(No Model.)

T. TRIPP.

Metallic Packing.

No. 236,116. Patented Dec. 28, 1880.

Fig. 1.

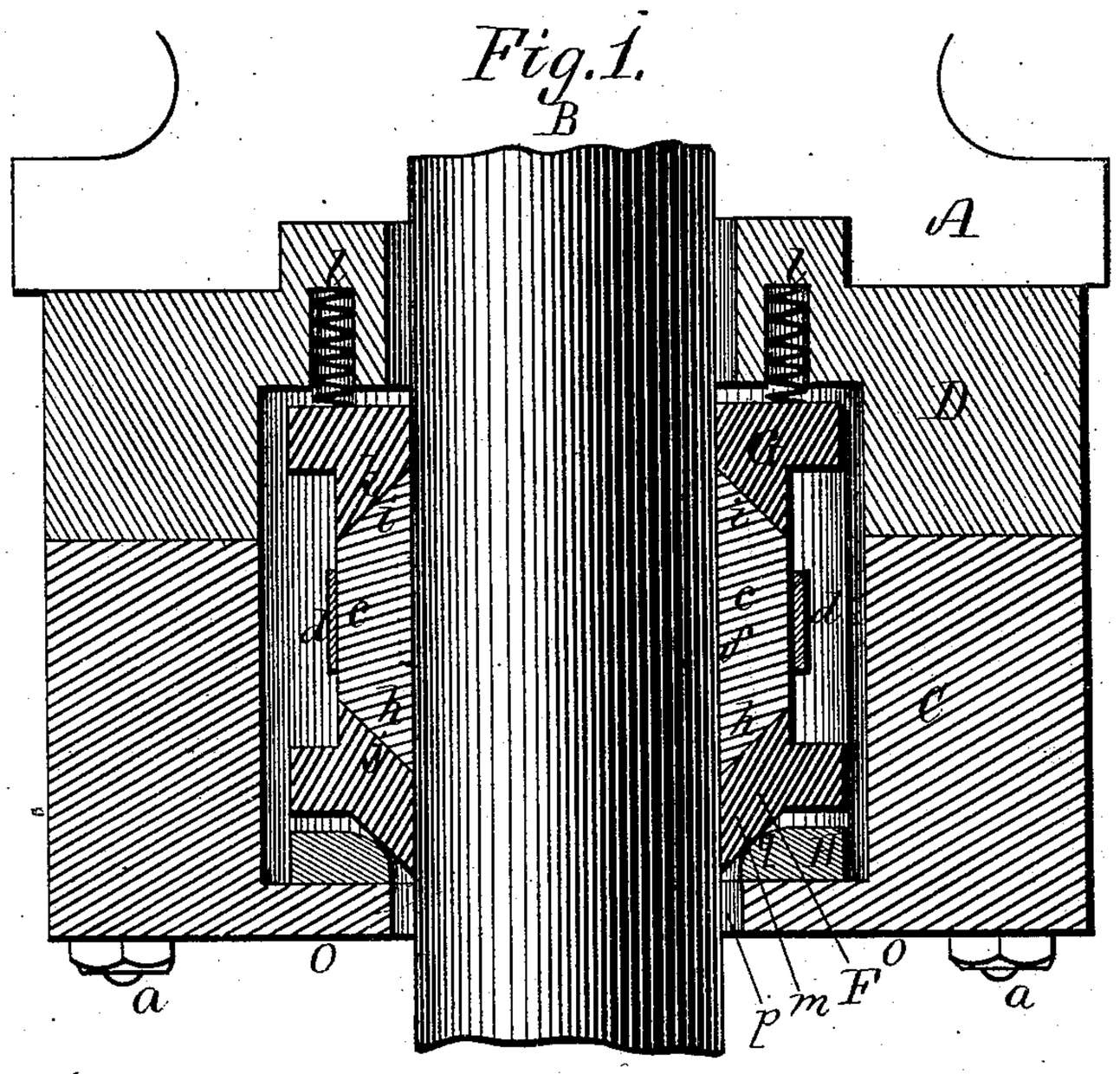


Fig. 4.

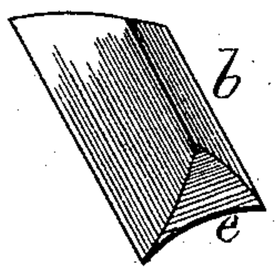


Fig. 2.

