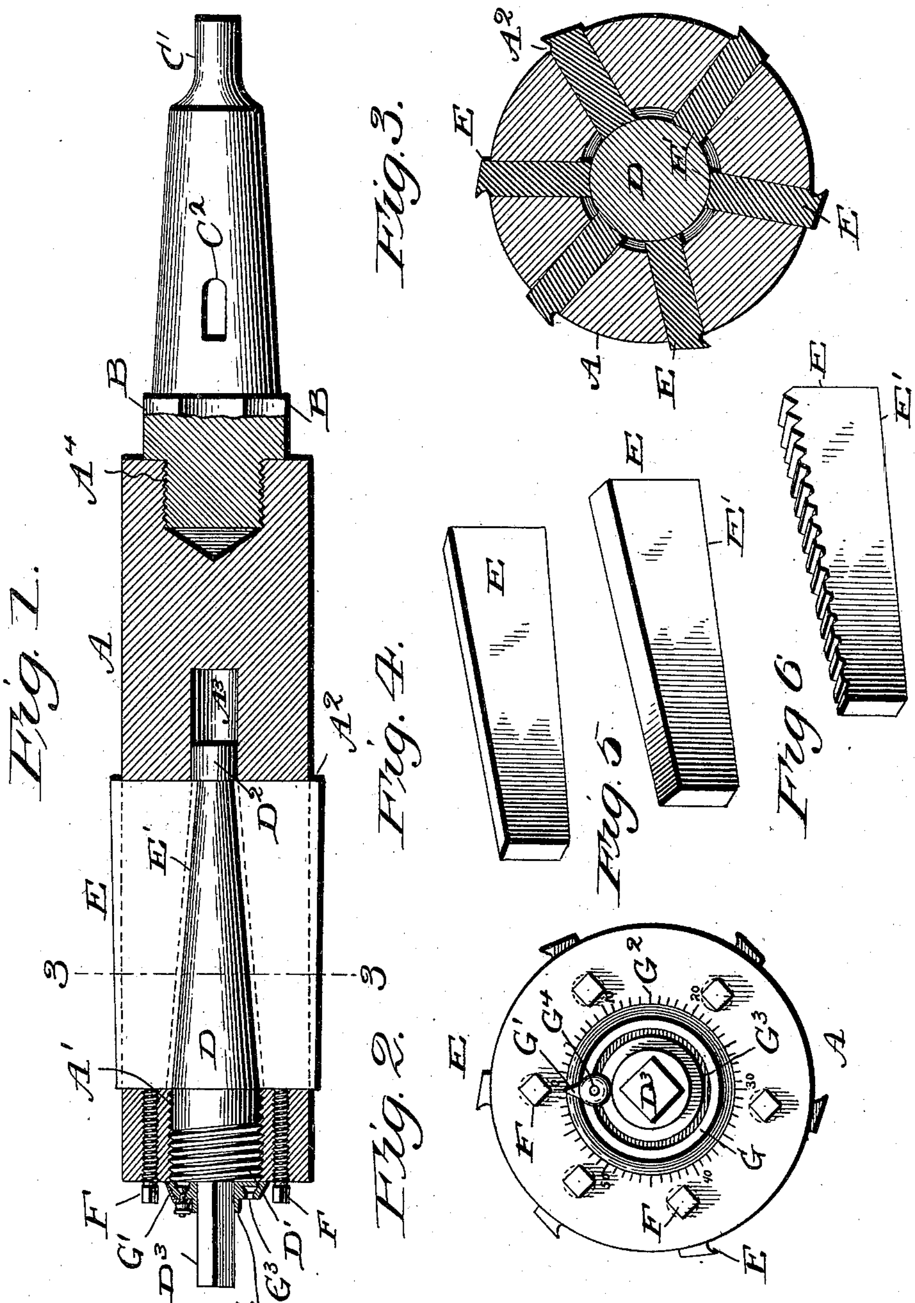
No. 627,098. Patented June 20, 1899.

W. D. CLUGSTON.

EXPANDING TOOL HOLDER.

(Application filed Dec. 8, 1898.)

(No Model.)



Witnesses
L. C. Hills
Alfred T. Gage.

Inventor:
Wm D. Clugston,
by E. B. Stocking
Attorney

UNITED STATES PATENT OFFICE.

WILLIAM D. CLUGSTON, OF WILMINGTON, DELAWARE, ASSIGNOR OF ONE-FOURTH TO THOMAS STERLING, OF SAME PLACE.

