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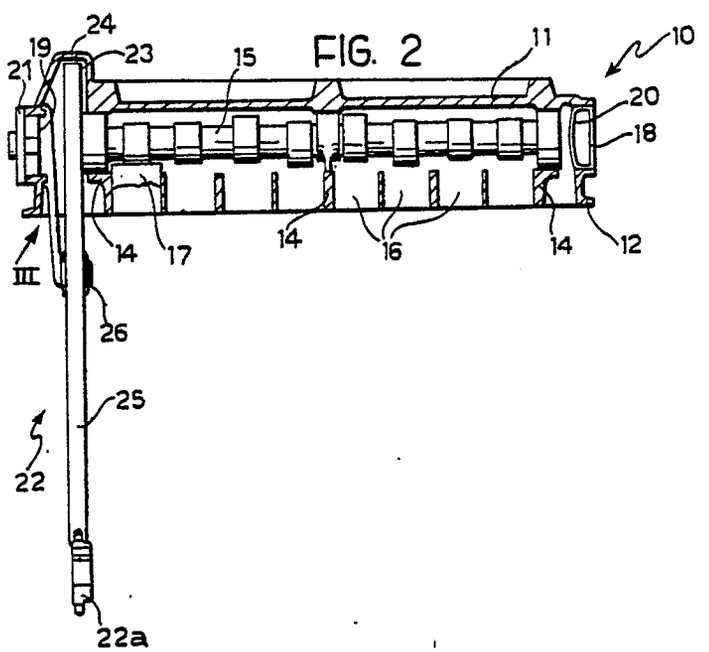
(54) A timing control assembly for a multi-cylinder internal combustion engine, particularly for motor vehicles.

(57) A timing control assembly for a multi-cylinder internal combustion engine is constituted by a preassembled unit (10) including a one-piece body (11) having a continuous flange (12) in a single plane at the bottom for coupling with a complementary flange (13) on the cylinder block (2) of the engine (1). The body (11) has a series of integral bearings (14) for the camshaft (15) and an integral end seat (20) for the chain tensioner (21) of the drive unit (22) for the camshaft (15).

FIG. 2



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A timining control assembly for a multi-cylinder internal combustion engine, particularly for motor vehicles

The present invention relates in general to multi-cylinder internal combustion engines for motor vehicles and more particularly to a timing control assembly for such an engine.

Conventionally, the timing control assembly comprises a body within which a camshaft with respective tappets for operating the inlet and exhaust valves is mounted for rotation, and a chain or belt unit for driving the camshaft from the crankshaft of the engine, normally including a drive sprocket coupled to one end of the camshaft and an adjustable chain tensioner. Normally, such control assemblies are formed by a considerable number of components: in particular, the body of the assembly is usually constituted by various parts which are fitted together after the installation of the camshaft with its tappets and the components of the drive unit.

The object of the present invention is to provide a control assembly of the type defined above which is constituted by a reduced number of parts and which is simpler and cheaper to produce and assemble.

According to the invention, this object is achieved by virtue of the fact that the assembly is constituted by a preassembled unit in which the body is in one piece and has a continuous flange in a single plane at the bottom for coupling with a complementary upper flange on the cylinder block of the engine, the body having a series of integral bearings for the camshaft, an integral end seat for the chain tensioner, coaxial with the bearings, and an aperture for the insertion of the camshaft into the body at the opposite end from the seat.

Preferably, the body defines an enlarged portion between the seat for the chain tensioner and the camshaft for housing the drive sprocket of the drive unit, the housing being formed with opposing shoulders for the axial retention of the drive sprocket.

The drive sprocket may be fixed to the camshaft by means of a threaded coupling member which is inserted through the chain-tensioner seat during assembly, or by means of axial driving when the shaft is inserted in the body after the sprocket has been positioned between the retaining shoulders of its housing.

