Sept. 18, 1934. H. J. LONG 1,973,855

METHOD OF MAKING TAPPETS

Filed Oct. 23, 1930

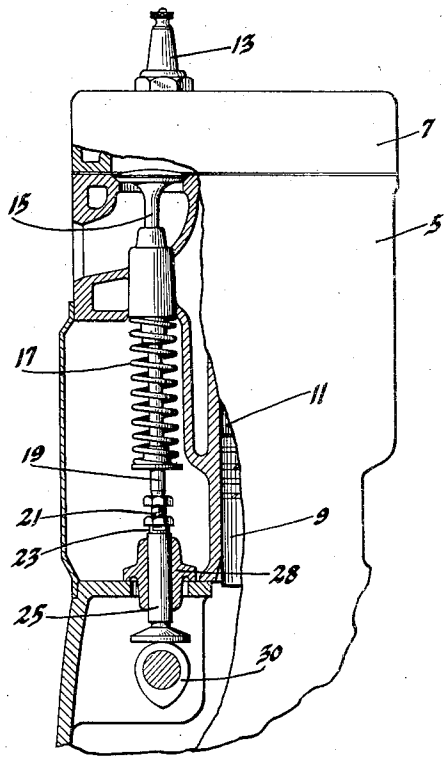


Fig. 1

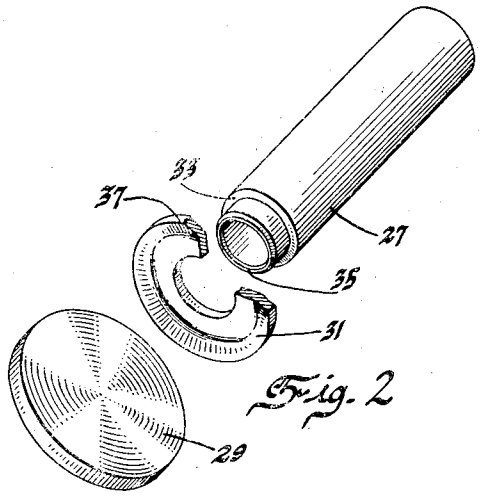


Fig. 2

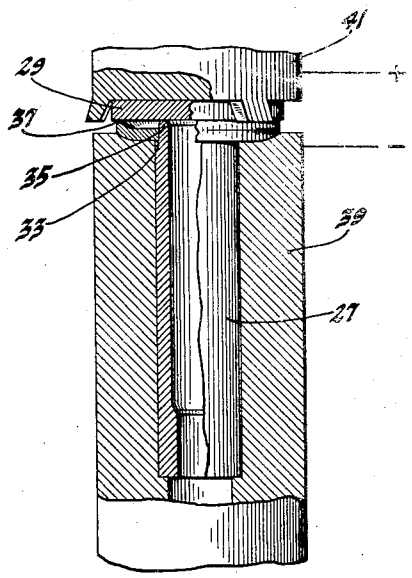


Fig. 3

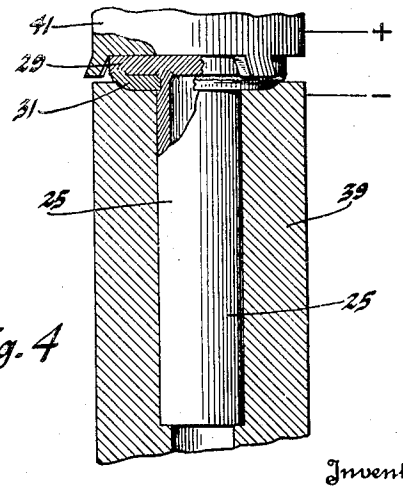


Fig. 4

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METHOD OF MAKING TAPPETS

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2 Claims. (Cl. 29—156.7)

This invention relates to tappets such as are used on engines to transmit the motion of the cams to the valves.

An object of the invention is to make a tappet structurally superior to tappets as heretofore made.

A further object of the invention is to reduce the expense of making such superior tappets.

The invention relates more particularly to that kind of tappet having a steel shank, preferably hollow, with a cast iron head secured to the shank, and has for its object an improvement in the structure of such a tappet and an improvement in the process of making it.

More specifically the invention provides for the use of an annular steel stamping together with a hollow steel shank of substantially uniform diameter throughout and a cast iron head. In connection with such a tappet another object of this invention relates to the specific arrangement of these parts and the process of welding them together.

Other objects and advantages will appear from the following specification and the accompanying drawing.

In the drawing—

Fig. 1 is an end view of an engine, partly in section, showing the tappet and the parts with which it is associated.

Fig. 2 is a perspective of parts constituting the tappet in disassembled relation.