EXPANDING TOOL-HOLDER.

SPECIFICATION forming part of Letters Patent No. 627,098, dated June 20, 1899.

Application filed December 8, 1898. Serial No. 698,638. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM D. CLUGSTON, a citizen of the United States, residing at Wilmington, in the county of New Castle, State of Delaware, have invented certain new and useful Improvements in Expanding Tool-Holders, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to expanding tool-holders adapted to receive and carry tools of different characters.

It has for its object to improve the details of construction of such a holder, so as to insure a firm holding and an accurate adjustment of the tool.

It has for a further object to accurately measure the degree of expansion given to the tool and the consequent cut in the material operated upon, and also to provide a construction to obviate injury of cutter-blades when used in withdrawing the tool from its work or from the material operated upon.

Other objects and advantages of the invention will hereinafter appear in the following description, and the novel features thereof will be particularly pointed out in the appended claims.

In the drawings, Figure 1 is a longitudinal vertical section of the invention. Fig. 2 is a front end view. Fig. 3 is a vertical cross-section on the line 3 3 of Fig. 1, and Figs. 4, 5, and 6 are detail perspectives of a mandrel-block, reamer-blade, and a cutting-tap, respectively, each capable for use with this invention.

Like letters of reference indicate like parts throughout the several figures of the drawings.

The letter A designates the body of a tool-holder, which is interiorly threaded at one end, as at A′, and provided with a series of radial slots A^2, spaced at irregular distances apart for a purpose to be hereinafter described. Beyond the radial slots A^2 a guiding-socket A^3 is formed. The opposite end of the body A is provided with a threaded aperture A^4, adapted to receive an exteriorly-threaded wrench-hold B, which may, if found convenient or desirable, be provided with a lathe attachment or center C′, having the usual opening C^2 for receiving an implement to prevent rotation when used on rotating material and for withdrawing the shank from a chuck.

Within the threaded aperture A′ the expanding cone D is introduced and fed by means of threads D′. The portion D of this cone is the surface against which a firm and extended bearing is secured for the inner edges or faces E′ of the several tools E, each of which is so tapered as to bring its outer face or edge parallel with the axis of the cone and holder. If desired, though this is not necessary, the inner edge of the tool E may be concaved to fit the cone, as shown in Fig. 3. The inner end of the cone is formed with a cylindrical tip D^2, fitting the aperture A^3, to prevent any motion of the cone other than in a longitudinal direction. Beyond the threads D′ a squared shank D^3 is provided, to which any suitable tool may be applied for adjusting or expanding the tools or cutters E. These tools or cutters when properly inserted are retained in the slots A^2 by means of independent set-screws F, threaded through the body A and extending into the radial slots, whereby each of the tools may be independently held in its slot and after adjustment locked independently therein.

By the construction thus far described it will be seen that by rotating the cone in one direction it is fed inwardly and acting like a wedge it forces the tools outwardly for a distance exactly proportioned to the extent of inward travel of the cone. Thus an outward adjustment of the tools is provided and a withdrawal of the cone permits an inward adjustment.

The independent devices for separately locking each of the tools have been found to be an important improvement in this art, as the screws will obtain firm contact upon the tools irrespective of any wear which may have occurred upon the ends thereof. When the ordinary nut is used, which in its rotary action rubs and contacts with the ends of all of the tools, there is an uncertain and irregular pressure upon the tools incident to the unequal wear and any inequalities in the face of the nut or in the thread by which it is held. Furthermore, the independent securing devices permit any one or more of the tools to be firmly locked in a cutting position, after

which the cone may be partially withdrawn and the remaining tools permitted to move out of operative position. It will be observed in this connection that the tools are spaced at irregular distances apart, as shown in Figs. 2 and 3, which spacing prevents the jumping or chattering of a cutting-tool when held and operated by a holder of this general character. Disagreeable noise and defective cutting frequently occur where the tools are spaced at an even distance apart; but I have discovered that the spacing of the tools at irregular distances prevents such noise and produces a much improved cutting action.

For the purpose of accurately measuring the degree of adjustment given to the tools there is provided upon the end of the holder a scale or a series of suitable graduations G^2, and fitted upon the squared shank D^3 of the cone is a suitable micrometer G, having a pointer G′, adapted to coöperate with the graduations G^2 of the scale upon the face of the holder. The micrometer member G is provided with a squared aperture removably fitting the squared shank of the cone and with an angular groove G^3, in which the pin G^4, carrying the pointer G′, is mounted and held by a milled nut, as shown. This construction permits the movement of the pointer to any desired graduations upon the scale on the holder, so that the pointer will traverse the scale and indicate with great accuracy the extent of adjustment given to the tools by rotating the cone, and thus starting from any graduation in the scale.

