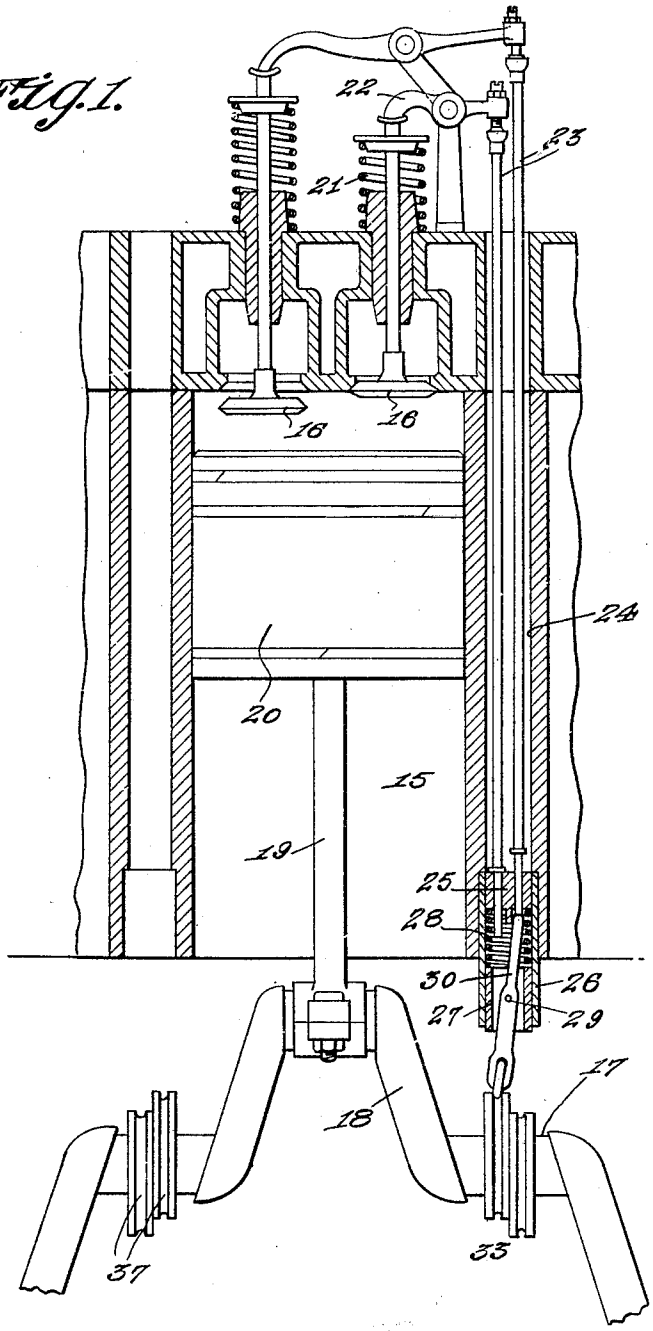
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Fig. 1.



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Fig. 3.

