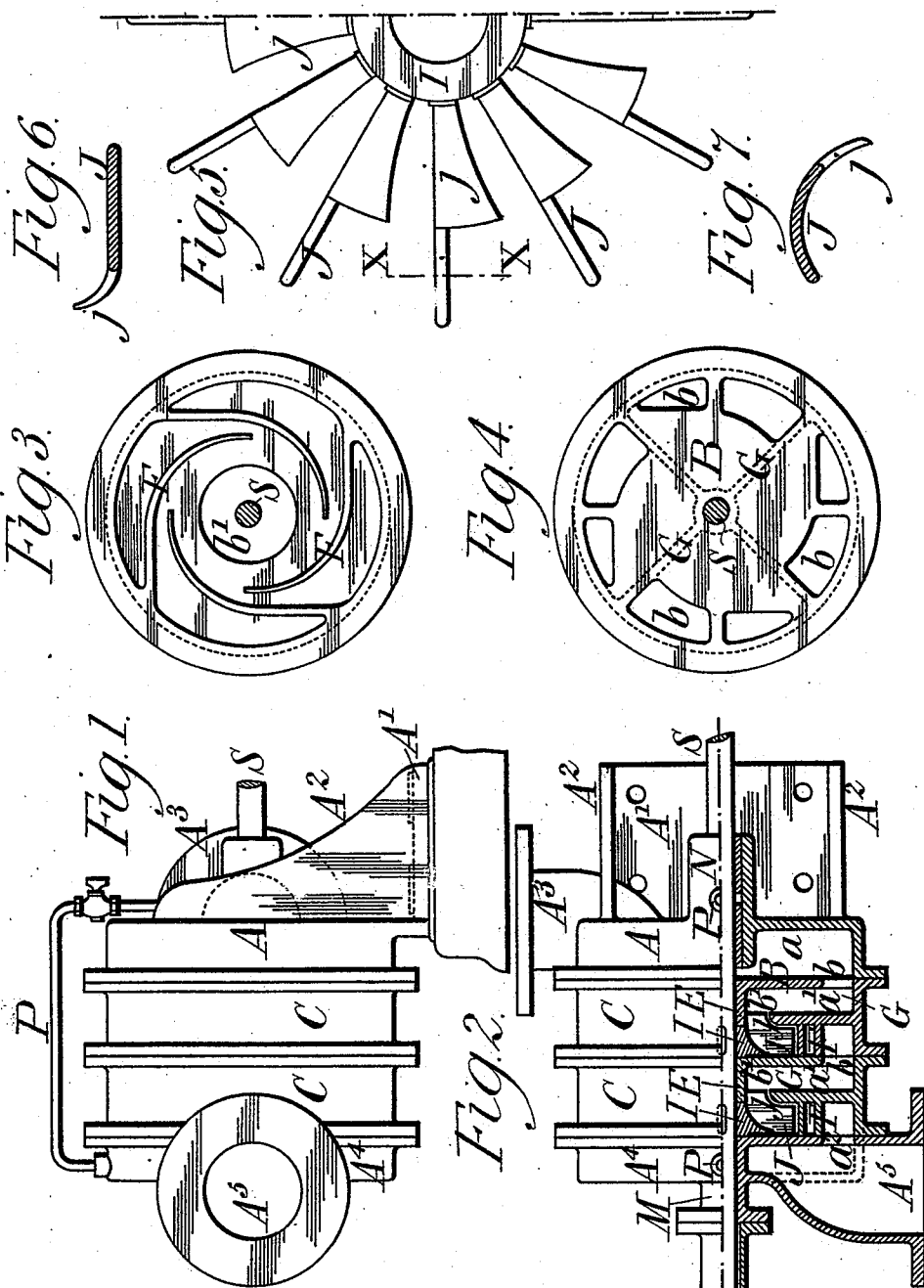


(No Model.)

O. REYNOLDS.
ROTARY PUMP OR TURBINE.

No. 541,455.

Patented June 18, 1895.



