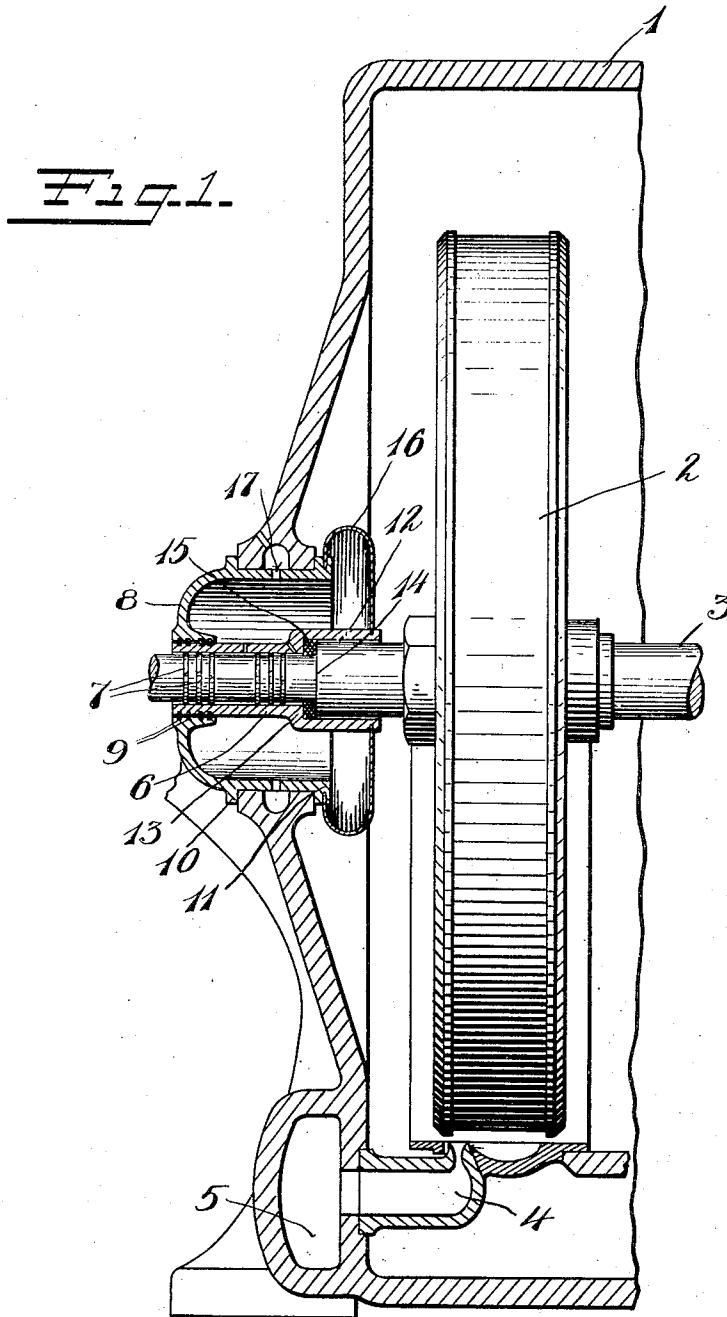


W. J. A. LONDON.
STEAM TURBINE PACKING GLAND.
APPLICATION FILED NOV. 10, 1911.

1,037,647.

Patented Sept. 3, 1912.

2 SHEETS—SHEET 1.



Witnesses:
Chas. A. Lead
Ida M. Kunzler

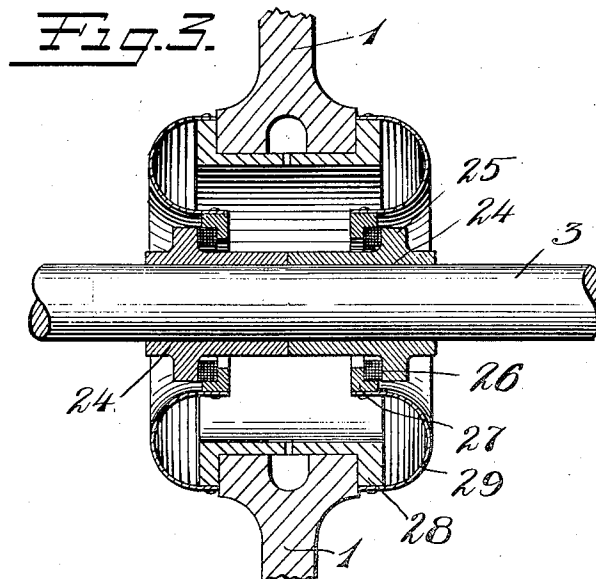
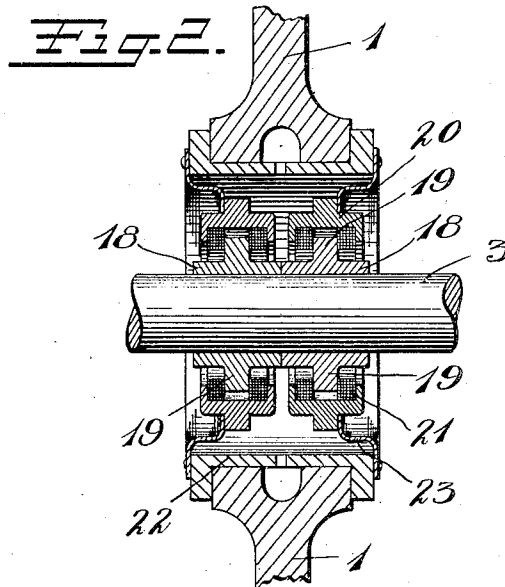
Inventor
W. J. A. LONDON
By his Attorneys
Partlett Brownell Mitchell

