

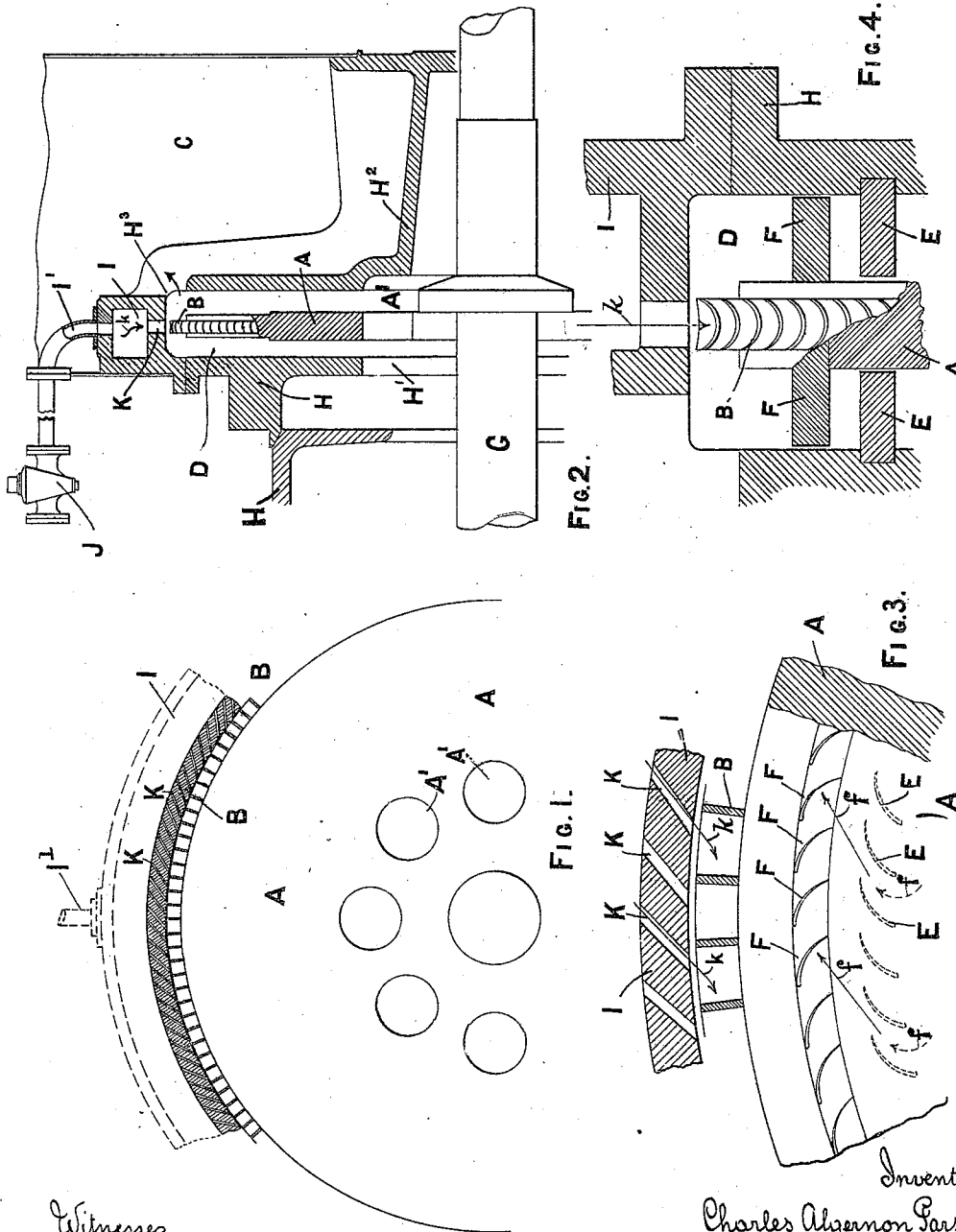
(No Model.)

2 Sheets—Sheet 1.

C. A. PARSONS.
STEAM TURBINE.

No. 553,659.

Patented Jan. 28, 1896.



Witnesses
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(No Model.)

