

Sept. 18, 1945.

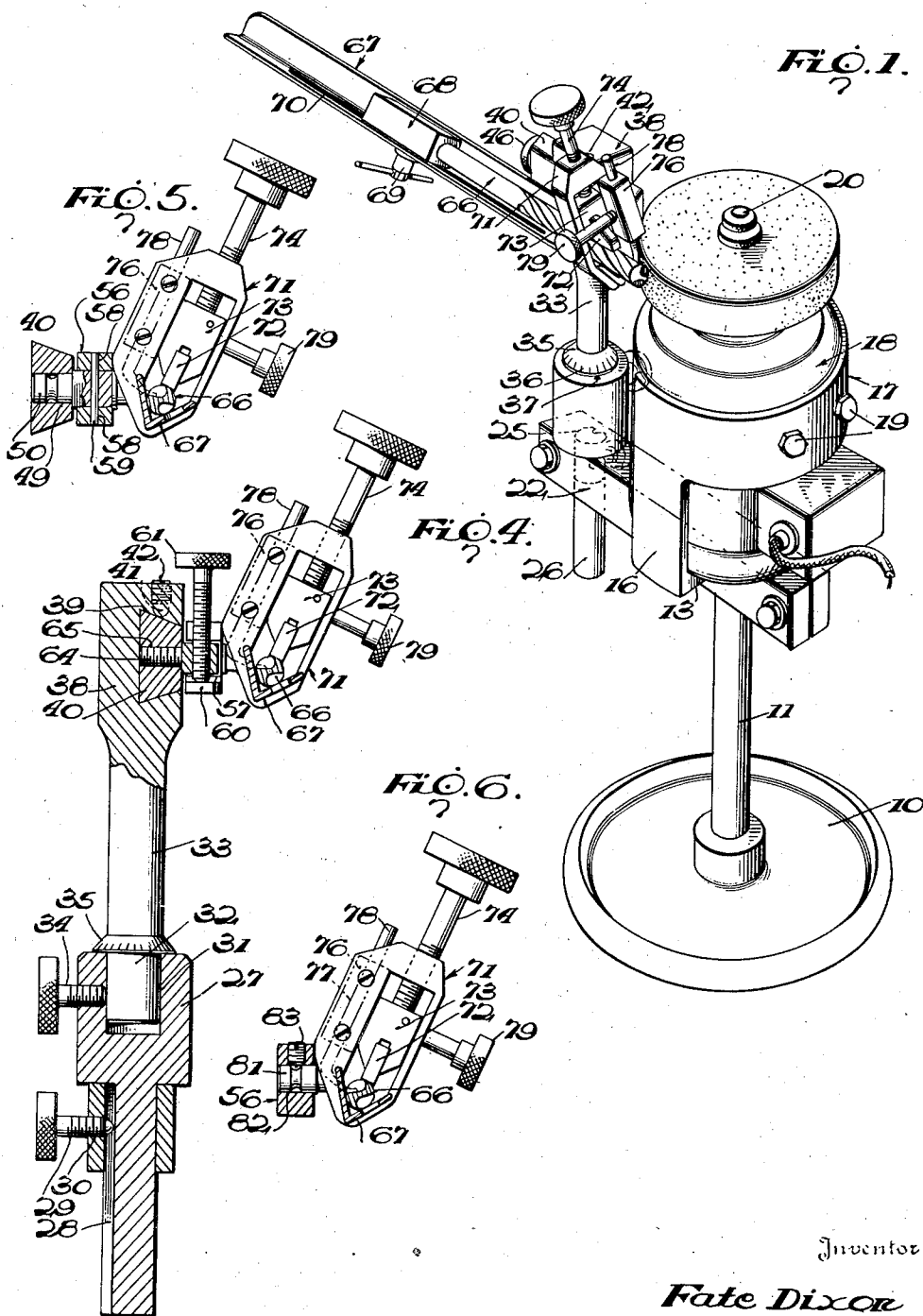
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2,384,899

MACHINE FOR GRINDING BITS

Filed Feb. 23, 1944

3 Sheets-Sheet 1



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FIG. 2.

