

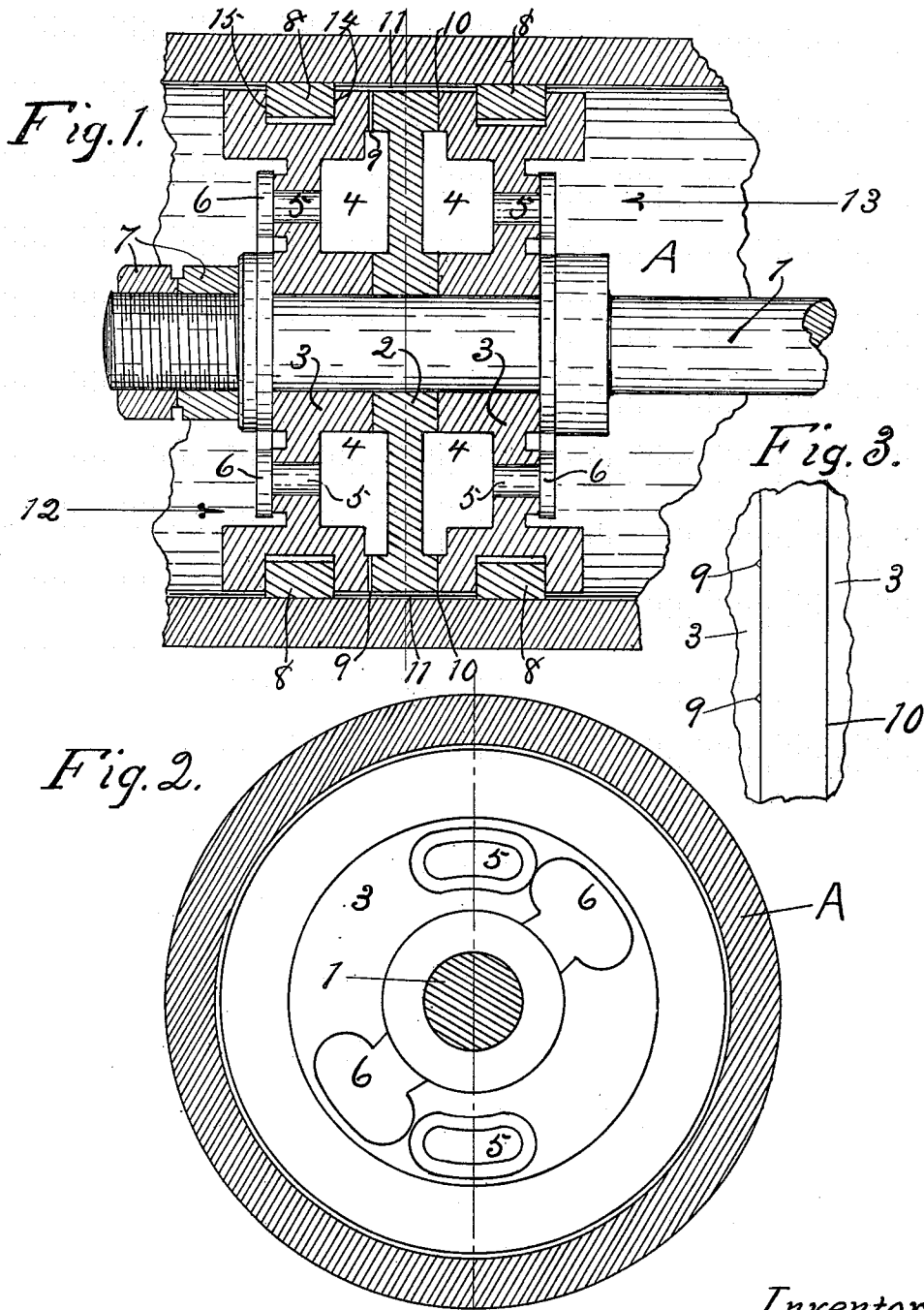
No. 615,183.

Patented Nov. 29, 1898.

J. IMLER.
STEAM PISTON HEAD.

(Application filed Apr. 4, 1898.)

(No Model.)



Witnesses.

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UNITED STATES PATENT OFFICE.

JOSEPH IMLER, OF KENDALLVILLE, INDIANA.

STEAM PISTON-HEAD.

SPECIFICATION forming part of Letters Patent No. 615,183, dated November 29, 1898.

Application filed April 4, 1898. Serial No. 676,410. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH IMLER, a citizen of the United States, residing at Kendallville, in the county of Noble and State of Indiana, have invented a new and useful Antifriction Piston-Head, of which the following is a specification.

My invention relates to improvements in a piston-head in which certain departures are made, greatly enhancing its effectiveness; and the objects of my improvement are, first, to make it lighter; second, to secure greater power by decreasing the friction; third, to obtain balanced piston-rings; fourth, to produce an adjustable slide to introduce as much or as little steam, gas, or air into the piston-head as desired, and, fifth, to prevent undue wear by reducing friction, &c. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a cross-section of the piston-head. Fig. 2 is a front view from the stem or piston side. Fig. 3 is a detailed view of a part of the face of the central part or diaphragm 2.

Similar letters and figures refer to similar parts throughout the several views.

Within the cylinder A the piston-head is mounted upon the piston-rod 1, which, in turn, may be attached to a crank or other means of transmitting power to turn wheels, or otherwise, outside of the cylinder.

