W. E. ELLIS.

VALVE ACTUATING MECHANISM.

APPLICATION FILED APR. 2, 1919.

1,346,401.

Patented July 13, 1920.

2 SHEETS—SHEET 1.

Fig. 1.

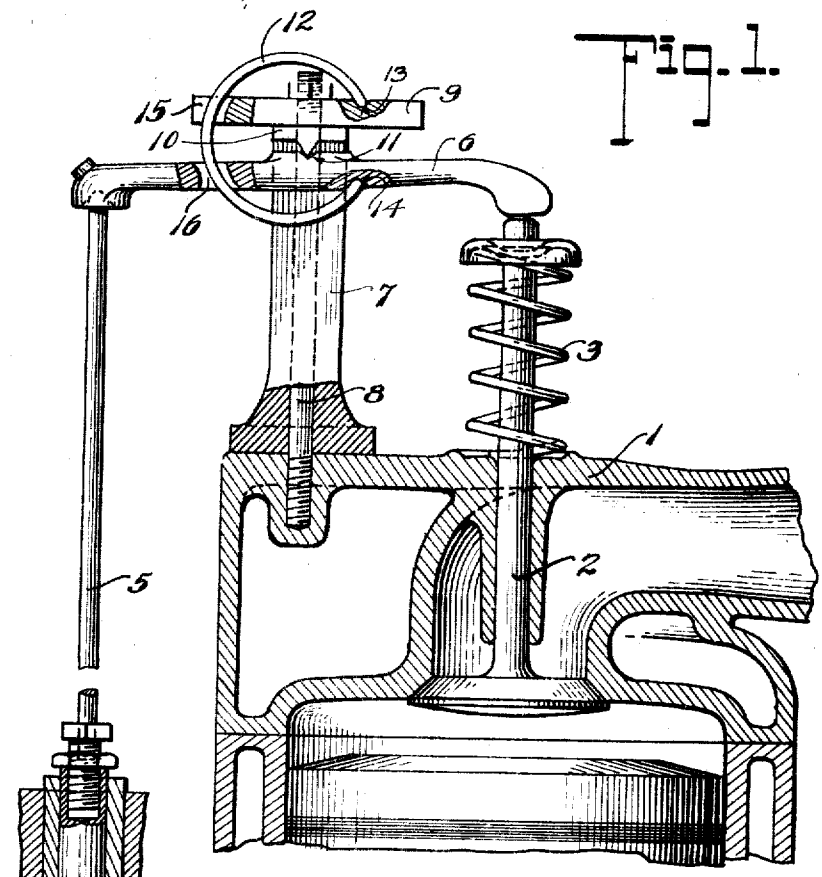
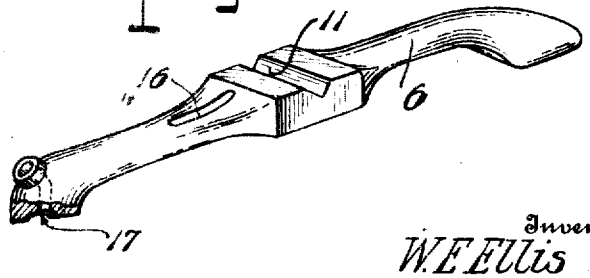


Fig. 3.



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2 SHEETS—SHEET 2.

Fig. 2.

