Dec. 4, 1934. R. R. TEETOR 1,982,706

EXPANDING MEANS FOR PISTONS

Filed Oct. 21, 1932

Fig. 1

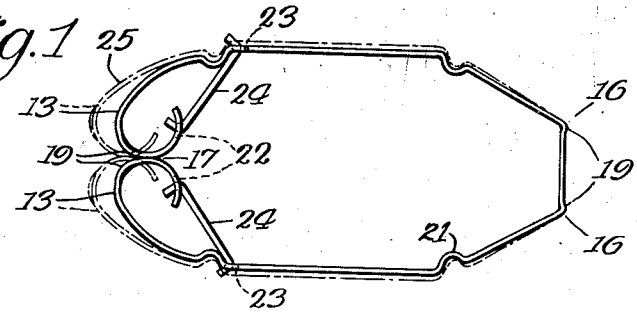
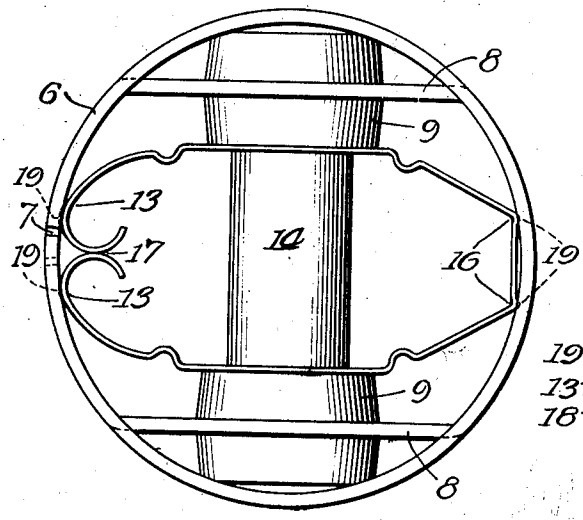


Fig. 3



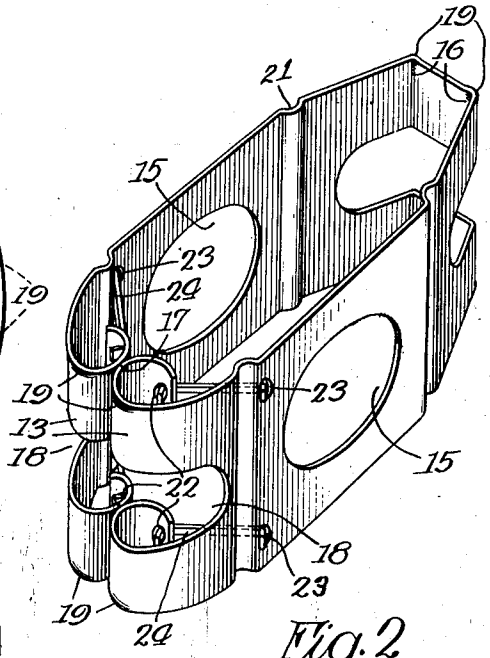


Fig. 2

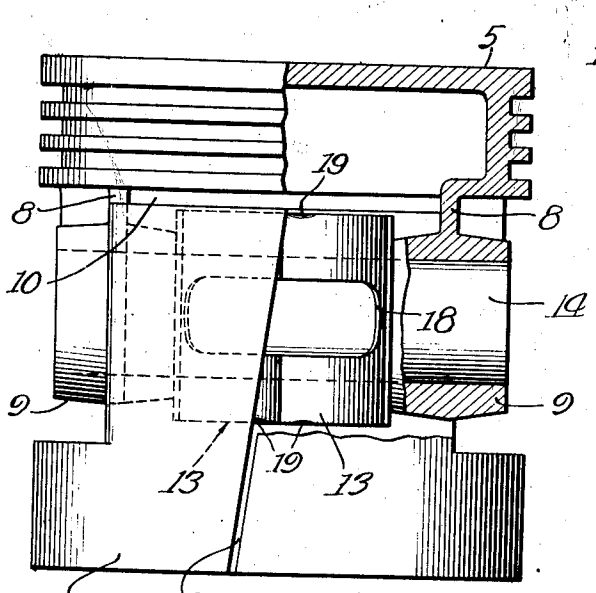


Fig. 4

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EXPANDING MEANS FOR PISTONS

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Application October 21, 1932, Serial No. 638,865

8 Claims. (Cl. 309—12)

My invention relates to means for expanding a split skirt of a piston for an internal combustion engine and the like, and more particularly, to means for facilitating application of the expander to such skirt.

The expander is formed of spring metal and when in operating position within the split skirt of a piston, particularly a worn skirt formed of aluminum and the like, it expands the skirt and maintains it in expanded condition so that it snugly fits the cylinder walls thus avoiding piston slap, excessive blow-by and oil consumption and other faults. A spring expander adapted to perform this function is difficult to insert into the piston skirt and without damage to the expander or skirt. My invention is more particularly directed to the provision of simple and efficient means for initially contracting the expander so that it may be easily inserted into the piston and so that the contracting means may be readily removed to permit the expander to spring into operating position. More specifically, I employ simple wire hooks or links which engage portions of the expander to contract it and which may be unfastened easily to allow the expander to spring into its expanding condition.

With the above and incidental objects in view the invention consists in certain novel features of construction and combination of parts, the essential elements whereof are recited in the appended claims and the preferred form of embodiment of which is described in detail hereinafter and illustrated in full in the accompanying drawing, which form part of this specification.

Figs. 1 and 2, respectively, are plan and perspective views of the expander with the contracting means applied thereto;

Fig. 3 is a bottom plan view of a piston with the expander applied in operating condition thereto; and

Fig. 4 is a side view of the piston partially broken away to show the expander in position in the piston.

