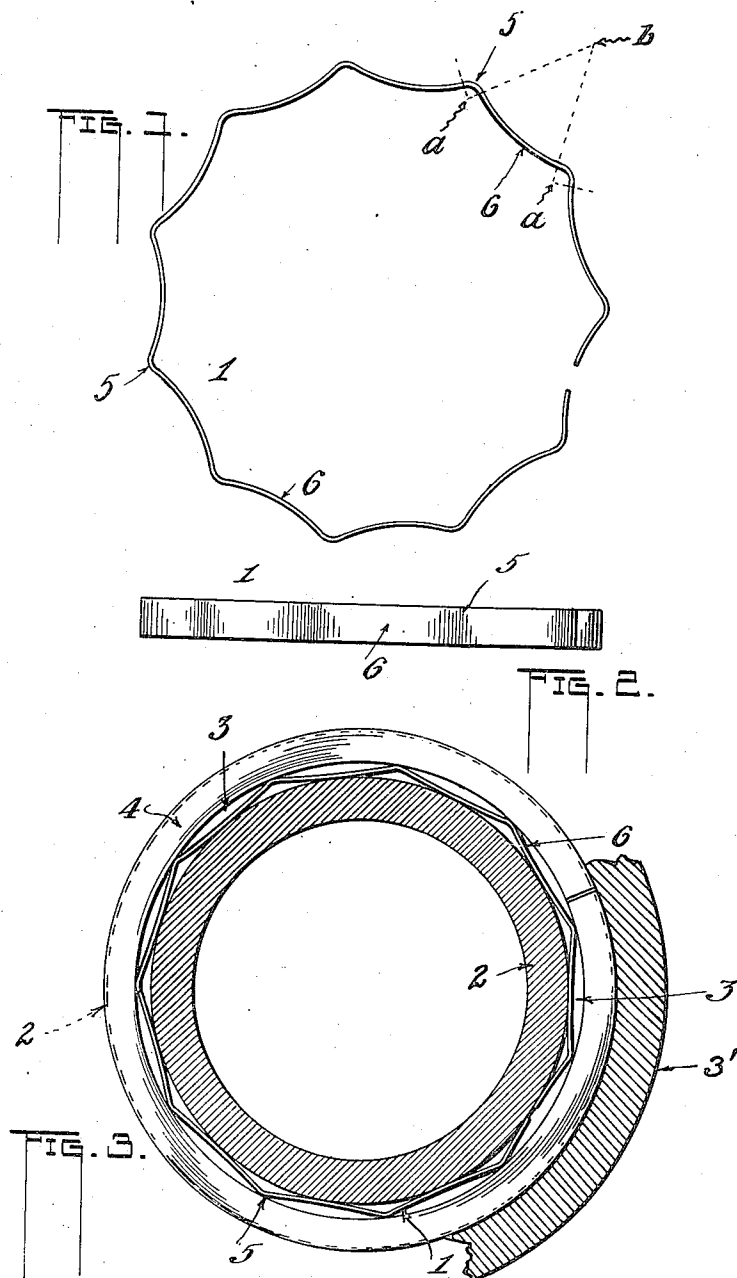


W. H. THOMSON.
CUSHION RING FOR EXPANDING GAS ENGINE PISTON RINGS.
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1,407,602.

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CUSHION RING FOR EXPANDING GAS-ENGINE PISTON RINGS.

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Specification of Letters Patent. Patented Feb. 21, 1922.

Application filed December 24, 1920. Serial No. 433,057.

To all whom it may concern:

Be it known that I, WILLIAM H. THOMSON, a citizen of the United States, residing at Peoria, in the county of Peoria and State of Illinois, have invented certain new and useful Improvements in Cushion Rings for Expanding Gas-Engine Piston Rings; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

This invention pertains to expansible rings adapted to have positions in the grooves of gas engine pistons behind their piston-rings for expanding the latter against the wall of cylinder.

The object of the invention is to construct a ring for this purpose of a form having certain advantages, to be pointed out herein, in centralizing the piston and preventing "piston-slap."

In the appended drawing,

Figure 1 is a plan of my new form of ring.

Figure 2 is a side elevation of the same, and

Figure 3 is a cross section of a piston and one of its rings showing my invention in position between the two in the usual ring-groove.

In said figures the numeral 1 designates the ring of my invention which consists, preferably, of a ribbon of steel of the desired gauge and width for the particular job to be equipped therewith.

