

No. 771,759.

PATENTED OCT. 4, 1904.

C. A. BACKSTROM.  
TURBINE RUNNING WHEEL.  
APPLICATION FILED JAN. 21, 1904.

NO MODEL.

Fig. 2.

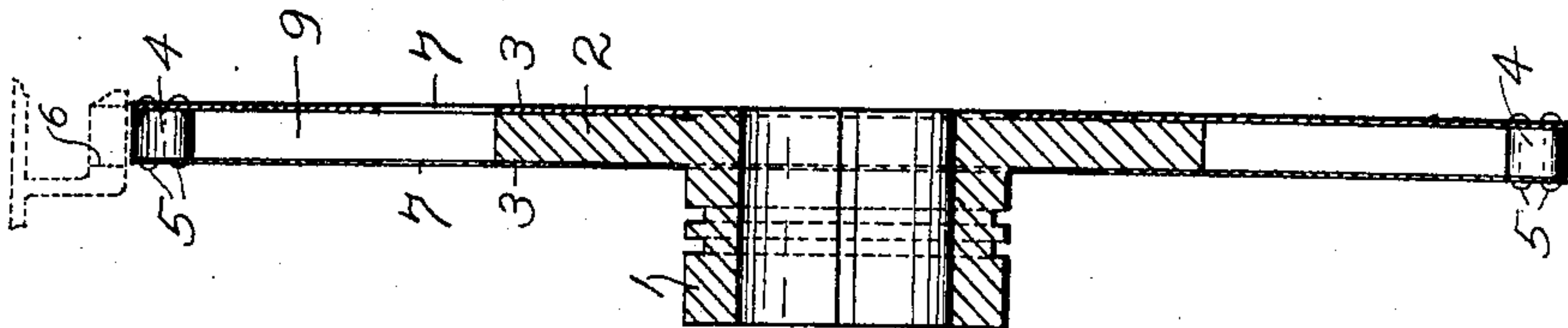
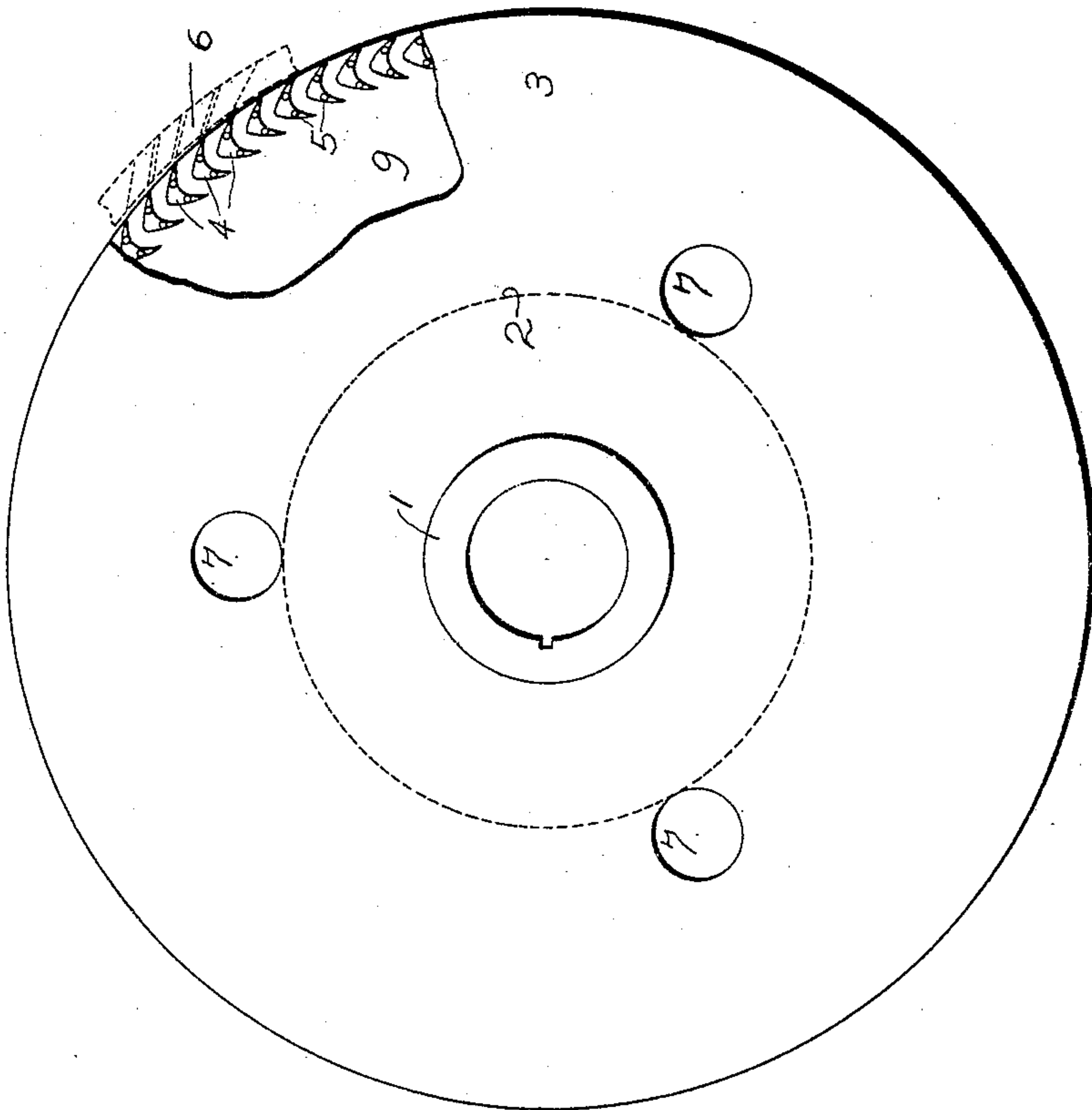


Fig. 1.



