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2,322,174

VALVE ACTUATING MECHANISM

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4 Claims. (Cl. 308—21)

This invention relates to improvements in valve actuating mechanisms, and particularly to that type of valve actuating mechanism wherein a rocker arm is rocked by an actuating cam for imparting motion to a valve stem, as illustrated in United States Letters Patent Nos. 2,209,480 and 2,226,985.

The primary object of the invention is to provide a comparatively simple arrangement for insuring correct assembly of the rocker arm in the valve actuating mechanism.

As explained in Patent No. 2,226,985, difficulties have been encountered in maintaining a flat contact between the surface of the rocker arm and the rocker arm cam, and a still further object of the invention is to provide means for permitting the rocker arm to adjust itself to the surface of the cam, said means being so constructed as not to require the use of any small structural elements that might be difficult to assemble or which might be easily broken or accidentally displaced.

More specifically, the invention contemplates mounting the rocker arm in a cylindrical supporting member formed of different diameters at different portions of its length, with the two portions arranged eccentrically of one another and this member is loosely seated in a correspondingly shaped opening with sufficient clearance to permit a slight rocking of said member. Thus, the supporting member cannot be improperly assembled and, though it is free to rock slightly, its movement is limited by binding of the eccentric surfaces, thus eliminating the use of stops or other separate means for limiting such motion.

With these and other objects in view, the invention consists in certain details of construction and combinations and arrangements of parts, all as will hereinafter be more fully described and the novel features thereof particularly pointed out in the appended claims.

In the accompanying drawing—

Figure 1 is a sectional view taken longitudinally of the rocker arm;

Fig. 2 is a plan view, partly in section, of the structure shown in Fig. 1;

Fig. 3 is a sectional view on the line 3—3 of Fig. 1; and

Fig. 4 is an exterior view, in elevation, of a portion of the motor casing, illustrating the bearing therein for the rocker arm supporting member.

As illustrated in Fig. 1, the rocker arm 10 is pivotally supported in the wall of the motor casing 11, with its free end in engagement with valve

stem 12, so that, when the arm is depressed by the higher portion of its operating cam 13, the valve stem will be correspondingly depressed. As will be understood, when the lower portion of cam 13 is in engagement with the rocker arm, the stem is urged to its raised or upper position by suitable spring devices (not shown).

In Patent No. 2,226,985, the rocker arm is shown pivoted in a cylindrical member which is adapted to rock in its bearing, so that the arm may accommodate or adjust itself to maintain a flat contact with the surface of its actuating cam, and this rocking motion of the supporting member for the arm is limited by a pin in the casing wall loosely engaging in a recess in said member. Such a construction presents some difficulty in assembly operations and the use of the pin for limiting the rocking motion of the cylindrical supporting member in which the rocker arm is pivoted presents a structural element that is rather fragile and may be easily broken, but there is also the possibility of its being lost. In the present invention, the use of comparatively small parts, such as the pin referred to in said patent, is eliminated and a substantial structure that can be easily and accurately assembled is provided by having the rocker arm pivotally supported in a cylindrical member formed with two different diameters at different portions of its length with these two portions of different diameters arranged eccentrically of each other and seated or journaled in an opening of corresponding cross-section in the motor casing wall. For instance, referring to Figs. 1, 3 and 4, the member in which rocker arm 10 is pivoted is formed for the major portion of its length with a cylindrical surface 25 concentric with the axis on which the rocker arm is adapted to tilt to accommodate itself to the surface of operating cam 13. Near its inner end, the supporting member for the rocker arm is formed of a reduced diameter 26 arranged eccentrically of the portion of larger diameter 25. Similarly, the bore in the motor casing wall is formed with a portion of larger diameter indicated at 27, substantially corresponding to the portion 25 of the rocker arm supporting member, and with an inner portion 28 of lesser diameter substantially corresponding to the cross-section of the reduced portion 26 of the rocker arm supporting member. The smaller portion 28 of the bore is also arranged eccentrically with respect to the enlarged portion 27. The eccentricity of these two portions corresponds to that of the portions 25, 26 of the rocker arm support and, due to the eccentricity of these several

portions, the supporting member can be inserted in the bore in the casing wall in one position only. Hence, improper assembly is impossible and, as the member need only be slipped into its seat, the time required for assembling it is materially reduced. That is, the diameters of the reduced portion 28 of the bore in which the member seats and the reduced portion 26 of that member are such that there is a slight clearance between these two associated parts, sufficient to permit the supporting member to revolve or rock to a limited extent in its bearing. In other words, the portions of large diameter of the bore in the casing wall and of the rocker arm supporting member being arranged concentrically of the longitudinal axis of the rocker arm on which the latter is permitted to tilt, turning of said supporting member and tilting of the rocker arm is limited only by the closeness of the fit between the eccentric reduced portions 26 and 28 of the supporting member and bore, respectively. Thus, as previously stated, it is only necessary to slip the rocker arm supporting member into the bore in the casing wall to assemble it, no additional structural elements being required for limiting the lateral tilting of the rocker arm.

It will be appreciated that the fit between the portions of larger diameter of the supporting member and the bore in the casing wall should be such that there will be no material play or looseness of said member in its bearing. Said member is preferably yieldingly held in the bore of the casing wall by a spring plate 29 carried on a cap 30 which serves as a cover for the outer end of the bore and which may be secured to the casing wall by any suitable fastening means such as bolts 31 and nuts 32.

Suitable means are provided for lubricating various surfaces of the actuating mechanism as more fully described and claimed in my pending application Serial No. 411,232, of which this is a division.

What I claim is:

1. A cylindrical supporting member for the rocker arm of a valve actuating mechanism, said member being rockable about its longitudinal axis, and said member being of one diameter for a portion of its length and of a less diameter for a second portion of its length, one of said portions being concentric and the other eccentric with respect to the longitudinal axis of said member to limit the rocking motion of said member.
2. A mounting for the rocker arm of a valve actuating mechanism, said mounting comprising a member having cylindrical portions of different diameters and being rockable about its longitudinal axis, one of said portions being disposed eccentrically of the other to limit the rocking motion of said member.
3. A mounting for the rocker arm of a valve actuating mechanism comprising a member having a cylindrical portion in which said arm is supported and a second cylindrical portion disposed eccentrically of the first-mentioned portion, a supporting structure having an opening in which said member is seated and is capable of rocking on its longitudinal axis, said opening having circular portions disposed eccentrically to one another corresponding substantially to the cylindrical portions of said member to limit the rocking motion of the member.
4. A mounting for the rocker arm of a valve actuating mechanism comprising a member having a cylindrical portion in which said arm is supported and a second cylindrical portion disposed eccentrically of the first mentioned portion, said member being adapted to seat in an opening in a supporting structure in which said member can rock about its longitudinal axis, said opening having circular portions disposed eccentrically to one another corresponding substantially to the cylindrical portions of said member, said rocking motion of said member being limited by the eccentricity of the cylindrical and circular portions of said member and opening.

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