Oct. 20, 1925. 1,557,548

D. F. ASBURY

VALVE OPERATING MECHANISM

Filed April 19, 1920

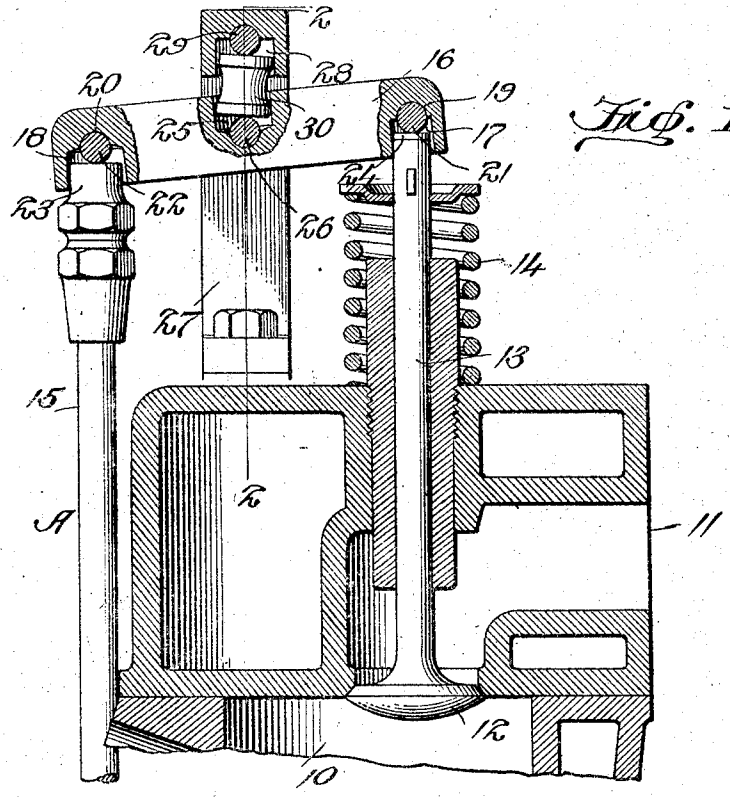


Fig. 1.

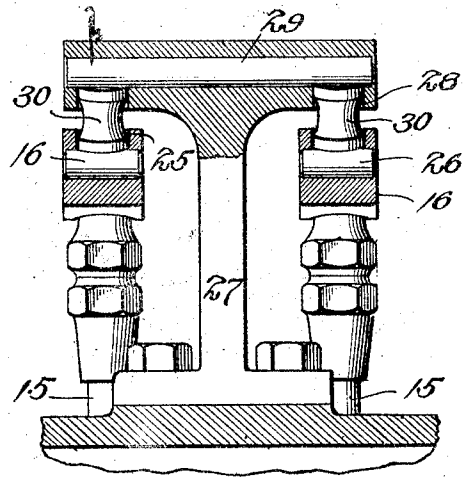


Fig. 2.

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UNITED STATES PATENT OFFICE.

DORSEY F. ASBURY, OF WASHINGTON, DISTRICT OF COLUMBIA.

VALVE-OPERATING MECHANISM.

Application filed April 19, 1920. Serial No. 374,996.

To all whom it may concern:

Be it known that I, DORSEY F. ASBURY, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Valve-Operating Mechanism, of which the following is a specification.

My invention relates to improvements over the construction of rocker arms for valve operating mechanisms as described and claimed in my copending application, filed Feb. 21, 1920, serially numbered 360,487, whereby friction and consequently wear and the necessity for lubrication of the points of contact between a rocker arm and the parts of the mechanism with which it is operatively associated is eliminated.

The accompanying drawings are illustrative of the preferred embodiment of my improved rocker arm construction.

In the drawings—

Fig. 1 is a vertical section through a portion of an internal combustion engine showing the application of my invention thereto; and

Fig. 2, is a section on the line 2—2 of Fig. 1.

Referring to the drawings in detail, A designates, generally, a portion of an internal combustion engine including a cylinder 10 and cylinder head 11. Seating on the head 11 is a puppet valve 12, the stem 13 of which extends through and above the head 11 and has associated therewith a spring 14 normally holding the valve to its seat. Disposed in operative relation to the valve is a tappet rod 15, and bridging the upper ends of said valve stem and said tappet rod is a rocker arm 16, fulcrumed intermediately whereby desired operation of the valve is accomplished upon actuation of the tappet rod, the latter being operated in any well known or preferred manner as by cam means not shown.