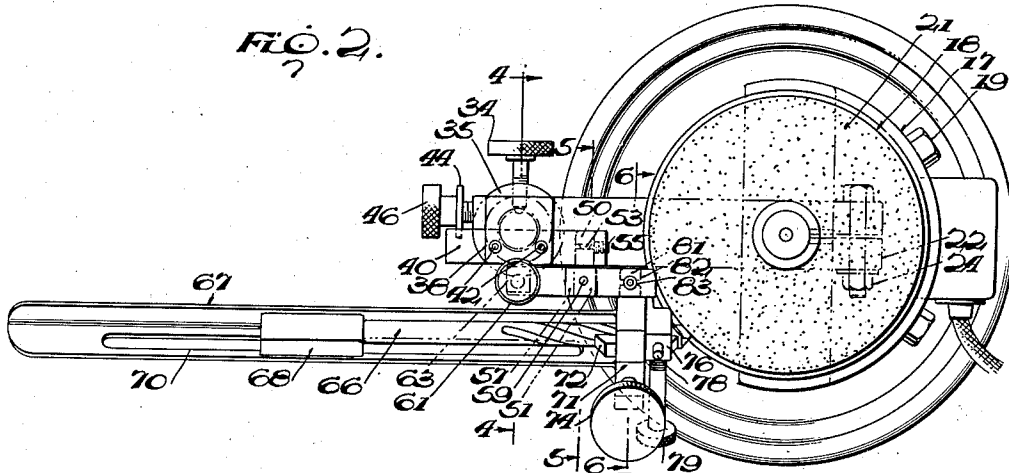


FIG. 3.

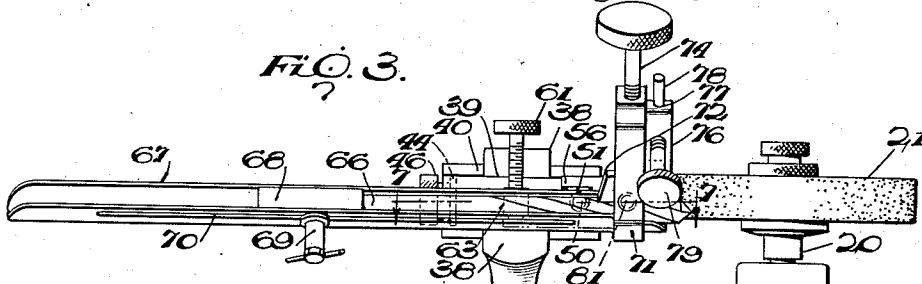


FIG. 7.

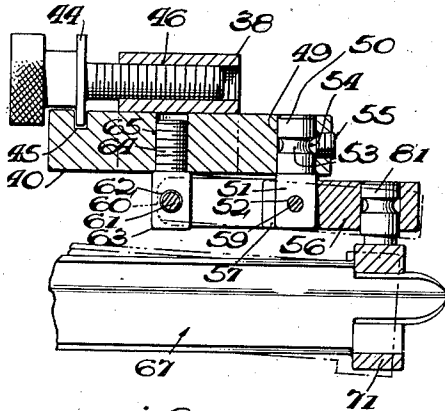
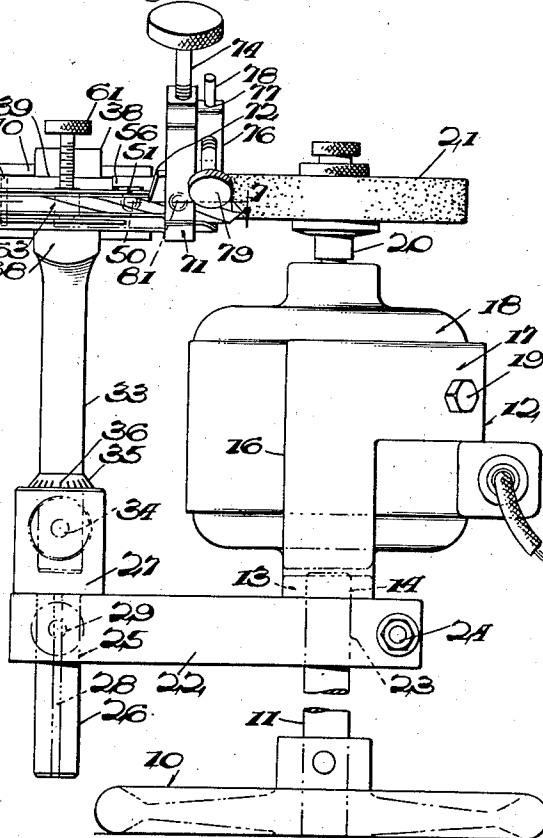
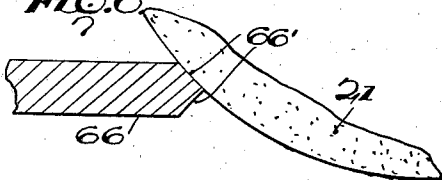


