No. 815,973.

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R. A. McKEE.

STEAM TURBINE PACKING.

APPLICATION FILED NOV. 21, 1904.

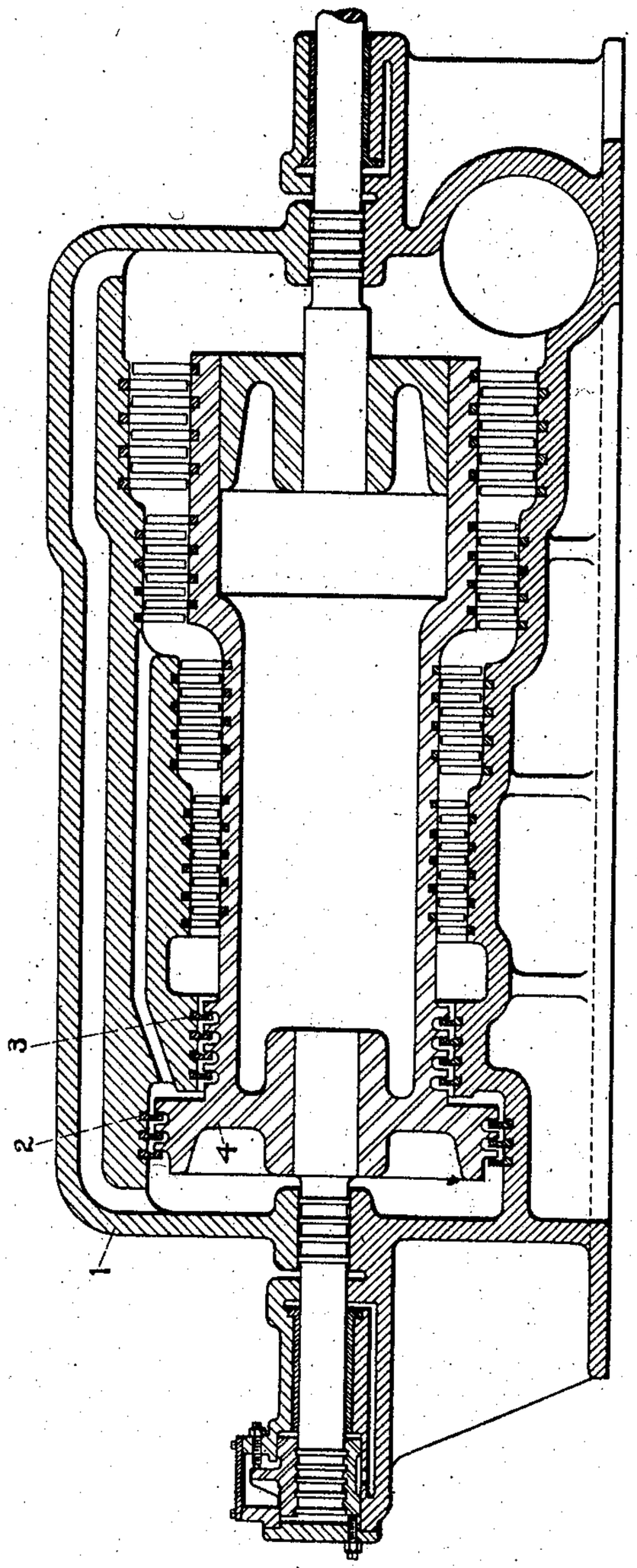

Fig. 1

Fig. 4

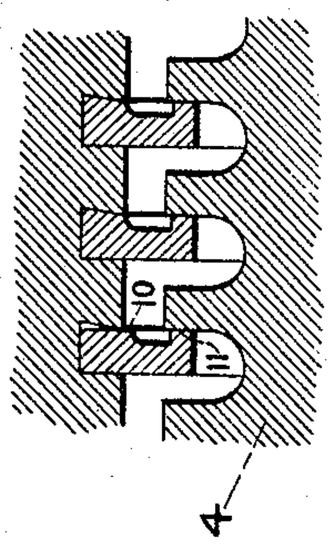

Fig. 3

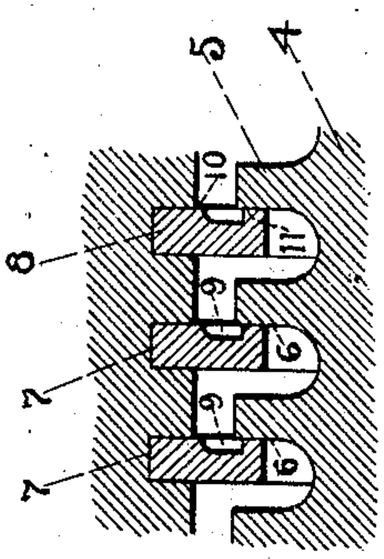

Fig. 2

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STEAM-TURBINE PACKING.

