Aug. 12, 1941. D. J. WHERRY 2,252,149

PISTON STABILIZER AND RECAM

Filed Jan. 6, 1941

FIG. 1

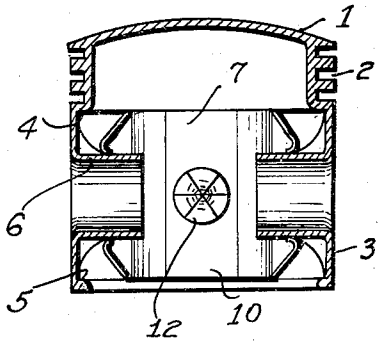


FIG. 2

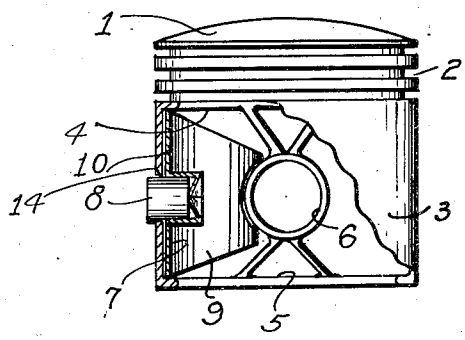


FIG. 3

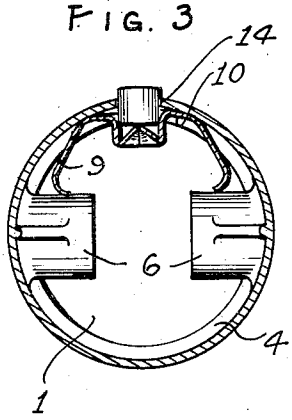


FIG. 4

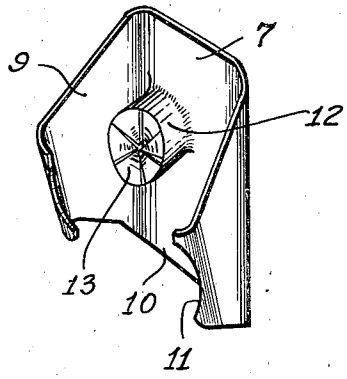
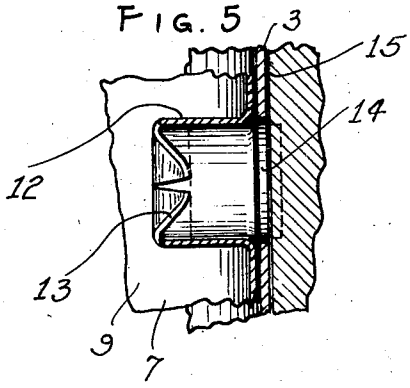


FIG. 5



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2,252,149

PISTON STABILIZER AND RECAM

Dale J. Wherry, St. Louis, Mo.

Application January 6, 1941, Serial No. 373,223

9 Claims. (Cl. 309—5)

This invention relates to improvements in piston construction, and more particularly to means for re-shaping the peripheral contour of pistons that have become worn to an out-of-round shape, and to stabilize the piston so that the same will travel more truly longitudinally within the enclosing cylinder, and with a minimum amount of piston slap.

Another object of my invention is to provide a single device that will function as a re-cam, and as a stabilizer, and wherein the stabilizer means of the same will be carried by the re-cam means.

A further object of the invention is to so construct the re-cam member, that the same may be sprung into operative position to engage between the pin bosses and the inner face of the piston skirt, to resiliently maintain the latter to its re-cam peripheral contour, the insertion of the device being performed simply by spreading apart a portion of the same, and then permitting the device to seat itself by springing back toward its original unspread state after the inserting tool is withdrawn.

An added object of the invention is to provide a cup element integrally with the re-cam element, and with spring elements integral with the cup adjacent the bottom of the same, the piston skirt being suitably apertured to permit the stabilizer plug to be seated within said cup and be constantly pressed radially outwardly (relatively of the piston) through said aperture, into engagement resiliently with the cylinder wall, the pressures of the re-cam element and the stabilizer means being so proportioned that the only engagement between the piston and the cylinder will be through said plug adjacent said aperture, and not through the re-cam means.

Other objects of the invention are to provide a device of the kind described, which will be extremely simple to make and install or remove, which will be of very low manufacturing cost, light in weight, with a minimum number of parts, and which will be otherwise satisfactory and efficient for use wherever deemed applicable.

Many other objects and advantages of the construction herein shown and described, and the uses mentioned, will be obvious to those skilled in the art to which this invention appertains, as will be apparent from the disclosures herein given.

To this end, my invention consists in the novel construction, arrangement, and combination of parts herein shown and described, and the uses mentioned, as will be more clearly pointed out in the claims hereunto appended.

