

May 30, 1944.

F. A. DEXTER

2,350,019

VALVE CUTTING TOOL

Filed Sept. 24, 1941

2 Sheets-Sheet 1

Fig. 1

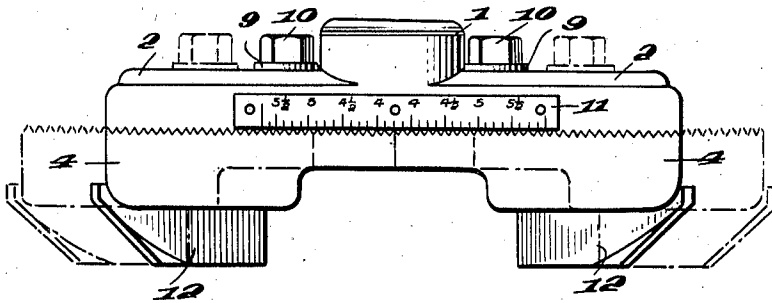


Fig. 2

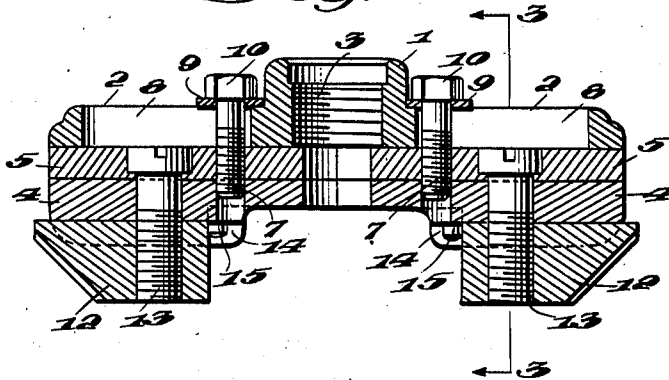
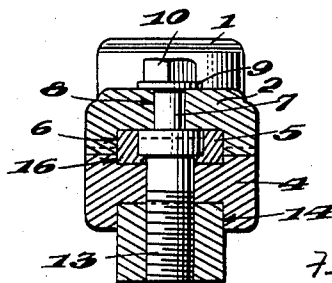


Fig. 3



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2 Sheets-Sheet 2

Fig. 4.

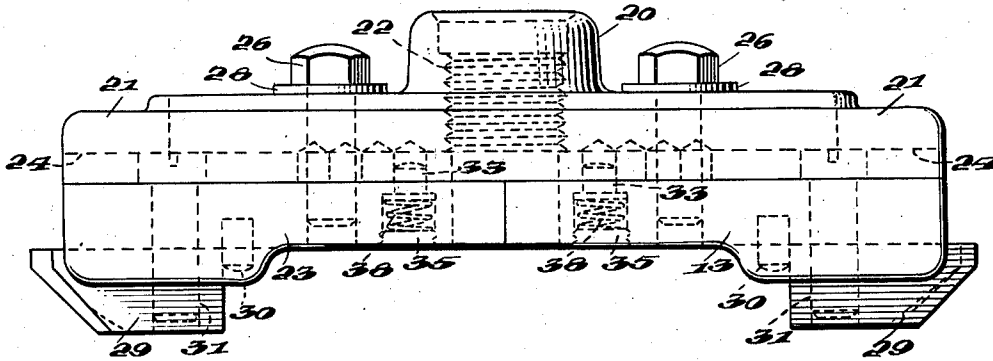


Fig. 5.

