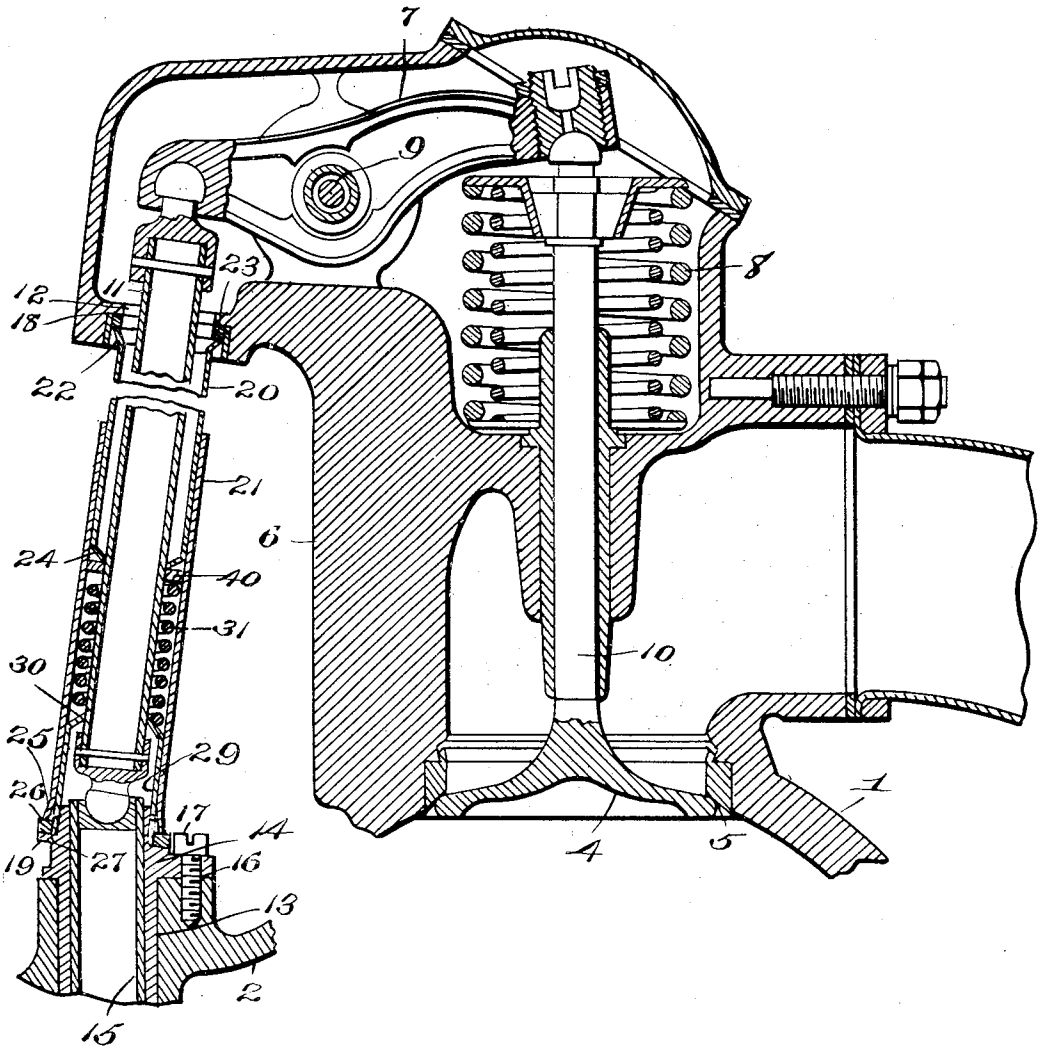
June 25, 1929. E. A. RYDER 1,718,490

INTERNAL COMBUSTION ENGINE

Original Filed July 23, 1926 2 Sheets-Sheet 1

Fig. 1.



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Fig. 2.

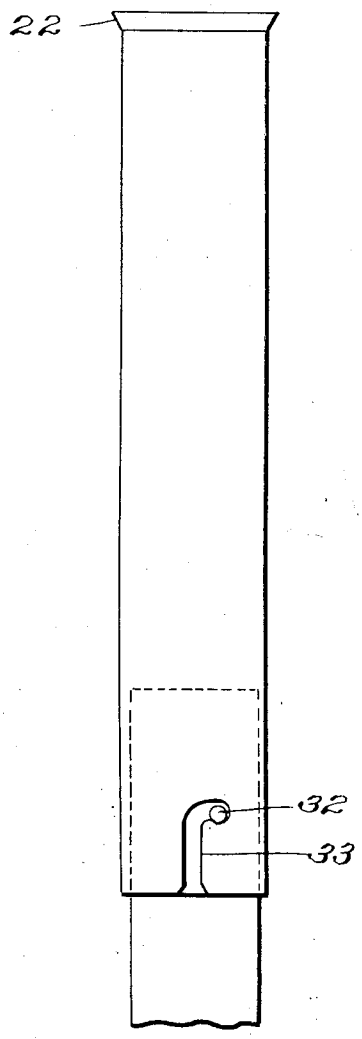
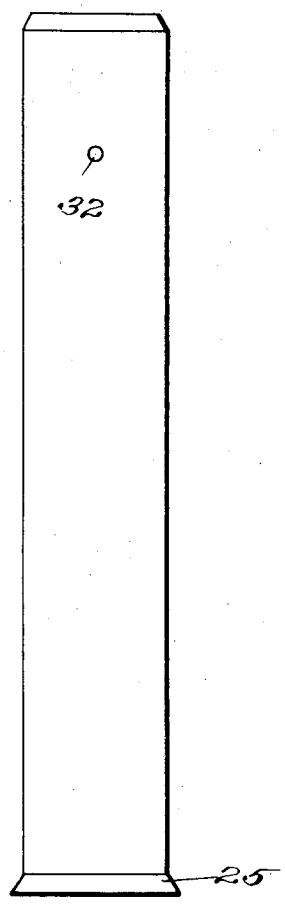


Fig. 3.



