COMMISSIONER'S DECISION

Obviousness: Ignition Plug Channel in Rotary Engine

Placement of the ignition means only in a channel known in the art to be located in a combustion zone was found to be obvious. As no claim was supportable by the principal disclosure, the supplementary disclosure was not allowable. Rejection affirmed.

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This decision deals with Applicant's request for review by the Commissioner of the Final Action on application 218,308 (class 171-87), entitled Rotary Engine. The inventor is Siak-Hoo Ong. The Examiner in charge issued a Final Action on March 7, 1980 refusing to allow the application to proceed to patent.

The application relates to a rotary piston internal combustion engine having: a chamber with a trochoidal inner surface and an eccentrically mounted, triangular in cross-section, rotor with its apex edges in sliding contact with the chamber; a plug channel opening 12 in the chamber surface and having a cross-sectional configuration which is narrower in the direction of rotation of the rotor than in the direction of the axis of rotation of the rotor. Figures 9, 11, 12A and 12B show the arrangement.

FIG. 9

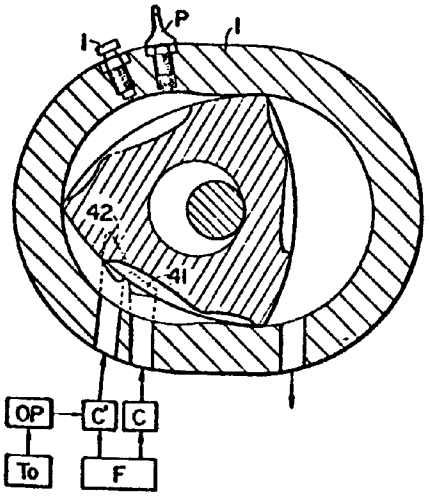


FIG. 11

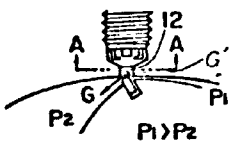


FIG. 12A

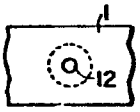
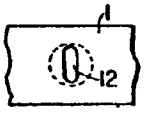


FIG. 12B



In the Final Action the Examiner refused the application on the ground of obviousness in view of the following United States patents:

3,698,364	Oct. 17, 1972	Jones
3,246,636	Apr. 19, 1966	Bentele

The Jones patent discloses a fuel combustion system for a rotary piston engine having a chamber with a plug channel opening in its surface which extends in the direction of rotation in the form of a narrow, shallow groove 62 which is longer and narrower in the direction of rotation than in the direction of the axis of rotation. Figure 4 of this patent illustrates the opening used in the structure.

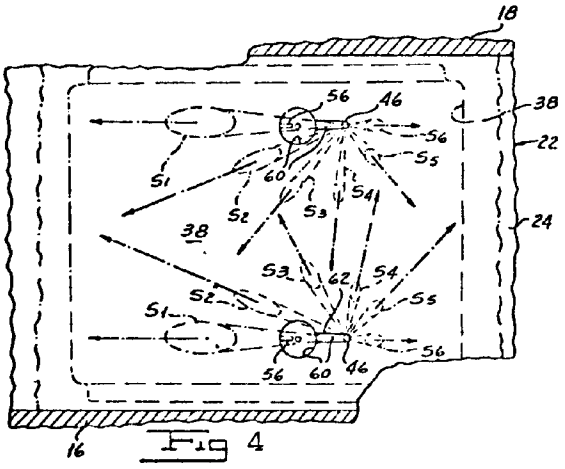


Fig 4

The Bentele patent discloses a fuel combustion system for a rotary piston engine having a chamber with a plug channel opening which has a cross-sectional configuration which is narrower in the direction

of the axis of rotation of the rotor than in the direction of rotation of the rotor. Figure 13 depicts the opening of this patent.

