 2.

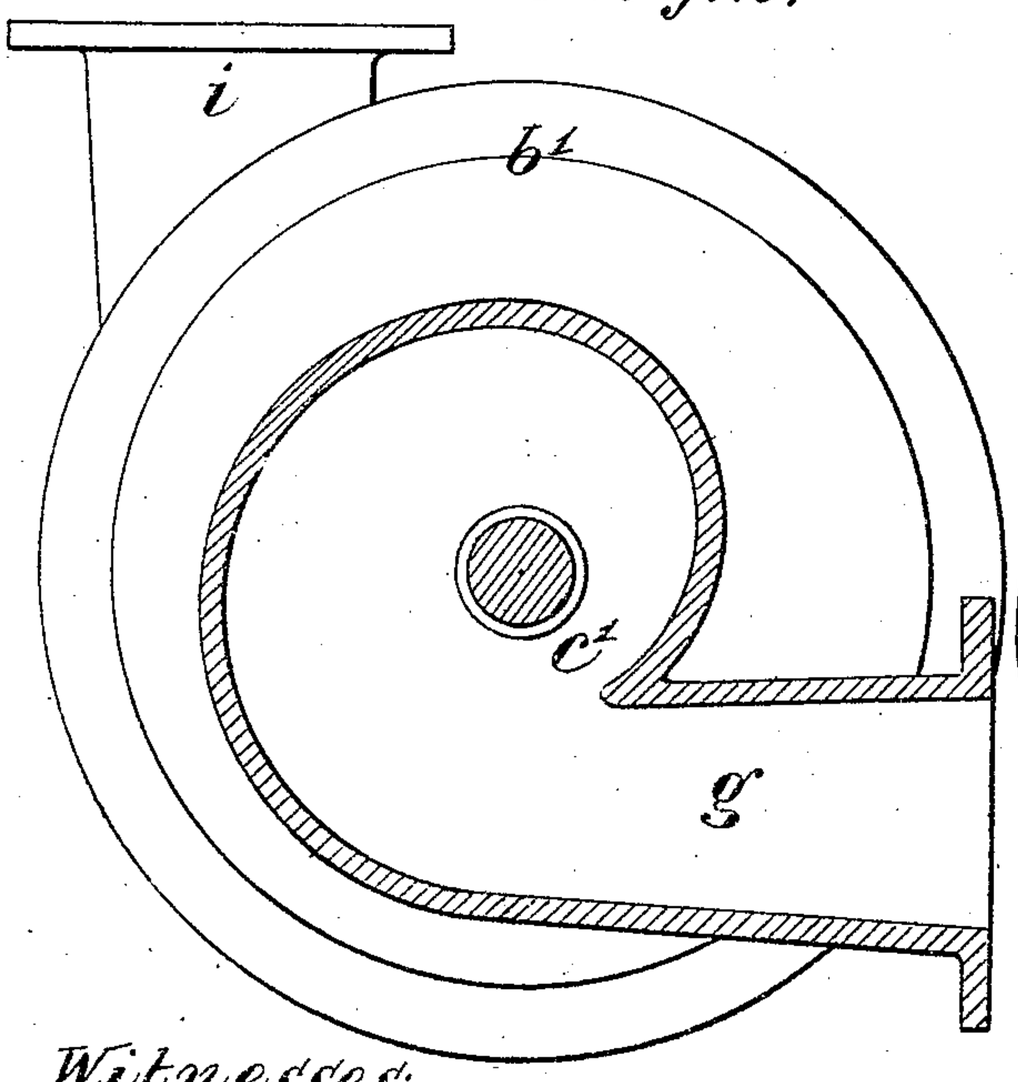
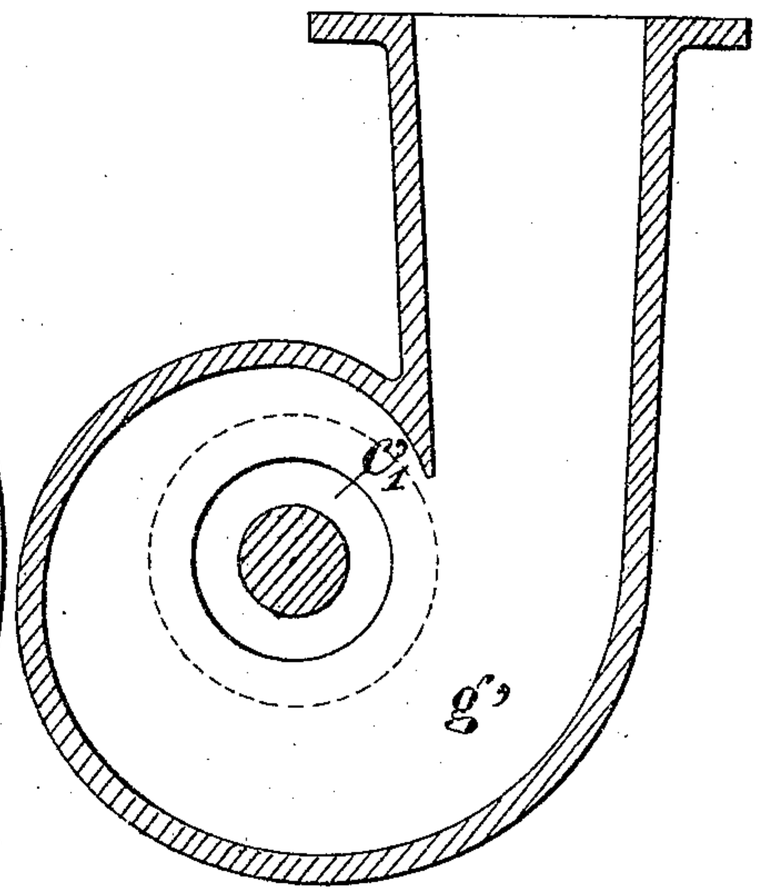