FIG. 8.



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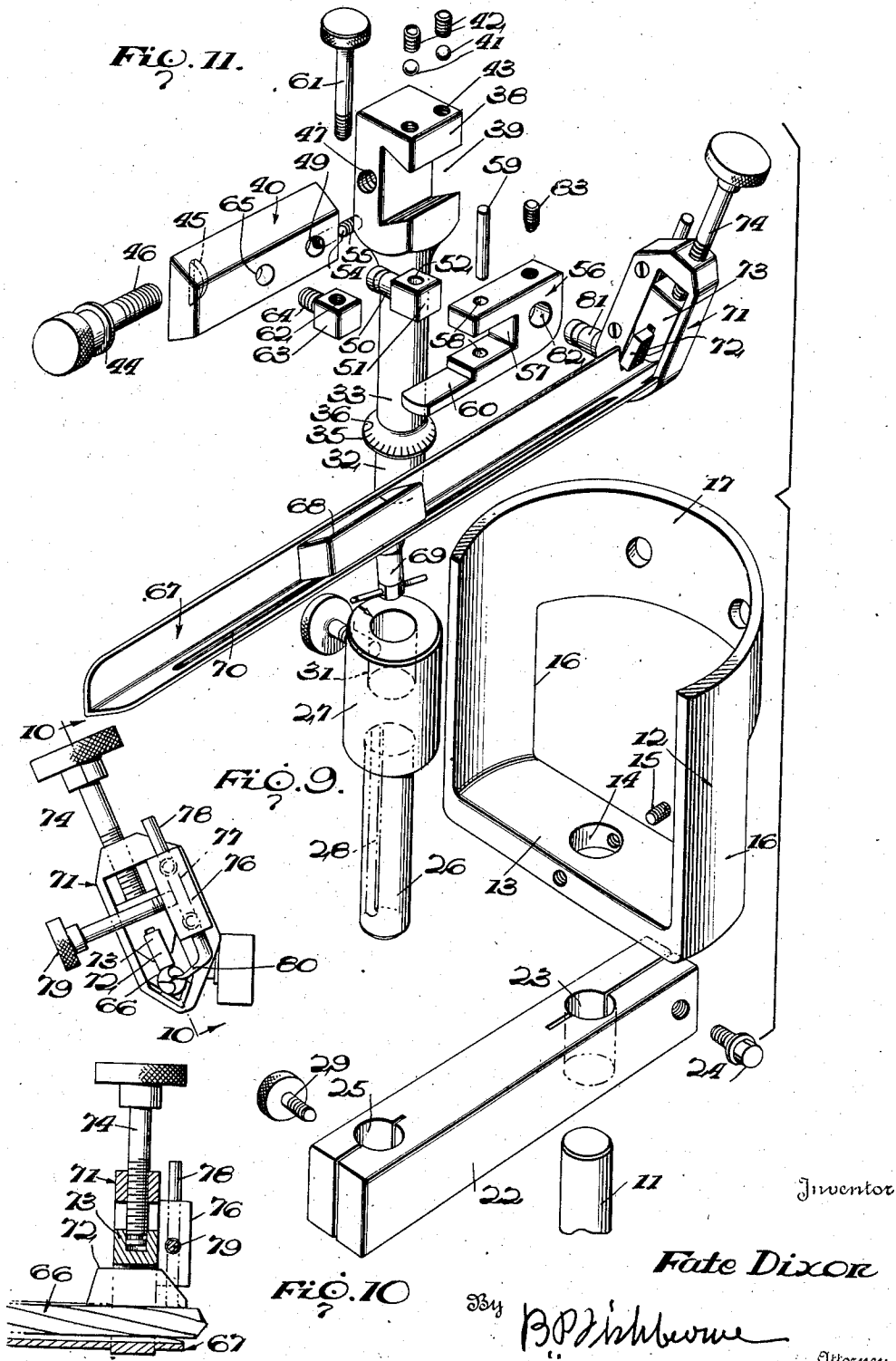
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UNITED STATES PATENT OFFICE

