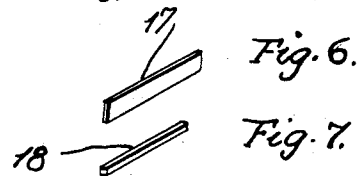
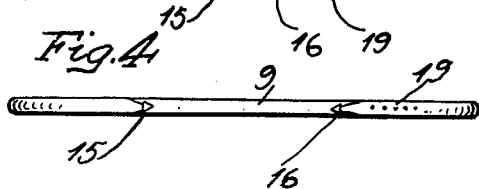
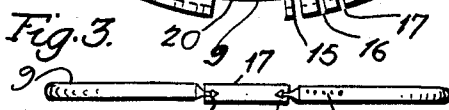
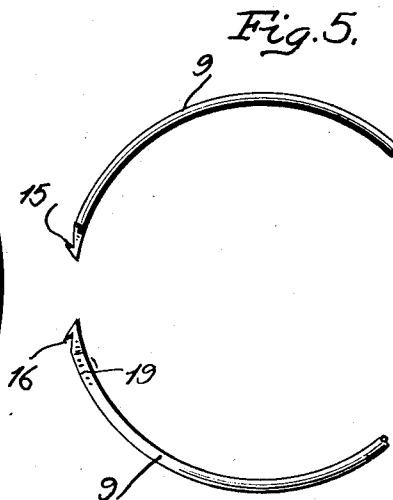
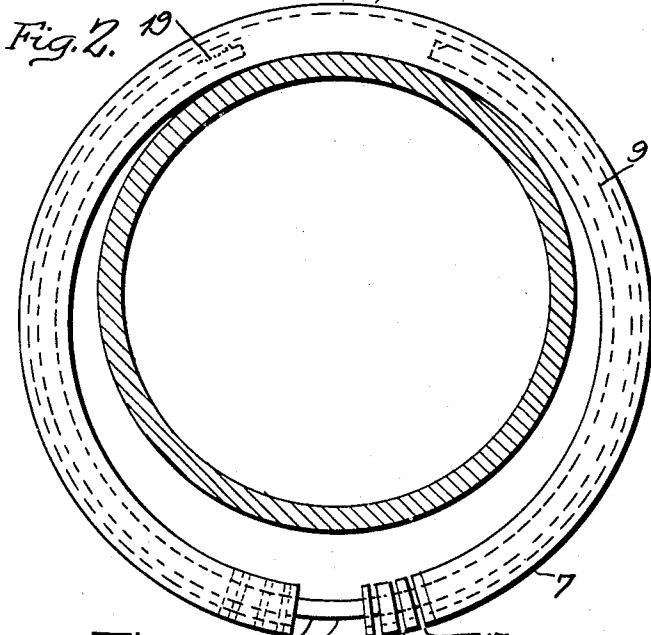
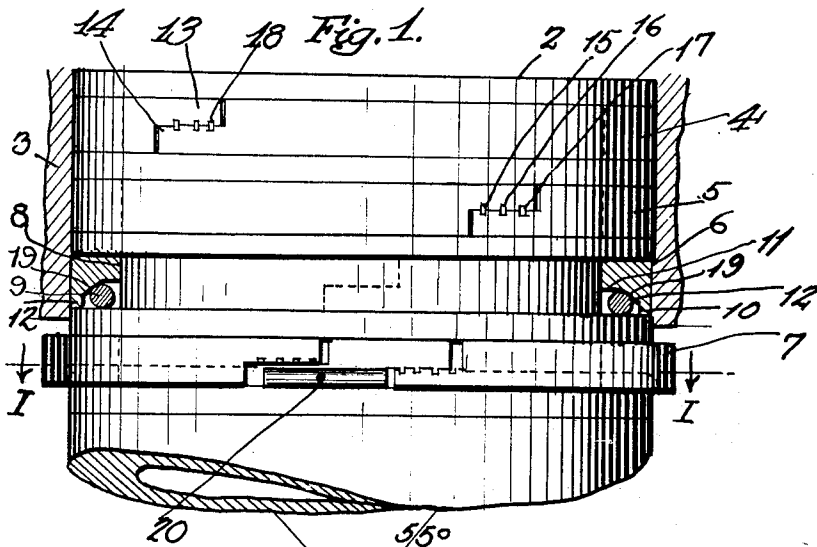


July 21, 1931.

