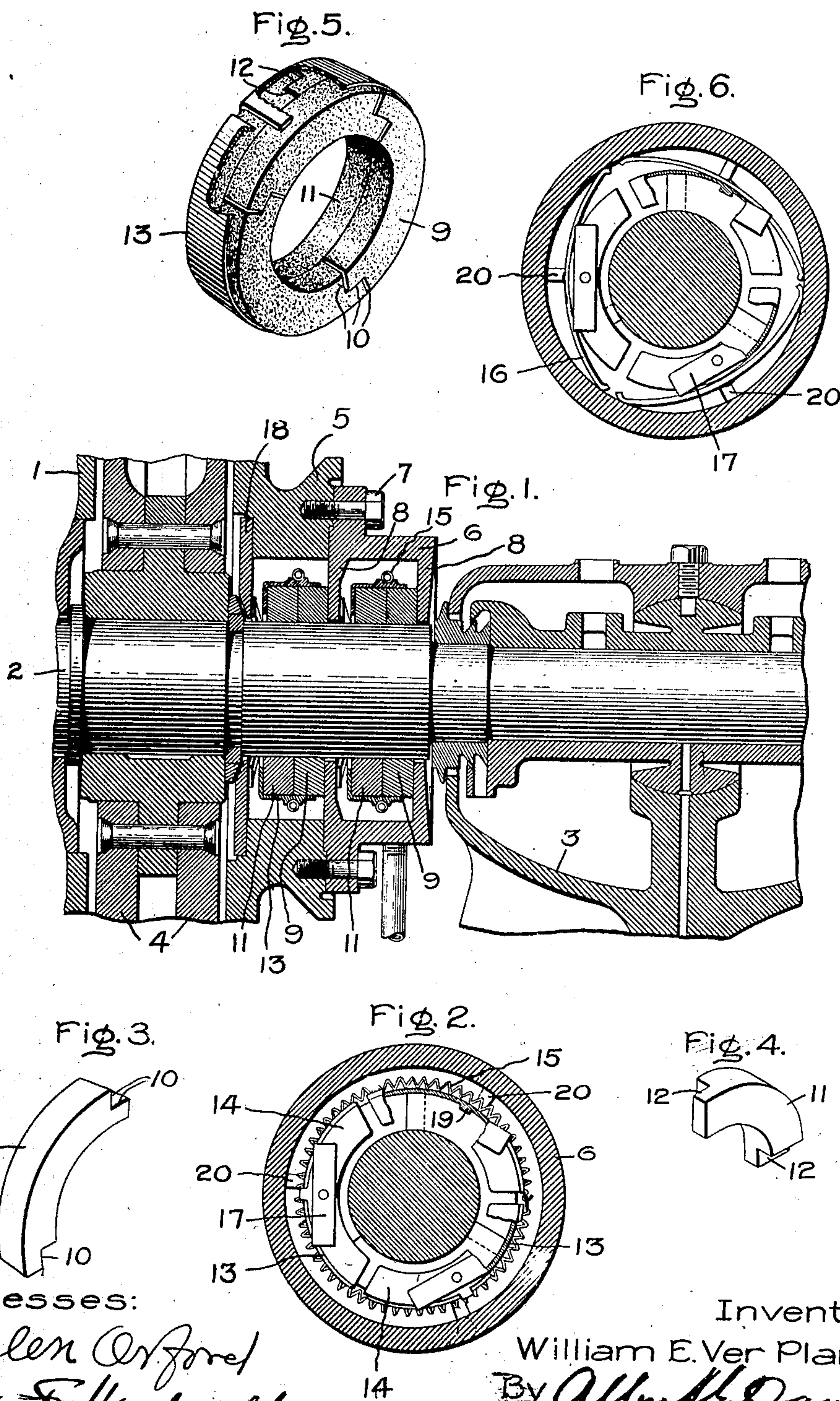


No. 872,366.

PATENTED DEC. 3, 1907

W. E. VER PLANCK.  
PACKING FOR SHAFTS OF ROTARY STEAM ENGINES.  
APPLICATION FILED AUG. 7, 1905.



Witnesses:

*Helen Crawford*  
*Alex. F. MacDonald.*

Inventor

William E. Ver Planck,

By *Albert H. Davis*  
Att'y



# UNITED STATES PATENT OFFICE.

WILLIAM EVERETT VER PLANCK, OF SWAMPSCOTT, MASSACHUSETTS, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

## PACKING FOR SHAFTS OF ROTARY STEAM-ENGINES.

No. 872,366

Specification of Letters Patent.

Patented Dec. 3, 1907.

Application filed August 7, 1905. Serial No. 273,002.

*To all whom it may concern:*

Be it known that I, WILLIAM EVERETT VER PLANCK, a citizen of the United States, residing at Swampscott, county of Essex, State of Massachusetts, have invented certain new and useful Improvements in Packings for Shafts of Rotary Steam-Engines, of which the following is a specification.

This invention relates to packing for making a steam tight joint where the shaft of a rotary steam engine passes out through the wall of the casing.

The object of the invention is to provide an efficient and durable device which will automatically take up the wear of its parts and will thus at all times effectually prevent the escape of steam.

The invention is especially applicable to the shafts of steam turbines, and for the sake of perspicuity it will be described in that connection.

