

May 7, 1946.

W. S. LOEB

2,399,683

PISTON RING

Filed Dec. 16, 1944

2 Sheets-Sheet 1

FIG. 1.

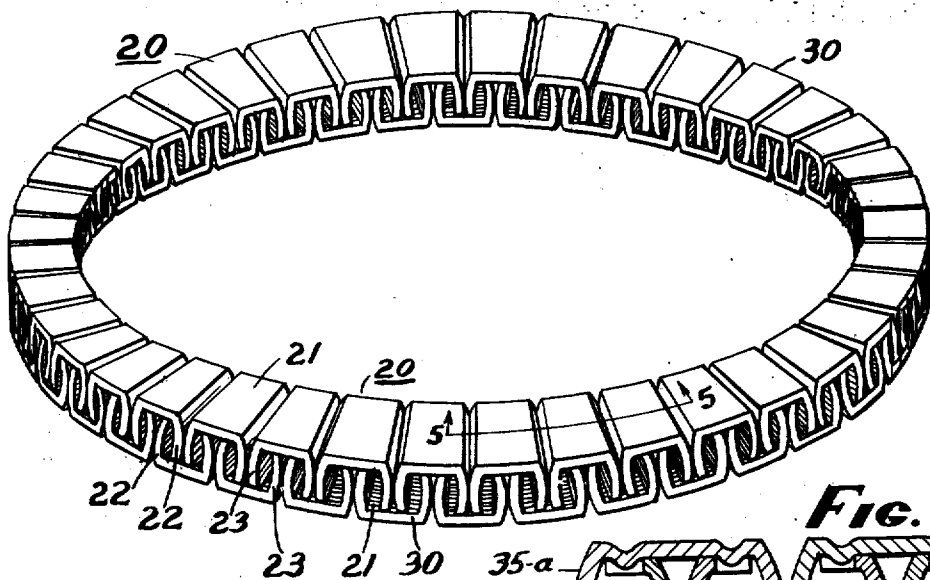


FIG. 12.

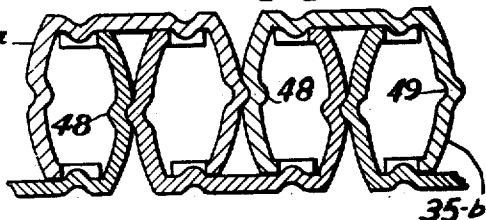


FIG. 3.

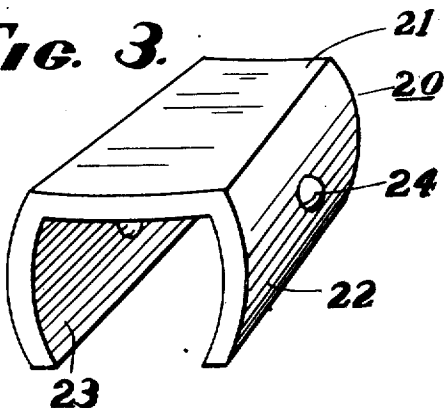


FIG. 2.

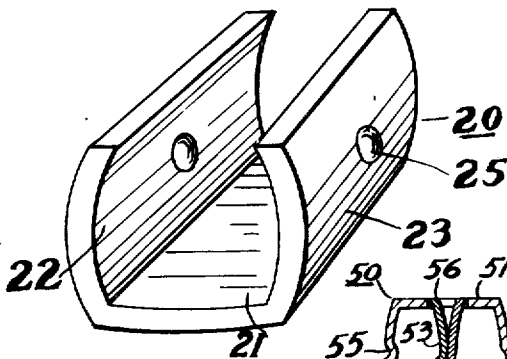
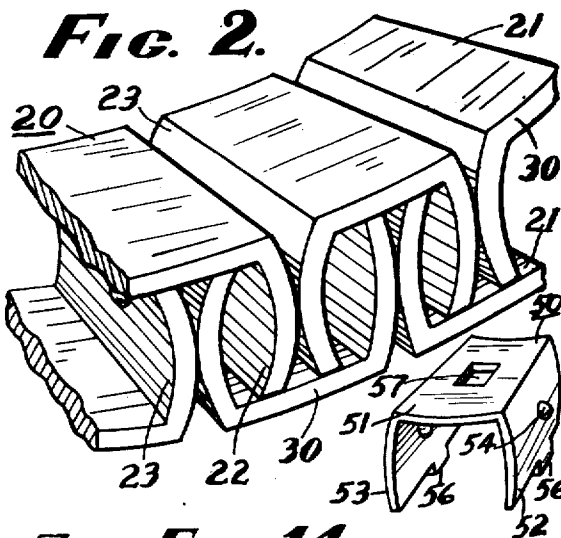


