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T. P. CARRAHER

2,548,289

VALVE RACK

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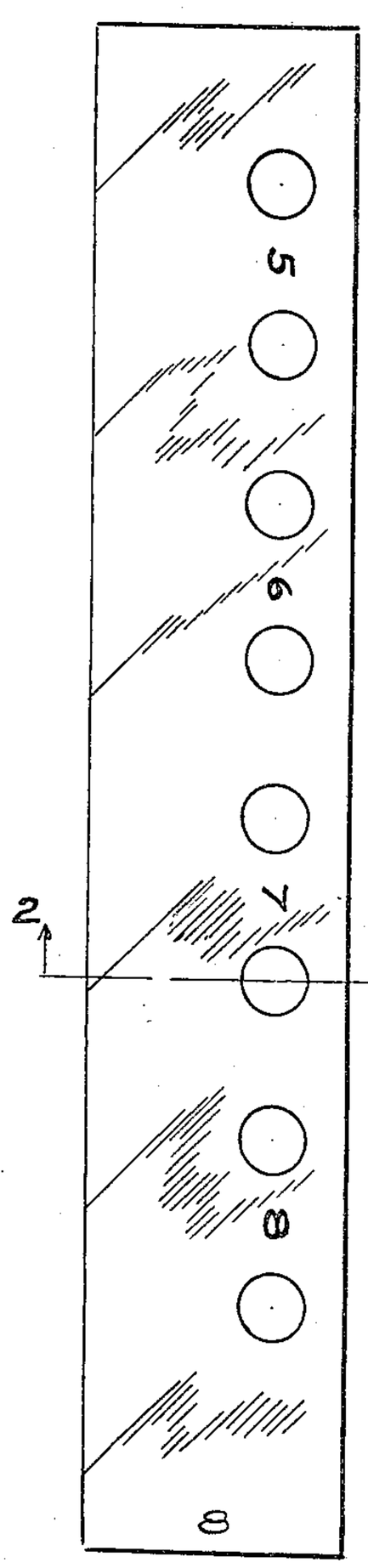

