No. 738,854. PATENTED SEPT. 15, 1903.

F. L. SMITH.

TOOL HOLDER FOR MACHINES FOR CUTTING VALVE DISKS.

APPLICATION FILED JULY 21, 1902.

NO MODEL.

Fig. 4.

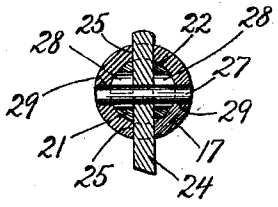


Fig. 1.

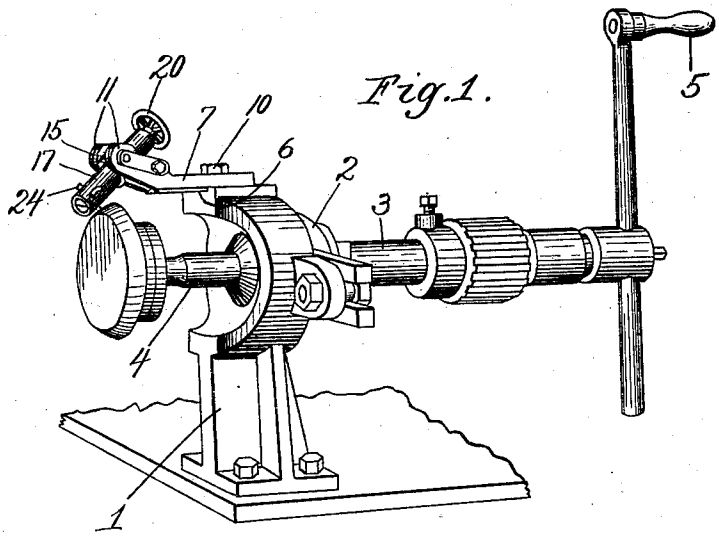


Fig. 3.

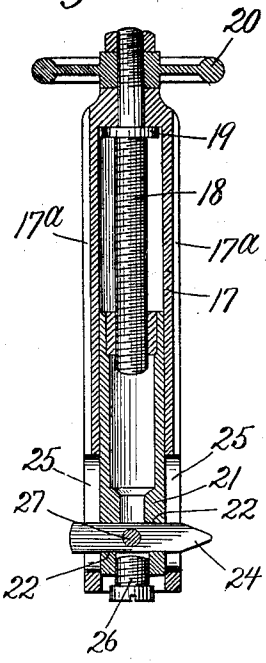


Fig. 2.

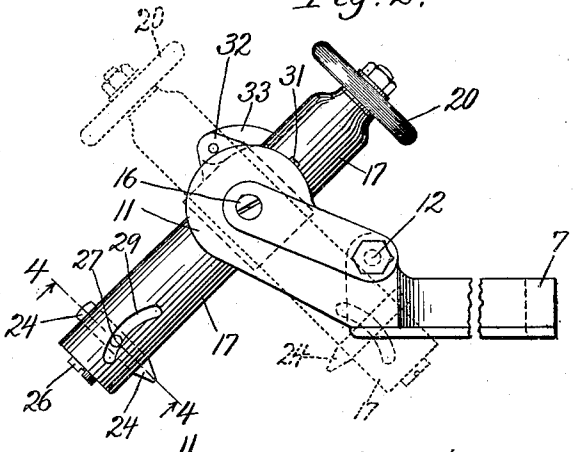


Fig. 6.

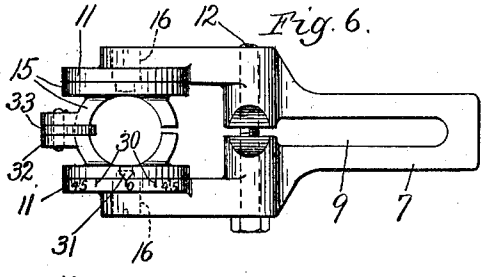
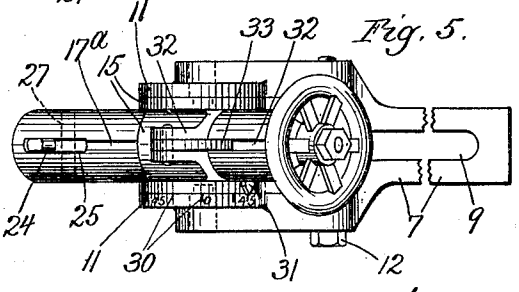


Fig. 5.



