Aug. 1, 1939. R. H. SHEPPARD 2,167,854

VALVE DEPRESSING MECHANISM

Filed Aug. 15, 1938

FIG. 1.

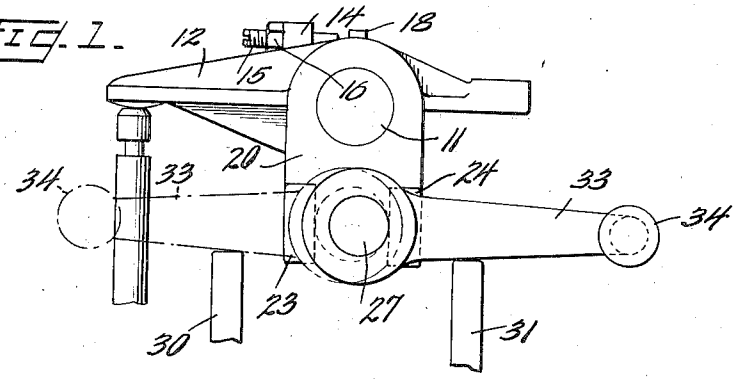


FIG. 2.

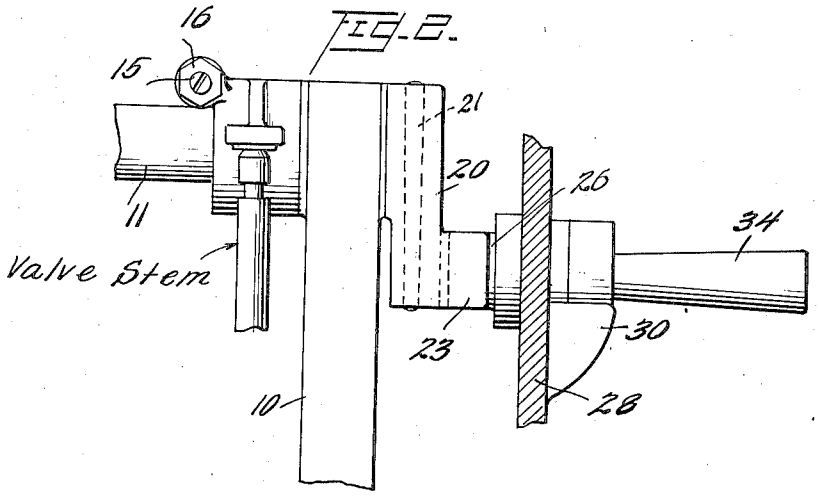


FIG. 3.

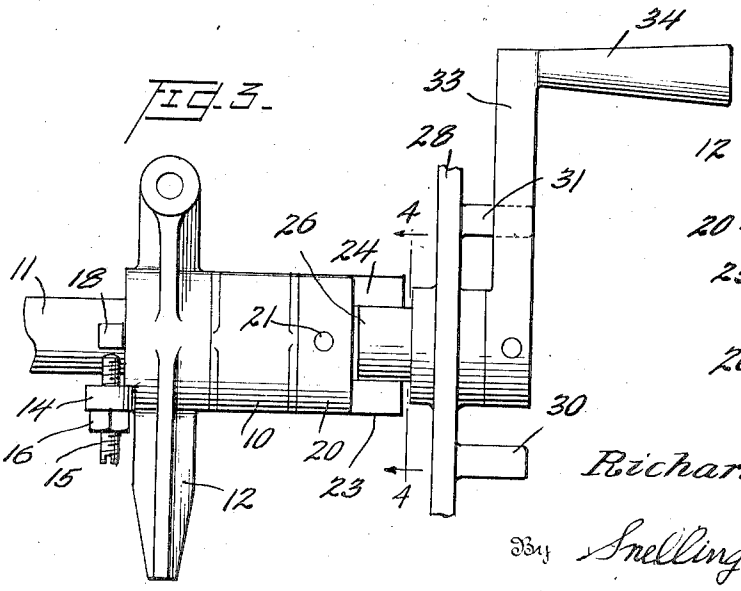
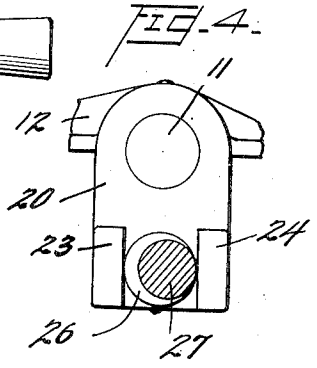


FIG. 4.



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VALVE DEPRESSING MECHANISM

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Application August 15, 1938, Serial No. 225,015

6 Claims. (Cl. 123—182)

This invention relates to internal combustion engines and in particular to valve opening means used in releasing the compression when starting such engines. The primary object of the invention is to provide an extremely simple and sturdy device for depressing the exhaust valves and for reliably holding the valves in depressed position until the engine is started. Another object is to provide a conveniently operable mechanism which may be readily adjusted when necessary. Still another object is the provision of a device which is positive in action and which locks the parts against movement from pressure releasing position or from running position. A still further object of the invention is to provide mechanism that may be easily and quickly assembled.

In the drawing:

Figure 1 is an end elevation of an embodiment of my invention.

Figure 2 is a side elevation of the device shown in Figure 1.

Figure 3 is a plan view of the device shown in Figures 1 and 2.

Figure 4 is a sectional view taken on the line 4—4 of Figure 3.