My invention consists in the provision of improved means whereby an anti-frictional fulcrum is provided for said rocker arm and an anti-frictional contact is provided between the rocker arm and the valve stem and tappet rod respectively, whereby noise, wear and the necessity for lubricating these relatively contacting parts is eliminated. The preferred arrangement for accomplishing these purposes is illustrated in the accompanying drawings and consists in providing in the ends of the rocker arm openings 17 and 18, respectively, of a size sufficiently large to freely receive the upper ends of the valve stem and tappet rod, respectively. These openings may extend entirely or only partially through the rocker arm, the sole essential being that they be open with respect to one face of the rocker arm in order that the valve stem and tappet rod may project into them a sufficient distance to enable the walls surrounding them to prevent excessive lateral displacement of the valve stem and tappet rod with respect to the rocker arm. Smaller openings 19 and 20 respectively are provided in the rocker arm at right angles to the first mentioned openings, and said latter openings respectively intersect the first mentioned openings at points somewhat remote from the face of the rocker arm through which the valve stem and tappet rod project. Hardened pins 21 and 22 are fixed in the openings 19 and 20 respectively in any desired manner, preferably as illustrated by spinning the relatively soft metal of the rocker arm around the ends of the pins. By this arrangement the portion of the pins extending transversely across the openings 17 and 18 provides a hardened curved surface for contact with the upper flat ends of the valve stem and tappet rod. If desired, members 23 and 24 having hardened flat surfaces for contact with said pins may be provided on the upper ends of the tappet rod and valve stem respectively, although such members are not essential to an efficient operation of the rocker arm.

At an intermediate point in the face of the rocker arm opposite to the face first referred to, that is, the upper face in the present disclosure, I provide an opening 25 similar to either of the openings 17 or 18 and associate therewith a pin 26 in a manner similar to the association of the pins aforementioned with the first openings. Likewise, in a bracket 27 secured to the cylinder head I provide an opening 28 and an intersecting pin 29, and between the pins 26 and 29 with its flat ends in contact with said pins and portions of its body projecting into the openings 25 and 28 I interpose a member 30 providing a flexible fulcrum for the rocker arm.

From the foregoing it is believed that the operation and advantages of my invention will be clearly understood, it being apparent that upon actuation of the tappet rod a rolling action will occur between the

respective contacting ports of the mechanism due to the floating or bodily movable arrangement of the rocker arm.

A single pin may be arranged to intersect two or more openings as for instance the pin 29 in Figure 2 of the drawings.

I claim:—

1. In a valve mechanism, a member provided with a pair of openings intersecting one another at right angles, and a cylindrical pin fitted within one of said openings whereby a side portion thereof provides within the other opening a convex bearing surface having parallel elements.

2. In a valve mechanism, a rocker arm provided with a pair of openings intersecting one another at right angles, and a cylindrical pin fitted within one of said openings whereby a side portion thereof provides within the other opening a convex bearing surface having parallel elements, the axes of said openings and pin being at right angles to the longitudinal axis of the rocker arm.

3. In a valve mechanism, a rocker arm provided with a pair of openings located adjacent to its ends, respectively, and forming guides for the ends of a valve stem and push rod, respectively, said rocker arm further being provided with a third opening located intermediately thereof and forming a guide for a fulcrum member, said rocker arm further having other openings intersecting said first mentioned openings at right angles, respectively, and a hardened cylindrical pin fitted in each of said last mentioned openings and forming within each of the first mentioned openings a convex bearing surface having parallel elements with which said valve stem, push rod and fulcrum member, respectively, are adapted to have rolling contact.

4. In a valve mechanism, a member provided with a pair of openings intersecting one another at right angles, and a cylindrical pin fitted within one of said openings whereby a side portion thereof provides within the other opening a convex bearing surface having parallel elements, said second mentioned opening being of limited depth and terminating substantially where it intersects the pin receiving opening whereby the pin is supported throughout its length at the side thereof opposite said first mentioned opening by the material of the member.

In testimony whereof I hereunto affix my signature.

DORSEY F. ASBURY.