Further characteristics and advantages of the present invention will become clear from the detailed description which follows with reference to the appended drawings, provided by way of non-limiting example, in which:

Figure 1 is a schematic cross-section of an internal combustion engine provided with a timing control assembly according to the invention,

Figure 2 is a partial longitudinal section taken on the line II-II of Figure 1, and

Figure 3 is a section of the detail indicated by the arrow III in Figure 2, on an enlarged scale.

With refernce initially to Figure 1, a 4-cylinder internal combustion engine for a motor car is generally indicated 1 and comprises essentially a cylinder block 2 formed integrally with the cylinders 4 and their respective combustion chambers 4a, intake ducts 5, exhaust ducts 6, seats 7 for the inlet and exhaust valves 8 and seats, not illustrated, for any spark plugs, a sump structure 3 which supports the crankshaft 9 and is fixed to the bottom of the cylinder block 2, and a timing control assembly, generally indicated 10, situated above the cylinder block 2.

With reference in greater detail to Figure 2, the timing control assembly 10 is constituted by a preassembled unit constituted by a one-piece body 11 having a continuous integral flange 12 in a single plane at the bottom for joining to a corresponding continuous flange 13 formed in a single plane at the top of the cylinder block 2.

The body 11 is formed integrally with bearings 14 in which a camshaft 15 is mounted for rotation, and in its lower part forms integral housings 16 for tappet units 17 which are preferably hydraulic and are associated with the inlet and exhaust valves 8.

The body 11 has two end apertures 18, 19 coaxial with the bearings 14, of which the former serves to enable the insertion of the shaft 5 during assembly and is then closed by means of a plug 20.

The other end aperture 19 defines an integral seat 20 in correspondence with which is arranged an adjustable chain tensioner device 21 associated with a drive unit 22 for the camshaft 15, which is fitted to the assembly 10 before the latter is joined to the cylinder block 2 of the engine 1.

As shown in greater detail in Figures 2 and 3, the drive unit 22 includes a driving sprocket 22a which is adapted to be mounted on one end of the crankshaft 9, and a driven sprocket 23 which is rotatable in an integral enlarged portion 24 of the body 11 and is keyed in the manner described below to the end of the camshaft 15, facing the aperture 19.

A chain or a toothed belt 25 passes over the sprockets 22a and 23 and can be adjusted by means of the chain tensioner 21. The latter comprises an idle sprocket 26 carried by an arm 27 whose angular position is adjustable by means of a ring 28 which is coupled by means of frontal teeth

28a to a support 30 inserted in the seat 20 and provided with respective frontal teeth 30a. When the adjustment has been carried out, the ring 28 and the support 30 are made fast to the body 11 by the tightening of a screw 29.

The driven sprocket 23 is rotatable between a pair of axial positioning and retaining shoulders 31 formed within the enlarged portion 24 and is keyed to the camshaft 15 according to one or other of the two variants shown respectively above and below the axis of the camshaft 15 in Figure 3. According to the first variant, shown in the upper part of Figure 3, the camshaft 15 has an internally-threaded hollow end part 32 into which a flanged retaining member 33 is screwed to clamp the sprocket 23 to the shaft 15. In this case, assembly is achieved in the following manner: firstly, the sprocket 23 complete with the chain 25 is positioned in the housing 4 between the two positioning shoulders 31, and then the camshaft 15 is inserted in the body 11 through the aperture 18. The retaining member 33 is then introduced into the body 11 through the aperture 19 and screwed into the hollow end 32 of the shaft 15. Finally, the chain tensioner device 21 and the plug 20 are fitted.

In the case of the second variant, shown in the lower part of Figure 3, the end of the shaft 15 is simply driven into the sprocket 23, after the latter has been positioned in the housing 24 between the two positioning and retaining shoulders 31.

