E. L. MILLS & J. W. WHITFORD.

TOOL HOLDER.

APPLICATION FILED APR. 29, 1911.

**1,015,903.** Patented Jan. 30, 1912.

Fig. 4.

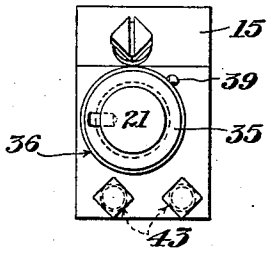



Fig. 1.

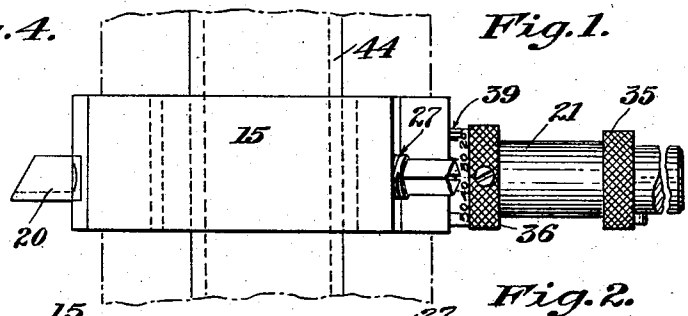



Fig. 2.

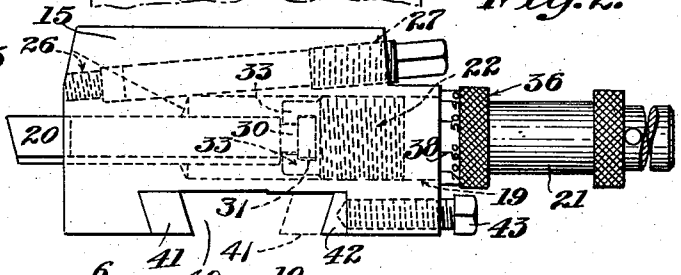



Fig. 3

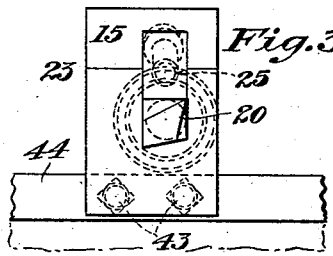



Fig. 6.

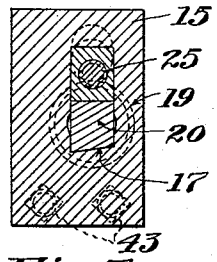



Fig. 7.

Fig. 5.

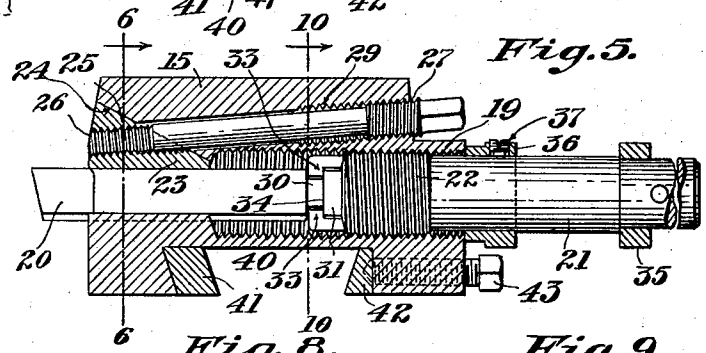



Fig. 8.

Fig. 9.

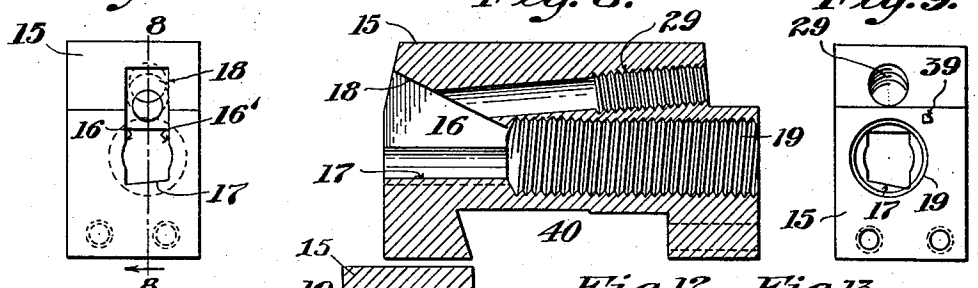
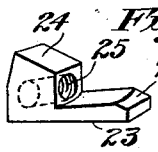



Fig. 11.