In the drawing, wherein like reference characters indicate like or corresponding parts throughout the views,

Figure 1 is a vertical cross-section of a piston equipped with my improved device, the wrist pin being removed in order to show the construction more clearly;

Figure 2 is another vertical cross-sectional view of the same (partly in elevation), but taken substantially at right angles to that shown in Fig. 1;

Figure 3 is a transverse cross-sectional view, looking into the open end of the piston;

Figure 4 is a perspective view of the re-cam element; and

Figure 5 is a cross-sectional detail showing the construction of the cup with its integral spring elements.

Referring more particularly to the drawing, wherein I have illustrated a preferred embodiment of my invention, there is shown a piston of a commonly used type, comprising a closed or head end 1, having the packing-ring receiving grooves 2 therebelow, and with the skirt or trunk portion 3 depending from said head. There are inwardly directed flanges or shoulders 4 and 5 within the skirt, and circumferentially extending, the former being adjacent the head end of the skirt immediately below the lowermost of the head-end packing ring grooves, and the latter shoulder being closely adjacent the lowermost end of the skirt. Inwardly directed bosses 6—6 are provided intermediate the height of the skirt, for receiving the wrist pin in the usual manner.

This type of piston is often made of steel or some other relatively strong material of comparatively thin cross-section, and is preferably unslotted upwardly from the bottom edge of the skirt; that is to say, the skirt is substantially uninterrupted about its periphery, except for the pin openings and the cut-backs or cut-outs that may be provided adjacent the pin openings.

These pistons are preferably ground to their finish contour by machine, and most generally through some sort of a cam control. When the piston skirt has become out-of-round, and which is usually accompanied by piston slap, the engine loses its efficiency, becomes noisy, and the parts wear rapidly.

My improved device for restoring the piston to approximately its original working efficiency and quietness of operation after it has become out-of-round, consists of a main member 7, stamped or otherwise suitably formed of very thin steel or other suitable material which is strong, lightweight, and will retain its resiliency under operating conditions, say about .02" thickness, and

an auxiliary element consisting of an extremely dense-body cylindrical wood plug 8 carried by the main member 7.

The main member 7 is formed into a shell that is approximately channel or U-shaped, having the pair of spaced opposed leg portions 9—9, connected through the main body portion 10, extending at an angle to said leg portions, somewhat as shown. The portion of the member 7 that is intermediate the leg portions may be flat thereacross, or otherwise arranged and shaped to be out of contact with the inner face of the piston skirt when the device is in operative position, so that the member 7 contacts the inner face of the skirt adjacent the areas where the legs 9—9 project inwardly.

The edges of the legs are provided with arcuate cut-outs or recesses 11 intermediate their length, with the lower ends of the recesses projecting outwardly a slight distance beyond the upper ends of the same, if so desired, in order to permit of easier insertion of the device into position. Further, those portions of the legs adjacent the recesses are preferably bent inwardly toward one another so that there will be less likelihood of the device cutting through the pin bosses in service, and the length of the member 7 is such that its top and bottom edges will engage the top and bottom shoulders 4 and 5 of the piston skirt.

The device is most easily inserted into position within the piston by using a tool which holds the devce with the legs sprung apart so that the device may be set within the piston and pass the pin bosses. Then, as soon as the device has its top and bottom edges in engagement with the limit shoulders of the skirt interior (and properly centered so that the plug carried by the same is in registry with the aperture through which it projects, as will be more clearly hereinafter set forth), the tool is removed and the element will thereupon immediately spring or clamp onto the pin bosses, and with the outermost portions of the element resiliently pressing against the interior of the piston skirt along the approximately vertically extending portions adjacent the juncture of the legs 9—9 and the connecting portion of the element 7, thereby providing vertically extending fold lines therealong. Thus, it is seen that the element 7 is resiliently held in place between the inner wall of the skirt and the peripheral walls of the pin bosses, constantly exerting spring pressure radially outwardly against said skirt, to re-cam the latter, but with not enough pressure to thrust the skirt into contact with the cylinder wall 15 thereat. The resiliency of the element 7 permits of inward flexing of the same, through the several fold or expansion lines or areas.

In addition to the re-camming functions of the device, I have provided a stabilizer. For this result, I have provided a cup element 12 intermediate the height of the member 7, and approximately in the plane of the wrist pin axes, and preferably formed integrally of the member 7 in some suitable manner, and is of a size to receive the plug element 8 and permit the latter to nicely slide therein. A spring means is interposed between the bottom of the cup and the inner end of said plug in order to constantly urge the latter radially outwardly of the piston, and in this particular instance I have been able to obviate a separate spring element, by forming the same integrally of the cup itself. This has been done by slitting the bottom of the cup and forcing the slit portions upwardly into the cup, as indicated by the spring prongs 13, whereby it is seen that these prongs will act as resilient cushions pressing against the plug seated thereagainst.

