(No Model.)

T. TRIPP.
Metallic Packing.

No. 236,117. **Patented Dec. 28, 1880.**

Fig. 1.

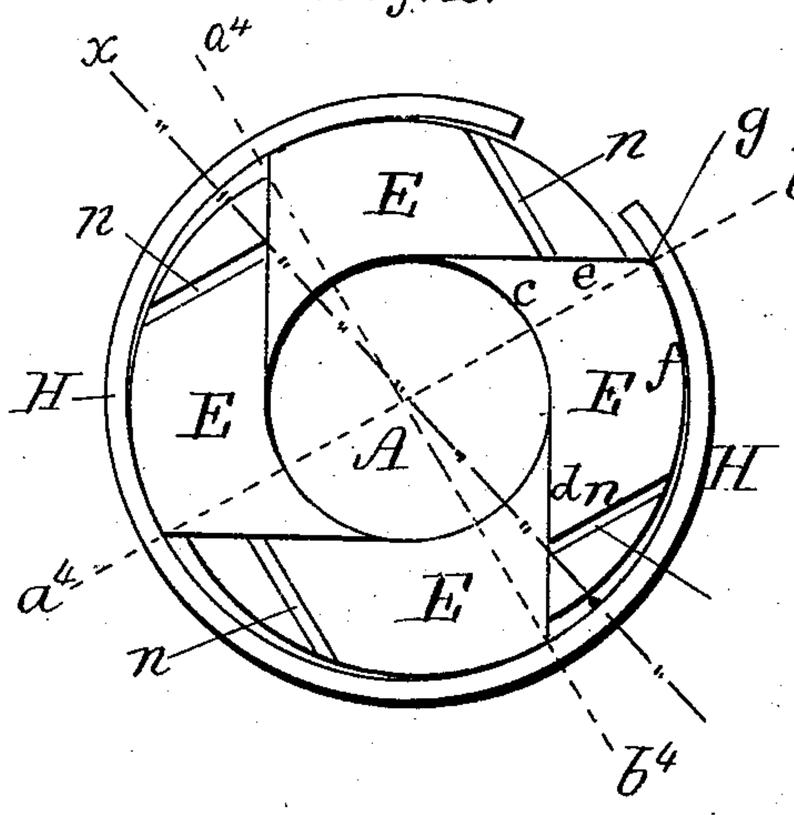


Fig. 4.

