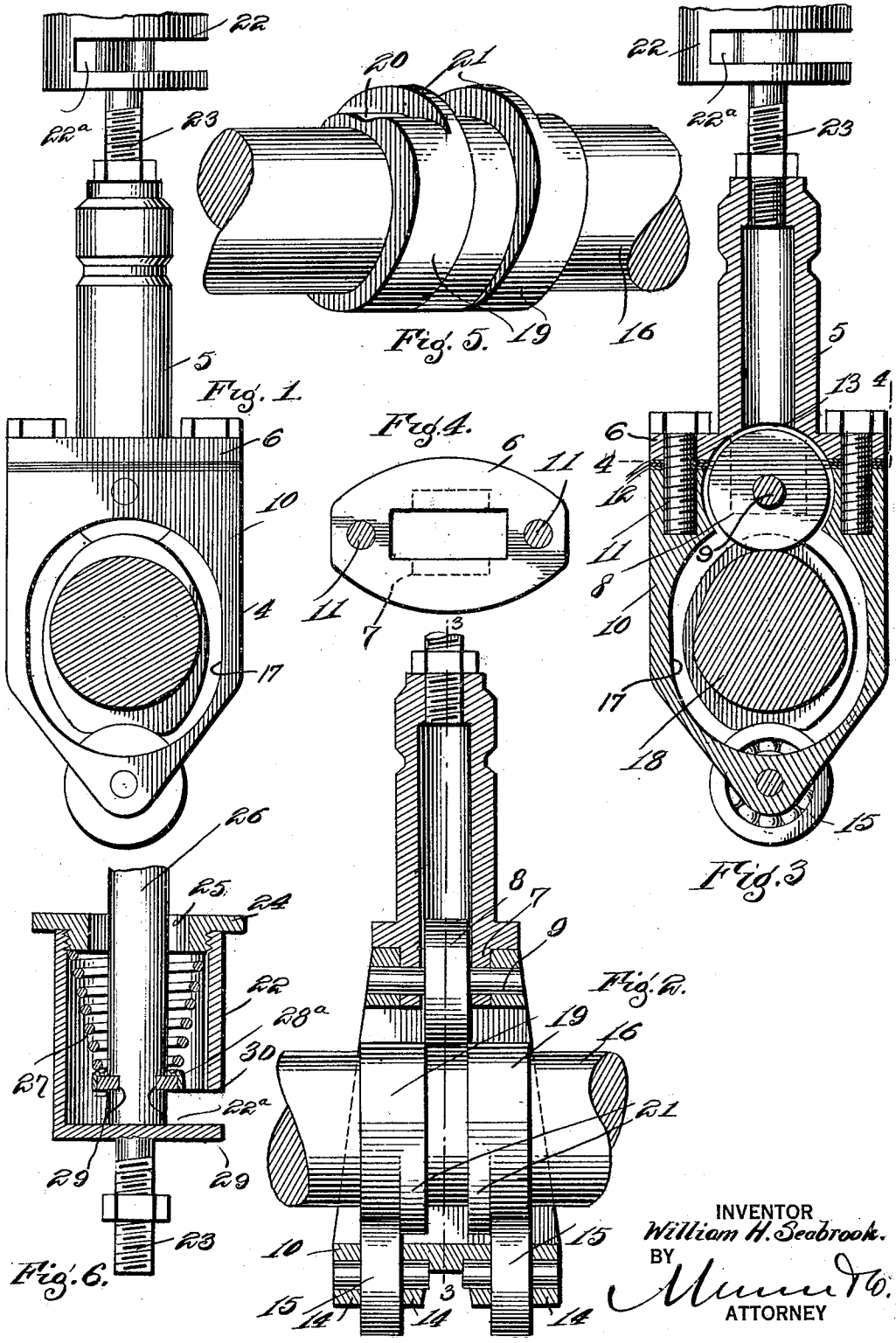
Aug. 2, 1932. W. H. SEABROOK 1,869,919

INTERNAL COMBUSTION ENGINE VALVE

Original Filed Aug. 14, 1928



Patented Aug. 2, 1932 1,869,919

UNITED STATES PATENT OFFICE

WILLIAM H. SEABROOK, OF DETROIT, MICHIGAN, ASSIGNOR TO SEABROOK MOTOR CORPORATION, OF FITZGERALD, GEORGIA, A CORPORATION OF GEORGIA

INTERNAL COMBUSTION ENGINE VALVE

Application filed August 14, 1928, Serial No. 299,626. Renewed July 2, 1930.

My invention relates to internal combustion engine valves and more particularly to improvements in my co-pending application Serial No. 218,829, filed September 10, 1927.

An object of the present invention is to provide a valve which is opened a maximum amount at the proper time in relation to the piston of the internal combustion engine cylinder with which the valve is associated.

Further the invention provides a valve which is positively closed, is free from chattering and smooth in operation.

Another object of the invention is to provide a valve of this character which is capable of universal movement so that the valve stem will be in true vertical alignment with its corresponding lift rod and thus obviate binding of the valve stem in its guide. In other words in the assembly of an internal combustion engine the longitudinal center of the valve stem does not always line up with the longitudinal center of the lift rod. With my invention the valve stem is capable of lateral movement to compensate for this condition.

With the preceding and other objects and advantages in mind, the invention consists in the novel combination of elements, construction and arrangement of parts to be hereinafter specifically referred to, claimed and illustrated in the accompanying drawing, wherein:

Figure 1 is a view partly in side elevation and partly in section of my invention;

Fig. 2 is a vertical sectional view of the same taken at right angles to Fig. 1;

Fig. 3 is a vertical section taken on the line 3—3 of Fig. 2.