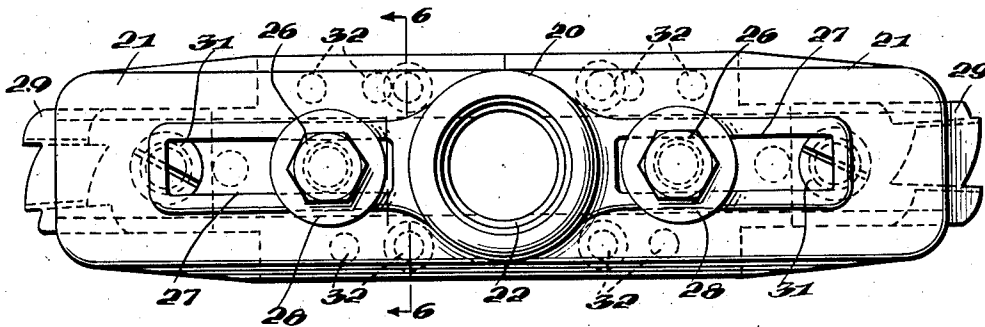
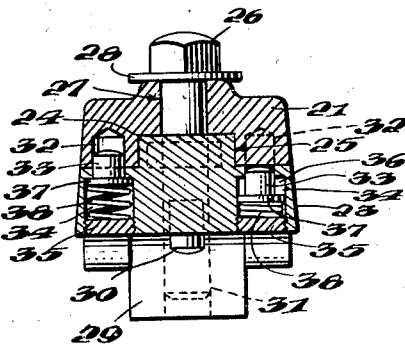


Fig. 6.



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UNITED STATES PATENT OFFICE

2,350,019

VALVE CUTTING TOOL

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Application September 24, 1941, Serial No. 412,189

4 Claims. (Cl. 29-105)

My invention relates to valve cutting tools and it has for its principal object to provide a tool which may be easily and quickly adjusted to fit the seats of valves of a great many different sizes.

The invention is particularly useful in cutting tapered seats of globe valves for, whereas in the past it has been necessary to stock a great variety of cutters since a separate cutter was required for each different sized valve, two identical cutters are all that is required for a tool embodying the present invention to cut the valve seats having the same degree of taper of all valves falling within a wide range of sizes.

A primary feature of the invention consists in providing the tool with a head having a plurality of arms on which cutter carrying members are respectively mounted for longitudinal adjustment, each arm and its associated member being provided with means whereby they may be selectively interlocked in a plurality of different positions of adjustment.

Another feature of the invention consists in providing the coating surfaces of the arms of the tool and of the cutter carrying members which are adjustable longitudinally thereof with toothed portions so that the members may be interlocked with their associated arms in a plurality of different positions of adjustment.

A further feature of the invention consists in providing the cutter carrying members with pins or the like which are selectively insertable within apertures in the under sides of the arms of the tool so that the members may be selectively interlocked with the arms in a plurality of different positions of adjustment.

Other and more specific features of the invention, residing in advantageous forms, combinations and relations of parts, will hereinafter appear and be pointed out in the claims.

In the drawings, illustrating preferred embodiments of the invention,

Figure 1 is a side elevational view of one form of the tool.

Figure 2 is a longitudinal vertical sectional view of the tool illustrated in Figure 1.

Figure 3 is a sectional view taken on line 3-3 of Figure 2.

Figure 4 is a side elevational view of another form of the invention.

Figure 5 is a plan view of the tool illustrated in Figure 4.

Figure 6 is a sectional view taken on line 6-6 of Figure 5.

Referring more particularly to the tool illustrated in Figures 1 to 3, inclusive, of the draw-

ings, 1 indicates the head of the tool which is provided with a plurality of arms 2 and with a centrally disposed screw threaded socket 3 whereby the tool may be easily attached to the lower end of a shaft (not shown) of conventional mechanism (also not shown) for imparting rotation thereto.

Mounted on the under side of each of the arms 2 is a cutter carrying member 4 which is provided with an upstanding rib 5 fitting within a groove 6 in the under side of the associated arm. Each cutter carrying member is adjustable longitudinally of the arm on which it is mounted and it is adapted to be secured in a desired position of adjustment by a screw 7 which has threaded engagement with the cutter carrying member and is movable longitudinally of the associated arm in a slot 8. Washers 9 are preferably interposed between the heads 10 of the adjusting screws 7 and the top surfaces of the arms 2 so as to bridge the slots 8 and thus enable the bolts to be firmly tightened without marring or defacing the upper surface of the arms.

As the cutting of valve seats requires precision of a high order, it is essential that the cutter carrying members are capable of being as immovably secured to the arms of the head of the tool as though they formed integral parts of the arms. Means is, therefore, provided for interlocking the cutter carrying members with the arms to prevent them from moving even the smallest amount longitudinally of the arms after being secured in a desired position of adjustment, transverse or lateral movement of the members with respect to the arms being effectively prevented by the ribs 5 which fit within the grooves 6 on the under sides of the arms.

