

PATENT SPECIFICATION



Application Date: Dec. 7, 1943. No. 20455/43.

570,286

Complete Specification Left: Dec. 4, 1944.

Complete Specification Accepted: June 29, 1945.

PROVISIONAL SPECIFICATION

Improvements in or relating to Rotary Valve Internal Combustion Engines

I, FRANK METCALF ASPIN, a British subject, of Walmer Place, 149, Walmersley Road, Bury, Lancashire, do hereby declare the nature of this invention to be as follows:—

This invention relates to rotary valve internal combustion engines of the kind having a rotary valve member with a ported tapered bearing and gas sealing surface and an end face presented to the cylinder and adjacent to a complementary face between which latter faces escaping gases or liquids have to pass from or to the cylinder and the said tapered bearing and gas sealing surface.

The normal function of the tapered bearing and gas sealing surface of the rotary valve member of the kind referred to and of the complementary tapered surface of this housing, is not only to seal as regards gases passing into or out of the port or ports in the rotary member itself, except to the ports in the housing, but to prevent leakage to or from the port or ports in the housing as regards either end of the rotary valve member, and mainly as regards the said end face presented to the cylinder.

The object of the present invention is to relieve the said tapered surfaces, at least in part, of the last mentioned function.

According to the invention, a rotary valve internal combustion engine of the kind referred to is characterised by complementary annular grooves in the end face of the rotary valve member and in the adjacent complementary face and a gas sealing ring located therein.

The engine may be further characterised in that the gas sealing ring is endless and free to float in its complementary annular grooves.

The invention may be applied particu-

larly though not exclusively to engines forming the subject of my earlier Patent No. 564,850.

The accompanying drawing (Fig. 1) is a cross section of the relevant part of one example of a rotary valve internal combustion engine made in accordance with the invention.

As shown in the drawing, the rotary valve member 10 is rotatably mounted in a housing 11, both parts having complementary tapered bearing and gas sealing surfaces. The lower end face of the rotary valve member is part conical at 10a and part flat at 10b, in which latter part is formed an annular square section groove for an endless rectangular section sealing ring 12. The end of the rotary valve member is presented to adjacent complementary part conical and part flat surfaces in a baffle member 13, which feature forms the subject of my above-numbered Patent No. 564,850, and in the said flat surface of which is a complementary annular square section groove in which the ring 12 is also located. The ring 12 is free to float in the complementary grooves and is lubricated from the lubrication system for the rotary valve member.

In use, it is found that the sealing ring, by reason of and/or in spite of carbon deposit from the lubrication or products of combustion, forms a very effective seal which relieves the complementary tapered bearing and gas sealing surfaces of a substantial part of the duty of sealing against leakage from or to that end of the rotary valve member.

Dated this 12th day of November, 1943.

For the Applicant,
WILSON, GUNN & ELLIS,
Chartered Patent Agents,

54/56, Market Street, Manchester, 1.

COMPLETE SPECIFICATION

Improvements in or relating to Rotary Valve Internal Combustion Engines

I, FRANK METCALF ASPIN, a British subject, of Walmer Place, 149, Walmersley Road, Bury, Lancashire, do hereby

declare the nature of this invention and in what manner the same is to be performed, to be particularly described and

ascertained in and by the following statement:—

This invention relates to rotary valve internal combustion engines of the kind having a rotary valve member with a ported tapered bearing and gas sealing surface and a ported end face presented to the cylinder and adjacent to a complementary face between which latter faces escaping gases or liquids have to pass from or to the cylinder and the said tapered bearing and gas sealing surface.

The normal function of the tapered bearing and gas sealing surface of the rotary valve member of the kind referred to and of the complementary tapered surface of this housing, is not only to seal as regards gases passing into or out of the port or ports in the rotary member itself, except to the ports in the housing, but to prevent leakage to or from the port or ports in the housing as regards either end of the rotary valve member, and mainly as regards the said end face presented to the cylinder.

