Sept. 16, 1930. H. W. KULP ET AL 1,776,159

SHIELD

Filed Nov. 23, 1929

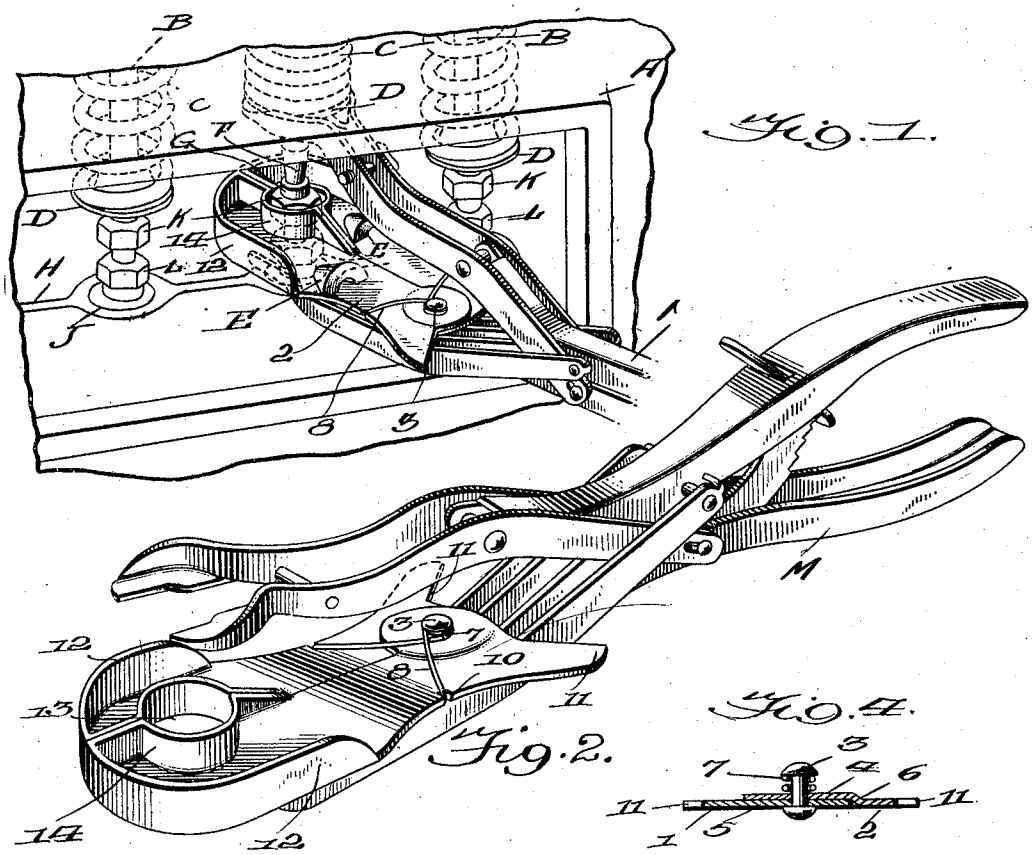


Fig. 1.

Fig. 2.

Fig. 4.

Fig. 5.

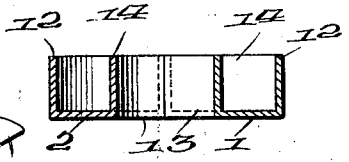


Fig. 3.

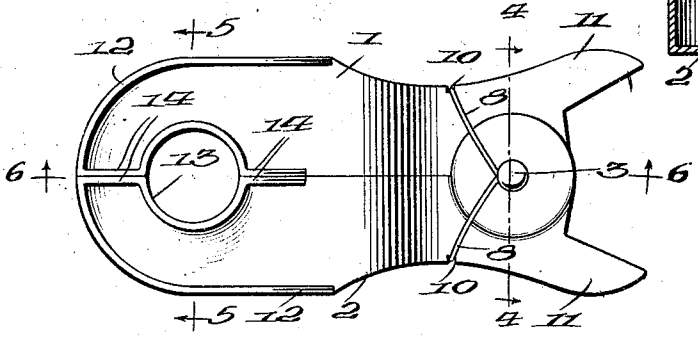
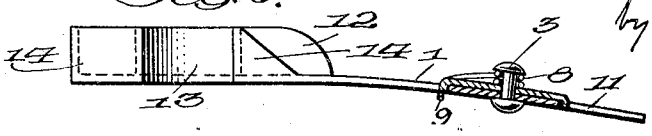


Fig. 6.



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UNITED STATES PATENT OFFICE

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SHIELD

Application filed November 23, 1929. Serial No. 409,323.

This invention relates to shields primarily intended for use in catching the removable locking means cooperating with the lower end portions respectively of the respective valve-stems to limit the downward movement of the respective spring retainers or cups or washers in connection with the operations necessary to the grinding or replacement of poppet-valves in internal combustion engines, particularly internal combustion engines as mounted in automobiles and as confined and obstructed by the related parts, such as the generator, distributor, carburetor, steering rod, chassis frame and other parts of the automobile.

