(No Model.)

F. McFADDEN.

PISTON.

No. 260,308. Patented June 27, 1882.

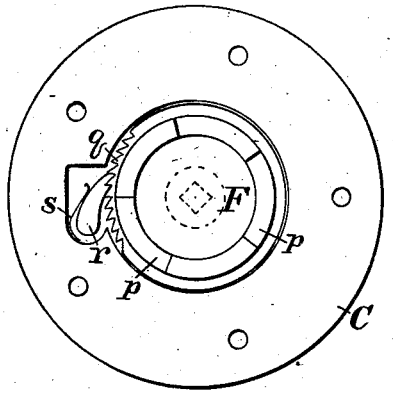

Fig. 2.

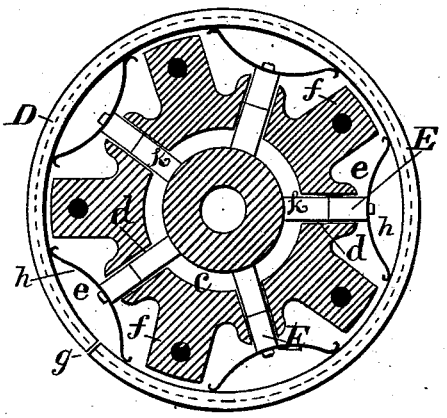

Fig. 1.

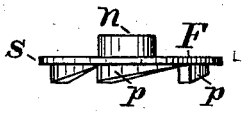

Fig. 4.

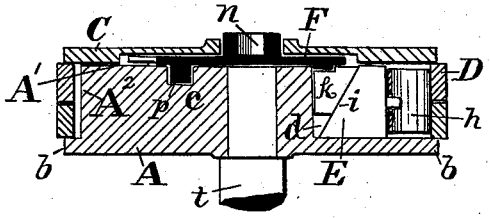

Fig. 3.

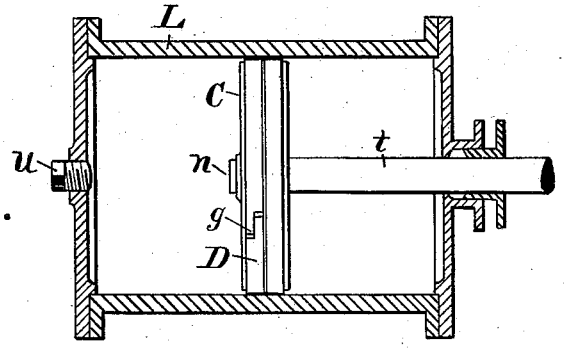

Fig. 5.

Witnesses:
John E. Morris
Geo. A. Boyden.

Inventor:
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By his Atty
Chas B. Mann

UNITED STATES PATENT OFFICE.

FRANCIS McFADDEN, OF BALTIMORE, MARYLAND, ASSIGNOR OF ONE-HALF TO ROBERT RYNEHART, OF SAME PLACE.

PISTON.

SPECIFICATION forming part of Letters Patent No. 260,303, dated June 27, 1882.

Application filed April 20, 1882. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS McFADDEN, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Pistons, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to certain improvements in pistons, and will first be described, and then designated in the claims.

In the drawings hereto annexed, Figure 1 is a view of the piston, the "follower" side being removed. Fig. 2 is an inner side view of the follower, showing the segment shape of the depressors. Fig. 3 is a diametrical section of the piston. Fig. 4 is a side view of the adjusting-hub. Fig. 5 is a sectional view of a cylinder containing the piston.

The letter A designates the head, having a flange, *b*, on one side of its rim. This head serves as one side of the piston.

C is the follower or opposite side of the piston, and its rim constitutes the other flange of the piston. Between the flanges of the two sides are the packing-rings D.

The inner face of the head is provided with an annular groove, *c*, concentric with the axis of the head. In practice the dimension, measuring diametrically from side to side of the groove, should be about one-third that of the piston. For an ordinary-sized piston—say from six to twelve inches in diameter—the annular groove would have a depth of about a quarter of an inch.

Extending outward from the innermost side of the annular groove are radial grooves *d*, in the present instance five in number. These radial grooves have a depth from the face A' to a plane coincident with the flange *b*. That part of the head which constitutes the periphery A^2 on the inner side of the flange *b* has a recess, *e*, at the end of the radial groove. That part *f* of the metal between the recesses is left intact or projecting to the periphery.