Witnesses.

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No. 738,854. Patented September 15, 1903.

UNITED STATES PATENT OFFICE.

FRANK L. SMITH, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO ALVA C. RICKSECKER, OF CHICAGO, ILLINOIS.

TOOL-HOLDER FOR MACHINES FOR CUTTING VALVE-DISKS.

SPECIFICATION forming part of Letters Patent No. 738,854, dated September 15, 1903.

Application filed July 21, 1902. Serial No. 116,325. (No model.)

To all whom it may concern:

Be it known that I, FRANK L. SMITH, a citizen of the United States, and a resident of Chicago, Illinois, have invented certain new and useful Improvements in Tool-Holders for Machines for Cutting Valve-Disks and Like Uses, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

The purpose of this invention is to provide an improved device for holding the cutting-tool in an appliance constructed and designed for recutting disk valves and for similar uses.

It is in detail designed for use in connection with my machine for cutting globe and gate valves and valve-seats, for which I obtained Letters Patent No. 682,368, dated September 10, 1901.

It consists in the features of construction set out in the claims.

In the drawings, Figure 1 is a perspective view of my valve-cutting apparatus provided with my improved tool-holder. Fig. 2 is a detail side elevation of the tool-holder. Fig. 3 is a detail axial section. Fig. 4 is a transverse section at the line 4 4 on Fig. 2. Fig. 5 is a plan view of the tool and holder. Fig. 6 is a plan view of the tool-holder, the tool being removed.

The bracket or standard 1 is designed to be mounted in any secure manner, and I have shown the entire machine of which said standard may be a part because so far as the use of my present improvement is concerned it is not necessary that the remainder of the machine be present. The bracket-plate 2, in which the chuck for holding the valve or disk to be cut is to be mounted, is bolted to the bracket 1, as seen in the drawings, and the collar or sleeve 3, which constitutes the exterior element of the adjustable bearing for the shaft or stem 4 of chuck, is screwed into said bracket-plate. The construction of this chuck-bearing and its capacity for adjustment are fully set out in my said patent of September 10, 1901, and I have not undertaken to illustrate the same in the drawings of this application. For the purpose of the present invention it is not material whether the chuck has the adjustment shown in said patent, and I have shown it, therefore, adjusted with its axis at right angles to the bracket-plate 2. It will be understood that by means of the crank-handle 5 the chuck and the valve or other part to be cut may be rotated.

The tool-holder is designed to be mounted upon the upper side of the bracket 1, a suitable channeled seat 6 being provided for it in that position.

The tool-holder comprises the bracket 7, which is adapted to be mounted in the channel-seat 6 and screwed rigidly, with the tool-holding parts overhanging as far as may be necessary to reach the work within the limits of adjustment afforded by the length of the seat and the bracket-base and the slot 9 in the latter, through which the clamping-bolt 10 takes to bind the bracket to this seat. The bracket comprises two parallel-faced ears 11 and is split in the plane between the ears from the forward end of the slot 9 to the forward end of the bracket, and the clamping-bolt 12, set through the two parts of the bracket, which is then rendered bifurcated, is adapted to draw the two ears toward each other. Between the ears there is mounted a block 15, pivoted on trunnions 16 16, which are set through the ears 11. The block is adapted to fit closely between the ears, so that a very slight tightening of the clamp-screw 12 binds the block tightly. Through the block, in line transverse to the action of the trunnions and in plane parallel with the face of the ears, there is formed a cylindrical aperture in which is lodged and adapted both to rotate and reciprocate the tool-holder barrel or sleeve 17. Journaled in the upper or rear end of the sleeve is the feed-screw 18, stopped against longitudinal movement by the shoulder 19 and the hub of the operating-handle 20. Within the barrel, fitting closely therein, is the tool-stock 21, axially apertured and interiorly threaded for engagement of the feed-screw 18, so that the rotation of the latter when the tool-stock is prevented from rotating causes said tool-stock to be actuated longitudinally in the barrel. The tool-stock has near its outer or lower end an aperture 22, through which the cutter 24 is inserted, the tool-holder barrel having slots 25 25 at opposite sides for the cutter, the length of the slots being such as to accommodate the maxi-