2 Sheets—Sheet 2.

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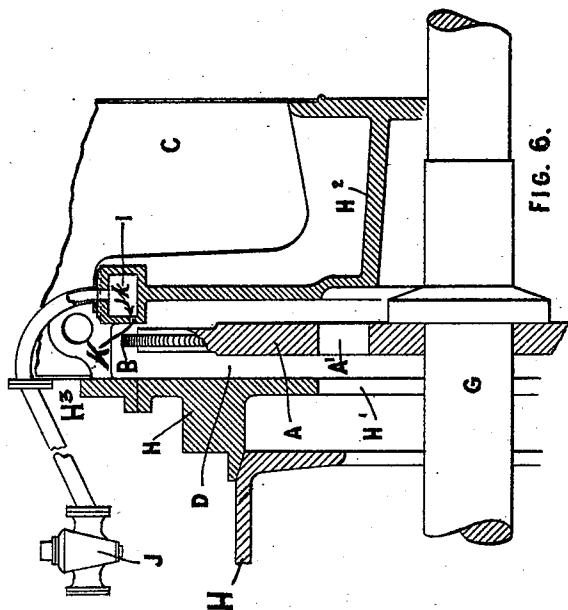


FIG. 6.

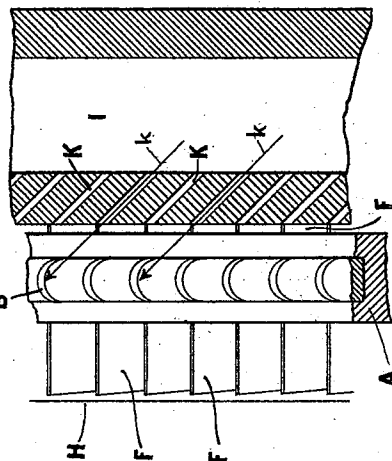


FIG. 8.

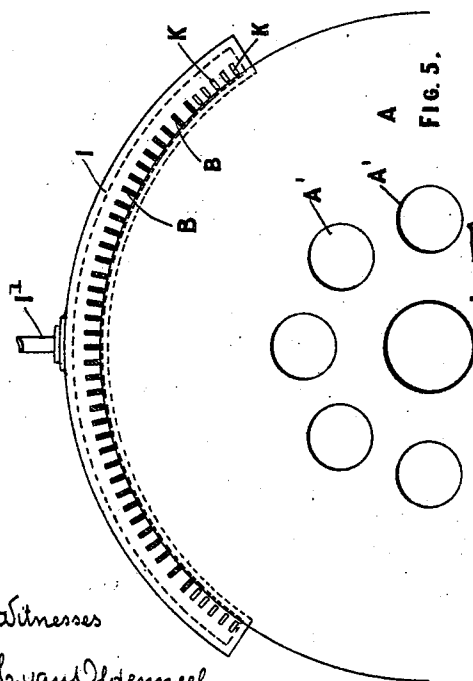


FIG. 5.

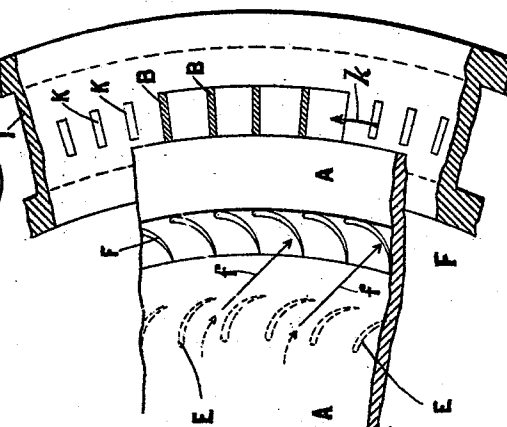


FIG. 7.

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UNITED STATES PATENT OFFICE.

CHARLES ALGERNON PARSONS, OF NEWCASTLE-UPON-TYNE, ENGLAND.

STEAM-TURBINE.

SPECIFICATION forming part of Letters Patent No. 553,659, dated January 28, 1896.

Application filed February 21, 1895. Serial No. 539,199. (No model.)

To all whom it may concern:

Be it known that I, CHARLES ALGERNON PARSONS, a subject of the Queen of Great Britain, residing at Newcastle-upon-Tyne, North-
5 umberland county, England, have invented certain new and useful Improvements in Steam-Turbines, of which the following is a specification.