The elements thus far described are not only compact, giving firm foundation and holding for the tools, but great accuracy of adjustment, comparatively great extremes of adjustment, and means of measurement, which is in no way subjected to strain or injury, as the pointer member G of the micrometer is readily removable at pleasure. Furthermore, a short threaded portion of the cone gives in proportion with its degree of taper a comparatively great radial movement of the tools as they are adjusted. The accuracy of measurement of adjustment is obtained by a fine division of each rotation of the cone, while such rotation advances or retracts the cone a fraction of an inch. Thus the final result of movement of the cutting edges of the tool is clearly indicated down to or nearly to one-thousandth of an inch. On the other hand, the extent of adjustment produced by a comparatively short travel of the cone covers an aggregate of over one-half inch of adjustment, whereby one holder takes the place of several unadjustable tools.

The threading of the wrench-hold B into the body A performs an important function in preventing injury to the tool, which frequently occurs by an operator attempting to back the tool out from the thread or other cut formed in the material by applying a wrench to the wrench-hold B. It will be seen that the application of power at this point will simply unscrew the wrench-hold from its socket without turning or dragging the edge of the tool in the material, while the application of power in the opposite direction screws the hold into its socket and then turns the entire tool-holder. The lathe attachment C′ which is carried by the wrench-hold may be removed and applied whenever found desirable for use in the operation of the tool in a chuck or upon a lathe-center.

It is obvious that different tools may be applied to the holder and that changes may be made in the details of construction and configuration without departing from the spirit of this invention as defined by the appended claims.

Having described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a tool-holder, the combination of a body provided with a threaded opening at one end and radial recesses extending to a central aperture, a cone located in said aperture and provided with a feeding-thread to engage said opening, tools located in said radial recesses bearing upon said cone, independent holding-screws adapted to engage the end of each of said tools, an angular shank on said cone, and an indicator longitudinally adjustable upon said shank to coöperate with indications located upon the body; substantially as specified.

2. In a tool-holder, the combination of a body provided with radial recesses extending to a central aperture, a cone provided with a feeding-thread and located in said aperture, tools located in said radial recesses and bearing upon said cone, a shank extending from said cone, an indicating-point carried by said shank and longitudinally movable thereon, and coöperating indications located upon the end of said body; substantially as specified.

3. In a tool-holder, the combination of a body provided with radial recesses extending to a central aperture, a cone provided with a feeding-thread and guiding-tip and located in said aperture, tools located in said recesses and bearing upon said cone, independent holding-screws adapted to engage each of said tools, an angular shank extending from said cone, and a disk movably mounted upon said shank and provided with an indicating-point coöperating with indications located upon an end of the body; substantially as specified.

4. In a tool-holder, the combination with a rotatable member, of an extension therefrom, a disk provided with an annular way and carried upon said extension, and an indicating-point adjustable in said way and coöperating with indications carried upon a non-rotatable part of said holder; substantially as specified.

5. In a tool-holder, the combination with a body having at one end laterally-adjustable tools mounted therein, an adjusting-cone and feed device, and a threaded socket at the opposite end, of a wrench-hold independent of

said cone and threaded into said socket; substantially as specified.

6. In a tool-holder, the combination with a body having radial recesses and laterally-adjustable tools mounted therein, an adjusting device, and a threaded socket at one end, of an independent wrench-hold threaded into said socket, and a lathe attachment carried by said wrench-hold; substantially as specified.

7. A tool-holder comprising an apertured body having radial recesses extending from said aperture and a threaded socket, an adjusting-cone threaded into said aperture and provided with an operating-shank, laterally-adjustable tools bearing upon said cone, independent adjusting-screws for each of said tools, and a threaded wrench-hold located in said socket; substantially as specified.

8. A tool-holder comprising an apertured body having radial recesses extending from said aperture and a threaded socket, an adjusting-cone threaded into said aperture and provided with an operating-shank, laterally-adjustable tools bearing upon said cone, independent adjusting-screws for each of said tools, a threaded wrench-hold located in said socket, and a disk carried by said shank and provided with an indicating-point coöperating with indications upon an end of the body; substantially as specified.

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

WILLIAM D. CLUGSTON.

Witnesses:
EDWARD KRAUSE,
CHARLES GREEN.