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UNITED STATES PATENT OFFICE.

WILLIAM J. A. LONDON, OF HARTFORD, CONNECTICUT, ASSIGNOR TO THE TERRY STEAM TURBINE COMPANY, OF HARTFORD, CONNECTICUT, A CORPORATION OF CONNECTICUT.

STEAM-TURBINE PACKING-GLAND.

1,037,647.

Specification of Letters Patent.

Patented Sept. 3, 1912.

Application filed November 10, 1911. Serial No. 659,479.

To all whom it may concern:

Be it known that I, WILLIAM J. A. LONDON, subject of King George V, residing at Hartford, Hartford county, Connecticut, have invented certain new and useful Improvements in Steam-Turbine Packing-Glands, of which the following is a full, clear, and exact description.

My invention relates to improvements in packing glands, particularly, though not exclusively, adapted for use with steam turbines.

The object of the invention is to provide a device which will respond readily to variations in pressure within the turbine casing.

A further object is to provide a gland with means whereby pressure on the packing may be increased or decreased at will to render the same more effective.

With these and other objects in view, as will appear from the following description, the invention consists in the construction and arrangement of parts, a preferred embodiment of which is illustrated in the accompanying drawings, in which—

Figure 1 is a fragmentary vertical sectional view of a steam turbine to which the invention is applied; Fig. 2 is a view similar to Fig. 1, of a modified form of the invention adapted for different conditions of use; and Fig. 3 is a view of a further modification.

In the embodiment of my invention illustrated in Fig. 1, 1 indicates the turbine casing, 2 the rotor and 3 the rotor shaft upon which the rotary is suitably secured. 4 indicates the steam jet and 5 a steam inlet. The packing gland comprises a sleeve 6, between which and the shaft 3 are interposed suitable flexible packing rings 7 of usual construction. One end of this sleeve is mounted in a case 8, between which and the sleeve packing rings 9 are interposed. The casing 8 is seated within the shaft opening in the upper and lower halves of the main turbine casing, and said gland casing is preferably provided with flanges 10 and 11, forming a channel to receive the main casing. The gland sleeve 6 has an enlargement 12, forming a shoulder 13, between which and a shoulder 14 on the rotor shaft

is interposed a carbon packing ring 15. This enlarged end of the sleeve 6 is supported from the gland casing 8 by means of a flexible supporting member in the form of a rolled thin plate 16. If a vacuum exists on the inside of the turbine casing there will be a tendency to draw the whole gland in, thereby causing the shoulder 13 of the sleeve 6 to bear harder on the carbon packing ring 15. Should this pressure of the sleeve on the carbon packing ring not be sufficient to prevent leakage, this pressure may be increased by admitting steam within the gland casing 8 through suitable inlets 17 connected with the steam supply. By this means pressure within the gland casing and against the inner side of the flexible member 16 may be increased, thus increasing the pressure of the sleeve shoulder 13 against the carbon packing ring 15. In case of back pressure within the turbine casing, the entire gland may be reversed, bringing the flexible member 16 on the outer side of the casing.

In the modification of the invention shown in Fig. 2, the gland is adaptable to either vacuum or back pressure. In this construction, short sleeves 18—18 are fixed to the shaft 3, each of said sleeves being provided with an annular rib 19. Overlying each rib 19 is a channel ring 20, between the side flanges of which and the rib 19 are interposed carbon packing rings 21. Each of these channel rings 20 is supported from what may be termed a gland casing ring 22 seated within the shaft aperture of the turbine casing by means of thin flexible plates or rings 23, similar to the plates or supporting members 16 shown in Fig. 1. With this construction it will be seen that vacuum within the turbine casing will cause the carbon rings at one side of the annular ribs 19 to bear harder thereon, whereas back pressure within the turbine casing will cause the carbon rings upon the opposite sides to be held more closely against the annular ribs 19.

