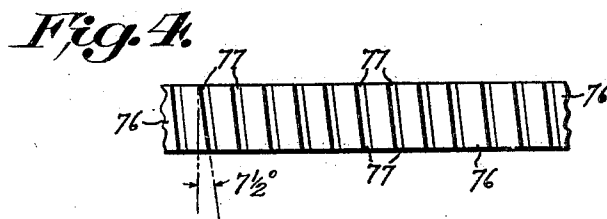
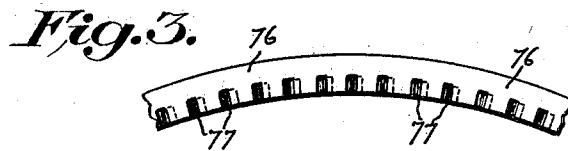
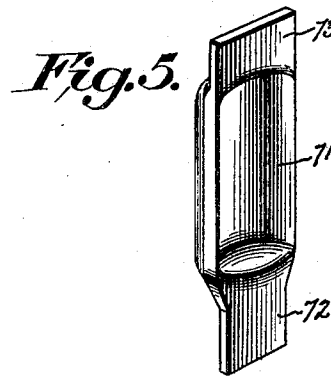
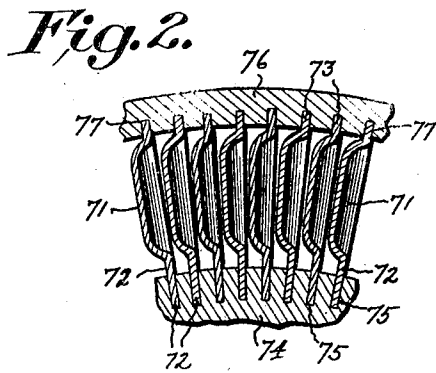
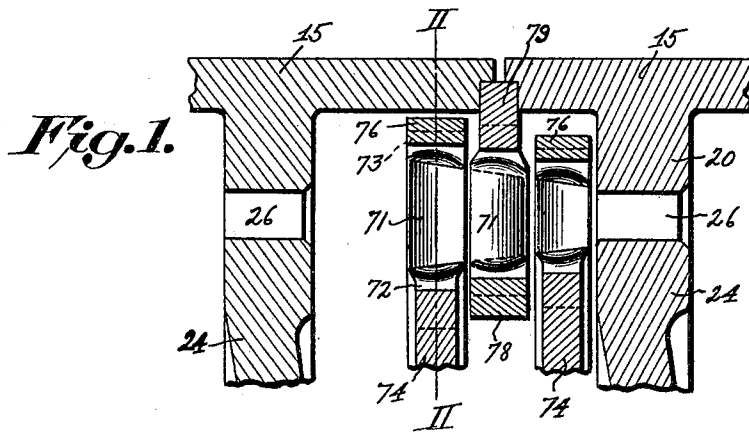


C. V. KERR.
STEAM TURBINE.
APPLICATION FILED NOV. 5, 1919.

1,398,461.

Patented Nov. 29, 1921.



Inventor

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STEAM-TURBINE.

1,398,461.

Specification of Letters Patent.

Patented Nov. 29, 1921.

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To all whom it may concern:

Be it known that I, CHARLES V. KERR, a citizen of the United States, residing at Aurora, in the county of Kane and State of Illinois, have invented certain new and useful Improvements in Steam-Turbines, of which the following is a specification.

This invention relates to new and useful improvements in elastic fluid turbines and more particularly to the buckets and means for securing the same to the rotor disks and guide rings employed in the "multi-cellular" compound type as shown for example in my former U. S. Patent No. 1,131,386, dated March 9, 1915, or in my co-pending application Serial No. 189,320, filed September 1, 1917, of which the present case is a divisional application.

The objects of this invention are:—

First, to provide a comparatively inexpensive rotor and stator construction by the use of stamped metal buckets.

Second, to provide a construction of rotor and stator in which the buckets comprising an element of the invention can be quickly assembled and firmly secured in slots machined in elements forming parts of the rotor or stator.

Third, to so construct a rotor or stator in which all the parts can be quickly and cheaply made and at the same time assembled and firmly put together with a minimum of time and cost and with unskilled labor.

Other objects and advantages of the invention will appear from the detailed description of the mode of construction and relation of the parts and operation of the invention to be hereinafter given.

The invention consists of structural characteristics and relative arrangements of elements which will be hereinafter more fully and clearly described and particularly pointed out in the appended claims.

