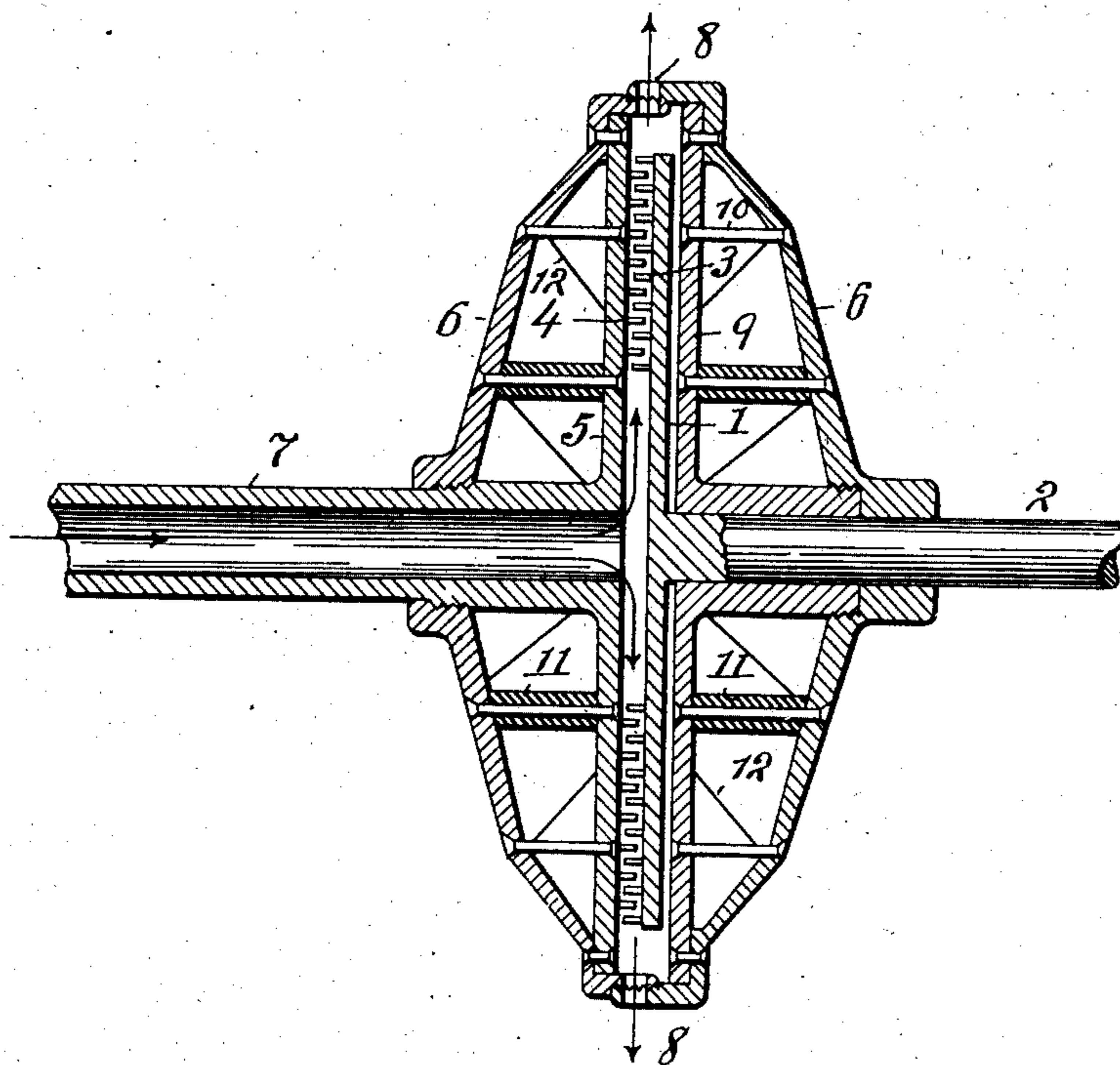


No. 883,404.

PATENTED MAR. 31, 1908.

