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VALVE TAPPET

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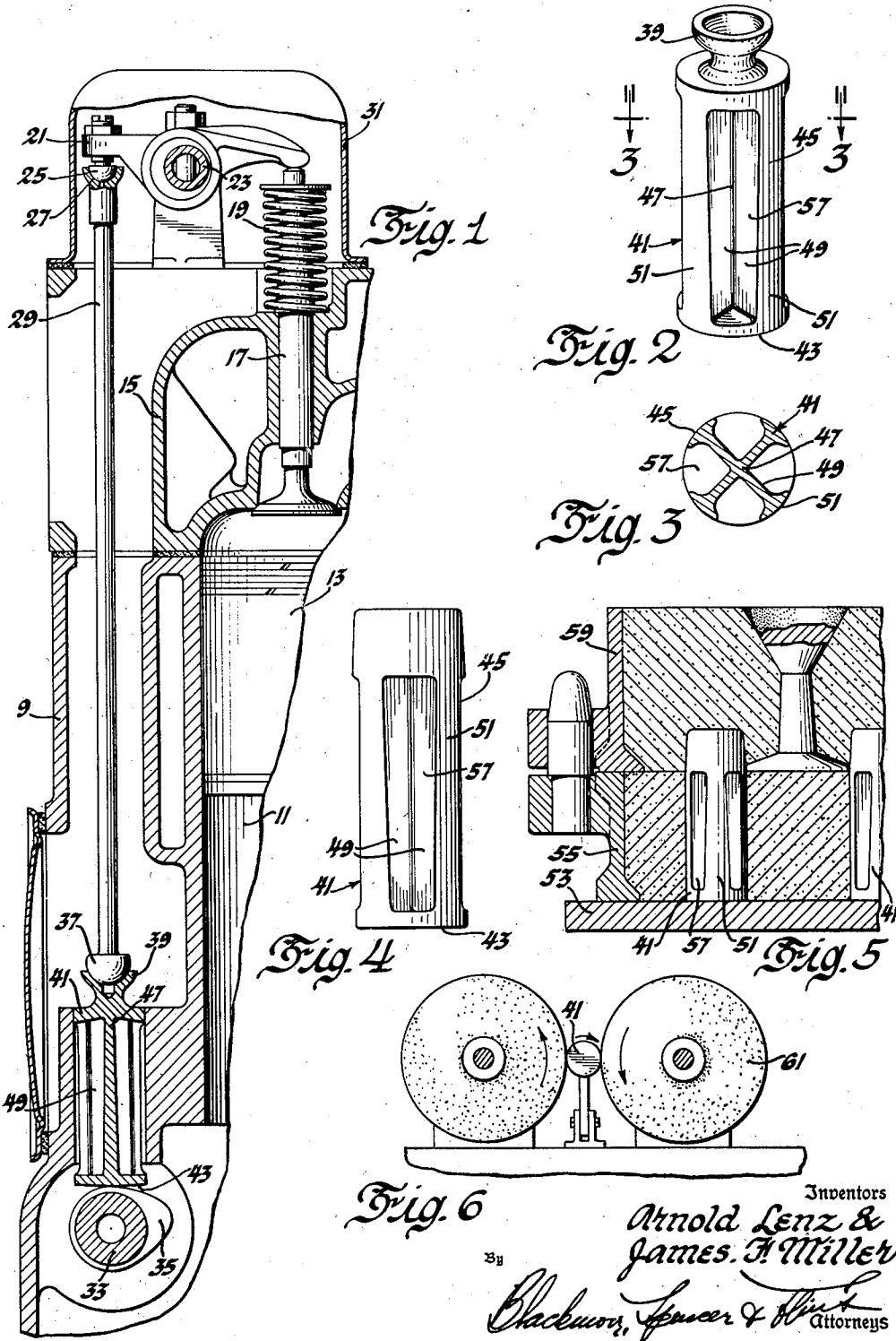


Fig. 6

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VALVE TAPPET

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2 Claims. (Cl. 123—90)

This invention relates to valve tappets as used with internal combustion engines.

The invention relates particularly to a novel cast iron tappet, and to a process for its manufacture.

An object of the invention is an improved tappet having a push rod engaging head which is cast as an integral part of the body.

Another object is a simplified method of manufacture.

Other objects and advantages will be understood from the following description.

