

No. 615,902.

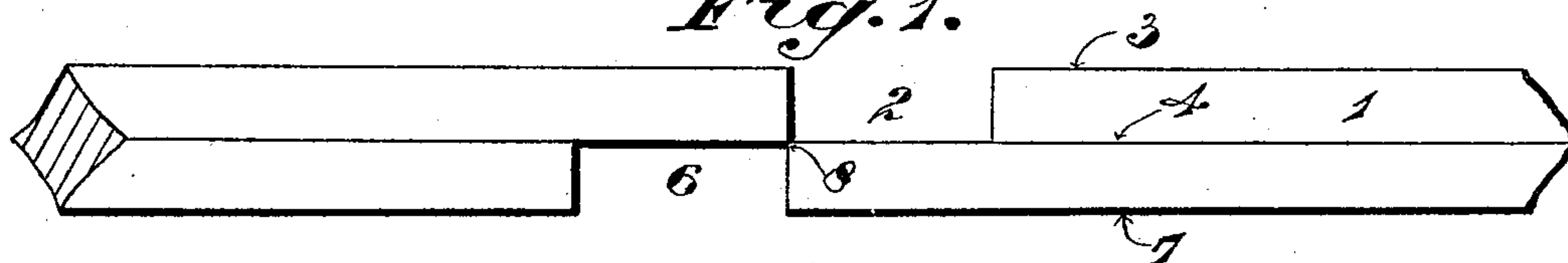
Patented Dec. 13, 1898.

J. S. RAWORTH.  
PACKING RING.

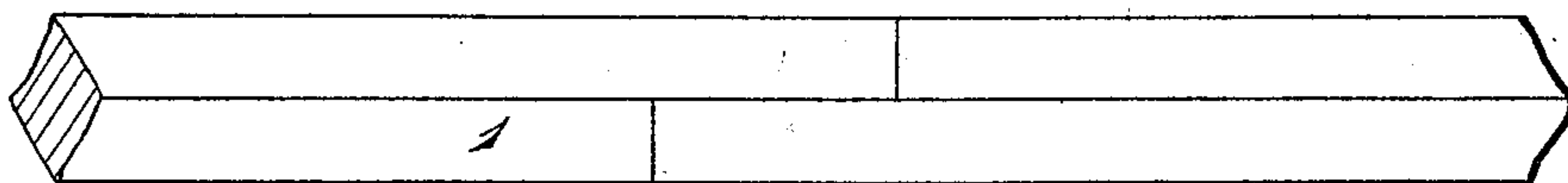
(Application filed Nov. 7, 1896.)

(No Model.)

