J. M. FOUNTAIN.

PISTON CONSTRUCTION FOR INTERNAL COMBUSTION ENGINES.

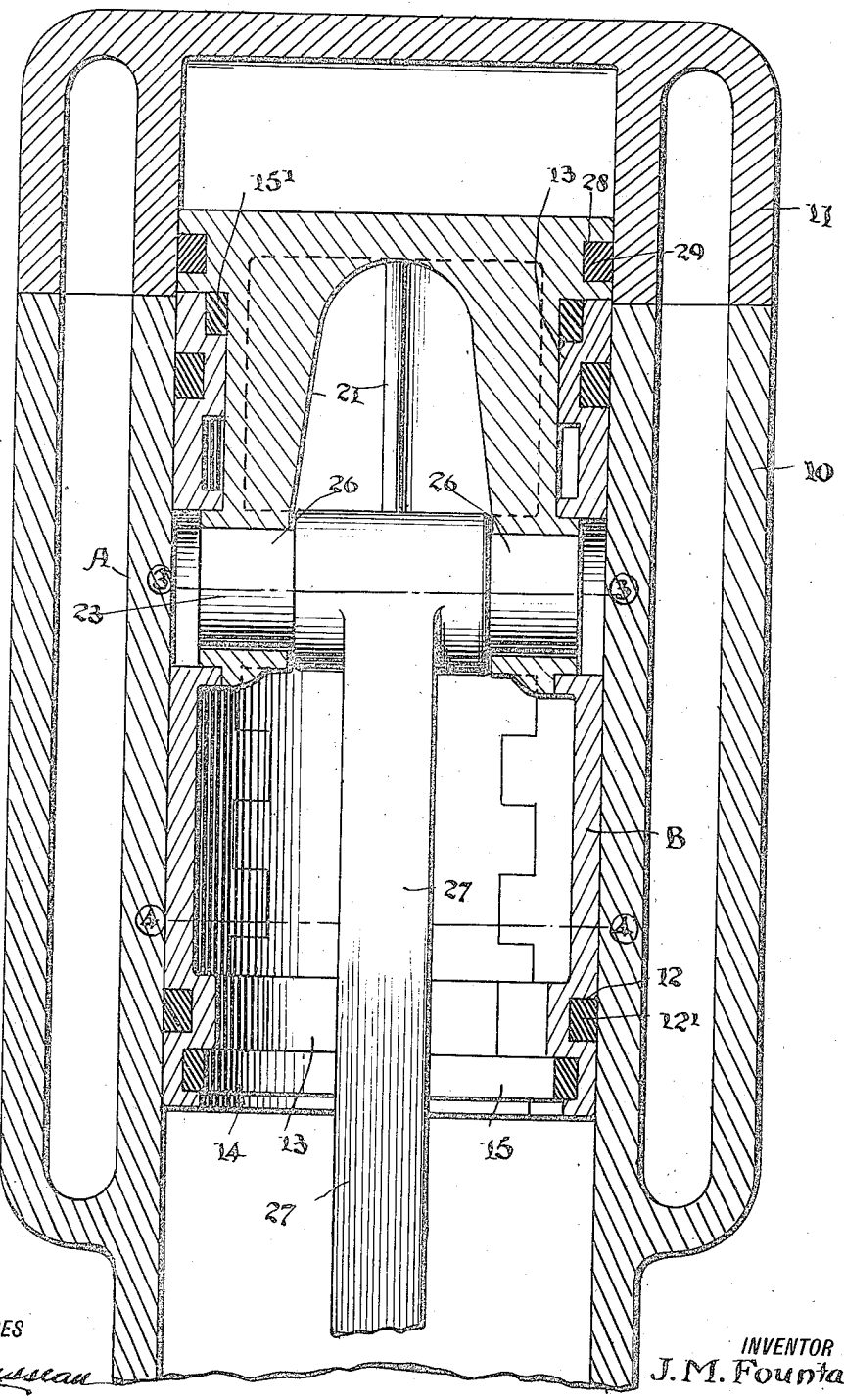
APPLICATION FILED JUNE 24, 1921.

1,435,386.

Patented Nov. 14, 1922.

2 SHEETS—SHEET 1.

Fig. 1.



