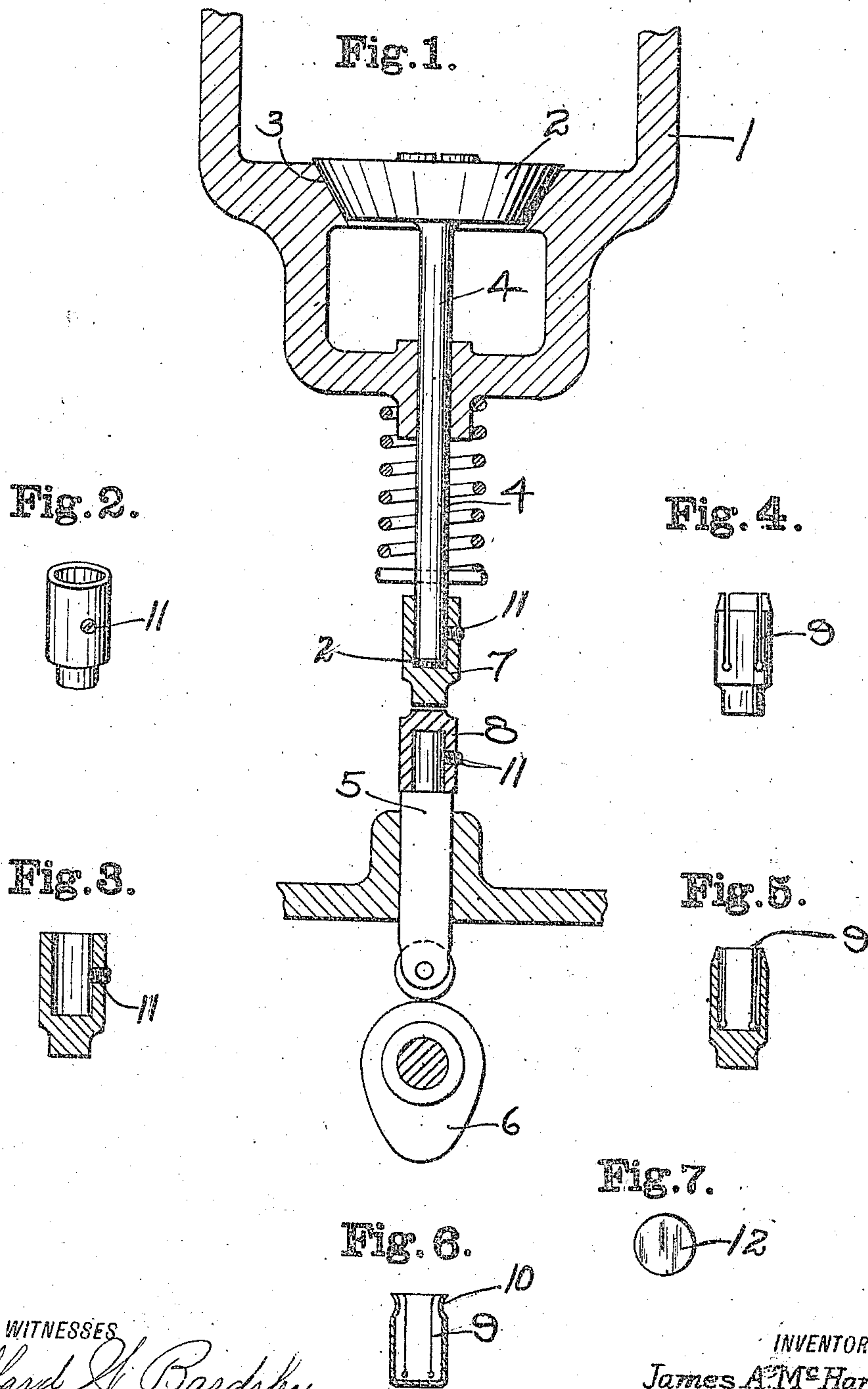


J. A. McHARDY.
CAP FOR RENEWING THE WORN ENDS OF ENGINE VALVE STEMS.
APPLICATION FILED AUG. 20, 1909.

976,274.

Patented Nov. 22, 1910.



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CAP FOR RENEWING THE WORN ENDS OF ENGINE VALVE-STEMS.

976,274.

Specification of Letters Patent. Patented Nov. 22, 1910.

Application filed August 20, 1909. Serial No. 513,796.

To all whom it may concern:

Be it known that I, JAMES A. McHARDY, a citizen of the United States, residing at the city of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Caps for Renewing the Worn Ends of Engine Valve-Stems, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to caps for renewing the worn ends or tips of engine valve stems and the like, the object being to provide an extremely simple, effective and inexpensive device adapted to be readily attached to any valve stem, or similar device after having been worn, to restore the same to its original length and consequently to its original usefulness.

Another object of this invention is to so construct these caps or tips that they may be employed on either the valve stem or the valve lift member, or both, if desired, when the same are new, so that either or both may be readily replaced, thereby quickly renewing the ends of each when worn and restoring the same to exactly their original length. Means are also provided in these caps whereby they may be firmly secured to the ends of the members over which they fit.

In the majority of explosive engines the ends of the valve stems come in direct contact with the members which lift them, and although both are hardened the continual action soon wears these ends, thus causing the valve to be operated out of time and so reduce the efficiency of the engine. The ordinary method of repairing a valve stem so worn is to heat, draw out, or lengthen the stem to compensate for the portion worn away. In doing this the stem is often sprung or thrown out of line and spoiled and the valve or the lift, or both, have to be replaced with fresh ones.

