

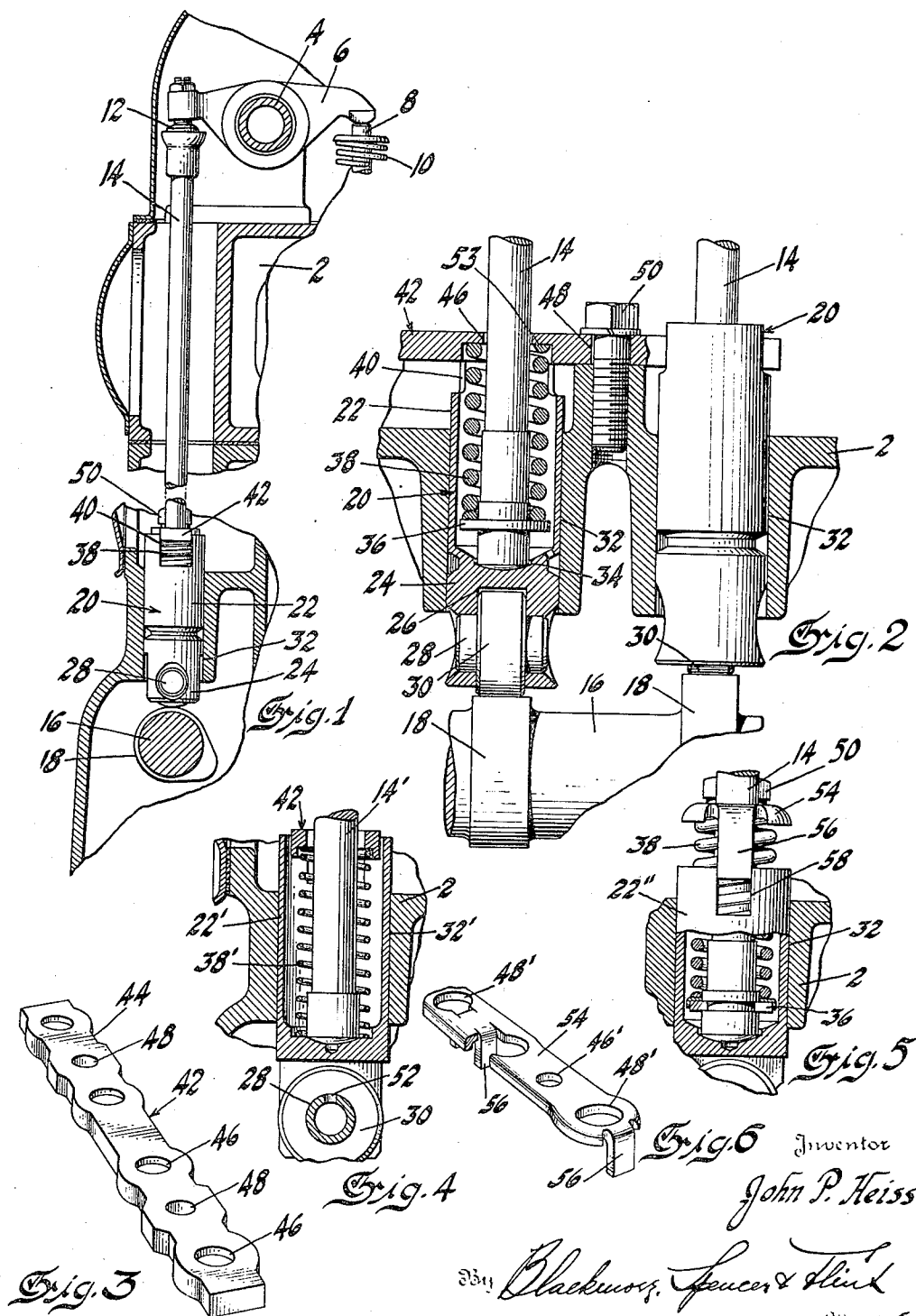
Aug. 10, 1937.

J. P. HEISS

2,089,478

TAPPET SPRING RETAINER

Filed May 23, 1935



UNITED STATES PATENT OFFICE

2,089,478

TAPPET SPRING RETAINER

John P. Heiss, Flint, Mich., assignor to General Motors Corporation, Flint, Mich., a corporation of Delaware

Application May 23, 1935, Serial No. 23,075

6 Claims. (Cl. 123—90)

This invention relates to internal combustion engines, and more particularly to valve operating mechanism therefor.

One object of my invention is to provide a single guide and retaining member for a plurality of lifter sleeves and push rods.

A further object is to provide a guide member which facilitates the assembly and disassembly of the motor.

With these and other objects in view, my invention resides in the construction as described in the following specification and claims and which is illustrated in the accompanying drawing, in which:

Figure 1 is a vertical section through a portion of an internal combustion engine showing the valve operating mechanism.

Figure 2 is an enlarged elevation, partly in section, of the operating cams and lifters of the valves.

Figure 3 is a perspective view of one form of guide and retaining member.

Figure 4 is a vertical section through a slightly modified lifting sleeve and roller.

Figure 5 is an elevation of a modified form of lifting sleeve and guide means with parts broken away.

Figure 6 is a perspective view of the modified form of guide used in Figure 5.

An engine block 2 has a rocker shaft 4 upon which a rocker arm 6 is pivoted. One end of the rocker arm engages a valve stem 8 to actuate the same, the stem being biased upwardly by a spring 10. The opposite end of the arm is connected through a ball and socket joint 12 to a push rod 14 which extends downwardly. The lower portion of the block supports a camshaft 16 having thereon a plurality of cams 18 which operate different valves. A lifter member 20 which engages both the lower end of the push rod and the cam shaft is made up of a hollow cylindrical sleeve 22 which merges into a round solid portion 24 and the latter has a cut away portion 26 in the lower extremity. Two portions of the member extend downwardly in each side of the cut away portion and have a pair of aligned openings therein which support a shaft 28 upon which a cam roller 30 is held within the cut away portion. The outer surface of the member 20 fits within an opening 32 in the block 2 and is reciprocated therein.

