

H. ZOELLY.  
WHEEL FOR STEAM TURBINES.  
APPLICATION FILED AUG. 24, 1903.

NO MODEL.

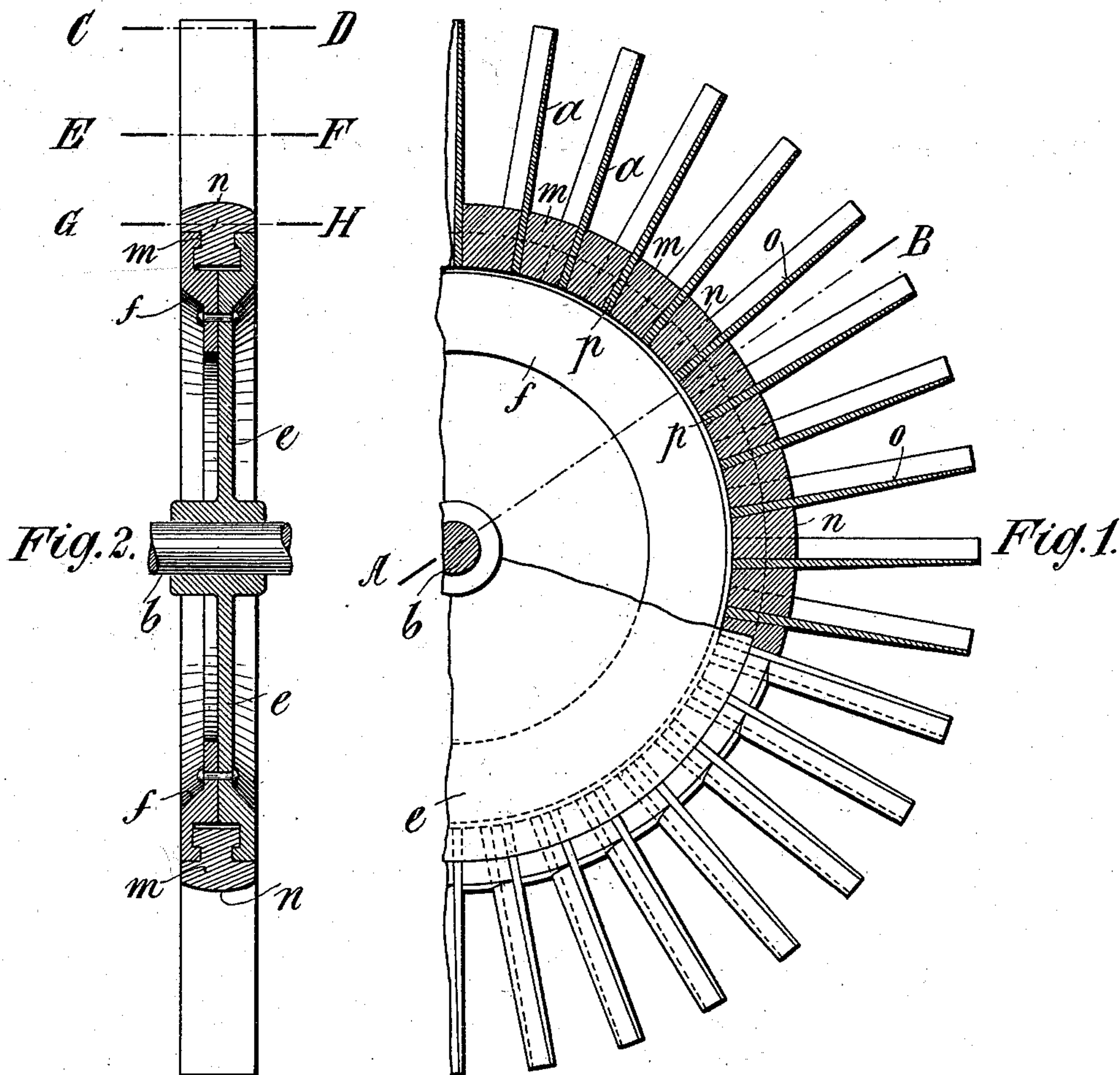


Fig. 3.



Fig. 4.



Fig. 5.



