

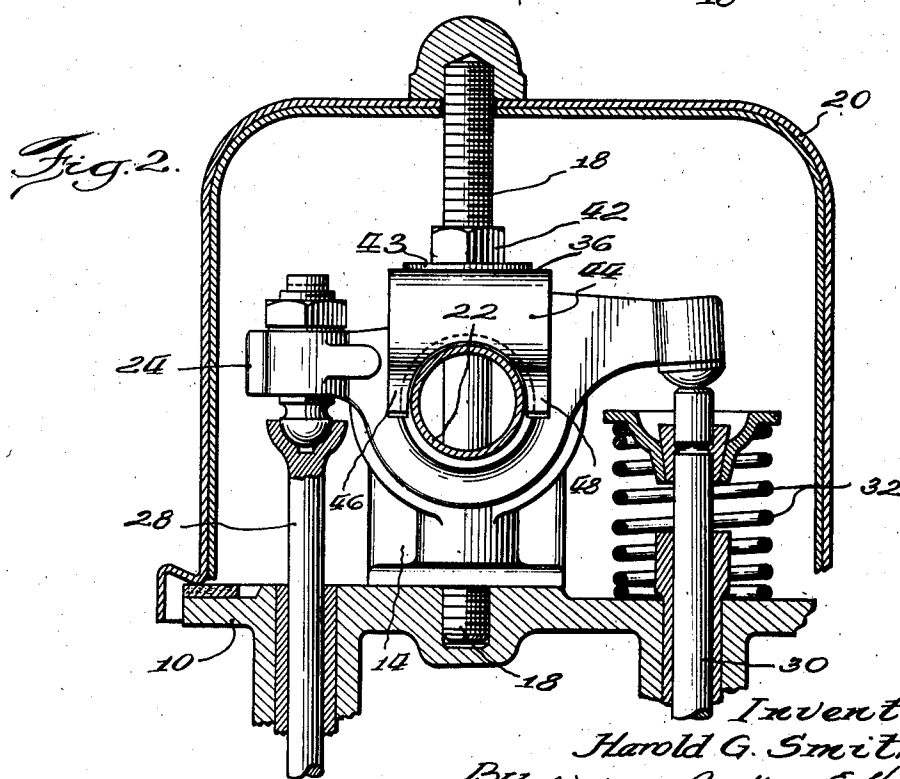
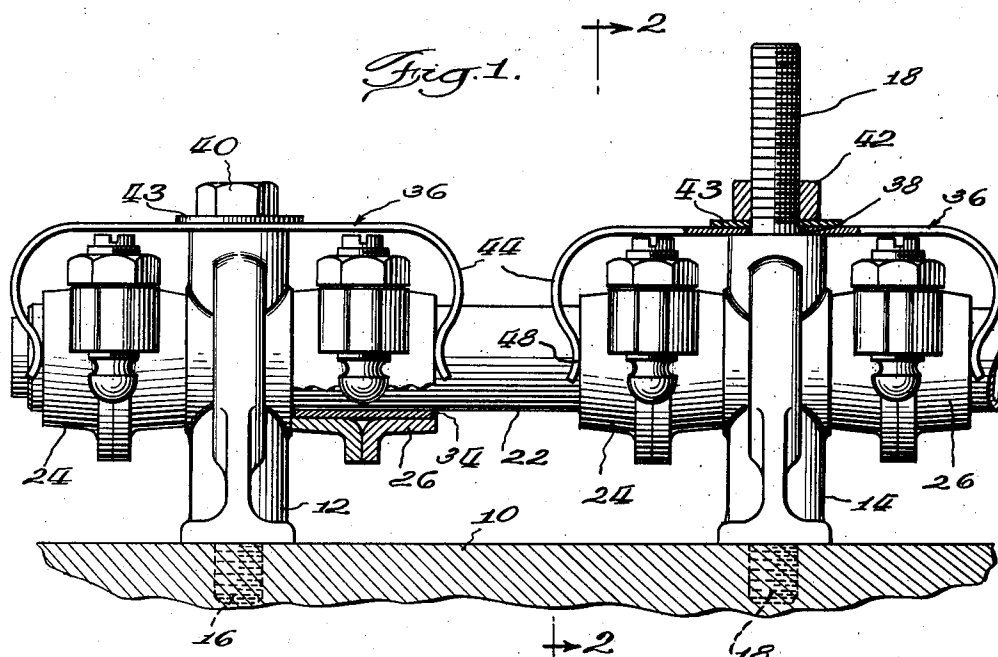
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ROCKER ARM ASSEMBLY

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ROCKER ARM ASSEMBLY

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9 Claims. (CL 123—90)

My invention relates to rocker arm assemblies for overhead valve engines of the internal combustion type.