In the form of the invention illustrated in Figures 1 to 3, inclusive, the means for interlocking the cutter carrying members against movement longitudinally of the arms consists of toothed or serrated portions formed on the under sides of the arms laterally of the grooves thereof and similarly formed toothed or serrated portions on the upper surfaces of the cutter carrying members laterally of the ribs thereof. The teeth on both the arms and the cutter carrying members are of the same shape and size and they are engageable with each other so that, after the screws 7 have been firmly tightened, the cutter carrying members are interlocked with the arms 2 and are thus effectively prevented from moving longitudinally of the latter. The distance between the teeth may be conveniently as small as a sixteenth of an inch so that a rather fine adjustment of

the cutter carrying members is possible, and to assist in adjusting the cutter carrying members for a valve of predetermined size a scale such as that indicated at 11 may be advantageously provided on the tool head, the particular scale illustrated being graduated in sixteenths of an inch and being for a tool whose cutters may be set for cutting valve seats ranging from $3\frac{3}{4}$ inches to $5\frac{3}{4}$ inches in diameter.

The cutter or cutting blades 12 are respectively secured by the members 4 by screws 13. The particular cutting blades illustrated in the drawings are for a tapered valve seat and they preferably fit within grooves 14 in the under sides of the members 4 with their inner ends abutting against stop pins 15 which are rigid with the members 4 and extend downwardly into the grooves 14. It will thus be seen that, although the cutters 12 are detachable from the members 4 so that cutters of varying design and taper may be applied thereto the means for securing the cutters to the members 4 is such as to rigidly and fixedly secure the cutters in place.

To enable the teeth to be easily cut in the upper surfaces of the cutter carrying members on opposite sides of the ribs 5 thereof, the ribs are formed as separate parts instead of being formed integrally with the cutter carrying members. To this end, the upper portion of each cutter carrying member is formed with a groove 16 for receiving the rib 5 which may be rigidly secured in place by the screw 13 employed for connecting the cutter to the member. The rib is, of course, not secured to the cutter carrying member until after the teeth have been cut on the upper surface thereof and, in the absence of the rib, the teeth may be easily and quickly cut.

In the form of the invention illustrated in Figures 4 to 6 of the drawings, the tool comprises a head 20 having radial arms 21 and a centrally disposed screw threaded socket 22 for receiving the lower end of an operating shaft (not shown). As in the form of the invention illustrated in Figures 1 to 3, inclusive, cutter blade carrying members 23 are mounted on the arms 21 for adjustment longitudinally thereof, each of the members having an upstanding rib 24 fitting within a groove 25 formed on the under side of the associated arm.

The cutter carrying members are adapted to be secured to the arms in a desired position of adjustment by screws 26 which have threaded engagement with the members but are movable longitudinally of the arms within slots 27. Washers 28 may be conveniently interposed between the heads of the screws 26 and the upper surfaces of the arms 21 so as to afford an extended bearing area for the screw heads.

Detachably secured to each of the cutter carrying members 23 is a cutter or cutting blade 29 of any suitable shape or configuration. The cutter which preferable extends into a groove formed in the under side of its carrying member with its inner end abutting against a stop pin 30 may be easily and rigidly secured to the member by a screw 31.

To selectively interlock each cutter carrying member with the arm on which it is mounted in a plurality of different positions of adjustment, each arm is provided on its under side with a plurality of sets of apertures 32 respectively disposed on opposite sides of the groove 25 thereof, the apertures on one side of the groove being arranged in staggered relation with the aper-

tures on the other side of the groove. Each of the cutter carrying members is provided with a plurality of pins or dowels 33, one for each set of apertures in the arm with which it is associated. However, as the apertures of the two sets of apertures of each arm are arranged in staggered relation with respect to each other, the pins or dowels 33 are movably mounted so that the pin for one set of apertures will not interfere with the insertion of the other pin in the apertures of the other set. To enable the pins to be easily forced into an inoperative position by contacting with the under surface of the arms, each is movably mounted within a recess or the like 34 which is adapted to be closed at one end by a removable plug 35 and is formed at the other end with a shoulder 36 affording an abutment for a peripheral flange 37 on the inner end of the pin. A compression spring 38 is interposed between the inner end of the pin and the removable plug 35 for normally maintaining the pin in an operative position, as shown at the left hand side of Figure 6. The spring, however, is of such strength that the coacting pin may be easily forced into an inoperative position as shown at the right hand side of Figure 6.

