Nov. 2, 1943. V. F. ZAHODIAKIN 2,333,457

PISTON RING AND METHOD OF FORMING THE SAME

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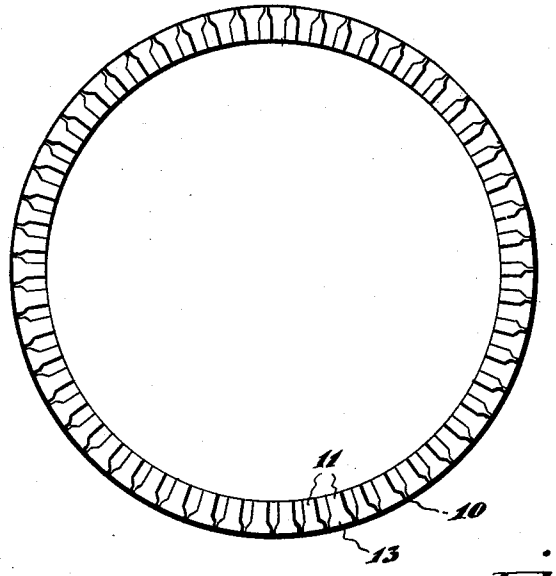


Fig. 1

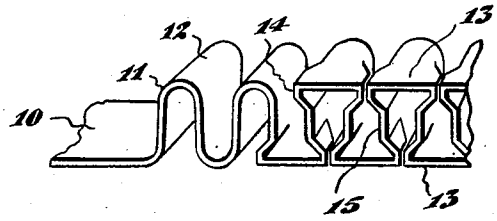


Fig. 2

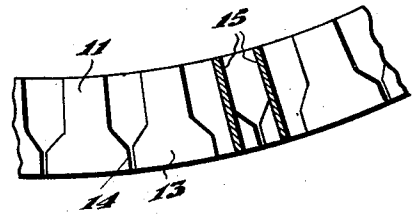


Fig. 3

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PISTON RING AND METHOD OF FORMING THE SAME

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3 Claims. (Cl. 309—45)

This invention relates to improvements in oil rings of the type adapted to be used in pistons. The improved ring of this invention is of particular value for use as an oil ring for the pistons of internal combustion engines but is not limited to this use. It is capable of use, with the same advantages, as the oil ring for the pistons of pumps, steam engines or any installation where it is necessary to prevent the escape of oil along a cylinder wall past a piston.

It has been one of the objects of the present inventor to provide an oil ring for pistons which is adapted to the above uses and which will readily and easily conform to any irregularity in the contour of a cylinder and will, in this respect, be of great value for use in worn cylinders. In other words the general purpose has been to provide an oil flow control ring which will conform to localized irregularities or distortions as well as to general irregularities in the contour of the cylinder wall.

It has been a further object of the present inventor to provide a piston ring which can be made, preferably, from a single strip of metal in an extremely simple manner by corrugating the strip and, thereafter, swaging the crowns of the corrugations adjacent the outer periphery of the ring. More specifically the object has been to provide a ring formed of a corrugated strip in which the various corrugations have a portion of their crowns at the outer ends spread out so as to be disposed in close minute proximity including relatively sharp corners presenting openings insufficient in size to permit the passage of oil. Reference may be had to the patent to Victor F. Zahodiakin, No. 1,957,927 disclosing and claiming a ring formed of overlapping corrugations.

The present ring has the further advantage that the top and bottom walls of the crown portions are adequately supported, the structure being braced by the side walls of the corrugations particularly at those portions of the crowns engaging the cylinder wall. The present ring provides a maximum amount of passage-way for oil flow through the ring to the outer periphery to the oil clearance holes in the piston and at the same time provides ample contact with the cylinder wall.

A further object of the present inventor has been to provide a method of forming this improved ring from the single strip of metal through the simple operations of corrugating and swaging. More specifically the crowns of the various corrugations are swaged to provide for maximum sealing efficiency where the piston ring engages the cylinder wall. Other advantages of the invention will be more fully apparent from the description of the drawing in which:

Figure 1 is a fragmentary top plan view of the improved ring.

Figure 2 is a perspective view showing in detail the manner in which the ring is made and showing the shape of the finished corrugations.

Figure 3 is a top plan view of a portion of a ring showing it in enlarged detail with one corrugation broken away to show its interior.

As shown in the drawing the ring is formed from a strip of metal 10. The strip is corrugated as shown at the left-hand side of Fig. 2 to provide a series of corrugations 11, having rounded crowns 12. The corrugations thus formed are swaged by means of forming tools to flatten and spread out the crowns at the outer periphery of the ring.

The intermediate portions of the vertical walls of the corrugations may be held by means of inserted dies while other dies are inserted into the rounded portions of the crowns to spread and flatten the corrugations as shown in Fig. 2. The swaging takes place inwardly a short distance. As a result the crowns are flat providing flat top or bottom walls 13 and vertical flat walls 14. The adjacent flat side walls of the adjacent corrugations are minutely spaced and formed so as to be disposed on radial lines when the strip is bent to circular form.

The ring is flexible and the vertical walls 15 beneath the flattened crown portions adequately brace the top and bottom walls of the ring. Since the structure is integral and there are no overhanging parts there is very little opportunity for breaking or fracturing of the ring structure. Ample oil clearance passage-way is provided in the interior of the ring and a great deal of ring engaging area is afforded as in the ring disclosed in the patent to Zahodiakin, above mentioned.

Having described my invention, I claim:

1. A piston ring comprising, a single strip of metal including continuous corrugations, the side walls of each of said corrugations being spaced circumferentially, the crowns of said corrugations adjacent the outer periphery of the ring being flat and the remaining portions of the crowns being rounded, the flat portions of the corrugations extending circumferentially substantially into engagement with but minute clearances therebetween and portions of the side walls of the corrugations being vertical.

2. A piston ring, comprising, a strip of resilient sheet metal and consisting of a series of open

corrugations, the crowns of said corrugations being round with the exception of those portions adjacent the outer periphery of the ring, said latter portions being flat so as to present substantially continuous top and bottom walls.

3. A piston ring comprising, a strip of resilient sheet metal and consisting of a series of corrugations, said corrugations adjacent the outer periphery of the ring having flat flared crowns presenting straight circumferential walls and straight side wall portions, said side wall portions being adjacently disposed and minutely spaced, said side walls flaring inwardly from said straight side wall portions and continuing straight side wall portions extending from these flared portions.

VICTOR F. ZAHODIAKIN.