Nov. 27, 1928. 1,693,129

R. C. WILLIS

VALVE SEAT REAMER

Filed March 11, 1925

Fig. 1.

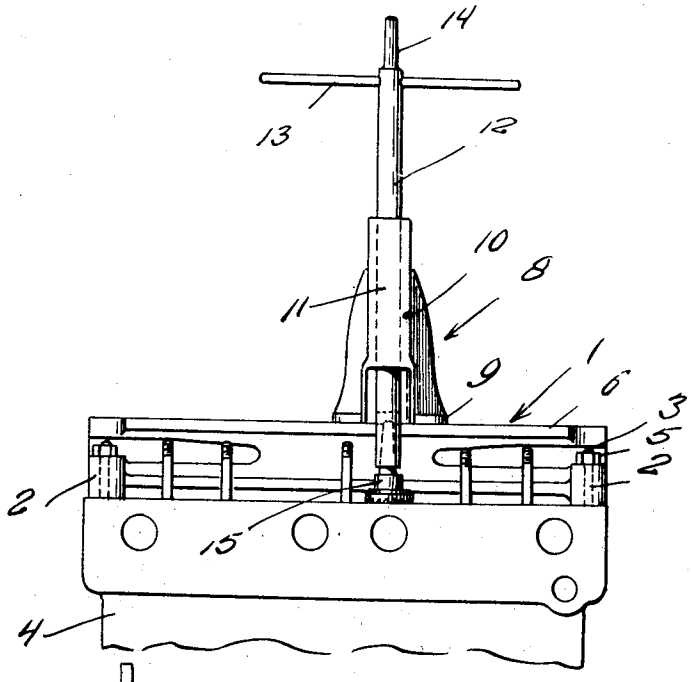



Fig. 2.

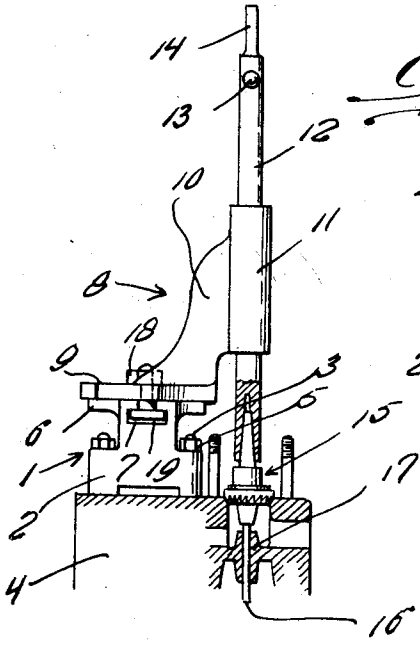
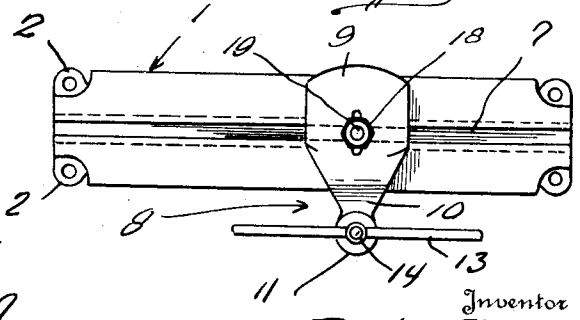



Fig. 3.




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# UNITED STATES PATENT OFFICE.

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## VALVE-SEAT REAMER.

Application filed March 11, 1925. Serial No. 14,740.

This invention relates to an improved tool designed for use in connection with internal combustion engines, the invention serving to permit accurate reaming of valve seating surfaces, and also for reaming a true surface in the bushing below the valve port commonly known as the "valve stem guide".

The improved reamer is particularly adaptable for resurfacing valve seats in that type of motor that has a removable cylinder head, and whose valve seats are cut directly in the cylinder block casting flush with the top of the block, and also for that type of motor that has a removable cylinder head with overhead valves, and whose valve seats are cut directly in the cylinder head castings.

Briefly described, the present improvement comprises a novel mounting which is clamped directly upon the top of the cylinder block after the head has been removed, there being a bracket slidably and adjustably supported upon this mounting, and this bracket constituting a carrier for an armor to which the reaming tool is connected, whereby to permit the reamer to be shifted longitudinally along the mounting to the desired point.

Accompanying the invention are numerous features and advantages derived from the particular construction and arrangement of parts briefly outlined, and these will become apparent from the course of the following description.

In the accompanying drawings, forming a part of this application, and in which like numerals are employed to designate like parts throughout the same:

Figure 1 is a side elevation of a portion of a conventional form of cylinder block, showing a reamer, constructed in accordance with the present invention, in place upon said block.

Figure 2 is an end elevation with portions broken away and shown in section to disclose the construction and method of operation more clearly.

Figure 3 is a top plan view of the device removed from the cylinder block.