FIG. 4.



FIG. 13.

FIG. 14.

INVENTOR.

WILLIAM S. LOEB

BY

Edward L. Loh

May 7, 1946.

W. S. LOEB

2,399,683

PISTON RING

Filed Dec. 16, 1944

2 Sheets-Sheet 2

Fig. 5.

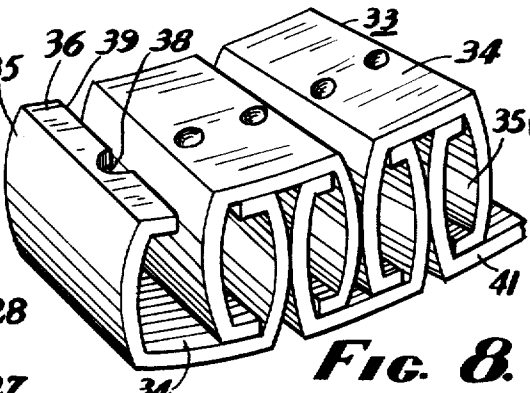
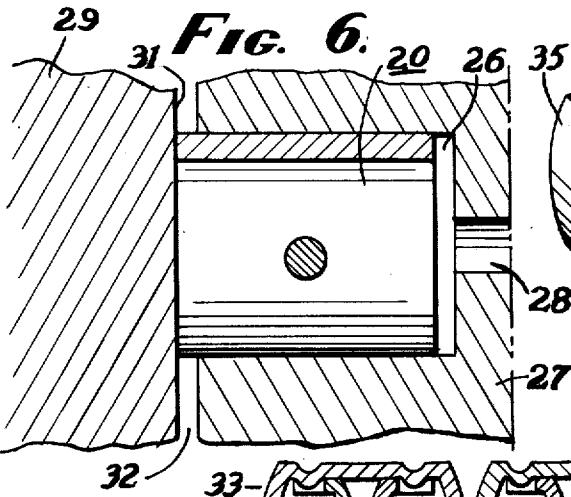
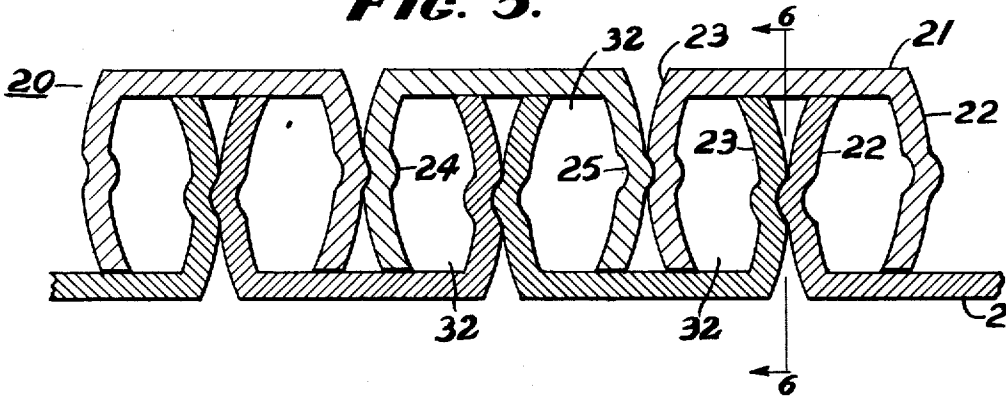


Fig. 8.

