No. 859,328. PATENTED JULY 9, 1907.

C. P. McMULLEN.

PISTON PACKING.

APPLICATION FILED DEC. 12, 1906.

Fig. 1.

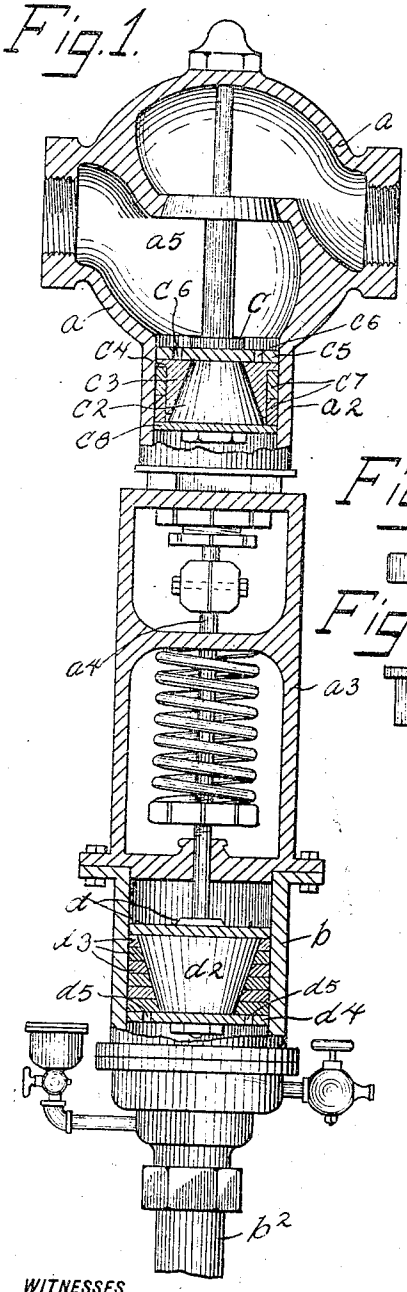


Fig. 2.

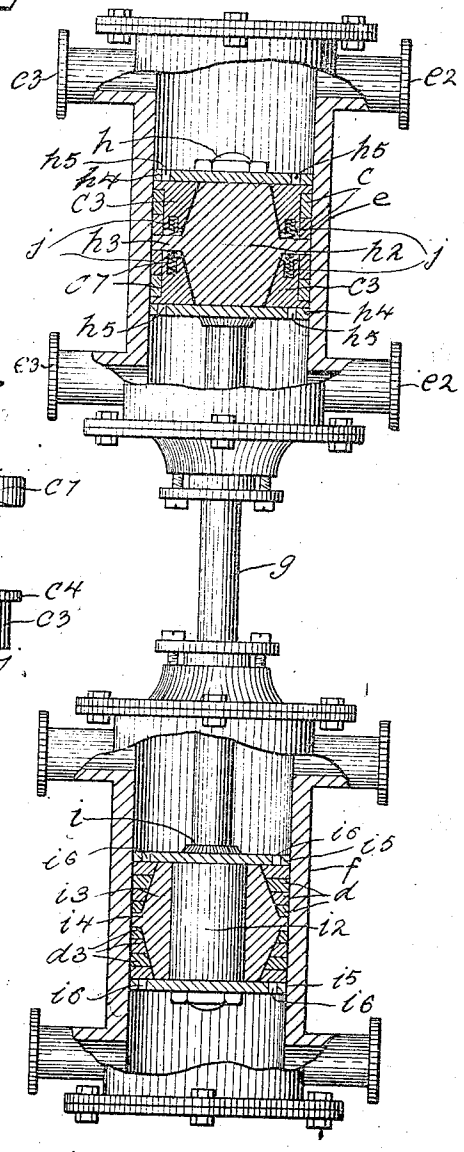


Fig. 3.

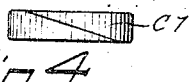
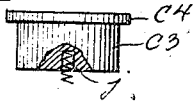


Fig. 4.



WITNESSES

Albert W. Gitts.

E. E. Mulvany

INVENTOR

Charles P. McMullen.

BY Edgar Tate & Co

ATTORNEYS

UNITED STATES PATENT OFFICE.