Fig. 3.



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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 4.

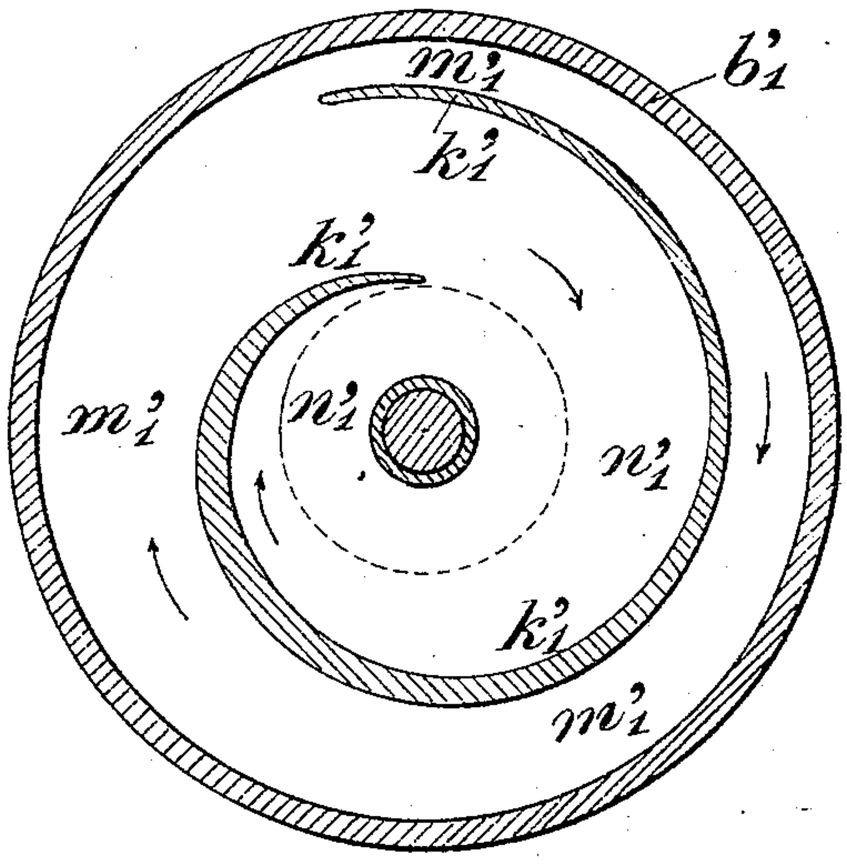


Fig. 5.