Witnesses:

*Attest.*  
*Wm. Summers*

Inventor:

*Heinrich Zoelly.*  
by *Wm. Orin*  
*Atty.*



# UNITED STATES PATENT OFFICE.

HEINRICH ZOELLY, OF ZURICH, SWITZERLAND.

## WHEEL FOR STEAM-TURBINES.

SPECIFICATION forming part of Letters Patent No. 748,139, dated December 29, 1903.

Application filed August 24, 1903. Serial No. 170,633. (No model.)

*To all whom it may concern:*

Be it known that I, HEINRICH ZOELLY, a citizen of the Republic of Switzerland, residing at Zurich, Switzerland, have invented new and useful Improvements in the Wheels of Steam or Gas Turbines, of which the following is a specification.

This invention relates to the wheels of turbines actuated by steam or gas.

10 In a turbine-wheel according to this invention the vanes or blades are formed by radiating bars or arms held at their inner ends. The blade-cavity of each radiating bar is made of approximately uniform depth throughout its entire length, and the thickness of the blade increases gradually toward the inner end of the radiating bar.

One construction of turbine-wheel according to this invention is illustrated, by way of example, in the accompanying drawings, in which—

Figure 1 is a side elevation, partly in vertical section, of part of a turbine-wheel. Fig. 2 is a section on the line A B of Fig. 1. Figs. 3, 4, and 5 are sections, respectively, on the lines C D, E F, and G H of Fig. 2 drawn to a larger scale.

The wheel shown is constructed as follows: On the shaft *b* is mounted a wheel disk or center *e*, to which is riveted a peripheral ring *f*. The wheel center and the peripheral ring grip between their edges the inner ends *p* of the radiating blade bars or arms *a*. Between the inner ends of the blades of each pair of adjacent radiating bars and between the edges of the wheel center and that of the peripheral ring there is arranged an intermediate piece *m* for the purpose of keeping the blades at the proper distance apart. The outer surfaces *n* of the intermediate pieces *m* form guide-surfaces for the steam or gas, and they also serve as the inner limits of the spaces or passages situated between the radiating bars. These outer surfaces *n* may also be utilized to produce a contraction or an enlargement of the said passages.

The radiating bars *a* are formed throughout their entire length with a blade-cavity *o* of approximately uniform depth, the thickness of the blade increasing from the outer ends of the bars to their inner ends. The

blade-cavities are continued in the inner ends, which serve to hold the radiating bars.

The advantage of the herein-described turbine-wheel consists in that the blades may be made by pressing.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. A turbine-blade constructed with a gradually-increasing longitudinal thickness and a longitudinal cavity of substantially uniform depth.

2. A turbine-wheel comprising a plurality of blades converging toward a common center, each blade increasing in thickness toward said center and provided with a cavity of substantially uniform depth throughout.

3. A turbine-wheel comprising a plurality of rectangular blades converging toward a common center, each blade increasing in thickness toward said center and provided with a longitudinal cavity of substantially uniform depth throughout the length of said blade.

4. A turbine-wheel comprising a hub portion, a plurality of blades mounted therein and converging toward a common center and increasing in thickness toward said center, and provided with a longitudinal cavity of substantially uniform depth throughout the length of the blade.

5. A turbine-wheel blade having an open-ended channel of substantially uniform depth throughout, said blade increasing in thickness from its outer to its inner end, substantially as described.

6. A turbine-wheel comprising a hub portion having a peripheral seat and blades increasing in thickness from their outer to their inner ends and having a channel of substantially uniform depth extending from end to end; in combination with spacing-blocks having faces *n* convex in cross-section, and means to secure the blades and blocks in the aforesaid peripheral seats, for the purpose set forth.

7. A turbine-wheel comprising a hub portion having a groove formed in one side near its periphery, a ring having an oppositely-disposed groove adapted to register with the

aforesaid groove forming a peripheral channel, a plurality of blades mounted in said channel converging toward the axis of the hub, a spacing member mounted in the channel between each blade and means for clamping the ring to the hub, substantially as and for the purpose specified.

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

HEINRICH ZOELLY.

Witnesses:

MORITZ VEITH,  
A. LIEBERKNECHT.