The cylinder head of the engine, not shown, is provided at both ends with upright posts 10 only one of which is shown. In these posts is journaled the normally stationary rocker arm shaft 11 on which is pivoted the usual rocker arms such as shown at 12. In my invention each exhaust valve rocker arm 12 is provided with an adjustable rotation-limiting means which as shown may be a laterally extending lug 14 carrying a set screw 15 held in any adjusted position by a lock nut 16. Adjacent the rocker arm and located in cooperative relation with the set screw 15 is a stop 18 screwed into the rocker arm shaft 11. In normal operation of the engine there is no engagement of the set screw 15 with the stop 18 but during the starting process the shaft 11 is turned about its axis a small angle to bring the stop 18 against the set screw 15, thereby causing the rocker arm to turn with the shaft an amount necessary to open the exhaust valve. Other means may be used to provide an adjustable angle of relative rotation of the shaft and arm without departing from my invention.

The mechanism shown for turning the rocker arm shaft 11 through a desired angle, consists of a crank 20 held on the shaft 11 by the tapered pin 21, which pin is preferably in the axis of the crank so as to strengthen the crank. Irreversible mechanism is used for actuating the crank 20, for example the end of the crank may be provided with a bifurcated yoke formed of two parallel lugs 23 and 24, spaced to receive between them a cylindrical cam 26 eccentrically carried by the cam shaft 27 journaled in a fixed support, such as the cap wall 28 adjacent the post 10, and which wall is provided with rests or stop lugs 30 and 31 located on opposite sides of the cam shaft. A crank 33, secured to the end of the cam shaft 27, is provided with a handle 34 for readily moving the crank from engagement with the stop lug 31 (running position) through a desired angle over against the stop lug 30 (starting position). This movement of the crank 33 rotates the cylindrical cam 26 eccentrically, and positively moves the crank 20 to turn the shaft 11 through the small angle necessary to press the stop 18 against screw 15 and thereby cause the rocker to open the exhaust valves of the engines. The crank and handle, which are preferably fairly heavy, rest horizontally in one position or the other on the supporting lug 30 or 31.

It will be apparent from an inspection of the drawing that the simple mechanism provided opposes any tendency of the rocker arm shaft to move from its normal running position shown in Figure 3 or from its starting position in which the crank 33 rests on the lug 30. The reason for this is that the cam is arranged with respect to the crank 33 so that the cam is at dead center when the crank rests on either one of the stops.

The parts of the mechanism are few and extremely simple and so may be manufactured and assembled at a relatively small cost. Among its other advantages my device is adaptable to remote control as by extending the cam shaft to any desired length.

What I claim is:

1. In combination with the exhaust valve of an internal combustion engine, a normally stationary shaft adjacent said valve, a rocker arm mounted to rock freely on said shaft thereby normally to operate said valve, a stop on the shaft and a stop engaging member on the rocker arm, said stop and member being spaced during normal operation of the valve but being positioned for engagement upon rotation of the shaft from its stationary position, means to rotate the shaft through a chosen angle, to cause engagement of the stop and member, and then to move the rocker arm from an inoperative position to open the valve, said means comprising an irreversible mechanism including an eccentric cam and a crank for turning the cam through a predetermined arc necessary to move the rocker arm shaft as recited.

2. The combination of claim 1 in which two fixed rests are provided for said crank, a running position rest located on one side of the cam and a starting position rest on the other side, said cam being at dead center in said positions whereby the crank due to its own weight will remain in either of said positions until manually moved to the other.

3. In a compression releasing mechanism for internal combustion engines, in combination: a rocker arm shaft normally having an inactive position, a valve actuating rocker arm pivoted on said shaft, cooperating means on the arm and shaft positioned for engagement upon rotation of the shaft from its inactive position, a crank for turning said shaft, and positive-motion cam mechanism for actuating said crank and thereby to move the rocker arm to valve opening position.

4. In a compression releasing mechanism for internal combusion engines, in combination: a rocker arm shaft normally stationary, a valve actuating rocker arm pivoted on said shaft for normal operation of said valve, adjustable means positioned on the shaft and rocker arm for engagement upon rotation of the shaft whereby the rocker arm may be actuated by rotation of the shaft, a crank for turning said shaft through an angle sufficient to move the rocker arm to valve opening position, a pair of spaced lugs projecting from the end portion of the crank and having their opposed walls parallel, an eccentric cam positioned to rotate between said parallel walls, and a crank for turning said cam thereby to move the rocker shaft.

5. In a valve depressing mechanism for use in starting internal combustion engines: a normally stationary rocker arm shaft mounted on the engine, a rocker arm pivoted on said shaft and positioned to be rocked to open an exhaust valve during normal operation of the engine, a lug fixed on said shaft adjacent the rocker arm, adjustable means projecting from the arm to be engaged by said lug upon rotation of the shaft, positive-motion cam means to turn the shaft from its stationary position through a limited arc first to cause said engagement of said lug and said adjustable means and thereafter to rock the rocker arm through an angle sufficient to depress the valve, and manually operable means for turning the cam through said angle, said cam being at dead center at both limits of rotation whereby tending to lock the mechanism against movement at said limits.

6. In a valve depressing device for an internal combustion engine including a valve stem, a normally stationary shaft mounted to turn about a fixed axis, a rocker arm rockable on said shaft and about the axis of said shaft as an axis to depress the valve stem at regular intervals during normal operation; means on the shaft and the rocker arm positioned to come into engagement upon turning of the shaft thereby to cause the rocker arm to move about the axis of the shaft and depress the valve stem, and means for turning the shaft to cause said engagement.

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