W. G. O'BRYAN
RADIALLY EXPANSIVE PISTON RING DEVICE
AND FUSIBLE LOCKING MEANS THEREFOR
Filed Nov. 14, 1929

1,815,418



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RADIALLY-EXPANSIVE PISTON RING DEVICE AND FUSIBLE LOCKING MEANS THEREFOR

Application filed November 14, 1929. Serial No. 407,205.

The present invention relates to devices for prevention of piston-slap in internal combustion engines and more especially to a radially-expansive piston-ring adapted to co-operate with a radially-expansive inner member; and further relates to certain fusible or meltable means whereby said rings and members are held under radial compression in the respective piston-grooves to facilitate their insertion into the relative cylinders.

My invention has for its objects the following desiderata:—

To provide a radially-expansive piston-ring with an inner auxiliary radially-expansive member adapted to exert upward and outward pressure upon said ring.

To provide a radially-expansive piston-ring of relatively strong cross-section, having a counterbore adapted to house an auxiliary radially-expansive member disposed therein so that the four relatively expansible limbs will face in diametrically opposite directions in parallel planes.

To provide a radially-expansive piston ring having a counterbore adapted to house an auxiliary, radially expansible, co-operative member, said counterbore providing side-play for the member and having a preferably tangential wall adapted to contact with the member so that expansion of the member will tend to apply both radially-expansible and axial pressure to the inner side of said counterbore; and, as it is very desirable to have both the piston ring and its related member maintain mutually fixed relations with respect to revoluble movement I provide a series of novel rasp-like points or burrs set up on the member adjacent one end thereof, said burrs being adapted to bite into said tangential wall at the point of contact.

To provide barbs or other suitable means adjacent the ends of the auxiliary member whereby a fusible keeper may be applied to contract said member and hold it in position for the counterbore of the ring to be cupped over it; and, further, to provide fusible means to lock said piston-ring in the compressed position.

My invention is an improvement on the present art inasmuch as it provides a greatly

stronger ring and relatively fixed auxiliary means which act to throw the neutral portion of said ring back against the cylinder wall so that close contact is formed by the piston-ring and all points of the cylinder bore.

Hitherto much trouble has been experienced in assembling devices of this general character in the cylinders. Oftentimes rings are broken or have their edge chipped or damaged, whereas, by the use of my fusible means the rings and auxiliary members may be compressed and locked so as to be pushed straight into the cylinder without interference or the slightest risk of damage; the locking means being adapted to melt and dissipate under heat.

I accomplish these results by the mechanism, parts and properties of the devices shown in the accompanying drawings forming a part of this specification, wherein like indicia are employed to designate like parts, in which:—

Figure 1 is an elevational view of the device.

Fig. 2 is a cross sectional view taken on the line I—I of Fig. 1.

Fig. 3 is a front view of the expansion member held in the closed position by the keeper.

Fig. 4 is a front view of said member shown in the expanded position without the keeper.

Fig. 5 is a broken top view of the expansion member illustrating the keeper hooks and barb elements.

Fig. 6 is a projectional view of the fusible keeper strip.

Fig. 7 is a projectional view of the fusible key stock.

In the drawings, 2 illustrates a conventional piston element within a cylinder structure 3; said piston being broken away at the non-pertinent lower end; 4, 5, 6, and 7 show my novel piston-rings disposed in their respective grooves 8 as is well shown at Fig. 1.

Said piston rings are counterbored in the under side to accommodate the expansion member 9, said counterbore being preferably large enough in diameter to give ample clearance for said member 9 between the inner wall thereof and the bottom of the groove 8, 10

said counterbore being sunk to a depth equal to the thickness of the member 9, bottoming parallel with the face of said ring at 11 and having the wall 12 tangential to the cross-section of the member 9 at an angle suitable to exert both vertical and radial thrust from the member 9 to said tangential wall.

Said piston rings are radially expandible, trans-slit and preferably provided with overlapping end members as 13 and 14. Said members being provided on their contacting edges with a plurality of transverse groove members 15, 16 and 17 which may well be notches or other forms which, when brought together under registry one above the other will present an opening for the reception of a key member 18 which when inserted will lock said overlapping ends together so that the outer surface of said piston rings will be flush with or slightly less in diameter thus providing means whereby said piston with its assembled rings may be inserted into said cylinder with facility and without the slightest risk of damage while being assembled.

