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(12) # EUROPEAN PATENT APPLICATION

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(54) **Valve control device in the timing system of an internal combustion engine.**

(57) The invention is related to a valve control device for engines with at least three valves per cylinder, two of them (3), having their axes on the same plane, are controlled by a mushroom cup (12), with the guide stem (13) arranged between the two valve springs (6) in a recess (9) obtained in the cylinder head (1).

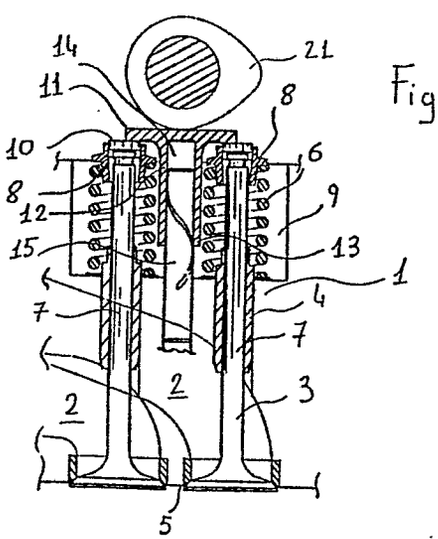

Fig 1

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The present invention regards a device designed to control matched and parallel valves in internal combustion engines, fitted with overhead camshaft and at least three valves per cylinder.

The scope of the present invention is to simplify at most the simultaneous control of two valves with their axes lying on the same plane.

An additional scope is to obtain a very low command in order to reduce the overall size of the engine at a minimum.

The above and other scopes are achieved by the present finding, which is related to a control device of timing system valves, in particular for matched valves with their axes parallel and lying on the same plane, characterised in that the camshaft cam directly controls a mushroom cup, whose head rims rest on the valve stem tips with the interposition of an adjustment insert, whilst the stem is placed between the two valve stems with a guide function of the cup itself.

Further features and advantages will become clearer from the following description, given as a non-restrictive example only and referred to the attached figures of which:

- Fig. 1 is a cross-section of a first realisation example of the finding;

- Fig. 2 is a schematic plan view of the Fig. 1 example;

- Fig. 3 is a cross-section of a second example of the finding realisation;

- Fig. 4 is a cross-section of a third example of the finding realisation;

- Fig. 5 is a partial cross-section along the IV-IV line of Fig.4;

- Fig. 6 is a schematic plan view of the Fig. 4 example with the camshaft turned;

- Fig. 7 is a partial cross-section along the line VI-VI of Fig.4;

- Fig. 8 is a schematic plan view of the Fig. 4 example with the valves placed at right angles with the camshaft axis.

With reference to the attached figures, 1 sketchly shows the cylinder head of an internal combustion engine fitted with at least three valves per cylinder.

Numeral 2 indicates the two ducts (in the example shown) of the engine, controlled by two valves 3 running into valve guides 4 and kept against the valve seats 5 by two springs 6 connected to the stem tips 7 through cotters 8 which insert into a groove at the bottom of the stem itself.

The springs are housed in a recess 9 obtained in the cylinder head and rest on the bottom of the recess itself.

On the valve tips rest the adjustment inserts 10 of the tappets.

On the adjustment inserts 10 acts the circular head 11 of a mushroom guide element 12, the stem of which 13 is positioned between the two valve springs.

In one of the preferred forms of the finding shown in Fig. 1, the stem 13 presents an axial hole 14 and is slidingly fitted on a pin 15 press fitted in the head 1.

In the second form of preferred realisation shown in Fig. 3 the full stem 13 slidingly inserts in a guide 16 provided with a hole 17 and fitted in the head 1.

In the third form of preferred realisation of the finding, shown in Figs. 4 and 5, the stem 13 shows a section with two convex walls 18 opposite between each other and blended by two concave walls 19 also opposite between each other.

The mushroom guide is accomplished by contact between the convex walls 18 and related concave seats 20 obtained in the side walls of the recess 9 in the cylinder head.

On the head 11 of the mushroom element 12 acts the cam 21 of the camshaft 22, which can be arranged at right angles with the plane passing through the two stems 7 (see Fig. 8), or can be placed parallelly or across it (see Fig. 6).

Obviously, the principle of the finding being the same, the execution details can be widely changed, with respect to the above description, without however coming out of the present invention field.

