

No. 765,935.

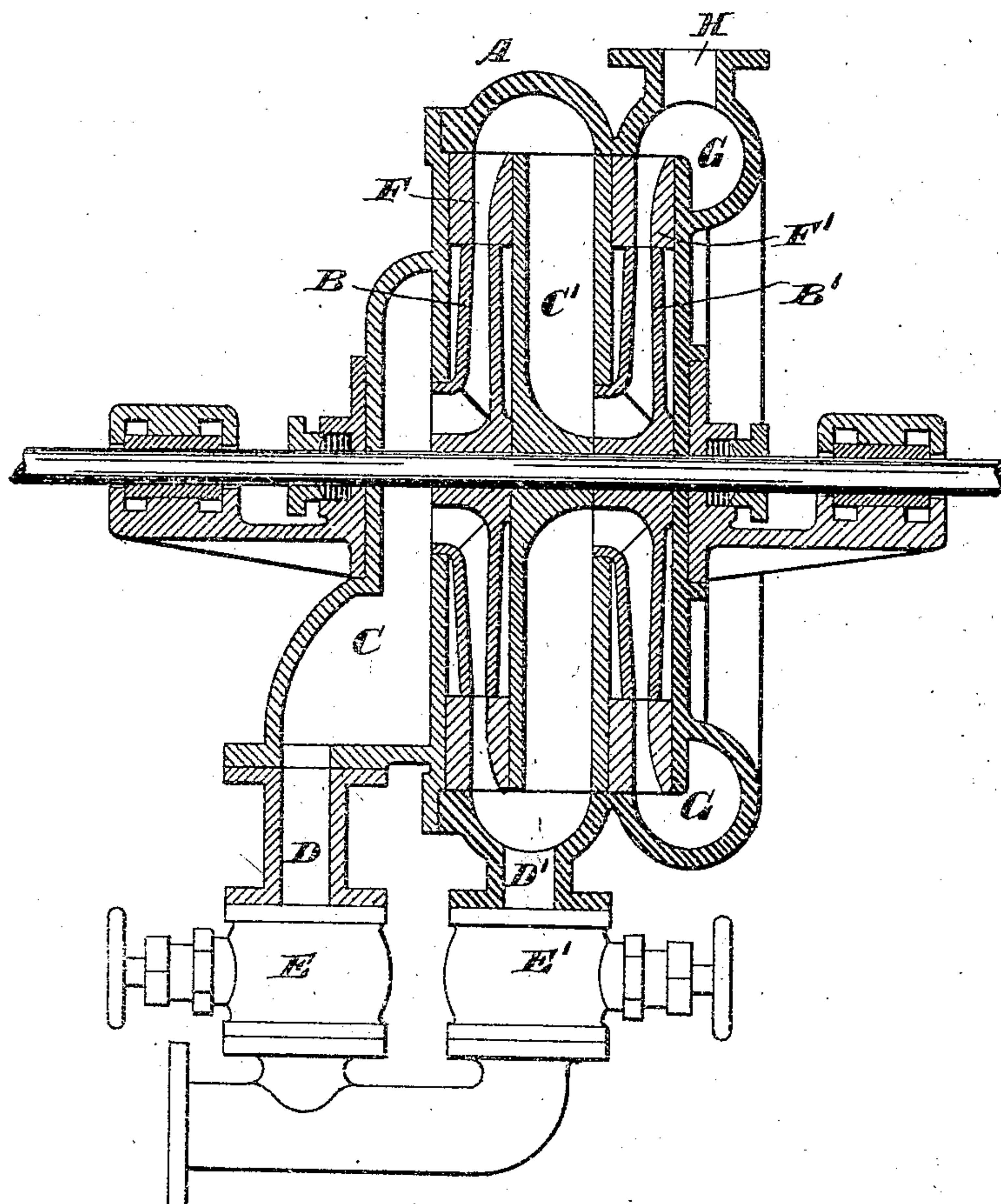
PATENTED JULY 26, 1904.