P. J. HEDLUND.
STEAM TURBINE.
APPLICATION FILED DEC. 21, 1907.



Witnesses:
Gustave T. Porter.
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UNITED STATES PATENT OFFICE.

PER JOHAN HEDLUND, OF STOCKHOLM, SWEDEN.

STEAM-TURBINE.

No. 883,404.

Specification of Letters Patent.

Patented March 31, 1908.

Application filed December 21, 1907. Serial No. 407,591.

To all whom it may concern:

Be it known that I, PER JOHAN HEDLUND, engineer, subject of Sweden, residing at Järfa, Stockholm, Sweden, have invented 5 new and useful Improvements in Steam or Gas Turbines, of which the following is a specification.

The present invention relates to steam or gas turbines of the kind, in which the turbine disk and the turbine casing rotate in opposite directions.

The invention consists in the construction of the turbine casing and its combination with the turbine disk, as more particularly 15 pointed out in the claims.

The drawing is a vertical transverse section of my improved turbine.

The turbine casing is formed in two parts, each part comprising a disk and a substantially convex shell 6 connected thereto. The 20 disk 4 forms a wall of one part, and the disk 9 a wall of the other part, these disks being disposed facing one another and separated by a space in which is placed the turbine disk 1. On one face of said disk 1 are concentric circular rows of buckets 3, and on the opposing face of disk 4 are similar concentric rows of buckets which enter between and alternate with the bucket rows on disk 1. 25 The parts of the casing are connected by threaded flanged rings 8 bolted to the disks 4 and 9 in which rings are openings for the exhaust. The hollow shaft 7 which may be integral with disk 4, is threaded on its periphery to receive a correspondingly threaded hub on the shell 6 of the casing. The other 35 part of the casing has a hub extending through it, through which passes the shaft 2 which carries the turbine disk 1. The disks 4 and 9 are connected to the casing shells 6 by bolts 10 and between said disks and shells are stay plates 12 some of which may be provided with sleeves 11 to receive said bolts.

45 In operation, the motor fluid enters as shown by the arrows through the hollow shaft 7 and passes between the buckets in a direction radial to the turbine disk and finally exhausts at the openings in rings 8; the casing and the turbine disk 1 then rotating in opposite directions.

The foregoing construction permits of the casing walls being made thin and the whole

casing structure is rendered rigid and comparatively light.

I claim:

1. In an elastic fluid turbine, a turbine disk, and a casing for said turbine disk formed in two parts each part comprising a disk and a shell connected thereto.

2. In an elastic fluid turbine, a turbine disk and a casing formed in two parts each part comprising a disk, a shell connected to said disk and internal stay plates connected to said shell and disk.

3. In an elastic fluid turbine, two shafts disposed end to end, a turbine disk carried by one of said shafts, and a casing carried by the other shaft: the said casing being formed in two parts, each comprising a shell 70 and a disk connected thereto, the said disks receiving the turbine disk between them.

4. In an elastic fluid turbine, a turbine disk, a casing completely inclosing said disk, bucket rings on a face of said disk and on the opposing face of said casing, a hollow 75 shaft carrying said casing and a shaft carrying said turbine disk and journaled in said casing; the said shafts being placed end to end.

5. In an elastic fluid turbine, an inclosing casing formed in two parts, each part comprising a disk and a shell connected thereto, a shaft supporting said casing, a turbine disk interposed between said casing disks and a shaft carrying said turbine disk; the 85 said turbine disk and one of the casing disks having concentric alternately disposed rings of buckets on their opposing faces.

6. In an elastic fluid turbine, an inclosing casing formed in two parts, each part comprising a disk and a shell connected thereto, means for connecting said disks at their circumferential peripheries, a shaft supporting said casing, a turbine disk interposed between said casing and a shaft carrying said 95 turbine disk; the said turbine disk and one of the casing disks having concentric alternately disposed rings of buckets on their opposing faces.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

PER JOHAN HEDLUND.

Witnesses:

WARDEMAN BOMAN,
HJALMAR ZETTERSTRÖM.