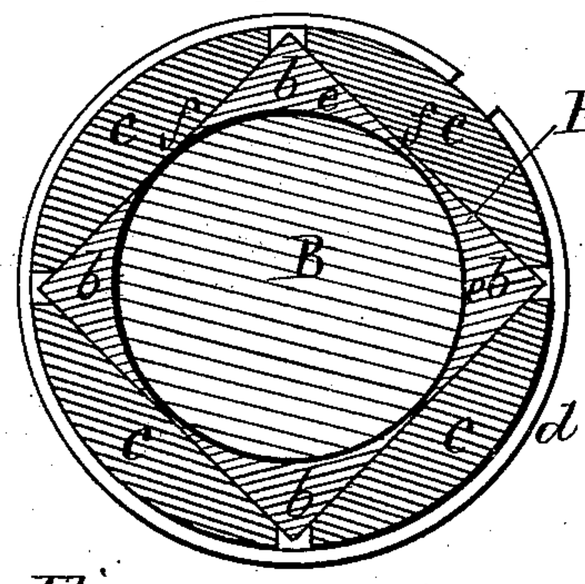


Fig. 3.

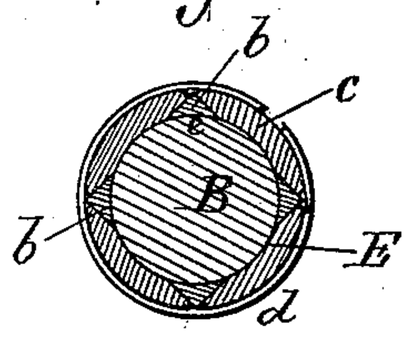


Fig. 6.

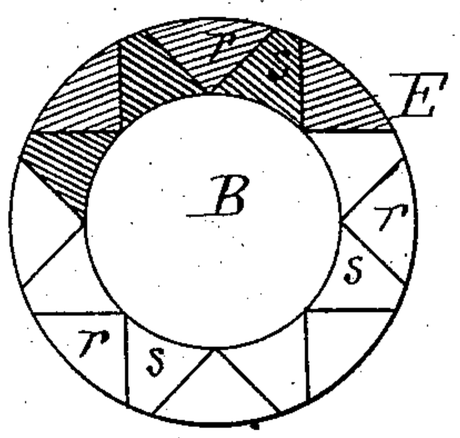


Fig. 5.

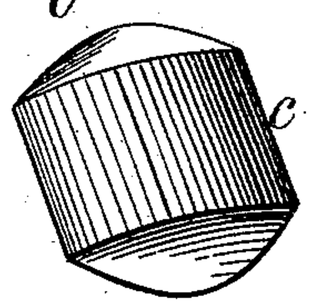
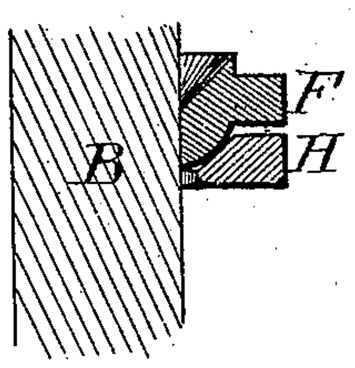


Fig. 7.



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H. C. Lodge

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Thomas Tripp.
H. Curtis. Atty.

UNITED STATES PATENT OFFICE.

THOMAS TRIPP, OF EAST STOUGHTON, MASSACHUSETTS.

METALLIC PACKING.

SPECIFICATION forming part of Letters Patent No. 236,116, dated December 28, 1880.

Application filed September 7, 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 Packing for Piston and other Rods; 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 consists, principally, in the employment, in connection with a piston-rod, of a flexible or separable ring or sleeve inclosing and hugging the rod with a steam-tight joint, and susceptible as it wears of automatic universal contraction about such rod, this ring or sleeve being composed of a series of parallel metallic plates, each of which in cross-section is preferably a quadrant of a tube of square exterior and circular bore, and all of uniform length, and operating with a second series of plates of like length, inclosing the first and breaking the joint between its sections, the entire series of plates being confined permanently together as regards each other and crowded up to and about the rod by annular caps or heads inclosing their conjoint ends, the ends of the ring thus composed of the united plates, as well as the bores of the annular caps which inclose them, being conical or tapering, in order that the contraction of said caps shall crowd the plates up to the rod, and the whole being inclosed within a cylindrical case or stuffing-box secured to the head of the cylinder or valve-chest, and operating as hereinafter explained.