Referring first to Figs. 3 and 4, I have shown for illustrative purposes only a piston having a head 5 and a skirt 6 which is provided with a vertical slot 7 in one side. Parallel webs 8 depend from the head and these webs carry piston pin bosses 9 through which extend a piston pin 14. Except where the webs are joined to the head, the head is preferably separated from the upper edge of the skirt by circumferential slots 10.

The expanding device, as shown in the several figures, is preferably formed of a strip of spring steel and is bent into its polygonal shape with the free ends 13 curved and contacting at 17. When the expander is in operative position in the piston, as shown in Figs. 3 and 4, the piston pin 14 projects through openings 15 in the flat parallel sides of the expander. The rear end of the expander contacts at the bends 16 with the interior wall of the piston opposite the slot 7. The free curved ends 13 contact with the interior wall of the piston adjacent the slot 7. With the expander in this position the bends 16 and free ends 13 press firmly in opposite directions against the skirt and at the same time the sides of the expander press firmly in opposite directions against the facing edges of the piston pin bosses with the result that the expander expands the skirt and maintains it in expanded condition so that it snugly fits the cylinder walls, thus eliminating piston slap and excessive blow-by and oil consumption. The rear end of the expander and the curved free ends are preferably cut away as at 18 in order to afford additional resiliency and to assure that the free ends and the bends press more uniformly against the piston wall. I also, preferably, though not necessarily, strike out sharp points or edges 19 which bite into the metal of the piston skirt and better anchor the expander in position. I also preferably provide the vertical bends or folds 21 in the sides of the expander to afford additional resilient expansibility.

In general the expander described above for illustrative purposes is disclosed in my copending application Serial No. 616,203, filed June 9, 1932.

I have found that unless there is some means provided for contracting the expander before it is inserted in the piston skirt that considerable difficulty is encountered in applying the expander. To this end I provide the contracting means which I will now describe, reference being had particularly to Figs. 1 and 2.

In each of the lower and upper portions of each of the curved ends, I provide a hole 22 and in each side of the expander I provide a corresponding hole 23. Wire hooks or links 24, preferably four in number, have their ends projected into the corresponding pair of holes 22—23, the expander first being contracted by any suitable device or by the hand if necessary in order to permit the links to be applied. In Fig. 1, I have illustrated by the dotted line 25 the condition of the expander after the links 24 are removed. It will be seen that with these contracting links in position both the width and length of the expander are reduced so that the length is slightly less than the diameter of the skirt and the width is slightly less than the distance between the

facing edges of the piston pin bosses of the piston. The expander in this contracted condition is slipped freely into position in the piston skirt, the piston pin is then mounted in position and the links are finally removed by pliers or any other suitable tool. As the links are removed the expander springs into its operating condition, as shown in Fig. 3, to expand the piston skirt.

It is now evident that my invention is admirably adapted to perform the functions first stated. The contracting means are extremely simple and highly efficacious. The links also facilitate shipment and handling of the expanders. Modifications may be made without departing from the spirit of the invention.

I claim:

1. In combination with a piston skirt expander formed of spring metal and adapted to be inserted into a split skirt of a piston and having body and end portions adapted to engage with inner surfaces of the piston skirt, of means self-contained within the expander and connected to the body and end portions thereof respectively for maintaining the expander in contracted position so that the expander may be easily inserted into the skirt, said means being readily detachable from the expander while in the skirt to permit the expander to spring into expanded operating engagement within the skirt.

2. In combination with a piston skirt expander formed of spring metal and adapted to be inserted into a split skirt of a piston with split end and body portions adapted to contact the inner wall of the piston, of link means having bent ends for engaging said body and end portions of the expander to reduce the size of the latter so that the expander may be readily inserted into the piston skirt, said bent ends being readily unhooked from said portions to permit the expander to spring into expanded operating position within the piston skirt.

3. In combination with a polygonally-shaped piston skirt expander formed of spring metal and normally expansible lengthwise and crosswise, of means self-contained within and releasably interlocked with spaced apart portions of the expander for simultaneously contracting the expander lengthwise and crosswise to permit the expander to be readily inserted in the skirt and said means being removable to permit the expander to spring into expanded opening position.

4. In combination with a piston skirt expander formed of spring metal and adapted to be inserted into a split skirt of a piston, the expander forming a closed figure with expansible formations, of detachable means engaged with and fully supported by certain of said expansible formations which are laterally spaced apart for contracting the expander to permit the expander to be readily inserted in the skirt.

5. In combination, a piston skirt expander formed of flat spring metal to a shape having different portions angularly expansible and contractible with respect to each other and adapted to be inserted into the split skirt of a piston, certain of said portions having holes, and links having their ends extending into said holes and of a length to contract the expander to permit the latter to be readily inserted into the skirt, said links being removable to permit the expander to spring into operating position in the skirt.

6. In combination with a piston skirt expander adapted to contact with the facing ends of the bosses of a split piston skirt and at points on the skirt intermediate the bosses, of removable means connected to said boss contacting and intermediate contacting portions of said expander and contracting said portions so that the width of the expander is less than the distance between said faces and its length is less than the interior diameter of the skirt.

7. In combination, an expansible and contractible piston skirt expander polygonal in shape and having side portions and curved ends contacting with each other, and means connecting said ends with said side portions and normally flexing them toward each other to contract the expander as a whole to permit the latter to be freely inserted into the skirt.

8. In combination with a piston skirt expander polygonal in shape and having side portions and curved ends contacting with each other, said ends and side portions having holes, of links having bent ends projecting through said ends to contract the expander to permit the latter to be freely inserted into the skirt.

RALPH R. TEETOR.