The metal packing-rings D are between the two peripheral flanges, and said rings are cut, as shown at *g*, to permit of their expansion. A bar, E, is fitted to slide in each of the radial grooves, and the outermost end of each bar is connected to a half-elliptic shape spring, *h*, whose two ends bear against the inner side of the packing-rings and keep them expanded.

One side of each radially-sliding bar is in contact with the follower-plate, and said side is shorter than the opposite side. This difference in the length of the two sides arises from the fact that the innermost end of the sliding bars is beveled or inclined, as at *i*. A wedge, *k*, occupies the innermost end of each radial groove and rests upon the inclined end of the sliding bar. The wedge is capable of moving in the direction of a line extending straight through the piston parallel with the piston-rod. Upon the wedge being forced in this direction the bar E moves outward and causes the spring to press against and expand the rings. An adjusting-hub consists of a circular plate, F, having on the outer flat side a central boss with a square socket, *n*, into which a key may be inserted for turning the hub. On the inner flat side of the circular plate, and near the rim, are segment or curve shaped inclines *p*, five in number, to correspond with the same number of sliding bars and wedges. Any one of the bars E may have the inclined end and the wedge which bears against it so varied in inclination that the partial turn of the hub will move some of the radial bars E outward more than others. Thereby, if desired, when the cylinder has become worn on one side, the packing may be adjusted outward on that side more than elsewhere. The inclined depressors have a segmental or curved shape, as seen in Fig. 2, and are thereby adapted to occupy the annular groove *c* in the head. The rim of the circular plate is provided with ratchet-teeth *q*.

The follower or side C of the piston has a central opening, through which the boss of the adjusting-hub projects. Upon the inner side or face of the follower, around the central opening, is a recess capable of receiving the circular plate F, as seen in Fig. 3, and a smaller recess at one side contains a pawl, *r*, against which bears a spring, *s*. The pawl engages with the ratchet-teeth on the rim of the circular plate, and holds the adjusting-hub from turning back and prevents the contraction of the rings.

All the parts here described are shown in

their respective positions in Fig. 3. It will be seen that the inclined face of each depressor *p* rests upon the large end of one of the wedges *k*. The least partial turn of the hub—that is, a turn sufficient to pass one of the ratchet-teeth on the pawl—causes the inclined face of the depressor to move over the end of the wedge, and has the effect to depress the wedge into the radial groove *d*, and by causing said wedge to press against the inclined end of the bar E the latter is moved outward and presses the spring *h*, which is at its outermost end, against the packing-rings D, thus causing them to expand against the inner wall of the cylinder. The expansion of the packing-rings is thus effected by the combination of devices herein described.

The construction here described as applied for the expansion of the packing-rings of a steam-piston may also be utilized in water suction or forcing apparatus.

In Fig. 5 a sectional view of a cylinder is shown containing my improved piston.

The letter L designates the cylinder, D the packing-rings of the piston, and *t* the piston-rod. The head of the cylinder has a central hole closed by a cap or screw-plug, *u*. By removing this plug a key may be entered through the central hole, and the adjusting-hub on the piston may thereby be turned to expand the packing-rings without removing the cylinder-head. The arrangement, therefore, of the piston having an adjusting-hub with a socket or equivalent means adapted for the attachment of a key, and the central hole in the cylinder-head for the entrance of the said key, enables the packing-rings of the piston to be adjusted without delay or inconvenience.

The adjusting-hub F of applicant and the ratchet-tooth *q* on its circular plate fit into and occupy a recess on the inner side of the follower-plate C, while a pawl, *r*, and spring *s* occupy a recess also on the inner side of the plate C.

Having described my invention, I claim and desire to secure by Letters Patent of the United States—

A piston consisting of a flanged head provided with an annular groove concentric with its axis, and with radial grooves extending outward from the annular groove, a follower, a series of expansible packing-rings between the head and follower, laterally-sliding bars within the radial grooves, springs interposed between the sliding bars and packing-rings, a circular plate between the head and follower, provided with a central boss adapted to receive a wrench or key, and with a series of circularly-arranged downwardly-projecting inclined lugs or teeth, a series of wedges interposed between the circular plate and the laterally-sliding bars, and a ratchet mechanism for retaining the circular plate, substantially as described.

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

FRANCIS McFADDEN.

Witnesses:
JNO. T. MADDOX,
WM. H. RYNEHART.