The object of the present invention is to relieve the said tapered surfaces, at least in part, of the last mentioned function.

According to the invention, a rotary valve internal combustion engine of the kind referred to is characterised by complementary annular grooves in the end face of the rotary valve member and in an adjacent complementary face and a gas sealing ring located therein.

The engine may be further characterised in that the gas sealing ring is endless and free to float in its complementary annular grooves.

The invention may be applied particularly, though not exclusively, to engines forming the subject of my earlier Patent No. 564,850.

The drawing filed with the Provisional Specification and designated Fig. 1 is a cross section of the relevant part of one example of a rotary valve internal combustion engine made in accordance with the invention.

In the drawings filed herewith Figs. 2 and 3 show alternative modifications of the construction shown in Fig. 1.

As shown in the drawing filed with the Provisional Specification (Fig. 1) the rotary valve member 10 is rotatably mounted in a housing 11, both parts having complementary tapered bearing and gas-sealing surfaces. The lower end face of the rotary valve member is part conical at 10a and part flat at 10b, in which latter part is formed an annular square section groove for an endless rectangular section sealing ring 12. The end of the rotary valve member is presented to ad-

acent complementary part conical and part flat surfaces in an inwardly projecting baffle member 13, which feature forms the subject of my aforesaid Patent No. 564,850 and in the said flat surface of which is a complementary annular square section groove in which the ring 12 is also which relieves the complementary tapered a cylinder head 13a in which the housing 11 is located as a plug-like unit. The housing 11, cylinder head 13a and baffle member 13 are cored for a cooling fluid. The ring 12 is free to float in the complementary grooves and is lubricated from the lubrication system for the rotary valve member. Obviously such grooves must be annular and coaxial with the axis of rotation of the rotary valve member.

In use, it is found that the sealing ring, by reason of and/or in spite of carbon deposit from the lubrication or products of combustion, forms a very effective seal which relieves the complementary tapered bearing and gas-sealing surfaces of a substantial part of the duty of sealing against leakage from or to that end of the rotary valve member. Also oil which by centrifugal force when running under light loads, is thrown down the conical surface of the rotary valve member, is trapped by the sealing ring and any carbon seal formed thereon, so that such oil is not drawn into the cylinder. Moreover, as the ring is set in from the outer periphery of the rotary valve member, such centrifugal force is to a large extent countered by centrifugal force developed on the under side of the rotary valve member. The distance of setting-in is however made as shown with consideration to giving some protective distance inwardly of the ring and between the complementary faces of the baffle 13 and end of the rotary valve member.

As shown in Fig. 2 the ring 14 is located in a groove in the baffle 13 and in said groove is a wavy spring ring 15 which presses the ring 14 against the flat end face of the rotary valve member 10.

As shown in Fig. 3, the ring 16 is located in a groove in the rotary valve member 10 and in said groove is a wavy spring ring 17 which presses the ring 16 against the flat end face of the baffle 13.

The arrangement of either of the above constructions operates in substantially the same manner as the example first described.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A rotary valve assembly for an in-