Of recent years it has been the practice to arrange the valve-stems, and push rods, with their cooperating parts in the interior of the engine block, permitting access thereto through an opening or port normally covered by removable cover plates to keep out dust and dirt. At first this opening was usually quite wide in a vertical direction, allowing relatively easy access, and the top of the crank-case and the adjacent portion of the cylinder block were such as to completely close the top of the crank-case at all points except for the passage of the rods, and the locking means for limiting the downward movement of the spring retainers or cups on the valve-stems under the thrust of their respective cooperating valve-springs, were cross-pins or other elements requiring to be gripped and positively displaced by the mechanic. However, as time has passed the width of the access opening or port has decreased, while the number of accessories has increased, rendering access to the valve-stems, spring, retainers and locks progressively more difficult.

Quite recently there has been a change whereby the push rods have been mounted in removable spiders, as illustrated in the patent to Horning, No. 1,604,412, granted October 26, 1926, the top of the crank-case on either side of the spider being left open, and it has been usual to continue the upper edge of the opening down in a flange to still further narrow the access opening or port which is normally closed by a cover plate, so that when the springs with their retainer cups are raised they are practically entirely behind the outer wall and the locking means are adjacent the top edge of the opening and to the rear thereof, so that in the usual multiple-cylinder engines access to said locking means is extremely difficult.

In a number of different engines of this type it is now usual to employ split conical locking means normally pressed radially inward toward each other by a cooperating conical face of the retainer to force and keep said locking means in a groove or radially inward of an enlarged lower end of the valve-stem, so that as the retainer is raised by the valve spring lifter tool these locking devices, "horseshoes" or semi-circular cone members are freed for radial spreading and usually drop out of place as the retainer is raised, sometimes falling on an inaccessible part of the push-rod spider or securing bolts for the latter, and sometimes falling between the face of said spider and the opposed face of the engine block or crank-case down into the latter.

The present invention has been developed with the above considerations in view to provide a compact shield which may be used between the jaws of the usual valve spring lifter and properly positioned between the jaws of the latter while the latter is in proper operative position and prior to the operation of the latter to raise the valve-spring retainer, and so formed that as the valve-spring retainer and valve-spring are raised the locking means or "horseshoes" mentioned, in falling, will fall into and be retained by said shield, and may be easily withdrawn with said shield, or picked off of the same.

In this application we show and describe only the preferred embodiment of our invention simply by way of illustration of the practice of our invention, as by law required. However, we recognize that our invention is capable of other and different embodiments, and that the various details thereof may be modified in a number of ways, all without departing from our said invention. Therefore, the drawings and description herein are

to be considered as merely illustrative and not as exclusive.

In the accompanying drawings:

Figure 1 represents a perspective view of a portion of an engine with the side plate removed, showing a shield embodying our invention as applied in use between the jaws of a valve-spring lifter, the locking means having fallen from normal position into said shield;

Figure 2, a perspective view of the shield of the present invention as arranged between the jaws of a valve-spring lifter preparatory to use;

Figure 3, a top plan view of the shield;

Figure 4, a sectional view on line 4—4 of Fig. 3, looking in the direction of the arrows;

Figure 5, a sectional view on line 5—5 of Fig. 3, looking in the direction of the arrows, and

Figure 6, a sectional view on line 6—6 of Fig. 3, looking in the direction of the arrows.

Referring now in detail to the drawings, A designates the engine generally; B, the valve-stems of the usual poppet-valves (not shown) thereof; C, the usual valve-springs; D, the valve-spring retainers, cups or washers; E, the split cone or semi-circular composite cone-shape locking means normally received in the reduced portion F of the valve-stems B with their cone faces presented upwardly and resting on the lower annular shoulder G of the valve-stem and normally so held by the cooperating inner lower conical face of the retainers, or cups or washers D; H, the push-rod spider; J, the push-rods, and K, the adjustable push-rod heads; L, the lock-nuts for the latter.

The parts specifically immediately above referred to are old and well known and are merely briefly described as above to aid in giving a clearer understanding of the present invention.

M designates generally a valve-spring lifter with which the present invention is preferably used, and said valve-spring lifter may be constructed as illustrated in accordance with our pending application Serial No. 331,773, filed January 11, 1929.

The shield of the present invention comprises two preferably thin sheet metal members 1 and 2 pivotally connected at their rear end portions to swing toward and from each other in a horizontal plane. Such pivotal connection may be by means of a vertical rivet 3 extending through their overlapping portions 4 and 5, and preferably the portion 4 of plate 2 will be offset, as at 6, for substantially the thickness of portion 5 of plate 1 so as to lie substantially flat against the top of the latter, with the lower faces of the rest of said plates substantially in registry at all points.

Preferably some yielding means for normally urging or forcing one of said plates 1 and 2 toward the other in a horizontal plane will be provided. Such means may be in the form of a coil spring 7 disposed about the stem of rivet 3, and preferably lying radially inward of the head of the same so as to be confined between said head and the opposed face of the adjacent overlapping portion of one of said plates 1 and 2, and having legs 8 which cross each other and which are preferably formed with extreme end portions adapted to positively engage or hook on or into the respective plates 1 and 2, as by having their end portions bent over, as at 9, and received in edge notches 10 respectively in said plates 1 and 2.