Fig. 4 is a transverse horizontal section taken on line 4—4 of Fig. 3.

Fig. 5 is a fragmentary perspective view of the cam shaft embodied in the invention and

Fig. 6 is a detail sectional view illustrating the elastic connection between the valve stem and actuating rod.

Referring to the invention in detail a hollow valve rod or tappet 5 formed with a horizontally disposed plate 6 at its lower end having parallel ears 7 formed on its under face is provided. As illustrated in Figs. 2 and 3 a lift roller 8 is arranged between the ears and is formed with laterally projecting stub shafts 9 which are revoluble in the ears. Arranged below the plate 6 is a casting 3 composed of parallel side plates 10 and front and rear walls 4. The side plates 10 are connected at their upper ends with the plate 6 by bolts 11.

Suitable shims 12 are disposed between the under face of the plate 6 and the upper ends of the plates 10 so that the distance between these points may be varied to compensate for wear of the rotatable parts of the mechanism. Directly above the roller 8 the under face of the plate is formed with a semi-circular recess 13 to provide clearance for the roller.

Pairs of vertically disposed ears or bearings 14 are formed on the under face of the casting. These pairs of ears 14 are disposed upon opposite sides of the roller 8 and journalled in these ears is a pair of transversely aligned valve rod depressing rollers 15, the latter passing through the web as illustrated in Fig. 2. Preferably the rollers 8 and 15 are of the bearing ball type so as to reduce friction to a minimum. A horizontally disposed cam shaft 16 passes between the rollers 8 and 15 and projects through relatively large openings 17 provided in the plates 10. An excentric or cam 18 is formed on the cam shaft directly below the roller 8 and cooperates with the latter in lifting the hollow valve rod 5 and associated parts. Also formed on the cam shaft at points in vertical alignment with the rollers 15 is a pair of spaced excentrics or cams 19 whose largest ends are provided with semi-circular seats or depressions 20. It will be observed that when the hollow valve rod is in its extreme raised position the seats 20 will accommodate the rollers 15 and thus obviate lost motion between the cams and rollers. Upstanding semi-circular flanges 21 extend along the inner edges of the cams 19 at their largest ends which cooperate with the rollers 15 and 8 in preventing lateral shifting of the hollow valve rod and associated parts. In this connection it will be seen when the cam shaft occupies the

position shown in Fig. 2 the outer faces of the flanges 21 will overlie the inner faces of the rollers 15. As the cams reach their uppermost position these flanges overlie the opposite faces of the roller 8.

In assembling internal combustion engines it has been observed that the longitudinal center line of the valve stems are usually off center with respect to the longitudinal centers of their corresponding lift rods or tappets. Due to this condition the valve stems are caused to bind in their guides thus causing the valve to stick or to produce sufficient friction as to cause wear.

To overcome this fault the present invention proposes a universally movable valve stem comprising a cylindrical housing 22 having a threaded shank 23 adjustably connected with the hollow lift rod. A bushing 24 is threaded in the upper end of the cylindrical housing and has an opening 25 of greater diameter than the valve stem 26 which passes through this opening and has its inner end disposed within the housing.

At its lower end, the housing 22 is provided with diametrically disposed slots 22*a* to permit the insertion of a thickness gauge when it is desired to adjust the valve stem. Encircling the valve stem is a tapered coil spring 27 having its largest end bearing against the bushing and its lower end bearing against a split washer 28 engaged in a groove 29 adjacent the lower end of the valve stem. The split washer is locked in place by pressure of the spring 27 on a cup shaped washer 28*a* which covers the split washer completely and which fits the valve stem closely.

It will be observed that the largest convolution of the coil spring is of sufficient diameter to be snugly received within the cylindrical casing while its lowermost convolution is of sufficient diameter to tightly hug the valve stem. By reason of this resilient connection between the cylindrical housing and valve stem the latter is free to move universally in the opening 25. In addition to the coil spring or resilient connection affording a universal mounting for the valve stem it also provides an elastic tension device between the lift rod and valve stem.

What is claimed is:

1. In a valve, a cylindrical housing for attachment to a valve tappet, a valve stem having one end loosely received therein, and a frusto-conical shaped expansible spring having its small end tightly hugging the valve stem and its large end snugly accommodated in the housing to permit the valve stem to shift laterally in any direction.

2. In a valve mechanism, a pair of parallel plates connected together at their ends, a valve tappet extending vertically from the upper ends of the plates, a cam shaft passing horizontally through the plates and having a plurality of cams which lie within the confines of the plates, and rollers arranged between the plates above and below the cam shaft and having rolling engagement with the cams, parallel flanges carried by the periphery of one pair of cams and cooperating with the rollers in preventing lateral movement of the plates.

3. In a valve mechanism, a pair of parallel plates connected together at their ends, a valve tappet extending vertically from the upper ends of the plates, a cam shaft passing horizontally through the plates and having a plurality of cams which lie within the confines of the plates, and rollers arranged between the plates above and below the cam shaft and having rolling engagement with the cams, parallel flanges carried by the periphery of one pair of cams and cooperating with the rollers in preventing lateral movement of the plates, the periphery of such cams having semi-circular seats to one side of the flanges to cause the rollers to follow the cams without vertical lost motion.

4. In a valve, a cam shaft having a plurality of cams, a reciprocable member loosely received on the cam shaft, rollers supported at the ends of the reciprocable member and having rolling contact with the cams, and parallel flanges carried by the periphery of one pair of cams and cooperating with the rollers and preventing lateral movement of the reciprocable member.

Signed at Manchester, in the county of Meriwether, and State of Georgia, this 12th day of July, A. D. 1928.

WILLIAM H. SEABROOK.