G. L. McCAIN.

METHOD OF MAKING VALVE TAPPET AND ROLLER HOLDERS FOR HYDROCARBON MOTORS.

APPLICATION FILED MAY 17, 1917.

1,345,942. Patented July 6, 1920.

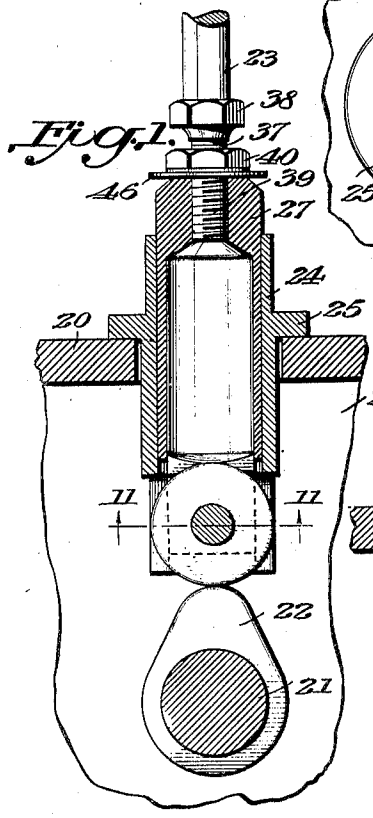


Fig. 1.

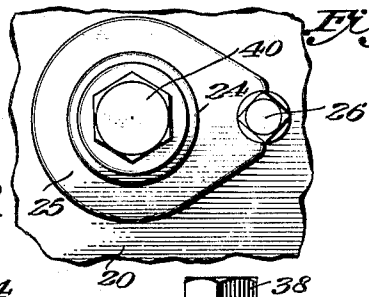


Fig. 3

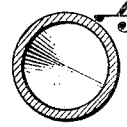


Fig. 6

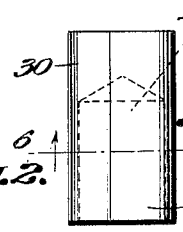


Fig. 4.

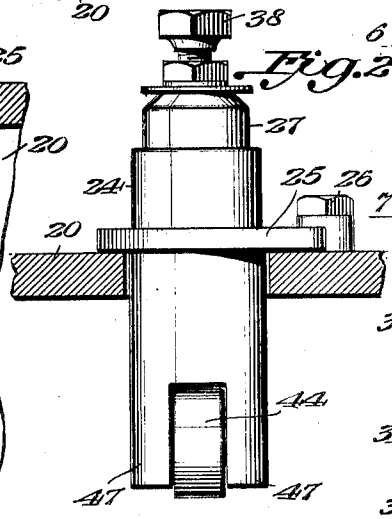


Fig. 2.

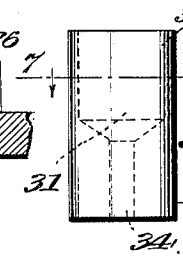


Fig. 5.

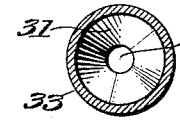


Fig. 7.

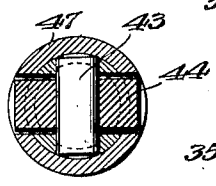


Fig. 11.

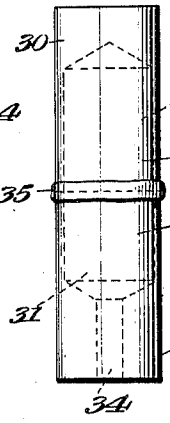


Fig. 8.

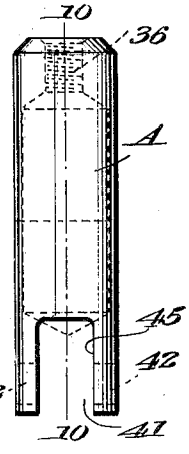


Fig. 9.