2,384,899

MACHINE FOR GRINDING BITS

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Application February 23, 1944, Serial No. 523,590

5 Claims. (Cl. 51—219)

My invention relates to a machine for grinding bits or the like.

An important object of the invention is to provide a machine of the above mentioned character which will properly grind the face of the bit without burning the same.

A further object of the invention is to provide a machine of the above mentioned character which will hollow grind the face of the bit.

A further object of the invention is to provide a machine of the above mentioned character which is relatively simple in construction and easy to operate.

In the accompanying drawings forming a part of this application, and in which like numerals are employed to designate like parts throughout the same,

Figure 1 is a perspective view of a bit grinding machine embodying my invention.

Figure 2 is a plan view of same,

Figure 3 is a side elevation of same,

Figure 4 is a vertical section taken on line 4—4 of Figure 2,

Figure 5 is a similar view taken on line 5—5 of Figure 2,

Figure 6 is a similar view taken on line 6—6 of Figure 2, parts in elevation,

Figure 7 is a horizontal section taken on line 7—7 of Figure 3,

Figure 8 is a fragmentary plan view of the grinding wheel and bit,

Figure 9 is an end elevation of the bit-holding frame,

Figure 10 is a vertical longitudinal section taken on line 10—10 of Figure 9, and,

Figure 11 is an exploded perspective view of the motor holding frame and associated elements.

In the drawings, wherein for the purpose of illustration is shown a preferred embodiment of my invention, the numeral 10 designates a base, having a vertical post 11 rigidly secured thereto. The numeral 12 designates a motor holder or frame, including a horizontal bar 13, having a central opening 14, for receiving the upper end of the post 11. The horizontal bar 13 is clamped to the post 11 by a setscrew 15. Rigidly secured to the ends of the horizontal bar 13 are vertical arms 16, connected at their upper ends by a curved horizontal strap 17. The curved strap 17 is concentric with the post 11. The numeral 18 designates a vertically arranged motor, resting upon the horizontal bar 13 and attached to the curved strap 17 by bolts 19 or the like. The motor is therefore concentric with the post 11 and is supported

thereby. The motor 18 has a vertical armature shaft 20, to the upper end of which is secured a grinding wheel 21, rotated in a horizontal plane. Any suitable means may be employed to mount the grinding wheel upon the armature shaft 20 for rotation therewith.

The numeral 22 designates a horizontal arm, extending radially of the grinding wheel 21 and having an opening 23 to receive the post 11. The end of the arm 22 adjacent to the opening 23 is preferably split, so that the arm may be clamped to the post 11 by a bolt 24. The bar or base 13 preferably rests upon the horizontal arm 22.