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Patented June 25, 1929. 1,718,490

UNITED STATES PATENT OFFICE.

EARLE A. RYDER, OF HARTFORD, CONNECTICUT, ASSIGNOR TO THE PRATT & WHITNEY AIRCRAFT CO., OF HARTFORD, CONNECTICUT.

INTERNAL-COMBUSTION ENGINE.

Application filed July 23, 1926, Serial No. 124,399. Renewed October 6, 1928.

This invention relates in general to air cooled internal combusion engines and more particularly to novel type of valve control assembly housings for use therein.

In air cooled engines it is the customary practice to place valves in the cylinder head itself and to operate the same by means of long push rods and rocking levers. The rockers have heretofore been without any housing or mounted in a housing detachably secured to the cylinder head. I have disclosed a structure in which the valve control assembly, including a portion of the push rods have been mounted in an integral extension of the cylinder itself.

It is an object of this invention to provide a suitable housing for the push rods to cooperate with the crank case of the engine and with the cylinder head extension to provide an oil tight inclosure for said push rod.

It is a further object of my invention to so adapt my push rod housing that it may form slip joint connection between the crank case and the rocker arm housing and may be extensible to overcome the differential expansion between the cylinder and its extension—and the push rod housing.

A further object of my invention is to provide the parts of my push rod housing with means providing a bayonet lock so that they may be collapsed and locked in collapsed position for convenience in assembly and disassembly.

It is another object of my invention to provide a push rod housing which may be installed and removed without the use of tools.

Other objects of my invention will be found in the accompanying specification and claims and will be disclosed in the accompanying drawings, in which—

Figure 1 is a central vertical section through a portion of an engine embodying my invention, a portion of the cylinder of said engine being broken away;

Figure 2 is a detail in front elevation showing my locking device;

Figure 3 is a detail and end elevation of one of my push rod housing members.

Referring now with greater particularity to the drawings, it will be seen that my device is comprised as follows:

The engine 1, having a crank-case 2 and cylinders not shown, is provided with valves 4 controlling the passage of gases through valve ports 5 in the cylinder heads of the said cylinders. Mounted in each of the pairs of integral extensions 6 of each of the cylinders is a suitable valve control device, in this instance the rocker arm 7, and the valve springs 8. The rocker arm 7 is pivoted on a pin 9 in the cylinder extension 6 and one end thereof bears against the upper end of the stem 10 of the valve 4 to operate the same.

The other end of the rocker arm bears against the upper end of a push rod 11 the lower end of which engages with a tappet or cam follower 15.

It is in the provision of a suitable housing for this push rod that this invention is primarily concerned. The cylinder extension 6 is provided with a downwardly extending bore 12 through which the push rod 11 reciprocates, the crank-case being provided with a complementary bore 13 in its upper face. A gland 14 is mounted in the bore 13 being secured thereto at 16 by any suitable means 17 and being adapted to act as a boss or guide for the tappet 15. The walls of the bore 12 and the gland 14 are cut away for a space to provide shoulders 18 and 19, respectively.

The push rod housing is comprised primarily of two telescopic tubes 20 and 21 the tube 20 having a snug sliding fit within the tube 21. The tube 20 is provided with a flared upper end 22 adapted to fit within the cut away portion of the bore 12 and to bear against the shoulder 18, a suitable washer 23 being interposed to prevent leakage. At its lower end the tube 20 is reduced in diameter sharply to provide a shoulder 24 the purpose of which will appear in the following description:

The tube 21 is cylindrical at its upper end and is flared at its lower end at 25 to fit with the cut away portion of the gland 14 to abut the shoulder 19, a suitable washer 26 being provided to prevent leakage. Within the lower portion of the tube 21, and having a cylindrical base 27 bearing on a leak proof washer 26 resting on shoulder 19 is a tube 29. The tube 29 is either integral with or is fixedly secured to the tube 21 and at its upper end is reduced in diameter sharply to provide a shoulder 30. A strong compression spring 31 is mounted concentrically of the push rod and bears between shoulders 24 and 30, a leak proof gasket 40 being mounted between the spring and the shoulder 24, tending to force the telescopic housing to ex-

tend to its greatest length and forcing the tubes 20 and 21 tightly against the washers 23 and 26 preventing any leakage of oil and yet permitting the housing to accommodate itself in length to the expansions and contractions of the cylinder and its extension under temperature changes.

The tube 20 is provided, intermediate of its ends, with a stud 32 adapted to fit within a bayonet guide 33 in the tube 21. By use of this structure the housing may be easily removed without the use of tools. It is only necessary to telescope the housing against the action of spring 31 the bayonet lock formed by the stud 32 and the guide 33 serving to hold the spring compressed while the housing is being removed and keeping the parts thereof in fixed assembled relation during handling.

I claim—

1. In an internal combustion engine, a push rod housing formed of two tubes mounted telescopically with respect to each other, and resilient means mounted between cooperating shoulders within said tubes for causing said housing to extend to its maximum length within the limits between the rocker arm housing and crank-case of said engine, and means for locking said tubes in the position of minimum housing length and when said resilient means is compressed.

2. In an internal combustion engine, a push rod housing formed of two tubes mounted telescopically with respect to each other, and resilient means mounted between cooperating shoulders within said tubes for causing said housing to extend to its maximum length within the limits between the rocker arm housing and crank-case of said engine, and means providing a bayonet lock for said tubes in the position of minimum housing length and when said resilient means is compressed.

In testimony whereof I affix my signature.

EARLE A. RYDER.