May 20, 1930. H. S. GRAVES 1,759,110

PISTON

Filed Aug. 10, 1927 2 Sheets-Sheet 1

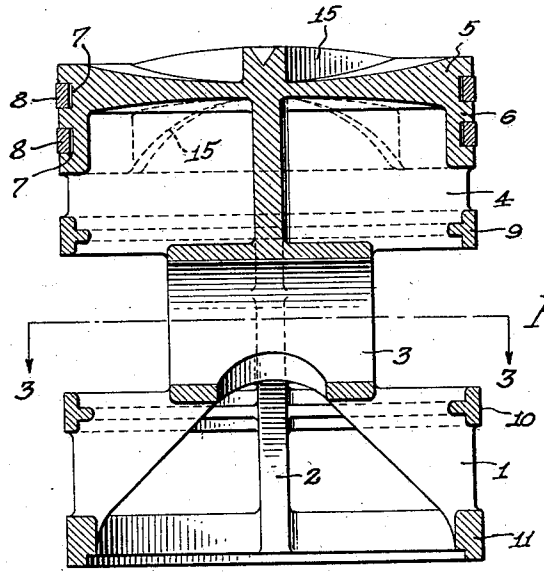


Fig. 1.

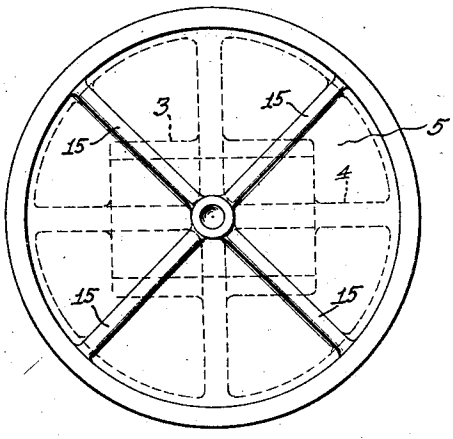


Fig. 2.

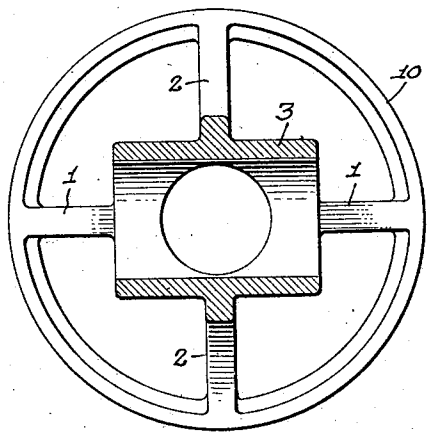


Fig. 3.

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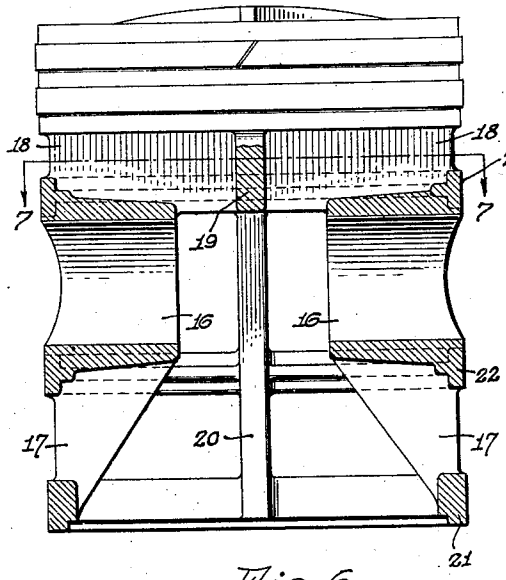


Fig. 6.

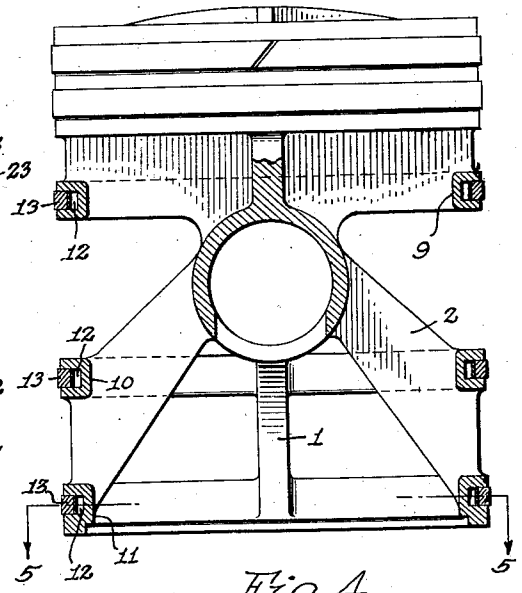


Fig. 4.

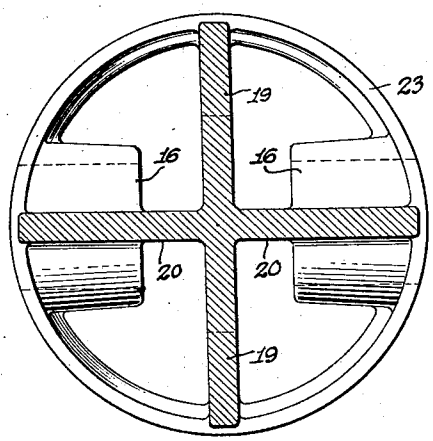


Fig. 7.

