Sept. 18, 1945. L. R. SPENCER 2,385,309

VALE ACTUATING MECHANISM

Filed Sept. 18, 1944

Fig. 1.

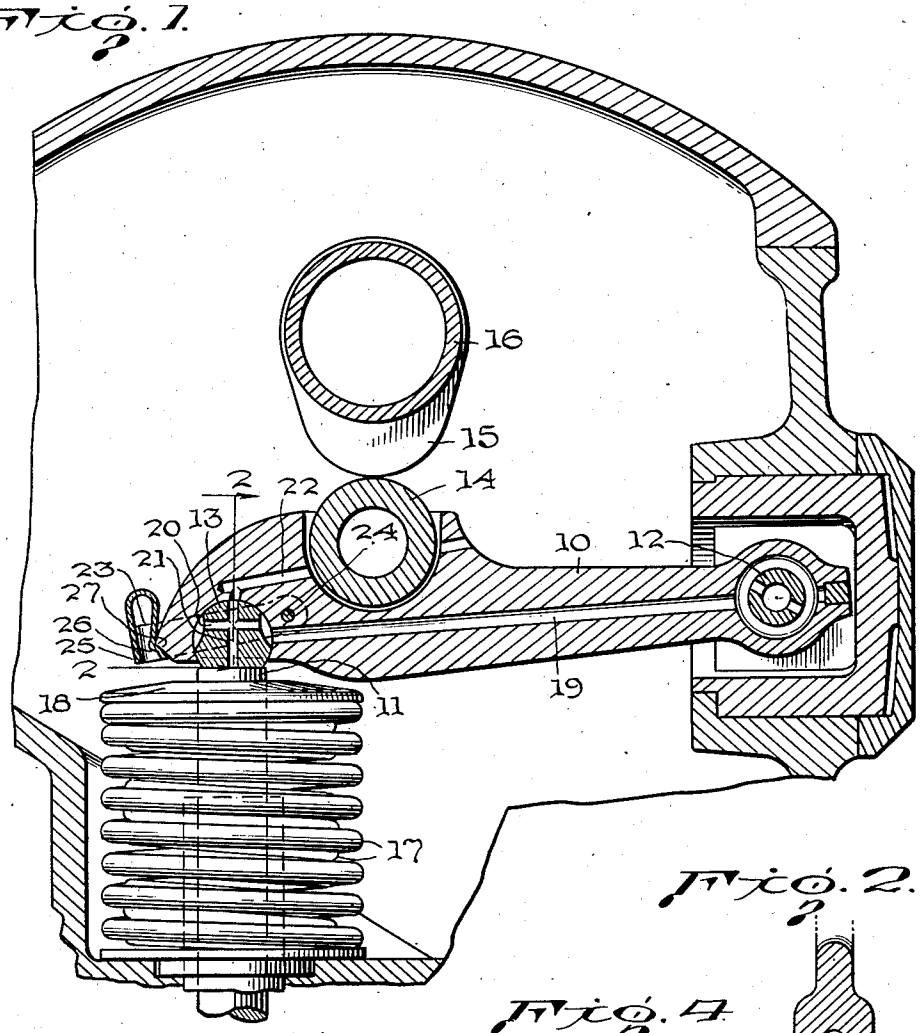


Fig. 2.

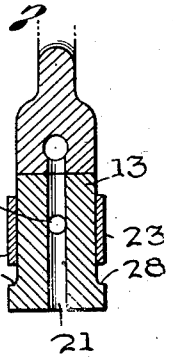


Fig. 3.

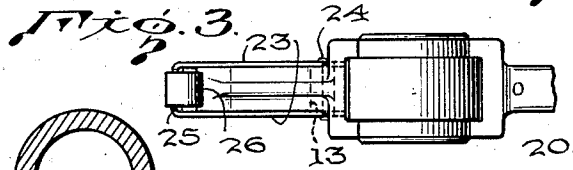


Fig. 4.