Fig. 9.

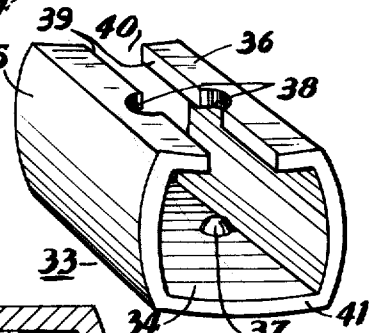
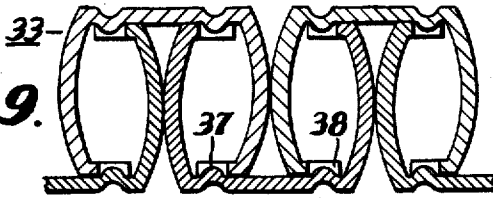


Fig. 10.

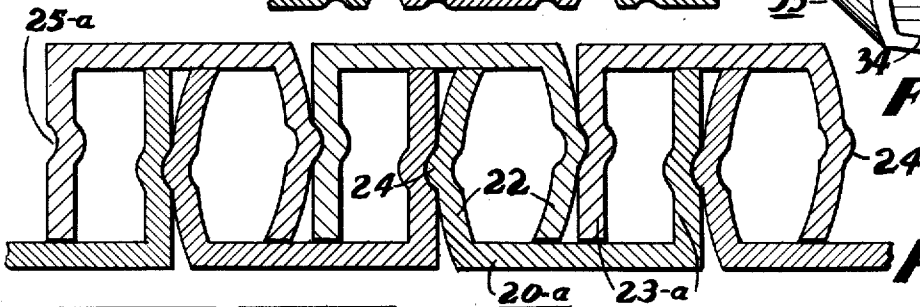


Fig. 7.

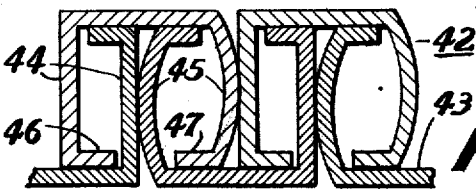


Fig. 11.

INVENTOR.

WILLIAM S. LOEB

BY

Leonard F. Kalish

UNITED STATES PATENT OFFICE

2,399,683

PISTON RING

William S. Loeb, Philadelphia, Pa., assignor to
Wilkening Manufacturing Company, Philadel-
phia, Pa.

Application December 16, 1944, Serial No. 568,407

20 Claims. (Cl. 309—45)

The present invention relates to certain new and useful improvements in piston-rings and it relates more particularly to a novel construction for oil-control piston-rings adapted for use in internal combustion engines.

An object of the present invention is to provide a simple, inexpensive and efficient piston-ring for internal combustion engines or the like. Another object of the present invention is to provide a composite oil-control piston-ring made up of a plurality of interchangeable circumferentially-disposed segments arranged in self-interlocking and form-retaining relationship. Still another object of the present invention is to provide an oil-control piston-ring more or less continuously built up from a plurality of inter-changeable sheet-metal segments, and having inherent circumferential and radial tension when installed within a cylinder.

Other objects and advantages of the present invention are apparent in the following detailed description, appended claims and accompanying drawings.

For the purpose of illustrating the invention, there are shown in the accompanying drawings forms thereof which are at present preferred, although it is to be understood that the various instrumentalities of which the invention consists can be variously arranged and organized and that the invention is not limited to the precise arrangements and organizations of the instrumentalities as herein shown and described.

Referring to the accompanying drawings in which like reference characters indicate like parts throughout:

Figure 1 represents a perspective view of one embodiment of the present invention, shown in compressed installed position.