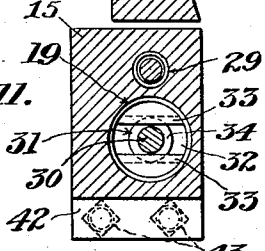




Fig. 10.

Fig. 12.

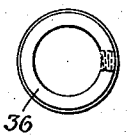
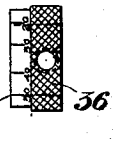



Fig. 13.

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Attorneys

# UNITED STATES PATENT OFFICE.

EDWARD LEWIS MILLS, OF FITCHBURG, MASSACHUSETTS, AND JOHN WALTER WHITFORD, OF JERSEY CITY, NEW JERSEY, ASSIGNORS TO FITCHBURG MACHINE WORKS, OF FITCHBURG, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

## TOOL-HOLDER.

1,015,903. Specification of Letters Patent. Patented Jan. 30, 1912.

Application filed April 29, 1911. Serial No. 624,201.

*To all whom it may concern:*

Be it known that we, EDWARD LEWIS MILLS and JOHN WALTER WHITFORD, residents, respectively, of Fitchburg, in the county of Worcester and State of Massachusetts, and of Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Tool-Holders, of which the following is a specification.

The present invention relates to tool holders for metal-working machines.

In the operation of turning a shaft, for example, it is desirable to retract the tool transversely of the shaft axis at the end of the feed stroke before moving the tool holder in the opposite direction with reference to the feed stroke so as to avoid scratching the turned surface of the work. In the course of turning a plurality of pieces of work of the same dimensions, it is, of course, absolutely necessary to locate the tool for each piece of work at the same distance from the axis of the work in every case.

The tool holder embodying the present invention is provided with means for adjusting the tool transversely of the axis of the work without moving the tool holder. The adjusting means includes an index whereby the tool after being withdrawn from its working position may be quickly and accurately adjusted again to its working position with relation to the holder.

A very common and very serious result of mounting a tool so that it may be adjusted with relation to its holder is the vibration of the tool when under stress due to inadequate means for securing the tool in working position.

One of the features of the present invention is improved means for holding the tool so as to prevent such vibration. The means for thus holding the tool comprises a wedge member arranged to engage one side of the tool near the cutting end and to hold the tool upon its seat in the tool block. The tool block is formed with a recess for the reception of the wedge member and is provided with an inclined face upon which a correspondingly inclined face of the wedge member is arranged to bear. The wedge member is adjusted by a screw which has two threaded portions, one of which engages the wedge member, and the other of which engages the tool block. The pitches of the two threaded portions are opposite, so that when the screw is turned the wedge member is moved in one direction or the other to release or clamp the tool. This means of securing the tool in the tool block is capable of adjustment so fine that vibration of the tool may be prevented without binding the tool in the tool block enough to prevent advancement or retraction of the tool.

Other improvements in construction are illustrated upon the drawings and hereinafter described.

Of the accompanying drawings which illustrate one form in which this invention may be embodied: Figure 1 represents a top plan view of the complete tool holder. Fig. 2 represents a side elevation thereof. Fig. 3 represents an elevation of the end from which the tool projects. Fig. 4 represents an elevation of the opposite end of the holder. Fig. 5 represents a longitudinal vertical section of the holder. Fig. 6 represents a transverse vertical section on the plane indicated by line 6—6 of Fig. 5. Fig. 7 represents an elevation of one end of the tool block stripped of all its fittings. Fig. 8 represents a longitudinal vertical section of the tool block as indicated by line 8—8 of Fig. 7. Fig. 9 represents an elevation of the opposite end of the tool block from that shown in Fig. 7. Fig. 10 represents a transverse vertical section, as indicated by line 10—10 of Fig. 5. Fig. 11 represents a perspective view of the wedge member which bears upon the tool. Fig. 12 represents an end elevation of an index collar for adjusting the tool. Fig. 13 represents a side elevation of said collar.

The same reference characters indicate the same parts wherever they occur.

