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(54) Tappet in an internal combustion engine

(57) The invention relates to a tappet in an internal combustion engine.

The said tappet according to the invention comprises the following features:

- a cylindrical body made of light metal;
- a wear resistant cam receiving plate having roughly equal diameter to an outer diameter of the body;
- an annular projection being formed adjacent to a circumference of a lower surface of the cam receiving plate;
- the annular projection is forcibly inserted in an inner circumferential surface of the body;
- the cam receiving plate is brazed on the body.

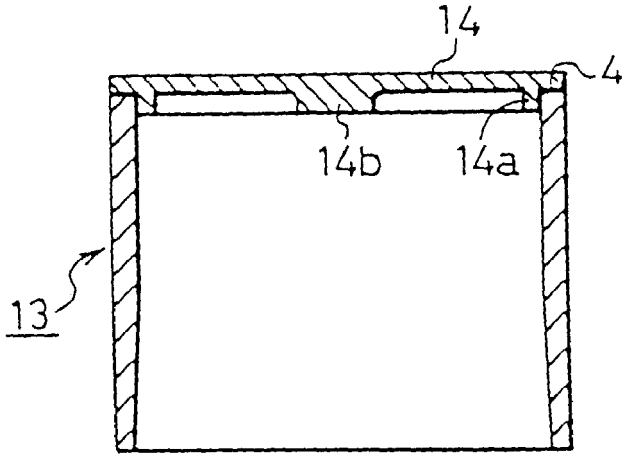

Fig. 1

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Description

[0001] The invention relates to a tappet in an internal combustion engine as per the preamble of claim 1.

[0002] A tappet in an internal combustion engine of the said type has become known from

1. Patent Abstracts of Japan vol. 15, no. 120 (M-1096), 25 March 1991 & JP-A-03 011107 (YAMAHA MOTOR CO LTD), 18 January 1991,
2. Patent Abstracts of Japan vol. 15, no. 374 (M-1160), 20 Sept. 1991 & JP-A-03 149305 (NGK SPARK PLUG CO LTD), 25 June 1991,
3. JP-A-07 332 028 (MITSUBISHI MATERIALS CORP), 19 December 1995
4. DE-A-40 28 985 (BAYERISCHE MOTOREN-WERKE AG)
5. US-A-5 284 112 (NISSAN MOTOR CO LTD).

[0003] To lighten a direct acting type valve operating mechanism in an internal combustion engine, Al alloy tappets are widely used instead of conventional steel tappets. Al alloy tappets are lower than steel alloy tappets in strength and wear resistance, and thus, wear resistant material is applied on the upper surface of a tappet which is slidably engaged with a rotary cam.

[0004] Fig. 2 illustrates a conventional Al tappet in which a cylindrical body 21 closed by an upper wall 21a at the upper end is molded from Al alloy. On the upper surface of the upper wall 21a, there is placed a wear resistant cam receiving plate 22 which has a smaller outer diameter than the body 21. The cam receiving plate 22 is fixed on the upper surface of the upper wall 22a by bending an annular protrusion 21b inwardly at the outer circumference of the upper end of the body 21. 23 denotes a rotary cam which contacts the upper surface of the cam receiving plate 22.

[0005] The cam receiving plate 22 of the Al alloy tappet acts as a cam follower to a nose 23a of the rotary cam 23. To rotate the rotary cam 23 smoothly, the size or area of the cam receiving plate 22 must be equal or larger than a rotation trace of the nose 23a. The maximum lift length is determined depending on the projected length of the nose 23a from a base circle. Efficiency of intake and exhaust air is determined on the lift length. Thus, to obtain a desired intake and exhaust efficiency, it is necessary to determine the size of the projection of the nose 23a suitably and to keep the diameter of the cam receiving plate 22 in size which is corresponding to the projection of the nose 23a.

[0006] As the conventional tappets, since the cam receiving plate 22 is fixed by caulking of the annular protrusion 22b to decrease an effective surface area of the cam receiving plate 22 having a relatively large diameter in the body 21 having a relatively large diameter to provide a surface area corresponding to the nose 23a of the cam 23. However, the tappet body increased in weight, the cylinder head increases in size, and flexibility in design of the engine decreases.

[0007] It is the objective of the invention to provide a joint between the top ball of the body of the tappet and the cam receiving plate sufficiently strong during use, and to select an appropriate brazing filler material.

