No. 793,973. PATENTED JULY 4, 1905.

E. T. WHITE.

PISTON AND METALLIC PACKING THEREFOR.

APPLICATION FILED APR. 5, 1905.

Fig. 2.

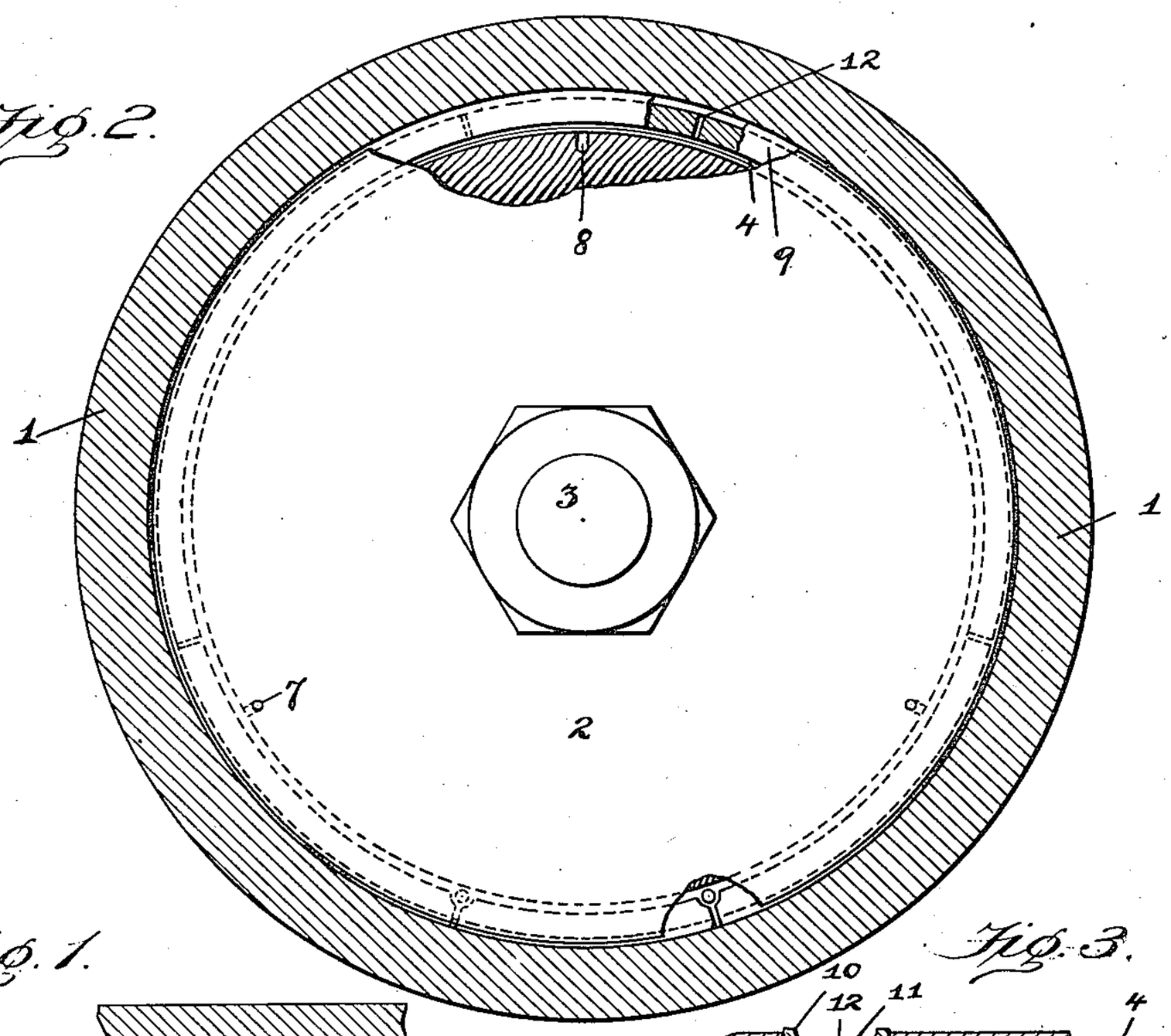


Fig. 1.