The arm 22 is provided near its outer or free end with a vertical opening 25, to receive a shank 26, depending from a socket 27, and formed integral therewith. The shank 26 has a longitudinal groove 28, for receiving the end of a setscrew 29, having screw threaded engagement with the arm 22, at 30. It is thus seen that by slightly unscrewing the setscrew 29 the shank 26 may be raised, but the setscrew 29 projecting into the groove 28 will hold the stem 26 against turning upon its longitudinal axis, and after this the setscrew 29 is manipulated to clamp the stem 26 at the raised elevation. The shank 26 may be vertically adjusted, depending upon the width of the grinding wheel 21. The socket 27 has a cylindrical recess 31, to rotatably receive a cylindrical extension or portion 32 of a vertical post or arm 33. The extension 32 is adapted to be turned upon its longitudinal axis within the recess 31 and to be clamped to the socket 27 in the selected adjusted position by a setscrew 34. The vertical post or arm 13 has a tapered annular portion 35, equipped with a scale 36, for co-action with a stationary pointer 37, formed upon the top of the socket 27. This scale and pointer indicate the extent of turning movement of the post or arm 33. Preferably formed integral with the vertical arm or post 33 is a head 38, provided upon one face with a horizontal dove-tailed groove or recess 39, receiving a horizontally adjustable slide or carriage 40. This slide or carriage is engaged by balls 41, forced inwardly by adjustable screws 42, engaging within screw threaded openings 43. By the adjustment of the screws 42 the play between the slide or carriage 40 and the head 38 may be taken up. The slide or carriage 40 is longitudinally adjusted by an annular flange or ring 44, operating within a transverse groove 45, formed in one face of the slide or carriage 40, near its outer end. The annular flange or ring 44 is rigidly mounted upon a bolt 46, having screw threaded engagement

within an opening 47, formed in the head 38. The bolt 46 has a milled head for turning it. It is thus seen that when bolt 46 is turned the slide or carriage 40 will move longitudinally with respect to the head 38.

The slide or carriage 40 is provided near its inner end with a transverse horizontal opening 49, to pivotally receive a cylindrical shank 50, having a head or block 51 rigidly secured thereto. This head or block has an opening 52 formed therein. The shank 50 has an annular groove 53, receiving the rounded end 54 of a setscrew 55. The shank 50 is therefore pivotally mounted upon the slide or carriage 40 to turn in a vertical plane. The numeral 56 designates a swinging carrier, having a recess 57 to receive the head or block 51, and openings 58 for alignment with the opening 52 for receiving a pin or pivot 59. The carrier 56 therefore swings upon the head 51 at a right angle to the turning movement of the head 51 with respect to the slide or carriage 40. The carrier 56 has a limited swinging movement with respect to the head 51, which is slightly spaced from the end wall of the recess 57. The carrier 56 has a tail or extension 60, preferably integral therewith, arranged to engage beneath an adjustable vertical stop or bolt 61, having screw-threaded engagement within an opening 62 formed in a head 63, carrying a screw-threaded shank 64, engaging in a screw-threaded opening 65 formed in the slide or carriage 40. The head or block 63 is therefore rigidly attached to the slide or carriage.

The holder for the bit 66 includes a channel-lever 67, formed V-shaped in cross section. This channel-lever has a slide 68 to be clamped in the selected adjusted position by a bolt 69 extending through a longitudinal slot 70. The channel lever 67 receives the bit 66, as shown. Preferably formed integral with the channel lever 67 near its inner end is a loop or frame 71, arranged at a right angle with relation thereto. Arranged within this loop or frame is a jaw 72, carried by a slide 73, for clamping engagement with the bit 66. The slide 73 has a swiveled connection with a feed screw 74, having screw threaded engagement with the end of the loop or frame 70 and having a milled head for turning the same. Preferably formed integral with one side of the frame or loop 71 is a block or lug 76, having a longitudinal opening 77 for slidably receiving a gage or index element 78, adapted to be clamped in the selected adjusted position by a setscrew 79 having screw-threaded engagement with the block 76, as shown. The gage has a finger 80 to engage the drill 66, as shown. Rigidly attached to the side of the loop or frame 71 adjacent to the block 76 and near the inner end of the loop or frame 71 is a cylindrical stud 81, pivotally mounted in a transverse horizontal opening 82 formed in the carrier 56, and clamped to the carrier by a set screw 83. The stud 81 may be turned with respect to the carrier 56 but is ordinarily locked to the carrier. The axis of the stud 81 is at a right angle to the plane of movement of the carrier 56, while the longitudinal axis of the loop or frame 71 is vertically inclined in a plane at a right angle to the plane of movement of the carrier. The frame or loop 71 is arranged in the transverse plane extending generally at a right angle to the plane of movement of the carrier 56, but the loop or frame 71 may be angularly adjusted longitudinally of the carrier 56, by turning the stud 81 within the opening 82.

