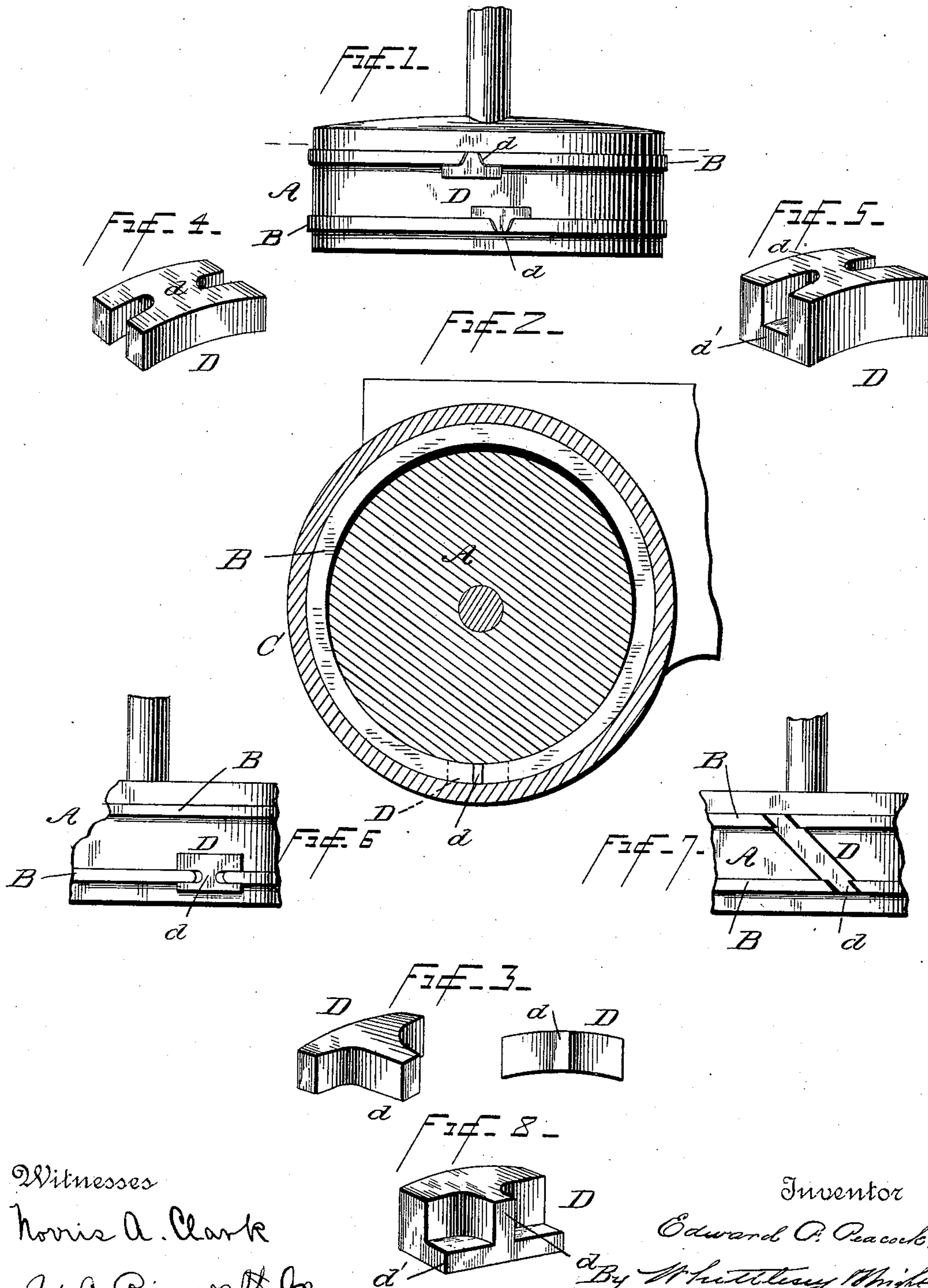


(No Model.)