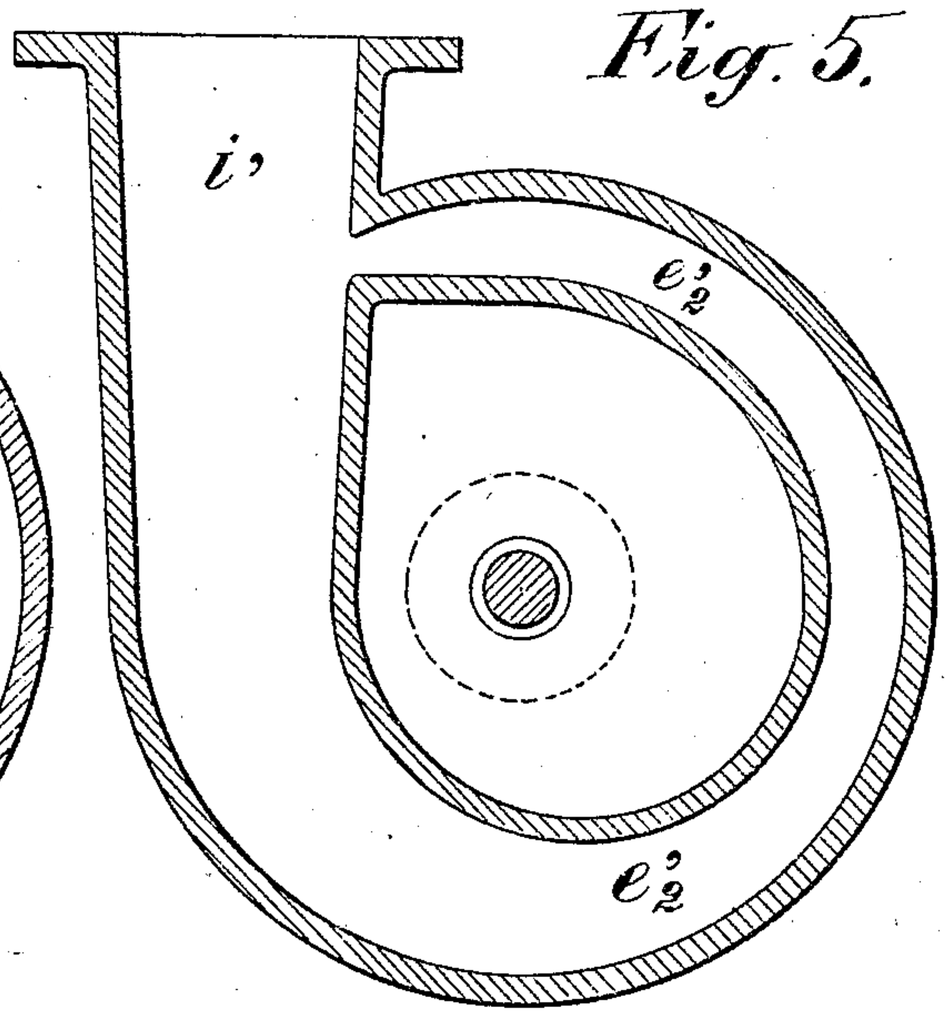


Fig. 6.

