

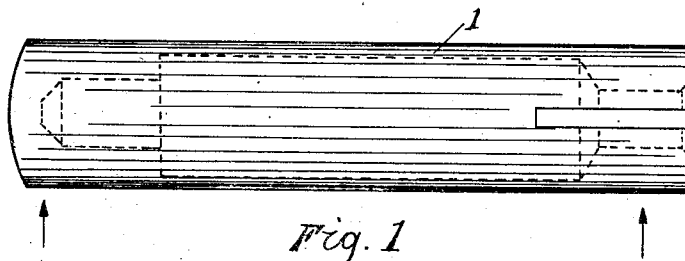
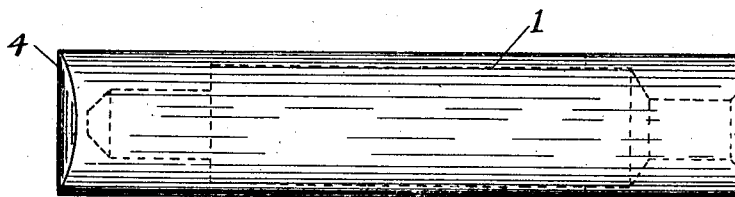
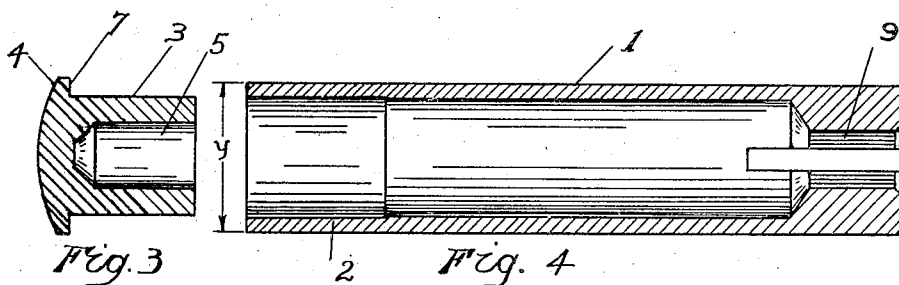
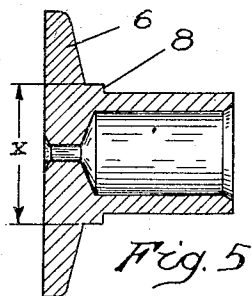
Oct. 9, 1923.

1,470,409

M. M. WILCOX

TAPPET

Filed Dec. 11, 1920



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INVENTOR

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BY

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UNITED STATES PATENT OFFICE.

MERRILL M. WILCOX, OF SAGINAW, MICHIGAN.

TAPPET.

Application filed December 11, 1920. Serial No. 430,030.

To all whom it may concern:

Be it known that I, MERRILL M. WILCOX, a citizen of the United States, residing at Saginaw, in the county of Saginaw and State of Michigan, have invented certain new and useful Improvements in Tappets; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to tappets such as are commonly employed to actuate the valves of internal combustion engines and the improvement relates more particularly to certain new constructions and combinations of parts whereby the objects of my invention are attained.

These objects are, first, to provide a tappet of such construction that the body of the tappet can be easily and quickly formed of a single piece of metal, while the end of the tappet which receives the impact of the engine cam is made of a separate piece of metal, preferably case-hardened so as to form a bearing surface that will resist the wear which would otherwise be caused by the impact of the cam.

A tappet of the kind referred to is shown and described in my application, Serial No. 324,959, filed September 19, 1919.

A further object of my invention is to provide in combination with a tubular body of light weight, a hard metal head of such construction as to combine lightness with great strength and to unite the head and the tubular body by means of electric welding so that the finished tappet will in effect be formed of a single piece of metal, the head end of the tappet being of very hard material, while the body is tough, yet light in weight.

My invention is illustrated in the drawings, in which Fig. 1 is a side view of a complete tappet, the interior walls of the tappet being indicated by dotted lines.

Fig. 2 is a similar view, showing the tappet of Fig. 1 as it appears when viewed in the direction of the arrows in Fig. 1.

Fig. 3 is a central longitudinal section of the case-hardened head.

Fig. 4 is a similar section of the tubular body.

Fig. 5 is a central longitudinal section of a modified form of head.

