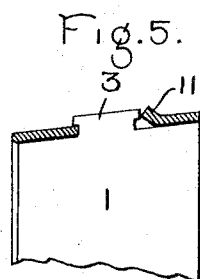
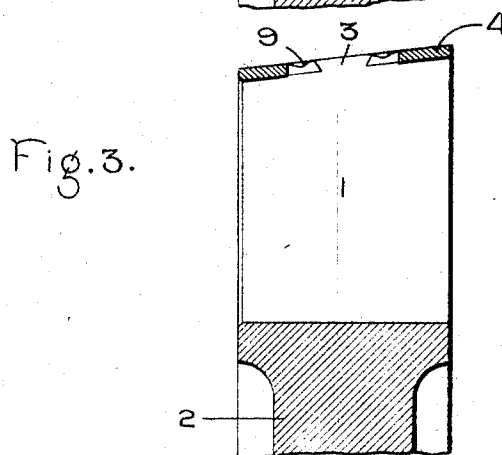
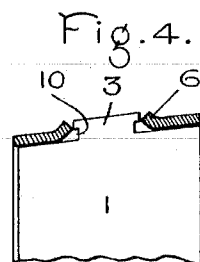
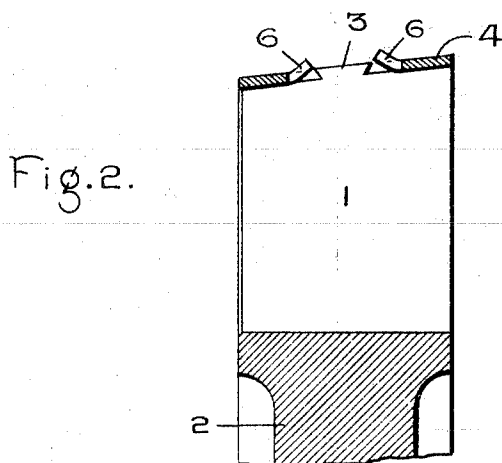
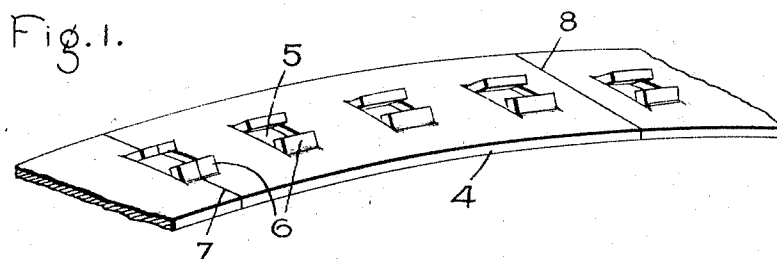


No. 764,452.

PATENTED JULY 5, 1904.

H. GEISENHÖNER.
TURBINE BUCKET COVER.
APPLICATION FILED DEC. 19, 1903.

NO MODEL.



Witnesses:

Marcus L. Byng.
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Att'y.

UNITED STATES PATENT OFFICE.

HENRY GEISENHÖNER, OF SCHENECTADY, NEW YORK, ASSIGNOR TO
GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

TURBINE-BUCKET COVER.

SPECIFICATION forming part of Letters Patent No. 764,452, dated July 5, 1904.

Application filed December 19, 1903. Serial No. 185,785. (No model.)

To all whom it may concern:

Be it known that I, HENRY GEISENHÖNER, a citizen of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Means for Attaching Turbine-Bucket Covers, of which the following is a specification.

The buckets of elastic-fluid turbines, and more especially those of the jet type, are commonly provided with a cover to confine the motive fluid to the proper passage. Owing to the high peripheral speed of these buckets, it is necessary to provide special means for securing them in place.

The present invention has for its object to provide a cheap and simple form of bucket-cover and attaching means whereby the former may be rigidly secured in place and this with a minimum expenditure of labor.

In the accompanying drawings, which illustrate one embodiment of the invention, Figure 1 is a perspective view of a cover. Fig. 2 is a radial section showing the relation of the parts prior to securing the cover in place. Fig. 3 is a radial section showing the cover secured in place. Fig. 4 shows a slight modification in the shape of the bucket-tenon, and Fig. 5 shows a modification of the cover-securing means.

