J. SHAW.

PISTON RING.

APPLICATION FILED NOV. 19, 1917.

1,292,101. Patented Jan. 21, 1919.

Fig. 1.

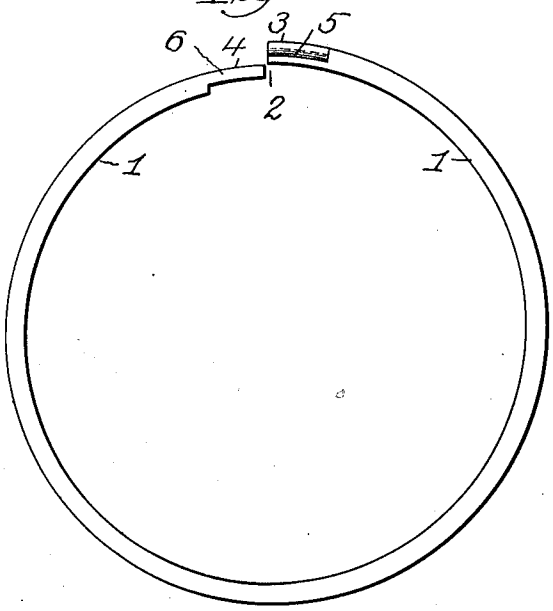


Fig. 3.

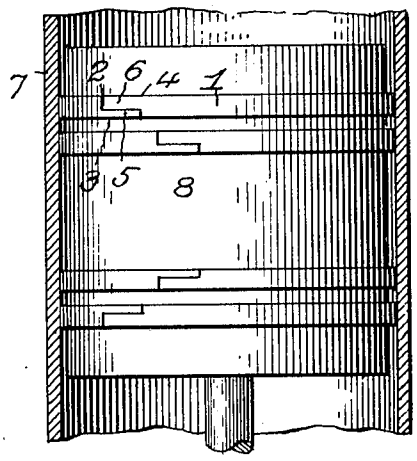


Fig. 2.

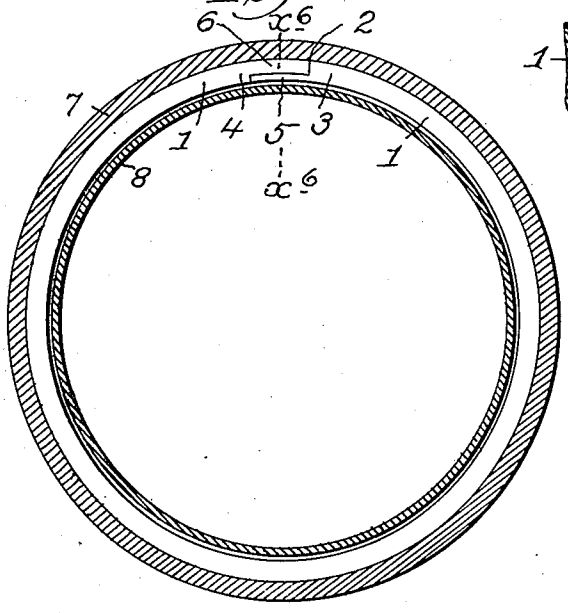


Fig. 4.

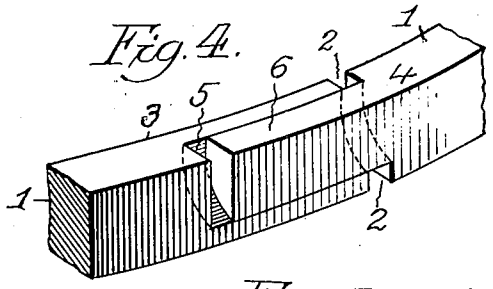


Fig. 5.

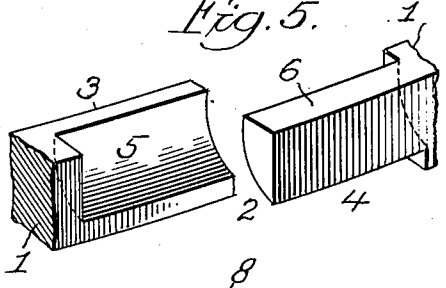
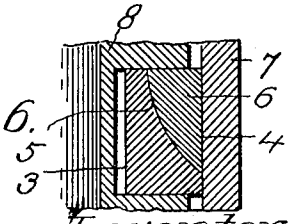


Fig. 6.



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UNITED STATES PATENT OFFICE.

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PISTON-RING.

1,292,101. Specification of Letters Patent. Patented Jan. 21, 1919.

Application filed November 19, 1917. Serial No. 202,687.

To all whom it may concern:

Be it known that I, JAMES SHAW, a citizen of the United States of America, and a resident of Chicago, in the county of Cook, State of Illinois, have invented certain new and useful Improvements in Piston-Rings, of which the following is a specification.