No. 815,973. Specification of Letters Patent. Patented March 27, 1906.

Application filed November 21, 1904. Serial No 233,632.

To all whom it may concern:

Be it known that I, ROBERT A. McKEE, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Steam-Turbine Packing, of which the following is a specification.

The object of this invention is to provide a steam-turbine packing which is more efficient than that heretofore used.

In steam-turbine packings it has been usual to undercut the spindle-collars of the rotor and allow the portion beyond the undercut to coact with packing consisting of dummy strips of softer material placed circumferentially upon the stator. The objection to this means of packing is that in preliminarily grinding the parts together a shoulder is worn upon the softer metal of the dummy strips by the relatively harder spindle-collar. This invention obviates this objection, besides securing other advantages.

The invention is more particularly described by reference to the drawings, in which—

Figure 1 is a vertical section through the turbine cylinder and spindle. Fig. 2 is an enlarged section through the packing. Fig. 3 is a similar view of a modification, and Fig. 4 is a face view of one of the sectional dummy strips looking at the grooved side.

The casing or stator 1 of the turbine-cylinder is of the usual type for Parson's turbines, in which the end thrust is balanced by means of communicating chambers at the opposite ends of the part to be balanced. In this means of balancing there will consequently be several chambers under different pressures and between said chambers must be placed some means for packing, so as to prevent the escape of steam from one chamber to another without doing work. Without showing all the details of the turbine, Fig. 1 shows two of these packings 2 3. This packing 2 3 is provided by forming the rotor 4 with collars 5. These collars are so shaped as to have one of their side faces 6 in a plane at right angles to the axis of the shaft. Upon the inner side of the casing or stator 1 are circumferential grooves 7, in which are calked dummy strips 8. These dummy strips 8 are thus firmly secured within the groove 7. The dummy strips 8 are made of a strip of soft metal, rectangularly shaped in cross-section, and have formed upon one of their side faces a groove 9. This groove 9 serves a double function, as, first, it provides a shoulder 10, at which place the strips are calked to hold them within the groove 7, as described, and, second, it provides a coacting portion 11 beyond the groove 9. This coacting portion 11 coacts over its entire surface with the collars 5 upon the rotor 4—that is, it extends within the outside diameter of the collars.

There will be sufficient friction resulting from calking to hold the dummy strips 8 in place if the grooves 7 are parallel-sided. However, the groove 7 may be undercut, as shown in Fig. 3. In this case when the strips are calked, as shown at the right in this figure, the soft metal of which they are made will be forced into the undercut part of the groove, and thus positively lock the strips in place.

The dummy strips 8 are conveniently cut into short lengths before being put in place. This will cause the dummy strip when in place to take the form of a sectional ring composed of arcuate strips.

It will be observed that in the preliminary grinding the collars 5, being usually made of steel, will wear away the coacting portion 11 beyond the groove 9 in the relatively softer strips 8, while the outer circumferential edge of the collar 5 under no circumstances can wear the shoulder in the dummy strip, because it extends beyond the coacting portion 11 of the strips 8. It will also be noted that a greater stiffness for the same thickness of the strips 8 is obtained than by the use of a coacting portion projecting beyond the base of the strip, because the calking-tool is applied to the shoulder 10 and not to the narrowest width of stock. Another advantage is the facility for calking the strips, because of the shoulder 10 formed on them. The construction is also cheaper than that necessitating undercutting the collars 5 on the rotor 4.

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 it to be understood that the apparatus shown is merely 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 a turbine, a hard collar integral with the rotor, and a soft grooved circumferential coacting strip on the stator.

2. In a turbine, a collar on the rotor having its side face in a plane at right angles to the axis, and a relatively softer grooved circumferential strip on the stator with the part beyond the groove in coaction with the side face of the rotor-collar.

3. In a turbine, a collar on the rotor having a side face in a plane at right angles to the axis, and a relatively-softer grooved circumferential sectional strip on the stator with the part beyond the groove in coaction with the side face of the rotor-collar.

4. In a turbine, a packing including a strip quadrilateral in cross-section, and grooved, and a hard means coacting with the grooved face of the strip.

5. In a turbine, a packing including a strip rectangular in cross-section, and grooved and means in which said strip is calked.

6. In a turbine, a packing including a strip having a bearing portion and a groove, and means in which the strip is calked, the groove forming a shoulder on which to calk.

7. As an article of manufacture, an arcuate packing-strip rectangular in cross-section and of soft material grooved on its plane side.

8. A grooved calking-strip rectangular in cross-section.

In testimony whereof I affix my signature in presence of two witnesses.

ROBERT A. McKEE.

Witnesses:

JAMES HORTON,

R. SCHLATTER.