In the central part of the piston-head is an imperforate diaphragm or partition 2, which separates the two heads 3 3, and through which latter are openings 5 5 5 5 for the admission of steam, gas, or air into chambers 4 4, which in turn are connected with small passages 11 11 around the head between the rings 8 8 8 8 by the seams or openings 9 10 9 10 for the purposes hereinafter described. Slides or gates 6 6 are mounted upon the piston-rod, and these, with the central diaphragm 2 and heads 3 3, are firmly bound together upon the piston-rod by the lock-nuts 7 7.

In operation the steam or gas, upon entering the cylinder A through the properly-provided port-holes, as usually found, acts alternately upon each head 3 3 of the piston by a suitably-provided shift-valve in the steam-chest or other receptacle and drives the piston from one end of the cylinder A to the

other and back again. Supposing the piston to be driven in the direction 12, (to the right,) the steam or gas will also enter the ports 5 5 on that side of the piston and fill the chamber 4 and pass through the apertures 9 9 into the space 11. This is equally true whether 9 is an aperture, as in Fig. 3, or a rough seam, as at 10, same figure, because the elastic force of the steam or gas in 4 forces the seam apart sufficiently to fill the space 11. The latter is the preferable mode of construction and in practice supplies a sufficient quantity of steam or gas. The object of introducing steam into space 11 is twofold—to form a cushion and thus secure an easier motion, and also to balance the piston-ring 8 by placing the same force on both sides 14 15 when the piston is moving before the live steam. When the steam or piston is traveling to the right or direction 12, as in the ordinary method of construction, the great force is upon side 15 of the ring, forcing it tightly against shoulder 14. While the exhaust is taking place upon the opposite side of the piston, there is practically no pressure of steam in the chamber 4 upon the exhaust side, and the live steam then simply serves to press the ring 8 through the chamber 11 tightly against the outer side of the groove in which it is placed, thus bringing practically all of the work upon a single ring at a time. The great pressure of the steam is thus brought to bear alternately upon the rings, and as only one ring at a time is brought into use a much less amount of friction is brought to bear upon the inner side of the cylinder. So long as one of the rings does not allow the steam to pass around it one ring at a time receiving the full pressure of the steam answers every purpose. By my invention the rings are put in equilibrium, the same force being on both sides. Especially when the cylinder becomes worn or is untrue the rings play up and down in the grooves, and all engineers are aware that it takes several pounds of steam to move the piston because of the friction created. In my invention by balancing the rings and supplying a cushion between them the friction is reduced to a minimum and much power saved, which by the old way is spent in overcoming the resistance of the cylinder. Again, as balancing the valve in the steam-chest re-

- lieves the friction so it does by balancing the rings 8 8, and, further, by reducing the friction the wear is equally reduced both on the rings and the internal surface of the cylinder.
- 5 Actual experimental tests have made this conclusive; but it has been found necessary in order to secure the best results to regulate the introduction of steam, gas, or air through the openings 5 5 by means of an adjustable slide
- 10 6. This is accomplished by liberating lock-nuts 7 and then rotating slide 6 upon piston-rod 1 until opening 5 is sufficiently large or small to secure best results, then locking nuts again. By this method of construction another beneficial result is obtained—viz., the
- 15 piston-head is kept much hotter, and, proportionately, condensation of steam in particular is prevented by a hollow piston-head.
- Actual experiment has proven that the
- 20 chamber 4 is always dry and any condensation that may take place is in the open space 11, which being filled with steam and water acts as a lubricator for the rings as well as a cushion or balance to the rings.
- 25 As I have explained, the above is my preferable mode of construction, and there may be any number of rings 8, or any number of chambers 4, or any number or size of openings 5.
- 30 I am aware that prior to my invention piston-heads have been made of great diversity in shapes and arrangements. I therefore do not claim such a device broadly; but
- What I do claim as my invention, and desire to secure by Letters Patent, is—
- 35 1. In a piston, two grooved heads, packing-rings placed in said grooves, the piston-rod to which the heads are secured, and a diaphragm which is located between the two

heads which are recessed upon their inner 40 sides so as to form steam-chambers, combined with a valve which is secured to the piston-rod, and which valve has a slightly-turning movement so as to adjust the amount of steam admitted to the chambers, there being suitable openings or passages for the outward passage of steam between the heads and the central diaphragm so as to permit the space or chamber formed between the cylinder and diaphragm and the heads to be filled with steam, 50 substantially as shown.

2. In a piston, two grooved internally-chambered heads of less diameter than the cylinder, suitable packing-rings placed in the grooves, and the diaphragm placed between the two 55 heads and also of less diameter than the cylinder, there being suitable openings between the heads and the diaphragm to permit of the outward passage of steam from the chamber that is formed between the heads and the 60 diaphragm, and the cylinder, combined with suitable valves for controlling the openings leading into the chambers formed inside of the head, substantially as set forth.

3. The combination with the heads having 65 annular grooves for packing-rings, of covers 6, the passages 5, the chambers 4, the passages 9, the space 11, the central diaphragm 2, the rod 1, and means for holding all of said parts fixedly together in proper position, substantially as specified. 70

In testimony that I claim the foregoing as my invention I have signed my name in the presence of two subscribing witnesses.

JOSEPH IMLER.

Witnesses:

J. E. NEFF,
A. C. NORTH.