In a conventional six cylinder overhead valve engine of the internal combustion type it is common to mount all of the valve rocker arms on a common shaft. The ends of the shaft are grooved and clothespin-like retainers are secured in these grooves to prevent the end rocker arms from slipping off the shaft. A spring flat washer and a regular flat washer are usually interposed between each retainer and the adjacent rocker arm, the spring washer serving to press the rocker arm against a shaft supporting bracket and the regular washer serving to prevent the spring washer from cutting the rocker arm.

The rocker arms of successive sets are commonly separated by coil springs surrounding the shaft, and regular flat washers are interposed between the rocker arms and the ends of the spring. These washers prevent the ends of the springs from cutting the rocker arms and also prevent the springs from being deflected by oscillation of the rocker arms, as such deflection sometimes results in spring breakage. These coil springs hold the rocker arms in contact with adjacent supporting brackets.

An object of my invention is to reduce the number and cost of the parts in a rocker arm assembly.

Another object of my invention is to utilize improved spring clips in lieu of the coil springs, spring flat washers, regular flat washers and retainers of the prior art.

Another object of my invention is to provide an improved and simplified method of assembling the various parts of valve rocker arm assemblies.

Another object of my invention is to reduce the time and cost of an assembly operation.

In the drawing, Figure 1 is a side elevation of part of a rocker arm assembly embodying my invention, certain parts being cut away to illustrate the construction more clearly, and Figure 2 is a transverse section taken on the line 2—2 of Figure 1 and showing a cover enclosing the assembly.

Referring to the drawing, it will be seen that I have illustrated my invention as being applied to the head 10 of a gasoline or other internal combustion engine which may be of conventional design. Identical brackets 12 and 14 are secured to the head 10 by studs 16 and 18, respectively, the stud 18 being longer than the stud 16 in order to secure in place a cover 20 illustrated in Figure

2. It will be understood that the number of brackets attached to the head 10 will depend upon the number of cylinders in the motor, there being one bracket for each cylinder.

The brackets 12 and 14 support a shaft 22 which is normally of a length approximating that of the head 10. The shaft 22 has suitable openings to receive the studs 16 and 18 and these studs serve to prevent longitudinal as well as rotational movement of the shaft 22.

A pair of rocker arms 24 and 26 is provided for each cylinder. The rocker arms 24 and 26 may be identical or different, depending upon the relative positioning of the intake and exhaust valves and possibly other factors. Each rocker arm is adapted to be oscillated in valve opening direction by a push rod 28 having a suitable ball and socket connection with one end of its rocker arm. The other end of each rocker arm is adapted to engage a valve stem, such as indicated at 30 in Figure 2. The valve and rocker arm are returned by the valve spring indicated at 32. In order to reduce friction, the rocker arms are commonly provided with bushings 34 and may be lubricated in any suitable or conventional manner.

I provide a novel spring clip 36 for resiliently holding each pair of rocker arms in engagement with opposite sides of one of the shaft supporting brackets. This spring clip 36 is formed of steel or other suitable resilient material and has an opening 38 for receiving a stud 16 or 18. The spring clips 36 are held in place by the nuts 40 and 42 and plain washers 43, which serve to secure the brackets to the motor head 10 so that no additional securing means is required for the spring clips 36. In fact, the resilience of the spring clips holds the nuts 40 and 42 securely in place and permits the substitution of the plain washers 43 for the lock washers heretofore commonly used between these nuts and the tops of the brackets 12 and 14.

The ends 44 of the spring clips 36 are bent downwardly and engage the exposed sides of the rocker arms 24 and 26 as clearly shown in Figure 1 of the drawing. These ends 44 are bifurcated, as best shown in Figure 2 and provide fingers 46 and 48 extending downwardly on opposite sides of the shaft 22. The extreme lower ends of the fingers 46 and 48 are bent outwardly, as clearly illustrated in Figure 1. The contacting surfaces of the clips 36 which engage the rocker arms lie approximately in a horizontal plane passing through the axis of the shaft 22, wherefore there

is no tendency to cant the rocker arms on their supporting shaft.

It will be noted that a single spring clip 35 serves to hold a set of rocker arms in proper resilient engagement with the supporting bracket located between the two rocker arms forming the set. The hole 38 is preferably made of such size or shape as to permit the spring clip to exert equal force against both rocker arms, even though the rocker arms be of slightly different widths.

My invention can be applied to new engines in the process of manufacture or to old engines already in use. Where my invention is applied to an existing six cylinder engine, twenty-seven different parts can be eliminated and six spring clips 35 and six plain washers 43 substituted therefor, giving a net saving of fifteen parts.

