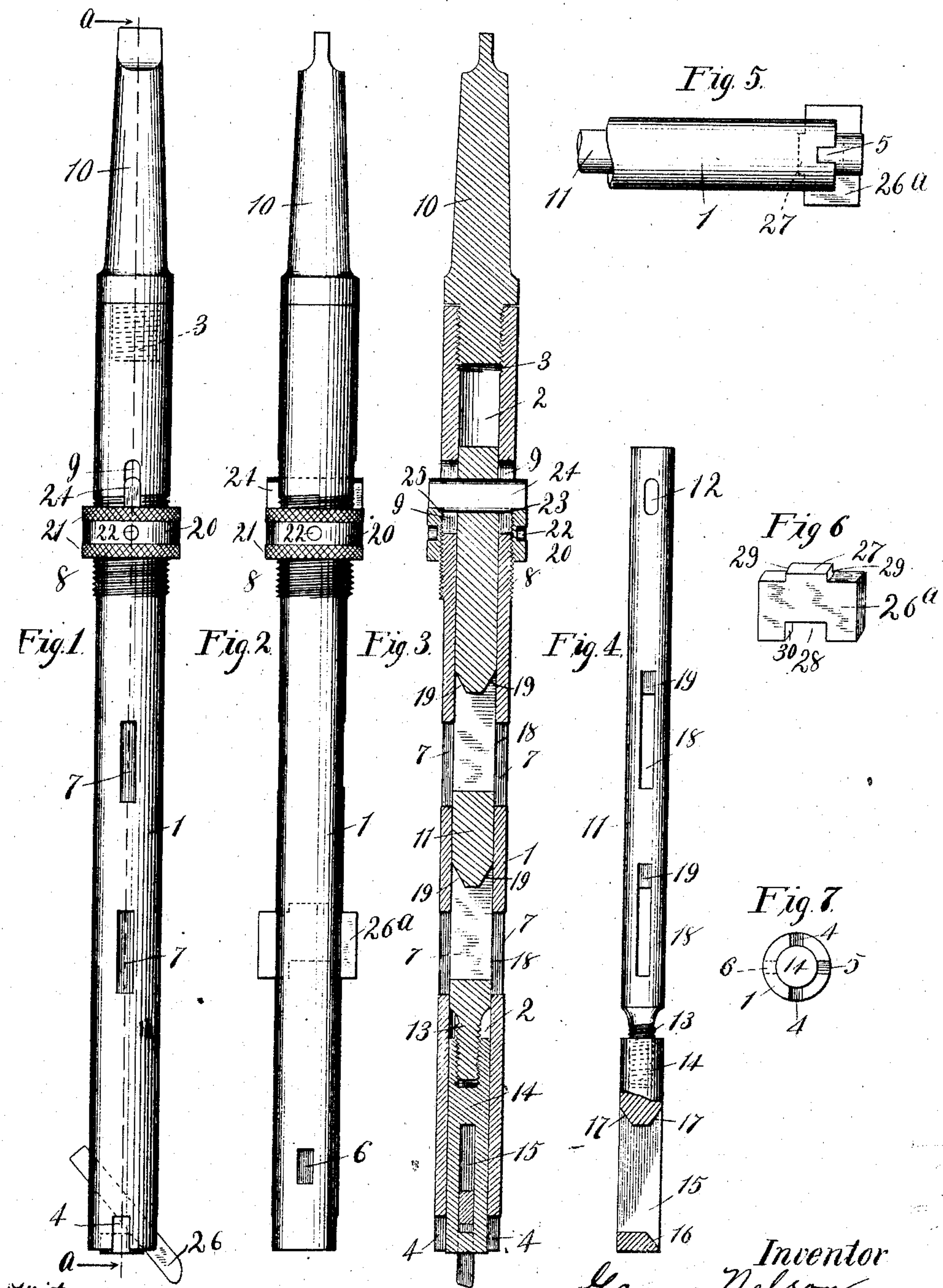


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G. NELSON.
TOOL HOLDER.

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UNITED STATES PATENT OFFICE.

GEORGE NELSON, OF CHICAGO, ILLINOIS.

TOOL-HOLDER.