*Fig. 1.*



*Fig. 2.*



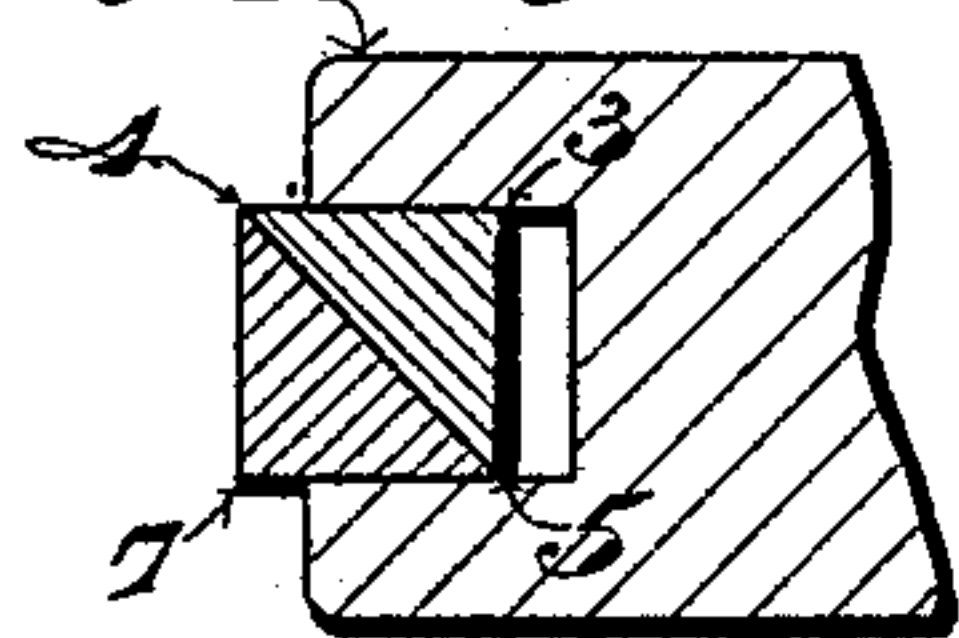
*Fig. 3.*



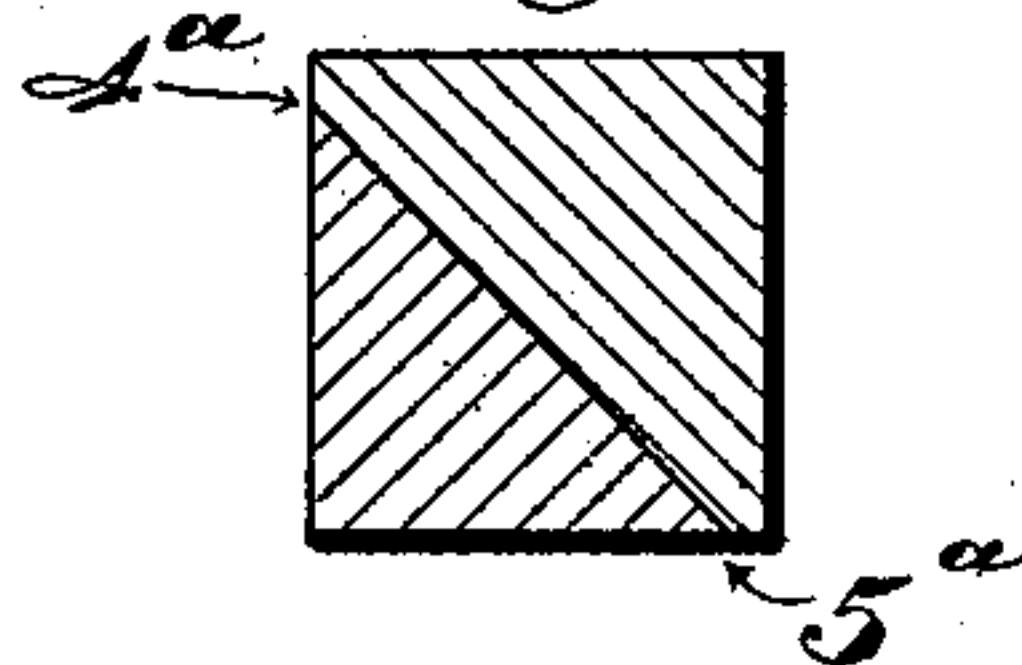
*Fig. 4.*



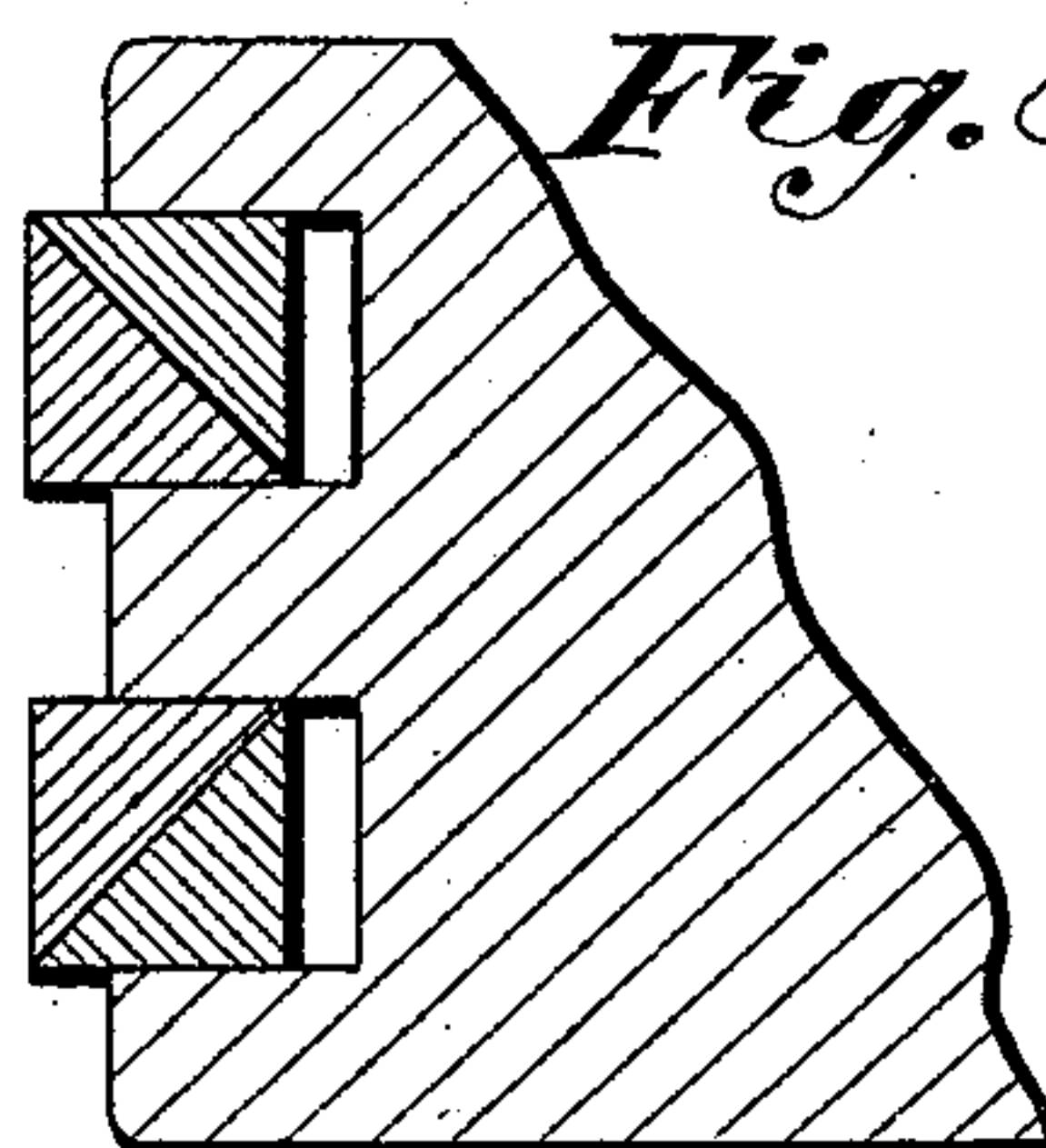
*Fig. 5.*



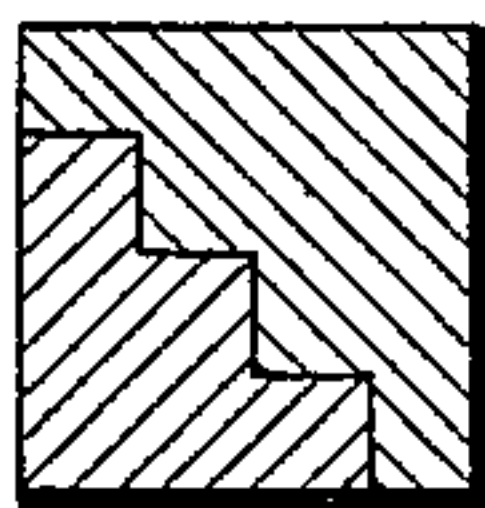
*Fig. 6.*



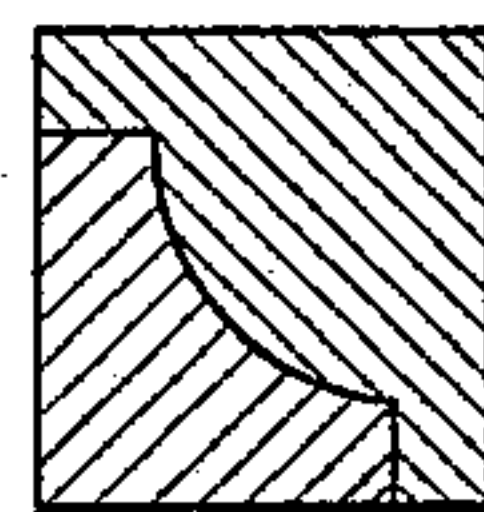
*Fig. 8.*



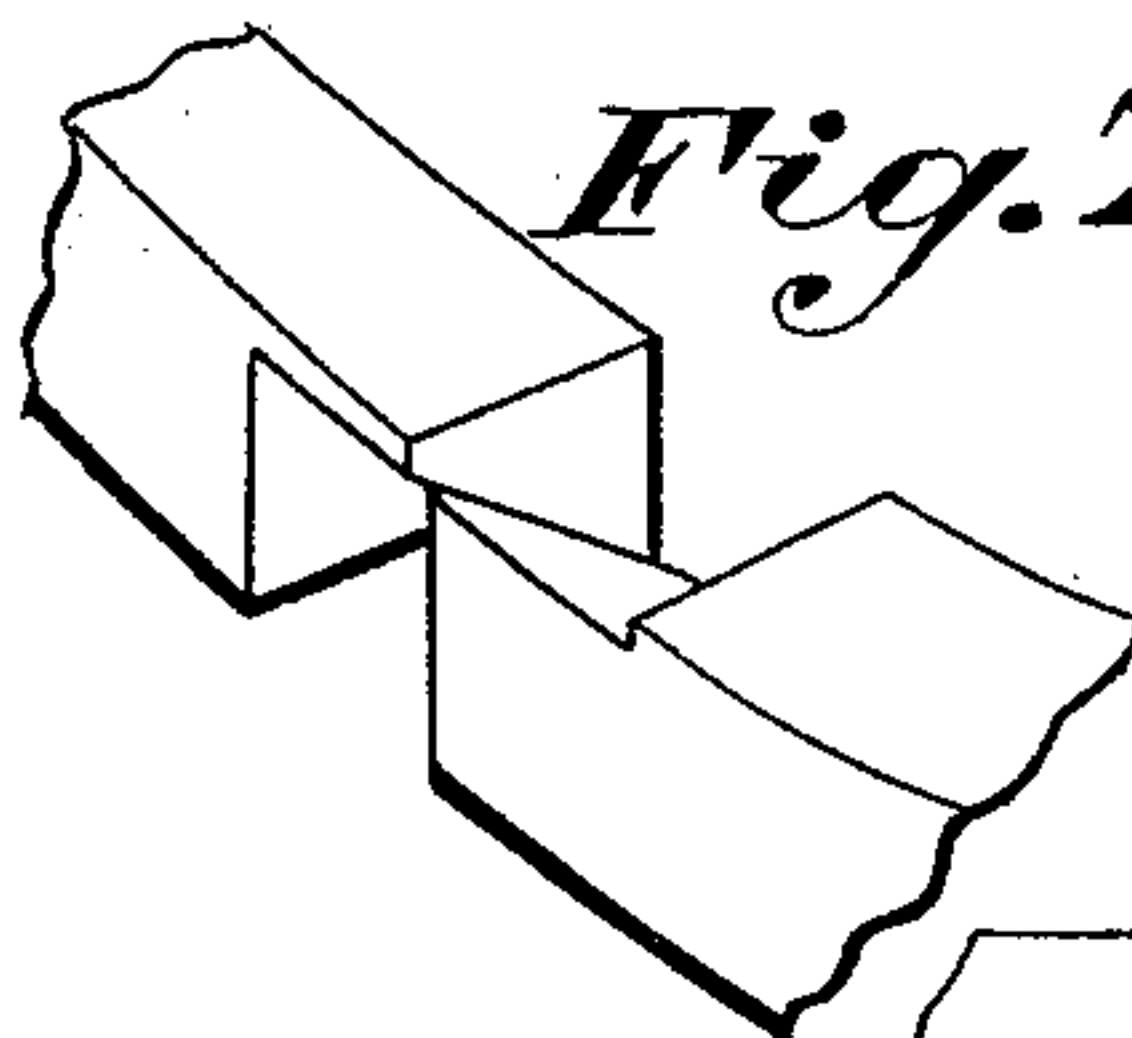
*Fig. 9.*



