Feb. 21, 1933. R. D. ELDER 1,898,720

VALVE HOLDER

Filed Sept. 18, 1930

FIG. 1.

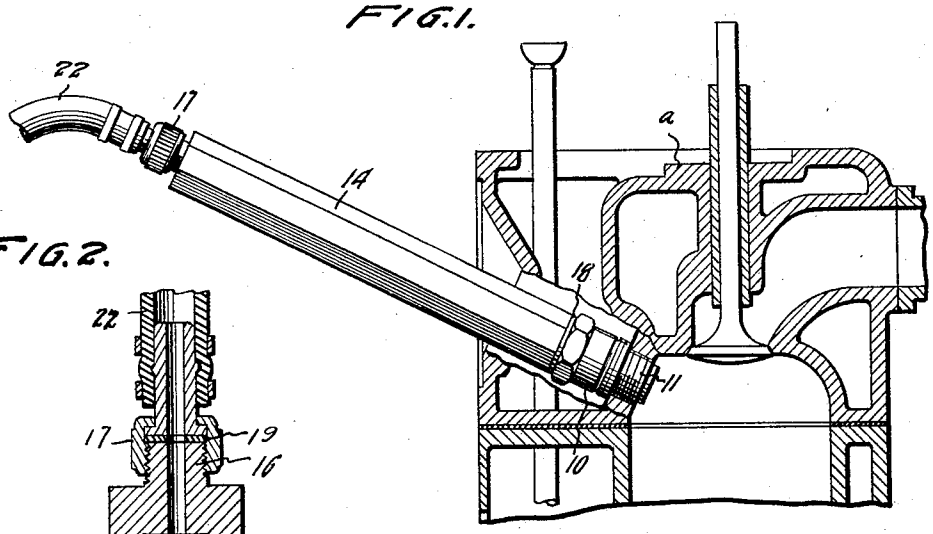


FIG. 2.

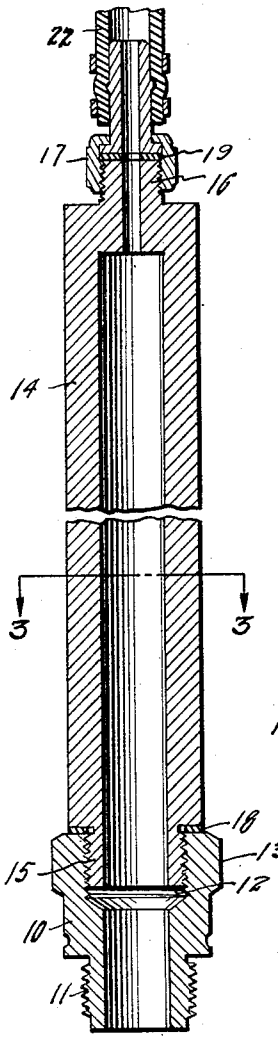


FIG. 3.

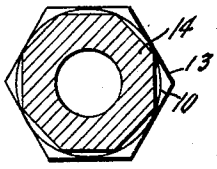
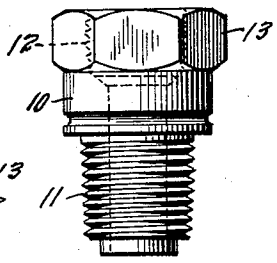
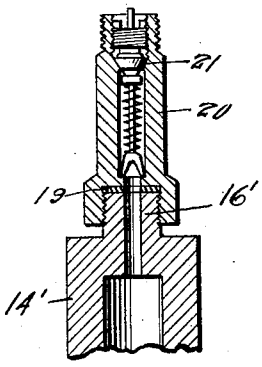


FIG. 5.

FIG. 4.





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UNITED STATES PATENT OFFICE

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VALVE HOLDER

Application filed September 18, 1930. Serial No. 482,825.