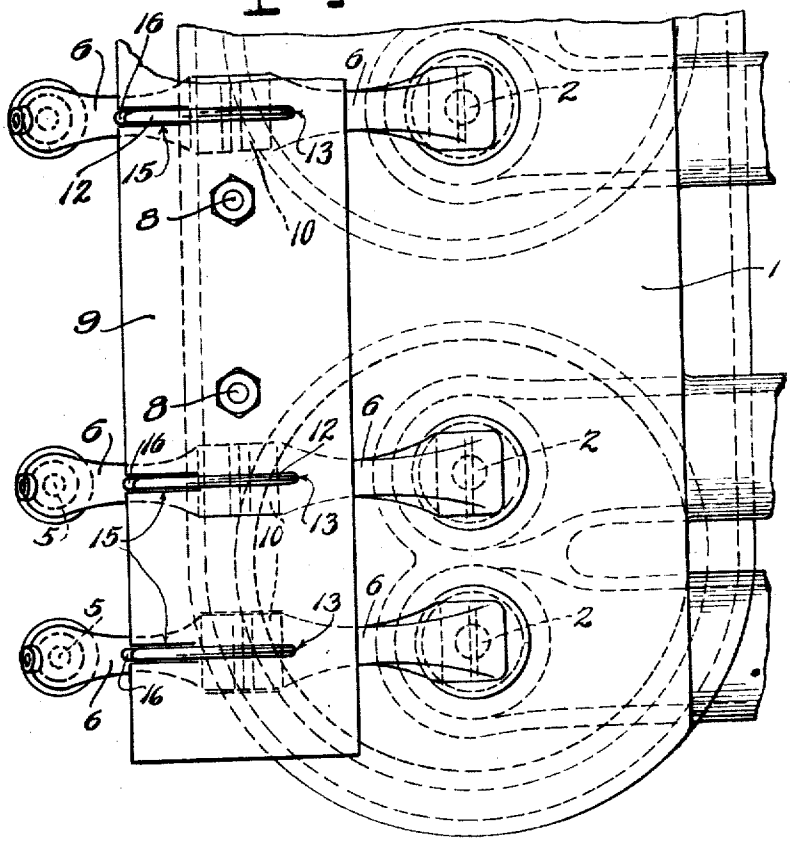


Fig. 4.

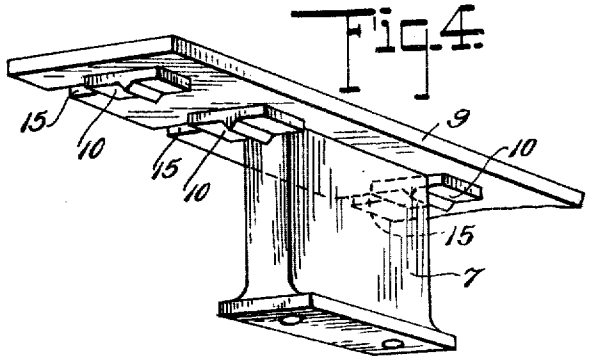
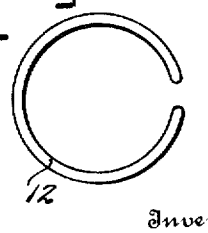


Fig. 5.



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UNITED STATES PATENT OFFICE.

WARREN E. ELLIS, OF LEBO, KANSAS, ASSIGNOR OF ONE-HALF TO WAYNE M. TRAYLOR, OF LEBO, KANSAS.

VALVE-ACTUATING MECHANISM.

1,346,401. Specification of Letters Patent. Patented July 13, 1920.

Application filed April 2, 1919. Serial No. 286,957.

To all whom it may concern:

Be it known that I, WARREN E. ELLIS, a citizen of the United States, residing at Lebo, in the county of Coffey and State of Kansas, have invented certain new and useful Improvements in Valve-Actuating Mechanism, of which the following is a specification.

This invention has to do with improvements in valve actuating mechanism for internal combustion engines, the invention lying more particularly in the arrangement of the rocker arm by means of which the valve is actuated.

In that type of motor known as the "valve-in-the-head", there is customarily provided a series of puppet valves which are unseated from the cam shaft by push rods which act upon rocker arms pivotally mounted intermediate the said rods and the valves. These arms are usually provided with bushings because of the great wear to which they are subjected and by the replacement of which bushings said wear is capable of being removed. However, owing to the fact that these arms operate at high speed it is difficult without frequent replacement to maintain them in good condition which is really an essential thing because otherwise the action of the valves becomes noisy and inefficient.

With this introduction, it may be stated that the object of my invention is to provide a rocker arm arrangement which eliminates the necessity for the use of such bushings, and necessarily with the requirements of replacement and frequent adjustment of the parts to compensate for wear; in other words a rocker arm so arranged and constructed as to be self-adjusting and self-sustaining, so to speak. To this end the invention consists of a support provided with a bearing, an arm arranged to rock on said bearing, and means to hold the arm against the bearing, in combination with the actuating means operable by the engine cam shaft.