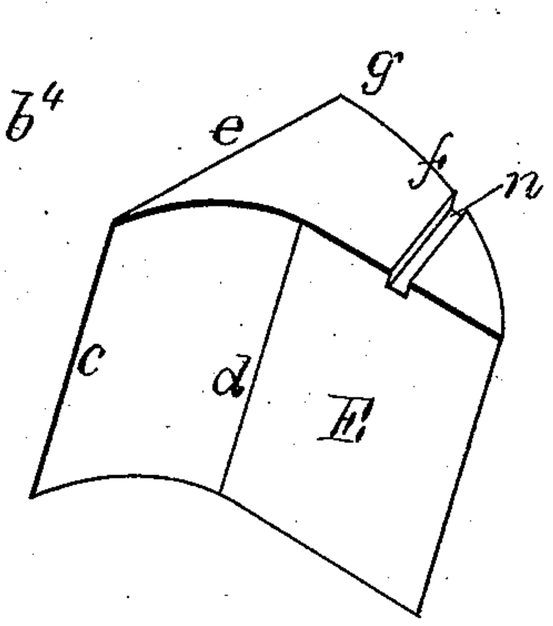
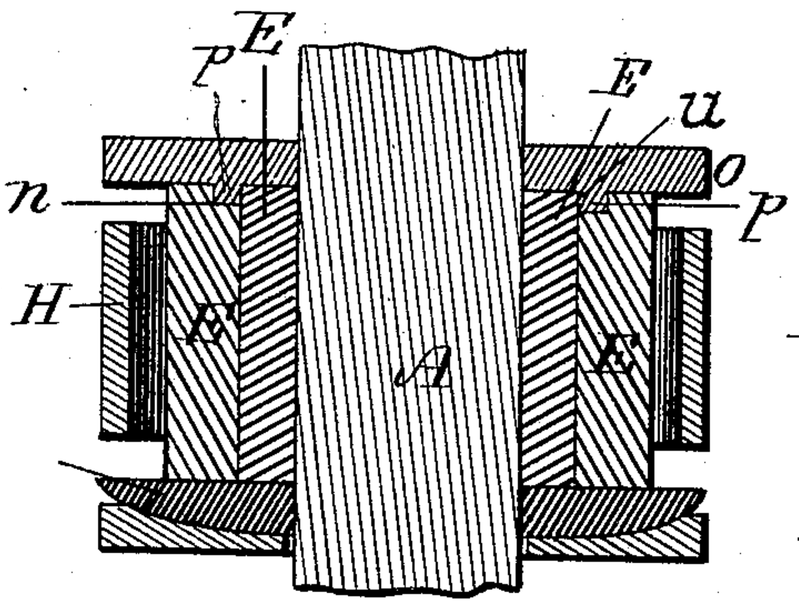
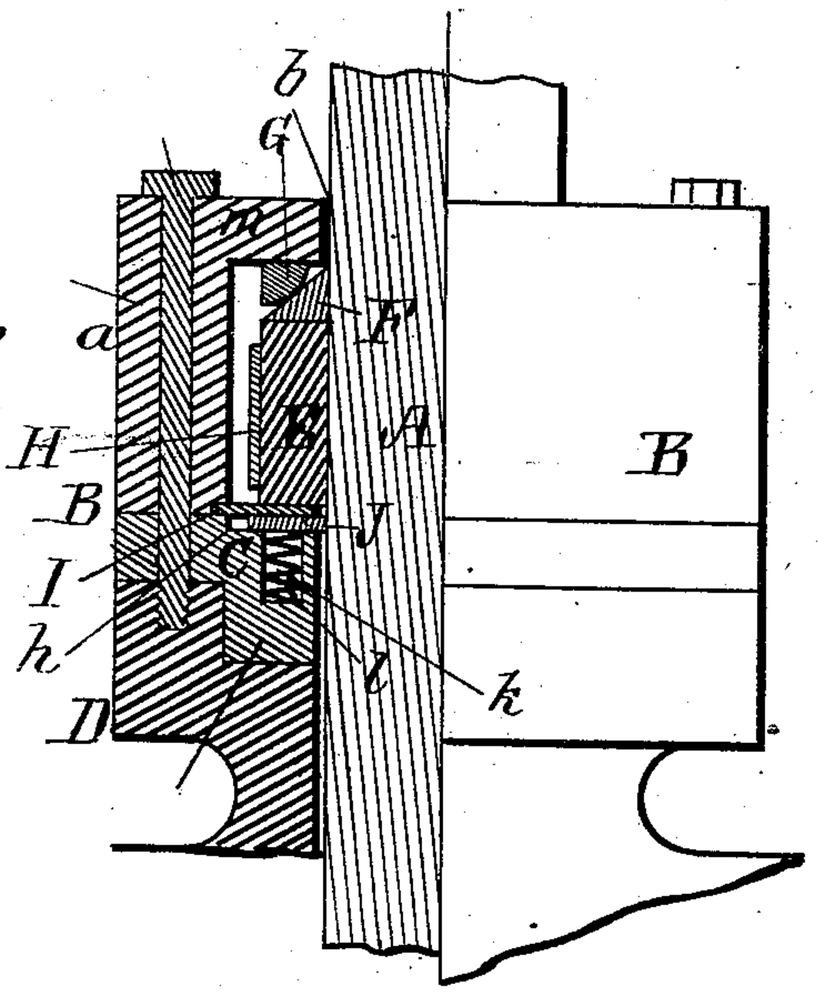


Fig. 2.

Fig. 3.



section through plane x y.



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UNITED STATES PATENT OFFICE.

THOMAS TRIPP, OF EAST STOUGHTON, MASSACHUSETTS.

METALLIC PACKING.

SPECIFICATION forming part of Letters Patent No. 236,117, dated December 28, 1880.

Application filed November 10, 1880. (No model.)