[0008] This objective is achieved by the characterizing portion of claim 1.

[0009] The features and advantages of the invention will become more apparent from the following description and the attached drawings:

Figure 1 is a central vertical sectional front view of a tappet according to the invention.

Fig. 2 is a central vertical sectional front view of a conventional tappet.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0010] The preferred embodiment is shown in figure 1, in which on the upper end of a cylindrical body 13, a cam receiving plate 14 has diameter equal to an outer diameter of a body 13, and a downward annular portion 14a having outer diameter roughly equal to inner diameter of the body 13. The annular portion 14a is engaged in the inner surface of the body 13 and contact surfaces are joined with a brazing filler material 4.

[0011] A projection 14b which contacts the end of a valve is formed in the middle of the lower surface of the cam receiving plate 14. In the fourth embodiment, similar advantages to the above embodiments can be achieved. Al alloy material is saved and the tappet can be made lighter since there is no top wall of the body 13.

[0012] The present invention may be applied to a tappet which has a body made of Mg allow.

Claims

1. A tappet in an internal combustion engine, comprising:

1.1 a cylindrical body (13) made of light metal;
1.2 a wear resistant cam receiving plate (14) having roughly equal diameter to an outer diameter of the body (13);
1.3 an annular projection (14a) being formed adjacent to a circumference of a lower surface of the cam receiving plate (14);
1.4 the annular projection (14a) is forcibly inserted in an inner circumferential surface of the body (13);
1.5 the cam receiving plate (14) is brazed on the body (13).

2. A tappet as defined in claim 1, wherein a central projection is formed in a middle of a lower surface of the cam receiving plate (14), an end of a valve being contacted with the central projection (14b).

3. A tappet as defined in claim 1, wherein the light metal comprises Al alloy.

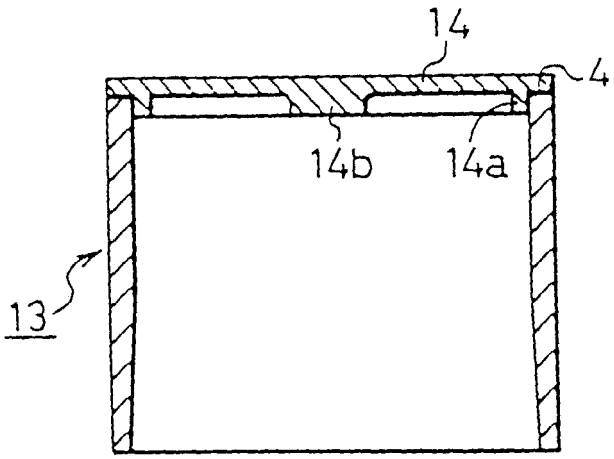

Fig. 1

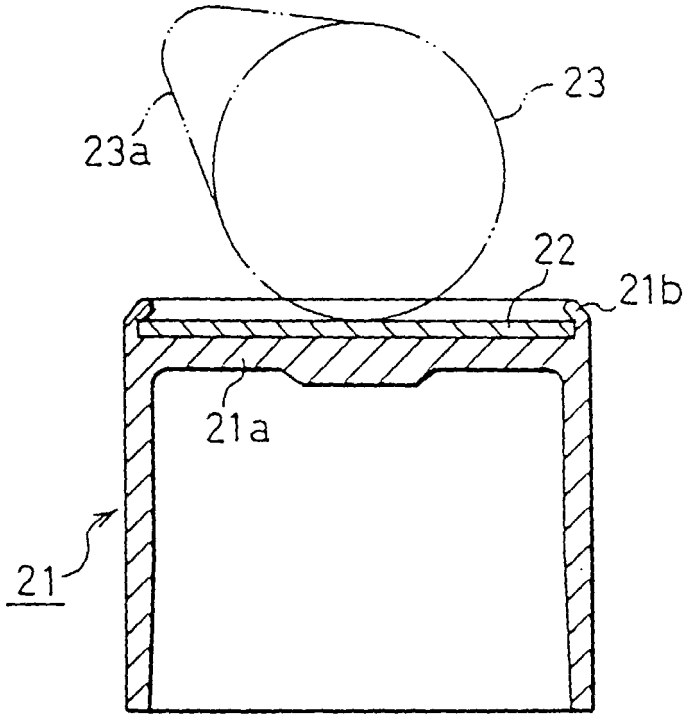

Fig. 2