1 represents a bucket or vane of suitable form, which may be formed integral with or separate from the support 2. In the present illustration the support is made in the form of a wheel; but it may be made stationary, if desired. The buckets may be either cast or cut from solid stock, as is desired. On the outer end of each bucket or on as many buckets as desired is formed an integral tenon 3, having undercut surfaces on either side, while the other two surfaces of the tenon are either plain or curved to correspond or substantially correspond to the concave and convex surfaces of the bucket. By making the surfaces formed in part to the shape of the bucket they may be formed with a minimum expenditure of labor.

The bucket-cover 4 is made of sheet metal

and is divided into suitable lengths. The cover, considered as a whole, has as many holes or openings 5 formed therein as there are tenons, and each of said holes registers with a tenon. The holes are formed by a suitable punch and die, which also cuts the stock for a short distance back from the hole to form tongues 6. Each hole has two tongues facing each other, that are suitably bent. In Fig. 1 they are shown as being bent upward slightly, and these are preferably, although not necessarily, formed by the same operation which makes the holes. The cover may be divided into sections in planes passing through the holes, as shown at 7, or it may be divided into planes passing between the holes, as indicated at 8. When the tenons are relatively far apart, the former type of joint is the best. When they are relatively close, the latter type of joint will be satisfactory. The latter type is also advantageous where the buckets are carried by segmental supports. In some instances one end of a section may have the former type of joint and the other the latter.

The bucket on each side of the tenon is finished off true, and the end surface may be straight or inclined with respect to the wheel-axis to provide an enlargement of the working passage. The undercut sides of the tenon may with advantage be formed at the same time the wheel is turned up, since by so doing a separate operation is avoided. After the tenons and cover have been properly formed the latter is placed on the ends of the buckets, as shown in Fig. 2, and the tongues forced under the overhanging sides of the tenon. It is advantageous, although not necessary in many cases, to force the metal with a punch over toward the tenon, as indicated at 9, Fig. 3. To state the matter in a different way, the cover is deformed for the purpose of mounting it in place and is afterward cured of its deformity by pressure to hold the same in place. As a further step in the manufacture the tongues may be elongated slightly to further insure a close fit with the tenons.

In Fig. 4 is shown a slight modification wherein the shape of the tenon is slightly al-

tered. Instead of having inclined walls it has a groove 10 formed on each side, into which the tongues 6 are forced and afterward elongated, if desired. Such a construction has some advantages over the previous construction in that it provides a square shoulder for the tongues to engage. The mode of manufacture and assembling is substantially the same as that previously described.

10 In Fig. 5 is shown a construction wherein only a single tongue 11 is employed for each tenon. The tenons have enlarged heads, and the cover is provided with an opening which substantially corresponds in shape and size to the tenon, as before. The tongue is bent suitably, after which the cover is applied to the ends of the buckets and moved sidewise until the overhanging side of each tenon engages the wall at one side of a hole or opening. The next step is to force the tongue into place under the overhanging wall of the tenon.

A further advantage of my improved construction resides in the fact that the wheel-cover presents a smooth exterior, which reduces the rotation losses to a minimum.

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. A turbine having buckets with integral tenons, in combination with a cover which is arranged to fit over the tenons and is secured

in place by forcing the metal of which it is composed under the tenons.

2. A turbine having buckets with integral tenons, in combination with a cover which is arranged to fit over the tenons, and is provided with tongues that engage with the tenon to hold it in place.

3. A turbine having buckets with integral tenons, each of which is provided with an enlarged head, and a cover that has openings registering with and substantially corresponding in shape and size to the tenons, which is held in place by forcing the metal of which it is composed under the enlarged heads of the tenons.

4. A turbine having buckets with integral tenons, and a cover which is applied to the ends of the buckets while in a deformed condition, and is cured of its deformity by pressure to cause it to engage the tenons.

5. A turbine having buckets with integral tenons having enlarged heads, with a cover having deformed integral tongues which, when cured of their deformity, engage with the tenons and secure the cover in place.

6. A turbine having buckets with tenons carried thereby, each of which is provided with an enlarged head, and a sheet-metal cover having punched holes therein registering with the tenons and oppositely-disposed tongues for each hole that engage the tenons.

In witness whereof I have hereunto set my hand this 17th day of December, 1903.

HENRY GEISENHÖNER.

Witnesses:

BENJAMIN B. HULL,
HELEN ORFORD.