

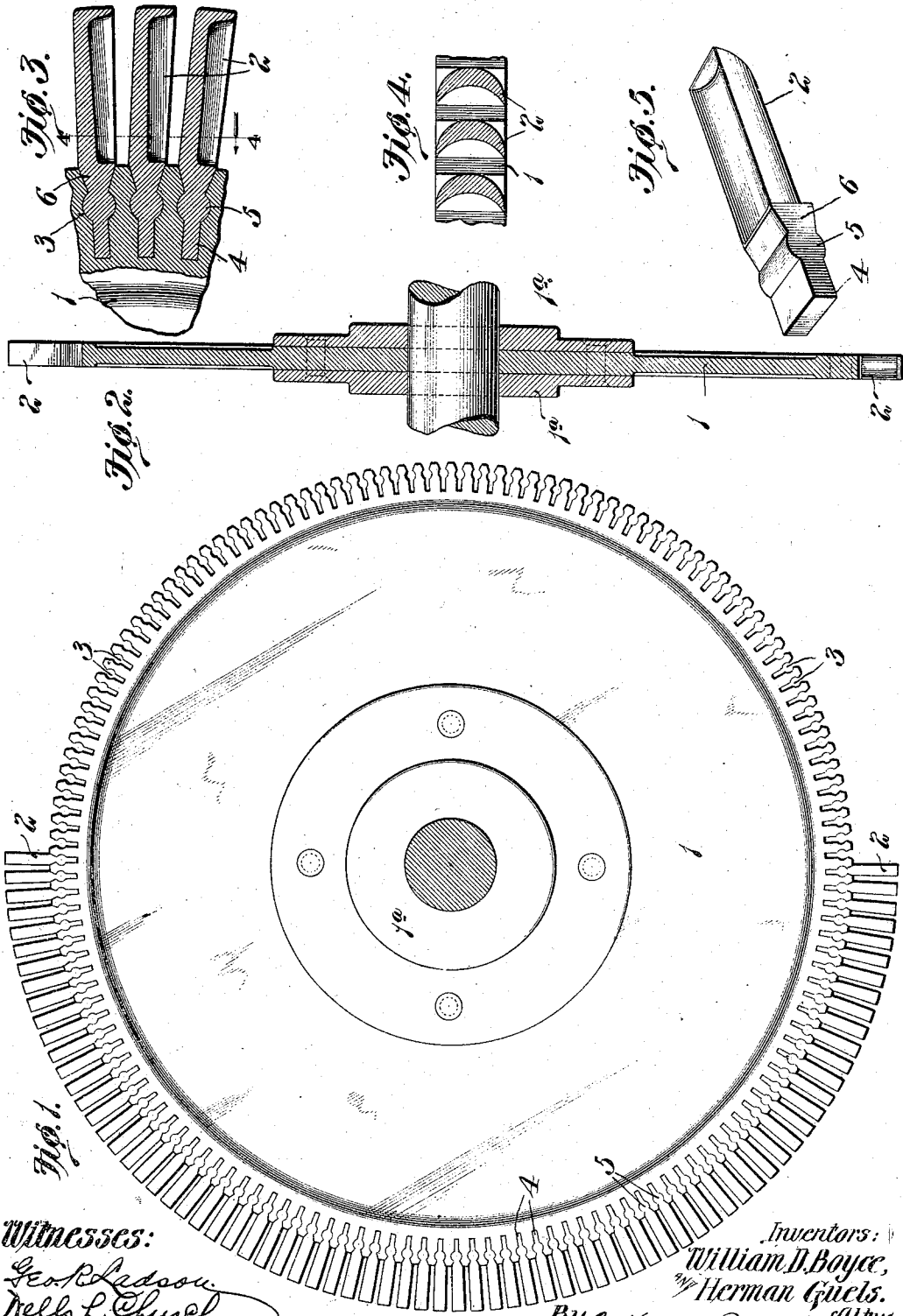
No. 873,344.

PATENTED DEC. 10, 1907.

W. D. BOYCE & H. GUELS.

TURBINE WHEEL.

APPLICATION FILED OCT. 2, 1907.



Witnesses:
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UNITED STATES PATENT OFFICE.

WILLIAM D. BOYCE AND HERMAN GUELS, OF ST. LOUIS, MISSOURI; SAID GUELS ASSIGNOR TO SAID BOYCE.

TURBINE-WHEEL.

No. 873,344.

Specification of Letters Patent.

Patented Dec. 10, 1907.

Application filed October 2, 1907. Serial No. 395,647.