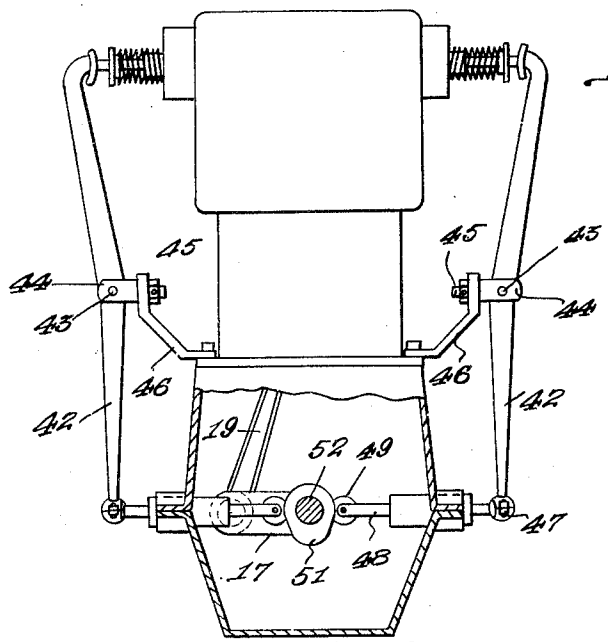
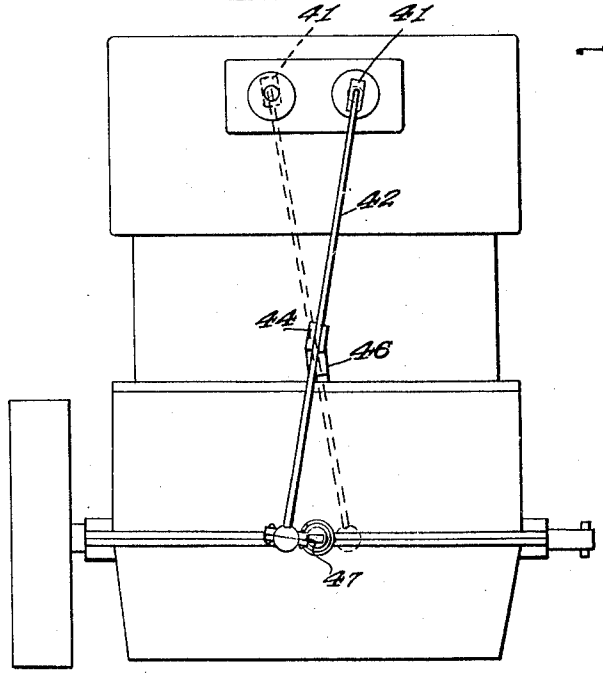


Fig. 4.



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Fig. 2.

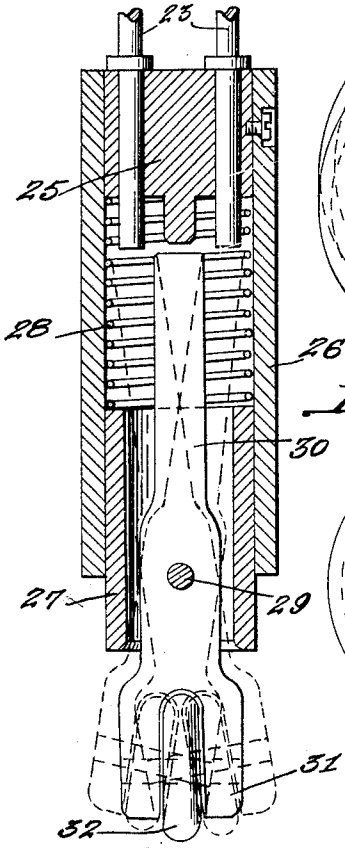


Fig. 5.

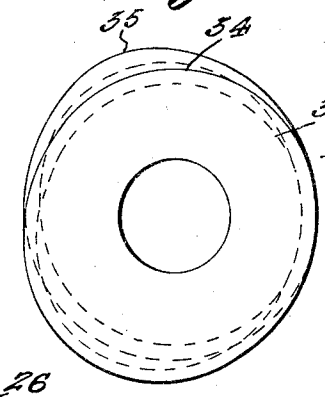


Fig. 6.

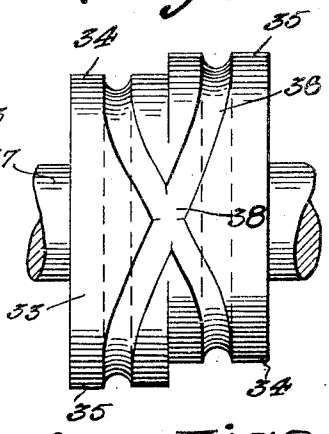


Fig. 7.

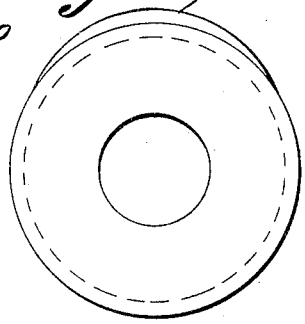


Fig. 8.