WITNESSES

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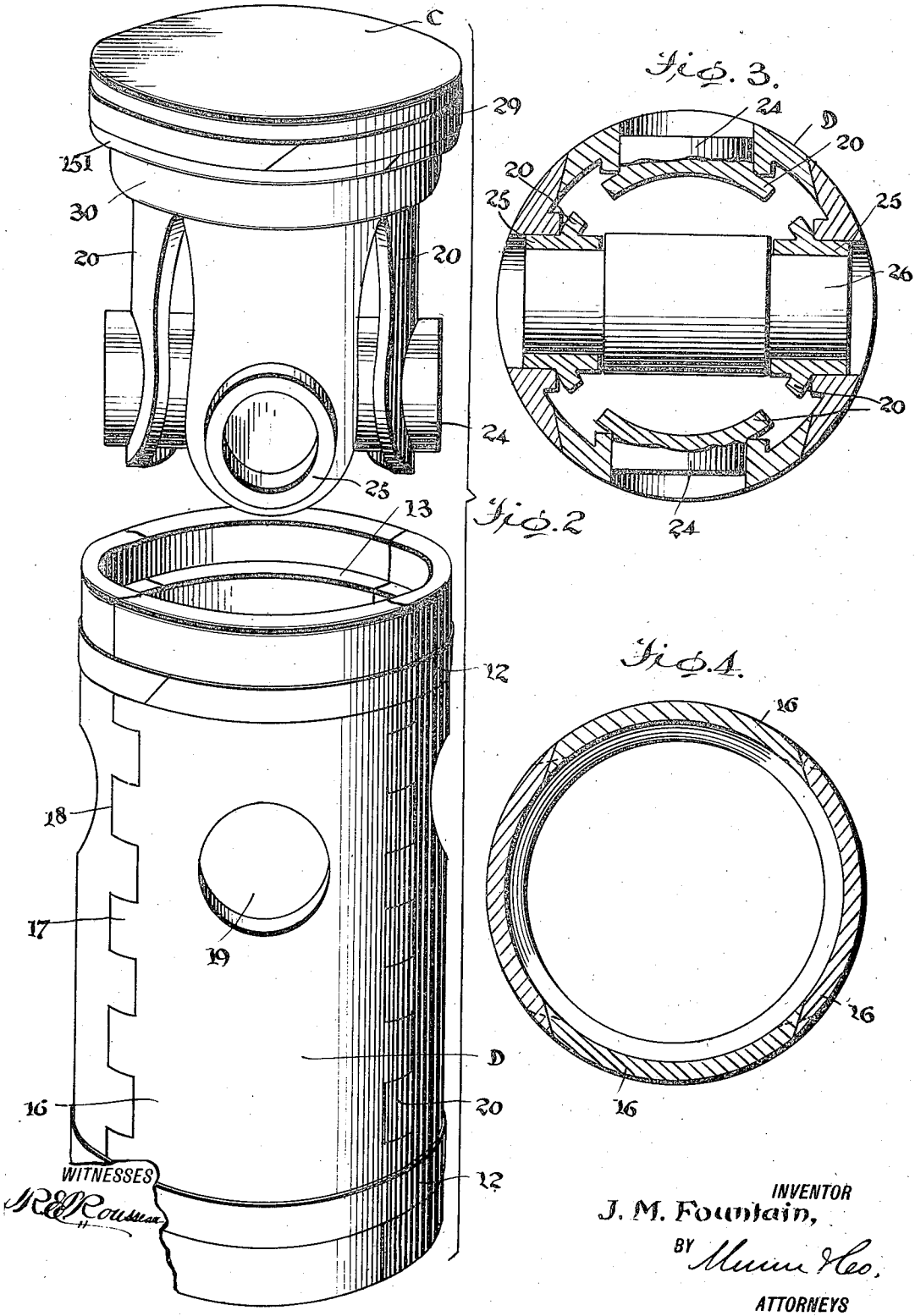
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UNITED STATES PATENT OFFICE.

JOSEPH MORIS FOUNTAIN, OF SAN FRANCISCO, CALIFORNIA.

PISTON CONSTRUCTION FOR INTERNAL-COMBUSTION ENGINES.

Application filed June 24, 1921. Serial No. 480,019.

To all whom it may concern:

Be it known that I, JOSEPH M. FOUNTAIN, a citizen of the United States, and a resident of San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Piston Constructions for Internal-Combustion Engines, of which the following is a specification.

This invention relates to a piston construction for internal combustion engines.

The primary object of the invention is to construct a piston of the above character which is adapted to entirely eliminate any possibility of leakage of gas between the walls thereof and the walls of the cylinder with which the piston may be associated.

It is also an object of the invention that the piston be adapted to substantially eliminate the necessity of removing the packing rings thereof.

Other objects and objects relating to details of construction, combination and arrangement of parts will hereinafter appear in the detail description to follow.

The invention is illustrated by way of example in the accompanying drawings, in which:—

Figure 1 is a central vertical sectional view illustrating a piston constructed in accordance with the present invention, and also a cylinder with which the piston may be associated.

Figure 2 is a collective view showing in perspective the piston head and body member,

Figure 3 is a transverse sectional view taken substantially on the lines 3—3 of Figure 1,

Figure 4 is a view similar to Figure 3 taken substantially on the line 4—4 of Figure 1.

Referring to the drawings more particularly, A indicates generally a cylinder of an internal combustion engine; 10 the water jacket therefor; 11 the cylinder head and B a piston reciprocable in the cylinder A and constructed in accordance with the present invention.