Specifically described, the invention comprises a mounting 1 which is in the form of an elongated base. The base is made from a single casting and is provided on its under side and at its corners with bored lugs 2, adapted to permit passage of existing studs 3 on the cylinder block 4 therethrough, the same nut 5, which serves to maintain the head (not shown), in place, being threaded on the ends of the studs to maintain the base in place. The base is of a length corresponding to the length of the block to which it is attached, and it will naturally vary in size according to the particular block upon which it is to be used. The base is provided with a top plate 6, which must, of necessity, be extremely accurate and perfectly flat, so that it will be in strict parallelism, with the flat top of the cylinder block. Formed in the center of the top of this plate is a guide groove 7, which extends from end to end, and, in fact, through the opposite ends of the base. The cross section of the slot is indicated in Figure 2.

Cooperating with the base is what may be broadly designated as sliding bracket 8. This bracket includes a horizontally disposed flange 9, resting slidably upon the top surface of the top plate 6, and an upright 10. This upright is very sturdy in formation, and the upper end thereof is offset in a manner to project beyond one longitudinal side of the base. This projecting end carries a vertical arbor guide 11. The guide may be of any length to insure rigidity and to guard against possible lost motion, when the tool is in operation. A comparatively long cylindrical arbor 12 is provided and extends slidably through this guide, this arbor being provided at its top with an appropriate removable cross piece 13 forming handles and having a reduced upper extremity 14, capable of permitting attachment of appropriate power thereto. The arbor is provided at its bottom with a conical socket, for reception of the tapered shank of an appropriate seat reaming tool 15. This tool is provided with a depending stem 16, which functions as a centering pin, and is adapted for reception in an opening provided in the usual valve stem guide 17.

In practice, the head is removed from the cylinder block, and the base 1 is placed over the usual cylinders, the lugs 2 being fitted over the existing studs provided on said blocks. In this way, the base of the device is rendered truly level with the surface of the cylinder block. The valve being removed, any selected seat may be reamed or resurfaced, by placing the reamer in position, as shown in Figure 2, with the shank thereof fitted into the socket in the lower end of the rotatable arbor 12, and by placing the bracket 8 opposite the seat to be surfaced. After this particular seat has been acted upon, the nut 18 with which the bolt 19 is provided, is tightened, to maintain the bracket in adjusted po-

sition. Now, the bracket may be shifted upon the base to the next seat, and so on. In this way, it is entirely unnecessary to disassemble and remove any part of the reaming device, until all of the seats have been treated.

From the forgoing description, it will be seen that I have evolved and produced an exceedingly novel and practical valve seat resurfacing and reaming tool. The tool has been constructed in an effort to give greater accuracy in the work that it has been selected to do. The base is employed to elevate the bracket and cooperating parts above the top of the cylinder head and at a point above the upper ends of the studs. When the base is bolted tightly in position, it cannot move and it is level with the top of the block, consequently, being rendered fool proof, inasmuch as it cannot be mounted improperly. There is little, or no liability of disalignment, even if it is mounted upon a warped cylinder block. A construction of the kind specified entirely obviates the necessity of bodily moving the tool from place to place as each seat is reamed. The bracket including the upright and the guide constitutes a most important feature of the invention. Such a structure assures accuracy and perfect work. The upright of the bracket being very sturdy, it is almost impossible to bend it or get it more than one-thousandth of an inch out of alignment. Then, this upright, together with its horizontal seating and sliding flange being made of tool steel, and being bolted firmly in place will not give and will form an accurate combination of elements in positively assuring accuracy in operation. The operator may therefore carry out the operation in the shortest time possible, without fear of the formation of an improper seat.

The invention serves to accomplish numerous other advantages, but these need not be enumerated, it is thought. It is also thought that the foregoing description, taken in connection with the accompanying drawing will enable persons skilled in the art to which the invention relates to obtain a clear understanding of the same. Therefore, a more lengthy description is thought unnecessary.

Although the preferred embodiment of the invention has been shown and described, it is to be understood that minor changes coming within the field of invention claimed may be resorted to, if desired.

I claim:

A valve seat reamer adapted to be removably secured to a cylinder block comprising a base having a bearing surface substantially coextensive with the length of the block including the valve seats, the upper surface of the base presenting a surface at true right angles to the axis of the valve seats, a tool mounting comprising a bracket having a broad bearing on the base, a connection between the bracket and base to permit a free rotative movement of the bracket with respect to the base, said connection having slidable connection with the base on a line parallel to a line joining the valve seats, an elongated arbor guide carried by the bracket and disposed beyond one edge thereof to permit the guide to be arranged in direct axial alignment with any valve seat, said arbor guide in any position of adjustment being maintained at a direct right angle to the bearing surface of the base, and a tool arbor freely slidable and rotatable in the arbor guide and held against any tilting movement therein, the lower end of the arbor being formed to removably cooperate with a reseating tool, whereby with the bracket adjusted to dispose the arbor guide and valve seat in axial alignment, the tool is compelled to cut the seat at right angles to the surface of the head.

In testimony whereof I affix my signature.

REX C. WILLIS.