The piston skirt is provided with an opening 14, radially therethrough, in registry with the plug 8 and of a diameter to permit the latter to project through the opening without danger of engaging the periphery of the opening, and when the device is in operative position, the plug is resiliently thrust through said opening and yieldably engages the cylinder wall thereat.

Although the element 7 must have sufficient spring pressure to be retained in mounted position, and to re-cam the piston skirt, yet the pressure is so proportioned as not to cause the piston skirt to contact the cylinder wall, but upon the contrary to have the plug yieldably in contact with the latter wall and to thereby stabilize the piston during the reciprocatory movement of the latter. Thus, the re-camming is performed through the member 7, and the stabilizing of the piston is performed through the spring-pressed plug 8.

Having thus described my invention, it is obvious that various immaterial modifications may be made in the same without departing from the spirit of my invention; hence I do not wish to be understood as limiting myself to the exact form, arrangement, construction and combination of parts herein shown and described, or the uses mentioned, except as limited by the state of the art to which this invention appertains, and the claims hereunto appended.

What I claim as new and desire to secure by Letters Patent is:

1. In a piston of the kind described having an opening through its side wall, a resilient shell supportingly inserted into said piston so a portion engages within the latter and another portion spaced radially from the first portion bears against said side wall; and a plug carried by said shell to be unitary therewith and thrust radially through said opening.

2. In a piston of the kind described provided with an opening through its side wall, a resilient metal shell inserted into said piston so that substantially radially spaced portions of the shell resiliently engage the interior of said piston and the interior of said side wall to either side of said opening; and a plug carried by said shell and thrust radially through said opening.

3. In a piston of the kind described adapted to reciprocate in a cylinder and provided with an opening through its side wall, a resilient metal shell inserted between the inner surface of said side wall adjacent said opening and the interior of said piston and constantly yieldably bearing against said skirt but with insufficient pressure to force the skirt to engage the cylinder wall thereat; and a plug radially mounted in said shell to yieldably project through said opening and engage said cylinder wall.

4. In a piston of the kind described provided with a radial opening through its skirt, a resilient metal shell detachably sprung into place between the interior of said piston and the inner face of said skirt and bearing against the latter at either side of said opening, said shell provided with a cup adjacent said opening; and a radially movable plug mounted in said cup and resiliently projecting through said opening.

5. In a piston of the kind described provided with wrist pin bosses, a re-cam member de-

tachably held in place within said piston between said bosses and the inner wall of said skirt, said member provided with a pair of spaced-apart leg portions provided with recesses in its edges to straddle the pin bosses, and said edges bent inwardly toward one another, whereby said legs may be spread further apart during insertion of the member into position to enable the latter to pass said bosses, the release of said member bringing its legs toward one another and resiliently engage between said bosses and the inner wall of the skirt opposed thereto.

6. In a piston of the kind described provided with pin bosses and a radial opening through its skirt, a resilient channel-shaped member inserted into said piston between the interior of said skirt and said bosses with the edges engaging the latter, said member having a plug-holding seat; and a plug carried at said seat and yieldably thrust outwardly through said opening.

7. The combination with a piston having packing ring grooves adjacent its head end and a skirt therebelow and provided with wrist pin bosses and an opening through its skirt; a resilient metal shell substantially channel-shaped in transverse cross-section inserted into said piston with the legs engaging said bosses and the intermediate portion engaging said skirt, said intermediate portion of said shell provided with a plug holder; and a plug carried by said holder and thrust yieldably through said opening.

8. In a piston of the kind described provided with wrist pin bosses and with a radial opening through its skirt, a spring metal readily-detachable shell member sprung into place between said bosses and the inner surface of said skirt, and exerting an outward thrust on said skirt to yieldably maintain the latter in re-cam contour, and provided with a cup formed integrally therewith and positioned adjacent said skirt-engaging portion; and a plug movably carried in said cup and yieldably thrust through said opening.

9. In a piston of the kind described provided with an opening through its side wall, a resilient shell inserted into said piston so as to be supported between the interior of the latter and the inner surface of said side wall adjacent said opening, a cup formed integrally on said shell adjacent said side-wall engaging portion, and spring means formed integrally on said cup; and a plug carried in said cup to be slidable therein and project radially through said opening and constantly pressed outwardly of said piston by said spring means.

DALE J. WHERRY.

DISCLAIMER

2,252,149.—*Dale J. Wherry*, St. Louis, Mo. PISTON STABILIZER AND RECAM. Patent dated Aug. 12, 1941. Disclaimer filed July 11, 1946, by the inventor.

Hereby enters this disclaimer to claims 1, 6, and 7 of said patent.

[*Official Gazette August 20, 1946.*]