W. F. RICE.

MOUNTING TURBINE BUCKETS.

APPLICATION FILED JAN. 4, 1913.

1,064,170. Patented June 10, 1913.

Fig. 1.

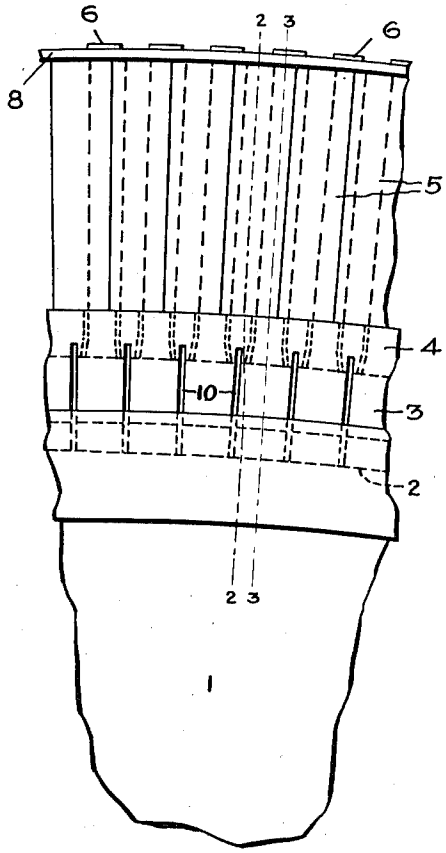


Fig. 2.

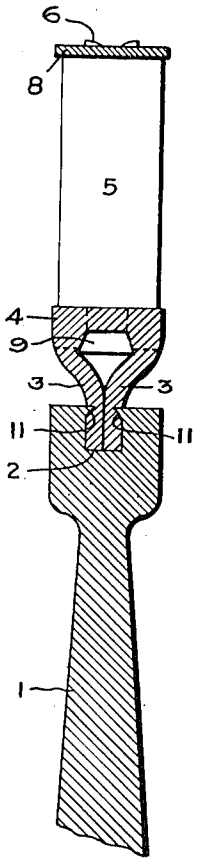
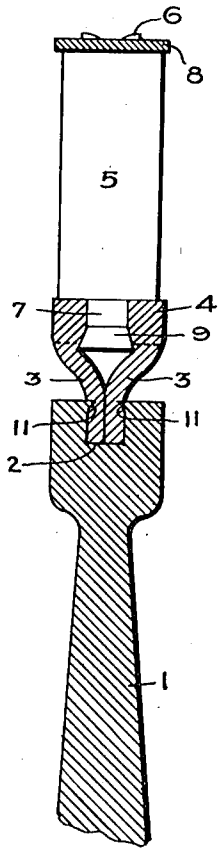


Fig. 3.



Witnesses:

Anthony E. Marx.

J. Ellis Glen.

Inventor:

Walter F. Rice,

by Albert G. Davis

His Attorney.

UNITED STATES PATENT OFFICE.

WALTER F. RICE, OF QUINCY, MASSACHUSETTS, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

MOUNTING TURBINE-BUCKETS.

1,064,170. Specification of Letters Patent. Patented June 10, 1913.

Application filed January 4, 1913. Serial No. 740,145.

To all whom it may concern:

Be it known that I, WALTER F. RICE, a citizen of the United States, residing at Quincy, county of Norfolk, State of Massachusetts, have invented certain new and useful Improvements in Mounting Turbine-Buckets, of which the following is a specification.

This invention relates to elastic fluid turbines, and its object is to improve the mode of mounting the buckets on the bucket wheels.

In a prior Patent, No. 905,460, granted December 1, 1908, I have disclosed and claimed means for securing a bucket to its support, comprising a base mechanically attached to the bucket and provided with parallel flanges or legs which enter parallel grooves in the support and are secured therein by staking or riveting. In small turbines this method of mounting involves considerable weight in the support, which must be made wide enough to contain the grooves and provide sufficient metal outside of them to firmly hold the shank of the bucket or the flanges of the base. This width of the support also necessitates making the turbine of a considerable length when several bucket wheels are used.