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- ternal combustion engine comprising a rotary valve member and housing having complementary ported tapered bearing and gas sealing surfaces, a stationary member having an annular end face adjacent to a ported complementary end face of the rotary valve member, one of the said end faces having an annular ring groove, a ring located in the said groove and means for causing the ring to have sealing engagement with the member having the other end face.
2. A rotary valve assembly according to Claim 1 characterised in that the said means comprises a complementary groove in said other end face so that the ring is at least partly located in said complementary groove.
3. A rotary valve assembly according to Claim 1 characterised in that the said means comprises a resilient member in the said groove behind the ring for causing the ring to press against the complementary end face.
4. A rotary valve assembly for an internal combustion engine of the kind referred to characterised by complementary like annular grooves in the end face of the rotary valve member and in an adjacent complementary face, and a gas-sealing ring partly located in both said grooves.
5. A rotary valve assembly according to any of the preceding Claims characterised in that the gas-sealing ring is endless.
6. A rotary valve assembly according to any of the preceding Claims 2, 4 or 5 characterised in that the gas-sealing ring is free to float in the said complementary annular grooves.
7. A rotary valve assembly for an internal combustion engine comprising a cylinder head adapted to be secured to the end of the engine cylinder, a valve housing in the said cylinder head, having an inwardly projecting baffle member adjacent the cylinder and a ported tapered bearing and gas-sealing surface, a rotary valve member mounted therein having a complementary ported tapered bearing and gas-sealing surface, and a ported end face complementary to an end face of the said baffle member, and a gas-sealing ring located partly in a groove in the said ported end face of the rotary valve member and partly in a complementary and like groove in the said inwardly projecting baffle.
8. A rotary valve assembly according to any of the preceding Claims characterised in that the gas-sealing ring is set-in substantially from the outer peripheral edge of the rotary valve member, as and for the purpose set forth.
9. A rotary valve assembly according to any of the preceding Claims characterised in that the gas-sealing ring is located so that there is a protective distance inwardly of the ring and between the end of the rotary valve member and the adjacent complementary face.
10. A rotary valve assembly for an internal combustion engine constructed and arranged substantially as herein described with reference to and as illustrated in the drawing filed with the Provisional Specification, or as modified in either figure of the drawing filed herewith.

Dated this 15th day of November, 1944.

For the Applicant,
 WILSON, GUNN & ELLIS,
 Chartered Patent Agents,
 54/56, Market Street, Manchester, 1.

[This Drawing is a reproduction of the Original on a reduced scale.]

