(Model.) 2 Sheets—Sheet 1.

C. P. GROUT.

DENTAL ENGINE HAND PIECE.

No. 277,126. Patented May 8, 1883.

Fig. 1.

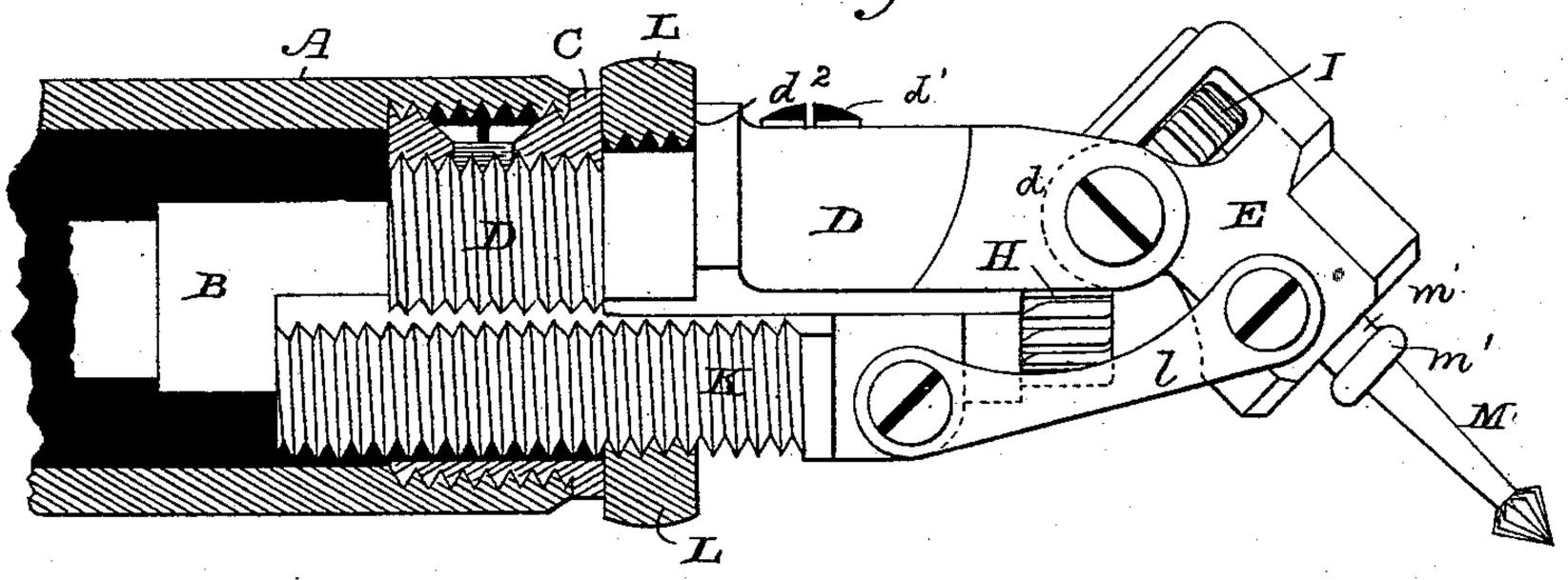


Fig. 2.