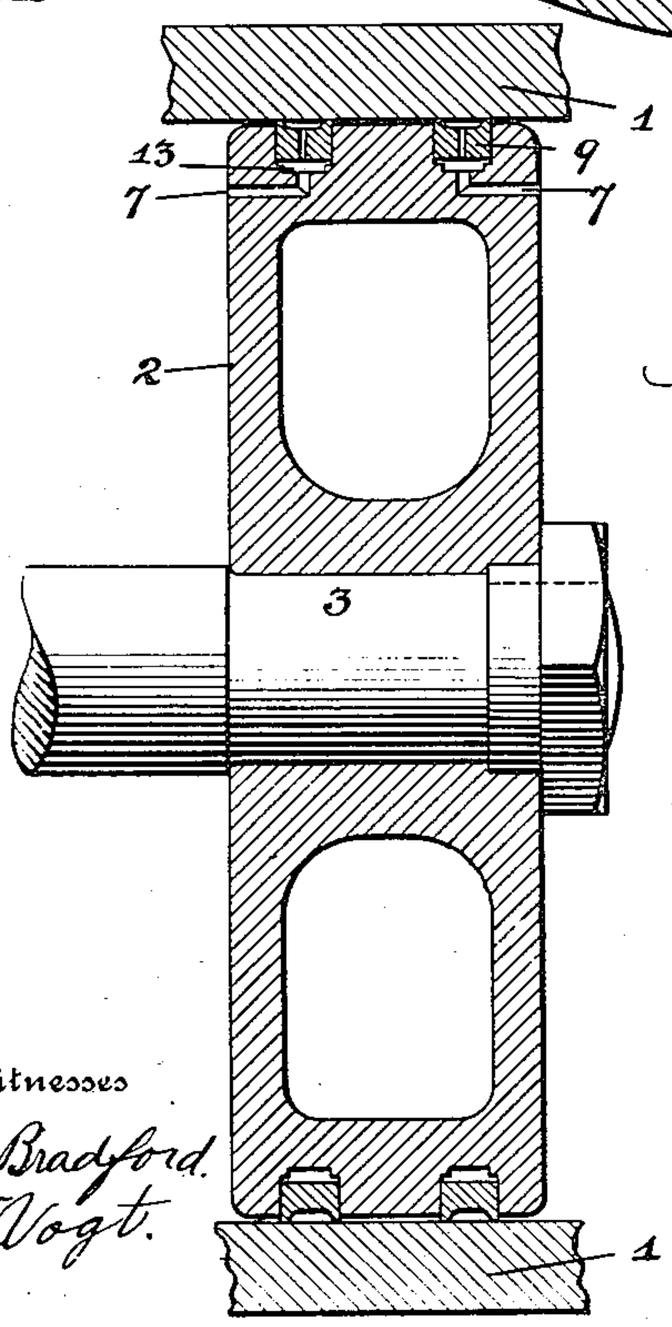


Fig. 3.

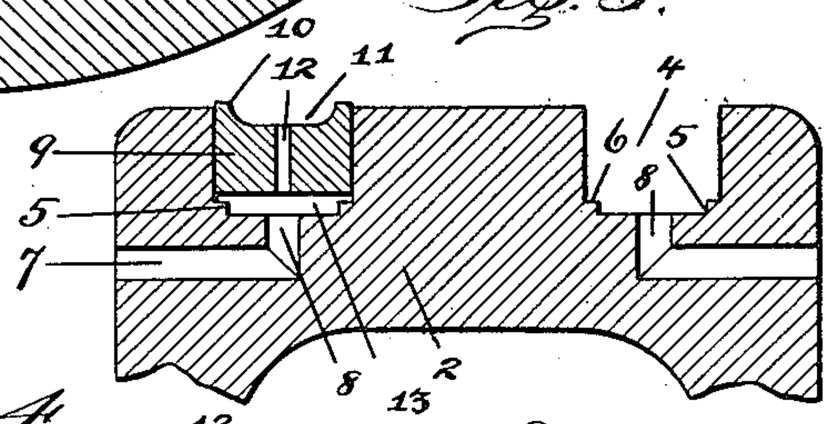
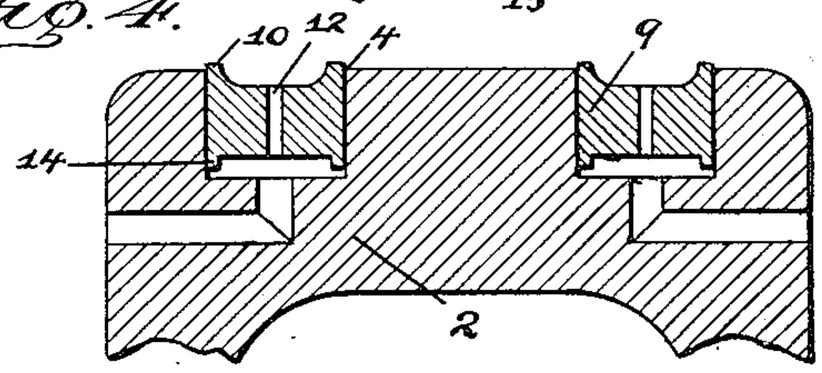


Fig. 4.



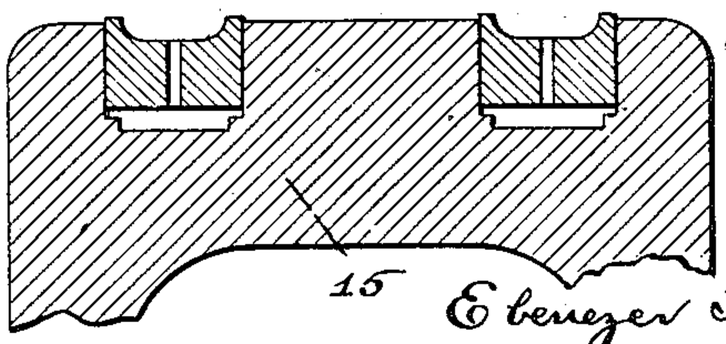


Fig. 5.