CLAIMS

1. Control device of timing system valves, in particular for matched valves (3) with their axes parallel and lying on the same plane, characterised in that the camshaft cam (21) directly controls a mushroom cup (12), whose head rims (11) rest on the valve stem (7) tips with the interposition of an adjustment insert (10), whilst the stem (13) is placed between the two valve stems (7) with a guide function of the cup (12) itself.

2. Device according to claim 1, characterized in that the stem (13) is cylindrical and shows an axial hole (14) and is slidingly fitted on a pin (15) secured to the cylinder head (1) between the two valves (3).

3. Device according to claim 1, characterized in that the stem (13) is cylindrical and inserts with a slide fit in a hole (17) of a guide (16) secured to the cylinder head (1) between the two valves (3).

4. Device according to claim 1, characterised in that the stem (13) shows a section composed of two convex walls (18), opposite between each other and blended to two concave walls (19) both of them opposite between each other.

5. Device according to claims 1 and 4, characterised in that the convex walls (18) co-operate with guide functions with related concave seats (20) obtained in the cylinder heads (1), whereas the concave walls (19) are turned toward the valve stems (7).

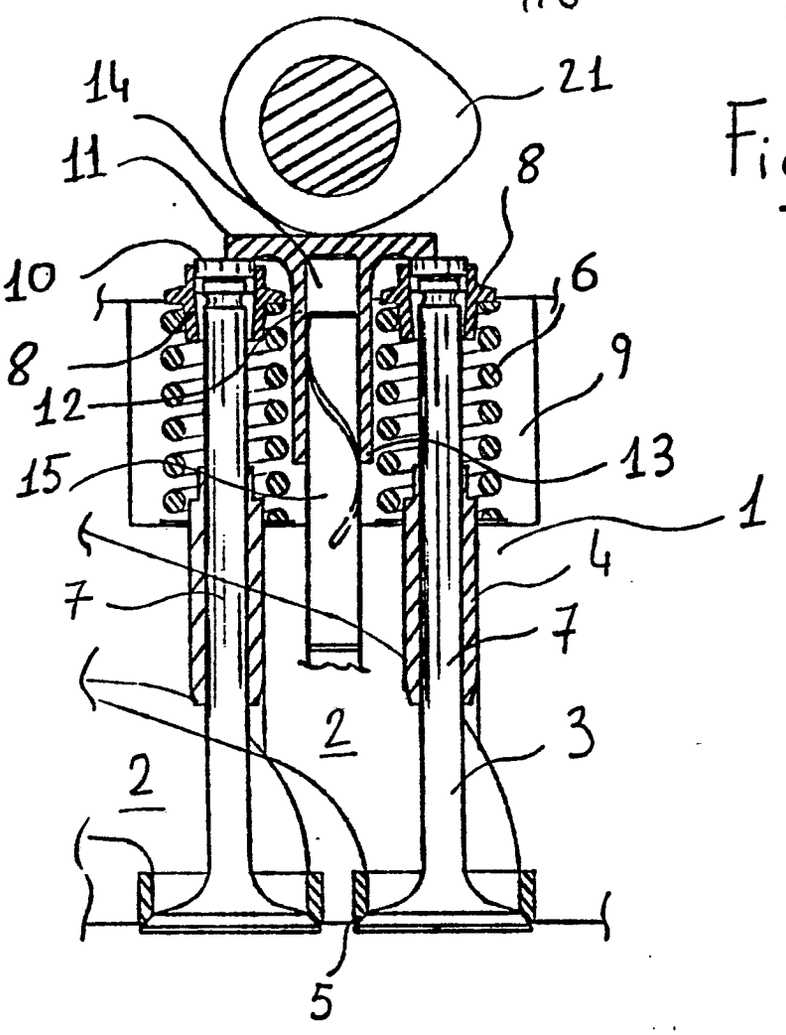


Fig 1

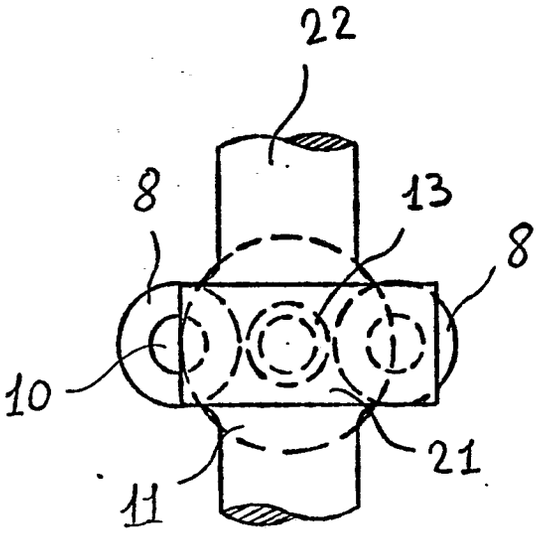
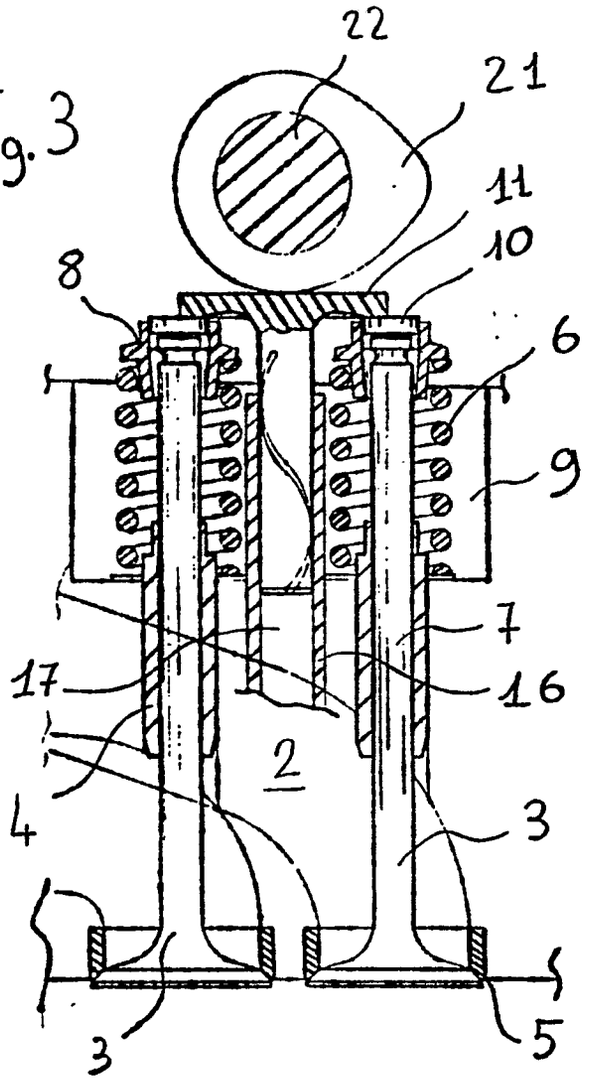