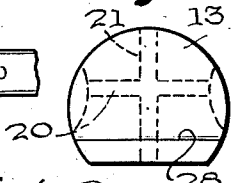


Fig. 5.

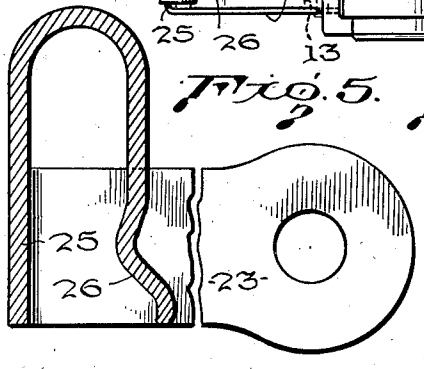
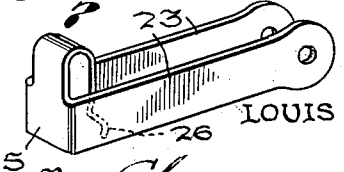


Fig. 6.



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Patented Sept. 18, 1945 2,385,309

UNITED STATES PATENT OFFICE

2,385,309

VALVE ACTUATING MECHANISM

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Application September 18, 1944, Serial No. 554,689

10 Claims. (Cl. 74—519)

This invention relates to improvements in valve actuating mechanisms wherein a cam actuated rocker arm engages a valve stem for effecting reciprocatory motion of said stem and particularly to that type of construction wherein the rocker arm is provided with a renewable wear member in the form of a rockable disk journaled in a recess therein at a point to engage the valve stem.

The primary object is to provide a construction of this type in which the recess in which said disk is journaled in the arm can be expeditiously bored, ground or lapped.

Another object is to provide a construction which will expedite removal and replacement of said valve stem engaging disk and adjustment of valve clearances by reason of the fact that such removal and replacement of the disk and adjustment of the valve clearances can be accomplished without withdrawal of the actuator assembly from the rocker arm box.

More specifically the invention contemplates a construction wherein the valve stem engaging disk can be inserted in, or removed from, its recess in the rocker arm by an axial movement through the side of the rocker arm and a further object is to provide means for normally preventing this axial displacement of said disk.

A still further object is to provide a construction of the type indicated wherein rotational movement of the disk in the rocker arm is limited by the same means which prevent axial displacement of the disk from its recess in the rocker arm.

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 explained and the novel features thereof particularly pointed out in the appended claims.

In the accompanying drawing—

Figure 1 is a vertical sectional view through a valve stem rocker arm of a valve actuating mechanism illustrating the preferred embodiment of the present invention;

Fig. 2 is a vertical sectional view on the line 2—2 of Fig. 1;

Fig. 3 is a top plan view of the end of the rocker arm which engages the valve stem;

Fig. 4 is a side elevational view of the valve stem engaging disk;

Fig. 5 is an enlarged view, partly in section and partly broken away, of the disk locking member; and

Fig. 6 is a perspective view of said locking member.

The valve actuating mechanism shown herein for purposes of illustrating the present invention is more fully shown and described in United States Letters Patent No. 2,322,173. It consists generally of a rocker arm 10 for each valve stem 11, said rocker arm being pivoted at one end on a hollow pivot pin 12 and provided at its opposite end with a disk 13 journaled for rocking motion in a recess in said arm in position to bear against the upper end of the valve stem 11. A cam roller 14, rotatably seated in the upper face of the rocker arm is engaged by a cam 15 on cam shaft 16 for depressing the arm and valve stem in opening the valve (not shown) and the latter is returned to its seat or closed position by springs 17 surrounding the valve stem immediately beneath an enlargement 18 on said stem, it being understood said springs are compressed each time the valve stem is depressed. Lubricant for the various bearing surfaces is supplied from the hollow pivot pin 12 through passage 19 in the rocker arm to the recess in which the disk 13 is journaled. By means of intersecting ducts 20, 21 in said disk and duct 22 in the arm, lubricant is distributed from the disk recess to the contacting surfaces of the disk and valve stem and to the recess in which cam roller 14 is journaled.