By providing the cutter carrying members with spring pressed pins for respectively cooperating with apertures arranged in staggered relation along opposite sides of the arms, the cutter carrying members may be interlocked in a greater number of different positions of adjustment with the arms than would be possible if each arm was provided with only a single row of apertures.

From the foregoing, it will be perceived that a simple and yet reliable valve cutting tool has been devised in which the cutter members may be adjustably secured in a most effective manner in a great many different positions of adjustment so that the tool may be readily used with a great many different sizes of valves. Those skilled in the art will readily perceive that various changes and modifications may be made in detail features of construction of the tool without departing from the spirit and scope of the invention as defined in the appended claims.

What I claim is:

1. An adjustable valve cutting tool including a head having a plurality of arms respectively provided on their under sides with grooves extending longitudinally thereof, cutter carrying members respectively mounted on and adjustable longitudinally of said arms, each of said cutter carrying members having a groove in its upper surface, an elongated member secured within the groove of each cutter carrying member and projecting upwardly therefrom into the groove on the under side of the arm with which the cutter carrying member is associated, each cutter carrying member being also provided with toothed portions on opposite sides of the elongated member secured thereto so that it may be selectively interlocked with the arm on which it is mounted in a plurality of different positions of adjustment, and means for detachably securing each of said cutter carrying members to its associated arm in a desired position of adjustment.

2. An adjustable valve cutting tool including a head having a plurality of arms respectively provided on their under sides with grooves extending longitudinally thereof, a longitudinally adjustable cutter carrying member mounted on each of said arms and having an upwardly extending rib fitting within the groove thereof, the under

side of each arm being provided with a set of apertures on each side of the groove thereof, the apertures of the set on one side of the groove being in staggered relation with the apertures of the set on the opposite side of the groove, spring pressed pins carried by each of said members for respectively cooperating with the sets of apertures in the arm with which the member is associated, the pins of each member being movable into inoperative positions so that when one of said pins is disposed within an aperture of one of the sets of apertures of the associated arm the other pin will assume an inoperative position, and means for detachably securing each of said members to its associated arm in a desired position of adjustment.

3. An adjustable valve cutting tool including a head having a plurality of arms, each of said arms having a groove extending longitudinally thereof on its under side, a cutter carrying member mounted on the under side of each of said arms and having an upstanding rib fitting within the groove thereof, the under side of each of said carrying members being provided with a longitudinally extending groove, a cutter disposed within the groove of each member and projecting beyond the outer end thereof, means having threaded engagement with each cutter and extending downwardly through the top wall of the groove in the member on which the cutter is mounted for detachably securing the cutter and member together, said members being respectively adjustable longitudinally of said arms and each of said members being provided later-

ally of the ribs thereof with means engageable with the arm on which it is mounted for selectively interlocking the member with the arm in a plurality of different positions of adjustment, and means for detachably securing each of said members to its associated arm in a desired position of adjustment.

4. An adjustable cutting tool including a head having a plurality of arms respectively provided on their under sides with longitudinally extending grooves, an adjustable cutter carrying member mounted on the under side of each of said arms and having an upstanding rib fitting within the groove thereof, the under side of each of said carrying members being provided with a longitudinally extending groove, a cutter disposed within the groove of each member and projecting beyond the outer end thereof, means having threaded engagement with each cutter and extending downwardly through the top wall of the groove in the member on which the cutter is mounted for detachably securing the cutter and member together each of said members respectively having transversely extending teeth on opposite sides of the rib thereof and the under surface of each of said arms having transverse teeth for coacting with the teeth of the member carried thereby so that said members may be selectively interlocked with their associated arms in a plurality of different positions of adjustment, and means for detachably connecting each of said members to its associated arm in a desired position of adjustment.

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