The drawings accompanying this specification represent, in Figure 1, a longitudinal section, and in Figs. 2 and 3 cross-sections, of a packing containing my invention. Fig. 4 is a view of one of the inner plates of the packing-ring, and Fig. 5 a view of one of the outer plates of such ring, while Fig. 6 is cross-section of a modified construction of said ring. Fig. 7 is a section showing a modified construction of the "check-ring," so called.

In the above-named drawings, A represents the flange in which the head of the steam cylinder or chest of a steam-engine usually terminates, and through which the piston-rod (shown at B) loosely passes, while secured at its inner end rigidly to this flange is a cylindrical case or cup, C, by means of an intermediate annulus, D, the cup being secured to the annulus by bolts *a a*, while the annulus, in turn, is securely bolted to the flange A.

The case or cup C constitutes what is usually termed the "stuffing-box," and it contains the sectional packing constituting my invention, which I will now describe.

The flexible or contractile packing-ring, to which allusion has been made, is shown at E as composed, as in the drawings, of two sets of plates, *b b b b* and *c c c c*, the plates *b* being section of a circle in cross-section and of uniform length, and with the plates *c* surrounded by an elastic metallic band, *d*, to confine them in place about the rod B and prevent misplacement at such times as the packing may be separated from its inclosing-case. The conjoint plates are, in the present instance, eight in number and in two sets, those of one set, *b b b b*, being right-angled triangles in cross-section, with their inner face, *e*, of a segment of a circle equal, when the facing is new, to one-fourth the circumference of the rod B. Therefore the united inner faces of these plates *b b b b* make up a cylindrical bore which incloses the rod. The outer series of plates, *c*, are also four in number, and have flat faces *f* to conform to the outer faces of the plates *b* and cover the joint between each pair of said plates *b*, the width of each plate *c* being, by preference, about equal to that of a plate, *b*, and its exterior being preferably a segment of a circle struck from the center of the rod B, though this is not essential. The plates *c*, overlying and breaking joints with the plates *b*, as stated, constitute the outer circumference of the ring E and are surrounded by the band *d*.

It will be observed that the meeting faces of the plates *b b b b* and *c c c c* are parallel with each other and with the axis of the rod B; hence any slight endwise slip between them does not disturb their positions relatively to each other and the rod, so far as preserving a tight joint about the latter is concerned.

It will also be seen that as fast as the con-

cave inner face, *e*, of the plates *b* wear by contact with the rod and their outer faces approach the latter the outer plates, *c*, follow and their inner faces begin to wear by contact with such rod, and that as the said concave faces of the inner plates decrease in cross area those of the outer plates, *c*, increase by wear upon the rod to a corresponding degree; hence the entire series of plates preserve their original length practically intact, and the entire circumference of the rod is covered by the plates until the latter are worn out.

In Fig. 3 of the drawings I have shown the parts as they will appear when the ring is considerably worn after long service, in which the inner faces of the outer plates have become for a portion of their area concave by contact with the rod, the wearing away of the inner faces of the inner plates having allowed the outer plates access to the rod. It will thus be seen that after the inner plates have become worn sufficiently to allow the outer plates to have access to and be in contact with the rod that the edges of the inner plates separate; but it will also be seen that the joints between such edges and the rod are broken by the outer plates.

To crowd the plates *b* and *c* permanently up to the rod B, I slope or bevel their conjoint ends—that is, the ends of the ring E—composed of the said plates, as shown at *h i*, and I cover or inclose these tapering ends of the ring each by an annular disk or cap, F G, the inner circumference, *j* or *k*, of which is of the same slope as that of the end of the ring which it incloses, the faces of both being flat.

The cap F is disposed at or near the outer end or head of the box C, while the cap G is disposed near to the annulus D, before named, and the entire series of packing-plates and caps are crowded outward by spiral or other springs, *l l*, &c., interposed between the cap G and the said annulus D, or the flange A should the annulus be omitted, as in some instances may be the case.

The outer end of the annular cap F is tapering or conical at a slope parallel, or approximately so, to the outer end of the ring E, as shown at *m*, this *m* being flat and encircled by a ring, H, which is disposed between it and the head *o* of the box C, the orifice *p* in the said head *o*, through which the piston-rod passes, being of larger diameter than the latter, in order to permit of slight lateral movements of the rod and packing with the ring within the box without disturbing the position of the latter upon the cylinder-head.