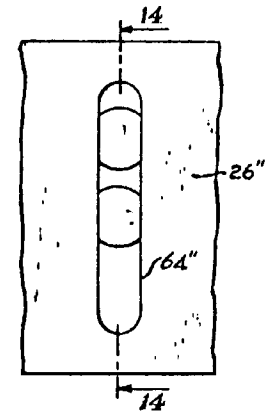


Fig 13

In the Final Action the Examiner stated, in part:

> The Jones patent discloses a rotary engine having a spark plug channel which has a cross-sectional configuration narrower in the direction of rotation than in the direction of the axes of rotation. The Bentele patent shows a spark plug channel which varies in shape from the normal shape.
>
> The primary purpose of the distorted spark plug opening with the included fuel injector, in the cited patents, is to promote better combustion; this in essence is applicant's reason for providing the various shapes of spark plug openings described and claimed in the application.
>
> The fact that applicant has not included the fuel injector in the same opening as that provided for the spark plug does not alter the reason for the variation in shape of the said opening. The variation in shape is intended to provide for improved combustion just as the use of non standard openings is indicated to provide for improved combustion in the teaching of the cited patents.

> Furthermore, since the cited patents teach spark plug channels which vary in shape from a normally round shape, any further variation in shape of such openings is considered to be well within the scope of expected skill for one in the art, and therefore not of patentable significance.
>
> Applicant's argument that the patent to Jones does not relate to a rotary engine having a spark plug channel which is narrower in the direction of rotation then in the direction of the axis of rotation is not correct. Figures 3 and 4 of the Jones patent show a combined spark and fuel injection channel elongated in the direction of rotation. The fact that the fuel injector is included in the said channel does not alter the fact that the spark plug is encompassed within this channel.
>
> Also the said channel in the Jones patent is located at the trailing pressure turning point similarly to that in applicant's device as disclosed in this application.

The Applicant did not agree with the Examiner, and in the response to the Final Action, he argued, in part:

...

> In the present invention, we are concerned with a spark plug arrangement alone, without dealing with any fuel injecting nozzle, between the electrode of such an ignition plug and the internal face of the casing being provided a plug channel. Therefore, from the outset, it is clear that the fuel injecting nozzle and ignition plug arrangement of the applied patent is directed to a different combination of elements and structure than the ignition plug of the present application. As above-mentioned, on one hand, the present application does not show a fuel injection nozzle and plug arrangement and, on the other hand, the applied patent does not show, in case of having such fuel injection nozzle and ignition plug arrangement located side by side, a plug channel as in the present application.

...

> It is therefore clear that the applied patent and the present application do not have the same object. Combination of the oval, lozenge or rectangular opening as taught in the present application with the location thereof at the trailing of the pressure turning point gives a better ignition result, while the combination of the enlarged opening and location of this opening in the applied patent gives a better injection of fuel. Therefore, the opening of BENTELE is related to a better injection and the opening of the present application is related to a better ignition.

In fact, when one compares the sizes of the two openings, the purposes of the openings, the locations of the openings and the elements in these openings, it is clear that the opening of BENTELE is an injection opening while the opening of the present application is a plug opening.

In order to reject this application, it is rather Figure 13 on which the Examiner has based himself. This Figure is described in column 7, lines 52 to 72. However, in the paragraph describing this Figure first, there is always the reference of a plug 44", and nozzle 46", and the recess 54" (this should be 64") into which the plug and nozzle project extend across the greater portion of the width of the peripheral roll. However, such an opening concerns only the spray nozzle as is evident from column 7, line 62 which says "a wide angle spray from the nozzle is provided for, such that fuel is sprayed substantially across the entire width of the combination chamber whereby substantially all the air moved by the rotor past the plug and nozzles passes directly through the region of the fuel spray and efficient combustion results". The object of such recess is not the same as the object of the channel opening of the present invention.

...

The U.S. Patent No. 3,246,636 to BENTELE discloses that an oval channel is located at the pressure turning point. This is clear from claim 6 and claim 7 combined and is shown in figures 5 and 6.

...

The present invention relates to an oval channel which has a position located at the trailing of the pressure turning point. The pressure turning point is shown by position 3_a of figure 25 of the present application or position B of figure 6 of BENTELE'S invention. Claim 1 of the present invention defines an oval-shaped opening at the trailing of the pressure turning point. It is because there exists a pressure difference at a position other than the pressure turning point to create leakage of gas, that the present invention has such a configuration of oval plug channel at the trailing of pressure turning point.

Therefore, it is clear that BENTELE has an oval channel at the pressure turning point for the purpose of wide injection of fuel and the present invention has an oval channel at the trailing of the pressure turning point for improved ignition by the spark plug.

...

