

E. RIVETT.

THREAD CUTTING ATTACHMENT FOR LATHES.

(Application filed Dec. 23, 1899.)

(No Model.)

2 Sheets—Sheet 1.

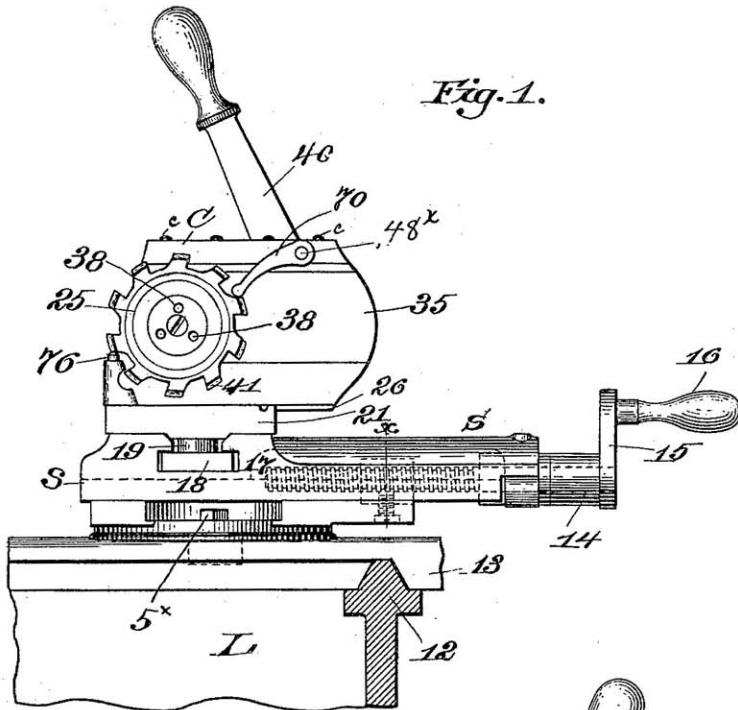


Fig. 1.

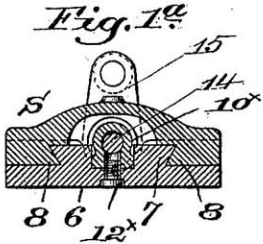


Fig. 1a.

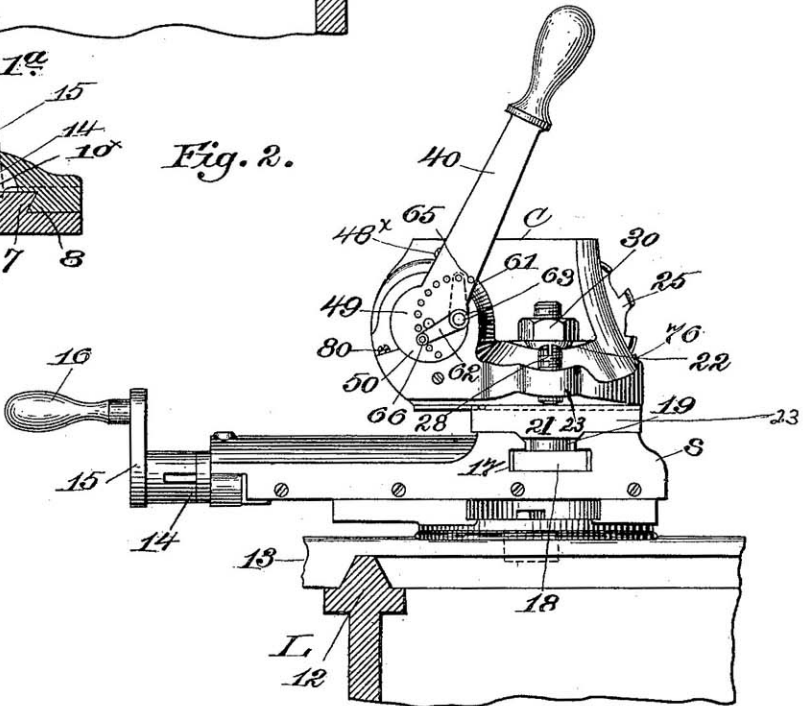


Fig. 2.

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2 Sheets—Sheet 2.