Figure 2 represents a fragmentary perspective view, on a greatly enlarged scale, of the embodiment of Figure 1; parts being broken away better to reveal the construction thereof.

Figure 3 represents a perspective view of one of the segments making up the embodiment of Figures 1 and 2.

Figure 4 represents a perspective view of another segment, identical with that of Figure 3, but shown disposed in inverted position relative thereto preliminary to assembly as part of a more or less continuous piston-ring.

Figure 5 represents a fragmentary vertical cross-sectional view generally along the line 5—5 of the embodiment of Figure 1.

Figure 6 represents a vertical cross-sectional view generally along the line 6—6 of Figure 5.

Figure 7 represents a vertical cross-sectional view generally similar to that of Figure 5 but showing a modified embodiment of the present invention.

Figure 8 represents a fragmentary perspective

view generally similar to that of Figure 2 but showing still another embodiment of the present invention.

Figure 9 represents a vertical cross-sectional view generally similar to that of Figure 5 but showing the embodiment of Figure 8.

Figure 10 represents a perspective view of one of the segments making up the embodiment of Figures 8 and 9.

Figure 11 represents a vertical cross-sectional view generally similar to that of Figure 9 but showing a modified form of the embodiment of Figures 8 to 10 wherein the locking buttons and notches are omitted.

Figure 12 represents a vertical cross-sectional view generally similar to those of Figures 9 and 11 but showing a further modified form wherein interlock is provided between adjoining similarly-positioned segments as well as between successively oppositely-positioned segments.

Figure 13 represents a view generally similar to those of Figures 9, 11 and 12 but showing still another embodiment of the present invention.

Figure 14 represents a perspective view of one of the segments making up the embodiment of Figure 13.

In one embodiment of the present invention, shown generally in Figures 1 to 6 inclusive, I may provide a plurality of identical interchangeable segments indicated generally by the numeral 20. The segments 20 are composed of sheet metal or other suitable material and are formed by suitable stamping, punching, bending, coining, grinding and/or other manufacturing operations in any desired sequence.

Each segment 20 includes a generally plane base 21 and a pair of convexly bowed sides 22 and 23 formed integrally with said base.

One of said sides 22 has a locking button 24 extending outwardly therefrom while the other side 23 has a corresponding indentation 25 formed thereon.

The segments 20 are adapted to be assembled into a more or less continuous ring as shown in Figure 1; successive segments being disposed alternately at the upper and lower sides of the ring.

All of the upper segments are arranged in abutting relationship and are compressed slightly when the piston-ring is assembled within the groove 26 of the piston 27 (provided with one or more oil-drain openings 28) and installed within a cylinder 29. The lower segments are similarly arranged in abutting relationship and are compressed slightly when installed upon the piston 27 and within the cylinder 29.

The segments 20 are given a slight radial taper corresponding generally to the radius of the cylinder within which they are adapted to be used.

The radially outer edges 30 of the segments 20

folded generally axially to provide a generally plane base, a pair of convexly bowed sides, and a pair of plane flanges extending toward each other from the free ends of said sides and having a gap therebetween, said segments being positioned alternately at the upper and lower sides of said ring, the sides of adjoining similarly-positioned segments being disposed in abutting relationship so as to provide upper and lower more or less continuous intermeshed annuli each having inherent circumferential and radial tension when said ring is installed upon a piston and within a cylinder, each base having a pair of inwardly protruding locking buttons formed thereon, each flange having a semi-circular notch formed on its free edge, the notches of the upper segments fitting about the buttons of the lower segments and vice versa so as to provide radial interlock between said upper and lower segments.

10. For use in assembling a more or less continuous oil-control piston-ring, an individual U-shaped segment integrally formed of resilient sheet metal or the like, said segment having a generally plane base convexly curved at its front edge and a pair of convexly bowed sides extending from said base.

11. For use in assembling a more or less continuous oil-control piston-ring, an individual segment integrally formed of resilient sheet metal or the like, said segment having a generally plane base convexly curved at its front edge and a pair of convexly bowed sides extending from said base, one of said sides having an outwardly protruding locking button formed thereon while the other side has a corresponding locking indentation formed thereon.

