(No Model.)

C. ROGERS.

METALLIC PISTON PACKING.

No. 393,177. Patented Nov. 20, 1888.

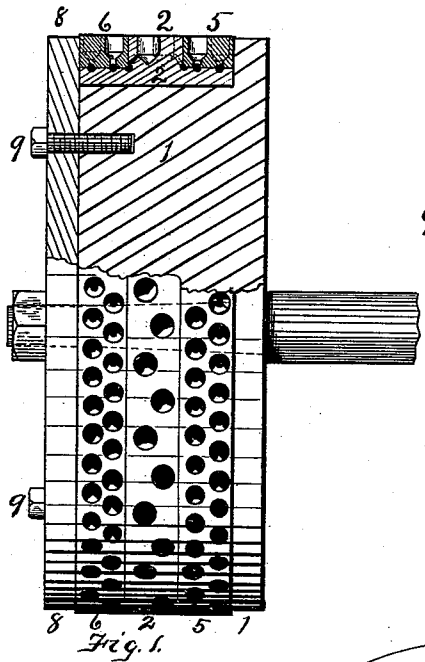


Fig. 1.

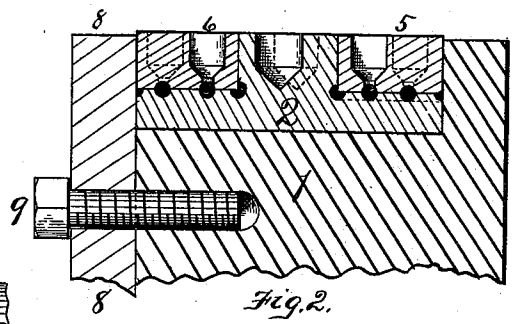


Fig. 2.

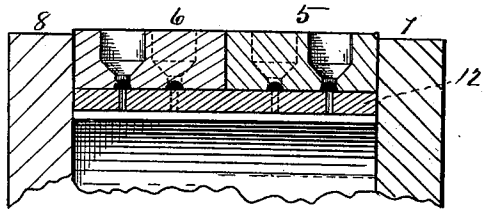


Fig. 3.

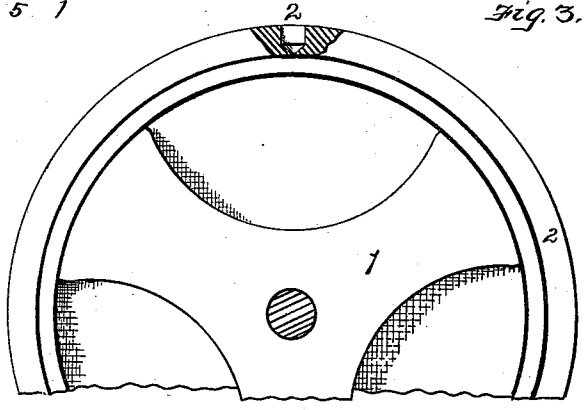


Fig. 4.

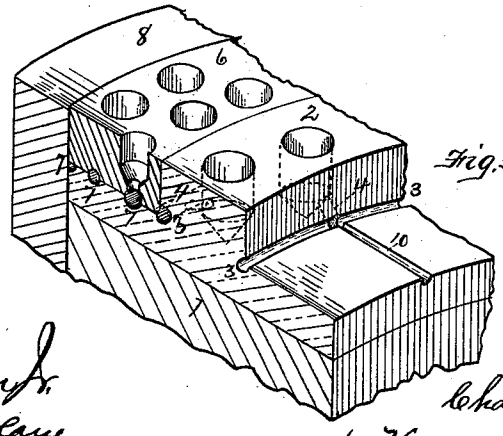


Fig. 5.

WITNESSES.

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UNITED STATES PATENT OFFICE.

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METALLIC PISTON-PACKING.

SPECIFICATION forming part of Letters Patent No. 393,177, dated November 20, 1888.

Application filed May 31, 1888. Serial No. 275,546. (No model.)

To all whom it may concern:

Be it known that I, CHARLES ROGERS, residing at Allegheny, in the county of Allegheny and State of Pennsylvania, a citizen of the United States, have invented or discovered a certain new and useful Improvement in Metallic Piston-Packings, of which improvement the following is a specification.

My invention relates to certain improvements in metallic piston-packings and bull-rings. Heretofore packings of the above character have been made without any provision for releasing the leakage steam which accumulated beneath them. I propose to perforate these packings and permit the steam to come between the outer surfaces of the packings and the wall of the cylinder. I facilitate the passage of the steam to these perforations by turning grooves around the inner circumference of the packings. I furthermore perforate the "bull-ring" and cut in it certain channels, all of which will be more fully described below.