The bit 66 has beveled faces 66¹, which are hollow ground by my machine.

The operation of the machine is as follows: The channel-lever 67 has its outer end swung to the right, Figure 2, whereby the inner end of the carrier 56 and the bit 66 is swung toward the slide or carriage 40 and the grinding wheel 21, and the face 66¹ of the bit may engage the periphery of the grinding wheel. The arm or post 33 is now turned upon its longitudinal axis, for determining the angle of the bevel face 66¹ and this angle is indicated by the pointer 37 upon the scale 36. The post 33 is now clamped in the selected adjusted position. The drill 66 is clamped in the channel lever 67, and the gage 78 engages the drill, as shown. When the outer end of the channel lever 67 is in the uppermost position, the tail 60 of the carrier 56 will engage the stop 61, and the face 66¹ of the bit will engage the periphery of the grinding wheel 21 adjacent to the lower end of the grinding wheel. The outer end of the channel-lever 67 is held to the right and is then swung downwardly about the pivot 50, whereby the face 66¹ of the bit engages the rotating grinding wheel as such face swings upwardly and disengages the grinding wheel during the upward portion of such swinging movement. When the forward end of the channel-lever 67 has reached the uppermost position, the outer end of the channel-lever is swung to the left, which shifts the inner end of the channel-lever and the face 66¹ of the bit from the grinding wheel so that the face 66¹ is spaced therefrom, when the outer end of the channel-lever is swung upwardly, and the face 66¹ moved downwardly in proximity to the lower end of the grinding wheel 21. It is thus seen that the face 66¹ engages with the grinding wheel when swinging upwardly for a portion of its travel, but does not engage with the grinding wheel when swinging downwardly to the starting lowermost position. The grinding action therefore occurs upon the upward swinging movements of the face 66¹ and there are time intervals between these upward movements which permit the face 66¹ to cool so that the drill will not burn. As the face 66¹ is being ground, the drill is advanced longitudinally toward the grinding wheel by moving the carriage or slide 40 forwardly, which is caused by turning the feed screw 46. When the channel-lever 67 has its outer end in the uppermost position and swung to the right, the face 66¹ will engage the periphery of the grinding wheel, at the selected angle to determine the general radial angle of the face 66¹, and the periphery of the grinding wheel will hollow grind the face 66¹ or render the same concave, as more clearly shown in Figure 8. After one face 66¹ is ground, the bit is turned upon its longitudinal axis and clamped within the channel-lever to grind the other face 66¹.

It is to be understood that the form of my invention herewith shown and described is to be taken as a preferred example of the same and that various changes in the shape, size, and arrangement of parts, may be resorted to without departing from the spirit of my invention or the scope of the subjoined claims.

Having thus described the invention, what I claim is:

1. A machine for grinding a bit or the like, comprising a support, a motor mounted upon the support and having its armature shaft arranged substantially vertically, a substantially horizontally rotating grinding wheel mounted upon

the armature shaft, a substantially vertical post mounted upon the support and adapted to be turned upon its longitudinal axis, a substantially horizontal carriage mounted upon the post and movable with relation thereto toward the grinding wheel, means to move the carriage, a member, means pivotally connecting the member and carriage and extending transversely of the carriage, a carrier, a pivot element connecting the carrier and member and extending at substantially a right angle to the pivotal connecting means, the arrangement being such that the carrier may be swung longitudinally and transversely of the carriage, adjustable means to regulate the extent of longitudinal swinging movement of the carrier toward the grinding wheel, and a bit holding device mounted upon the carrier and arranged to bring the face of the bit into engagement with the periphery of the grinding wheel.