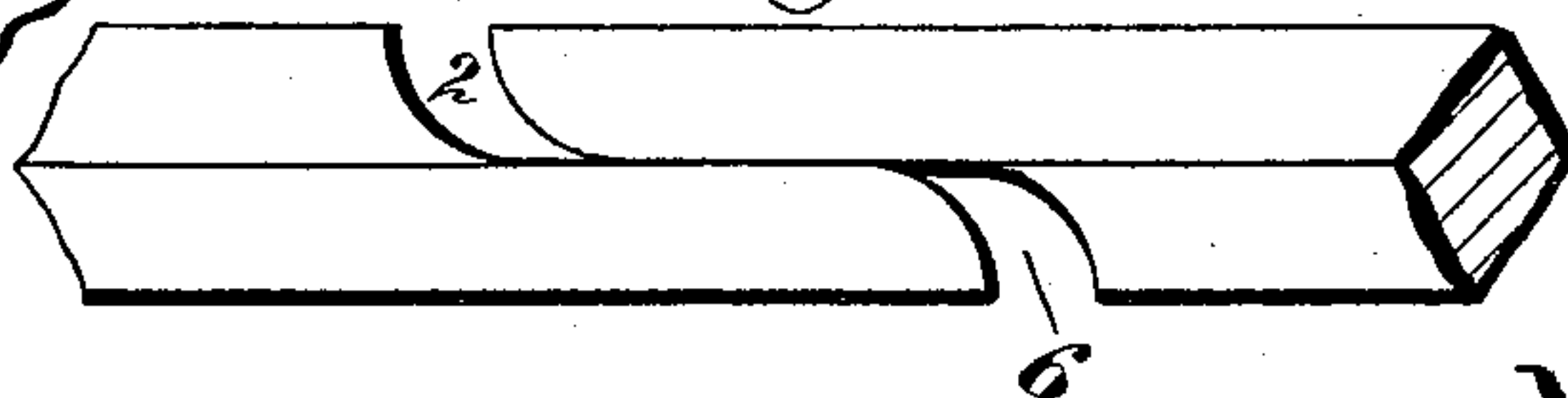
*Fig. 10.*



*Fig. 7.*



*Fig. 11.*



Witnesses.

*Geo. C. Truch.*  
*James W. Bevens*

Inventor.

*John S. Raworth,*  
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# UNITED STATES PATENT OFFICE.

JOHN SMITH RAWORTH, OF LONDON, ENGLAND.

## PACKING-RING.

SPECIFICATION forming part of Letters Patent No. 615,902, dated December 13, 1898.

Application filed November 7, 1896. Serial No. 611,393. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN SMITH RAWORTH, a subject of the Queen of Great Britain and Ireland, residing at Streatham Hill, in the city of London, England, have invented Improvements in Packing-Rings, (for which patents have been granted in the following countries: Belgium, No. 122,146, dated June 25, 1896; France, No. 257,568, dated June 25, 1896; Austria, No. 46/4,441, dated November 2, 1896; Hungary, No. 8,106, dated September 3, 1896; Switzerland, No. 12,894, dated July 18, 1896, and Great Britain, No. 19,664, dated October 19, 1895,) of which the following is a specification.