FIG. 3

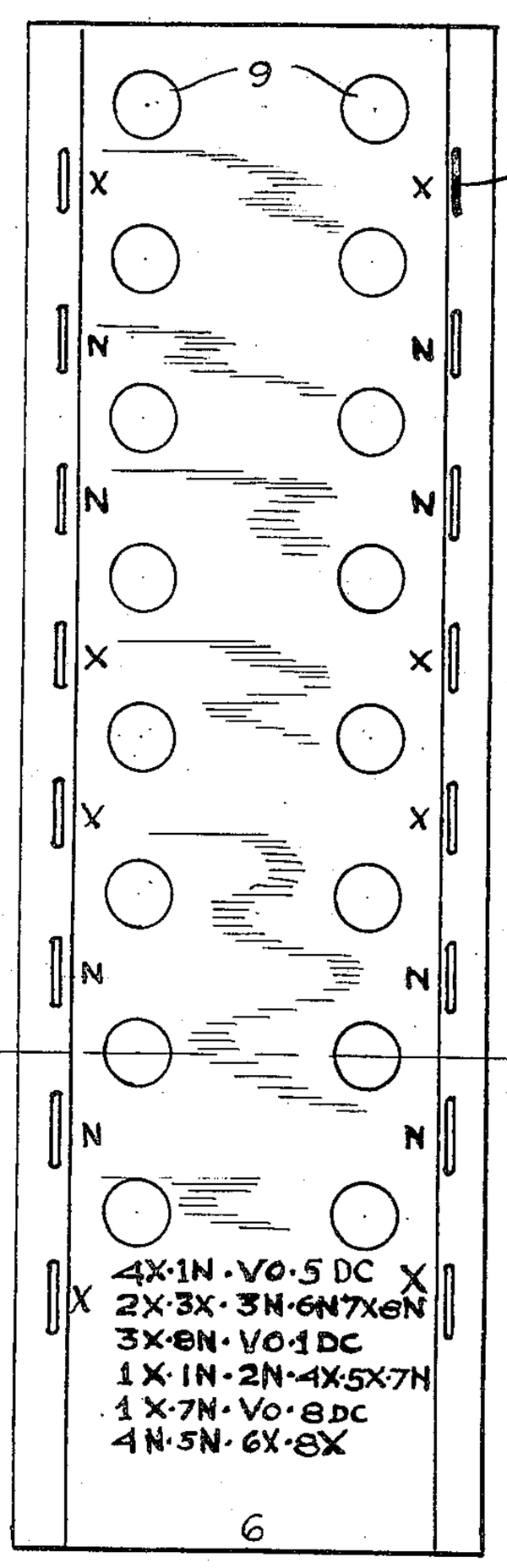

FIG. 1

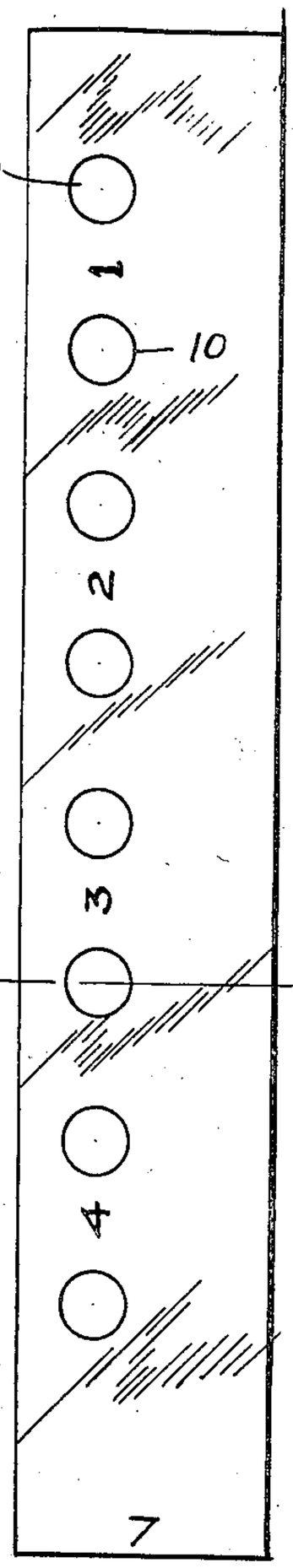

FIG. 4

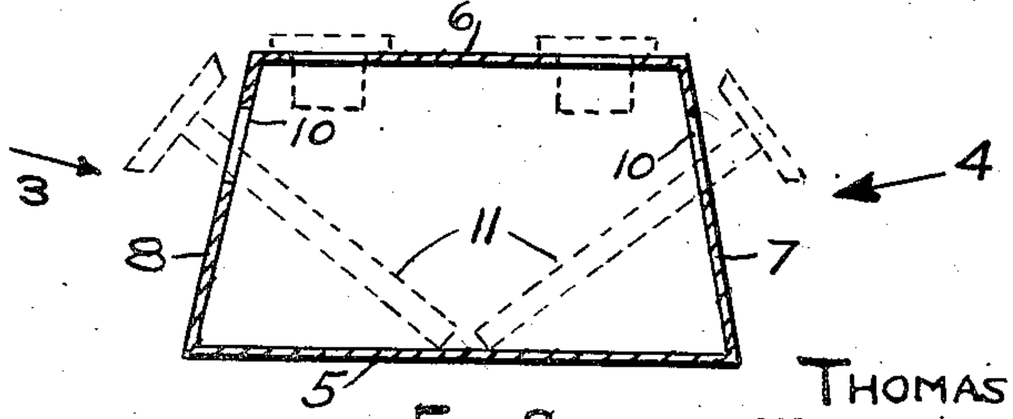

FIG. 2

INVENTOR.
THOMAS P. CARRAHER
BY
Martin E. Anderson
ATTORNEY

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VALVE RACK

Thomas P. Carraher, Denver, Colo.

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1 Claim. (Cl. 211—13)

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This invention relates to improvements in devices for supporting valves and valve guides in a predetermined order during a motor overhaul.

When internal combustion engines, for example, such engines as have eight cylinders, are taken apart for the purpose of repair, for instance, for the purpose of grinding the valve seats or otherwise, it is necessary that the valves and valve guide be repositioned in the places from which they were removed, as it sometimes happens that the valve stem and valve lifters are of slightly different lengths for the different cylinders.

It has been customary to provide a stick of wood with a number of holes through which the valves may be inserted when removed from the engine and thus kept in a predetermined order, enabling the mechanic to replace them in the exact order in which they were removed.

It is the object of this invention to produce a device of a simple construction that will facilitate the handling of the valves and valve guides and make it comparatively easy for the operator to replace them in their proper positions.

It is the further object of this invention to produce a device for the purpose specified which shall have printed or stamped therein a table by means of which the mechanic can determine exactly how the different pistons are to be positioned so as to expedite the insertion of the valves.

This invention can be most readily described and understood when reference is had to the accompanying drawing in which it has been illustrated in its preferred form, and in which:

Figure 1 is a top plan view of the device;

Figure 2 is a section taken on line 2—2, Figures 1, 3 and 4;

Figure 3 is a side elevation looking in the direction of arrow 3, in Figure 2; and

Figure 4 is a side elevation looking in the direction of arrow 4, in Figure 2.

The device which forms the subject of this invention is made from sheet metal of any suitable kind, preferably from a sheet of soft steel bent into the form of a trapezoid. The base of the trapezoid has been designated by reference numeral 5 in Figure 2 and the top has been designated by reference numeral 6, while the sides have been designated by reference numerals 7 and 8. Member 6 is the top and this is provided with a number of round openings 9 of the proper size to receive the valve guides. In the present embodiment the device is made more particularly for use with engines of the V-type, such as the Ford engine, but may, of course, be used with

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any other engine constructed in a similar manner. The holes 9 along the righthand edge of the top, when viewed as in Figure 1, are arranged in pairs, each pair corresponding to the two valves of number one cylinder. Arranged along the inclined side 7 is a series of eight holes that have been designated by reference numeral 10 and these are for the reception of the valves. It will be observed that the numeral 1 is positioned between the two upper holes 10 in Figure 4 and this indicates that they are for the reception of the two valves belonging to cylinder 1. On the top 6, the letter X indicates that the corresponding hole 10 is for the exhaust valve of cylinder 1, while the letters N indicate the intake valves. This arrangement identifies the valves for each of the four cylinders on one side of the V-block and a corresponding arrangement is provided for the valves and valve guides relating to the cylinders on the other V-block.