F. RAY.

MULTISTAGE CENTRIFUGAL, TURBINE, OR SIMILAR PUMP.

APPLICATION FILED OCT. 1, 1903.

NO MODEL.



Attest:

*J. T. Traver*  
*W. H. Kennedy*

Inventor:

*Frederick Ray*  
*by Philip Tanager Keist Kennedy*  
*Attys*

# UNITED STATES PATENT OFFICE.

FREDERICK RAY, OF EAST ORANGE, NEW JERSEY, ASSIGNOR TO HENRY R. WORTHINGTON, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

## MULTISTAGE CENTRIFUGAL, TURBINE, OR SIMILAR PUMP.

SPECIFICATION forming part of Letters Patent No. 765,935, dated July 26, 1904.

Application filed October 1, 1903. Serial No. 175,267. (No model.)

*To all whom it may concern:*

Be it known that I, FREDERICK RAY, a citizen of the United States, residing at East Orange, county of Essex, and State of New Jersey, have invented certain new and useful Improvements in Multistage Centrifugal, Turbine, or Similar Pumps, fully described and represented in the following specification and the accompanying drawings, forming a part 10 of the same.

The object of the present invention is to provide an improved centrifugal, turbine, or like pump for obtaining different discharge-pres- 15 sures with the pump running at constant speed.

I secure the result desired by providing the impellers of a multi-impeller centrifugal, turbine, or like pump with separate suction- 20 means for opening and closing them, so that the suction of the first impeller or of a subsequent impeller of the series may be used and the liquid acted upon by the number of impellers desired on its way to the delivery, according to the discharge-pressure required.

In the accompanying drawing, the invention 25 is shown as applied to a two-stage turbine-pump of a well-known type, and from a description of this pump the application of the invention in connection with a multistage pump having any number of impellers will 30 readily be understood.

In the drawing, which is a central section of the pump taken longitudinally of the axis, A is the casing inclosing the two impellers B B'. The first impeller B takes its suction from 35 the chamber C at the end of the casing, which is supplied through suction-pipe D, controlled by valve E, and this impeller B delivers the water through the diffusing-ring F to the chamber C', forming the suction-chamber for 40 the second impeller B'. This suction-chamber C' for the second impeller is provided also with suction-pipe D', controlled by valve E'. The second impeller B' delivers its water through the diffusing-ring F' and delivery- 45 chamber G to the outlet H.

Full pressure is obtained by closing suction D' by valve E' and opening suction D by valve E. The water entering from suction D through suction-chamber C is then acted on succe- 50 ssively by the two impellers B B' and then delivered through outlet H. Lower pressure is obtained by closing suction D by valve E and opening suction D' by valve E'. The water then enters suction-chamber C' from suction D' and is acted on only by impeller B'. 55

When the impeller B' is not in use—that is, when the suction D' is used—the impeller B being on the suction side of the working im- 60 peller B' runs in air, and this is an important advantage of my construction as compared with constructions in which the non-working 65 impeller is on the force side of the working impeller, as the friction, wear, and tendency to leakage is thus greatly reduced. It will be found that the suction-chamber C and the im- 65 peller-chamber will soon be emptied of water in operating the pump with the suction D' open. If in any case it be desired to admit air to the chamber C in starting the pump with the suction D', this can readily be done by an 70 air-valve on chamber C.

It will be understood that the invention is not limited to the special type of pump shown, but that it is applicable generally in multi- 75 stage turbine, centrifugal, or like pumps.

What is claimed is—

A centrifugal, turbine or like pump having a plurality of impellers arranged in series, separate suction- 80 means for opening and closing the suction of the different impellers to take the suction on the first or subsequent impeller according to the discharge-pressure desired.

In testimony whereof I have hereunto set my hand in the presence of two subscribing 85 witnesses.

FREDERICK RAY.

Witnesses:

C. J. SAWYER,

W. H. KENNEDY.