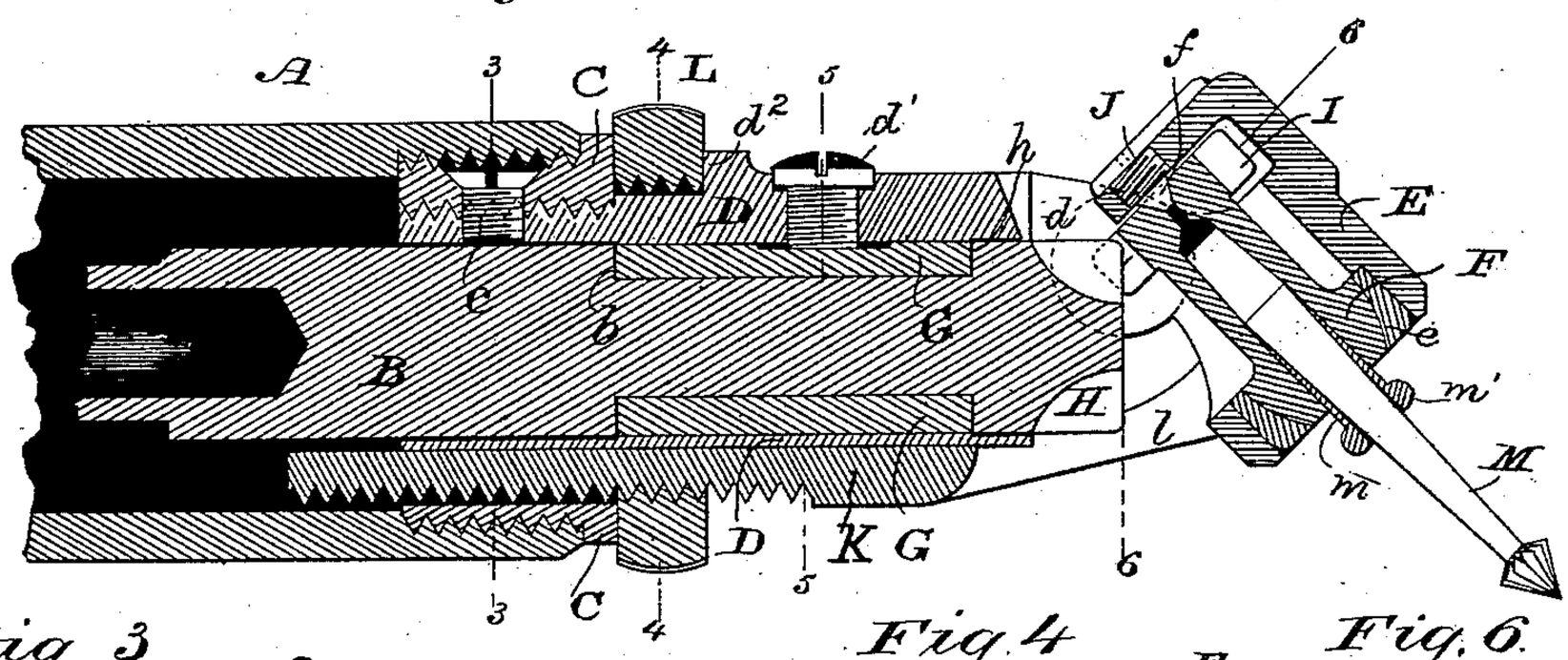


Fig 3

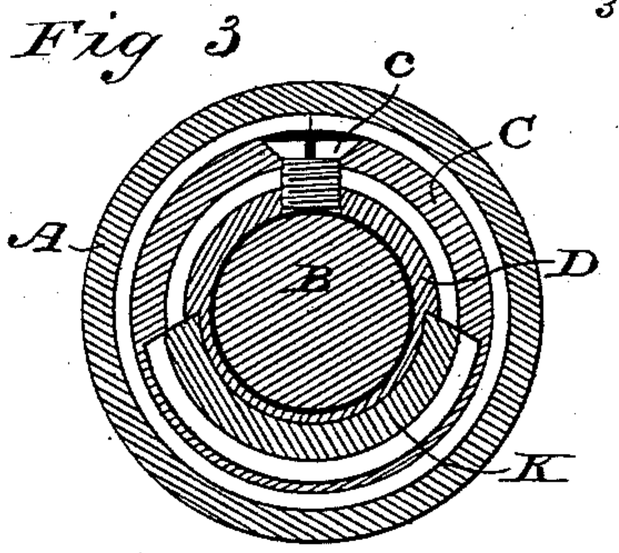


Fig. 4

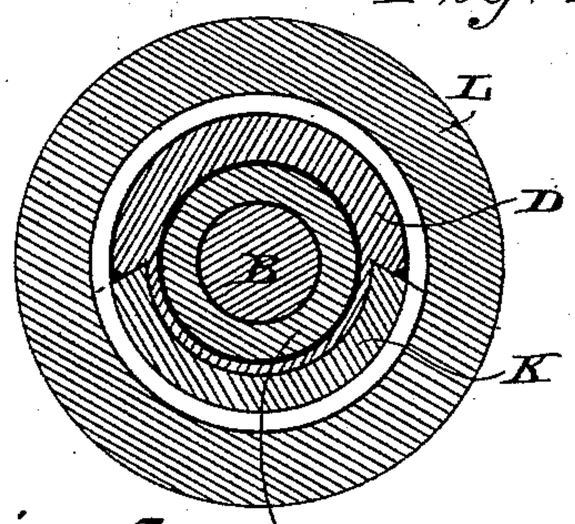


Fig. 6.

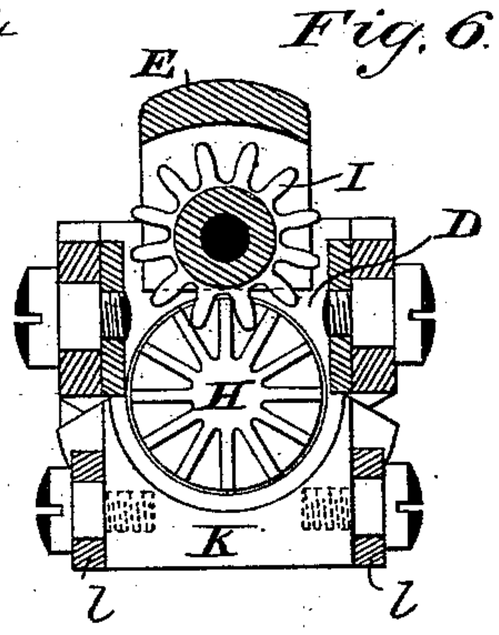
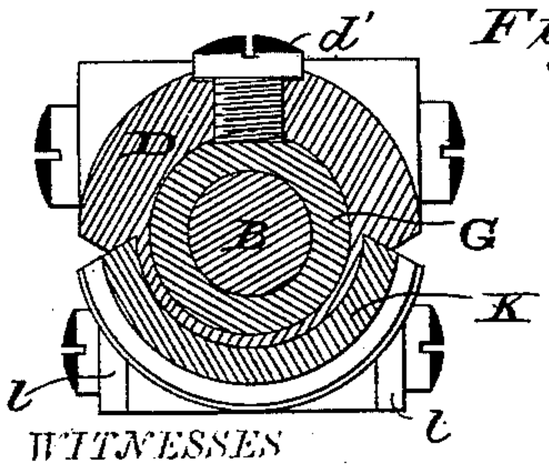


Fig. 5.



WITNESSES

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INVENTOR

Charles P. Grout.

By his Attorneys.

Baldwin, Hopkins & Peyton.

(Model.)

2 Sheets—Sheet 2.

C. P. GROUT.

DENTAL ENGINE HAND PIECE.

No. 277,126. Patented May 8, 1883.

Fig. 7.

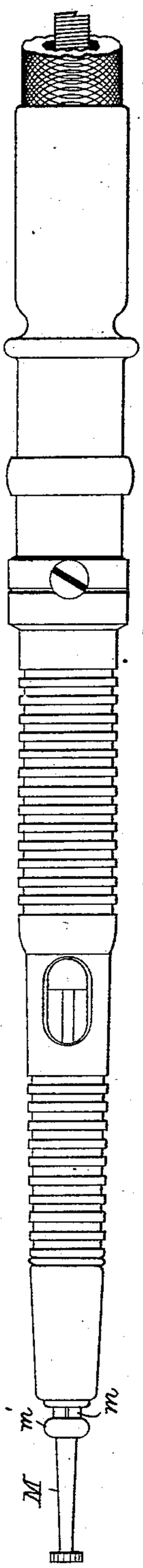


Fig. 9.

