R. W. BAKER.

PISTON RING.

APPLICATION FILED JULY 9, 1920.

1,377,151. **Patented May 3, 1921.**

Fig. 1.

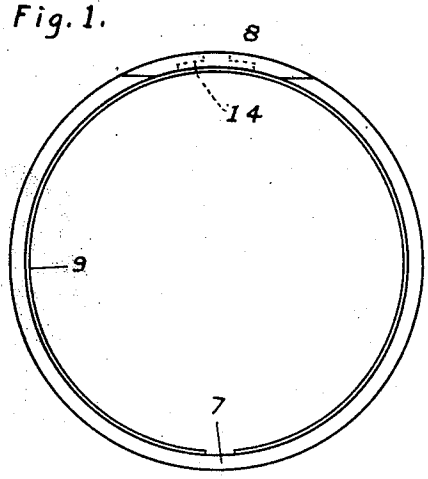


Fig. 3.

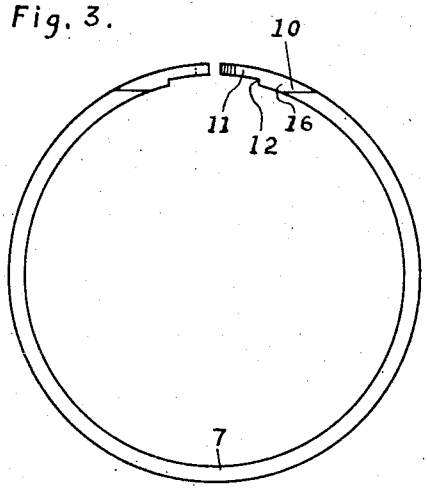


Fig. 2.

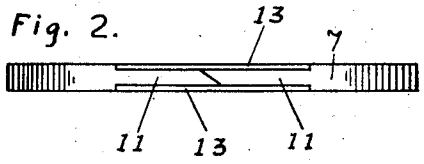


Fig. 6.

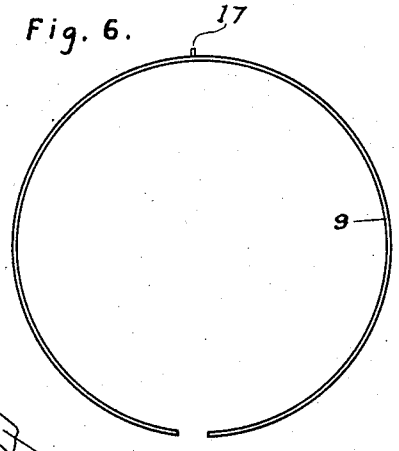


Fig. 4.

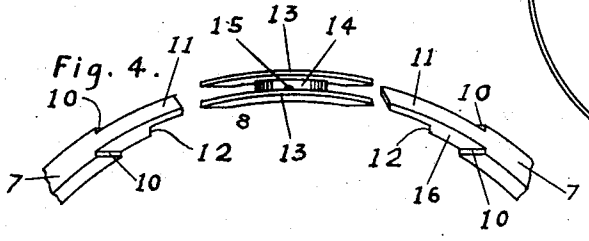
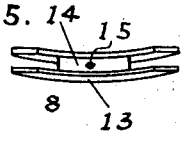


Fig. 5.



Robert W. Baker, INVENTOR.

BY

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UNITED STATES PATENT OFFICE.

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PISTON-RING.

1,377,151. Specification of Letters Patent. Patented May 3, 1921.

Application filed July 9, 1920. Serial No. 395,089.

To all whom it may concern:

Be it known that I, ROBERT W. BAKER, a citizen of the United States, residing in the city of Omaha, county of Douglas, and State of Nebraska, have invented certain new and useful Improvements in Piston-Rings, and have described the same in the following specification, illustrated by the accompanying drawings.

My invention relates to that class of metallic rings which are commonly used as piston packing in the cylinders of internal combustion engines, and which individually comprise a concentric discontinuous ring proper and a bridge, or H connection, so called, spanning the opening of the discontinuous ring. It is the main object of the invention to obstruct the passage of gases through the opening of the ring proper and to prevent leakage past or through the bridge, in a piston of this class; for this purpose to exert upon the bridge a constant thrust outward in a radial direction, independently of the push which it may receive from the ring proper, and additional thereto; and to advance the bridge constantly in that direction for the purpose of taking up its peripheral wear produced by friction with the cylinder. To accomplish these results I incorporate in my improved piston ring, as parts thereof, a ring proper which is of special obstructive formation at the opening, a bridge which is of special formation corresponding to that of the ring proper at the opening of the latter, and a ribbon spring lining the ring proper and attached to the bridge.

