

(19)



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(11) Publication number:

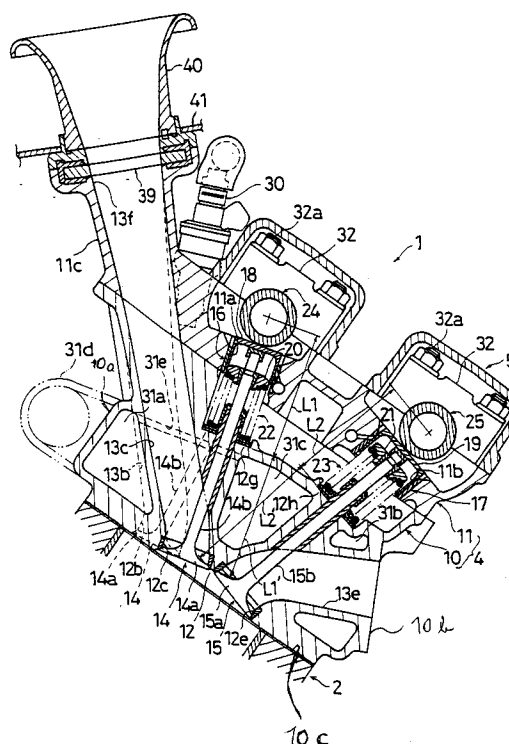
**0 474 217 A3**

(12)

**EUROPEAN PATENT APPLICATION**(21) Application number: **91114944.1**(51) Int. Cl.<sup>5</sup>: **F01L 1/26, F01L 3/10,  
F01L 1/14**(22) Date of filing: **04.09.91**(30) Priority: **04.09.90 JP 235268/90**(43) Date of publication of application:  
**11.03.92 Bulletin 92/11**(84) Designated Contracting States:  
**DE FR GB IT**(88) Date of deferred publication of the search report:  
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W-8000 München 22(DE)**(54) **A valve operating mechanism for an internal combustion engine.**

(57) The present invention relates to a self-operating mechanism for a 4-cycle internal combustion engine comprising more than two intake valves (14) and a plurality of exhaust valves (15), specifically to a 5-valve engine. In order to provide sufficient space for the cooling jacket (31) on the exhaust side of the cylinder head and/or increasing the valve lift of the exhaust valves without increasing the total height of the engine, the valve spring retainers (21) of the exhaust valves (15) together with the upper ends of the associated exhaust valve springs (23) are accommodated inside the exhaust valve lifters (19), respectively, while the valve spring retainers (20) of the intake valves (14) are disposed adjacent to a lower end of the associated intake valve lifters (18).

FIG. 2

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## EUROPEAN SEARCH REPORT

Application Number

EP 91 11 4944

| 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) |
| E                                                                                                                                                                                                                       | PATENT ABSTRACTS OF JAPAN<br>vol. 015, no. 497 (M-1192)16 December 1991<br>& JP-A-03 217 606 ( YAMAHA MOTOR CO LTD ) 25 September 1991<br>* abstract *                         | 1                                                                                                                                                                                                                                                                                     | F01L1/26<br>F01L3/10<br>F01L1/14              |
| Y                                                                                                                                                                                                                       | DE-A-3 724 495 (AUDI AG)<br>* figure 2 *                                                                                                                                       | 1-3                                                                                                                                                                                                                                                                                   |                                               |
| Y                                                                                                                                                                                                                       | US-A-4 615 309 (YAMAHA HATSUDOKI KABUSHIKI KAISHA)<br>* column 1, line 43 - line 61 *<br>* column 3, line 45 - line 59 *<br>* column 4, line 10 - line 25 *<br>* figures 1,4 * | 1-3                                                                                                                                                                                                                                                                                   |                                               |
| A                                                                                                                                                                                                                       | PATENT ABSTRACTS OF JAPAN<br>vol. 014, no. 355 (M-1004)31 July 1990<br>& JP-A-2 123 207 ( YAMAHA MOTOR CO LTD ) 10 May 1990<br>* abstract *                                    | 1                                                                                                                                                                                                                                                                                     |                                               |
| A                                                                                                                                                                                                                       | PATENT ABSTRACTS OF JAPAN<br>vol. 011, no. 323 (M-634)21 October 1987<br>& JP-A-62 107 211 ( YAMAHA MOTOR CO LTD ) 18 May 1987<br>* abstract *                                 | 8                                                                                                                                                                                                                                                                                     |                                               |
| The present search report has been drawn up for all claims                                                                                                                                                              |                                                                                                                                                                                |                                                                                                                                                                                                                                                                                       | TECHNICAL FIELDS SEARCHED (Int. Cl.5)         |
| Place of search<br>THE HAGUE                                                                                                                                                                                            |                                                                                                                                                                                |                                                                                                                                                                                                                                                                                       | Examiner<br>KLINGER T.G.                      |
| CATEGORY OF CITED DOCUMENTS                                                                                                                                                                                             |                                                                                                                                                                                |                                                                                                                                                                                                                                                                                       |                                               |
| X : particularly relevant if taken alone<br>Y : particularly relevant if combined with another document of the same category<br>A : technological background<br>O : non-written disclosure<br>P : intermediate document |                                                                                                                                                                                | T : theory or principle underlying the invention<br>E : earlier patent document, but published on, or after the filing date<br>D : document cited in the application<br>L : document cited for other reasons<br>.....<br>& : member of the same patent family, corresponding document |                                               |