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# UNITED STATES PATENT OFFICE.

CHARLES A. BACKSTROM, OF MILWAUKEE, WISCONSIN.

## TURBINE RUNNING WHEEL.

SPECIFICATION forming part of Letters Patent No. 771,759, dated October 4, 1904.

Application filed January 21, 1904. Serial No. 190,043. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES A. BACKSTROM, a citizen of the United States, residing at Milwaukee, county of Milwaukee, and State of Wisconsin, have invented new and useful Improvements in Turbine Running Wheels, of which the following is a specification.

My invention relates to improvements in turbine running wheels.

One object of my invention is to confine the jet of motive fluid as it leaves the vanes between parallel surfaces.

A further object is to provide a form of construction in which the pressure of the motive fluid upon opposite sides of the running wheel will be balanced.

In the following description reference is had to the accompanying drawings, in which—

Figure 1 is a side view of a running wheel embodying my invention with a portion of one of the outer disks broken away to show the position of the vanes and with a portion of a nozzle-ring indicated in dotted lines. Fig. 2 is a diametrical sectional view, also showing a nozzle-ring or partition in dotted lines.

Like parts are identified by the same reference characters in both views.

The running wheel is formed with a central hub 1, provided with an outwardly-projecting flange 2, to which disks 3 are secured, one on each side. The vanes 4 are located between the outer portions of the disks with their ends abutting the inner faces of the respective disks and are secured by rivets 5 in a position to receive the motive fluid from the inwardly-directed nozzles 6, (indicated in dotted lines.) The hub 1 is adapted to fit the turbine-shaft and is splined or otherwise rigidly secured thereto.

The fluid is delivered from the vanes into the space or cavity 9 between the disks and within the path of the vanes—i. e., between the path of the vanes and the marginal edge of the flange 2. From this space the fluid passes outwardly through suitable apertures 7 in the respective disks to both sides of the wheel, the pressure upon the sides of the wheel being thus equalized.

The apertures 7 have a capacity much

greater than that of the nozzles, so that there is no tendency to accumulate or increase the density of the motive fluid between the disks 3. The inner faces of the disks are, however, substantially parallel, so the reactionary force of the motive fluid is in line with the vanes themselves and not partially outside of the path of the vanes.

It will be observed that as the vanes have the usual concave receiving-surfaces the movement of the motive fluid as it leaves the point of impact will be in a direction opposite that of the rotation of the wheel, and therefore against the body of fluid between the disks and traveling with the wheel. A reactionary effect is thus secured by which the entire kinetic energy of the fluid which has been developed by the nozzles is expended to drive the wheel before the fluid reaches the apertures 7. To secure this result, it is necessary that the apertures 7 should be of sufficient capacity to permit the density and pressure of the motive fluid to equalize in the space within the cavity and at the sides of the running wheel, the apertures being adapted to permit an entirely free and unobstructed passage of steam from the interior of the cavity to the sides of the running wheel. It will also be noted that the apertures are located at a substantial distance from the vanes, so that there will be no lateral movement of the motive fluid adjacent to the vanes.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination with a turbine-shaft, of a running wheel having an interior cavity and vanes arranged for the inward delivery of motive fluid to said cavity; the walls of said cavity being substantially parallel and provided with apertures leading to the exterior at the sides of the running wheel between the shaft and the vanes, but at a substantial distance from the latter; said apertures being adapted to afford a free and unobstructed passage of motive fluid therethrough and of sufficient capacity to permit the pressure and density of the motive fluid to equalize in the space within the cavity and at the sides of the wheel.



2. The combination with a turbine-shaft, of a turbine running wheel having an interior cavity and apertures in both side walls communicating with the exterior at the sides of said wheel and between the shaft and the periphery of the wheel; said wheel being provided with peripheral vanes arranged for the inward delivery of motive fluid to said cavity, and the interior wall-faces of said cavity being substantially parallel.

3. The combination with a turbine-shaft, of a turbine running wheel having an interior cavity and apertures in both side walls communicating with the exterior at the sides of said wheel and between the shaft and the periphery of the wheel; said wheel being provided with peripheral vanes arranged for the inward delivery of motive fluid to said cavity,

and the interior wall-faces of said cavity being substantially parallel adjacent to the vanes.

4. The combination with a turbine-shaft, of a turbine running wheel comprising parallel side disks; vanes interposed between the peripheral portions of said disks; and nozzles arranged for the inward delivery of motive fluid to the vanes and the interior space between said disks; said disks being both provided with apertures, of greater capacity than the capacity of the nozzles.

In testimony whereof I affix my signature in the presence of two witnesses.

CHARLES A. BACKSTROM.

Witnesses:

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