In the embodiment of the invention illustrated in Fig. 3, sleeves 24 are mounted upon the shaft 3, each sleeve having an annular rib 25, against which the carbon pack-

ing ring 26 is pressed by a ring-like member 27, supported from the gland casing ring 28 by means of the thin flexible plates or annular ribs 29. In this construction it will be seen that vacuum within the turbine casing will cause the ring 27 to bear harder against the carbon ring 26, and by admitting steam within the gland ring 28 through suitable apertures, both rings 27 will be caused to press more firmly upon the carbon rings 26.

In all three forms of the device above described it will be seen that the shaft and its gland are free to "float" in all directions, as well as being capable of endwise motion. This in the first form is due to the packing rings 9 surrounding the gland sleeve 6 and the flexibility of the member 16. In the form shown in Fig. 2, the flexible members 23, and in the form shown in Fig. 3 the flexible members 29, allow for this free movement of the shaft and gland rings or sleeve.

While I have herein described preferred embodiments of my invention, it is to be understood that the same may be altered in details and arrangement of parts within the scope of the appended claims.

What I claim is:

1. A packing gland for shafts comprising in combination with a shaft having an annular shoulder thereon, an annular member slidably mounted on said shaft, a packing interposed between said shoulder and said member, a casing, a flexible member secured to said casing and supporting said annular member, said parts being so constructed and arranged that variations of pressure upon either side of said flexible member will cause pressure of said annular member on said packing.

2. A packing gland for shafts comprising in combination with a shaft having an annular shoulder, an annular member capable of longitudinal movement relative to said shaft, packing material interposed between said shoulder and said annular member, a casing for said annular member, a flexible member inclosing one end of said casing and supporting said annular member, and means for varying the pressure within said casing and against said flexible member to vary the pressure of said annular member on said packing material.

3. A packing gland for shafts comprising the combination with a shaft having an annular shoulder, a sleeve on said shaft having a shoulder opposite the shaft shoulder, packing material between said shoulders, a casing inclosing said sleeve, a flexible diaphragm inclosing one end of said casing and supporting said sleeve, said parts being so constructed and arranged that reduction of pressure upon the outer side of said dia-

phragm and increase of pressure upon the inner side of said diaphragm will increase the pressure of said sleeve shoulder on said packing material.

4. A packing gland comprising the combination with an engine shaft having an annular shoulder, of an annular member capable of slidable movement on said shaft, packing material between said annular member and said shaft shoulder, a casing inclosing said annular member, a flexible diaphragm inclosing one end of said casing and supporting said annular member, and means to admit fluid under pressure within said casing and against said diaphragm to vary the pressure of said annular member on said packing material.

5. A packing gland comprising the combination with a shaft having a plurality of annular shoulders thereon, of an annular pressure member adjacent each shoulder and capable of longitudinal movement relatively to said shaft, packing material between each shoulder and its adjacent annular member, a casing surrounding said members, a flexible diaphragm inclosing each end of said casing, each diaphragm supporting one of said annular pressure members, said parts being so constructed and arranged that reduction of pressure upon the outer side of either diaphragm will increase the pressure of the pressure member carried thereby on the adjacent packing material, and means for admitting fluid under pressure within said casing whereby increase of pressure within said casing will likewise cause increase of pressure of the annular pressure members upon the adjacent packing material.

6. A packing gland for fluid turbines, comprising a turbine casing, a rotor within said casing, a shaft therefor extending through an opening in said casing, said shaft having an annular shoulder thereon, an annular pressure member slidably mounted on said shaft opposite said shoulder, packing material between said shoulder and said annular pressure member, a chamber surrounding said shaft, a flexible diaphragm inclosing one end of said chamber and supporting said annular pressure member, said parts being so constructed and arranged that reduction of pressure within the turbine casing will increase the pressure of said annular pressure member upon said packing material and increase of pressure within said chamber will likewise cause increase of pressure of said annular pressure member upon said packing material.

7. A packing gland for shafts comprising, in combination with a shaft having an annular flange or shoulder thereon, a casing surrounding said shaft, a gland member within said casing and connected therewith

by means of a flexible pressure member, a packing interposed between said shoulder and said gland member, said parts being so constructed and arranged that variations of
5 pressure upon either side of said pressure member will cause pressure of said gland member on said packing, and whereby said

free movement of said shaft in all directions is permitted.

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Witnesses:

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