This invention relates to that type of single piece cast metal piston rings which rely upon the natural resiliency of the metal to maintain the ring in proper place and action after assemblage, and to which end the ring is made of an open or split shape with the ends formed for lapping interengagement, and the present improvement has for its object:—

To provide a simple and efficient structural formation of a piston ring of the type above mentioned, whereby an even and uniform expanding resiliency of the ring is attained, and with which a true circularity of the ring, when contracted to fit an engine piston and cylinder, is also attained, all as will hereinafter more fully appear.

In the accompanying drawing:—

Figure 1, is an elevation of the present ring structure in an uncontracted condition, after manufacture and before assemblage.

Fig. 2 is a transverse sectional elevation, illustrating the piston ring in its normal contracted condition and in assembled relation to the piston and cylinder of an engine.

Fig. 3, is a central sectional elevation illustrating an engine piston and cylinder provided with a plurality of the present piston rings.

Fig. 4, is a detail perspective view of the joint between the ring ends at the split separation of said ring, the parts being shown in the interengaged condition assumed in actual use.

Fig. 5, is a similar view, showing the parts in the disengaged condition of said parts after manufacture and previous to assemblage.

Fig. 6, is an enlarged section on line X^6—X^6, Fig. 2, of the piston, cylinder and the piston ring.

Like reference numerals indicate like parts in the several views.

Referring to the drawing, 1 designates the piston ring having the usual rectangular form in cross-section and formed with a single split or opening 2. The material part of the present improvement consists in making the aforesaid split or open piston ring 1 in the form of a flat spiral in which the distance from a central point increases progressively from the innermost to the outermost end of the ring as shown, and the subsequent interengagement of the respective ends of the ring by an inward springing of the initially outermost end and the engagement of the same inside the initially innermost end of the ring, the formation of the interengaging surfaces being such, that leakage of the motive fluid at such point is prevented, and preferably by a special formation of such ends or terminal portions as follows:—.

In the preferred construction of the aforesaid interengaging members or portions 3 and 4, shown in Figs. 4, 5 and 6 of the drawing, the member or portion 3 is formed by a cavity 5 in the perimeter of the ring member 1 and at an outer corner of the same, said cavity being preferably of a curved form in cross-section as shown, while the other member or portion 4 is formed by a tongue 6, of reduced dimensions, also formed at the perimeter of the ring member 1 and at an outer corner of the same, said tongue 6 having a cross-sectional formation adapted to fit and have movement in the cavity 5 above described.

With the present piston ring structure, as the spiral ring member 1, shown in Fig. 1, is contracted to fit the bore of the engine cylinder 7 with the respective end portions 3 and 4 in the inter-engaged condition above described. During such operation the ring 1 assumes a true circular shape corresponding with that of the bore of the engine cylinder 7, and owing to the described interengagement of the end or terminal portions of the piston ring, all expansion tendency of the ring is in a circumferential manner. In practice it has been found that such circumferential expansion maintains the piston ring in proper circular shape during the life of the ring, with an avoidance of undue friction and irregular wear of the engine cylinder usual to the ordinary single piece split expansion rings now in general use.

For efficient operation it is advisable that the side of the ring member 1 into which the cavity 5 opens, be arranged toward the direction of pressure stress in an engine cylinder, and where pressure stress prevails alternately in opposite directions in the en-

gine cylinder, a plurality of piston ring members 1 arranged in reversed order will be employed, as illustrated in Fig. 3.

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

1. An expansion piston ring, comprising a circumferentially separated annulus having an initial flat spiral formation with an inherent resilient tendency to circumferential expansion when contracted, said ring being provided with inter-engaging formations at the point of separation, which when the ring body is contracted to attain an inter-engagement of said formations and the placing in the bore of an engine cylinder, said inter-engaged formations in connection with the cylinder bore are adapted to hold the ring body to a circular form and impose circumferential expansion thereon under the inherent tendency of the ring body to return to its initial spiral form, substantially as set forth.

2. An expansion piston ring, comprising a circumferentially separated annulus having an initial flat spiral formation with an inherent resilient tendency to circumferential expansion when contracted, said ring being provided with inter-engaging formations at the point of separation, which when the ring body is contracted to attain an inter-engagement of said formations and the placing in the bore of an engine cylinder, said inter-engaged formation in connection with the cylinder bore are adapted to hold the ring body to a circular form and impose circumferential expansion thereon under the inherent tendency of the ring body to return to its initial spiral form, said inter-engaging formations comprising a curved peripheral cavity formed in an outer corner of the ring body and a reduced tongue of a size to fit said cavity, substantially as set forth.

Signed at Chicago, Illinois, this 14th day of November, 1917.

JAMES SHAW.