CHARLES P. McMULLEN, OF BROOKLYN, NEW YORK

PISTON-PACKING.

No. 859,328. Specification of Letters Patent. Patented July 9, 1907.

Application filed December 12, 1906. Serial No. 347,395.

To all whom it may concern:

Be it known that I, CHARLES P. McMULLEN, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Piston-Packings, of which the following is a specification, such as will enable those skilled in the art to which it appertains to make and use the same.

This invention relates to means for packing pistons used in steam, hydraulic or similar apparatus, and the object thereof is to provide improved packings for pistons of this class which are operated and made effectual by pressure applied to the pressure end or ends of the piston, said pressure being applied by means of steam, water, or other substance on or in connection with which the piston operates.

The invention is fully disclosed in the following specification, of which the accompanying drawing forms a part, in which the separate parts of my improvement are designated by suitable reference characters in each of the views, and in which:—

Figure 1 is a sectional elevation of a part of an automatic pump governor having two pistons provided with different forms of my improved packing and one of which operates in a steam and the other in a hydraulic cylinder; Fig. 2 a similar view of a part of a pump apparatus comprising a steam and a hydraulic cylinder having connected pistons showing different forms of my improved packing; Fig. 3 a side view of a packing ring which I employ; and, Fig. 4 a similar view of a piston ring in connection with which the packing ring is employed.

In Fig. 1 of the drawing, I have shown a part of what is known as the "Ideal" pump governor comprising a steam throttle valve casing a and a hydraulic cylinder b. The valve casing a is provided with a cylinder a^2, and connected with the end of the hydraulic cylinder b opposite the valve casing a is a water supply pipe b^2. The parts of this device above described are connected by a central frame a^3 through which is passed a piston and valve rod a^4, and the piston and valve rod a^4 within the cylinder a^2 is provided with a piston c, and said piston and valve rod within the hydraulic cylinder b is provided with a piston d. The piston c comprises a conical body portion c^2 on which is mounted a conically tapered ring c^3 having a flange c^4 on the end thereof adjacent to the valve casing a, and the ring c^3, a side view of which is given in Fig. 4, is held in place by a plate c^5 provided with ports or passages c^6 through which pressure of the steam is applied to the ring c^3. Mounted on the ring c^3 are packing rings c^7 of ordinary form, and one of which is shown in Fig. 3, said rings being of the ordinary split ring type, and the piston is provided at the end thereof opposite the plates c^5 with another plate c^8 by which the rings c^7 are held in position. With this form of packing, at each movement of the piston in the direction of the valve casing chamber a^5, the pressure of the steam passes through the ports or passages c^6 and forces the ring c in the direction of the opposite end of the piston, and this operation of said ring expands the packing rings c^7 as will be readily understood, and when the piston c moves in the opposite direction the expansion of the ring c^7 is released to a slight extent which enables the piston to move more freely in said direction.

The piston d, within the hydraulic cylinder b, comprises a hollow conical body portion d^2 on which are placed packing rings d^3 composed of fibrous material, said packing rings being shaped in cross section to correspond with the conical body portion d^2 of the piston, the smaller end of which is directed toward the water supply pipe b^2 and the packing rings d^3 are held in place by a plate d^4 at said end of said piston, and said plate is provided with ports or passages d^4 through which pressure is applied to the packing rings d^3, and in this operation said packing rings are compressed and expanded laterally and this causes a tight packing and tight fit of the piston in the cylinder when said piston is moved in the direction of the water supply pipe b^2, but when said piston moves in the opposite direction the pressure on the packing rings d^3 is relieved to an extent as is also the expansion thereof and the pistod d moves more easily and freely.

The other features of the construction shown in Fig. 1 form no part of my invention and are not described, but said features of construction are well known in automatic steam pump governors and especially in the "Ideal" governor hereinbefore referred to.