As is clearly shown in the drawings, the body consists of a hollow tubular shell 1,

which may preferably be formed by axially boring a bar of metal; or if desired, the tubular shell may be made of a length of drawn or pressed tubing, one end of which is swaged or upset in such a manner as to thicken the walls of the tube, thereby forming the guide opening 9 to receive a push rod or an adjusting screw, or similar part, not shown, which is interposed between the tappet and the valve in certain types of engine construction. At one end of the shell, as indicated at 2, the bore may, if desired, be reamed somewhat larger to receive the tubular shank 3 of the case-hardened end, the end of the head, as indicated at 4 in Fig. 3, being substantially the same diameter as the outside diameter of the tubular body 1.

The head is preferably bored as at 5 to reduce the weight and to leave a relatively light and thin tubular wall that can be readily welded by spot-welding or otherwise to the interior wall of the tubular body 1.

In Fig. 5 the face of the head is illustrated as a wider flange 6, this being a modified form of the head shown at 4 in Fig. 3.

In Fig. 3 the head 4 is formed with a shoulder 7 and in Fig. 5 the head is shown with a similar shoulder 8, the shoulders 7 and 8 being adapted to bear against the tubular end of the shell 1 to form a solid bearing for the head against the tubular shell.

After the parts are assembled as shown in Figs. 1 and 2, the body and the head are secured together by electric welding, or in any other suitable or equivalent manner.

In practice during the first half of the lift of the tappet the revolving of the engine cam causes a strong sidewise thrust against the tappet, tending to force the tappet against the guideway in which it slides up and down. Consequently if the shell of the tappet at the point where it enters the guideway at the time the sidewise thrust is brought upon it, has a thin wall, this thin wall will buckle, distorting the tappet and finally causing it to stick in the guideway. This trouble has frequently put engines out of operation.

My hardened tappet head has a long shank 3 and this elongated shank has its upper end always in the guideway of the engine and consequently the side thrust above referred to is withstood by that part of the tappet shell which is reinforced by the long shank 3, eliminating danger of distortion and preventing the tappet from sticking

after it has been in use a considerable length of time. This long shank construction of the tappet head has avoided the difficulties due to distortion which were previously
5 made in practice and has saved great expense which would have been incurred for replacement had the thin shells 1 been employed without the elongated shanks 3 to reinforce them.

10 In practice I prefer to make the head 4 of alloy steel in order to avoid wear caused by the impact of the engine cam and by so doing I am enabled to employ this relatively expensive material for the wearing
15 part of the tappet and to make the body of the tappet of less expensive material. Thus I may employ cheaper grades of metal for those parts of the tappets where wear is not excessive and employ a small amount of
20 more expensive material in those parts that are subjected to excessive wear.

By the means above described I have produced a simple and light, yet strong and very durable tappet having a body of tough
25 material and a case-hardened head, the construction of the tubular body being such that it can be readily formed by boring a cylindrical bar of metal and the head being of such construction that it can be easily and
30 quickly formed in a turning lathe or upset by a forging operation.

After the parts are assembled and welded as indicated in Figs. 1 and 2 the exterior surface of the tappet may be trued by grinding
35 or otherwise.

In Fig. 5 diameter X at shoulder 8 is preferably less than the body diameter Y, Fig. 4, so that the exterior of the shell can be ground to size upon a grinding wheel without the necessity of undercutting the shell
40 as is indicated in Fig. 1 of application Serial No. 324959 above referred to. The operation of undercutting the end of the shell is thereby rendered unnecessary.

45 While I have shown and described my

improvement as applied to the specific form of tappet illustrated in the drawing, it will be understood that my construction may be also applied to tappets of the so-called mushroom type in which are included other arrangements of push rod connections than
50 herein described.

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

1. As an article of manufacture a tappet comprising a tubular body and a case-hardened cam-contacting head, said head having an elongated shank adapted to be received in one end of said body, said shank recessed
55 and secured to said tubular body by welding, for the purposes set forth.

2. As an article of manufacture, a tappet comprising a tubular body having its walls at one end thickened, a cam-contacting head
60 of hardened metal adapted to be received in one end of said body, said head having an elongated cylindrical shank formed with a recess, the recessed portion secured to said tubular body by welding.
70

3. A tappet comprising a tubular body, an independent cam-contacting head of hardened metal, said head formed with an elongated shank adapted to be received within the end of said tubular body, said shank
75 axially recessed, the exterior walls of said shank fixed to the interior walls of the body, for the purposes set forth.

4. A tappet comprising a tubular body, an independent cam-contacting head of
80 hardened metal, said head formed with an elongated shank adapted to project within said tubular body, said elongated shank axially recessed, the exterior walls of said shank fixed to the interior walls of the body, a
85 shoulder formed on said head and adapted to abut against the end of said tubular body, for the purposes set forth.

In testimony whereof, I affix my signature.

MERRILL M. WILCOX.