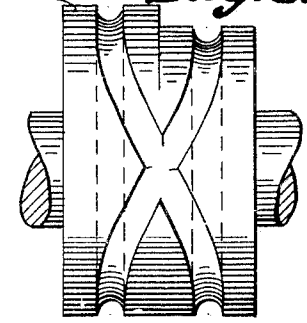


Fig. 9.

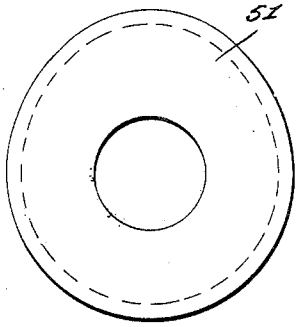


Fig. 10.

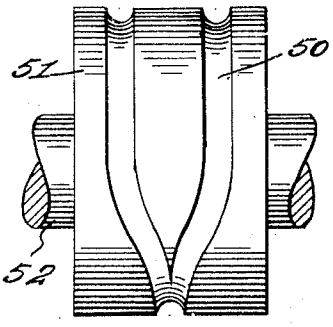


Fig. 11.

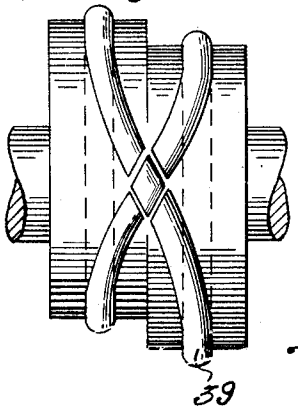
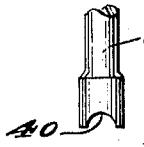


Fig. 12.



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Patented Apr. 9, 1929. 1,708,749

UNITED STATES PATENT OFFICE.

ALEX J. ADAM, OF SAN ANTONIO, TEXAS.

CAM AND VALVE LIFTER.

Application filed February 21, 1927. Serial No. 170,018.

This invention relates to valve mechanisms for internal combustion engines, an object being to provide means for simplifying the construction and operation and reducing the number of working parts of a mechanism of this character.

To this end the invention provides means for actuating a plurality of valves by a single cam or eccentric, novel means being provided for alternately acting upon the intake and exhaust valves of one or more cylinders.

With the above and other objects in view, the invention further includes the following novel features and details of construction, to be hereinafter more fully described, illustrated in the accompanying drawings and pointed out in the appended claim.

In the drawings:—

Figure 1 is a fragmentary sectional view illustrating the invention.

Figure 2 is an enlarged detail sectional view showing the valve lifter and contiguous portions of the mechanism illustrated in Figure 1.

Figure 3 is an elevation partly broken away showing the valves of a two-cylinder engine actuated by a single cam.

Figure 4 is an elevation at right angles to Figure 3.

Figures 5 and 6 are side and edge views respectively of the cam shown in Figure 1.

Figures 7 and 8 are side and edge views respectively of a cam for actuating a single valve.

Figures 9 and 10 are side and edge views respectively of the cam shown in Figure 3.

Figure 11 is an edge view of the type of cam shown in Figures 5 and 6, the cam groove being replaced by a cam bead.

Figure 12 is a fragmentary view showing the end of a valve lifter for use in connection with the cam shown in Figure 11.

Referring to the drawings in detail wherein like characters of reference denote corresponding parts, the reference character 15 indicates the cylinder of an internal combustion engine having overhead valves 16, one of which is an intake and the other an exhaust valve. The engine crank shaft is shown at 17 and this shaft is provided with the usual crank arms 18 for connection with the rod 19 of a piston 20.

As is usual in valve mechanisms of this character, the valves are normally seated by springs 21 and are engaged by rocker arms 22 which have connected thereto push rods 23. These push rods extend downwardly through a passage 24 provided in the cylinder block and through a bearing or guide 25. This guide is secured within one end of a bearing sleeve 26, which is in turn suitably secured within the lower end of the passage 24. The opposite end of the sleeve 26 has mounted therein a slide 27 and inward movement of this slide is resisted by a spring 28 which is interposed between the inner end of the slide and the inner end of the bearing or guide 25.