To all whom it may concern:

Be it known that we, WILLIAM D. BOYCE and HERMAN GUELS, both citizens of the United States, residing at St. Louis, Missouri, have invented a certain new and useful Improvement in Turbine-Wheels, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation of a turbine wheel embodying the features of our invention, one-half of the buckets or blades being omitted to show more clearly the shape of the slots in the body portion of the wheel in which the shanks of the blades are mounted; Fig. 2 is a cross sectional view of the wheel shown in Fig. 1; Fig. 3 is an enlarged detail sectional view showing the manner in which the blades are connected to the body portion of the wheel; Fig. 4 is a cross sectional view taken on the line 4—4 of Fig. 3; and Fig. 5 is an enlarged perspective view of one of the blades or buckets.

This invention relates to turbines, and particularly to the rotating member or bucket wheel of such engines.

The main object of our invention is to provide a turbine wheel in which the radially projecting buckets or blades are so formed and are connected to the body portion of the wheel in such a manner that there is no possibility of the blades becoming bent or displaced.

Referring to the drawings which illustrate the preferred form of our invention, 1 designates the body portion of the wheel, and 2 the radially projecting blades or buckets that are secured to the edge portion thereof. The edge portion of the body of the wheel is provided with radially disposed slots, each of which has a widened portion 3 intermediate its inner and outer ends, the side walls of the outer end portion of said slot being inclined or flared outwardly from the widened portion 3, as shown clearly in Figs. 1 and 3, and the side walls and base of the inner end of the slot being straight. The blades or buckets 2 are provided at their inner ends with shanks that fit in the radially disposed slots in the body portion of the wheel and the inner end portion 4 of each shank is of rectangular-shape in cross section, as shown in

Fig. 5, so that it will fit snugly in the inner end of the slot in which it is arranged. At approximately the middle of the shank is a bulb or enlarged portion 5 which corresponds in shape to the widened portion 3 of the slot in the wheel, and the portion 6 of the shank between said enlarged portion 5 and the base of the bucket or blade is wedge-shaped so that it will fit snugly in the flared outer end of the slot. By constructing the shanks of the buckets in this manner we produce a bucket which cannot possibly bend at its base or inner end as the cross section of the metal in the wedge-shaped portion 6 of the shank is equal to the cross section of the metal in the bucket proper. In other words, we have produced a bucket or blade that is strongest at the point where it is most apt to bend; namely, at the junction between the blade proper and its attaching shank. Consequently, it is not necessary to connect the outer ends of the buckets or blades together to prevent them from bending so that the motive fluid can escape readily after it has expended its energy.

The body portion of the wheel can be formed by a single forging if so desired but we prefer to form the hub of the wheel from separate pieces 1^a that are secured to the opposite side faces of the body portion 1, as shown in Fig. 2. In this way we are enabled to use a piece of steel plate for the body portion of the wheel so that the cost of manufacture is much less than if a single forging were used. It is immaterial, however, how the body portion of the wheel is formed so that we do not wish it to be understood that our invention is limited to the exact construction herein shown.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is:

1. A turbine wheel comprising a body portion provided with radially disposed slots, and radially projecting blades or buckets having attaching shanks that fit snugly in said slots, each of said shanks being provided intermediate its end and the base of the bucket with an enlarged portion that fits in a widened portion of the slot located between the inner and outer end of the slot; substantially as described.

2. A turbine wheel comprising a member provided in its edge portion with radially disposed slots and radially projecting buckets

or blades having attaching shanks that fit snugly in said slots, the portion of each shank at the base of the bucket being wedge-shaped in cross section and merging into a bulb or enlarged portion located some distance from the inner end of the shank; substantially as described.

3. A turbine wheel consisting of a body portion provided with radially disposed slots, each of which has a rectangular-shaped inner end, a flared outer end, and an intermediate widened portion, and radially projecting blades or buckets provided with attaching shanks that conform in cross section to the shape of said slots; substantially as described.

4. A turbine wheel consisting of a member

having radially disposed slots formed in its edge portion, the outer ends of said slots being flared and merging into a widened portion that is located intermediate the inner and outer ends of the slots, and radially projecting blades or buckets provided with shanks that conform in cross section to the shape of the slots in said member; substantially as described.

In testimony whereof we hereunto affix our signatures in the presence of two witnesses, this 28th day of September, 1907.

WILLIAM D. BOYCE.
HERMAN GUELS.

Witnesses:

WELLS L. CHURCH,
GEORGE BAKEWELL.