No. 874,027.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, GEORGE NELSON, citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Tool-Holders, of which the following is a specification.

My invention relates to tool holders and especially to that class of devices adapted for universal use in the various machines designed for metal cutting such as lathes, drill presses, vertical and horizontal boring mills.

Important objects of my invention are to provide a device for securely and properly holding a larger variety of cutting tools of different sizes and patterns than is possible with holders heretofore constructed; to enable the cutting tools to be held at various angles and to permit a tool to be changed without moving the holder or bar from its position in the machine or altering the relation of the cutting edge to the work.

Another object of my invention is to afford means for automatically centering tools of certain forms.

One great advantage of my improvement is the securing of a maximum strength and rigidity with a minimum weight, which is accomplished by so relating the structural parts that the strain of the work will be borne by the main body of the holder instead of by the cutting part or tool, as is usually the case.

Another advantage lies in the method of securing a tool in position in the holder which insures that the strain put upon the draw bolt when a wrench is used to lock a tool in place will be borne by the strongest portion of the device.

In the accompanying drawing which forms a part of this application:—Figure 1 shows my improved holder with a cutting tool secured in an oblique position; Fig. 2 shows the holder turned 90° from its position as seen in Fig. 1, and with a self-centering double-end cutting tool secured therein; Fig. 3 is a longitudinal section of Fig. 1, on the line *a—a*; Fig. 4 is a view of the draw-bolt with a portion broken away to show the formation of the slot in the auxiliary head; Fig. 5 is a fragmentary view in elevation of the slotted end of my improved tool-holder with a self-centering double-end cutter held therein; Fig. 6 is a detail of a self-centering double-end cutter, and Fig. 7 is an end view of my improved

tool-holder showing the relative positions of the end slots.

Similar characters of reference indicate corresponding parts in the several figures.

Referring more particularly to the drawings, 1 represents a hollow cylindrical steel bar having a bore 2 of uniform diameter throughout its length, and furnished with internal threads 3 at its holding end and a series of slots 4, 4, 5, and 6, at its operative end, two of said slots 4, 4, being open and cut in opposite sides of the bar so as to register each with the other. The ends of the slots 4, 4, are formed at right angles to the longitudinal axis of the bar. The inner end of the slot 5 is cut at an oblique angle with the said axis and a short distance from the end is a slot 6 which extends through one side only of the bar.

At points between the ends of the bar are cut a plurality of elongated slots 7 extending therethrough, the slots in one side of said bar registering with the slots in the opposite side. These slots are shown of equal dimension, but I do not wish to be limited to the precise form indicated since it is evident that they may be made of various shapes and angularity so that various cutting tools may be held in different oblique positions as well as at right angles to the longitudinal axis of the bar. Throughout a portion of its length the bar is externally threaded as at 8 the bar being formed with a sufficiently greater cross-diameter at this point for that purpose. A longitudinal slot 9 is cut through both walls of the bar, said slot for a portion of its length being within the threaded portion 8 and extending therefrom into the unthreaded portion of the cylinder.

For use in certain class of machines I provide a tapered shank 10 externally threaded to engage the internal thread 3 in the bar. By means of this shank the holder can be rigidly held in the machine, and at the same time the length of the bar is materially increased. Fitting within the bore of the bar is a draw bolt 11 which is furnished near one end with a slot 12 and at its opposite end is reduced in diameter and on such reduced portion is cut a thread 13 to receive an auxiliary head 14 in which is cut a longitudinal slot 15 one end wall of which is cut away to form an oblique face 16, while at its opposite end the slot has two oblique faces 17. Intermediate the ends of the draw bolt are elongated slots 18.

gated slots 18 one end wall of each slot having oblique faces 19. The said auxiliary head is an important feature of my invention since it can be turned in either direction to
 5 bring its slot 15 into alignment with the various slots in the bar and also permits of adjustment for different sizes of cutters. Another advantage of this construction is the facility it affords to vary the length of the
 10 draw bolt for any purpose whatever.