In the structure illustrated in said Patent No. 2,322,173, the valve stem engaging disk is insertable into its recess in the rocker arm from the bottom face of the latter, due to the recess opening being wider than the reduced width or diameter of the disk at the point where the latter is flattened to form the stem engaging surface on the periphery of the disk. In other words, in said patented structure, the disk is seated in a recess closed at its ends or at the sides of the rocker arm with the result that the machine operations required in shaping and properly finishing this closed-end recess have proven rather difficult and, obviously, expensive. In accordance with the present invention, therefore, this recess for the valve stem engaging disk is made to expose the end of the disk at the side of the rocker arm so as to permit the disk to be inserted or removed axially through the side of said arm. Preferably, in order to facilitate the boring and finishing of said recess it extends transversely entirely across the rocker arm so as to expose both ends of the disk at opposite sides of the arm as best illustrated in Figs. 2 and 3. In other words, in the preferred embodiment of the invention, the disk extends

the full width of the rocker arm and, in the absence of retaining means, can be withdrawn axially or endwise from either side of the arm without disassembling any other structural element of the actuating mechanism.

Normally, however, the disk is held against axial or endwise displacement by retainer means carried by the rocker arm and disposed across the exposed end or ends of said disk. For instance, where the disk is exposed at opposite sides of the arm, as illustrated, these retainer means preferably take the form of a U-shaped member whose side portions constitute retainer bars **23** positioned across the open ends of the recess and the exposed ends of the disk. It is also preferred that these retainer bars be yieldingly locked in their disk retaining positions and this may be accomplished by pivotally supporting the otherwise free ends of the bars on a cross-pin **24** in the rocker arm and forming the cross-piece **25** of said U-shaped member with a spring catch **26** adapted to engage an undercut surface **27** on the end of the rocker arm which normally prevents upward movement of said retainer bars **23**, at least to an extent where they will clear the ends of the disk.

As will be apparent, the disk **13** must be free to rock in its recess as the rocker arm is alternately depressed and elevated. Also, prior to installation of the rocker arm in the assembly of the entire mechanism, it is essential that the disk be retained in its recess with its flat, stem engaging surface properly disposed at the exterior of the rocker arm. In other words, to facilitate installation of the rocker arm, care must be taken to prevent the disk turning in its recess to a point where its flattened surface will be located within the recess or where the disk might drop out the recess. Likewise, the rocking motion of the disk should also be limited during operation of the valve actuating mechanism. For these reasons, the disk is provided at one or both of its ends with means adapted to engage one or both of the retainer bars **23**. For instance an abutment, preferably in the form of a shoulder **28** on the end of the disk normally spaced a slight distance from the retainer bar will permit ample rocking motion of the disk under normal operating conditions but, at the same time, such rocking motion will be limited by the abutment or shoulder engaging the retainer bar.

Thus the present invention provides a structure wherein the disk recess can be expeditiously and comparatively inexpensively formed and machine finished; the disk can be readily inserted in its recess and securely retained therein at all times while still being allowed ample rocking motion under operating conditions; and the disk can just as quickly be removed by releasing the retainer bar catch **26** and elevating said bars to permit withdrawal of the disk endwise through the side of the rocker arm.

What I claim is:

1. A valve actuating mechanism comprising a rocker arm having a valve stem engaging disk journaled therein, characterized by said arm having a disk receiving recess extending transversely therethrough in which the disk is rotatably supported with the ends of the disk exposed at opposite sides of the arm, removable retainer bars carried on said arm and normally positioned across the ends of said recess at opposite sides of said arm, and means for releasably locking said bars in their normal position, said disk being rotatably supported in its recess independently of said retainer bars.

