Sept. 6, 1966 YOSHITSUGU HAMADA 3,270,719

PRESSURE REDUCING DEVICE FOR DIESEL TYPE ROTARY ENGINES

Filed June 5, 1962

Fig. 1

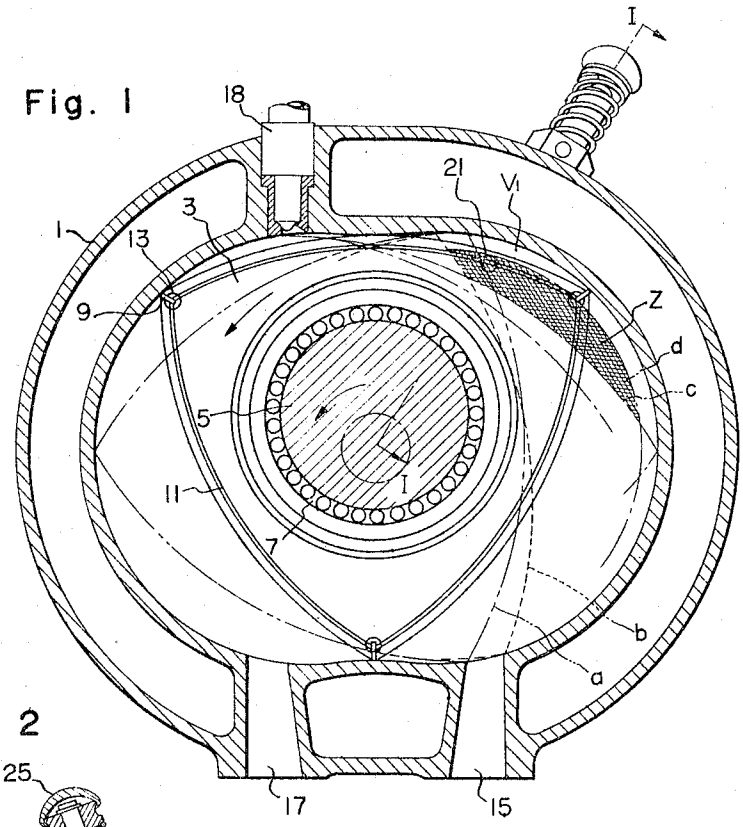
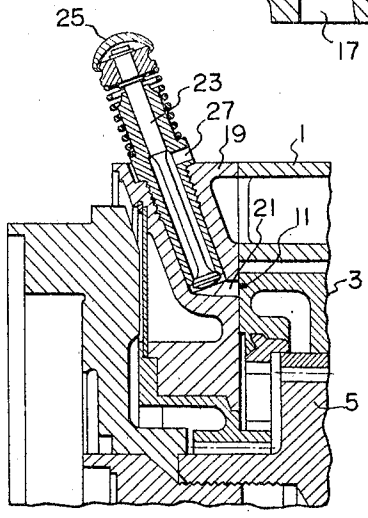


Fig. 2



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3,270,719

Patented Sept. 6, 1966

3,270,719

PRESSURE REDUCING DEVICE FOR DIESEL TYPE ROTARY ENGINES

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Filed June 5, 1962, Ser. No. 200,170
Claims priority, application Japan, July 25, 1961, 36/37,512
1 Claim. (Cl. 123—8)

Diesel engines in general are required to compress the fuel-air mixture to approximately 40 atmospheres for ignition and thus considerable torque is required in the compression process. With hand-started diesel engines, it is well known that a suitable pressure reducing means is utilized to minimize the torque for hand starting.

The present invention relates to pressure reducing devices for rotary diesel engines comprising a housing having an inner wall surface of epitrochoidal configuration and a rotor operable in sliding engagement with said inner wall surface.

FIG. 1 represents a transverse cross section of the diesel type rotary engine; and FIG. 2 represents a cross-sectional view substantially taken along the line I—I in FIG. 1.