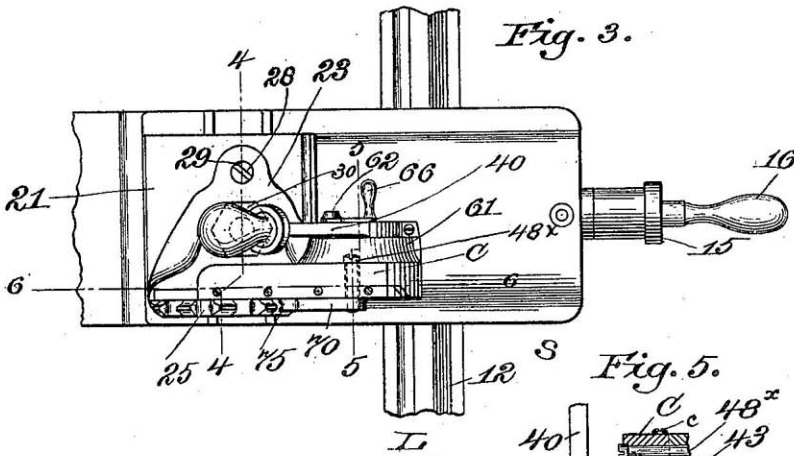


Fig. 3.

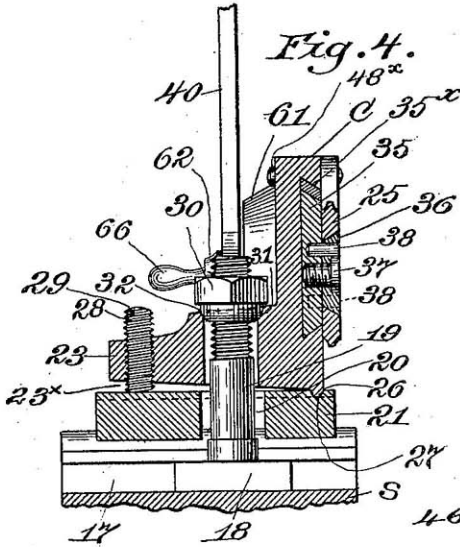


Fig. 4.

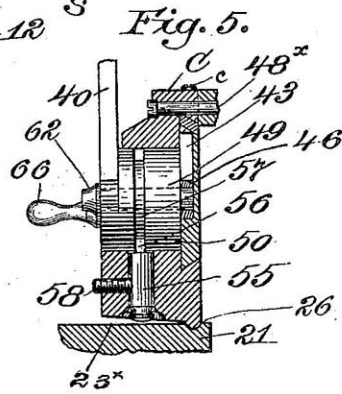


Fig. 5.

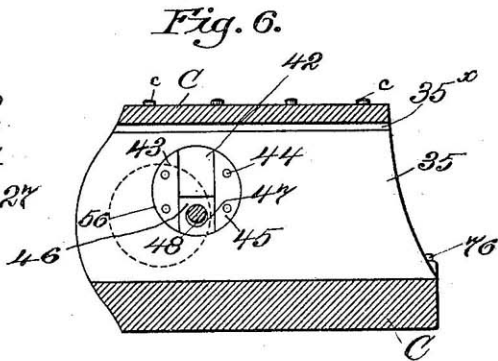


Fig. 6.



Fig. 7.

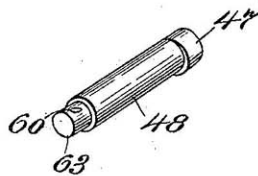


Fig. 8.

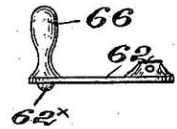


Fig. 9.

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# UNITED STATES PATENT OFFICE.

EDWARD RIVETT, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE RIVETT-DOCK COMPANY, OF CAMDEN, NEW JERSEY, AND FANEUIL, MASSACHUSETTS.

## THREAD-CUTTING ATTACHMENT FOR LATHES.

SPECIFICATION forming part of Letters Patent No. 652,643, dated June 26, 1900.

Application filed December 23, 1899. Serial No. 741,414. (No model.)

*To all whom it may concern:*

Be it known that I, EDWARD RIVETT, a citizen of the United States, and a resident of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Thread-Cutting Attachments for Lathes, of which the following description, in connection with the accompanying drawings, is a specification, like letters and numerals on the drawings representing like parts.