Claims

1. A timing control assembly for a multi-cylinder internal combustion engine having a cylinder block and a crankshaft, comprising a body containing a camshaft and its respective tappets, and a chain or belt unit for driving the camshaft from the crankshaft of the engine, including a drive sprocket coupled to one end of the camshaft and an adjustable chain tensioner, characterised in that it is constituted by a preassembled unit (10) in which the body (11) is in one piece and has a continuous flange (12) in a single plane at the bottom for coupling with a complementary upper flange (13) on the cylinder block (2), the body (11) having integral bearings (14) for the camshaft (15), integral seats (16) for the tappets (17), an integral end seat (20) for the chain tensioner (21), coaxial with the bearings (14), and an aperture (18) for the insertion of the camshaft (15) into the body (11) at the opposite end from the seat (20).

2. An assembly according to Claim 1, characterised in that the body (11) has an integral enlarged portion (24) between the seat (20) for the chain tensioner (21) and the camshaft (15) for housing the drive sprocket (23), the housing (24) being provided with opposed shoulders (31) for the axial positioning and retention of the drive sprocket (23).

3. An assembly according to Claim 2, characterised in that the drive sprocket (23) is fixed to the camshaft (15) by means of a threaded coupling member (33) which is inserted through the seat (20) of the chain tensioner (21) during assembly and is screwed into a corresponding internally-threaded hollow end (32) of the camshaft (15).

4. An assembly according to Claim 2, characterised in that the drive sprocket (23) is fixed to the camshaft (15) by axial driving.