Witnesses

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No. 793,973. Patented July 4, 1905.

UNITED STATES PATENT OFFICE.

EBENEZER T. WHITE, OF BALTIMORE, MARYLAND.

PISTON AND METALLIC PACKING THEREFOR.

SPECIFICATION forming part of Letters Patent No. 793,973, dated July 4, 1905.

Application filed April 5, 1905. Serial No. 253,946.

To all whom it may concern:

Be it known that I, EBENEZER T. WHITE, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Pistons and Metallic Packings Therefor, of which the following is a specification.

This invention relates to improvements in pistons and metallic packings therefor.

The object of the invention is to provide a construction whereby the steam-pressure may act on both sides of the ring and prevent excessive frictional pressure of the ring against the cylinder.

It is desirable to use packing-rings of sufficient width and thickness to prevent breakage of the rings; but in increasing the width of the ring the frictional contact and wear on the cylinder is proportionately increased and a greater proportion of the power developed in the cylinder is absorbed by this frictional resistance.

By my invention I employ a packing-ring of increased width without increasing the frictional resistance, because I partially equalize or balance the pressure on both sides of the ring, and a tight packing in the cylinder, with a minimum frictional resistance, thereby reducing the rapid wear on cylinders that takes place on packing where high steam-pressures are used, and thus prolonging the life of both the cylinder and the packing and permitting the power now absorbed in the cylinder by this frictional resistance to be utilized in increasing the work done by the engine.

The accompanying drawings illustrate the invention, in which—

Figure 1 shows a sectional view of portions of a cylinder provided with a piston having my improved features. Fig. 2 illustrates a front elevation of the piston and a sectional view of the cylinder inclosing it. Fig. 3 is a detail sectional view, on an enlarged scale, of a portion of the piston and packing-rings; and Figs. 4 and 5 illustrate modified forms of devices.

Referring to the drawings, Figs. 1, 2, and 3, the numeral 1 designates the cylinder, 2 the piston, and 3 the piston-stem. The piston-head is provided with one or more annular or circumferential channels 4, and at the base and each side of said channels the head is provided with annular shoulders 5, which form a seat 6. This head is also provided with one or more ports 7, which extend from the sides of the head to a point below the channels 4, and ports 8 establish communication between the side ports 7 and the channels 4. Thus it will be seen that the head is provided with openings or passages which extend from the side to the annular channels. A metallic packing-ring 9 is fitted in each of the circumferential channels, and said rings are provided at opposite edges of their outer contact-faces with outwardly-projecting contact-flanges 10, and also on the outer faces the rings are provided with a central annular steam-space 11. A plural number of ports 12 are also provided in the ring, and said ports extend radially through the center of the rings from the steam-space 11 at the outer side of the ring to the contracted space 13, formed between the shoulders 5 at the inner side of the rings and in a plane coincident with the ports 8 in the piston-head. It will thus be seen that a steam-space is provided on opposite sides of the packing-rings and that the ports 12 establish communication between said steam-spaces.

Referring to Fig. 4, it will be seen that the invention is readily susceptible of modification by providing the inner side of the rings with shoulders 14 instead of the shoulders 5 in the channels 4 of the head, and by reference to Fig. 5 another modification is illustrated, in that the piston-head 15 has no side ports 7 and lateral ports 8, in which case the steam that would ordinarily pass around the ring will act on opposite sides of the latter, and thus reduce the frictional contact between the rings and cylinder.

It is to be understood that in practice the steam will pass through the side ports 7 of the piston-head, then through lateral ports 8 into the reduced or contracted steam-space 13 at the inner side of the ring, then through the ports 12 in the rings to the outer central steam-space 11 between the two side flanges 10. By this arrangement steam-pressure is applied to the rings at opposite sides, so that the pres-

sure at the outer side of the rings will counteract to a considerable degree the pressure on the inner side, and thus reduce the excessive contact-pressure of the ring against the cylinder.

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

1. The combination of a piston-head having a circumferential channel; a packing-ring in said channel having two exterior flanges, 10, forming a central circumferential exterior steam-space, 11; mechanical means for keeping the said ring spaced from the bottom of the channel to form on the inner side of the ring a steam-space, 13, and ports through the ring to establish communication between said exterior and inner annular spaces, whereby a packing-ring of maximum width may be employed without increase of frictional resistance of the ring against the cylinder.

2. A piston-head having a circumferential channel and ports leading from the side of the head and opening into said channel, said ring having an exterior flange at each side and an annular exterior steam-space between said side flanges and also having one or more ports extending from the central exterior annular steam-space to the inner side of the ring.

3. A piston-head having a circumferential channel with annular shoulders in said channel and ports leading from said channel to the side of the head, a packing-ring fitting in said channel and having an annular exterior central steam-space with a flange at each side thereof and also having ports leading from said exterior steam-space to the inner side of the ring.

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

EBENEZER T. WHITE.

Witnesses:

CHARLES B. MANN, Jr.,

FELIX R. SULLIVAN.