Referring to FIG. 1, numeral **1** denotes a housing having an inner wall surface of epitrochoidal configuration; and **3** denotes a rotor therein. The rotor **3** is supported on the output shaft **5** by way or rotor bearings **7** so as to effect planetary motion in the direction of the arrow with the rotation of the output shaft **5**. Edge seals **9** are disposed along the edges of the rotor so as to continuously slide along the inner wall surface of the housing during the motion of said rotor separating respective working chambers, and together with side seals **11** mounted on the side faces of the rotor serve to seal said working chambers air-tight. Numeral **13** denotes corner pins engaging the edge seals **9** and side seals **11** to obtain proper operation of the seals.

The drawing illustrates the engine with its rotor in a position assumed when the compression terminates in the working chamber V_1 and the latter has its minimum volume. The double-dotted chain line *a* indicates the profile or position of the rotor when said working chamber has its maximum volume.

As the rotor moves from position *a* to position *b*, it closes a suction port **15** for the working chamber V_1. Then, the compression is started in the working chamber as the rotor further moves in the direction of the arrow unless an appropriate pressure reducing device is provided. As the rotor proceeds to take the position indicated by the chain line *c*, the working chamber V_1 comes to have a volume reduced to one quarter of the maximum volume.

As shown in FIGS. 1 and 2, a pressure reducing bore **21** is opened in the housing side cover **19** within the area Z encircled by the lines *b*, *c* and the locus *d* of the corner pin **13** to communicate the working chamber V_1 with the atmosphere with the result that the working chamber at the maximum compression has a reduced pressure of from less than several atmospheres to approximately the atmospheric pressure.

If a reducing bore **21** be arranged in the epitrochoidal housing wall, the reducing bore would straddle or interconnect adjacent working chambers separated by the edge seal therebetween upon passage of said seal over the reducing bore. In contrast, the reducing bore **21**, where it is opened in the above areas of the housing side cover, it never straddles or interconnects the adjacent working chambers at any time. As a consequence, there is no danger of said bore impairing the air-tight sealing of the

working chambers during engine operation if only the reducing bore **21** is closed against the atmosphere. Further, the fact that the reducing bore **21** is located inside of the locus *d* of the axis of the corner pins **13** serves to prevent the latter from falling into the bore and also to prevent the normal sliding engagement from being adversely affected by the presence of the bore **21**.

Referring further to FIG. 1, numeral **17** indicates an exhaust port and **18**, a fuel injection valve.

In FIG. 2 showing the reducing device in detail, numeral **23** denotes a reducing valve. As will readily be understood, depression of a hand grip **25** causes to communicate the engine working chamber with the atmosphere through the reducing bore **21** and a passageway **27** thereby avoiding undesirable compression of the fuel-air mixture.

What is claimed is:

A decompression device for providing decompression control in a diesel type rotary internal combustion engine comprising a housing having axially spaced end walls and a peripheral wall interconnecting said end walls to define between said walls a cavity with the inner surface of said peripheral wall having a two-lobed epitrochoidal profile, a rotor received in said cavity and supported for rotation with respect to said housing, said rotor having axially spaced end faces provided with end seal means for sealing engagement with said end walls and an outer surface with three circumferentially spaced apex portions provided with edge seal means for sealing engagement with the peripheral wall inner surface of the housing to divide the space between said inner surface and the outer surface of the rotor into three working chambers, and corner pins at the apex corners of the end faces of the rotor for holding said end face seal means and edge seal means, a suction port and an exhaust port each formed in said peripheral wall; said decompression device comprising a bore in one of said end walls, a normally closed control valve mounted within said bore and which, when actuated, provides communication between atmosphere and said cavity, said bore being located in an area of said end wall surface which is defined by three curved lines, namely, the line of rotor profile at the instant when the suction port in the engine housing has been closed by the rotor, the line of rotor profile at the instant when the volume of said working chamber under compression has been reduced during compression stroke to preferably one quarter of its maximum value, and the locus of the axis of the corner pin of the rotor.

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