FIG. 1

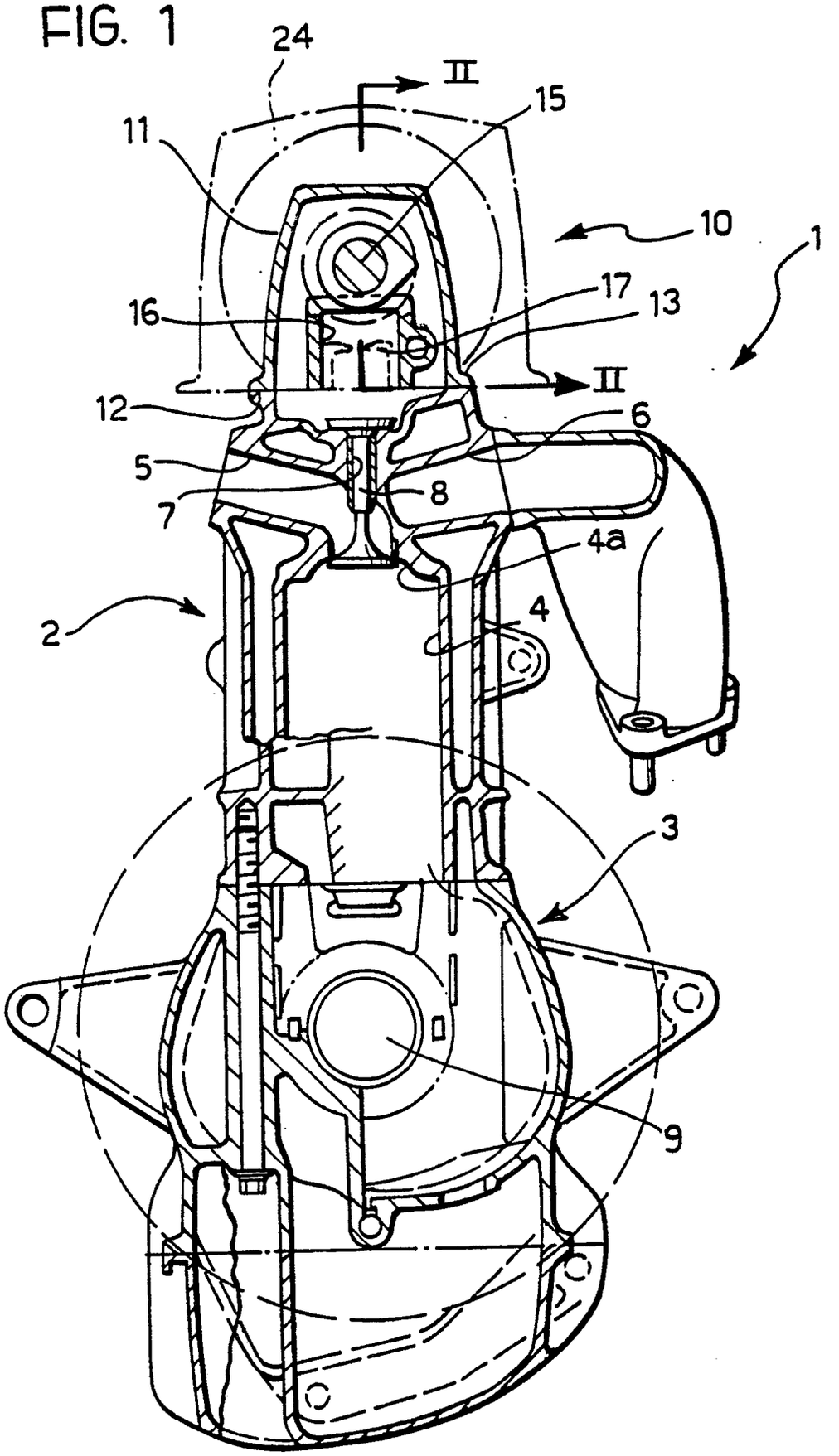

FIG. 2

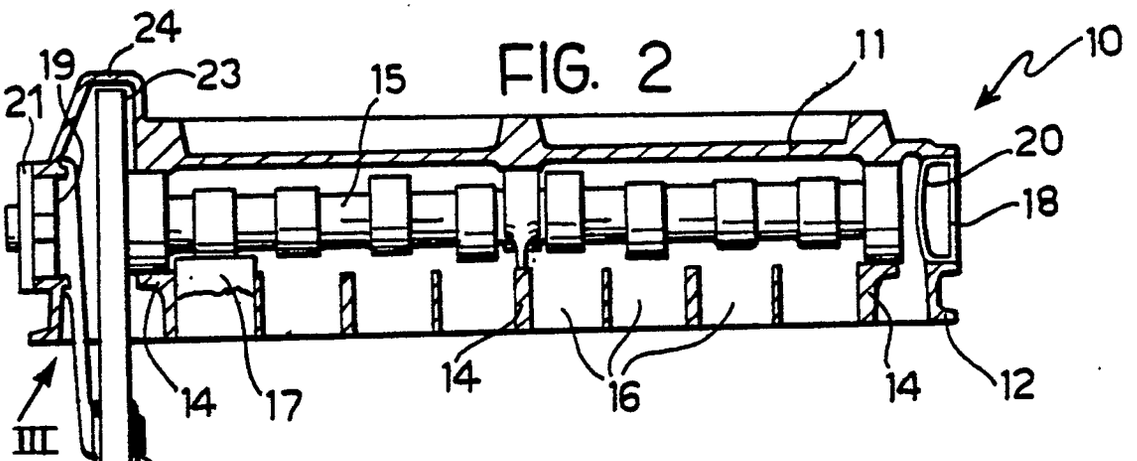
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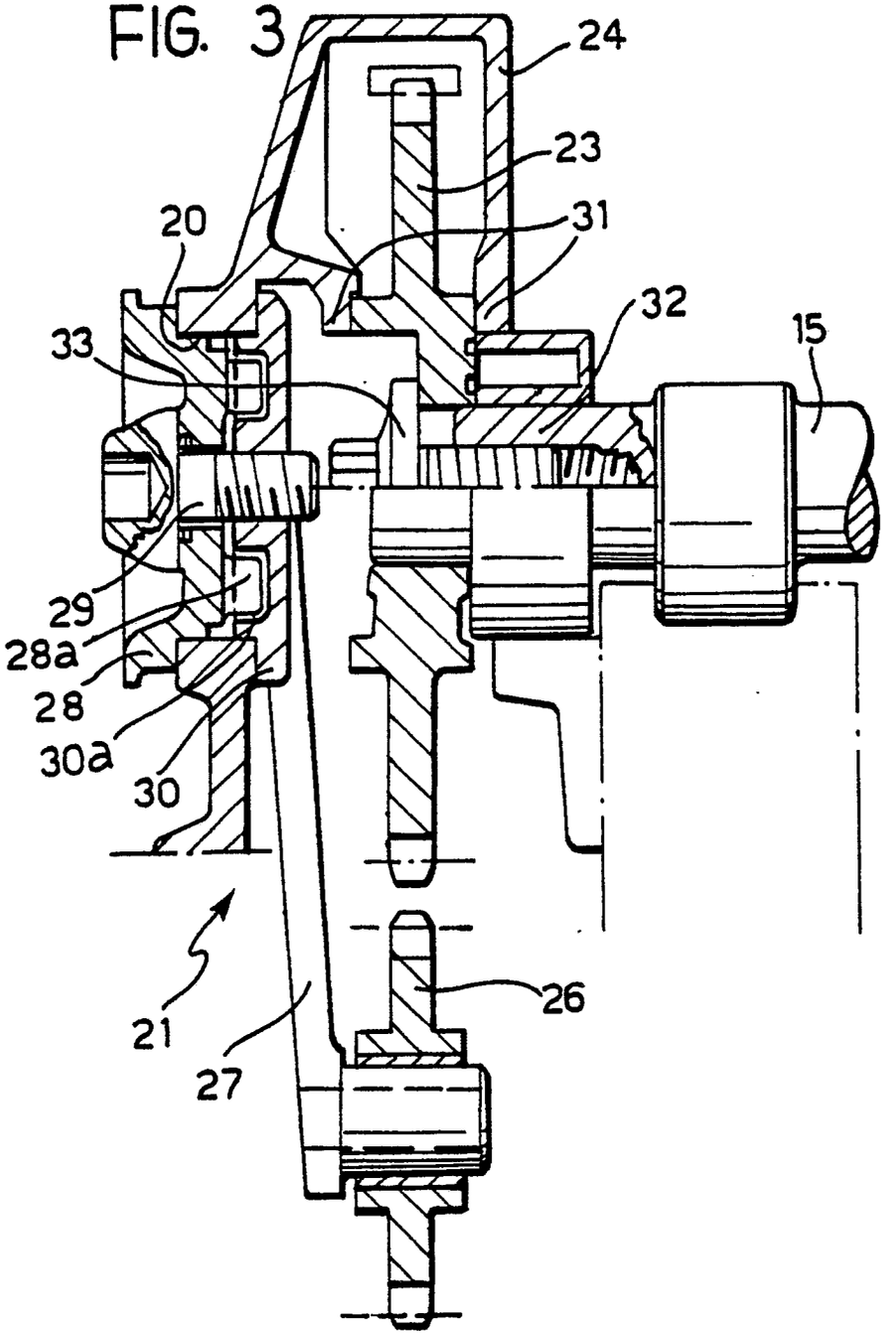
FIG. 3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EUROPEAN SEARCH REPORT

Application Number

EP 89 83 0553

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	GB-A-557700 (MORGAN) * page 4, line 11 - page 4, line 19 * * page 4, line 25 - page 4, line 31 * * page 4, line 39 - page 4, line 62; figures 1, 2 *	1-3	F01L1/02 F01L1/04
A	DE-A-3406100 (ROTH) * page 2, paragraph 2; figure 1 *	1	
A	US-A-3441009 (RAFANELLI) * column 2, line 27 - column 2, line 35; figure 1 *	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			F01L

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	02 APRIL 1990	LEFEBVRE L.J.F.

CATEGORY OF CITED DOCUMENTS

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