This invention appertains to improvements in valve holders generally and more particularly to a form thereof for facilitating the overhaul and repair of the valves of internal combustion motors, especially those employed in automobile motors of the over-head valve type.

An object of the invention is to provide a holder of this class which will function in a highly effective manner to cause a valve to be held in a proper position that a motorist or a mechanic may easily and readily remove a broken or otherwise deficient spring therefrom and replace the same with a new one without removing the head from the cylinder block of a motor as is usually necessary for the purpose, and whereby the repair operation may be accomplished in but a few minutes as compared to the three or four hours time ordinarily required for its performance.

Another object of the invention resides in the provision of a device of this character which is extremely simple in design, durable in construction, inexpensive to manufacture and easy to be quickly installed in and removed from a position of use.

A further object of the invention lies in the employment of the device to introduce a supply of air under pressure into the combustion chamber at the upper side of a cylinder of an over-head valve type of motor whereby the air will hold the valve in its uppermost position during the removal and replacement of a spring and thereby prevent the same from dropping down into the motor in the interval between the removal and replacement operations.

With the foregoing and other equally important objects and advantages in view, the invention resides in the certain new and useful combination, construction and arrangement of parts, as will be hereinafter more fully described, set forth in the appended claims, and illustrated in the accompanying drawing in which:—

Figure 1 is a fragmentary vertical transverse section through the upper side of an internal combustion motor of the over-head valve type and showing a practical embodiment of the invention as it appears when operatively installed thereon, the latter being in side elevation,

Figure 2 is a vertical section through one form of the device per se,

Figure 3 is a horizontal section taken on the line 3—3 of Figure 2,

Figure 4 is a side elevation of one of the interchangeable adaptors per se for engagement in a spark plug opening in the motor head block, and

Figure 5 is a vertical section through a modified form of the device.

Referring to the drawing, wherein like characters of reference designate corresponding parts in the several views thereof, and more particularly to Figures 1 to 4 inclusive, the embodiment of the invention, as shown therein by way of example only, is constituted in an adaptor 10, which has the general form of the usual metal body or shell of a standard form of spark plug, and a substantially tubular extension 14 arranged for detachable engagement with the adaptor 10 at one end and at its other end to the adjacent end of a hose or pipe line 22 leading to a suitable source of air pressure.

These adaptors 10 are preferably made in different sizes corresponding to those of the metal bodies or shells of different standard sizes of spark plugs, whereby the externally screw threaded end portion 11 of each may be engaged in a like sized spark plug opening in the motor head block *a* upon the removal therefrom of the spark plug normally seated therein.

The outer end portion of the bore extending longitudinally through each adaptor 10 is of an enlarged diameter, as at 12, and is screw threaded for the engagement therein of a complemental end 15 of the metal extension 14, which end 15 is preferably of a reduced diameter to that of the enlarged bore portion and exteriorly screw threaded for the purpose. This end portion of an adaptor 10 is also exteriorly enlarged, as at 13, and preferably formed to polygonal form for the engagement of a wrench or other suitable tool therewith to be employed in tightening and loosening the same into and from secured

engagement in a spark plug opening in the motor head block *a*.

The extension 14 is hollow and preferably polygonal in cross-section to facilitate the turning movements of the same into and out of threaded engagement with an adaptor 10 and has its outer end provided with an exteriorly screw threaded nipple 16 to be engaged by any one of the several types of couplings or nozzles of an air supply hose or line, such as the swiveled coupling 17, for the admission of air under pressure into and through the extension.

Suitable packings or washers 18 and 19 are preferaby interposed between the shoulder portion of the lower or inner end of the extension 14 and the upper or outer end of an adaptor 10 in use at the moment on the one hand and between the upper or outer end of the nipple 16 and the opposed part of the coupling 17 on the other hand respectively, in order to prevent leakage of air pressure at these points.

As shown in Figure 5, the nipple 16 may first have a form of check valve 20 secured on the same before the air hose or line is coupled to the extension 14.