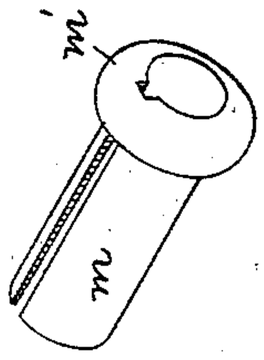
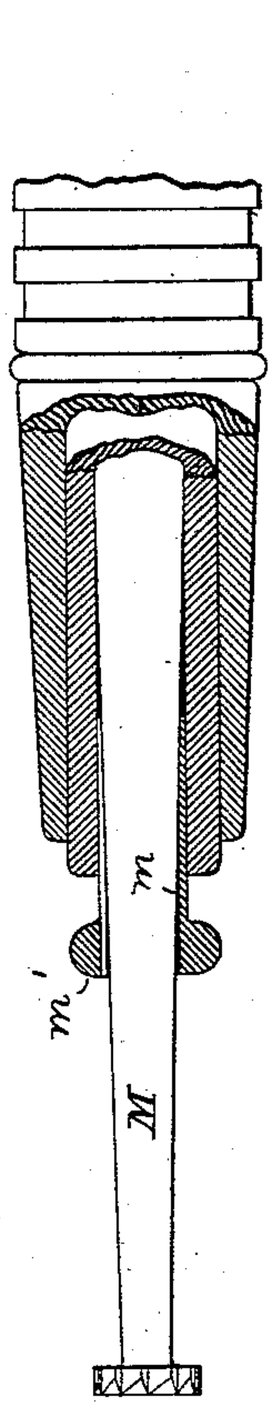


Fig. 8.



WITNESSES

Wm A. Skinkle.

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INVENTOR

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UNITED STATES PATENT OFFICE.

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DENTAL-ENGINE HAND-PIECE.

SPECIFICATION forming part of Letters Patent No. 277,126, dated May 8, 1883.

Application filed May 24, 1880. (Model.)

To all whom it may concern:

Be it known that I, CHARLES P. GROUT, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Dental-Engine Hand-Piece Attachments and Operating-Tools, of which the following is a specification.

My invention relates more especially to dental-engines of the class having a spindle-chuck or tool-holder rotated in bearings in a hand-piece casing by means of a flexible driving-connection, which permits the hand-piece grasped by the fingers of the operator to be moved freely about in various directions to permit the operating-tool driven by the spindle-chuck to be applied at the point desired. The best types of this class of engines, in my opinion, are those which have been long made and sold under the name of the "S. S. White Dental Engine," some of the later forms of which are shown in Letters Patent No. 219,320 and No. 222,093, dated, respectively, September 2 and November 25, 1879.

The object of the first part of my invention is to provide an improved angle attachment for dental-engine hand-pieces or a tool-carrier having the capacity of adjustment so that the operating-tool carried by said attachment or carrier may be readily placed at different angles to the longitudinal axis of the hand-piece casing, or to the driving-shank of said carrier or attachment, so as to operate upon any part of a tooth, the adjustment of the angle at which the operating-tool of the attachment or carrier operates being accomplished easily, rapidly, and with nicety, while the tool, when so adjusted, is securely locked against accidental variance.

I am of course aware that angle attachments or tool-carriers having the capacity of adjustment to vary the angle of the operating-tool are very common.

The object of the next part of my invention is to provide improved means whereby a tool-shank may be easily and firmly locked in its rotary tool holder or chuck against any wabbling or lateral movement, which movement, when not overcome, is a serious obstacle to the skillful performance of the necessarily delicate operations required by the tool in working upon natural teeth in the mouth.

The subject-matter claimed will be specifically pointed out at the end of the specification.