mum range of travel which the cutter is designed to have in doing its work. The cutter may be bound tightly in the stock by means of the screw 26, set through the end of the stock and impinging against the side of the cutter, forcing it back against the upper side of its aperture in the stock. This mode of securing the cutter will be employed when it is desired to cut a plain face, whether conical, cylindrical, or flat. For the purpose of adapting the tool to cut a crowning or concave face the screw 26 will be left slack, and the cutter will be held in place in the stock by means of pin 27, set through the stock and the cutter, the apertures 28 in the stock being elongated transversely with respect thereto, so that the cutter can travel in its seat transversely to the axis of its travel with the stock in the barrel, and to cause such transverse travel at proper rate and in proper direction to produce a curved seat, whether convex or concave, I provide in opposite sides of the barrel the slots 29 29, which are curved in the arc of a circle whose radius is that of the maximum disk for which a particular tool is adapted. For example, for a tool adapted to cut a valve up to four inches in diameter the slot 29 will be curved with a two-inch radius. The pin 27 enters the elongated slot at one side of the tool-stock, and the aperture in the cutter by being inserted through one of the curved slots 29 and is arranged to come tight by a slight taper in the cutter near the end, protrudes through the other curved slot, the ends of the pin being arranged so as not to protrude beyond the cylindrical surface of the barrel when it is thus tight in the cutter. By this construction it will be noticed that the form of the slot controlling the pin causes the pin to control the movement of the cutter transverse to the barrel and causes its cutting-point to traverse a curve corresponding to that of the curved slots 29, while it is advanced in the direction of the axis of the barrel by the action of the feed-screw.

The ears 11 11 are curved in the arc of a circle about the clamp-screw and graduated, as seen at 30, to indicate the angle of deflection, if any, of the axis of the barrel 17 from vertical position, an index or reading point 31 being pivoted on the similarly-curved periphery of the block 15. The point at which the axis of the barrel is vertical, so that the tool by being fed longitudinally will cut a plain face, is marked "0," and the scale is graduated both ways from that point, all desirable or common angles of work being marked. The bracket 7 and the block 15 are formed so as to permit a range of angular adjustment of the block in the bracket from the position at which the axis of the sleeve or barrel is inclined forty-five degrees inward—that is, back toward the standard 1—to a position at which the barrel extends horizontally, with the end carrying the tool projecting forward. This adapts the device to cut any face, either flat, concave, or convex, within a range of one hundred and thirty-five degrees, for it will be noticed that by rolling the barrel in the block the slots 29 may be made to stand either convex or concave to the face which is operated upon by the tool, and thereby said face may be given either curvature. In order to cause the tool at all times to project, as it should, radially with respect to the axis of the sleeve, I provide upon the surface of the latter at opposite sides longitudinal slots 17^a 17^a, and pivoted in a lug 32 on the upper side of the block 15 is a latch 33, which is adapted to be thrown down rearward into engagement with the slot 17^a, thus locating the sleeve in correct position before it is secured by the clamping-bolt 12.

It will be understood that the cutter may be secured in the tool-stock with its cutting end protruding in either direction, as required to reach the face to be cut.

In order that the sleeve may be clamped firmly in the block, so as not to move longitudinally nor rotate therein during the work, I slot the block through at the rear side, making it an open ring, the slot being in the fore-and-aft plane in which the bracket is bifurcated, so that the clamping-bolt which causes the bracket to bind the block tightly between the ears also causes the block to bind the sleeve firmly in position.

I claim—

1. In a machine of the character described, in combination with the rotatable work-holder, a tool-holder comprising a bracket mounted on the work-holder bearings; a block pivoted in such bracket, with capacity for angular adjustment in a plane radial to the work-holder axis; means for securing it in adjusted position; a sleeve which penetrates the block in a direction at right angles to its pivotal axis, and is rotatable and longitudinally movable in the block; the cutter, and the tool-stock carrying the same mounted in the sleeve and provided with means for moving it longitudinally therein to carry the cutter along the face of the work.

2. In a machine of the character described, in combination with the rotatable work-holder, a tool-holder comprising a bracket mounted on the work-holder bearings; a block pivoted in such bracket with capacity for angular adjustment in a plane radial to the work-holder axis; means for securing it in adjusted position; a sleeve which penetrates the block in a direction at right angles to its pivotal axis, and is rotatable and longitudinally movable in the block; the cutter, and the tool-stock carrying the same mounted in the sleeve and provided with means for moving it longitudinally therein to carry the cutter along the face of the work, the sleeve having a curved slot and the tool-stock having the aperture in which the cutter is mounted, elongated transversely with respect to the axis, the cutter being retained by a pin projecting into the curved slot of the sleeve,

whereby the cutter is moved longitudinally in direction transverse to the axis, as the stock is moved longitudinally in the sleeve.