These and such other objects as may hereinafter appear are attained by the novel construction, combination and arrangement of parts to be hereinafter specifically described and claimed. Reference will now be had to the accompanying drawings forming a part of this specification, wherein:

Figure 1 is a vertical section showing the application of my invention;

Fig. 2 is a top plan view;

Fig. 3 is a perspective view of one of the rocker arms;

Fig. 4 is a perspective view of the bearing support for the rocker arms; and

Fig. 5 is a detail view of one of the rocker arm springs.

Throughout the following detail description and on the several figures of the drawings, similar parts are referred to by like reference characters.

Referring to the drawings, 1 indicates the usual removable cylinder head, 2 the valves therein, held closed by springs 3; 4 denotes the engine cam shaft and 5 the push rods which when lifted rock the arms 6 and cause the valves 2 to be depressed or opened. Except for the construction of the arms, the foregoing is a conventional arrangement and operation requiring no further description. Speaking with reference to a single one, the mounting of the rocker arm 6 is the feature which forms the subject matter of this invention. As shown clearly in Figs. 1 and 4, I mount upon the cylinder head of the engine at one side of the valves a support 7 which is detachably secured to the head by means of bolts 8. This support is provided with a top plate 9 on the under side of which are provided knife-edges or bearings 10, there being one for each valve and rocker arm. By reference to Fig. 3, it will be observed that each rocker arm upon its upper surface and midway of its length is formed with a transverse groove 11 in which its edge 10 is received. Obviously, the arm when actuated in the operation of the engine by its push rod 5 rocks on this knife-edge with a minimum amount of friction and necessarily little or no wear. The problem of maintaining the arm in this position is only solved by the provision of a special type of spring which it will be observed in Figs. 1 and 5 is in the form of an open ring. This spring, designated 12, is so engaged about the plate 9 and rocker arm as to produce pressure upon the latter, one end of the spring being seated in a small recess 13 in the top surface of the plate and the other end being seated in a similar recess 14 in the under side of the arm at one side of the center. To per-

mit of this disposition, the plate 9 is slotted at its edge as at 15 and the arm 6 is slotted at 16, this being important for the reason that through this arrangement the arm is held against its knife edge and is prevented from being displaced laterally. The tension, of course, which is exerted by the spring tends to hold the rocker arm 6 with the end in contact with its push rod, said end being preferably provided with a recess 17 to assist in maintaining proper alinement. The facility with which the rocker arms may be placed or displaced will be instantly apparent, while the whole assemblage of arms may be removed as a unit by removal of the bolts 8 or their nuts, in an obvious manner.

To reiterate, the arms are held in place against their bearings by means of the springs which by virtue of their coöperation with the slots in the arms and the plate 9, in conjunction with the knife edges quite securely maintain the proper alinement to insure coöperation with the push rods and valve stems.

Having thus described my invention, what is claimed as new is:

1. The combination with a valve and actuating cam, of a support having a knife edge, a rocker arm intermediate the cam and valve and seated against said edge, and means engaging about said support and arm to hold the latter against the edge.

2. The combination with a valve and actuating cam, of a support having a knife edge, a rocker arm intermediate the cam and valve and seated against said edge, and a spring engaging with the support at one side of the edge aforesaid and with the arm at the corresponding side to place said arm under tension holding it against the edge.

3. In an engine, the combination with a valve, a cam shaft and push rod, of a support adjacent to the valve, an arm having a bearing intermediate its length against said support on which it may be rocked, and a spring engaging the support at one end and the arm at its other end whereby to hold the arm against its bearing in position to be actuated by the push rod to in turn actuate the valve.

4. Valve actuating mechanism for valve in the head motors comprising a support provided with a knife edge at one side, a rocker arm engaging intermediate its length with the edge, and an open ring spring engaging about the support and arm to hold the latter against the edge.

5. Valve actuating mechanism for valve in the head motors comprising a support provided with a knife edge at one side, a rocker arm engaging intermediate its length with the edge, and an open ring spring engaging about the support and arm to hold the latter against the edge, the arm having a slot through which the ring passes whereby to prevent lateral displacement of the arm.

6. Valve actuating mechanism for valve in the head motors comprising a support having one edge thereof provided with a series of slots and having on its under surface a series of knife edges, rocker arms engaging with said edges, each having a slot therethrough, and a spring member for each arm engaging the support at one end and passing through the support and arm slots aforesaid, to hold said arms in operative position against displacement from the knife edges.

In testimony whereof I affix my signature.

WARREN E. ELLIS.