My improved device completely obviates the above difficulty. The bottom portion of the little caps may be made of any desired thickness and hardened and when a repair is to be effected a cap of the proper thickness is selected and quickly applied to the end of the valve stem or to the lifter, or both, fully and permanently restoring these parts to their original usefulness.

Another feature of the invention is that should the bottom of the cap be too thin to

replace the entire portion worn away I have provided a plurality of thin disks or washers adapted to be readily dropped into the inside of the cup before it is positioned, to build up this bottom or contacting portion so as to obtain exactly the required distance between the end of the stem and the working face of the cap.

With these and other objects in view, the invention consists of certain novel features of construction, as will be more fully described and particularly pointed out in the appended claims.

In the accompanying drawings: Figure 1— shows a valve and its application to its seat which is shown in section, also showing the valve lift and a contact or wear receiving cap or thimble on both the valve stem and the valve lifting member. Fig. 2— is a detail in perspective of the cap or cup as made from solid stock. Fig. 3— is a sectional view of the same. Fig. 4— shows one of the caps as slotted to render its walls springy or yieldable so that it may be pressed in position on the end of the stem and be retained thereon by friction. Fig. 5— is a sectional view of the construction illustrated in Fig. 4. Fig. 6— illustrates one of the little caps as having been drawn up and constructed from sheet metal. Fig. 7— is an enlarged view showing one of the disks or washers which are inserted into the cap for building up or thickening the lower end of the same.

Referring to the drawings, 1 designates the valve casing, a portion of which is shown in section. The valve 2, which is of the usual beveled seated type, finds its seat at 3 in said casing and its stem 4, which is formed integral with the valve, projects downward to meet the valve lift 5, which latter is raised by the cam 6 to engage and open and close the valve at the proper time for the operation of the engine.

The contacting ends of both the valve stem and the stem of the lifting member are shown as being supplied with caps 7 and 8 respectively. These caps may be constructed plain and from solid stock, as illustrated in Figs. 2 and 3, or they may be drawn up into a cup shape from sheet stock of any suitable thickness, if desired, see Fig. 6, and hardened so they will fit tightly onto the ends of the valve stems. The cap may be slotted as at 9, see Figs. 4, 5 and 6, if de-

sired, and its upper edge bent inward as at 10, see Fig. 6, so as to grip stem and be retained in position thereon by a yielding pressure. If desired, a set screw 11 may
5 be employed for retaining the cap in position, or both the set screw and the spring lips may be done away with and the caps be formed to fit tightly and be forced into
10 operative position and caused to hold themselves by friction only.

A feature of this invention is that in order to avoid the grinding or filing of the contacting surfaces of these caps to reduce them to the required thickness for setting the
15 valve, I have provided a very simple, inexpensive and effective method of accomplishing this purpose by supplying a plurality of extremely thin washers 12 which may be
20 dropped into the cup, as illustrated in Fig. 1, for the purpose of building up or increasing the distance between the end of the stem and the working face of the cap.

My improved cap or thimble supplies a long felt want for a simple, inexpensive
25 and effective method of renewing the worn portion of a valve stem and restoring the same to its original length, timing and consequent effectiveness.

Having thus described my invention, what
30 I claim as new and desire to secure by Letters Patent, is:

1. As a new article of manufacture, a hardened metallic cap having a substantially plain bore the sides of which are substantially parallel and adapted to be readily
35 applied to an engine valve stem or valve lifter whereby the worn contacting surfaces between the stem and the lifter may be readily renewed, said cap having means
40 whereby the same is retained in position solely by friction.

2. As a new article of manufacture, a hardened metallic cap having a substantially plain bore and adapted to be readily applied
45 to an engine valve stem or valve lifter whereby the worn contacting surface between the stem and the lifter may be renewed, means in said cap for retaining the same in position, and means for regulating

the distance between the thrust receiving
50 end of the stem and the working face of said cap.

3. As a new article of manufacture, a hardened metallic cap having a substantially plain bore and adapted to be readily
55 applied to an engine valve stem or valve lifter whereby the worn contacting surface between the stem and the lifter may be renewed, and spring retaining walls in said cap whereby the same is retained in its
60 operative position by friction.

4. As a new article of manufacture, a hardened metallic cap having a substantially plain bore and adapted to be readily
65 applied to an engine valve stem or valve lifter whereby the worn contacting surface between the stem and the lifter may be renewed, said cap being retained in position by friction, and one or more spacing washers
70 in said cap whereby the distance between the thrust receiving end of the stem and the working face of said cap may be regulated.

5. As a new article of manufacture, a hardened metallic cap having a substantially plain bore and adapted to be readily
75 applied to an engine valve stem or valve lifter whereby the worn contacting surface between the stem and the lifter may be renewed, spring retaining walls in said cap whereby the same is retained in its operative
80 position by friction, and one or more spacing washers in said cap whereby the distance between the thrust receiving end of the stem and the working face of said cap
85 may be regulated.

6. The combination with a valve stem and cooperating valve lifter of an engine, of hard metal caps removably fitted to the opposing ends of said stem and lifter, said caps being renewable to preserve the proper
90 cooperation of the stem and lifter.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES A. McHARDY.

Witnesses:

HOWARD E. BARLOW,
E. I. OGDEN.