It will be observed that sides 7 have openings for eight valves corresponding to cylinders 1 to 4 and that side 8 has eight openings for the reception of the valves belonging to cylinders 5 to 8, the openings being identified as above explained.

In Figure 2, two valves have been indicated by broken lines and designated by reference numeral 11. It will be observed that they rest with the end of the valve stem on the inner surface of bottom 5 and that the valve stem is supported on the lower edge of openings 10. The valve guides have been designated by reference numerals 12.

When the mechanic removes the valves and valve guides from the engine block, he takes care to position the valves in the proper openings and the valve guides in the corresponding openings 9, in top 6. By means of this rack the mechanic can readily keep the valves and valve guides in such position that he will have no difficulty in repositioning them in the places from which they were removed and in this way a large amount of time and labor is saved.

As above stated, the valves are usually independently adjusted for clearness with respect to the valve tappets and unless they are replaced so as to cooperate with the tappet with which they were originally adjusted, it becomes necessary to readjust all of the valves. If this is not done, the mechanic must spend a lot of time testing to determine where each valve belongs. Although the valve guides are more readily interchangeable than the valves, it has been found desirable to so position these on the racks that they can be replaced in the exact position from which they

were removed and in which position they will cooperate with the valve belonging to that position.

The upper surface of the rack has a six-line table of abbreviations that instruct the mechanic in the best way of positioning the engine parts so as to facilitate the insertion and removal of the valves. Line 1 is as follows:

4X. 1N. VO. 5DC

which interpreted means "with number four exhaust valve and number 1 intake valve in valve open position and piston 5 in dead center." Line 2 is as follows: 2X. 3X. 3N. 6N. 7X. 8N which interpreted means "exhaust valves 2, 3 and 7 and intake valves 3, 6 and 8 may be removed or replaced with the engine positioned as in line 1."

Line 3 is as follows: 3X. 8N. VO. 1DC and designates the second position of the engine which, interpreted, is "position engine with exhaust valve 3 and intake valve 8 in valve open position and piston 1 at dead center."

Line 4, specifies the valves that may be removed or reinserted when the engine is positioned as in line 3 and reads: 1X. 1N. 4X. 5X. and 7N which, interpreted is "exhaust valves 1, 4 and 5 and intake valves 1, 2 and 7 may now be removed or replaced."

In line 5 from the top we find: 1X. 7N. VO. 8DC, which gives the third position of the engine, namely, "with number 1 exhaust valve and number 1 intake valve in valve open position and piston 8 on dead center."

The last line is: 4N. 5N. 6X. 8X, which means that in the third engine position intake valves 4 and 5 and exhaust valves 6 and 8 may be inserted and removed.

By following the directions, the mechanic finds that in the three engine positions, the valves designated are in the best position for removal and insertion.

The rack above described and shown on the drawing is very simple but greatly expedites and simplifies the removal and replacement of valves and guides. By means of this rack the danger of getting the valves mixed is obviated. The bottom 6 may be omitted, if desired, as its function is merely to give the rack greater rigidity and to support the ends of the valve stem.

Having described the invention, what is claimed as new is:

A rack for use in removal and replacement of valves and valve guides in engines, the valves being of the type having circular heads and elongated circular stems, and the valve guides being circular and provided with projecting flanges, comprising; an elongated member of sheet material having a top wall and a bottom wall disposed in parallel relationship and downwardly and outwardly diverging side walls, the member, in section, being trapezoidal in shape, pairs of transversely aligned openings in the side walls spaced apart at least as great as the diameter of a valve head and of a size at least as great as the diameter of a valve stem, said openings being closer to the top corners of the member than to the bottom corners, the side walls being spaced apart a distance such that a valve stem may rest in an opening with its free end resting on the bottom wall, transversely aligned pairs of openings in the top wall adjacent the top corners of such size as will receive a valve guide with the flange of the guide resting on the top wall and spaced from the flange on a transversely aligned valve guide, the last named openings being staggered with respect to the first named openings in such manner that portions of the valve guides adapted to extend downwardly within the member may be disposed within spaces between adjacent valve stems.

THOMAS P. CARRAHER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,933,495	Howard	Oct. 31, 1933
1,946,779	Conway	Feb. 13, 1934
2,172,172	Mount	Sept. 5, 1939

FOREIGN PATENTS

Number	Country	Date
76,857	Switzerland	July 1, 1918