The member 9 has many novel and useful features. It is preferably a steel wire bent to an approximate circle of greater diameter than said cylinder; the ends of said member are provided with the barbs 15 and 16, said barbs may project radially outward toward the wall 10 of said counterbore or otherwise may hook slightly backward and away from each other, the stock being suitably reduced so that the keeper 17 may be applied thereto in a neat and satisfactory manner without binding in said counterbore. At the tangential point of contact between the member 9 and the wall 12, and preferably adjacent one of said barbs the rasp-like burrs 19 are set up on the surface of said member, burrs, such for instance as might be produced by a diamond-point chisel, the object being to provide a series of outstanding burrs, which when hardened, will be adapted to bite into said tangential surface and lock said member 9 thereto against rotary movement with respect to its related piston ring.

The material composing the keeper 17 and the key 18 is preferably composed of an alloy or other suitable substance not necessarily metal, but of sufficient strength to withstand the requisite tensile and shearing strain required to hold the parts together in their relatively closed position.

Said substance must however, be adapted to fuse at a relatively low temperature.

When assembling, a member 9 having the burrs 19 uppermost is sprung into each groove, the ends thereof are then drawn closely together and a short length of keeper-stock 17 forced on to the barbs 15 and 16 thereby binding the ends of the member 9 together. Next, one of the piston rings is assembled in the related groove as represented by the ring 7, well shown in Figs. 1 and 2, the prick-

punch mark 20 being brought in registry with the gap between said ring ends.

Said ring is then compressed until the notches 15, 16 and 17 register, whereupon a piece of the key-stock 18 may be inserted in the hole or holes formed by said registry of the notches. The piston rings thus assembled will appear as shown by 4, 5, the ring 6 having been cut away; obviously, as many rings as desired can be employed on one piston.

By this relative disposition of the member 9 with its contacting ring, the expansive energy thereof tends to force said ring back against the cylinder at a point diametrically opposite the open ends of said ring, thus providing close contact between the ring and the cylinder all round the bore. Furthermore, the expansion of the member 9 acting on the tangential wall 12 tends to thrust the ring tight up against the upper wall of the piston groove thereby preventing leakage.

Before the engine is started heavy oil is applied to the pistons to hold the compression, when started the heat generated by a few explosions melts and dissipates the fusible members 17 and 18, thus allowing the members 9 and the related rings to function.

It is believed that the construction, operation and advantages of the invention will now be clearly understood. The present embodiments of the invention have been disclosed in detail merely by way of example, since in actual practice they attain the features of advantage set forth as desiderata in the statement of the invention and the above description.

Numerous changes in the details of construction, and in the combination and arrangement of parts may be resorted to without departing from the spirit or scope of the invention as hereinafter claimed or sacrificing any of its advantages.

Having thus described my invention, what I claim as new is:—

1. The combination with a cylinder, of a piston loosely fitting the same and provided with a ring groove, a trans-split ring in said groove, a counterbore in said ring, an auxiliary expandible member in the counterbore, one vertical wall, one horizontal wall and one sloping wall to the counterbore, said sloping wall tangential to the auxiliary ring and adapted for axial displacement and radial expansion of said trans-split ring under radial expansion of said auxiliary member, upper and lower over-laps carried by companion ends of said trans-split ring, radial groove means in said engaging over-laps, said means being adapted to form regulated key-openings when said ring is compressed, said key-openings being adapted to receive a locking key to hold said ring under compression.

2. In a device as specified in claim 1, holding means carried on the free ends of said

auxiliary member, said means constituting means whereby a keeper may be applied to said free ends to hold said member close against the bottom of said groove under compression.

5 3. In a device according to claim 1, keeper means adapted to engage complemental means carried by said auxiliary member, said keeper adapted to hold said member under
10 compression, said keeper composed of matter fusible at a low temperature.

4. In a device in accordance with claim 1, key means adapted to cooperate with complemental openings in a compressed piston ring,
15 said means being composed of fusible material adapted to melt at a comparatively low engine temperature.

In testimony whereof I have hereunto set my hand this 4th day of November, 1929.

20 WILLIAM GARVIN O'BRYAN.

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