In Fig. 2, I have shown the cylinders of a pump, e being a steam cylinder and f a water or hydraulic cylinder, and these cylinders are provided with a piston rod g the end of which within the steam cylinder e is provided with a piston h and the other end within the hydraulic cylinder f with a piston i. The piston h comprises a body portion h^2 conically tapered at both ends and provided centrally with an annular flange h^3, and on each end of the body portion h^2 is a conically tapered ring c^3 similar to that shown in Fig. 1, and on each of the rings c^3 are placed packing rings c^7 similar to those shown in Fig. 1. At each end of the piston h is a plate h^4 provided with ports or passages h^5. The cylinder e is also provided at each end with a steam inlet e^2 and a steam exhaust e^3, and in the movement of the piston h toward either end of the cylinder the steam passes in through the ports or passages h^5 at the corresponding end of the piston, the corresponding ring c^6 is forced farther onto the body portion h^2 of the piston and the corresponding packing rings c^7 are expanded, this operation being the same as with the piston c shown in Fig. 1, ex-

cept that the piston *h* i a double ended piston and provided at both ends with the rings c^3 and packing rings c^7.

The piston *i*, in the hydraulic cylinder *f*, is a modified form of the piston *h* and comprises a cylindrical body portion i^2 on which is mounted a supplemental member or casing i^3 conically tapered at both ends and provided with a central annular flange i^4 and on the opposite ends of which packing rings d^3 similar to those shown in Fig. 1 are placed. The piston *i* is also provided at its opposite ends with plates i^5 having ports or passages i^6, and when said piston is moved toward either end of the cylinder the pressure in said end of the cylinder exerted through the ports or passages i^6 expands the packing rings d^3 on the corresponding end of the piston and causes the said rings to closely fit the cylinder, and when the piston moves in the opposite direction, this pressure on the said rings is released and the packing rings on the other end of the cylinder are compressed and expanded.

The packing rings c^7 are preferably composed of metal and the packing rings d^3 are composed of fibrous material and are not split rings.

The inner diameter of the piston rings c^3 is of slightly less dimensions than the outer diameter of the conical or tapered part of the body of the piston on which said rings are mounted and this allows of the slight movement of said rings necessary in the operations thereof as herein described, and in practice I also prefer to place between the inner ends of said rings and the flange h^3 spiral springs *j* which normally hold said rings at the limit of their outward movement, and while the springs *j* are only shown in Fig. 2 it will be understood that they may also be applied to the construction shown in Fig. 1, if desired.

In Fig. 2, I have not shown the means for controlling the inlet and exhaust of the steam and water to the cylinders *e* and *f* as they form no part of this invention which relates only to the means for packing the pistons. My improved means for packing a piston is not limited to the various forms of construction shown nor to any particular apparatus and the same may be employed in connection with steam, hydraulic or similar apparatus wherever used.

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

1. A piston, comprising a tapered body portion and end plates connected therewith, and compressible and expansible packing rings placed on said conical portion of the piston and tapered in cross section to correspond with the taper thereof, the end plate at the smaller end of the tapered portion of the piston being provided with ports or passages through which pressure from the cylinder in which the piston is placed is applied to the side face of the adjacent packing ring, and said packing rings being movable longitudinally of the piston and on the conical portion thereof.

2. A piston provided with a body portion which is tapered in both directions, end plates secured to said body portion and which substantially fit the cylinder in which the piston is placed, compressible and expansible packing rings placed on both ends of the tapered body portion of the piston, said rings being tapered in cross section to correspond with the taper at the opposite ends of the body portion of the piston and said end plates being provided with ports or passages through which pressure from the cylinder is applied to the side faces of the adjacent packing rings, and said packing rings being movable longitudinally of the piston and on the conical portion thereof:

3. A piston provided with a body portion which is tapered in both directions, end plates secured to said body portion and which substantially fit the cylinder in which the piston is placed, compressible and expansible packing rings placed on both ends of the tapered body portion of the piston, said rings being tapered in cross section to correspond with the taper at the opposite ends of the body portion of the piston, and said end plates being provided with ports or passages through which pressure from the cylinder is applied to the side faces of the adjacent packing rings, said packing rings being movable longitudinally of the piston and on the conical portion thereof, said tapered body portion of the cylinder being also provided centrally with an annular bead or flange by which the packing rings on the opposite end portions thereof are separated.

In testimony that I claim the foregoing as my invention I have signed my name in presence of the subscribing witnesses this 10th day of December 1906.

CHARLES P. McMULLEN.

Witnesses:
C. E. McILREANY,
ALBERT. W. GIBBS.