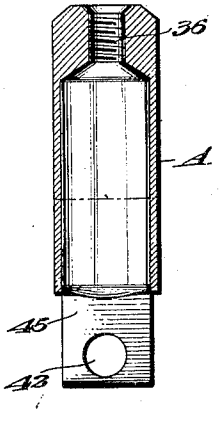


Fig. 10.

INVENTOR:
George L. McCain,
BY Miller & Sketta,
ATTORNEY.

UNITED STATES PATENT OFFICE.

GEORGE L. McCAIN, OF DETROIT, MICHIGAN, ASSIGNOR TO PACKARD MOTOR CAR COMPANY, OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN.

METHOD OF MAKING VALVE TAPPET AND ROLLER HOLDERS FOR HYDROCARBON-MOTORS.

1,345,942. Specification of Letters Patent. Patented July 6, 1920.

Application filed May 17, 1917. Serial No. 169,250.

To all whom it may concern:

Be it known that I, GEORGE L. McCAIN, a citizen of the United States, and resident of Detroit, Wayne county, State of Michigan, have invented certain new and useful Improvements in Methods of Making Valve Tappet and Roller Holders for Hydrocarbon-Motors, of which the following is a specification.

This invention relates to hydrocarbon motors and particularly to methods of making valve tappet- and roller-holders of such motors.

One of the objects of the invention is to provide a novel method of making a valve tappet- and roller-holder of simple and strong, yet light, construction.

Another object of the invention is to provide a method of making a holder having a thin tubular body construction and relatively heavy ends adapted to receive the tappet and roller respectively.

Other objects of the invention will appear from the following description taken in connection with the drawings which form a part of this specification and in which:—

Figure 1 is a sectional view of part of the crank case of a hydrocarbon motor including the lower end of one of the motor valves, the motor cam shaft, and the parts arranged between the cam shaft and the valve for operating the latter, said parts including a tappet- and roller-holder made in accordance with this invention;

Fig. 2 is an elevation showing the holder and its guide together with the adjacent part of the motor crank case to which the guide is attached;

Fig. 3 is a plan view of the parts shown in Fig. 2;

Figs. 4 and 5 are elevations of the two pieces which are used in making a valve tappet- and roller-holder according to this invention;

Figs. 6 and 7 are respectively transverse sections on the lines 6—6 and 7—7 of Figs. 4 and 5;

Fig. 8 is an elevation of a holder in process of construction and illustrating the welded joint formed when the two pieces of the holder are brought together;

Fig. 9 is a view similar to Fig. 8 but showing a completely machined holder;

Fig. 10 is a longitudinal section on the line 10—10 through the holder shown in Fig. 9; and

Fig. 11 is a transverse section on the line 11—11 of Fig. 1.

Referring to the drawings, 20 represents the crank case of a hydrocarbon motor in which is suitably mounted a cam shaft having a cam 22. Arranged on the motor above each of the cams 22 is a motor valve 23, the lower end of the stem of which is shown in Fig. 1.

It is usual to arrange some sort of push rod or tappet means between each of the cams and the valve of a hydrocarbon motor for the purpose of trasmitting the cam action to the valves. In the present invention a guide 24 of somewhat tubular construction is detachably secured to the crank case as by a flange 25 and bolt 26, and within this guide is reciprocally mounted a push rod or holder 27 which, for the best results, should be extremely light due to the fact that it must reciprocate very rapidly, and should provide a threaded portion at one end for a valve tappet and a slotted portion at the other end with rather full flat faces for the roller which is to operate on the cam. The present invention provides a novel method of making such a tappet- and roller-holder and the holder so produced is of novel and particularly efficient construction.

In forming the tappet- and roller-holder of this invention two parts are employed, which parts may be conveniently made of bar stock from which they are properly machined. When so machined the two parts are of somewhat similar form, the part 28 shown in Figs. 4 and 6 being of cylindrical form and somewhat longer than its diameter and having a thin tubular portion 29 and a head portion 30, and the part 31 shown in Figs. 5 and 7 being similar to the part 28 in that it also has a thin tubular portion 32 and a head portion 33. The part 31 however is drilled through its head portion as shown at 34, for a purpose that will hereafter appear. When so formed the parts 28 and 31 are ready for the welding operation of this invention, which consists in placing the ends of the thin tubular portions of the parts 28 and 31 together and welding these thin edges so that the two parts become integral. This welding is preferably done by passing an electric current through the abutting

edges but any other means of applying heat to those edges may be used for this purpose. During the welding process the opening 34 permits the escape of air and gases from the interior of the parts.