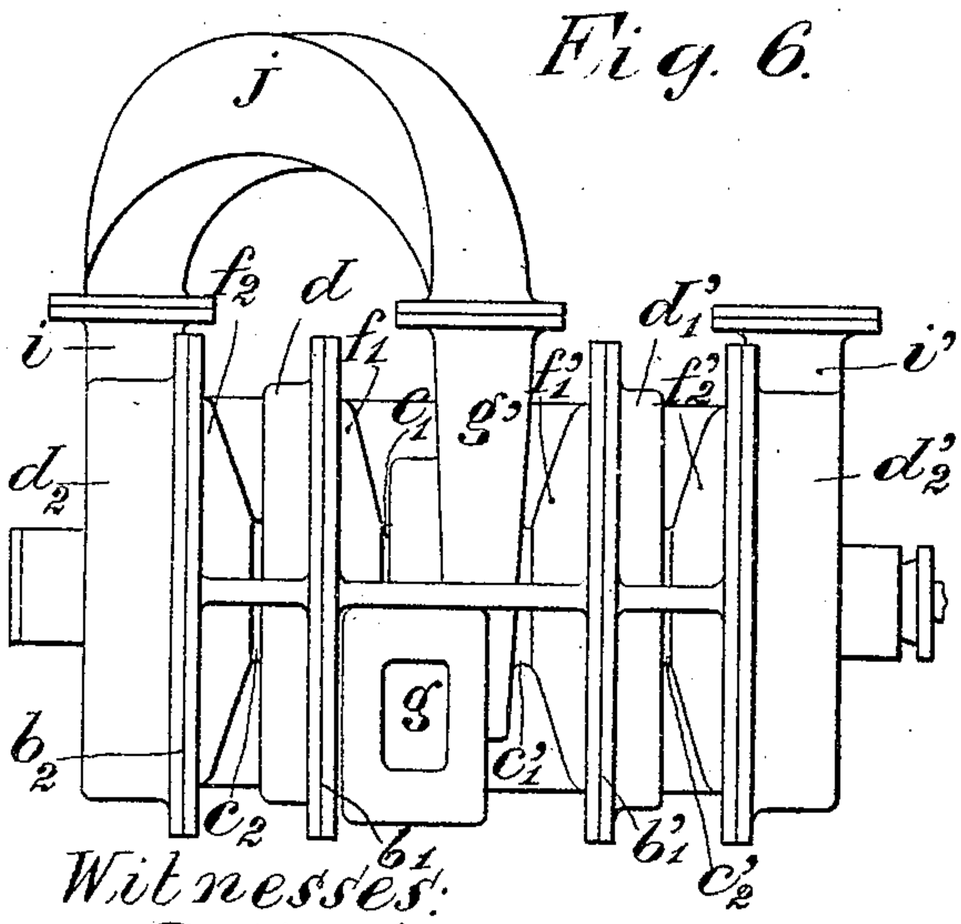
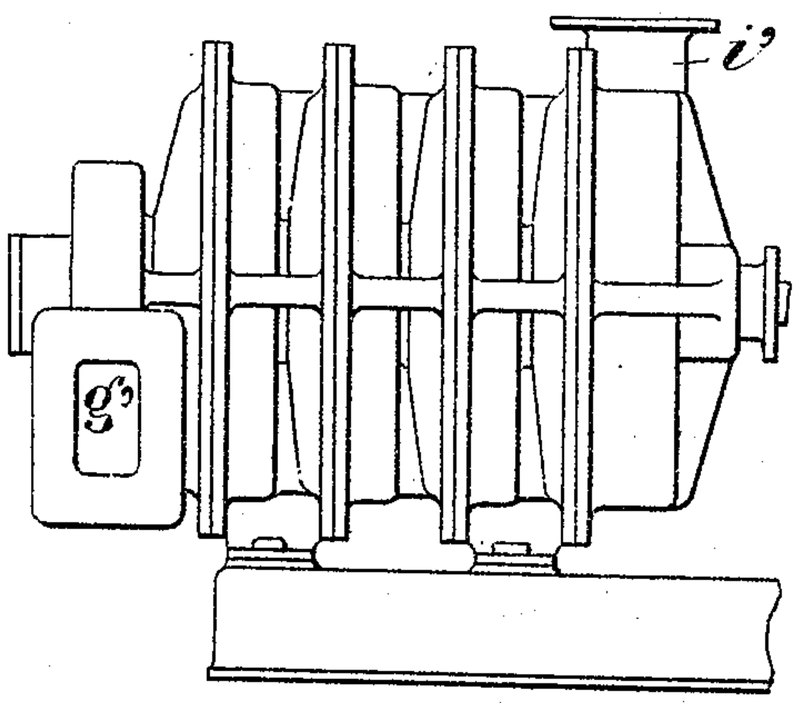


Fig. 7.



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No. 773,953. Patented November 1, 1904.

UNITED STATES PATENT OFFICE.

ALBERT MAGINOT, OF DAMPIERRE, FRANCE, ASSIGNOR TO SOCIÉTÉ L'ECLAIRAGE ELECTRIQUE, OF PARIS, FRANCE.

POLYCELLULAR CENTRIFUGAL PUMP.

SPECIFICATION forming part of Letters Patent No. 773,953, dated November 1, 1904.

Application filed April 14, 1904. Serial No. 203,183. (No model.)

To all whom it may concern:

Be it known that I, ALBERT MAGINOT, a citizen of the French Republic, residing at Dampierre, Jura, France, have invented certain new and useful Improvemements in Polycellular Centrifugal Pumps, of which the following is a specification.

This invention relates to a polycellular centrifugal pump for great heights of elevation. The principal feature of this system of polycellular centrifugal pump is the method of connection between two consecutive cells of the same series. This method of connection consists in dividing the cavity of the circular forcing-shell of each cell, not being an end cell, by means of a partition of spiraloid form with cylindrical walls cast in a foundry or made in sections joined together into two concentric spiraloid channels, the first serving as a collector or forcing-volute and the second as a suction-volute, the connection being effected at the point where their section is largest.