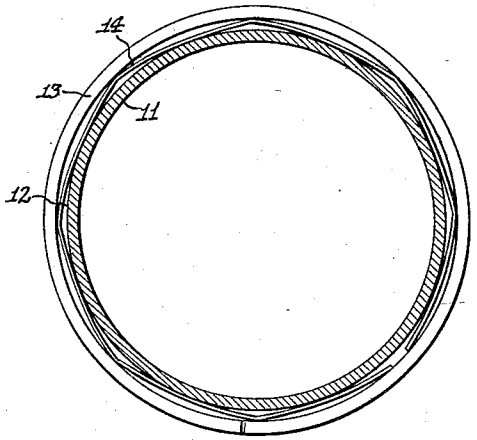


Fig. 5.

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Patented May 20, 1930 1,759,110

UNITED STATES PATENT OFFICE

HARRY S. GRAVES, OF HIGHLAND PARK, MICHIGAN; ETHEL S. GRAVES ADMINISTRATRIX OF SAID HARRY S. GRAVES, DECEASED

PISTON

Application filed August 10, 1927. Serial No. 211,901.

The present invention pertains to a novel piston construction for internal combustion engines.

The principal object of the invention is to provide a piston which is of light weight and yet of sufficient strength for the purposes to which it is to be applied. In the accomplishment of these objects, the piston is constructed in the form of a skeleton consisting of vanes radiating from the longitudinal axis of the piston.

In the preferred construction there are provided two sets of such vanes one above and the other below the bearing member.

The upper set of vanes is surmounted by the piston head which preferably increases in thickness from the center to the periphery for maximum conduction of heat to the cylinder walls.

For the purpose of strengthening the head, radial ribs are formed therethrough. Packing rings are formed around the vanes for the purpose of receiving the piston rings which prevent flow of gas from one side of the piston to the other.

The invention is fully disclosed by way of example in the following description and in the accompanying drawings, in which

Figure 1 is a longitudinal section of a piston constructed according to the invention;

Fig. 2 is a plan thereof;

Fig. 3 is a transverse section on the line 3—3 of Fig. 1;

Fig. 4 is an elevation, partly in section, at right angles to Fig. 1;

Fig. 5 is a section on the line 5—5 of Fig. 4;

Fig. 6 is a longitudinal section, particularly in elevation of a modified construction;

Fig. 7 is a section on the line 7—7 of Fig. 6.

Reference to these views will now be made by use of like characters which are employed to designate corresponding parts throughout.

The device shown in Figs. 1 to 5 includes two pairs 1 and 2 of lower vanes which extend from the center to the periphery of the piston. These vanes, particularly the members 1, are of substantially triangular formation, having a vertex disposed substantially at the longitudinal axis of the piston and having one side lying in the cylindrical surface of the piston. The bearing member 3 of the piston is formed upon the vanes 1 and is engaged by the innermost ends of the vanes 2 as shown in Figs. 1 and 4.

Another set of vanes 4 is formed upon the bearing member 3, and the members of this set preferably lie in the same planes as the vanes 1 and 2. The vanes 4 are surmounted by a partitioning head 5 having a depending annular flange 6 which rests on the upper edges of the vanes. The flange is formed with a pair of peripheral grooves 7 for receiving piston rings 8, and ribs 9 and 10 surround the upper and lower vanes respectively, preferably at the inner edges thereof, for the purpose of providing additional sealing means at the cylinder walls. These ribs, as well as a base rib 11 surrounding the lower set of vanes at their lower vertices, may be grooved as at 12, for receiving additional piston rings 13 as illustrated in Fig. 4. If desired, the rings may be backed by bent spring wires 14 which furnish the elastic and distending characteristic to the piston rings.

It has been found that a piston head conducts heat to the cylinder walls more efficiently if it increases from the center to the periphery. Accordingly the piston head 5 has been made of such construction as shown in Fig. 1. In order to strengthen the head particularly at the shortened part thereof, it is formed with radial ribs 15 which preferably bisect the angles formed by the vanes 4.

In the construction shown in Figs. 6 and 7, there are provided two alined bearings 16 at diametrically opposite points on the piston. Two of the lower vanes 17 and two of the upper vanes 18 engage the outer surfaces of the bearings longitudinally, so that the lower vanes constitute an effective support for the bearings and the bearings similarly support the head. Another pair of ribs 19 intersect the ribs 18 at substantially right angles thereto and are of the same size as the ribs 18 as shown in Figs. 6 and 7. The rib structure is completed by a pair of ribs 20

each positioned midway between the ribs 17 and extending upwardly until they merge into the ribs 19. The lower vertices of the ribs 17 and 20 are surrounded by a ring 21. Similar rings 22 and 23 surround the ribs 17, 18, and 19 at the lowest and highest points of the bearings 17. The ribs 20 may be of triangular form, having one vertex in the ring 21 and one side passing through the ring 22 and lying parallel to the longitudinal axis of the piston.

It will be seen that I have provided a skeleton piston construction consisting of vanes which support the bearings, head and peripheral packing rings. Further, these rings may be provided at the skirt or lower vanes as well as at the upper vanes, so the advantage of having several packing members is not sacrificed by the skeleton construction.

Although specific embodiments of the invention have been illustrated and described, it will be understood that various alterations in the details of construction may be made within the scope of the invention as indicated by the appended claims.

What I claim is:

1. A piston comprising a single central bearing member, radial vanes formed above and below the same, and a partition head formed upon the upper vanes.

2. A piston comprising a plurality of radial vanes, and a partition head mounted thereon, and radial ribs formed beneath said head and prolonged through said head above the upper surface thereof.

3. A piston comprising a bearing member, radial vanes formed above and below the same, a partition head formed upon the upper vanes, and radial ribs formed beneath said head and prolonged through said head above the upper surface thereof.

4. A piston comprising a bearing member, radial vanes formed above and below the same, a partition head formed upon the upper vanes, and radial ribs intersecting said head, said head gradually increasing in thickness from the center to the periphery.

In testimony whereof I affix my signature.

HARRY S. GRAVES.