

J. A. GERMONPREZ.

VALVE TAPPET.

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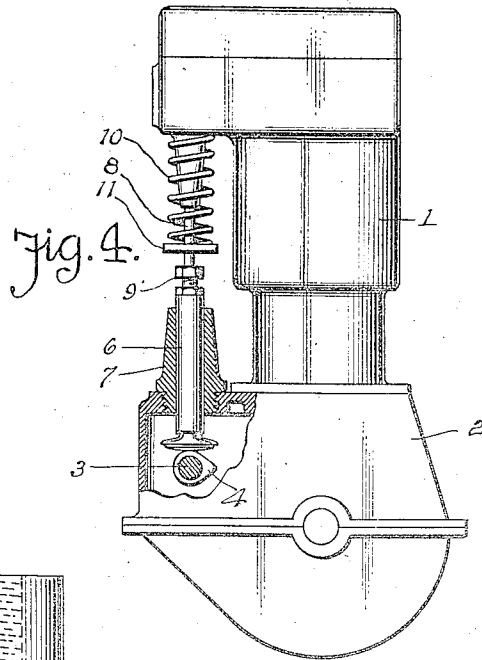
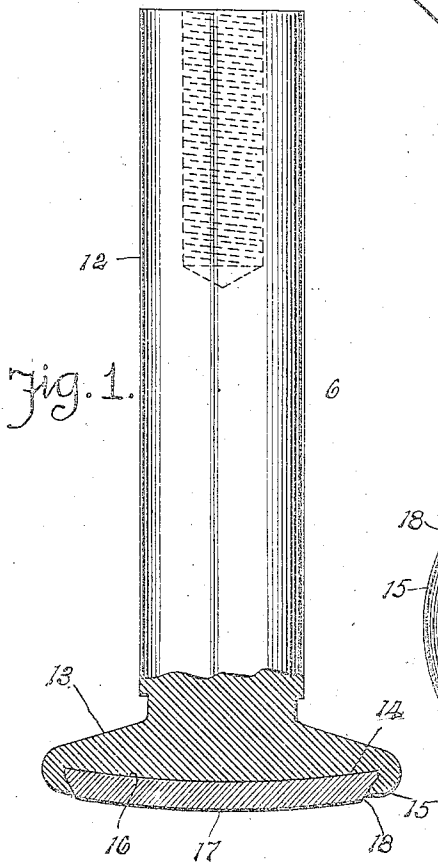
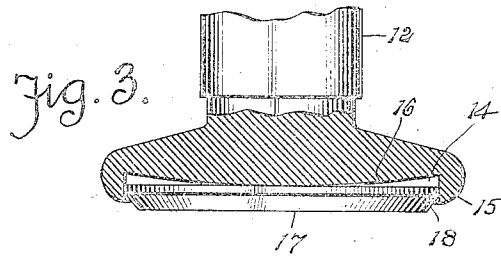
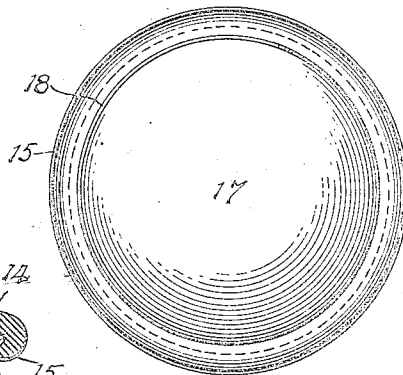


Fig. 2.

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VALVE TAPPET.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOHN A. GERMONPREZ, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Valve Tappets, of which the following is a specification, reference being had therein to the accompanying drawings.

10 Gas and other internal combustion engines as commonly constructed have valves which are operated in timed relation to the engine pistons by means of cams upon a cam shaft which cams engage valve tappets and lift
15 the valves in operating the same. The rapid rotation of the cam shaft and the constant hammering action of the cams against the tappet heads, soon wears the heads and causes lost motion. The heads of the tappets
20 are therefore usually hardened, but to harden the heads of the tappets to the desired degree of hardness is a very difficult operation and often results in the metal being too hard and brittle so that the heads
25 break in operation.

