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(54) **An improved cam-shaft.**

(57) An improved camshaft forming a type of valve timing system that can be used with all the four cycle combustion internal engines, the so-called Otto engines, in which each of the cams extends in an identical one, symmetrical and positioned at 180 degrees with relation to the former, resulting that the number of cams is twice the number of cams foreseen in a conventional shaft, and the number of revolutions is half of the required ones for the latter to get the same purpose.

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Improved camshaft

The present invention refers to an improved camshaft that has been designed to get a number of advantages with relation to the conventional camshafts, and it can be considered as a
5 technologic improvement to be taken into account in its field of application.

It is known that in the conventional camshafts that have been used since the internal combustion engine was invented, the only improvements proceeded from the quality of the metal, as
10 well as from the final treatment, but with regard to the structural change to get a better performance, there has not been any noticeable improvement or modification, since the cams are shaped with a profile starting from their circular shaft and radially project triangularly with their peak quite rounded
15 according to an end profile which can be considered as semicircular. That is, this type of cams shaping from a camshaft like those used in the internal combustion engines or four-cycle engines (the so-called Otto engines), has not experienced noticeable changes, so to have a higher efficiency
20 of said engines it is necessary to modify and to improve the performance of engine units different from the cam timing.

The subject of the invention is a camshaft that is modified in its structure with relation to the known camshafts and whose modification just affects to the cams, so that in the referred
25 shaft the cams are dual in number, that is to say, each cam extends in another that is equal and oppositely projected, so that a dual cam is defined instead of the previous cam, and, in this way, the shaft will have a number of cams that is double than the number of cams corresponding to the conventional
30 camshaft. Logically, each pair of cams is identical, the cams are symmetrically located and angularly displaced 180° one another.

So, with a camshaft made according to what it has been just disclosed, that is, according to the object of the invention, half of revolutions is required to get the same power than through a conventional camshaft.

5 The rotation of the camshaft at half of the revolutions that a conventional camshaft, to get the same power, has the following main advantages :

1.) A higher power is got, for the following reasons :

10 a) When the camshaft of the invention rotates at half of revolutions, the frictional forces are lesser.

b) The alternate masses of all the timing system will be subjected to half of decelerations.

15 c) On being subjected to lower decelerations, the cam profiles can be improved allowing, for the same conditions, higher valve openings.

d) As said previously, a higher number of revolutions can be obtained.

20 2.) The engine will have a lower fuel consumption, according to the above- mentioned paragraph.

3.) For the same reasons, the noise will be remarkably reduced.

25 4.) The life of the camshaft will be higher, since the work developped by the conventional system with one cam, the new shaft makes it with two cams.

30 To ease a better understanding of the characteristics of the invention it is made a detailed description based in the set of drawings accompanying the present specification, being integral part of this and in which, with an orientative and not limiting object, is illustrated the following :

In the first Figure is illustrated an elevation of the camshaft of the invention foreseen for four cycle internal combustion engine.

In the second Figure is illustrated a cross-section view taken by the plane passing through the line II-II of the preceding Figure, so to get the dual cam that is determined in each.

5 In the above-mentioned Figures, the numerical references correspond to the following components and units :

1. Camshaft
2. Overall cams of the shaft (1)
 - 2a. Cam opposite and equal to the cam (2b).
 - 10 2b. Cam opposite and equal to the cam (2a).

According to what can be seen from the above-mentioned Figures, the subject of the invention is a new camshaft which consists of a shaft (1) from which radially extends by regular intervals a set of suitably positioned cams (2) which, in this
15 case, are dual cams, that is, each of cams (2) consists of two identical cams (2a) and (2b), and they are located in opposite way, that is to say, displaced at 180 degrees.

With this camshaft we shall have a number of revolutions, with regard to a conventional shaft, that will be half of this,
20 to get the same purposes.

Apart from the above-mentioned advantages, the described camshaft can be easily used in the present internal combustion engines, merely, by replacing the conventional camshaft and the gear or pulley driving such a camshaft, for one that has
25 double number of teeth, not requiring any modification of the existing engines, since with the two above-mentioned changes (the shaft and the driving gear or pulley) would be enough for most of existing engines can perfectly operate without any trouble, and get the above-mentioned advantages.

30 Finally, we want to manifest that said camshaft has been tested in engines of various types, obtaining in those the above-mentioned advantages, and, what is more important, without noticing any disadvantage of any kind.

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CLAIMS

1. - An improved camshaft forming a type of valve timing system that can be used with all the four cycle combustion internal engines, the so-called Otto engines, characterized by the fact that of the cams extends in an identical one, symmetrical and positioned at 180 degrees with relation to the former, resulting that the number of cams is double than the number of cams foreseen in a conventional shaft, and the number of revolutions is half of the required ones for the latter to get the same purpose.

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