The results attained by my invention may be summarized thus: first, a reduction of friction and consequently of wear of the bearing-surfaces of the packings, the bull-ring, and the walls of the cylinder; second, a steam-lubrication of all bearing-surfaces; third, floating the piston-head, by which wear on the seat is diminished.

In the accompanying drawings, which make part of this specification, Figure 1 is a side elevation, broken away, of an ordinary piston-head fitted with my improved bull-ring and packings. Fig. 2 is a like but enlarged view of the upper portion of Fig. 1. Fig. 3 corresponds with Fig. 2, except that the bull-ring is omitted and a spring-ring used. Fig. 4 is a face view, broken away, of a "spider" or skeleton piston-head and the bull-ring fitted thereon. Fig. 5 is a perspective view, but necessarily inverted, of a section from the lower half, respectively, of the bull-ring, one packing, follower, and piston-head.

My invention is applicable to all pistons using metallic packings or bull-rings, and the piston-heads shown in the drawings are merely illustrative.

Fig. 1 shows a familiar form of piston-head, 1, having a bull-ring, 2, fitted thereto in the usual manner. The bull-ring 2 is held rigidly in place between the angle of the head 1 and the follower 8, which is secured by screws 9. In the raised center of the bull-ring holes are drilled of any desired shape and size. These perforations preferably overlap, that the wear on the bearing-face of the bull-ring may be equalized. The function of these perforations will be explained later. Grooves 3 3 and 3 3 are turned clear around the bull-ring 2 on both sides of and at the base of its raised center. These grooves are best seen in Fig. 5. The perforations on the lower half, or nearly all the lower half, of the bull-ring 2 communicate with these grooves 3 3 and 3 3 by means of the oblique channels 4 4. (Seen in Fig. 5.) Cross-grooves 10 are also cut at regular intervals in the circumference of the bull-ring and on either side thereof, as shown in Fig. 5. Packing-rings 5 5 and 6 6 are loosely fitted over the bull-ring. They are free to move up and down and therefore slightly from right to left. These packings are also perforated and desirably with overlapping holes for equalization of wear. The number, size, shape, and relative position of the holes may be varied as circumstances demand. To insure a proper distribution of steam to these perforations in the packings, I turn a series of inner circumferential grooves in the rings, as clearly seen at 7 7 7 in Fig. 5.

Fig. 3 shows similar packing-rings used with a spring-ring, 12. This spring-ring is perforated at suitable intervals to make connection with the grooves of the packing-rings. It is of course indifferent whether the grooves are turned in the packings or in the bull-ring. It is apparent also that the grooves and perforations heretofore mentioned may be cast, if wished.

The action of the steam on the packing-rings in my device will be as follows: As the packing-rings 5 5 and 6 6 do not fit closely against the angle of the piston-head 1, or against the follower 8, the leakage steam will pass down beneath the packings, and will then be distributed by the grooves and cross-grooves to the holes in the packings, so that the pressure on the inside and outside of the packing-rings will be nearly equalized, effectually preventing the packing from binding in the cylinder from an unrelieved pressure on the in-

side of the packing, which frequently occurs in the use of the ordinary packing. Moreover, the outer surface of the packing will be uniformly lubricated to a certain degree. It is apparent that the same effect will be produced when the packing-rings are used with the spring-ring 12. (Shown in Fig. 3.)

The action of the steam on the bull-ring will be as follows: Since the perforations in the upper half of the bull-ring are not drilled through to the distributing-grooves, these perforations will act simply as lubricating-pockets to receive and give out the leakage-steam, which may enter them from the packing-rings on either side.

The perforations on the lower half of the bull-ring being in communication with the steam-distributing channels 3 3 and 3 3 perform the important and novel function of discharging steam into the perforations in the lower half of the bull-ring, which will there generate a pressure tending to float the piston-head and prevent excessive wear of the seat and head. In other words, the piston is supported, raised, or buoyed up by the steam-pressure beneath it. The various distributing-grooves may be omitted, but the stream will not then be so satisfactorily equalized. An additional advantage in the use of the perforations is that their area very considerably subtracts from the actual area of the bearing-surfaces, thus materially reducing the friction in the cylinder.

Having thus fully described my invention, I claim—

1. Metallic packing-rings having rows of independent perforations drilled therein to reduce the bearing-surface of said packing-rings and to equalize the steam-pressure on the outer and inner surfaces of said rings, all substantially as and for the purposes described.

2. The combination of metallic packing-rings having rows of independent perforations drilled therein, and a perforated spring-ring, all substantially as and for the purposes described.

3. A bull-ring having pockets drilled in its upper and outer semi-circumference and perforations in its lower semi-circumference, extending from steam-distributing grooves to the exterior of the bull-ring, all substantially as and for the purposes described.

In testimony whereof I have hereunto set my hand.

CHARLES ROGERS.

Witnesses:

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