In the accompanying drawings, which illustrate the best way now known to me of embodying my improvements, Figure 1 is a side view, partly in section, of the improved angle attachment or carrier. Fig. 2 is a longitudinal section therethrough, showing the manner of locking the tool in the socket of the tool-holder of said attachment. Figs. 3, 4, and 5 are transverse sectional views through the attachment or carrier on the lines 3, 4, and 5, respectively, of Fig. 2. Fig. 6 is a sectional view on the line 6 6 of said Fig. 2. Fig. 7 is a view of a hand-piece with an operating-tool secured in the spindle tool-holder thereof according to my invention. Fig. 8 is a longitudinal section through the front end of the hand-piece, to show more clearly the manner of locking the tool-shank against lateral or shaking motion in the tool-holder; and Fig. 9 is a view in perspective of the device which locks the tool-shank in the holder against the aforesaid lateral movements.

I will first describe the angle attachment shown in Figs. 1 to 6, inclusive.

The barrel or tube A of the attachment or carrier is of the usual form, so as to fit or be slipped upon the end of the hand-piece casing and be retained thereon, as usual, while the driving-shank B, fitted in bearings at the front end of said barrel, enters the socket in the front end of the rotary spindle-chuck or tool-holder of the hand-piece in the usual way, so as to be locked in said chuck and be given a rapid revolving motion, which is communicated to the tool-holder of the attachment by gearing, as will be presently explained. Connected with the front end of the barrel A—by screw-threads in this example—is an annulus or ring, C, screwed upon and made fast by a connecting-screw, *c*, to a tubular section, D, of the carrier, which section D is provided with ears or projections *d d* at its front end, between and to which ears *d d* the casing E, which affords bearings for the tool-holder F of the attachment, is pivoted, so that said casing E may

swing or be rocked on said pivots to vary its angle and that of the tool-holder F, in which the operating-tool is inserted relatively to the axial line of the hand-piece casing and to the driving-shank B and barrel A of the attachment. The said shank B is locked from endwise movement in the tubular section D, while free to revolve axially therein, by means of an annular shoulder, *b*, of said shank, which abuts against the rear end of a tubular bushing or sleeve, G, locked in the socket of the section D, and surrounding a reduced portion of the shank, the gear-wheel H at the front end of said shank B affording an annular shoulder, *h*, to abut against the front end of said sleeve or bushing G, all of which is clearly shown in the sectional view, Fig. 2. The bushing or sleeve G, which constitutes the bearing in which the shank B turns, is secured in the socket of the tubular section D by means of a fastening-screw, *d'*; but the said bushing may be otherwise connected with the section D or secured in the socket thereof. By means of the fastening-screw *d'* in the organization shown I am enabled to shift the sleeve or bushing to compensate for wear. The said toothed gear-wheel H at the front end of the shank B is of well-known construction, and meshes with a spur-wheel, I, also of well-known construction, mounted on the rear or butt end of the tool-holder F of the attachment, so as to give said tool-holder a rapid revolving motion. The said tool-holder F is conical or tapering at its front end to fit a corresponding seat or bearing, *e*, formed at the front of the rocking casing E, while its butt-end is provided with a conical socket, *f*, for the reception of the cone-shaped or tapering end of a set-screw, J, passing through the butt-end of the said casing E, whereby the said screw forms the rear bearing on which the tool-holder turns, so as to enable said holder to run steadily when driven by the gearing. Said conical end bearing is adjustable by its screw-threads, it will be observed, so that it can be screwed up or tightened, and thus compensate for and take up wear of the tool-holder in or upon its bearings, and thereby enable it to run smoothly and steadily at all times. The said toothed wheels H and I are so fitted as to remain in gear, whatever may be the angle of the casing E and tool-holder F relatively to the main body or barrel A of the attachment, by the adjustment or rocking of the said casing upon its pivots.