3. In a machine of the character described, in combination with the rotatable work-holder, a tool-holder comprising a bracket mounted on the work-holder bearings, said bracket being bifurcated in a plane radial to the work-holder axis forming ears adapted to be clamped toward each other; a bolt for clamping them; a block pivoted in the bracket between the ears and adapted to be held by clamping the ears together, said block having capacity for angular adjustment about its pivot between said ears, said block and ears having on one part a graduated angular scale and on the other part an index or reading point traversing such scale as the block is adjusted about its pivot; and means mounted in the block for carrying the tool and advancing and retracting it in the plane in which the block has its angular adjustment.

4. In a machine of the character described, in combination with the rotatable work-holder, a tool-holder comprising a bracket mounted on the work-holder bearings; a block pivoted in such bracket with capacity for angular adjustment in a plane radial to the work-holder axis, and means for securing it in adjusted position; devices carried by said block for carrying the tool and for advancing and retracting it with respect to the pivotal axis of the block.

5. In a machine of the character described, in combination with the rotatable work-holder, a tool-holder comprising a bracket mounted on the work-holder bearings, a block pivoted in such bracket, with capacity for angular adjustment in a plane radial to the work-holder axis, and means for securing it in adjusted position; means carried by said block for carrying the tool and for advancing and retracting it with respect to the pivotal axis of the block, said means comprising a tool-stock; a tool carried thereby, with capacity for adjustment transversely with respect to said advancing and retracting movement, and a cam device which operates to guide the tool in said transverse direction as it is carried bodily back and forward in said advancing and retracting movement.

6. In a machine of the character described, in combination with the rotatable work-holder, a tool-holder comprising a bracket mounted on the work-holder bearings; a block pivoted to such bracket, with capacity for angular adjustment in a plane radial to the work-holder axis; devices carried by said block for carrying the tool and for advancing and retracting it with respect to the pivotal axis of the block, the block and the bracket having corresponding and laterally contiguous disks or lugs curved about the axis of their pivotal connection, one of said contiguous parts having a graduated angular scale, and the other part an index or reading point traversing such scale as the block is adjusted about the pivot, and means for securing it in adjusted position.

7. In a machine of the character described, in combination with a rotatable work-holder, a tool-holder comprising a bracket mounted on the work-holder bearing; a block pivoted to such bracket with capacity for angular adjustment in a plane radial to the work-holder axis; means for securing it in adjusted position; devices mounted on such block for carrying the tool, adapted to be rotated in the block about an axis in a plane at right angles to the axis of the block, and comprising means for advancing and retracting the tool with respect to the pivotal axis of the block.

8. In a machine of the character described, in combination with the rotatable work-holder, a tool-holder comprising a bracket mounted on the work-holder bearings; a block pivoted in such bracket with capacity for angular adjustment in a plane radial to the work-holder axis, and means for securing it in adjusted position; a sleeve which penetrates the block in a direction at right angles to its pivotal axis, said sleeve being rotatable and longitudinally movable in the block; the cutter and the tool-stock carrying the same mounted in the sleeve and provided with means for moving it longitudinally therein to carry the cutter along the face of the work, the sleeve having longitudinal grooves at opposite sides in the plane in which the cutter projects from the stock; and a latch mounted on the block adapted to be engaged with either of the grooves to retain the sleeve, as to rotation about its axis with the cutter, in the proper radial plane.

9. In a machine of the character described, in combination with the rotatable work-holder, a tool-holder comprising a bracket mounted on the work-holder bearings, bifurcated and provided with a clamping-bolt; a block pivoted in the bracket between the parts separated by the bifurcation, and adapted thereby to be clamped by the bolt, the block being apertured and slotted fore and aft, and a tool-carrying sleeve penetrating the block at said aperture, movable longitudinally and rotatable therein, and adapted to be clamped in the block by the bolt when the block is clamped in the bracket.

In testimony whereof I have hereunto set my hand, at Chicago, Illinois, this 7th day of July, 1902.

FRANK L. SMITH.

Witnesses:
CHAS. S. BURTON,
EDGAR L. CONANT.