The tool block indicated at 15 is formed with a horizontal recess which extends entirely through it from front to rear, one end of said recess having parallel vertical faces 16, 16′, a laterally inclined bottom face 17, and a longitudinally inclined top face 18. The other end of the recess is screw-threaded, as indicated at 19. The space surrounded by the faces 16, etc., is for the reception of a cutting tool 20, and the screw-threaded portion 19 is for the reception of an adjust-

ing member 21 which is screw-threaded as indicated at 22. The tool 20 is adapted to slide freely between the faces 16 and 16′. The bottom face of the tool is inclined to correspond with the face 17 upon which it is seated. The face 17 and the coactive face of the tool are inclined in the manner illustrated in order to utilize the downward stress of the work to keep one side of the tool pressed against the face 16. The tool is held upon its seat 17 by a wedge member shown by Figs. 5, 6, and 11. The face 23 of the wedge member is arranged upon the upper side of the tool, and the face 24 of said member is inclined and coacts with the inclined face 18 in the tool block. The wedge member is provided with a screw-threaded hole 25 for the reception of one end of an adjusting screw. The adjusting screw, as shown by Fig. 5, has two screw-threaded portions,—one indicated at 26 and the other at 27. The portion 26 is adapted to coöperate with the wedge member, and the portion 27 is adapted to coöperate with a screw-thread 29 in the tool block. The pitch of the thread 26 is opposed to that of the thread 27, and the wedge member is moved positively in either direction when the screw is correspondingly turned in the tool block.

The adjusting member 21 and the inner end of the tool 20 are formed with integral portions adapted to coact with each other to advance or retract the tool when the adjusting member is turned in the tool block. The inner end of the tool is grooved to provide a cylindric neck 30 and a head 31. The head is also cylindric and is fitted in an undercut transverse groove 32 in the adjacent end of the adjusting member 21. The head 31 is held seated against the adjusting member 21 by the transverse faces of the flanges 33 which engage the inner face 34 of the head. The tool is thus directly engaged by the adjusting member while the latter is adapted to rotate by reason of the formation of the inter-engaged portions. The head 31 of the tool is, of course, inserted in the end of the adjusting member before being inserted in the tool block, and the tool and adjusting member are then inserted together through the screw-threaded end of the recess in the tool block.

The shank of the adjusting member 21 is preferably cylindrical and finished smooth. Its outer end is provided with a knurled collar 35 by which it may be manually rotated. An index collar 36 is fitted loosely upon the shank between the collar 35 and the threaded portion 22. The index collar is provided with a setscrew 37 which is adapted to engage the smooth shank to fasten the collar at any desired position, both longitudinally and rotatively with relation to the shank. The collar 36 is provided with suitable marks 38 dividing its periphery into the desired number of divisions. An index pin 39 projects from the tool block at a point where it is adapted to overlap the graduated portion of the index collar to coöperate therewith in gaging the rotation of the adjusting member.

In practice, the index is used as follows: When the tool is to be used for turning a number of pieces of work of the same dimensions, it is first located with relation to the tool block by experimenting until the desired position is found. The index collar is then slipped along the shank of the adjusting member until it abuts against the end of the tool block. The collar is then turned about the adjusting member until the desired mark upon the index 38 registers with the index pin 39. The index collar is held in this position against the tool block while the setscrew 37 is tightened. A permanent indication of the desired position of the tool is thus secured. After the tool has been presented to the work and has performed its operation, the adjusting member 21 is rotated so as to withdraw the tool from the work before the tool block is moved in the opposite direction with relation to its feeding stroke. When the adjusting member 21 is rotated to retract the tool, the index collar 36 is correspondingly retracted and is also rotated with relation to the tool block. When the next piece of work is in position to be engaged by the tool, the attendant has merely to turn the adjusting member 21 to advance the tool. An attendant having even a slight experience with the adjusting device may be able to determine at a glance whether the space between the index collar 36 and the end of the tool block is more or less than the lead or pitch of the screw-thread 22. If the space is appreciably greater than the lead of the screw, the adjusting member 21 may be turned rapidly until the space is reduced to less than the lead of the screw, without fear of displacing the index collar and losing the desired indication. When the space between the collar and tool block is less than the lead of the screw, the attendant may give his sole attention to the selected index mark upon the collar, taking care to turn the adjusting member only so far as to move the selected mark into line with the index pin 39. In this way the tool may be returned with the utmost precision to the desired position without depending upon the attendant's sense of touch as would be the case if the adjustment were repeated by rotating the adjusting member until rotation were arrested by the collar 36 abutting against the tool block. The tool block is adapted to be mounted upon a suitable feed carriage. For this purpose a dovetail groove 40 is formed in the bottom of the