12. For use in assembling a more or less continuous oil-control piston-ring, an individual U-shaped segment integrally formed of resilient sheet metal or the like, said segment having a generally plane base and having a pair of sides extending from said base, at least one of said sides being convexly bowed.

13. For use in assembling a more or less continuous oil-control piston-ring, an individual segment integrally formed of resilient sheet metal or the like, said segment having a generally plane base and having a pair of sides extending from said base, at least one of said sides being convexly bowed, one of said sides having an outwardly protruding locking button formed thereon while the other side has a corresponding locking indentation formed thereon.

14. For use in assembling a more or less continuous oil-control piston-ring, an individual segment integrally formed of resilient sheet metal or the like, said segment having a generally plane base, a pair of convexly bowed sides extending from said base, and a pair of generally plane flanges extending toward each other from the free ends of said sides and having a gap therebetween.

15. For use in assembling a more or less continuous oil-control piston-ring, an individual segment integrally formed of resilient sheet metal or the like, said segment having a generally plane base, a pair of convexly bowed sides extending from said base, and a pair of generally plane flanges extending toward each other from the free ends of said sides and having a gap therebetween, said base having a pair of inwardly protruding locking buttons formed thereon, said

flanges having a pair of generally semi-circular locking notches formed thereon.

16. For use in assembling a more or less continuous oil-control piston-ring, an individual segment integrally formed of resilient sheet metal or the like, said segment having a base and a pair of sides extending from said base, at least one of said sides being convexly bowed, and a pair of generally plane flanges extending toward each other from the free ends of said sides and having a gap therebetween.

17. For use in assembling a more or less continuous oil-control piston-ring, an individual segment integrally formed of resilient sheet metal or the like, said segment having a base and a pair of sides extending from said base, at least one of said sides being convexly bowed, and a pair of generally plane flanges extending toward each other from the free ends of said sides and having a gap therebetween, said base having a pair of inwardly protruding locking buttons formed thereon, said flanges having a pair of generally semi-circular locking notches formed thereon.

18. For use in assembling a more or less continuous oil-control piston-ring, an individual segment integrally formed of resilient sheet metal or the like, said segment having a base and a pair of sides extending from said base, at least one of said sides being convexly bowed, and a pair of generally plane flanges extending toward each other from the free ends of said sides and having a gap therebetween, said base having a pair of inwardly protruding locking buttons formed thereon, said flanges having a pair of generally semi-circular locking notches formed thereon, one of said sides having an outwardly protruding locking button formed thereon while the other side has a corresponding locking indentation formed thereon.

19. An oil-control piston-ring comprising a plurality of individual circumferentially-disposed segments of resilient sheet metal or the like, each being generally U-shaped in circumferential cross-section and having a base and a pair of sides, at least one of said sides being convexly bowed, said sides having a pair of tongues formed on their free ends, said base having an opening formed therein, successive segments being positioned alternately at the upper and lower sides of the rings, the sides of adjoining similarly-positioned segments being disposed in abutting relationship so as to provide more or less continuous upper and lower intermeshed annuli each having inherent circumferential and radial tension when said ring is installed upon a piston and within a cylinder, the tongues of the upper segments being disposed within the openings of the lower segments and vice versa thereby to provide circumferential and radial interlock between the upper and lower segments.

20. For use in assembling a more or less continuous oil-control piston-ring, an individual segment integrally formed of resilient sheet metal or the like, said segment having a base and a pair of sides extending from said base, at least one of said sides being convexly bowed, said sides having a pair of locking tongues extending from their free ends, said base having a locking opening formed therein.

WILLIAM S. LOEB.

May 7, 1946.

