April 9, 1935. R. R. TEETOR 1,997,023

PISTON SKIRT EXPANDER

Filed April 12, 1933

Fig. 1

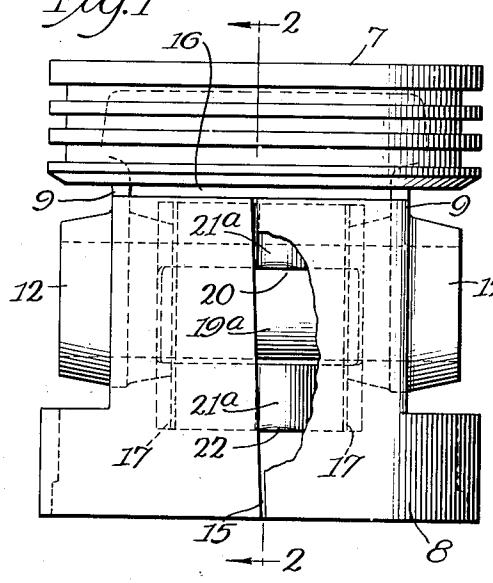


Fig. 2

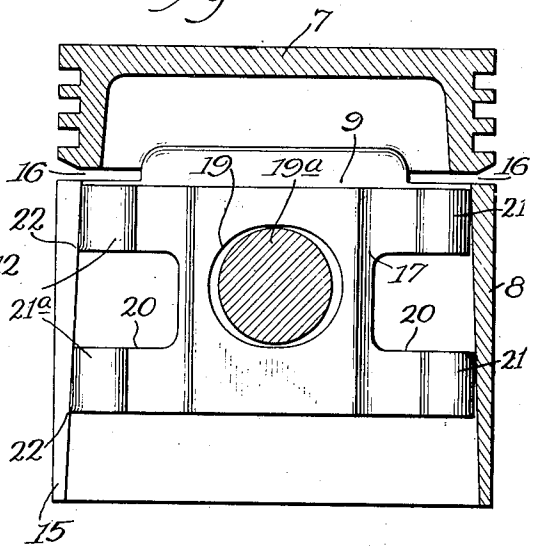


Fig. 4

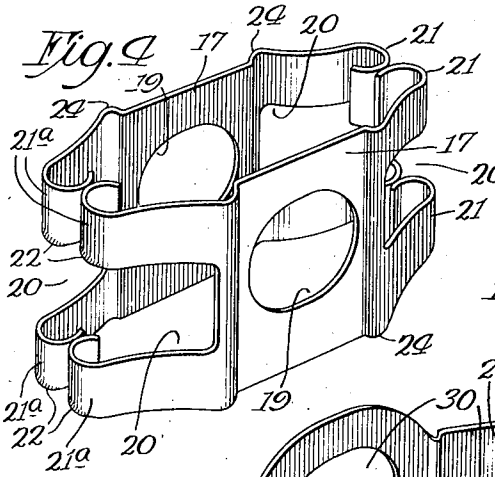


Fig. 3

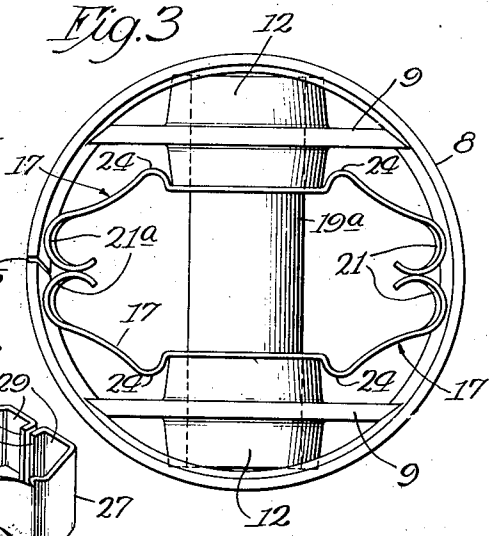
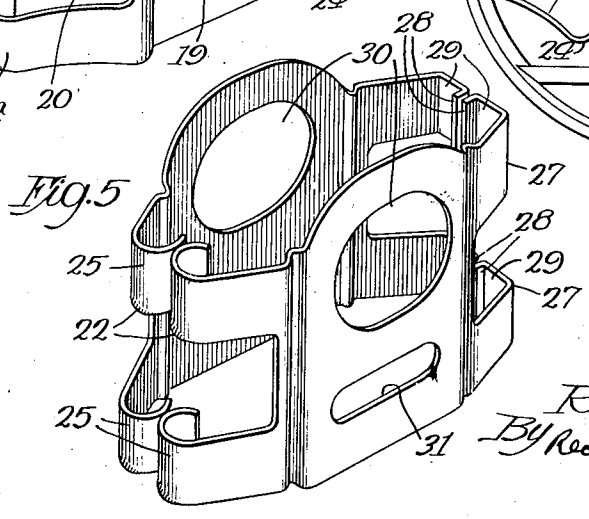


Fig. 5



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UNITED STATES PATENT OFFICE

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PISTON SKIRT EXPANDER

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5 Claims. (Cl. 309—12)

My invention relates more particularly to an expanding device for expanding the split skirt of a piston of an internal combustion engine and the like in order to overcome defects in such pistons, particularly after the same have become worn.

It is well known that pistons, particularly when provided with split skirts of aluminum or similar material, wear quickly with the result that there is piston "slap" and excessive oil consumption and blow-by. The principal object of my invention is to provide a simple and improved piston skirt expander which eliminates these defects. More particularly, I provide an expander comprising two half sections formed of leaf spring metal and so shaped as to cooperate together to expand the skirt. The expander is quite wide lengthwise of the piston and is formed to accommodate a piston skirt having a tapering inside wall.