2 indicates an engine piston provided with the customary groove 3 for receiving the ring 4, and 3' designates the engine cylinder.

The said ring is of a very special form, being constructed in a special machine, not shown, so constructed that the ring will be complete in the unsprung form shown in Figure 1, wherein, at substantially regular intervals throughout its circumference, is created a short bend 5 struck on a small arc described from a point *a* within the ring by which said bends are rounded at the outer side. The intermediate portions 6, or those lying between these bends 5, are struck on larger arcs described from points *b*, for example, said Figure 1, a ring thus being formed which is round in general contour, although it is created or made up of alternately short and long oppositely formed

bends merging into one another, making a ring substantially in the form of a polygon whose sides however are inwardly curved arcs with outwardly curved connecting corners.

In use, when introduced into the groove 3 between the ring 4 and the piston, the ring assumes a slightly different form, as shown in Figure 3, in that it is then exerting its force to spread the said ring 4 against the walls of the cylinder.

That is to say, the points or corners 5 bear against the piston-ring while the longer portions or sides 6 are partially straightened by being confined between the piston and the ring in the bottom of the groove 3, thus forming arcs of a longer curve.

The inwardly curved longer portions 6, being more flexible than the outwardly curved short bends 5, furnish resiliency though spreading the piston-ring 2 against the cylinder walls.

When placed in the groove 3, the combined portions 6, being straightened somewhat, as explained, serve to spread said ring, all of the bends 5 bearing against said ring and thus the centralizing of the piston must result. The tendency of the piston to slap is met by the more rigid bends 5, it will be seen. The greater this tendency is, due to greater lateral thrusts of the piston at times, the more will the portions 6 be flattened to, in effect fit about the curved wall of the latter with a consequent less yielding at the bends 5 preventing most effectively, all slap. In short, the portions 6 spread the ring 4 and the bends 5 prevent slap.

By making a device of this kind many sided, the piston in forming a backing therefor at a number of points with the short bends 5 engaging the piston-ring at as many points, the latter is spread uniformly and snugly against the cylinder walls and greater control in the prevention of piston slap is the result. And this is possible in the use of a metal of very light gauge when constructed as described where the space between the ring 2 and the piston wall within the groove 3 is necessarily limited.

If the portions 6 were straight between the corners or bends 5 their lengths would have to be greater than that shown in order to have a point of contact for and have control of the piston. There would be fewer bends 5 for a piston of a given size, in consequence, and a ribbon of heavier gauge

would be required to serve the purpose of a ribbon of the lighter gauge.

I claim:

1. A device for insertion in a piston-ring groove behind the piston ring consisting of a ribbon of spring metal substantially polygonal in form, whose sides or faces are arcs lying within the outermost boundary of the device, the same being described from positions outside the said boundary, the corners connecting such sides or faces being smaller arcs described from points within such boundary.
2. A device for insertion in a piston-ring groove behind the piston ring, consisting of a ribbon of spring metal, having substantially the form of a polygon, whose sides or faces are alternately inwardly and outwardly curved, the inwardly curved faces being longer than the outwardly curved ones, the curves of each being parts of circles whose radii are of different length.
3. A device for expanding a piston-ring consisting of a single ribbon of spring metal having substantially a polygonal form, alternately inwardly and outwardly curved, the inwardly curved portions being relatively long described from points far removed from the outward limits of the polygon, the outwardly curved portions being relatively shorter and described from points closely adjacent the inner limit of said polygon.

4. In combination with a piston and piston-ring, of an expanding device interposed between the two, comprising a ribbon of spring metal substantially polygonal in form having sides describing relatively long inwardly directed curves to lie against the piston, said sides being joined by outwardly curved relatively shorter portions adapted to engage the said ring.

5. An article of manufacture comprising a ribbon of spring metal having the general form of a polygon but whose sides are arcs inwardly curved, the corners of the polygon between the several inwardly curved sides being outwardly curved forming relatively smaller arcs constituting the outermost limit or greatest diameter of said polygon.

6. An article of manufacture comprising a ribbon of spring metal having the general form of a polygon, each of whose corners connecting the sides is rounded outwardly describing an arc struck from a point within the boundary of said polygon, each of the said sides having greater length between said corners than the length of the radius of any circle of which any one of the arcs is a part.

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

WILLIAM H. THOMSON.

Witnesses:

MABEL F. IRELAND,
L. M. THURLOW.