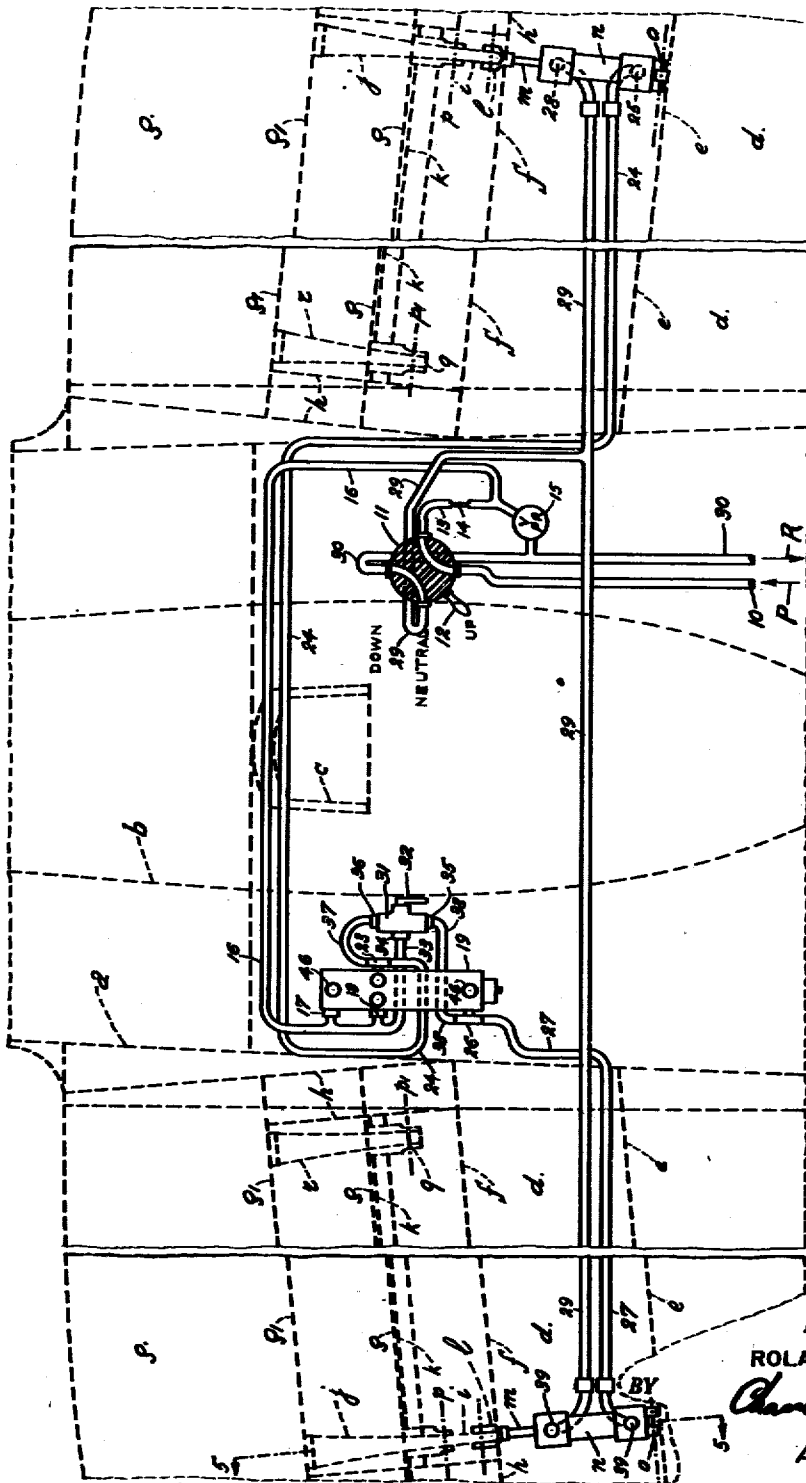
R. C. BERGH

2,399,719

AIRCRAFT STRUCTURE

Filed Nov. 26, 1942

3 Sheets-Sheet 1



INVENTOR,
ROLAND C. BERGH.

ATTORNEY.