Fig 2

Fig. 3



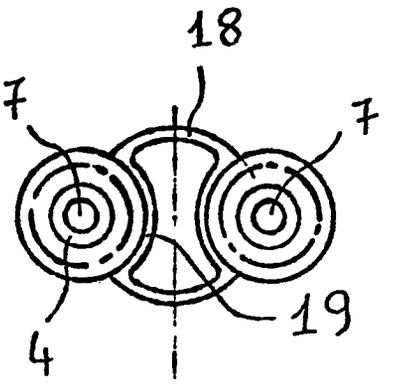


Fig. 7

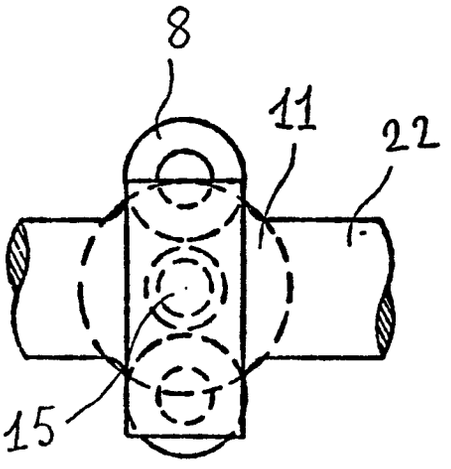


Fig. 8

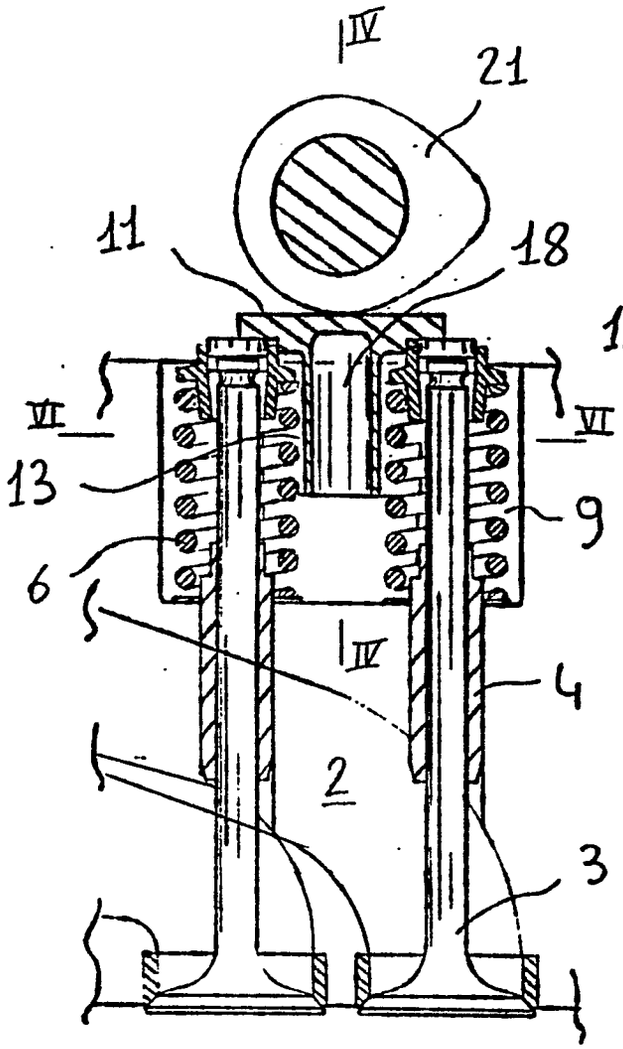


Fig. 4

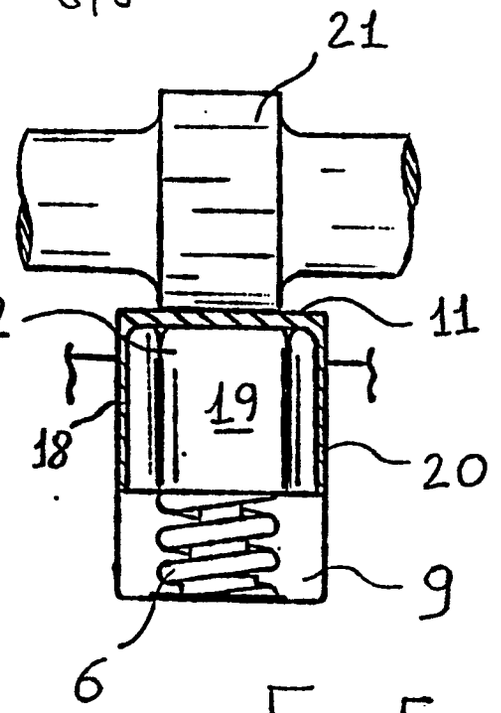


Fig. 5

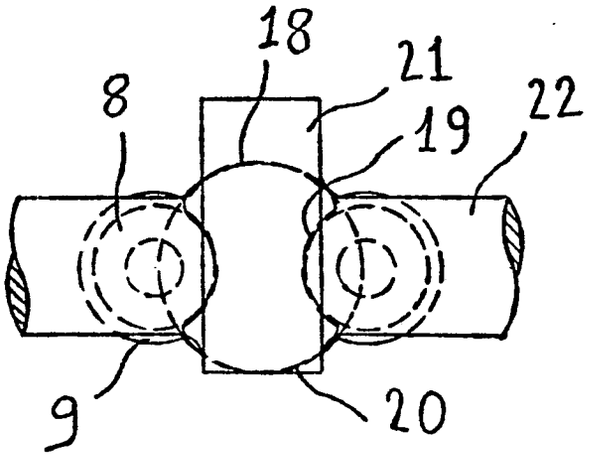


Fig. 6