In said drawings, illustrating the best manner in which I have contemplated applying the principles of the invention, Figure 1 is a side elevation of a piston ring which is constructed in accordance with these principles, and assembled as in operation. Fig. 2 is an edge elevation of the same. Fig. 3 is a side elevation of the ring proper of the same piston ring. Fig. 4 is a perspective view of the bridge and the adjacent ends of the ring proper, grouped concentrically together but disassembled. Fig. 5 is a perspective view of the bridge. Fig. 6 is a side elevation of the spring.

In these views the numerals 7, 8 and 9 denote respectively the ring proper, the bridge and the spring, which constitute the piston ring. These parts may be conveniently described as positioned in Fig. 1. The ring proper which may be of gray cast iron, has each of its free end portions uniformly rabbeted at opposite sides so as to form the rectangular shoulders 10, which are secant to the periphery of the ring, and the peripheral tongues 11, which extend centrally from between these shoulders. These tongues are severally and equally beveled in opposite directions at their mutually abutting ends, as plainly shown in Fig. 3, and are uniformly undercut throughout a portion of their length so as to leave the transverse shoulder 12 on the underside of each tongue, approximately midway of its length, as shown in Figs. 3 and 4. A portion of each tongue, denoted by the numeral 16, and extending from the shoulders 10 to the shoulder 12, constitutes the fixed base of the tongue and has the same depth in a radial direction as has the body of the ring proper in general. The bridge 8 is formed integrally of steel. It consists of the duplicate and arcuate side walls 13 and the intermediate arcuate floor 14 by which they are united in parallelism. These walls are centrally of the same radial depth as the body of the ring proper. They are normally in contact with both sides of tongues 11, at the free end of the latter and at the base 16. By the floor 14 the side walls 13 are spaced apart far enough to admit the tongues 11 slidably between them. Terminating in a horizontal plane secant to their own curvature and to the curvature of the ring proper, these walls are fitted to abut against the shoulders 10 and are respectively flush with the opposite sides of the ring proper. The bridge floor 14, which is shorter than the side walls of the bridge and longer than the maximum operative distance between the meeting ends of the ring tongues 11, is adapted to break the joint between these tongues and also to fill the space between the tongue shoulders 12. Through the middle of this floor is a radially directed pin-hole 15, which is equidistant from the opposite ends of the bridge. The spring 9 is a steel ribbon, as wide as the bridge, and is sprung concentrically into the ring proper in contact with the bottom of the bridge and the inside of said ring. It has, midway of its length, a radially directed engagement

pin 17, carried thereby and loosely occupying the pin-hole 15 in the floor of the bridge.

Such being the construction of my improved piston ring, the spring lining thereof, operating immediately and constantly on the bridge, and taking up wear and clearance, forces the peripheral surfaces of the bridge outward to meet the inside of the engine cylinder, and also forces the floor of the bridge in the same direction to meet the underside of the ring tongues 11 where they are undercut. By spanning and covering the entire opening of the ring proper, as well as the entire arched bottom of the bridge, the spring operates as a barrier to stop the passage of gases to or from the inside of the ring, through the bridge or through any part of this opening. The opposite ends of the bridge floor normally abut against the tongue shoulders 12 respectively, while the ends of the side walls 13 similarly meet the shoulders 10. But in case of any separation of these normally contacting parts, the opening, transversely of the ring, between the shoulders 10 and the ends of the side walls is spanned, obstructed and closed throughout its whole extent by that portion of the tongue base 16 which is uncovered by the separation, so that gases cannot in any case blow through the ring from either side to the other. Furthermore the concentric ring proper and the ribbon spring therein, whose openings are diametrically opposite, coöperatively tend to produce between the ring and the cylinder wall a practically uniform bearing pressure like that which has heretofore been produced or sought by the aid of piston rings of the eccentric type.

I claim as my invention—

1. A piston ring of the specified class, comprising a discontinuous ring proper, a bridge spanning the opening of the discontinuous ring, and a ribbon spring lining the ring proper and engaging the bridge.

2. A piston ring of the specified class, comprising a discontinuous ring proper of the concentric type, a bridge spanning the opening of the ring proper and a ribbon spring attached to the bridge and lining the ring proper.

3. A piston ring of the specified class, comprising a discontinuous ring proper having terminally undercut tongues as deep at the base as the ring proper, and an arcuate bridge having side walls as deep as the tongues and an arcuate floor between the side walls, in combination with a ribbon spring continuously contacting with the floor of the bridge and the inside of the ring proper.

4. A piston ring of the specified class, comprising a discontinuous ring proper having terminally undercut tongues with bases as deep as the ring proper, and an arcuate bridge having a floor under the free ends of the tongues, and side walls contacting with the sides of the tongues and tongue bases.

Witness my signature at Omaha, Nebraska, June 22d, 1920.

ROBERT W. BAKER.