The lower end of the push rod fits down within the sleeve 22, the tip resting in a countersunk portion 34. Adjacent the end there is located a horse-shoe washer 36 around the push rod and

snapped loosely into a groove therein and a helical spring 38 surrounds the push rod and has one end bearing upon the horse-shoe washer 36. The upper end of the sleeve has two diametrically opposed slits 40. A guide and retaining bar 42 cut in the shape shown in Figure 3 has a series of notches 44 cut in the edges, which notches are adapted to fit within the slots 40 of the different sleeves. There are also a series of holes 46 for the valve push rods to project through as well as other and smaller holes 48 for securing purposes. As will be evident, each guide bar will encompass a plurality of push rods and may or may not encompass four push rods as shown, the number being merely illustrative. The guide is bolted to the block at raised points between the push rods by bolts 50.

As best shown in Figure 2, the under surface of the guide is countersunk adjacent the push rod holes, as shown at 53, and acts as a seat for the top of the helical springs 38. Since the retainer is stationary, it is evident that the spring 38 causes a downward pressure upon the members 20 and keeps the cam wheel 30 in engagement with the cam at all times. The slits 40 extend down into the sleeve far enough to allow sufficient reciprocation of the lifter member 20 without the contacting of the bottom of the slit with the retainer and the passing of the same through these slits prevents rotation of the lifter in the passage 32 so that the cam wheel or roller 30 cannot turn at 90° to the cam face.

In Figure 4 is shown a slightly modified form of lifter in which the spring 38' bears against the lifter member at the bottom of the sleeve portion instead of against a ring on the push rod 14. The sleeve 22' reciprocates in the opening 32' and a guide 42 holds the spring and prevents the sleeve 22' from turning. The cam wheel 30 as before is mounted on a shaft 28 and the oil hole 52 is shown at the top of the shaft. The purpose of having the oil hole at the top of the shaft is that the main pressure on the cam wheel is applied at the bottom and therefore the greatest point of force transmittal is between the lower part of shaft 28 and the lower half of the bore in the cam wheel in contact therewith. If there is no opening in this part the maximum load carrying capacity of the oil film will be obtained so that it is very advantageous to put the oil hole in the top where a minimum of pressure is applied.

The modification shown in Figures 5 and 6 has a stamped metal guide and retainer 54 instead of a bar 42. A series of holes are punched in the

stamping in the same relation as in the bar, as shown at 46' and 48'. Adjacent the openings 48' which are the ones through which the push rods project, the metal is punched downwardly to form tongues 56. These tongues 56 engage slots 58 in the sleeves 22'' to guide the sleeves and prevent them from turning. As in Figure 2, the spring 38 bears against a horse-shoe washer which is set into the lower part of the push rod and the upper part of the spring bears against the under surface of the retainer adjacent the opening 48'.

It is thus evident that I have provided a simple, economical guide which facilitates assembly by locking a plurality of lifter sleeves against rotation by simply slipping it down on the push rods and bolting it in place as well as to give retaining means for the top of the biasing spring.

I claim:

1. In an internal combustion engine, an engine block, valve actuating means comprising a cam shaft, cams on the shaft, lifter members actuated by the cams within the block, hollow sleeves forming the upper part of the lifter members, push rods extending within the sleeves to engage the lifter members, aligned slots in the sleeves and a guide member having openings through which the push rods extend and engaging the sides of the slots of a plurality of sleeves and secured to the block whereby the sleeves are kept from angular displacement during actuation.

2. In valve actuating mechanism, an engine block, lifter members reciprocable therein, push rods actuated by the lifter members, cross slots in the lifter members and a guide member having openings therein through which the push rods pass and which engages the sides of the cross slots of a plurality of lifter members, and means to secure the guide to the engine block.

3. In valve actuating mechanism, an engine block, lifter members reciprocable in said block, a portion of said members being hollow, a slot across the end of the hollow portion, a push rod

extending within the hollow end, a spring surrounding the rod, a member engaging the sides of the slot and bearing against the spring end and having openings through which push rods extend, and means for securing the member to the block whereby the lifter member is guided in its reciprocation and the spring is retained within the hollow end.

4. In an internal combustion engine, a cam, a push rod, a lifter contacting both to transmit motion from one to the other, a hollow sleeve forming the upper part of the lifter and having the end portion of the push rod extending within it, a slotted opening in the edge of the sleeve, a guide and retaining member engaging the sides of the slot and having an opening therein through which the push rod shaft extends, a spring surrounding the push rod within the sleeve and abutting the retaining member, and means to secure the retaining member to the engine.

5. In an internal combustion engine having a motor block and reciprocating push rods, hollow tappets engaging the push rods, the upper ends of which are provided with cross slots and a member having a plurality of spaced openings throughout its length, means for securing the member to the motor block, the push rods and securing means passing through the openings and means on the member engaging the cross slots to prevent the hollow tappets from turning.

6. In an internal combustion engine having a motor block and reciprocating push rods, hollow tappets engaging the push rods the upper ends of which are provided with cross slots and a member having a plurality of spaced openings throughout its length and also spaced portions of reduced width, means for securing the member to the block the push rods and securing means passing through the openings and the reduced portion fitting within the cross slots to prevent the tappets from turning.

JOHN P. HEISS.