2. A machine for grinding a bit or the like, comprising, a support, a motor mounted upon the support and having its armature shaft substantially vertical, a grinding wheel mounted upon the armature shaft to rotate substantially horizontally, a substantially vertical post arranged near the grinding wheel, a substantially horizontal carriage mounted upon the post and movable toward the grinding wheel, said carriage having a transverse opening, means to move the carriage, a member having a shank pivotally mounted within the transverse opening, the member being arranged upon one side of the carriage, a carrier mounted upon the member, a pin pivotally connecting the carrier and member and disposed at substantially a right angle to the shank, a tail carried by the outer end of the carrier, an adjustable stop for the tail mounted upon the carriage, and means mounted upon the carrier for holding a bit and arranging the bit longitudinally of the carrier and bringing its face into engagement with the periphery of the grinding wheel.

3. A machine for grinding a bit or the like, an upstanding post, a motor holding frame mounted upon the post and including a horizontal bar and vertical arms and a curved strap which is concentric with the post, a motor mounted within the frame and having the curved strap secured thereto, the motor having its armature shaft vertical, an arm mounted upon the post, a vertical post mounted upon the arm, a carrier, means to pivotally mount the carrier upon the vertical post so that the carrier can swing in vertical and horizontal planes, and a bit holding device mounted upon the carrier.

4. In a machine for grinding a bit or the like, a grinding wheel having a periphery, means to rotate the grinding wheel, a post extending parallel with the axis of rotation of the grinding wheel and arranged radially outwardly of the grinding wheel, the post being adapted to be turned upon its longitudinal axis, means to clamp

the post in the selected adjusted position, a carriage mounted upon the post and shiftable toward the periphery of the grinding wheel, a bit holding device including a handle, a pivot for the bit holding device mounted upon the carriage and arranged between the ends of such device whereby the handle extends beyond the pivot for a substantial distance to be grasped in the hand, said pivot being parallel with the plane of rotation of the grinding wheel and arranged generally within such plane of rotation so that the bit holding device may have its end next to the grinding wheel swung longitudinally of the axis of rotation of the grinding wheel while the bit is engaging the periphery to effect the grinding action, and a second pivot element carried by the first pivot element and engaging the bit holding device, the second pivot element being arranged at a right angle to the first pivot element and extending generally parallel with the axis of rotation of the grinding wheel, the bit holding device swinging upon the second pivot to shift its end next to the grinding wheel generally radially with respect to the grinding wheel, the arrangement being such that the bit is hollow ground.

5. In a machine for grinding a bit or the like, a grinding wheel having a periphery, means to rotate the grinding wheel, a post extending parallel with the axis of rotation of the grinding wheel and arranged radially outwardly of the grinding wheel, said post being adapted to be turned upon its longitudinal axis, means to indicate the extent of turning movement of the post, means to clamp the post in the adjusted selected position, an elongated carriage mounted upon the post to be shifted longitudinally toward the periphery of the grinding wheel in a plane parallel with the plane of rotation of the grinding wheel, adjustable means to shift the carriage longitudinally and hold it in the selected adjusted position, a pin arranged parallel with the plane of rotation of the grinding wheel and extending transversely of the carriage and pivotally mounted upon the carriage, a second pin carried by the first pin and adapted to be arranged generally parallel with the axis of rotation of the grinding wheel, the first named pin being arranged generally in the plane of rotation of the grinding wheel, a carrier pivotally mounted upon the second pin, a lever mounted upon the carrier and having the first pin arranged between its ends so that the rear end of the lever extends beyond the first pin for a substantial distance to be grasped in the hand, and a bit holding device mounted upon the forward end of the lever for holding a bit in a position extending longitudinally of the lever, the arrangement being such that the lever may be turned about the axis of the first named pin and the bit moved longitudinally of the axis of rotation of the grinding wheel while the bit is engaging the periphery of the grinding wheel to effect the grinding action.

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