The object of this invention is to provide a hard wear surface for the heads of tappets to be engaged by the cams and further to provide such wear surface in the form of a
30 hardened steel disk. It is also an object of the invention to provide means for securing the disk to the head in such a manner that the disk will always be firmly seated and cannot become detached or loose in operation.
35 tion.

With the above and other ends in view, the invention consists in the matters herein-after set forth and more particularly pointed out in the appended claims, reference being had to the accompanying drawing, in which—

Fig. 1 is a side elevation of a tappet with the head thereof shown in section;

Fig. 2 is an elevation of the lower end face of the tappet shown in Fig. 1;

Fig. 3 is a sectional detail illustrating the manner in which a face disk is applied to the tappet head; and

Fig. 4 is an end elevation of a gas engine with parts broken away and in section to show a tappet in place thereon and co-operating engine parts.

As shown in Fig. 4, 1 indicates the usual engine cylinder, 2 the crank case, 3 a cam shaft within the case having a cam 4 thereon to engage the head of a tappet 6 which is

mounted to slide within a suitable bearing member 7 on the crank case of the engine. 8 indicates the usual valve stem and 9 the usual adjustment between the lower end of the stem and the upper end of the tappet 6, and 10 indicates the usual coiled spring sleeved over the valve stem between a suitable abutment 11 on the stem and the engine casing.

The tappet indicated as a whole at 6, comprises a cylindrical body 12 which engages and slides within the bearing 7 on the engine crank case and this body 12 is formed at its lower end with a circular head 13 of considerably greater diameter than the diameter of the body. This head is recessed in its lower end face, as at 14, and an edge flange 15 surrounds this recess. The bottom 16 of the recess is curved transversely of the longitudinal axis of the head and stem 12 so that at the axis or center of the recess 14 this bottom wall is higher than at any other point of its surface, thus curving outwardly and upwardly in a direction from this axis toward the flange 15.

To form a hardened surface for the head 13 of the tappet, a disk 17 is formed of steel or other suitable material which is properly hardened and ground to give a very smooth, hard lower surface. The edge of this disk is formed at an incline, as shown at 18, providing an edge portion at the upper side of the disk which is of greater diameter than the lower surface of the disk.

The disk 17 is secured in place within the recess 14, by forcing it against the bottom wall of the recess under heavy pressure, thus springing or flexing the disk into conformity with the curved bottom of the recess and into close contact therewith and while so held in contact, the edge flange 15 on the head 13 is formed over and down upon the inclined edge 18 of the disk, thus securely locking the disk within the recess of the head. The disk being sprung or flexed in the recess, always has a tendency to spring back to normal position and thus its edge is firmly held in contact with the turned over edge 15 of the head by this tendency of the disk to spring back to normal condition and therefore the disk will not become loose in the recess of the head in use but will always remain firmly held in place by this spring action of the disk itself. If it were not for this tendency of the disk to spring back to its flat condition, it would very soon become loose within

the recess of the head and would then wear and finally drop out.

By this construction a very light, hard, smooth surface is provided for tappet heads to take the wear of the cams and this surface is a separate part which is applied to the head in such a manner as to obviate any danger of its becoming loose or detached in use. By providing the separate disk facing, the body or stem 12 and head portion 13 of the tappet may be formed from any suitable steel or other material which may be easily machined and then the hardened steel disk applied thereto. The disk may be given the proper hardness without danger of making it brittle and the manufacture of the tappet is greatly facilitated by constructing the body separate from the face so that the body may be made of material which may be readily machined.

