This invention relates to tools for the removal and installation of keys employed on the stems of valves in internal combustion engines and has particular reference to such a tool of the plier type having interchangeable magnetic jaws.

The principal object of the invention is to provide a valve key tool consisting of relatively pivoted handle members which are bent transversely of their longitudinal axes to expedite manipulation and application of work holding jaws, one of which is interchangeably attached to the operative end of each handle member. The jaws are provided with complementary work engaging faces of a shape peculiar to the profile of the particular type or make of valve locking key being applied and further, the magnets of which the jaws are composed have like poles in order that separate sections of split keys may be attached by individual jaws and thus be removed simultaneously from the valve stem without magnetic influence between the key sections.

Another object of the invention is to provide a tool of the character set forth in which the magnetic jaws may be held in spaced apart relationship during the removal of valve key sections but releasable to clampingly engage the key sections for the purpose of installing the same. In any case, the jaws are interchangeable on the handle members to accommodate valve keys of various shapes.

With the foregoing objects in view, the invention has further reference to certain features of accomplishment which will become apparent as the description proceeds, taken in connection with the accompanying drawings wherein:

Figure 1 is a perspective view of a valve key tool constructed according to the invention.

Figure 2 is a fragmentary plan view showing the jaws held in spaced apart relationship in extracting key sections.

Figure 3 is a similar view showing the jaws closed on a key.

Figure 4 is a sectional view of the jaws taken on line 4-4 of Figure 2.

Figure 5 is a side elevational view of the tool.

Figure 6 is a detail view of the jaws per se showing the pole positions of the respective jaws.

Continuing with a more detailed description of the drawing, reference numeral 10 denotes a pair of handle members, pivoted at 11 in the manner of pliers. The handle members are curved across their longitudinal axes in order that the forward end of the tool may be operatively manipulated in relation to an installed valve, for better visibility and to avoid adjacent obstructing parts of the engine.

The operative ends of the handle members 10 are each formed in such manner as to receive and retain work holding jaws 12 for interchangeability. There are several different types and forms of valve keys and it is obvious that the jaws 12 may be altered insofar as the form of work conforming face is concerned, to accommodate a particular type of key without departing from the intent and purpose of the invention.

In their present form, the jaws 12 are each provided with a semi-circular recess 13 which corresponds to the curvature of a valve key section 14 and each recess has a semi-circular lip 15 at its bottom; the lips jointly serving to effect alignment of the valve key sections preparatory to their installation on a valve stem, not shown.

Irrespective of the form or contour of the jaws 12, each is fashioned from magnetized metal, the magnets each having a flux path along a line connecting the poles of the magnets with an external path of generally semi-elliptical configuration also extending from one pole to the other.

Each of the magnets will attract a key section 14, thus to hold the sections for removal or installation. The key sections thus retained by the jaws will be magnetically repellant and therefore will not influence each other during removing and installing operations.

When the tool is used to install the key sections, the latter are placed in the recesses of the jaws in the manner shown in Figure 3 and the handle members 10 may be manipulated to expand the jaws so that the key sections may be disposed one on each side of the valve stem. The magnetic influence of the jaws will hold the key sections against displacement during this operation.

To remove the key sections from the valve stem, the handle members 10 are provided with means to limit the closing action of the jaws 12. This means consists of a short arm 16, pivoted at 17 to one of the handle members 10 and displaceable to a position where it will enter a recess 18 in the companion handle member and thus hold the jaws in spaced apart relationship. The described means for accomplishing the foregoing or an equivalent means enables the jaws 12 to be held in spaced relation to the key sections in place on each side of the valve stem so that the sections will be independently attracted to respective jaws and thus removed from the valve stem.

It is clearly apparent from the foregoing that
the time ordinarily consumed in removing and installing valve stem keys may be reduced considerably and much of the painstaking effort removed. Also, the tool is effective to prevent loss and misplacement of valve keys which occurs frequently with less efficient tools.

Manifestly, the construction as shown and described is capable of some modification and such modification as may be construed to fall within the scope and meaning of the appended claims is also considered to be within the spirit and intent of the invention.

What is claimed is:

1. A tool for installing and removing the semi-cylindrical key sections of a valve, comprising a pair of jaws, each having a semi-circular recess for receiving a key section, the confronting recesses being formed with complementary lips for the alignment of said key sections, said jaws being composed of magnets, each having a flux path along a line connecting the poles of the magnet with an external path of generally semi-elliptical configuration also extending from one pole to the other and effective to attract individual key sections and to render the latter relatively repellant and means for actuating said jaws.

2. A tool as set forth in claim 1 in which the means for actuating the jaws consists of a pair of relatively pivoted handle members bent transversely of their longitudinal axes, an arm pivoted to one of said handle members and displaceable to a position for engagement with a recess in the companion handle member to hold said handle members in spaced apart relationship to limit the closing action of said jaws.

PAUL H. NASH.

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