A nut 20 travels on the external threaded portion 18 of the bar and has knurled faces 21 to afford a grasp for the fingers and holes 22 to receive the lugs of the ordinary spanner
 15 wrench. The threads of the nut are cut away for a short distance at one end to form an annular recess 23. A key 24 fits closely the slot 12 in the draw-bolt, through which it passes, projecting at each end through the
 20 slots 9 in the bar sufficiently to permit engagement with the nut 20. The key 24 is faced on one edge near each end to form shoulders 25 to engage with the said recess 23 on the inside of the nut 20. This method
 25 of putting traction upon the draw-bolt to hold the tool securely is of very great advantage. The comparatively large diameter of the nut and its frictional surfaces form a firm grasp for the hand and it can be rapidly op-
 30 erated so that a wrench need be used for only part of a turn to loosen or tighten the screw. As the thread 8 is cut upon the outside of the thickened walls of the bar the latter is not
 35 weakened thereby, and being placed near the shank this part of the device is convenient for manipulation while the tool is in the machine and will not interfere with the work being performed.

In order to permit the insertion of a cutting tool, the nut 20 is turned back until the
 40 key 24 is released sufficiently to allow the draw-bolt to be drawn outwardly until the lower end of the auxiliary head of the draw-bolt protrudes when any needed adjustment
 45 in the length of the draw bolt may be accomplished by turning the auxiliary head on its axis or the key may be entirely withdrawn from its slot in order to facilitate the adjustment.

50 If it is desired to use a single cutter tool at the end of the holder the draw-bolt is screwed toward such end sufficiently to allow the tool to be placed in position—in the slots 4, 4, if it is to be used at right-angles to the holder or
 55 in the slots 5 and 6 as shown in Fig. 1, when an oblique position is required.

In order to hold the tool 26 firmly in place the draw bolt is so adjusted that the slot 12 will register with the slot 9, the key 24 then
 60 inserted and the nut 20 turned until the recess 23 engages the shoulders 25 of the key, thus drawing upon the draw bolt and preventing the key 24 from working loose during the use of the tool. For the purpose of
 65 tightening the tool more securely than can

be done by the hand the nut 20 is fashioned so that some form of wrench can be used thereon.

In order to use a tool at a median position in the holder the key 24 is released or removed
 70 by loosening the nut 20 and the draw-bolt moved until the required tool can be inserted in the registering slots. The key is then replaced, if it should have been entirely removed, and the tool firmly secured in position
 75 by means of the nut 20 in the manner hereinbefore described, no adjustment of the auxiliary head being required in such case.

It will be noticed that no rotary adjustment is required in order to cause the slots 7
 80 and 18 to register when the key 24 is simply loosened by retracting the nut 20, the longitudinal adjustment, which is governed by the width of the key in relation to the length of the slot 9 in the cylinder, being usually suffi-
 85 cient to accomplish the desired adjustment.

The use of a tool in an oblique position at the end has the advantage that the cutting edge projects sufficiently to give an advance
 90 cut when operating.

A double end cutter 26^a is shown in Fig. 2 in a median position. It is also seen in Fig. 5 placed at the end of the cylinder where it engages the slots 4, 4, and held in position by the auxiliary head. This tool is automatic-
 95 ally centered by means of a shoulder 27 and a recess 28. The shoulder 27 has its edge faces 29 formed to fit the bore of the cylinder and the inner faces 30 of the recess are adapted to receive that portion of the draw-bolt
 100 adjacent to the slot in which the tool may be inserted. When this tool 26^a is used at the end of the holder it has the advantage of giving an advance cut as in the case of the straight single cut tool 26 held obliquely, and
 105 as the centering shoulder 27 is formed on the side opposite to the cutting edge the tool may be sharpened and in time entirely worn out without destroying its self centering features.
 110

It is obvious that many changes may be made in the form and construction of my device without departing from the spirit thereof, but

Having thus described my invention, I
 115 claim as new and desire to secure by Letters Patent the following:

In a tool-holder, the combination with a slotted bar and a slotted draw-bolt fitting the internal bore thereof, of means for vary-
 120 ing the length of said draw-bolt and means for adjusting said draw-bolt relatively to said bar, in one direction.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE NELSON.

Witnesses:

H. DELOS HIGMAN,
 F. BENJAMIN.