On the accompanying drawing is shown one embodiment of the invention. On this drawing:

Fig. 1 is a vertical section through a part of an internal combustion engine to show a cam, tappet, push rod, rocker arm and valve.

Fig. 2 is a perspective of a finished tappet.

Fig. 3 is a section on line 3—3 of Fig. 2.

Fig. 4 is an elevation of a tappet as it comes from the casting step of its manufacture.

Fig. 5 is a view in section of the mold for casting.

Fig. 6 is a diagram to show a machining step.

Referring to the drawing the engine block 9 is shown only in part. The part shown includes a cylinder 11 within which reciprocates a piston 13. Above the block 9 is a head 15 also shown only in part. There is shown, guided by the head, one of the valves 17 normally seated by a spring 19. A rocker arm 21 is to be rotated about its shaft 23 to overcome spring 19 and open the valve. At the power end the rocker arm is provided with a spherically shaped member 25 which is seated in a cup 27 on the end of a push rod 29. The rocker arm may be enclosed within a housing 31 seated on the head 15. Within the engine block is a camshaft 33 provided with cams, one of which is marked 35. It will be understood that there are a plurality of valves, two for each cylinder, and that their actuation is provided for by a plurality of cams, push rods and rockshafts. The lower end of each push rod has a spherical surface 37 received within a cup 39 formed at the upper end of a tappet 41 slidably guided by an engine block passageway. The lower end of the tappet has a hardened face 43 engaged by the cam.

The invention sought to be protected by this application is in the structural characteristics of the tappet and in its process of manufacture. It has been proposed in the past to cast hollow tappets and to secure thereto a push rod engaging head of steel. The simplicity and economy of casting the head as an integral part of the

body needs no argument. Various attempts to do this have been undertaken and the present invention aims to secure a tappet having this integral characteristic and one wherein all the advantages of a tappet with a separate steel head are present. The tappet of this invention may be said to include a hardened cam engaging face 43, a fluted column body 45 and a hardenable cup shaped end 39. By a fluted column body is meant one having between its upper and lower faces a central column 47 with radial webs 49 terminating in arcuate surfaces 51 to be guided by the guiding surface in the engine block.

In making the tappet there is employed a mold somewhat as shown by Figure 5. In this figure is shown a chill plate 53 above which is a drag mold 55. By the use of suitable patterns the drag mold is made ready to receive the molten iron for shaping a plurality of cast iron tappets. As will be seen the drag mold shapes the tappets from their bases to a position at the top of recesses 57 between the guide surfaces 51. Above the drag mold is the cope mold 59. It is to be assembled and secured over the drag mold as shown. It not only is formed to provide the sprues and gates as usual but is also formed, by means of patterns, to have recesses or pockets to override the tappet forming parts of the drag mold, and thus to form a cylindrical upper end on the tappet. Fig. 4 shows a tappet as it comes from the mold. The presence of the cylindrical region at the ends of the recesses is of importance. It is obviously necessary that the cylindrical guide surfaces 51 be parts of a true cylinder. When the tappet surface is ground by such grinding elements as 61 shown by Fig. 6, the continuous surfaces just beyond both ends of the recesses prevent the grinding elements entering the recesses. The next operation is the rough grinding of the chilled bottom end. The cupped upper ends are then formed in a magazine automatic screw machine. Rough and finish turns are given the cup. The cups are preferably hardened by the well-known process of magnetic induction and quenching. Then follows the finish grinding of the chilled bottom and the circumference of the fluted column.

There is thus produced by the process of casting a light weight tappet having its two ends integral with the body portion. The outline of the body portion is such as to provide adequate guide surfaces. The ends of the body adjacent the terminal faces provide for machining the surface to a true circular outline with no tendency for the

grinding elements to enter the recesses present in the body part.

We claim:

1. A tappet of generally cylindrical outline, said tappet having an axial column disposed centrally of said cylindrical outline, said column terminating in integral end abutments, spaced webs projecting radially from said column and extending axially from one end abutment to the other, said webs being of uniform radial extent between said 10

abutments and enlarged circumferentially at their outer edges to form arcuate guiding surfaces, said surfaces being dimensioned circumferentially to provide spaces therebetween.

2. The invention defined by claim 1, the parts of said tappet adjacent each end and beyond said spaces having unbroken circular walls.

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