Referring to the drawings, in which similar reference characters indicate the same parts in the several figures:—

Figure 1, is a fragmentary longitudinal sectional view of one of the stages of a turbine showing the buckets and means for securing the same to the rotor disks and stationary reversing rings or stator.

Fig. 2, is a sectional view of a part of the

rotor disks or bucket wheel on line II—II of Fig. 1.

Fig. 3, is a side elevation of a fragment of the peripheral ring attached to the outer ends of the buckets shown in Figs. 1 and 2.

Fig. 4, is a plan view of the inner side of the ring shown in Fig. 3, and

Fig. 5, is an enlarged perspective view of one of the buckets shown in Figs. 1 and 2.

Referring to the drawings 15, 15, represent two of the series of abutting annular sections which form the several stages of the "multi-cellular" compound turbine, each of which sections 15 is provided with an internal flange 20, forming a diaphragm 24 having the nozzle 26 coöperating with the buckets on the rotor member of the turbine.

The rotor or bucket wheel of the turbine in each stage preferably consists of two rings or disks 74 fixed to and rotatably supported by a shaft, not shown. Each of the disks 74 has on its outer periphery a series of separated slots, 75, 75, which may be milled and which are adapted to receive the inner ends of the buckets 71. The slots 75, preferably extend at an angle about $7\frac{1}{2}^{\circ}$ to the axis of the turbine, or disk 74, and each slot 75 is adapted to receive the inner projection or tab 72 of a bucket, the lateral edges of the projection or tab 72 being riveted or rolled to secure the buckets in the slots 75. It will be observed that the buckets 71 are dished and have their edges thinned or reduced to offer less resistance to the flow of the motive fluid. The outer ends of the buckets 71 are provided with similar projections or tabs 73 as the inner tabs 72 and are adapted to be engaged and seated in slots 77 on the inner periphery of the ring 76, said ring 76 fitting over the outer ends of the tabs 73 of the buckets 71. The edges of said tabs 73 are riveted or rolled over to secure the outer ends of the buckets 71 to the ring 76 in the same manner and for the same purpose as described with reference to inner tabs 72.

In applying the invention and form of bucket 71, shown in Fig. 5, to construct a reversing bucket or stator element of the turbine as shown in Fig. 1, the outer ring 79 is provided on its inner periphery with slots similar to the slots 77 of ring 76 only oppositely arranged, and the outer pe-

riphery of the inner ring 78 of said reversing bucket is provided with similar slots as the slots 75 of the disk 74 and also oppositely arranged so that the elastic fluid in passing from one stage of expansion and through the stator or reversing bucket will be properly and efficiently directed to the next succeeding stage of expansion or rotor element of the turbine as well understood and needs no further explanation.

Although I have shown a stage of the turbine as comprising two sets of rotatable buckets and one set of stationary reversing buckets this combination may be readily varied. It may also be found desirable in some instances, to make changes in details of the specific construction of my preferred form of the invention, and I do not care to limit myself to these specific details, as they may be modified in many ways without departing from the spirit of my invention and still accomplish all the objects, advantages and results pointed out in the statement of invention.

What I claim is:

1. A turbine bucket adapted for stamping from flat sheet metal having a central concave portion, thin lateral edges on said central portion, rounded ends on said central portion, and rectangular projections beyond said rounded ends, said thin edges and said rectangular projections lying in the same plane.

2. A turbine bucket adapted for stamping from flat sheet metal having a concave cen-

tral portion, thin lateral edges differing in length on said central portion, rounded ends on said central portion, and rectangular projections beyond said rounded ends, said edges and said projections lying in the same plane.

3. A bucket wheel for elastic fluid turbines, comprising a central disk with a circular periphery, a number of transverse slots with parallel plane sides in said periphery, a ring of larger diameter than said central part arranged concentric therewith, a like number of similar slots on the inner surface of said ring, and a like number of sheet metal turbine buckets, each having a concave central portion and flat rectangular ends engaged in said slots and secured therein by riveting the edges of said ends.

4. A reversing element for elastic fluid turbines, comprising an outer ring having lateral surfaces adapted for clamping said ring between adjacent annular sections of said turbine, a number of transverse slots with parallel plane sides in the inner edge of said ring, an inner ring of similar diameter than said outer ring arranged concentric therewith, a like number of smaller slots in the outer edge of said inner ring, and a like number of sheet metal turbine buckets, each having a concave central portion and flat rectangular ends, engaged in said slots and secured therein by riveting the edges of said ends.

In testimony whereof I affix my signature.
CHARLES V. KERR.