The issue before the Board is whether or not the application is directed to a patentable advance in the art. Claim 1 reads:

> 1. A rotary piston internal combustion engine comprising a peripheral wall having a trochoidal inner surface, a rotor eccentrically mounted on a rotatable shaft to perform a planetary motion within the chamber defined by the inner surface of the peripheral wall, the rotor being substantially triangular in cross-section having its apex edges in sliding contact with the inner trochoidal inner surface of the peripheral wall, characterized in that said combustion engine has an ignition system comprising a first plug channel terminating in an opening in said trochoidal inner surface, said opening being at the trailing of the pressure turning point, and accommodating an electrode of a ignition plug, the opening of said plug channel having a cross-sectional configuration which is narrower in the direction of rotation of the rotor than in the direction of the axis of rotation of said rotor.

We observe in the patents applied against the application, that channels or openings for use with ignition means as well as with injection means have been provided in the inner surface of a combustion chamber in a combustion environment. The Jones patent provides a channel which extends generally in the direction of rotation, whereas the Bentele patent uses a channel which extends in the direction of the axis of rotation. Each of these openings are provided for ignition purposes as well as for injection purposes. The Bentele channel has a cross-sectional configuration which is narrower in the direction of the rotation of the rotor than in the direction of the axis of rotation of the rotor, which corresponds to the cross-section and the disposition of the channel that Applicant has described and claimed.

Applicant has argued that his channel is related to a better ignition result while that of Bentele is related to a better injection result.

The environment in which Applicant's channel functions is in a combustion system, just as is the environment for the channels of the cited art, and in particular that of Bentele.

Thus, channels or openings of the configuration presented by Applicant in his principal disclosure have been employed in combustion systems, particularly that of Bentele. We are of the opinion that to delete one of the combustion components which has previously been used with such an opening in a combustion environment, and to use only the other of the previously used combustion components in such a known kind of opening, would not be outside the stride of what may be expected by a person skilled in the art. We believe that Applicant's shape of the opening provides the same kind of function as does the shape in the Bentele patent, and that it would continue to provide for improved characteristics in a combustion environment for purposes of, ignition, injection, or both ignition and injection together.

Also, we note that the Bentele patent discusses that the placement of his channel may be at the zero pressure differential location, or downstream, or upstream, of that location. Further we note that the Bentele patent envisages that the plug and nozzle need not be in a common channel. From the disclosure of Bentele which envisages various dispositions of the channel, and the disposition of plug and nozzle in separate, but close relationship, so that they are not in a common channel, we are of the view that Applicant's placement of his ignition means, only, in a channel known in the art would be obvious to a person skilled in the art.

In summary, after reviewing the application and considering the arguments developed, we are satisfied that the application has not

described nor illustrated any matter therein that may be considered as more than a slight variation of known techniques. We are of the opinion that Applicant has presented matter that should be considered as falling into the category of that which is obvious to a person skilled in the art, and should not be considered as indicative of invention. We note that a supplementary disclosure was filed which describes certain specific configurations of the opening. However, because we are of the view that the principal disclosure and its only claim fail to present a patentable advance in the art, the supplementary disclosure is not allowable in view of the requirement in Rule 57 that for a supplementary disclosure to be allowable there shall be a claim allowable in the principal disclosure.

We refer to the statements in Niagara Wire Weaving v. Johnston Wire Works Ltd. (1939) Ex.C.R., by Mr. Justice Maclean, which we hold are indicative of the kind of variation that Applicant has presented:

> at page 273;
>
> Small variations from, or slight modifications of, the current standards of construction, in an old art, rarely are indicative of invention: they are usually obvious improvements resulting from experience and the changing requirements of users.
>
> and further at page 276;
>
> No step is disclosed there which would be described as invention. There is not, in my opinion, that distinction between what was known before, and that disclosed...that called for that degree of ingenuity requisite to support a patent. If those patents could be supported it would seriously impede all improvements in the practical application of common knowledge.

We are satisfied that no invention has been described and claimed in the principal disclosure of the application.

We recommend that the rejection of the application be affirmed.

G.A. Asher
Chairman, Patent Appeal Board, Canada

I concur with the reasoning and findings of the Board. Accordingly, I refuse to grant a patent on this application. The Applicant has six months within which to appeal my decision under the provision of Section 44 of the Patent Act.

J.H.A. Gariépy
Commissioner of Patents

Dated at Hull, Quebec
this 16th day of December, 1981

Agent for Applicant

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