In order to vary the angle of inclination of the casing E, and with it the tool-holder F and the operating-tool driven thereby, I connect a curved plate, K, fitted to the reduced side of the tubular section D, so as to slide endwise thereon, with the pivoted or jointed casing E by means of links *l l*, one on each side, whereby by the endwise adjustment of the sliding plate K the angle of the casing E and tool-holder F will be varied, as is obvious, the sliding of the plate inwardly increasing the angle by drawing the outer end of the casing toward the body of the attachment, while forcing it outwardly lessens the angle relatively to the axial line of the hand-piece and barrel of the attachment by carrying the outer end of said casing away from the body of the attachment. The reciprocation or sliding movement of the plate K is accomplished with great nicety and firmness, and at the same time with ease and rapidity, by a turning finger-ring or thimble, L, mounted upon the reduced portion of the tubular section D, between the shoulder d^2 thereof and the annulus or ring C, an internal screw-thread of said finger-ring L fitting corresponding male threads on the curved surface of the sliding plate K, whereby, as the finger-ring or thimble L cannot move endwise, owing to its being seated between shoulders upon each side, it will be obvious that any motion given to the ring around the section D will move the sliding plate K endwise, thereby, owing to the link-connection with the casing E, determining the angle of said casing, as before described.

I will now describe the manner of inserting and securing the operating-tool in the socket of the tool-holder. The said tool M is provided with a tapering shank, as clearly shown in Figs. 1, 2, 7, and 8, and upon this tapering portion of the shank is fitted a sliding tubular split wedge, *m*, the said sliding wedge being fitted upon the tool-shank in any of the well-known ways common in the art, so as preferably to be a part of the tool, while capable of moving endwise to a limited extent upon the inclined portion of said shank. The tool-shank is inserted in the socket of the holder, as shown in Figs. 1 and 2, (which form of holder has no device to lock the shank in the socket,) and the tubular wedge then moved endwise on said shank into the mouth of said socket, the wedge expanding as it is forced up the incline of the tool-shank until it completely fills the socket, thereby locking the tool in the tool-holder not only as against endwise movement, but also against any lateral play or wabbling movement, whereby the tool is driven as firmly and steadily as the holder itself, of which, when the wedge is forced home, it virtually forms a part. An enlargement or collar, *m'*, at the outer end of the sliding wedge M constitutes the means of forcing it up the inclined surface of the tool-shank and for withdrawing it when the tool is to be removed from the socket of the tool-holder.

In Fig. 9 of the drawings I have shown the tubular split wedge in perspective detached from the tool, while in Figs. 7 and 8 I have shown a tool having the wedge applied fitted in the socket of the spindle-chuck of a dental-engine hand-piece, which chuck is provided with tool-locking devices, operated in any of the well-known ways, to secure or lock the tool-shank therein, the tubular wedge M merely serving to fill up the socket and prevent any lateral motion between the tool-holder and tool, which motion, unless overcome by a compensating device, is very objectionable.

It will of course be understood that any wear

or enlargement of the socket of the tool-holder is compensated for by the wedge.

I claim as my invention—

1. The combination, substantially as herein-before set forth, of the barrel or tube, the driving-shank, the pivoted casing carrying the rotary tool-holder, the slide, a link-connection between said casing and slide, and a turning screw-ring to move said slide to vary the angle of the tool-holder relatively to the axial line of the barrel of the attachment.

2. The combination, substantially as herein-before set forth, of the tool-holder casing, the tool-holder mounted in said casing, having a cone-journal at its front end and a cone-socket at its butt-end, and the tapering set-screw passing through the rear end of said casing into said cone-socket of the tool-holder, whereby the tool-holder is provided with cone-bearings and compensation for wear permitted by means of a single set-screw.

3. The combination, substantially as herein-before set forth, of the tapered-shank operating-tool with the endwise-movable tubular split wedge encircling said shank, and provided at its front end with a collar or projection to operate it, whereby the tool may be inserted into the truly-cylindrical socket of a tool-holder and securely locked therein against lateral motion, while capable of being readily released by the hand of the operator by sliding said wedge endwise relatively to the tool-holder.

In testimony whereof I have hereunto subscribed my name.

CHAS. P. GROUT.

Witnesses:
SAML. V. BILLINGS,
FRANCIS C. HARMSTAD.