In order to enable the invention to be fully understood, it is hereinafter described with reference to the accompanying drawings, in which—

Figure 1 is a longitudinal section of the pump. Figs. 2, 3, 4, and 5 are transverse sections on the lines A A, B B, C C, and D D, respectively, of Fig. 1, clearly showing the forms of the suction-volutes, of the connection of two symmetrical series of turbines, and of the connection of two consecutive and forcing cells. Fig. 6 is an exterior view of a pump having two series of symmetrical turbines, and Fig. 7 is an exterior view of a pump having four turbines in series not arranged symmetrically.

This improved polycellular centrifugal pump comprises two series of an equal number of turbines a_1 a_2 a_1' a_2', Fig. 1, symmetrically keyed upon a common shaft revolving in circular pump bodies or cells b_1 b_2 b_1' b_2' and taking water through central openings c_1 c_2 c_1' c_2'. Each cell consists of two circular shells connected by sunk bolted joints. The rear or forcing shell d_1' of any one cell e_1', not being an end cell, is cast with the front shell f_2' of the following cell e_2', Figs. 1 and 6, with which it communicates through the opening c_2'. Two suction-volutes g g' independent of each other, placed between the two series of cells, conduct the water, respectively, to each of these series. The said volutes and the front shells of the cells e_1 and e_1' are all formed in one casting, thus constituting the middle part of the system. The rear shells d_2 d_2' of the end cells e_2 e_2' are respectively provided with force-pipes i i'', and a connection j, Fig. 6, places the force-pipe i of one of the series of cells in communication with the suction-volute g' of the other series, Fig. 6.

The result of these arrangements is that the water coming through the volute g and opening c_1 into the cell e_1 is forced by the turbine a_1 through the opening c_2 in the cell e_2 and is then forced by the turbine a_2 and passes, through the medium of the force-pipe i and connection j, into the suction-volute g' of the other series of cells. The said water thus reaching the cell e_1 is forced by the turbine a_1' through the opening c_2' into the cell e_2' and is finally forced by the turbine a_2' and the force-pipe i'' at a pressure equal to the sum of the pressures communicated by each turbine, Figs. 1 and 6.

As already stated at the commencement of this description, the cavity of the circular forcing-shell d_1' of each cell, not being an end cell e_1', for example, is divided by means of a partition k_1' k_1' of spiraloid form and having cylindrical walls cast or in sections joined together, Figs. 1 and 4, into two concentric spiraloid channels m_1' m_1' n_1' n_1', the first serving as the collector or forcing-volute of the cell e_1' and the second as the suction-volute of the following cell e_2' and following the former, so that their junction is effected at the point where their section is largest. The circulation of the water in these channels takes place in the direction of the arrows, which is also the direction of rotation of the turbines. The continuity of the water circulation from one cell to the next in the same series is thus effected by means of a very simple and advantageous arrangement from the triple point of view of cost of apparatus, its

mechanical capacity, and its impediment in the axial direction. The cell e_2', in fact, introduces into the suction channel or volute $n_1' n_1'$ the water forced by the turbine a_1' exactly in the same manner as the cell e_1' introduces it into the suction-volute g', only the suction-volute $n_1' n_1'$ of e_2' is, so to speak, telescoped into the interior of the forcing-shell d_1' of e_1', which considerably reduces the impediment in the axial direction, and consequently the length of the line of shafting.

It is obvious that two series of an unequal number of turbines can be employed and even a single series—such, for example, as e_1' e_2'—the volute g' being the suction-volute and i'' the force-pipe of the said single series.

As illustrated in Fig. 7, the four turbines can be arranged in series, as the application of two symmetrical series of a like number of turbines has only for object to obviate any axial reaction while at work.

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—

A polycellular centrifugal pump, having a plurality of stationary forcing-shells, an axially-disposed shaft, and turbines on said shaft within the chambers of the respective shells, each intermediate shell having in its chamber a partition of spiraloid form which divides the chamber into two concentric spiraloid channels, one channel serving as a forcing-collector and the other as a suction-volute, the two channels being connected at the point where their sections are largest, and said pump having shells each with a passage of spiraloid form and provided respectively with the inlet and an outlet for the fluid.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

ALBERT MAGINOT.

Witnesses:

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HANSON C. COXE.