My invention relates to steam-turbines applied to propel steam-vessels; and my object is to so construct such turbines that they may be reversed when it is desired to reverse the action of the screw-propeller.

My invention consists in arranging in connection with and within the steam-turbine a set of reversing-blades and guide-blades or orifices which are brought into operation only when the vessel is to be reversed. As reversing is only required for a short time, I need
20 not arrange the reversing part of the turbine to give economical results as to steam consumption. The only necessity is to give a considerable power for a short time.

To stop the turbine quickly before reversing I sometimes turn the water from the hot well into it to produce liquid friction between the blades and the guide-blades or orifices.

Referring to the accompanying sheet of drawings, Figure 1 is a part sectional front elevation, and Fig. 2 a corresponding part sectional side elevation, of a low-pressure large-diameter disk of a steam-turbine having reversing-blades arranged on its periphery, while Figs. 3 and 4 are respectively detail part sectional front and part sectional side elevations of the disk periphery and casing.
35 Figs. 5 and 6 are respectively part front elevation and part sectional side elevation similar to Figs. 1 and 2, but showing the steam-jets issuing through lateral orifices in the casing, while Figs. 7 and 8 are respectively detail part sectional front elevation and part sectional plan of the disk periphery and casing corresponding to Figs. 5 and 6.

In carrying my invention into effect I arrange upon the periphery of a low-pressure disk of large diameter A a series of curved or cupped blades B, and I dispose the disk at the rear end of the turbine within the chamber D, in which are secured the fixed guide-blades E, Figs. 3, 4, and 7, for guiding the steam to impinge upon the blades F, arranged

upon either face of the disk A, to produce or augment the rotation in its normal direction of the shaft G, to which the disk A is secured. The steam, after passing through a series of turbine disks or cylinders of the usual construction and arrangement disposed in the fore part of the turbine casing H, or on its first introduction, passes through the annular space H', and also through the apertures A' in the disk A, and pursues its course radially outward upon either side of the disk impinging upon the rotating blades F, as indicated by the arrows f, Figs. 3 and 7, and producing thereby the rotation of the disk and propeller-shaft G in its proper direction.

Around the periphery of the disk A is arranged a hollow casing or steam-chest I, either entirely surrounding or partially surrounding the disk, as in Fig. 5, such casing or chest being formed preferably in one casting integral with the casing H². Within the lower peripheral wall of this casing or chest I are formed inclined orifices K, through which the high-pressure steam passes, as indicated by the arrows k, after being admitted to the chest by an independent valve J through the pipe I', thereby impinging upon the peripheral curved blades B, vertically disposed upon the disk. The orifices K are inclined in the same direction as the fixed blades E, so that on the steam being admitted to the chest or casing I a powerful reverse rotation is imparted to the disk and the direction of rotation of the propeller-shaft reversed. The steam, after thus impinging upon the rotating blades, passes through apertures H³ to the exhaust-trunk C to the condenser. It is obvious that the orifices K could be made vertical and the blades B oppositely inclined to the fixed blades E for producing the reverse rotation of the disk, all that is necessary being that the steam should issue to the respective moving blades in contrary directions. In this arrangement only a single set of blades is used; but should greater economy be necessary than is possible with this arrangement several successive rows of blades to the main turbine may be used, with corresponding orifices or guide-blades. These reversing-blades, being on the large low-pressure disk when the turbine is propelling the vessel ahead, rotate in the exhaust and offer little resistance to the work-

ing of the turbine. The reverse turbine part may be used to stop the main turbine quickly when desired.

5 Figs. 5 to 8 illustrate a modification of the arrangement shown in the first four figures of the drawings, the steam being shown as arranged to issue laterally upon the peripheral blades of the disk, such casing being suitably disposed upon the side of the disk to effect this
10 purpose.

In the figures the same letters of reference indicate the same parts.

I claim—

In combination in a steam turbine, the casing, the disk therein having openings A' there- 15 through and the buckets F disposed on the sides of the disk, the blades E fixed to the casing and the peripheral buckets B with means for directing the jet thereto, substantially as described. 20

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

CHARLES ALGERNON PARSONS.

Witnesses:

FREDERIC SMITH,

JOHN HETHERINGTON.