E. F. PEACOCK.  
PISTON PACKING.

No. 407,370.

Patented July 23, 1889.



Witnesses

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# UNITED STATES PATENT OFFICE.

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## PISTON-PACKING.

SPECIFICATION forming part of Letters Patent No. 407,370, dated July 23, 1889.

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*To all whom it may concern:*

Be it known that I, EDWARD F. PEACOCK, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Piston-Packings; and I do 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 the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to steam-engines; and its object is to prevent the leaking of the steam past the piston at the joint of the packing-rings, and also to prevent the ridging of the cylinder by the uneven wearing action of the packing-rings.

In horizontal engines—such as locomotives—the gradual wearing away of the cylinder and the piston allows the center of the piston to drop below the axis of the cylinder, leaving a lune-shaped opening between the upper edge of the piston and the cylinder. In order to close this opening, the packing-rings must expand, thereby causing their ends to separate. If the ends of the ring happen to be at the bottom of the cylinder, their separation leaves a narrow longitudinal surface of the cylinder not subjected to the wear of the ring, which results in the formation of a ridge on the inside of the cylinder. If the ring has worked around in its groove, so that its ends lie at the top of the cylinder, then their separation leaves an opening through which steam can escape from one side of the piston to the other. This opening has been found to be in some instances, by actual measurement, three-fourths by three-eighths inch in a twenty-inch cylinder. My invention obviates both these difficulties, in that it prevents the rings from working around in their grooves, and also provides a wearing-surface to prevent the formation of a ridge in the cylinder.

The invention consists in a block let into a recess in the piston adjacent to the packing-ring groove, and having a rib to enter between the ends of the packing-ring, as hereinafter described, and particularly pointed out in the claims.

In the drawings, Figure 1 is an edge view of a piston provided with one form of my break-joint block. Fig. 2 is a section of a cylinder, showing the lune-shaped opening caused by the wear of cylinder and piston. Fig. 3 shows one form of my break-joint block in perspective and edge views. Figs. 4 and 5 are perspective views of other forms of block. Fig. 6 shows the mode of using these forms. Fig. 7 shows a further modification of block inserted in a piston, and Fig. 8 is another modification.

The piston A is shown provided with peripheral grooves to receive the packing-rings B. These are usually made of cast-iron, a little larger than the bore of the cylinder C, and with a piece cut out of them to allow the ends to be sprung together to permit the rings to be inserted into the cylinder. The space between the ends of the ring allows it to expand and contract to fit the cylinder. Various devices have been proposed to close this space and break the joint; but objection has been found to them in practice.

In addition to the expensive shapes of the blocks and their multiplicity of parts, the ends of the ring have to be cut away to fit certain parts of the block, and therefore they must be comparatively thick to admit of the formation on them of the various shoulders and tongues. The cutting away of the ring greatly weakens it at the points where it should be strong and promotes a tendency to break at the angles formed by the shoulders, grooves, or tongues. The pins or lugs or springs with which the blocks are provided frequently break off or get loose and come out. The damage caused by these loose pieces of rings and pins in the cylinder, in addition to the original cost of the blocks and the impossibility of using them with the shallow cast-iron rings preferred by so many builders, has prevented any of them from coming into use. The break-joint block which I have invented is intended to be used with plain packing-rings, which are free from all objectionable and weakening shoulders, grooves, steamways, dowel-pins, and the like, and which may be of any desired thickness. They are of the same cross-sectional area at all points, and therefore expand and contract evenly. My break-joint block is capable of various modifications, but consists, generic-



ally, of a piece of metal or other suitable material D let into a recess formed in the body of the piston alongside of the ring-groove. The simplest form of this block is shown in Figs. 1, 2, and 3. It is long enough to extend a little way along the ring on each side of the joint, so as to effectually cover the space between the ends of the ring. The faces of the block next to the ring-groove form practically a continuation of the wall of the groove, so as to fit snugly against the side of the ring. The outer surface of the block is curved to correspond with the surface of the piston. At about the middle of the block is a rib *d*, projecting transversely of the ring-groove between the ends of the ring. It does not entirely fill the space between them, but serves as a dowel or stop to prevent them from working away from the block.