Each said plate 1 and 2 has an operating ear 11 extending from its rear portion to the rear of said rivet 3, which serves as a fulcrum point or pivot, said ears being disposed at the distant sides of said plates 1 and 2 and the material of said plates being cut away between said ears, so that said ears may be pressed toward each other to cause said plates to swing about rivet 3 away from each other.

Except for the offset 6 in plate 2, said plates 1 and 2 are preferably duplicates in form, size and material.

Each said plate 1 and 2 is formed with a preferably abrupt outer edge flange 12 extending about its outer side and forward end portion and having an inner face extending preferably abruptly with relation to the top of its plate.

Said plates 1 and 2 are provided with a semicircular notch 13 at a slight distance from the flange 12, the said notches of the said plates 1 and 2 registering lengthwise of said plates to together define a substantially circular opening of sufficient diameter to accommodate therein one of the push-rod adjustable heads K when the plates 1 and 2 are closed about the same; that is, when they have been applied thereto and have their opposed edges in contact, or substantially in contact, at substantially all points.

The opposed inner edges of the plates 1 and 2 preferably including the semicircular notches 13 are provided with abrupt flanges 14 similar to the flanges 12.

The opposed faces of the flanges 12 and 14 of each plate 1 and 2 are to be spaced at all points at such distance from each other as to certainly receive in the interval between them the respective members or elements of the locking means E as they drop out when the spring-retainer D is raised so that there will be no chance of one of said elements E falling on the edges of the flanges and sliding off of the shield as the latter is removed.

Preferably the plates 1 and 2 will be downwardly curved or inclined from front to rear from the rear ends of their outer flanges 12 to their extreme rear portions, such downward and rearward curve or incline facilitating the ease of application of the shield in

operative position, serving as a runway for deflecting the locking means E outward under the influence of gravity as they drop from position and strike the upper face of the shield and slide partially down the curve or inclined face thereof under the force of gravity to be most accessible, and also facilitates the ease of arrangement and disposition between the jaws of the valve-spring lifting tool. However, while such curved or inclined form is preferred, it is not essential to our invention, considered in its broader aspects.

The terms "horizontal" and "vertical" as used in the specification and the appended claims are used only in a relative sense and as applicable to the shield as used on a vertical cylinder engine. Obviously, if the shield be held in the hand at right angles to the position illustrated in Fig. 1, the relation of the parts to each other would remain the same.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is:

1. A shield comprising a plurality of plates, and means for pivotally connecting said plates to swing toward and from each other in a single plane, said plates having their opposed forward inner edge portions notched out in registry to together in closed position receive an object between them, and being provided at their front end portions with flanges extending abruptly upward from their respective upper faces and respectively about their inner and outer edges, and said plates being bent downward rearwardly from a point adjacent the rear ends of said flanges, in combination with a spring coiled about said pivotal connecting means and engaging the respective plates in advance of said pivotal means to force said plates about said pivotal means to normal closed position, and ears extending from said plates to the rear of said pivotal connecting means.

2. A shield comprising a plurality of plates, and means for pivotally connecting said plates to swing toward and from each other in a single plane, said plates having their opposed forward inner edge portions notched out in registry to together in closed position receive an object between them, and being provided at their front end portions with flanges extending abruptly upward from their respective upper faces and respectively about their outer edges, in combination with a spring coiled about said pivotal connecting means and engaging the respective plates in advance of said pivotal means to force said plates about said pivotal means to normal closed position, and ears extending from said plates to the rear of said pivotal connecting means.

3. A shield comprising two horizontally disposed plates having overlapping portions, and a rivet extending vertically through said overlapping portions, said plates having their opposed forward inner edge portions notched out in registry to together in closed position receive an object between them, and having their inner and outer marginal edges of their front portions raised above the normal upper faces of the respective plates, in combination with yieldable means acting to force said plates to normal closed position, and operating ears extending from said plates.

4. A shield comprising two plates, and means for pivotally connecting said plates to swing toward and from each other in a horizontal plane, said plates having their opposed forward inner edge portions notched out in registry to together in closed position receive an object between them, and being provided at their front end portions with marginal portions extending above the rest of the respective plates, in combination with resilient means for moving said plates about said pivotal means to normal closed position.

5. A shield comprising two plates, and means for pivotally connecting said plates to swing toward and from each other in a single plane, said plates having their opposed forward inner edge portions notched out in registry to together in closed position receive an object between them, and being provided at their front end portions with flanges extending abruptly upward from their respective upper faces and respectively about their inner and outer edges, and said plates being bent downward rearwardly from a point adjacent the rear ends of said flanges.

6. A shield comprising two horizontal plates, and a vertical rivet passing through both of said plates for pivotally connecting them, said plates having their opposed forward inner edge portions notched out in registry to together in closed position receive an object between them, and being provided at their front end portions with flanges extending abruptly upward from their respective upper faces and respectively about their edges.

In testimony whereof, we have signed our names to this specification at Lancaster, Pennsylvania, this 22nd day of November, 1929.

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MARTIN C. DELLINGER.