It comprises two or more rings each composed of segments, one ring breaking joints with the other. The joints between the segments in one ring are on longitudinal planes parallel with the shaft, while the joints in the other ring are on radial planes. The segments are retained in place by segmental holders, and springs are provided to press the rings lengthwise against a stationary surface, and also to compress the segments upon the shaft. To insure a complete packing, two or more sets of rings are preferably employed, the outer set stopping what little steam may leak past the first or inner set.

In the accompanying drawing, Figure 1 is a longitudinal sectional elevation of a portion of a steam turbine embodying my invention; Fig. 2 is a cross section; Fig. 3 is a perspective view of one of the segments of the outer ring; Fig. 4 is a perspective view of a segment of the inner ring; Fig. 5 is a perspective view of a set of rings, the holders being partly broken away; and Fig. 6 is a cross section showing a modification.

The turbine illustrated has a casing 1 through which passes a shaft 2 suitably journaled in a pillow block 3 and carrying the bucket wheel 4. The casing has an annular neck 5 concentric with the shaft and faced off to receive a collar 6 which is secured by the screws 7 or otherwise and has two parallel inwardly projecting flanges 8. The space between the neck 5 and the shaft forms a chamber for the first or inner set of packing

rings, while the annular space between the two flanges 8 forms a chamber for the outer set. That portion of the shaft inside these chambers is turned smooth and cylindrical, so as to make a close fit with the packing rings which are composed preferably of carbon or a carbonaceous substance, and are made in segments, preferably three in number. The rings have flat parallel faces, and the outer ring 9 fits against the end of its chamber, that is, against the flange 8. The ends of the segments are rabbeted together, the meeting surfaces 10 of the joints being parallel with the shaft. The segments are cut a little short to leave room for contraction of the ring as it wears away on the inside. The inner ring 11 is also composed of segments, preferably three in number, arranged to break joints with the ring 9. The ends of these segments are rabbeted together, but the meeting surfaces 12 are radial to the shaft.

The two rings lie closely together and are inclosed in metallic holders 13 which are made in segments and have flanges 14 extending inwardly over the inner face of the inner ring. The holders extend nearly to the flanges 8, so as to cover the joints as completely as possible. The holders are clamped upon the ring by suitable means, such as the garter springs 15 shown in Figs. 1 and 2, or the flat two-armed springs 16 shown in Fig. 6. Springs are also interposed between the holders and a stationary portion of the casing; such as the flat springs 17 secured to each segment of the holder and abutting against the flange 8 or the flat ring 18 secured to the casing at the base of the neck 5.

A rib or ribs 19 on the holders enters a corresponding groove or notch in the edge of the rings, and prevents them from working around into a position where the joints would register. On the inside of the flange 8 are lugs 20 which engage with the holders and prevent the rings from revolving with the shaft. The springs 17 simply hold the rings 9 up to the flanges 8, as the steam which has free access to the inner of the two chambers will force the inner ring tightly against the flange, while the outer ring will also be forced against its abutting flange by the steam that leaks past the inner ring.

It is evident that no steam can pass through the joints of the ring 11 in a longi-



tudinal direction, but it could get through in a radial direction between the ends of the segments. This is prevented by the holders which completely cover the joints in the ring

5 11. The steam cannot pass through the joints of the ring 9 in a radial direction, but it could get through in a longitudinal direction. This is prevented by the ring 11 and the abutting flange 8. The two rings thus  
10 coöperate to make a tight joint.

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

1. A packing for a rotating shaft comprising two segmental rings lying side by  
15 side and arranged to break joints, the abutting ends of the segments being rabbeted together.

2. A packing for a rotating shaft comprising two segmental rings lying side by  
20 side and arranged to break joints, the abutting ends of the segments being rabbeted together, the meeting surfaces of the joints in one ring being parallel with the shaft and in the other ring radial thereto.

25 3. A packing for a rotating shaft comprising two segmental rings arranged to break joints, the abutting ends of the segments being rabbeted together, and segmental metallic holders overlapping the joints.

30 4. A packing for a rotating shaft comprising two segmental rings arranged to break joints, the abutting ends of the seg-

ments being rabbeted together, and segmental metallic holders overlapping the joints, and having flanges extending inwardly over 35 the face of one ring.

5. A packing for a rotating shaft comprising two segmental rings lying side by side and arranged to break joints, the abutting ends of the segments being rabbeted to- 40 gether, a stationary abutment for said rings, springs urging them toward said abutment, and circumferential springs for compressing them upon the shaft and taking up the wear.

6. A packing for a rotating shaft com- 45 prising two segmental rings arranged to break joints, the abutting ends of the segments being rabbeted together, and segmental metallic holders overlapping the joints and having ribs engaging with grooves in 50 said rings.

7. The combination with a shaft, of a stationary flange having one or more lugs, two carbon packing rings made in segments fitting said shaft and breaking joints, and me- 55 tallic holders for said rings restrained from rotation by said lugs and having ribs engaging said rings.

In witness whereof I have hereunto set my hand this thirtieth day of June, 1905.

WILLIAM EVERETT VER PLANCK.

Witnesses:

JOHN A. McMANUS, Jr.,

HENRY O. WESTENDARP.