To all whom it may concern:

Be it known that I, THOMAS TRIPP, a citizen of the United States, residing at East Stoughton, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Metallic Packings; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

This invention relates to a class of fluid-tight metallic packings for piston and other rods in which is employed a flexible or expansible ring encircling the rod with a fluid-tight joint, and composed of a series of parallel segmental metallic plates arranged longitudinally upon the rod, the series of plates being confined together and crowded up to the periphery of the rod by encircling springs, and the whole inclosed within a suitable box secured to the outside of the valve-chest or steam-cylinder.

My invention consists, first, in a packing-ring composed of a series of four plates, each of which has parallel longitudinal faces, with the inner face in cross-section made up in part of a segment of a circular bore, which embraces one-fourth the periphery of the rod, and in part of a straight flat portion departing at a tangent from said segmental portion, the opposite inner side of the plate being also flat and arranged at right angles to the straight flat face, and terminating at the circumference of the rod, the whole being so arranged that the flat face of one plate overlaps the contiguous side of the next adjacent plate with a fluid-tight joint, while the combined segmental faces of the four plates constitute a circular bore to inclose the rod.

My invention consists, secondly, in means for preventing entrance of fluid to the box or case containing the packing from the cylinder or valve-chest of the engine about the rod; and to this end I employ an elastic or yielding annular diaphragm disposed between the inner end of the packing-ring and the bottom of the box or case containing said ring, and loosely encompassing the rod to permit of lateral play of the latter, the diaphragm being confined at its circumference to the case, so as to be immovable with respect to the rod and packing-rings, and being pressed up to the end of the ring by springs, an intermediate flat ring being employed between the diaphragm and rings, which tightly incloses the rod, and together with the packing-rings follows any irregular lateral movements of each rod, the whole being as hereinafter explained.

The drawings accompanying this specification represent, in Figure 1, a cross-section, and in Figs. 2 and 3 longitudinal sections, of a packing embodying my invention, while Fig. 4 is a perspective of one of the segmental plates.

In these drawings, A represents a cylindrical rod, which may be the piston or valve rod of a steam-cylinder or valve-chest of a steam-engine, such rod passing through a circular box or case, B, usually denominated a "stuffing-box," and which is secured to the head of the cylinder or valve-chest, this box, in the present instance, being a cup, *a*, with its outer end closed, except for a circular passage, *b*, which loosely receives the piston-rod A and permits of slight lateral play of the latter, the inner edge or margin of the mouth of the cup *a* abutting against the outer edge of a flat annulus, C, which loosely encompasses the rod, the annulus C, in turn, being inclosed between the cup and the flange D of the head of the cylinder or valve-chest, and the whole being confined securely together by bolts, which pass through the wall of the cup and screw into the flange.

In carrying out the first portion of my invention I provide four metallic plates, E E E E, of equal size and shape, each of which has square ends and parallel sides, and which together encircle the rod, as shown in Fig. 1 of the drawings. The inner side of each plate E—that is, the side next the rod—is, for a portion of its surface, a segment of a circular bore, as shown at *c*, this segment being ninety degrees of a circle, and inclosing one-fourth the periphery of the rod. The remainder of the inner side of the plate is flat and departs at a tangent from the concave portion, as shown at *d*. The opposite side, *e*, of the plate E is also flat, and terminates at the circumference of the rod,

and is at right angles to the flat face *d*; hence, when in place upon the rod, departs from the latter at a tangent, as is the case with the face *d*. The outer face or periphery, *f*, of each plate E is eccentric with the axis of the rod, its highest point (which is pressed upon by the encircling spring) being the corner *g* at its junction with the side *e*, in order that the pressure of the spring may crowd the plate up to the rod in such a direction as shall effect an equal wear upon all the plates, this direction being shown by the line a^4 b^4 in Fig. 1 of the drawings. When the four plates are placed about the rod the flat face *d* of each plate abuts against the contiguous flat side *e* of the next adjacent plate with a fluid-tight joint, while the combined inner concave faces of the four plates constitute a circular bore to closely inclose the rod, thus not effectually preventing escape of steam between the plates themselves, but between the plates and the rod. The outer ends of the conjoint plates E are covered by a conical ring, F, which closely encircles the rod A, and the inner side of which is flat, the outer and tapering periphery of such ring serving as a seat to a second ring, G, loosely encompassing the rod, and whose bore is tapering or flaring and convex in cross-section, this last ring being adapted to rock upon the ring F during any irregular lateral movement of the rod, and prevent escape of steam from the box about the opening *b* in its head. A circular band-spring, H, encircles the series of plates E, and crowds them up and confines them about the periphery of the rod, as shown in Fig. 1.