This invention has reference to an improved construction of packing-rings suitable for use with pistons for steam and other fluid-pressure engines, for the buckets and valves of pumps, and compressors generally. According thereto a packing-ring, which may be of rectangular (preferably square) form in cross-section similar to the ordinary rings in common use and known as "Ramsbottom" rings, is constructed with overlapping ends or parts, the line of division between the adjacent surfaces of which, as seen in cross-section, extends from one side or edge to the other side or edge of the ring and diagonally of the ring, as seen in a cross-section thereof through the joint. My improved packing-ring joint consequently consists of two partly-radial or cross cuts connected by a conical cut. The object and effect of this method of cutting the ring is to make the ring steam-tight without the aid of supplementary pieces, such as tongues or wedges. The steam, when the construction is used, cannot pass along the wall of the cylinder; neither can it pass over and under the ring through the body of the piston as it does in the well-known form of lap-joint.

My joint may be made as I shall now explain with reference to the accompanying drawings, wherein—

Figure 1 is an elevation of part of a packing-ring set on edge, showing how the joint is formed. Fig. 2 is a similar view, but showing the ends of the cut ring overlapped. Figs. 3, 4, and 5 show the packing-ring joint in outside elevation, plan, and cross-section, respectively, the latter figure showing also a part of a piston to which the ring is applied.

Fig. 6 is a similar view to Fig. 5, but showing a slight change in the position of the conical cut. Fig. 7 is a perspective view of the joint. Fig. 8 shows in longitudinal section part of a piston fitted with two piston-rings having joints according to this invention. Fig. 9 is an edge view showing a modified form of the radial cuts in the joint. Fig. 10 is a cross-section showing a modified form of joint. Fig. 11 is a side elevation showing a further modification.

Assuming the section of the ring 1 to be square, as shown, I make a wide cut 2, Fig. 1, from the upper right-hand corner 3, Fig. 5, down to the diagonal line 4 5, or, better still, down to the line 4<sup>a</sup> 5<sup>a</sup>, just below the diagonal line, as shown in Fig. 6, and another wide cut 6 from the lower left-hand corner 7 up to the diagonal line 4 5 or to the line 4<sup>a</sup> 5<sup>a</sup>, as the case may be, these two wide cuts being so arranged that they break through one into the other on the diagonal line at the point 8, Fig. 1. When the ring is compressed to fit the cylinder, the triangular-shaped ends overlap each other, as shown in Fig. 2, and the cut then consists of two triangular radial surfaces connected by a conical surface.

Fig. 5 shows the position of the packing-ring joint relatively to the piston, which is assumed to be a single-acting one and subjected to pressure on the side 9. For a double-acting piston two packing-rings should be used, having the improved joints arranged relatively to each other, as shown in Fig. 8.

It will be obvious that the conical cut, which is shown in Figs. 1 to 8 of the drawings as a plain cone, may be varied by the use of steps or curved surfaces cut on the sides of the theoretical cone demanded by the invention. For instance, the cross-section of the cut might appear as shown in Fig. 9 or in Fig. 10.

The radial cuts may be varied almost indefinitely by rounding out the corners, as shown, for example, in Fig. 11, or otherwise.

The advantage of cutting and arranging the packing-ring joint in the manner hereinbefore described is that without the addition of loose plates or tongues no open space or spaces is or are formed in the ring by movement of the overlapping ends or parts one on the other through which steam or other fluid can pass when the ring is in use.

It is not essential to my invention that the section of the ring should be a complete square or rectangle. One or even two of its corners or edges 3 and 7 may be cut off without affecting the tightness of the ring.

What I claim is—

1. A packing-ring joint consisting of overlapping parts separated by two radial or cross cuts and a conical cut, the cross-cuts extending in opposite directions from the conical cut, substantially as described.

2. A packing-ring joint composed of overlapping parts each of triangular form in cross-

section arranged with their abutting surfaces extending diagonally from one flat side and near to the inner periphery of the joint to the outer periphery and near to the other flat side of the joint, substantially as described and shown.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN SMITH RAWORTH.

Witnesses:

EDMUND S. SNEWIN,  
WM. O. BROWN.