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 two forms of embodiments of which are described in detail hereinafter and illustrated in full in the accompanying drawing, which forms part of this specification.

Figure 1 is a side view of the piston partially broken away to show part of the expander in position within the piston;

Fig. 2 is a longitudinal section taken on the line 2—2 of Fig. 1;

Fig. 3 is a bottom plan view of the piston with the expander;

Fig. 4 is a perspective view of the expander shown in Figs. 1 to 3; and

Fig. 5 is a perspective view of another form of my expander.

Referring first to Figs. 1, 2 and 3, the piston shown in these figures for illustrative purposes is preferably formed of aluminum alloy and comprises a head 7, a skirt 8, and struts 9 on the skirt connected to the head. The struts 9 carry the piston pin bosses 12. Except where the struts 9 join the head, the skirt is separated from the head by circumferential slots 16. On one side the skirt is provided with a vertical slot 15 extending from its upper to its lower edge.

The expander, as shown in Figs. 1 to 4, comprises two complementary halves 17 each formed from a strip of spring or leaf steel. Each end of each half is curved or curled and these curved ends of the two halves press against each other. Each half is also provided with an opening 19 through which the piston pin 19a is adapted to extend when the expander is in position in the piston. Each end of each half has a recess 20 forming the curved tongues 21 at the rear and tongues 21a at the front end. The lower edge of each tongue 21a is bent outwardly to provide a sharp protruding lip 22. Similar lips may be formed on the lower edge of the lower tongues 21 if desired. Vertical ribs or bends 24 may be provided to increase the expansion action of the expander.

It will be observed that when the expander is not in the piston skirt, the lower tongue 21a projects outwardly considerably beyond the upper tongue 21a. The wall of the piston skirt (Fig. 2) tapers in thickness from top to bottom, the interior of the skirt being of lesser diameter at the top than at the bottom.

When the expander is to be inserted in the piston, the two halves are brought together as shown in Fig. 4, and then contracted crosswise and lengthwise by hand or by any desired means. With the expander in this condition it is inserted into the skirt and then released whereupon it assumes the position shown in Figs. 1 to 3 with the sides pressing against the facing ends of the pin bosses 12, the tongues 21a pressing outwardly against the skirt adjacent the vertical slot 15 and the tongues 21 pressing outwardly against the skirt opposite the slot 15. The lips 22 bite into the metal of the skirt and aid in locking the expander in place.

It will be apparent from the foregoing that the expander tends to expand the piston skirt so that the latter at all times snugly fits the cylinder wall. The cooperating curved tongues at each end afford a high degree of expansive force which acts directly against the skirt at right angles to the piston pin and also against the piston pin bosses in the direction of the piston pin. As the upper tongues 21a are shorter than the lower tongues 21a, the expander is more easily inserted into the tapered skirt and the upper tongues 21 and 21a are permitted to exert substantially the same pressure against the skirt as the lower tongues 21 and 21a so that the skirt is more evenly or uniformly expanded.

The form of expander shown in Fig. 5 accommodates a different type of piston, particularly one in which the piston pin is adjacent the upper end of the skirt or the construction of the piston otherwise requires that the major portion of the expander be below the piston pin. The half sections of the expander have curved tongues 25 at one end adapted to engage the skirt adjacent the

vertical slot 15. The other ends have L-shaped tongues 29 adapted to have their bends 27 engage the skirt opposite the slot and their flanges 28 to press against each other. Elongated openings 30 are adjacent the top edges of the half sections to receive the piston pin. Narrow elongated openings 31 accommodate other protuberances on the piston.

It is apparent that changes may be made without departing from the spirit of the invention.

I claim:

1. A piston skirt expander elongated in shape and adapted to extend across the skirt, the expander being formed of leaf spring metal and comprising two half-sections each formed at each end with two tongues, the tongues at at least one end being curved inwardly and the corresponding tongues on the two half-sections being in firm engagement when assembled in the piston.

2. The combination of a piston having a skirt with a vertical slot, the interior wall of the skirt being tapered, of an expander formed of wide leaf spring and comprising two half-sections adapted to extend across the skirt, said half-sections being shaped to form in assembled relation an elongated figure having at each end a plurality of upper and a plurality of lower separated expansible formations adapted to engage the piston wall, the bottom portion of the expander including said lower expansible formations being longer than the upper portion to accommodate the tapered wall of the piston skirt and effect uniform expansion of the skirt.

3. A piston skirt expander elongated in shape and adapted to extend across the skirt, the expander being formed of leaf spring metal and comprising two half-sections each formed at each end with two tongues, the tongues at at least one end being curved inwardly and the corresponding tongues on the two half-sections being in firm engagement when assembled in the piston, and the lower tongues at at least one end of the half-sections being longer than the upper tongue on such end.

4. An expander adapted to be inserted into a piston skirt having a vertical slot and an interior tapered wall, the expander being formed of wide leaf spring metal shaped to form an elongated figure, and the expander having at each end upper curved tongues and longer lower curved tongues, the upper tongues engaging each other and the longer tongues engaging each other and forming expansion formations, such tongues also engaging the interior tapered wall of the piston skirt.

5. An expander adapted to be inserted into a piston skirt having a vertical slot formed of spring metal comprising complemental half-sections, each said half-section comprising a central web having oppositely projecting tongues inclined, diagonally inwardly to engage similarly inclined tongues on the other of said complemental formed half-section.

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