The inner periphery of the ring H is convex or crowning in cross-section, as shown at *q*, in order that any irregular lateral movements or swaying of the rod B may not result in a separation or leak between the cap F and the head of the stuffing-box. Should any such movements occur by the rod being thrown out of truth, the ring H moves laterally upon the head *o*, and its convex surface adapts itself to the sloping end of the cap F and a tight joint between the two is maintained, the bore of the ring H being somewhat larger than the diameter of the rod to permit of the lateral movements of the latter without allowing steam to escape from the stuffing-box through the passage *q* in its head.

In lieu of the bore of the ring H being convex or crowning, as stated, it may be a flat surface, and the teat upon the cap or hub F, with which it operates, be convex, as shown in Fig. 7 of the drawings. This, however, would be a mere transposition of parts.

It will thus be seen that I obtain a packing-ring which is practically a single ring, and one that is susceptible of uniform contraction as its bore wears; hence the joint between it and the rod is always intact and tight, and one which cannot be disturbed by irregular lateral movements of the rod, since it follows the latter in such movements.

The check-ring H is not literally a component part or necessary adjunct to the packing-ring E, as the end of the latter may be concave or convex to enter a corresponding opening in the head of the box C. I prefer to employ the ring H, as it permits of free lateral movements of the rod and packing within the box without disturbing the latter, and is an effectual check upon escape of steam from such box by the opening *p* in the cylinder-head through which the rod passes.

Should the lengths of the plates *b c* vary under wear, the shorter ones would not be crowded laterally up to the rod by the action of the caps F G, and hence a leak might take place; but if eight plates are employed and the meeting faces of each are equal and the inner ones are quadrants of a circle, as would necessarily be the case, the entire series will approach the rod under wear at a uniform rate; hence their lengths are always uniform, and the joints between the ends of the ring E and the said caps remain intact. It is for this reason that I prefer to divide the packing-rings or cylinder E into two sets of plates, the inner ones of which are segments of one-fourth a tube in cross-section, as stated; but it is evident that my invention is not restricted to the precise number or form of the plates which in aggregate make up the ring—as, for instance, as shown in Fig. 6 of the drawings, two sets of eight plates each—sixteen plates in all—may be employed, as shown at *r r*, &c., and *s s*, &c., each bearing at its inner face upon the rod, and each plate of one series being arranged between the two adjacent plates of the other series. In this case, however, the plates are of unequal size and shape in cross-section; hence the wear upon one set would be more or less than that upon the other set, and they would approach the rod as they become worn at unequal rate of speed; hence their lengths would vary, and the ends of those most worn would fall away from the others, and a leak between them and the caps F G and the rod be the result.

What I claim as my invention is as follows:

1. A metallic packing-ring for piston and

other rods, composed of two sets of plates, *b c*, formed and arranged as described, and having beveled ends adapted to be received in beveled annular spring-pressure caps, which crowd them against the piston or other rod, substantially as hereinbefore set forth.

2. The combination, with the packing-ring built up of parallel prismatic plates and provided with the annular compression-caps, as stated, of a flat annulus or check-ring disposed between the outer cap and the head of the stuffing-box, the bore of the check-ring inclosing a conical annular teat upon the cap, and operating to prevent escape of steam from the interior of the stuffing-box during irregular movements of the rod by adapting itself to such movements of the rod, while maintaining a light joint with the head of the box, substantially as explained.

3. A metallic packing-ring for piston-rods, composed of two sets of plates, four in each set, (eight in all,) the wearing-faces of these plates with respect to each other and the periphery of the rod which they inclose being parallel to the latter, and the plates of the inner series being in cross-section a quadrant of a tube of square exterior and circular bore, the outer plates breaking joints with the inner ones and the rod, and the whole being as stated.

4. In combination, the rod B, ring E, consisting of prismatic plates *b c*, formed and put together as described, annular caps F G, check-ring H, and springs *l l* with the box C, the latter being secured rigidly to the cylinder-head, and the rod and packing-ring being susceptible of lateral play within the box, substantially as explained.

5. The plate *c*, prismatic in form and an equilateral triangle in cross-section, with the exception of one face being concave, and with all its longitudinal faces parallel and its ends beveled, as explained.

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

THOMAS TRIPP.

Witnesses:
F. CURTIS,
CHARLES J. BROTHERS.