The piston B comprises the head generally indicated by the reference character C and a hollow cylindrical body generally indicated by the reference character D, Figure 2. The cylindrical body D has formed adjacent each end thereof an annular groove 12′; each groove being adapted to receive a packing ring 12 of the type shown; also upon the inner wall of the member D there is formed adjacent each end thereof an annular rib 13, said ribs occurring immediately beneath the grooves 12 as shown. At the lower end of the body member D and upon the inner periphery thereof, there is formed a flange 14 and between the flange 14 and associated rib 13 there is positioned an expansion ring 15; also above the rib 13 which occurs at the upper end of the cylindrical body D there is fitted a similar expansion ring 15′. The expansion rings, in each instance, are similar to an ordinary packing ring, that is, the ring is split and made of spring metal so that the same will have a tendency to press outwardly upon the inner periphery of the cylindrical body member D.

The cylindrical body D is made of four longitudinal sections 16 and adjacent edges of the sections are formed with intermeshing teeth 17, said teeth occurring between the exterior annular grooves 12′. The forward edge of the teeth 17 and also the associated edge of the recesses 18 occurring between the teeth are cut so that they may overlap each other and likewise the edges of the end portions of the sections are joined in a similar manner. As is obvious the purpose of this construction is to permit the cylindrical member B as a whole to expand, or the diameter thereof to increase to a certain extent without any possibility of leakage of gas between the adjacent edges of the sections 16.

Each section 16 is formed with a circular opening as indicated at 19, the purpose of which will later become apparent.

Referring to the head member C it will be seen that the same is formed with four downwardly extending ears 20 which are reinforced by the ribs 21, Figure 1. The ears 20 are arranged, as shown, and adapted to slide within the cylindrical body member B. A pair of the ears which are diametrically opposed to each other are each formed adjacent their lower ends with a boss 24 which are adapted to be fitted into the openings 19 of the associated sections 16 of the cylindrical body D. The two remaining ears 20 are each formed with a sleeve extending transversely thereof, said sleeve being adapted to journal the ends 23 of a cross head 26, said cross head being integrally formed upon the end of a connecting rod 27.

The piston head C is also formed with an annular groove 28 adapted for receiving the packing ring 29 which is of the split type, as shown. The portion 30 of the head immediately below the groove 28 is reduced and adapted to fit within the cylindrical body D. The head also seats upon the expansion ring 15′ as shown in Figure 1 and holds the same in position.

In the operation of the present invention, the expansion rings 15 and 15′ tend to press the section 16 forming a cylindrical body D apart, or in other words, expand the cylindrical body D and hold the sections in close contact with the inner walls of the cylinder A, thus in every way insuring that no leakage will occur between the cylindrical member D of the piston and the interior walls of the cylinder. As is obvious by continuously pressing outwardly the sections 16 of the cylindrical body 10 the wear of the piston is distributed over its entire exterior surface, and not entirely imposted upon the packing rings as is usually the case.

While I have shown and described the preferred form of my invention it is to be understood that I am aware of the fact that the construction, combination and arrangement of parts may be changed by those skilled in the art without departing from the spirit of my invention, as indicated by the appended claims.

I claim:—

1. In combination, a cylindrical hollow piston comprising a plurality of longitudinal sections having overlapping adjacent edges, expansion split rings carried within said piston, a head closure for the upper end of said piston, a pair of ears depending from said head closure diametrically opposed with respect to one another and each having formed therewith an outwardly extending boss, said boss in each instance being journaled in an opening formed in the associated section of the piston, and means for connecting a connecting rod to said head closure.

2. In combination, a cylindrical hollow piston comprising a plurality of longitudinal sections having overlapping adjacent edges, expansion split rings carried within said piston, a head closure for the upper end of said piston, a pair of ears depending from said head closure diametrically opposed with respect to one another and each having formed therewith and outwardly extending boss, said boss in each instance being journaled in an opening formed in the associated section of the piston, a radial rib extending longitudinally and upon the inner side of each ear depending from said head closure whereby said ears may be reinforced, and means for journaling a connecting rod to said head closure.

3. In combination, a cylindrical hollow piston comprising a plurality of longitudinal sections having overlapping adjacent edges, expansion split rings carried within said piston, a head closure for the upper end of said piston, a pair of ears depending from said head closure diametrically opposed with respect to one another and each having formed therewith an outwardly extending boss, said boss in each instance being journaled in an opening formed in the associated section of the piston, a second pair of diametrically opposed ears depending from said head closure and each ear being formed with a journal sleeve extending transversely thereof, whereby the cross head of a connecting rod may be journaled to said head closure, and a radial reinforcing rib extending the length of and upon the inner side of each of the downwardly depending ears from said head closure.

4. In combination, a cylindrical hollow piston comprising a plurality of longitudinal sections having overlapping adjacent edges, expansion split rings carried within said piston, a head closure for the upper end of said piston, means whereby a connecting rod may be journaled to said head closure, and means depending from said head closure whereby journaled connections may be formed between sections of the piston and the head closure.

5. In combination, a cylindrical hollow piston comprising a plurality of longitudinal sections having overlapping adjacent edges, expansion split rings carried within said piston, a head closure for the upper end of said piston, means depending from said head closure whereby the cross head of a connecting rod may be journaled to said head closure, and means also depending from said head whereby a connection between the sections of the piston and the head may be established.

JOSEPH MORIS FOUNTAIN.