The outer surface of the rib lies in the same cylindrical superficies as the surface of the body of the block, and the depth of the rib is the same as or greater than the thickness of the packing-ring B. The rib is integral with the body of the block, so that there are no joints to come loose under the action of the steam, oils, and other agents in the cylinder. The recess in which the block is set may be of the same depth as the ring-groove or deeper, as desired. It has parallel perpendicular walls to fit the sides of the block, so that the latter can play easily up and down therein. It is preferably located at the bottom of the piston, as shown in Fig. 2.

The result of this construction is, that the block always remains at the bottom of the cylinder, where the weight of the piston holds it down upon the surface of the cylinder, and where, in case the piston should have any upward play, the weight of the block itself will cause it to remain in contact with the cylinder. It prevents the ends of the packing-ring from working around to the upper side of the piston, and it affords a wearing-surface extending across the space between the ends of the rings to keep the cylinder from ridging.

The block shown in Figs. 4 and 6 has two break-joint portions lapping on both sides of the ends of the ring, as shown, and united by the rib or web *d*. The block shown in Fig. 5 is similar, except that it is made deeper than the ring-groove, so that it has a portion *d'* underlying the end of the ring. The block shown in Fig. 8 is similar to Fig. 3, but has the underlying portion *d'* the same as Fig. 5. In Fig. 7 a block is shown adapted to break the joints in two packing-rings. It may extend across at right angles to the rings, but is preferably arranged diagonally, as shown, to throw the joints of the rings out of line and to provide for a wider wearing effect upon the cylinder. This block has a central body portion with a rib *d* at each end.

In the case of the blocks shown in Figs. 5 and 8 the recesses in the piston must be deeper than the ring-grooves, for, as stated

above, the rings should not be cut away where they enter the block, since this weakens them and causes unequal expansion and wear. The other blocks shown may be either of the same depth as the ring-grooves or deeper, as desired.

If under any circumstances it is found to be necessary or preferable to locate these blocks at any other part of the piston than the bottom, or in case they are used in engines having the cylinder arranged vertically, provision must be made for holding them out against the cylinder. This may be accomplished in any of the well-known methods, either by springs inserted beneath them or by the pressure of steam admitted under them through suitable passage-ways in the piston.

The blocks are preferably made of phosphor-bronze, though any suitable material may be used.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination, with a piston provided with a packing-ring, of a break-joint block seated in a recess in the piston adjacent to the packing-ring groove and having a rib entering between the ends of the ring, the outer surface of the rib lying in the same superficies as the surface of the body of the block, and the depth of the rib being as great as the thickness of the packing-ring, substantially as set forth.

2. The combination, with a piston provided with a packing-ring groove and having a recess adjacent to said groove, of a packing-ring received in the groove and of the same cross-sectional area at all points, and a break-joint block seated in the recess, one face of the block forming a continuation of the wall of the groove, said block having a rib extending transversely of the groove between the ends of the packing-ring, the depth of the rib being as great as the thickness of the ring, substantially as described.

3. The combination, with a horizontal cylinder, of a piston provided with a packing-ring groove and a recess adjacent to but at one side of said groove and located at the bottom of the cylinder, a cut packing-ring lying in the groove, with its ends adjacent to the recess, and a break-joint block composed of a body received entirely within the recess and having a rib entering between the ends of the ring, the outer surface of the rib lying in the same superficies as the surface of the body of the block, and the ends of the ring being free from all tongues, grooves, shoulders, or other weakening conformations, substantially as described.

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

EDWARD F. PEACOCK.

Witnesses:

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