Dec. 8, 1925. 1,565,223

H. D. CHURCH

HYDROCARBON MOTOR

Filed Feb. 10, 1919

Fig. 1.

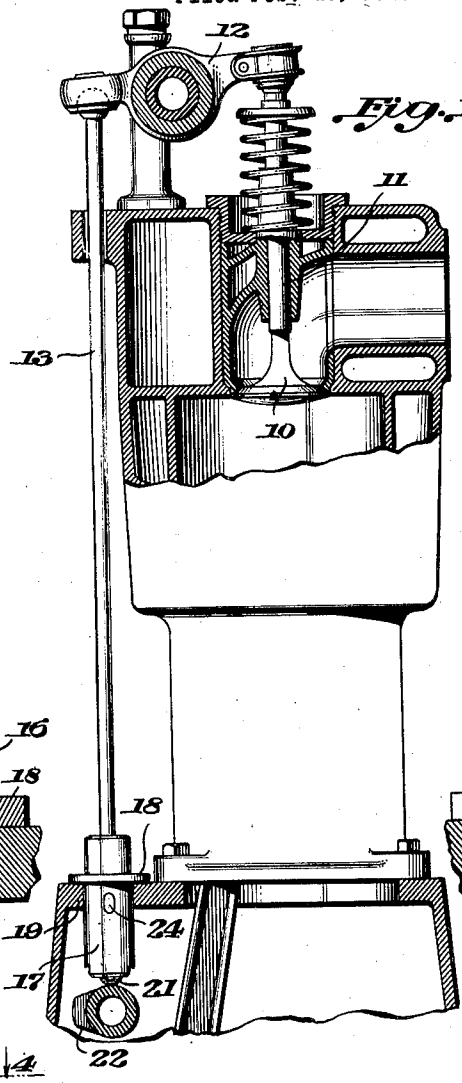


Fig. 2.

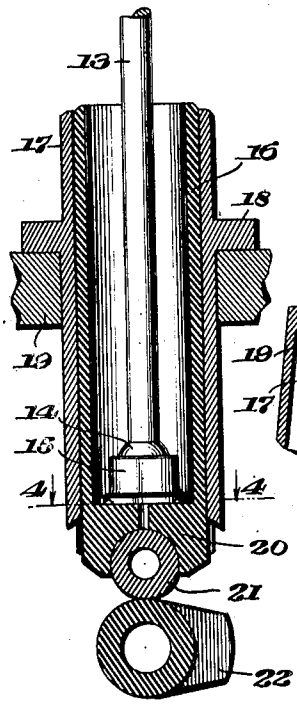


Fig. 3.

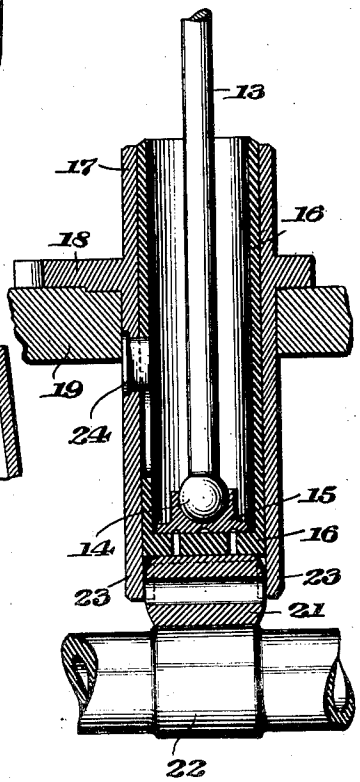
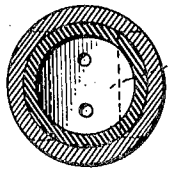


Fig. 4.



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UNITED STATES PATENT OFFICE.

HAROLD D. CHURCH, OF DETROIT, MICHIGAN, ASSIGNOR TO PACKARD MOTOR CAR COMPANY, OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN.

HYDROCARBON MOTOR.

Application filed February 10, 1919. Serial No. 275,973.

To all whom it may concern:

Be it known that I, HAROLD D. CHURCH, a citizen of the United States, and resident of Detroit, Wayne County, State of Michigan, have invented certain new and useful Improvements in Hydrocarbon Motors, of which the following is a specification.

This invention relates to hydrocarbon motors and more particularly to valve operating mechanisms.

One object of the invention is to provide a member intermediate the cam and the push rod for the valves which shall present a cylindrical bearing surface along the line of contact.

Another object of the invention is to provide a pinless roller for such intermediate contact member.

Another object of the invention is to enable the ordinary push rod guide to be utilized in retaining the roller in position.

With these objects and others in view, the invention is embodied in preferable form in the construction and arrangement hereinafter described and illustrated in the accompanying drawings, in which

Fig. 1 is a side view in elevation partly in vertical section, showing the invention applied to a valve of a hydrocarbon motor;

Fig. 2 is an enlarged vertical detail section of the push rod lifting means;

Fig. 3 is a similar section on a plane at right angles to Fig. 2;

Fig. 4 is a horizontal cross section on the line 4—4 of Fig. 2.