Having thus fully described my invention, what I claim is:—

1. As a new article of manufacture, a tappet comprising a body having an end portion formed with a surface which is curved transversely of the longitudinal axis of the body, and a resilient cam engaging element held in close contact with said curved surface throughout its area by the yielding engagement of said element with said portion to prevent relative movement of the parts.

2. As an article of manufacture, a tappet comprising a body having an end portion formed with a surface curved transversely of the longitudinal axis of the body, and a resilient cam engaging element seated upon said curved surface and held in firm contact therewith to prevent relative movement thereof by the resilient engagement of the edge portion of said element with said end portion of the body.

3. As a new article of manufacture, a tappet comprising a body having an end portion formed with a surface curved transversely of the longitudinal axis of the body, a resilient cam engaging disk seated upon said surface and sprung laterally into firm contact therewith throughout said surface, and means engaging the edge portion of said disk to hold said disk in its sprung condition.

4. As an article of manufacture, a tappet comprising a body having an end portion formed with a recess in its end face with the bottom of the recess curved transversely of the longitudinal axis of the body and an edge flange surrounding the recess, and a disk within the recess in close contact with its bottom throughout the area thereof and held in such contact by the yielding engagement of the edge portion of the disk with said flange.

5. As a new article of manufacture, a tappet comprising a body having a head formed with a recess in its end face, said re-

cess having a bottom curved transversely of the head, said head being formed with an edge flange surrounding said recess, and a disk forced into contact with the curved bottom of the recess and sprung laterally thereby, said disk being held within the recess by the yielding engagement of its edge portion with said flange.

6. As a new article of manufacture, a valve tappet wherein a solid unyielding body is provided with an outwardly curved end surface of smooth unbroken area and a separate hardened member is secured under stress in firm contact throughout its area with said end surface to provide a hardened unyielding contact end surface for the tappet.

7. As a new article of manufacture, a valve tappet comprising a body having a head formed with a smooth outwardly curved end surface, a hardened disk, and means for securing said disk with one face in firm contact with said surface throughout its entire area.

8. As a new article of manufacture, a valve tappet comprising an unyielding body having a head formed with a smooth end surface of unbroken area, a thin disk forming a hardened contact covering for said end surface of the head, and means for holding one face of said disk in firm contact with said end surface of the head throughout the area of said face, one of said contacting surfaces being curved.

9. As a new article of manufacture, a valve tappet comprising a cylindrical body having a head portion formed with a recess in its end, the bottom of which recess is continuous and unbroken throughout its area, and a hardened disk held in said recess with one face in firm contact throughout its area with said bottom of the recess, by the portion of the head surrounding the recess, one of said contacting surfaces being curved.

10. As a new article of manufacture, a valve tappet comprising a body having a head portion formed with a smooth end surface, a hardened disk, and means for securing said disk flexed with one face in firm contact with said surface throughout its entire area.

11. As a new article of manufacture, a valve tappet comprising a cylindrical body having a head portion formed with a recess in its end, the bottom of which recess is continuous and unbroken throughout its area, and a hardened disk held flexed in said recess with one face in firm contact throughout its area with the bottom of said recess by the portion of the head surrounding the recess.

12. As a new article of manufacture, a valve tappet comprising a body having a head portion formed with a smooth end surface at its axial portion, a hardened disk,

and means for securing said disk flexed with the face adjacent to the tappet body in firm contact with the axial portion.

13. As a new article of manufacture, a
5 valve tappet comprising a body having a head portion formed with a recess in its end, the bottom of which recess is continuous and unbroken at the axial portion of the tappet, and a hardened disk held flexed in said recess with the central portion of one face in
10 firm contact with the bottom of said recess by the portion of the head surrounding the recess.

14. As a new article of manufacture, a valve tappet comprising a body having a head portion forming a seat, and a hardened flexed disk seated on said seat and held in firm contact therewith by the resiliency of the flexed disk.

In testimony whereof I affix my signature 20 in presence of two witnesses.

JOHN A. GERMONPREZ.

Witnesses:

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