The object of the present invention is to avoid using such a wide and heavy support, so as to lighten the machine and at the same time shorten it.

A further object is to simplify the construction by reducing the number of grooves in the support.

My invention comprises a support having a single groove, into which are inserted the two flanges on the base of the bucket, said flanges having been previously squeezed together after the buckets have been riveted into the base. The two flanges thus constitute in effect a single flange, which is secured in the groove by staking the metal of the support against the sides of said flange.

In the accompanying drawing, Figure 1 is a side elevation of a few buckets mounted upon a support in accordance with my invention. Figs. 2 and 3 are cross sections on the lines 2—2 and 3—3 respectively, Fig. 1.

For convenience the buckets are shown as mounted upon the rim of a wheel 1, but it will be understood that the invention is not limited in its use to this precise construction, as the buckets may be mounted upon the face as well as the rim, and upon separate supporting pieces secured to the wheel in place of mounting directly upon the wheel itself. In the support, of whatever character, there is formed a circumferential groove 2, in which are received the flanges 3 upon the base 4 of the buckets 5. The base has the form originally of a channel bar, that is two parallel flanges projecting from a web or central portion connecting them at one end. The buckets may be made from extruded metal bars and each provided with a tenon 6 and a shank 7 for uniting them with a separate cover 8 and the base 4. The tenon is riveted down upon the cover, as shown. The shank is originally cylindrical to fit a cylindrical hole in the web of the base. The inner end of said hole is countersunk so that when the end of the shank is riveted it can expand and fill said countersink and form a head 9 which securely unites the bucket and the base.

After the channel-bar base is milled to the proper shape and punched at regular intervals to receive the shanks of the buckets and after the buckets have been put in and riveted in place, the flanges are pressed together by suitable dies so that they assume the appearance shown in Figs. 2 and 3. The flanges are then slitted at intervals by a gang of saws or otherwise. These slits 10 extend to within a short distance of the outer side of the base and are comparatively narrow, but have sufficient width to permit the base to be bent to the curvature of the periphery of the support. The combined width of the united flanges is just sufficient to fit snugly into the groove 2 in the support, and by reason of the slits 10 the base can be easily bent by hand to the proper curvature as the flanges are inserted in said groove. After placing the flanges in the groove the metal of the support is staked into shallow grooves 11 in the outer sides of the flanges.

It will be seen that this construction shortens the axial length of the support and reduces the amount of metal necessary, so that the machine is smaller and lighter, besides being more easily constructed.

In accordance with the provisions of the patent statutes, I have described the principle of operation of my invention, together with the apparatus which I now consider to

represent the best embodiment thereof; but I desire to have it understood that the apparatus shown is only illustrative, and that the invention can be carried out by other means.

What I claim as new and desire to secure by Letters Patent of the United States, is:—

1. In an elastic fluid turbine, the combination with a support having a single groove, of a bucket, a base mechanically attached to said bucket and provided with flanges pressed together and received in said groove, and means for securing said flanges in place in said groove.

2. In an elastic fluid turbine, the combination with a support having a groove, of a bucket, a base to which said bucket is riveted, parallel flanges on said base pressed together and received in said groove, and means for securing said flanges in said groove.

3. In an elastic fluid turbine, the combination with a support having a groove, of a bucket-carrying base provided with parallel flanges pressed together and received in said groove and provided with shallow grooves on their outer faces, the support being staked into said shallow grooves.

4. In an elastic fluid turbine, the combination with a narrow support having a single circumferential groove, of a channel bar base, buckets secured in the web of said bar, the flanges of said bar being pressed together and inserted in said groove, and means for securing them therein.

In witness whereof, I have hereunto set my hand this 2nd day of January, 1913.

WALTER F. RICE. [L. S.]

Witnesses:

L. C. HOLLIS,

M. G. MITCHELL.