In carrying out the second feature of my invention I employ a thin flexible or semi-flexible annular diaphragm, I, the bore of which is somewhat larger than the diameter of the rod A, which it incloses, in order to permit of lateral play of such rod within it, and I confine the edges of this diaphragm between the cup or box *a* and the annulus C, before named, a shallow recess, *h*, being formed in the outer end of such annulus, as shown in Fig. 2, inside of the diaphragm, to receive a flat ring, J, whose circumference is smaller than the diameter of the recess, in order that it (the ring) may be permitted a slight lateral play by and with the rod and between the diaphragm and annulus. The ring J abuts against the inner face of the diaphragm, and the diaphragm upon its opposite side abuts against the inner conjoint ends of the plates E, while, bearing upon the inner side of the said ring J, I employ a series of coiled springs, *k k*, &c., which are let into pockets *l l*, &c., in the outer end of the annulus C. The springs *k* serve to crowd the plate E and rings F G outward against the inner face of the head *m* of the box B, and the diaphragm accommodates itself to any slight longitudinal play of said plate E.

The bores of the annulus C, diaphragm I, and head D of the cylinder or valve-chest are larger than the diameter of the rod, in order, as before stated, that the rod may be allowed lateral play, should it become out of truth for any reason, while the bores of the plates E and rings J, F, and G encircle the rod with a fluid-tight joint. It follows, therefore, that any fluid from the cylinder or valve-chest is shut out from the interior of the box B, for the reason that it cannot pass between the diaphragm I and plate E, or between such diaphragm and the inner walls of the box.

By excluding fluid under pressure from the interior of the stuffing-box B the plates E are relieved from such pressure, and undue friction between them and the rod avoided, by which means the wear upon both plates and rod is greatly prolonged. The elastic band or spring H crowds the plates up to the rod with sufficient pressure to insure a tight joint.

To compel the plates E to move up to the rod in the direction of the lines a^4 b^4, in order to insure equal wear upon each, I create in the inner end of each plate (see Figs. 1 and 3 of the drawings) a straight groove, *n*, parallel to the said line a^4 b^4, and I form upon the contiguous face of a flat ring, *o*, which overlaps the outer ends of the plate E, and is disposed between the said inner ends of such plate E and the outer end of the annulus C, straight ribs or splines *p p*, &c., to enter the grooves *n n*, &c. These grooves and ribs compel the four plates to preserve their original positions, and as they wear they approach the rod in given paths, by which the wear upon each is uniform. In the construction shown in Fig. 2 of the accompanying drawings the grooves *n* are to be formed in the outer ends of the plates E, and the ribs *o* upon the inner end or face of the ring F, or vice versa.

I claim—

1. In combination with the four segmental packing-plates, the rod, and the box or case, the annular diaphragm held or confined at its outer edge between the abutting faces of the sections of said box or case, substantially as hereinbefore set forth.

2 In combination with the segmental or sectional packing-plates, the rod, and the box or case B, the springs *k* and the diaphragm held at its outer edge between the abutting faces of the sections of said box, substantially as hereinbefore set forth.

3. A sectional metallic packing-ring composed of four plates of equal size and length, the united concave faces of such plates constituting a circular bore to inclose the rod with a fluid-tight joint, and a portion of the inner face of one plate bearing with a fluid-tight joint upon the contiguous side of the next adjacent plate, substantially as herein set forth.

4. A piston-packing composed of plates each having its inner face composed in part of a segment of a circle to partially encircle the rod, and in part of a flat face departing at a tangent from the first to overlap the contiguous side of the next adjacent plate, the

opposite edge of each plate being at right angles to said flat face, and terminating at the circumference of the rod, substantially as explained.

5. The packing-plates each formed with faces *c d e f*, as described, in combination with the diaphragm I and case or box B, substantially as herein set forth.

6. The combination, with the ribbed plate *o*, of the packing-plates formed with faces *c d e f* and grooves *n*, substantially as and for the purposes hereinbefore set forth.

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

THOMAS TRIPP.

Witnesses:

GEORGE DUSTAN,

H. E. LODGE.