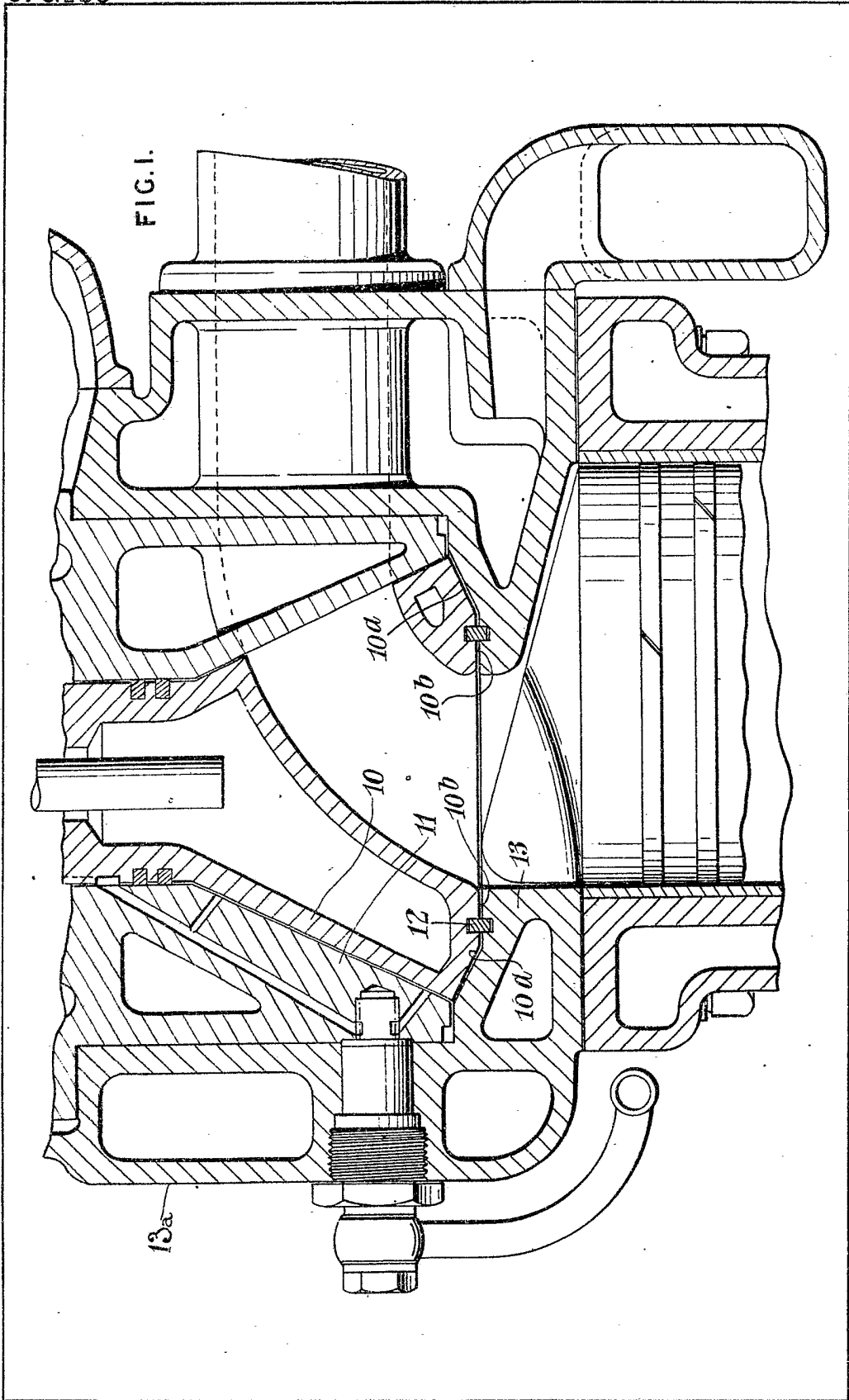


FIG. 2.

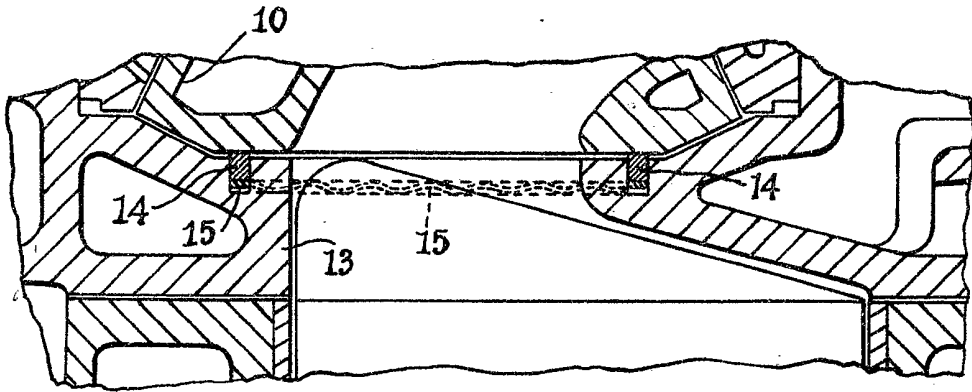
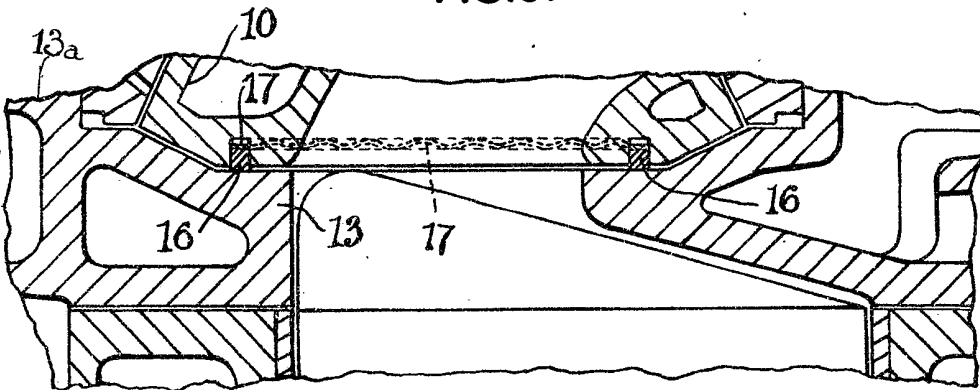


FIG. 3.



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