2. A valve actuating mechanism comprising a pivoted rocker arm having a valve stem engaging disk journaled therein characterized by said arm having a disk receiving recess extending entirely across its lower surface, with the ends of the disk exposed at opposite sides of the arm, retainer bars pivotally mounted on each side of said arm and movable to and from positions across the ends of said recess and disk, and means for releasably locking said bars across the ends of aid recess and disk.

3. A valve actuating mechanism comprising a pivoted rocker arm having a valve stem engaging disk journaled therein characterized by said arm having a disk receiving recess extending entirely across its lower surface, with the ends of the disk exposed at opposite sides of the arm, retainer bars pivotally mounted on each side of said arm and movable to and from positions across the ends of said recess and disk, and a cross-piece connecting said retainer bars frictionally engaging the free end of the rocker arm for releasably locking said bars across the ends of the recess and disk.

4. A valve actuating mechanism comprising a pivoted rocker arm having a valve stem engaging disk journaled therein characterized by said arm having an undercut surface on one face thereof and a transverse disk receiving recess extending entirely across the same with the ends of the disk exposed at opposite sides of the arm, retainer bars pivoted on opposite sides of the rocker arm and movable to and from positions across the exposed ends of the disk and spring means attached to said bars engageable with said undercut surface for releasably locking said retainer bars in position across the ends of said disk.

5. A valve stem actuating mechanism comprising a rocker arm having a valve stem engaging disk journaled therein characterized by said arm having an undercut end face and a transverse disk receiving recess extending entirely across the same with the ends of the disk exposed at opposite sides of the arm, and a U-shaped disk retainer having its side members pivoted on the sides of the rocker arm and movable to and from positions across the exposed ends of the disk and a spring on its cross member engageable with the undercut end surface of the rocker arm for releasably locking the retainer side members in position across the exposed ends of the disk.

6. A valve actuating mechanism comprising a rocker arm having a valve stem engaging disk journaled therein, characterized by said arm having a transverse disk receiving recess extending entirely across the same with the ends of the disk exposed at opposite sides of the arm, disk retainer members pivotally mounted on the rocker arm and normally positioned across the exposed ends of the disk, and an abutment on one end of the disk engageable with one of said retainer members for limiting rocking motion of the disk in its recess.

7. A valve actuating mechanism comprising a rocker arm having a valve stem engaging disk journaled therein, characterized by said arm having a disk receiving recess extending entirely across the same with the ends of the disk exposed at opposite sides of the arm, disk retainer means comprising bars carried on the sides of the rocker arm movable to and from positions across the exposed ends of the disk, means for releasably

locking said bars in position across the ends of said disk, and means on the disk engageable with said disk retainer means for limiting rocking motion of the disk in its recess.

8. A valve actuating mechanism comprising a rocker arm having a valve stem engaging disk journaled therein, characterized by said arm having a disk receiving recess extending entirely across the same with the ends of the disk exposed at opposite sides of the arm, disk retainer means comprising bars carried on the sides of the rocker arm movable to and from positions across the exposed ends of the disk, means for releasably locking said bars in position across the ends of said disk, and a shoulder formed on one end of the disk engageable with one of said retainer bars for limiting rocking motion of the disk in its recess.

9. A valve actuating mechanism comprising a rocker arm having a transverse recess therein and a valve stem engaging disk journaled in said recess characterized by one end of said disk being exposed at the side of the arm, a bar pivotally mounted on the rocker arm and normally positioned across the exposed end of the disk to prevent axial removal of the disk through said side of the arm, and an abutment on said exposed end of the disk engageable with said bar for limiting rocking motion of the disk in its recess.

10. A valve actuating mechanism comprising a rocker arm having a transverse recess therein and a valve stem engaging disk journaled in said recess characterized by one end of said disk being exposed at one side of the arm, a bar pivoted on said side of the arm movable to and from a position across the exposed end of said disk, means releasably locking said bar in position across the exposed end of the disk, and an abutment on the exposed end of the disk engageable with the locked bar for limiting rocking motion of the disk in its recess.

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