This check valve 20 is constituted in a tubular body having its lower or inner end exteriorly screw threaded for engagement on the nipple 16′ and its upper or outer end exteriorly screw threaded for the engagement therewith of the coupling or nozzle 17 of an air hose or line 22. The bore of the valve body 20 is formed to house an inwardly opening valve 21 within the same, which valve is preferably of the automatic plunger type usually employed in pneumatic tire inflation valves.

In the use of the valve holder, as thus constructed and arranged, a spark plug will be removed from the head block *a* of an automobile motor and replaced with an adaptor 10 whose exteriorly screw threaded end corresponds in size to that of the like end of the metal body or shell of the displaced spark plug. With the adaptor in position, the tubular extension 14 will now have its screw threaded end 15 engaged in the outer enlarged end 13 thereof, if not already in connection therewith when the adaptor is secured in the spark plug opening, when an air supply line 22 will be coupled to the outer end of the extension 14 and air permitted to pass inwardly therethrough to the combustion chamber. With a sufficient air pressure in the combustion chamber of the motor, the defective valve will be held up thereby during the servicing of the same by the motorist or mechanic. By thus sustaining the affected valve in its uppermost position, the old spring associated therewith may be readily removed and a new one placed in position in but a comparatively short length of time, without fear of the valve falling downwardly of the cylinder and without removing the head block of the motor for the purpose.

The manner of connecting an air supply line or hose 22 to the extension 14, as shown in Figures 1 and 2, is best employed when a constant air pressure is connected with the line or hose 22, while that, as shown in Figure 5, is of greater efficiency when a hand operated air pump only is available, since the check valve 21 of the latter form of connection between the air line or hose 22 and the extension 14′ will function to allow for the building up of sufficient air pressure within the combustion chamber of the motor without loss by leakage during the operation of the pump.

In any case, twenty-five pounds of air pressure within a combusion chamber has been found to be amply sufficient for the accomplishment of the intended purposes of the invention, but no danger of any kind will result if a pressure up to one hundred pounds is used.

With this simple adjunct to the usual tool kit, a person on the road can replace a broken valve spring with approximately the same ease and expenditure of time obtaining in the changing of a tire and of course is equally of value to the mechanic as a time and labor saving adjunct to the usual repair equipment of a motor car garage or repair shop.

By providing the outer or free end of the tubular extension 14 of the device with the nipple 16 for the separate engagement therewith of both the air hose or line and the check valve 20, but one of the extensions 14 is necessary with each set of different sized adaptors 10 in order to permit of the universal use of the device with all types of air hose or line discharge nozzles or couplings as will be obvious.

Without further description, it is thought that the features and advantages of the invention will be readily apparent to those skilled in the art, and it will of course be understood that changes in form, proportion and minor details of construction may be resorted to, without departing from the spirit of the invention or its scope as claimed.

I claim:

1. A valve holder comprising an adaptor body arranged for secured engagement with a usual spark plug opening of an overhead type of internal combustion motor and having a bore therethrough, a straight extension of polygonal form projecting from said body and having detachable connection therewith, a nipple at the outer end of said extension, a valve chamber arranged for detachable engagement with said nipple, said extension nipple having a common bore to connect the first named bore with said valve chamber when the parts are in assembly, an inwardly opening check valve housed within

said chamber, and a conduit leading from said chamber outwardly of the valve therein for connection with a source of compressed air whereby an amount of the latter will be admitted to the engine to effectively hold a valve in a manner to facilitate the removal and replacement of the valve spring.

2. The method of removing and replacing a damaged or broken spring of a valve of an over-head valve type of internal combustion engine, which consists in admitting air under pressure to a combustion chamber of the engine, through the usual spark plug opening thereof, to hold the said valve in seated position during the removal and replacement of said spring.

In testimony whereof I affix my signature.

REUBEN DRUE ELDER.