block and is occupied by gibs 41 and 42. The gib 42 is engaged by screws 43 threaded in the tool block. When the tool block is mounted upon a feed carriage having a dove-tail guide 44 adapted to fit between the gibs, the tool block may be securely fixed upon said guide by turning the screws 43 to cause the gib 42 to clamp the guide.

The provision of two gibs in the form shown is an important feature of the tool block and adapts the same to work of relatively great or relatively small diameter. For example, the gib 41, in the position shown by solid lines, advances the tool block toward the work so that the tool need not project unduly from the block when working on a small diameter. This insures rigidity of the tool. But for a relatively large diameter, retraction of the tool alone might not leave the required space for the work. The gib 41 may be shifted from the position shown by solid lines to that indicated by dotted lines (Fig. 2) and in this way the tool block is shifted away from the work. The gibs, when arranged one against another upon the same side of the guide, are as effective in binding the block upon the guide 44 as when they are disposed on opposite sides of the guide.

We claim:

1. A tool carrier for metal-working machines, comprising a block having a socket for the tool, said socket having an inclined face, a wedge member arranged to slide on said inclined face and engage the tool to hold it against its seat, said block and wedge member having internal screw threads of different pitch, and an adjusting screw having external screw threads operatively engaging said threads of the block and said wedge member for tightening and releasing said wedge member.

2. A tool carrier for metal-working machines, comprising a block having a socket extending through from front to rear, a tool fitted into one end of said socket, an adjusting screw threaded into the other end of the socket, said tool and screw abutting against each other in end to end relation, and having integral complemental portions adapted to be interengaged to transmit forward and backward movement to the tool, and to permit rotation of the screw.

3. A tool carrier for metal-working machines, comprising a block having a socket extending through from front to rear, a tool fitted into one end of said socket, an adjusting screw threaded into the other end of the socket, the inner end of said tool having opposed transverse faces, and the inner end of said screw having means adapted to be interengaged with said faces to position said tool longitudinally, said faces and said means being adapted to permit rotation of said screw.

4. A tool carrier for metal-working machines, comprising a block having a socket extending through from front to rear, a tool fitted in one end of said socket, an adjusting screw threaded in the other end of said socket, means connecting said tool and screw whereby said tool may be advanced and retracted, a collar arranged to turn and slide on the outer end of said screw, said collar having a mark upon its exterior, an index on said block adapted to coöperate with said mark, and means for securing said collar upon the screw.

5. In a metal-working machine, a feed carriage, a tool block mounted on the carriage, one of said members having a groove and the other having a guide considerably less in width than said groove, means carried by one of said members for acting against one side of said guide to draw the tool block laterally against the opposite side of the guide, and a filling piece adapted to be interposed between said means and one side of said guide, or between the opposite side of the guide and the confronting face of the tool block, whereby the block may be secured in different positions with relation to said carriage.

6. The combination with a tool block, of a tool and adjusting member therefor, said block having a socket open at both ends for the reception of the tool and screw, one end of said socket having faces upon which the tool may slide longitudinally, the other end of said socket having an internal screw thread for coöperation with an external thread on said adjusting member, said tool and adjusting member being adapted to abut against each other in end to end relation, the tool having a groove near its inner end whereby it is provided with a head and neck and a transverse face at the inner side of the head, and said adjusting member having a transverse undercut groove in its inner end whereby it is provided with a socket for the head of the tool, and with transverse flanges adapted to occupy the groove of the tool and couple the tool and adjusting member so that the adjusting member may be turned about its axis.

In testimony whereof we have affixed our signatures, in presence of witnesses.

EDWARD LEWIS MILLS.
JOHN WALTER WHITFORD.

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Witnesses to J. W. W.:
LEON ERVIN,
WILLIAM RANKIN.