Fig. 3 is a view partly in elevation and partly in section of the tappet with its parts assembled for the welding operation.

Fig. 4 is a view similar to Fig. 3 showing the welded tappet.

In the drawing numeral 5 is used to designate an engine having a head 7. At 9 is seen the piston reciprocably mounted in a cylinder 11. At 13 is shown one of the usual spark plugs, and the numeral 15 represents one of the valves. The valve is normally held seated by a spring 17, and its stem 19 is engaged and reciprocated by an adjustable abutment 21 threaded to the end 23 of the tappet designated, as a whole, by numeral 25. The tappet is slidably mounted in a guide 28 and is actuated by a conventional cam 30.

The tappet 25 is formed by uniting three separate parts. There is a tubular stem shank 27, a cast iron cam-engaging head 29, and an annular steel stamping 31. The steel shank is to be internally threaded at one end for adjustably securing the abutment as explained above.

Figs. 3 and 4 show the tappet before the threads are provided. At its other end the shank is slightly reduced in diameter forming a shoulder 33. It will be observed that there is no integral enlarged head as is commonly provided, it being obvious that the unheaded shank is more economical in production than the shank with an integral enlarged head. The extremity of the reduced end of the shank is chamfered both inside and outside as at 35. The steel stamping snugly fits over the reduced portion of the shank and engages the shoulder 33. Its thickness is less than the axial length of the reduced portion of the shank, so that the chamfered extremity extends beyond the plane of the stamping. Peripherally the stamping is distorted from the plane of its inner region, such distortion turning up an edge indicated on the drawing by numeral 37. This edge 37 lies substantially in the plane of the extremity of the tubular shank. The cast iron head 29 is a simple disc having a radius corresponding substantially with, or but slightly greater than that of the stamping. The head is positioned concentrically with the shank and stamping, and when so positioned engages the chamfered end of the shank and the edge 37 of the stamping.

At 39 is a support for the shank and the stamping when the latter is in position as shown. At 41 is a member mounted movably in the axis of the shank and is arranged to press the head 29 in the direction of the said axis. Preferably the member 41 may be provided with tongues as shown to accurately position the head 29. The members 39 and 41 may serve as electrodes for the welding current. As is well known the cast iron has a lower melting temperature than the steel, and by making those regions of the steel which engage the cast iron of reduced dimensions, as at 35 and 37, there is a tendency to equalize the melting action of the two members to be welded together. Under the influence of pressure from part 41 and the heat from the current, the extremity of the shank is welded both to the head 29 and to the inner periphery of the stamping. The outer periphery of the stamping is also welded to the outer periphery of the disc-shaped cast iron head. As a result of this arrangement the cast iron head does not have an unsupported overhang from the tubular shank as in some former constructions, but is supported by the steel stamping throughout substantially its whole surface, which stamping is itself welded to the shank. Added support is thus given the cast iron head as in the case of the more expensive integrally headed steel shanks.

It will be seen that the shank itself is less expensive to manufacture, that the disc or head 29

is simple and comparatively inexpensive, and requiring no machining, may be made from any non-machinable cast iron. The reinforcing back or support is an inexpensive stamping. The parts, when assembled, are permanently welded together by a single welding operation. There is thus made from parts which are themselves inexpensive to manufacture a composite tappet which has the best known kind of cam-engaging head, the lightest and strongest shank, and the head is not only securely welded to the shank but by the single welding operation there is also secured both to the shank and to the head the disc of steel which provides as effective a supporting back for the cast iron head as is obtained in the case of the more expensive construction involving a shank with an integral enlarged end portion.

It should be explained that the expression "substantially uniform diameter" as applied to the shank is intended to differentiate from a shank with an end materially enlarged radially to form a cam-engaging head or to support such a head, the word "substantially" being used to accurately describe this shank which does have its end slightly reduced to receive and support the stamping.

I claim:

1. The process of making a tappet comprising: preforming a tubular shank of steel; preforming an annular steel stamping; preforming a disc-shaped part of cast iron; assembling said stamping about the end of said shank and said disc upon said stamping and end of said shank and thereafter welding said parts together by welding together the peripheral regions of the steel stamping and the cast iron disc and by welding the shank to the disc and stamping.

2. The process of making a tappet comprising preforming a tubular shank of steel with a reduced end; preforming an annular steel stamping with a peripheral distortion to produce an axially projecting circular edge, preforming a disc of cast iron, assembling said stamping about the end of said shank, assembling said disc upon the reduced end of said shank and upon said circular edge and thereafter welding said parts together by welding together the peripheral regions of the steel stamping and the cast iron disc and by welding the shank to the disc and stamping.

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