Fig. 8 shows the two parts 28 and 31 as so welded together, the weld being shown as a rough flange 35 at the middle of the integral piece. The exterior of the piece is then machined or ground or both, and one end of it is tapped longitudinally as at 36 to receive a tappet 37 which is in the form of a threaded bolt having a head 38 and a shank 39, the latter threading into the opening 36. A nut 40 on the shank of the tappet locks the tappet in adjusted position in the opening.

The other end of the piece formed by the parts 28 and 31, and which piece may be herein referred to by the letter A, then has a transverse slot 41 machined in it and alined openings 42 drilled transversely of the slot to provide a bearing for a pin 43 upon which is mounted a roller 44. This roller has flat sides which are adapted to contact with the flat sides 45 of the slots 41, so that the roller is properly positioned in the slot. The finished tappet- and roller-holder is illustrated in Figs. 9 and 10 of the drawings.

It will be understood that the various parts above referred to are assembled by arranging the roller 44 in the slot 41, inserting the pin 43, telescoping the tappet- and roller-holder upwardly in the guide 24, placing a washer 46 which is slightly larger than the diameter of the holder, on top of the holder and inserting the tappet 37 in the threaded opening 36 with the lock nut 40 in place on the shank of the tappet. The guide 24 with the holder in place may then be secured to the crank case 20 between the cam 22 and the valve 23 and the tappet 37 may then be adjusted between said cam and valve and the nut 40 will lock the tappet in its adjusted position. The washer 46 is large enough to prevent the holder from dropping through the guide in case of removal of the cam shaft and the guide 24 is provided with downwardly extending arms 47 on two sides of the holder and at the ends of the pin 43 so that the pin cannot be withdrawn or drop out until the holder is partly removed from the guide.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:—

1. A method of making valve tappet- and roller-holders consisting of forming two cylindrical pieces each with a tubular portion and a solid head portion, and welding the tubular portions together end to end.

2. A method of making valve tappet- and roller-holders consisting of forming two cylindrical pieces of the same outside diameter throughout their length each with a tubular portion and a solid head portion, and welding the tubular portions end to end.

3. A method of making an article of manufacture of the class described consisting of drilling two cylindrical pieces to provide each with a tubular wall throughout part only of its length, welding the tubular wall parts of the pieces together end to end, tapping one end of the single piece thus formed to hold a tappet, and preparing the other end for holding a cam-engaging member.

4. A method of making valve tappet- and roller-holders consisting of drilling two similar cylindrical pieces to provide each with a relatively thin tubular wall throughout part only of its length, drilling a hole through the remaining part of one of said pieces to provide a vent, and welding the thin wall parts of said pieces together end to end.

5. A method of making valve tappet- and roller-holders consisting of welding together a tappet-holder part and a roller-holder part, and cutting the piece thus formed to hold a tappet in one end and a roller in the other end.

6. A method of making valve tappet- and roller-holders consisting of welding together two cylindrical pieces of partly tubular form and cutting the single piece thus formed to hold a tappet in one end and a roller in the other end.

7. A method of making valve tappet- and roller-holders consisting of welding together two cylindrical pieces of partly tubular form, tapping one end of the single piece thus formed to hold a tappet, and machining a slot and bearing parts in the other end to hold a roller.

8. A method of making an article of manufacture of the class described consisting of welding together two cylindrical pieces of partly tubular form, tapping one end of the single piece thus formed to hold a tappet, and preparing the other end for holding a cam engaging member.

In testimony whereof I affix my signature.

GEORGE L. McCAIN.