Referring to the drawings 10 indicates a valve of a hydrocarbon motor, 11 a valve stem, 12 a rocker arm and 13 the push rod for actuating said rocker arm. This push rod at its lower end is provided with a ball 14 freely engaging a base member 15 which bears against the lower inner face of a cylindrical roller holder 16. This roller holder is mounted for vertical reciprocation within a cylindrical guide 17 which is provided with flanges 18 adapted to engage the wall 19 of the crank case.

The roller holder 16 terminates in a head 20 which is provided with an approximately semi-cylindrical opening extending therethrough and into which is adapted to be projected a roller 21 constituting the contact member between the holder and the push rod on the one hand and the operating cam 22 on the other hand. The curved wall on the head 20 extends below the horizontal diametrical plane of the roller hence the latter is prevented from downward escape therefrom. The guide member 17 is formed with two downwardly prolonged ears or lugs 23 which are adapted to fit over the spherical ends of said roller and extend below the horizontal axis of the roller when the guide is slid down into place, thus retaining the roller within the holder. The spaces between the ends of the projecting parts 23 permit the insertion of the roller into the socket of the holder endwise, whereupon the holder is then turned to carry the ends of the roller against the projecting ears, so that the roller will be retained against endwise escape. The radius of the spherical ends of the roller is the same as that of the guide.

The holder 16 and the guide member 17 are adapted to be maintained in proper relative position by means of a key 24 which is adapted to be inserted into suitable slots formed in the members 16 and 17 before said parts are inserted through the opening in the crank case. These slots are in line with the end opening in the socket of the holder when the latter and the guide are assembled. This key serves to lock these parts together and following such engagement the guide is slipped down through the crank case. The roller holder 16 is slotted below the key sufficiently to permit a vertical movement thereof with respect to the guide to an extent that will permit corresponding vertical reciprocation of the push rod.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:—

1. In a valve operating mechanism, a valve, a cam, valve moving means between the valve and cam, a cylindrical roller having direct contact with the cam and means carried by the valve moving means for holding the roller and having an open curved socket embracing more than half the circumference of the roller.

2. In a valve operating mechanism, a valve, a cam, a roller holder intermediate the cam and valve, a roller in said holder, the latter having a curved socket to seat and retain said roller and which is open at both ends and lengthwise, and extends around more than half the circumference of

the roller, and means to retain the roller against endwise escape.

3. In valve operating mechanism, a cam, a valve rod, a contact roller between the cam and rod, said roller having spherical ends and a fixed member having at its lower end a cylindrical surface adapted to fit and retain the roller at said ends.

4. In valve operating mechanism, a valve push rod, a cam, a roller, a cylindrical roller holder, and a cylindrical holder guide adapted to embrace the ends of said roller.

5. In valve operating mechanism, a valve push rod, a cam, a roller having spherical ends, a holder having a transverse curved socket opening at the lower part thereof, to receive said roller and a cylindrical guide having its lower end formed to embrace and retain the spherical ends of the roller.

6. In valve operating mechanism, in combination, a cam, a roller holder having a partly cylindrical opening, an elongated cylindrical roller in said opening having circumferential contact with both the cam and the interior opening, and means not movable with the holder for retaining the roller against endwise movement in the opening.

7. In valve operating mechanism, a push rod for a valve, a cam, a roller having spherical ends, a cylindrical holder having an open curved lower end to receive said roller, a guide to which said holder is keyed having end members adapted to embrace said spherical ends of the roller to retain the same in the holder.

8. In a valve operating mechanism, a valve, a cam, a roller holder, means between the holder and valve for actuating the latter, a roller in said holder, the latter being extended more than half the circumference of the roller to retain same, a fixed guide for the holder, means to limit the reciprocatory movement of the holder with respect to the guide, said guide having at one end opposite projecting parts extending over the ends of the roller and having recesses between said parts to permit the insertion of the roller in the holder.

9. In valve operating mechanism, a valve, a cam, a cylindrical cam contacting roller, a roller holder having an open curved seat for retaining the roller, a guide having projecting means for lapping the ends of the roller and slotted to permit the insertion and withdrawal of the roller past said means, a key for locking the holder in the guide against rotatable movement and said holder being slotted longitudinally in line with the end of the socket and beyond the length of the key to receive the latter and permit reciprocatory movement of the holder.

10. In valve operating mechanism, a reciprocatory valve operating roller holder, a hollow cylindrical guide in which such holder is movable and a roller mounted in the holder and having ends curved on the same radius as that of the guide wall and fitting against said wall.

In testimony whereof I affix my signature.

HAROLD D. CHURCH.