My invention is even more advantageous in the manufacture of new engines. In the conventional engine of the prior art, the rocker arms, supporting brackets, coil springs, regular washers and spring washers all have to be slipped over the shaft 22 in predetermined sequence. The rocker arm shaft 22 also has to be grooved and the clothespin retainers inserted in the grooves. Where my invention is used, the grooving of the shaft can be eliminated and it is only necessary to slip the rocker arms and supporting brackets over one end of the shaft 22. The spring clips 36 can be put in place after the rocker arm shaft and supporting brackets have been placed in final position on the engine head.

My invention, therefore, saves considerable time in the assembly operation and permits the use of less skilled operators.

I have referred to a six cylinder engine by way of example only. My invention is not limited to a six cylinder engine, but may be used on any engine of the overhead valve type or, in fact, any engine in which a rocker arm assembly of similar design is used.

While I have illustrated and described only a single embodiment of my invention, it will be understood by those skilled in the art that my invention may be embodied in numerous other forms and that the appended claims are not to be limited to the particular form illustrated and described in detail herein.

I claim:

1. A rocker arm assembly comprising a supporting bracket, a stud for securing said bracket to a motor block, a shaft carried by said bracket, a rocker arm mounted on said shaft on each side of said bracket, a spring clip having a centrally located opening for receiving said stud and downwardly-extending, bifurcated arms terminating in ends lying on opposite sides of said shaft and pressing said rocker arms against said bracket, and a nut on said stud for retaining said spring clip and bracket in place, said spring clip resiliently holding said nut against rotation and exerting axially directed pressure on said rocker arms substantially in a plane passing through the axis of said shaft.

2. A rocker arm assembly comprising a supporting bracket, a shaft carried by said bracket, a rocker arm mounted on said shaft on each side of said bracket, and a spring clip having downwardly-extending, bifurcated arms terminating

in reversely bent fingers lying on opposite sides of said shaft and pressing said rocker arms against said bracket, said spring clip exerting resilient axially-directed pressure on said rocker arms substantially in a plane passing through the axis of said shaft.

3. A rocker arm assembly comprising a supporting bracket, a stud for securing said bracket to a motor block, a shaft carried by said bracket, a rocker arm mounted on said shaft on each side of said bracket, a spring clip formed of flat resilient material having a centrally located opening for receiving said stud and downwardly-extending ends pressing said rocker arms against said bracket, and a nut on said stud to hold said bracket for retaining said spring clip and bracket in place, said spring clip resiliently holding said nut against rotation and resisting axial movement of said rocker arms.

4. A rocker arm assembly comprising a supporting bracket, a shaft carried by said bracket, a rocker arm mounted on said shaft on each side of said bracket, a spring clip having downwardly-extending arms terminating in ends engaging and pressing said rocker arms against said bracket.

5. A spring clip for a rocker arm assembly comprising a strip of flat, resilient material having a central opening to receive a mounting stud and downwardly curved ends terminating in reversely bent fingers adapted to lie on opposite sides of a rocker arm shaft, said fingers having curved surfaces adapted to engage sides of said rocker arms to hold said rocker arms against movement lengthwise of said shaft.

6. A spring clip for a rocker arm assembly comprising a strip of resilient material having a central opening to receive a mounting stud, downwardly curved ends terminating in fingers adapted to lie on opposite sides of a rocker arm shaft, said fingers having surfaces adapted to engage sides of said rocker arms to hold said rocker arms against movement lengthwise of said shaft, the central portion of said clip being adapted to function as a lock washer to prevent rotation of a retaining nut threaded on said stud.

7. A spring clip for a rocker arm assembly comprising a strip of resilient material having a securing means and downwardly curved ends terminating in reversely bent fingers adapted to lie on opposite sides of a rocker arm shaft, said fingers having curved surfaces adapted to engage rocker arms in planes normal to the axis of said shaft to hold said rocker arms against movement lengthwise of said shaft.

8. A spring clip for a rocker arm assembly comprising a strip of resilient material having a central opening to receive a mounting stud and inwardly curved ends terminating in fingers adapted to lie on opposite sides of a rocker arm shaft, said fingers having curved friction-reducing surfaces adapted to engage sides of said rocker arms to hold said rocker arms against movement lengthwise of said shaft.

9. A spring clip for a rocker arm assembly having a pair of oppositely disposed ends adapted to engage the sides of a pair of rocker arms to urge said rocker arms toward each other while offering no appreciable resistance to oscillating movement of said rocker arms.

HAROLD G. SMITH.