Witnesses,

George William Rea,

Robert Emmett.

Inventor,
Osborne Reynolds.

By
James L. Norris,
Att'y.

UNITED STATES PATENT OFFICE.

OSBORNE REYNOLDS, OF MANCHESTER, ENGLAND.

ROTARY PUMP OR TURBINE.

SPECIFICATION forming part of Letters Patent No. 541,455, dated June 18, 1895.

Application filed January 23, 1895. Serial No. 535,973. (No model.) Patented in England July 13, 1894, No. 13,578.

To all whom it may concern:

Be it known that I, OSBORNE REYNOLDS, a citizen of England, residing at The Owens College, Manchester, in the county of Lancaster, England, have invented certain new and useful Improvements in Rotary Pumps or Turbines, (for which I have obtained a patent in Great Britain dated July 13, 1894, No. 13,578,) of which the following is a specification.

My invention relates to a construction of apparatus which, when driven by power, operates as a rotary pump, or when supplied with water under pressure, operates as a turbine, as I shall describe, referring to the accompanying drawings.

Figure 1 is a side elevation. Fig. 2 is a plan partly sectional. Fig. 3 is a front view of one set of the guides on their disk. Fig. 4 is a front view of one of the intermediate disks. Fig. 5 is a part front view drawn, to an enlarged scale, of one of the wheels. Fig. 6 is a transverse section, on X X of Fig. 5, of one of the blades; and Fig. 7 is a transverse section of a modified form of blade.

I shall describe the apparatus applied as a pump.

The casing is made in four parts having flanges by which they are bolted together. The first part A is made with a flange A', stiffened by side ribs A², which is bolted down to a suitable foundation. It has also an inlet A³ for the fluid to the first internal chamber *a* from which there are passages *b* through the partition B into the next chamber *a'*. In this chamber there are radial ribs G which prevent the fluid from revolving so that it flows toward the axis passing through a central aperture *b'* into the first wheel chamber meeting the curved parts *j* of the wheel blades J which project from the boss I. The wheel rotating sets the fluid in rotary motion, but it is directed by the fixed spiral guides F arranged in the chamber beyond the wheel toward the second set of apertures *b* into another chamber *a'*, in which another set of radial ribs G cause it to flow toward the second central aperture *b'* to be acted on by a second wheel J and set of fixed spiral guides F, and finally delivered through a chamber *a*² to the outlet A⁵ in the end part A⁴ of the casing.

The shaft S works in a bearing M formed in

the end part A⁴ of the casing, and extends beyond this bearing within a closed tube D. The shaft also works in a bushed bearing N formed in the part A of the casing, and the bushing is made in two parts with an interval between them forming a groove all round the shaft. To this groove fluid under pressure is conducted by a pipe P, the quantity being regulated by a cock.

The wheels are of such width as almost but not quite to touch the sides of the chambers in which they revolve, these sides as well as the sides of the wheels being faced in the turning lathe, and the bosses I of the wheels just fitting between bosses E at the centers of the chambers. The wheel bosses I are fitted on the shaft S on feather keys which are parallel, allowing the bosses I to accommodate themselves to the sides of the bosses E.

When the apparatus is employed as a turbine, its action is simply reversed, the water under pressure entering at A⁵ and issuing at A³, the radial ribs G being in this case dispensed with.

Although I have shown on the drawings only two chambers C containing wheels and guides, there may obviously be a greater number when the pump is required to act against a higher column, or when the turbine is to be worked by water under higher pressure.

Having thus described the nature of this invention and the best means I know of carrying the same into practical effect, I claim—

A rotary pump or turbine, consisting of a plurality of partitioned, cylindrical chambers provided internally with fixed, spiral guides F and radial ribs G, one chamber communicating with the adjoining chamber by openings near the circumference, and the partition in each chamber having openings near the center, and a revolving wheel in each cylindrical chamber provided with blades J, substantially as described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 8th day of January, 1895.

OSBORNE REYNOLDS.

Witnesses:

WM. BROWN,
JAS. HEWITT.