Pivotally mounted within the slide 27 upon a pin 29 is a valve lifter 30, so that the said lifter may be moved longitudinally within the sleeve and may also be moved upon the pivot 29. The outer end of the valve lifter 30 is bifurcated so as to provide spaced arms 31 and mounted between these arms is a roller or tracer 32. Secured upon the crank shaft 17 is a cam 33. This cam which is shown in Figure 1 of the drawings is illustrated on an enlarged scale in Figures 5 and 6. As shown in these figures the cam includes oppositely located low portions 34 and similarly arranged high portions 35, while a double groove 36 extends around the cam. Upon one side of the cam the double groove provides parallel grooves 37 as shown in Figure 1, while these double grooves cross upon the opposite side of the cam as shown at 38 in Figure 6.

As the cam is revolved by the rotation of the crank shaft, the wheel 32 will travel in the double cam groove 36 and when the parts are in the position shown in Figure 1, one of the rods 23 will be lifted to open its particular valve. As rotation of the cam continues, the wheel 32 will pass from the portion of the groove shown in Figure 1 to the opposite portion, first permitting the valve to seat under the action of its spring 21. As the wheel passes to the opposite portion of the groove 36, the valve lifter will be moved upon its pivot so as to bring its inner end beneath the other push rod 23 and when the wheel reaches the high portion of the cam, this push rod will be actuated to open the other valve.

The cam shown in Figure 11 is of the same type as that illustrated in Figures 5 and 6, except that the groove 36 is replaced by a bead 39 which is engaged by the recessed end 40 of a valve lifter 30a. The operation is the same as that just described.

The cam shown in Figures 7 and 8 differs

from the cam illustrated in Figures 5 and 6 in that only one high point 35^a is provided, so that instead of actuating a valve at each half revolution, a single valve is actuated once in each complete revolution.

In Figures 3 and 4, a two-cylinder engine is illustrated, each cylinder having upon opposite sides an intake valve and an exhaust valve. These valves are indicated at 41. Mounted upon each side of the cylinder block is a rocker arm 42. This arm is mounted for pivotal rocking movement as shown at 43 and upon an arm 44 and the latter is in turn pivotally mounted as shown at 45 in a bracket 46. The rocker arm 42 is thus capable of pivotal rocking movement to actuate the valves and of lateral pivotal movement for the purpose of bringing its upper end into alternate engagement with the valves 41 upon one side of the block. For this purpose, the lower end of the rocker arm 42 has a universal connection 47 with a lifter 48 which is mounted and movable after the manner of the lifter shown in Figure 2 of the drawings. Like the lifter 30, the lifter 48 carries at its inner end a wheel or roller 49 which operates in a double cam groove 50 provided in a cam 51 which is mounted upon the crank shaft 52 of the engine.

As the cam 51 is revolved, the lifter 48 will be moved longitudinally and pivotally after the manner of the lifter 30 and this movement will cause the rocker arm 42 to be rocked upon its pivot 43 as well as to be moved laterally upon the pivot 45. The rocker arm will thus be caused to alternately engage and actuate the valve upon one side of the cylinder block. As the mechanism is duplicated upon opposite sides of the cylinder block as shown in Figure 3 of the drawings, an exhaust valve and an intake valve will be alternately operated in each cylinder of the engine by the action of a single cam.

The invention is susceptible of various changes in its form, proportions and minor details of construction and the right is herein reserved to make such changes as properly fall within the scope of the appended claim.

Having described the invention what is claimed is:

In a valve mechanism for internal combustion engines, normally seated intake and exhaust valves, push rods operatively associated with the valves, a bearing sleeve, a bearing at one end of the sleeve to slidingly receive the push rods, a spring resisted slide mounted in the opposite end of the sleeve, a valve lifter pivotally secured to the slide and having one of its ends adapted to engage the push rods and means acting upon the other end of the valve lifter to move the latter longitudinally and pivotally and alternately engage and actuate the push rods.

In testimony whereof I affix my signature.

ALEX J. ADAM.