This invention relates to metal-working apparatus, and while it is capable of many different uses it is of especial utility in cutting or chasing either right or left hand threads or grooves, it being adapted to cut accurately heavy lead-screws for lathes, and milling or other like machines, provision having been made for cutting either the right or left hand groove at any desired pitch by tipping the holder supporting the rotating cutter or tool used, the apparatus also being adapted for cutting, if desired, annular grooves in metal bars.

Figure 1 is a right-hand side elevation of my improved apparatus in one of the best forms now known to me, it showing my improvement mounted upon the carriage of a lathe. Fig. 1<sup>a</sup> is a section in the line *x*, Fig. 1. Fig. 2 is an opposite side elevation of my improved apparatus. Fig. 3 is a plan view of the same. Fig. 4 is a sectional elevation, the section being taken in the line 4 4, Fig. 3, and looking toward the right. Fig. 5 is a similar view, the section being taken in the line 5 5 of said Fig. 3. Fig. 6 is a longitudinal section taken in the line 6 6, Fig. 3. Fig. 7 is a front elevation of a pawl for actuating the cutter and a portion of its support, and Fig. 8 is a perspective view of an eccentric-pin. Fig. 9 is a detail showing detached the arm 62 with its pin or projection 62<sup>x</sup>.

Referring to the drawings, L designates a portion of the rigid framework of a lathe, it having in practice two parallel races or guides 12, one of which is shown, upon which is mounted to slide a traveling carriage 13 of any usual character, it being moved in usual manner by or through the medium of a screw-thread of ordinary construction, which may be operated by the ordinary reversing-gears (not shown) of the lathe.

The parts constituting the essential element of my invention are preferably mounted upon a slide S, movably mounted upon a block and having at its under side suitable dovetailed projections 8, (see Fig. 1<sup>a</sup>,) which fit a dovetailed projection 7 at the upper side of a plate 6, secured by a suitable bolt 5<sup>x</sup> to the upper side of the traveling carriage 13 in usual manner. The slide S is provided with a feed-screw 14, represented as provided with a crank 15, having a handle 16 to be engaged by the hand of the operator, the rotation of said feed-screw in a nut 10<sup>x</sup>, held on the plate 6 by a set-screw 12<sup>x</sup>, enabling the slide S to be slid horizontally in either direction transversely of the length of the lathe, said slide being so adjusted when it is desired to move the rotating cutter or tool to be described toward or from the work, the latter being supported in any usual manner, preferably between live and dead centers of a lathe.

Instead of the particular means referred to for adjusting the slide I may use any other usual or suitable appliances.

The slide S has a groove or slot 17, represented as of **L** shape, said groove receiving the enlarged foot or head 18 of a bolt 19, the shank of said bolt being extended upwardly through an enlarged opening 20 of a holder-support 21, having at its under side a rib or projection (see Fig. 1) which enters the upper end of the slot 17, (see Fig. 2,) said rib and slot preventing any slipping or undue lateral movement of the support on or with relation to the slide S. The bolt 19 is also extended through an enlarged opening in a holder to be described, the upper end of the bolt receiving upon it a nut, at the under side of which is a spherical bearing-surface or washer 32, said surface or washer entering a suitable seat at the upper end of the hole made through the holder C.

The holder C in the form in which I have herein represented it is provided with an extended foot 23, containing a suitable tipping device, shown as a screw 28, notched at 29, for the reception of a screw-driver, the opposite edge of the holder being adapted to tip or rock on or with relation to the support 21 by or through a projection, as 26, and a groove 27, the projection being herein represented as

extended from the holder, the groove being represented as made in the support; but the converse of this—that is, making the groove in the holder and extending the projection from the support—would operate equally as well, the purpose of the groove and projection being to form a tipping-point for the holder, and the extension 23 is of such shape that preferably when the right-hand side (see Fig. 4) of the holder is vertical the end of the screw 29 is inserted sufficiently through the foot or portion 23 of the holder to leave a space 23<sup>x</sup> between the holder and the support, so that by turning said screw in one or the other direction the holder may be tipped to the right or to the left, viewing Fig. 4, such tipping being determined by the extent of movement imparted to the screw, and by varying the extent of this tipping movement it is possible to change the direction of the thread, chase, or groove, so that it will constitute a right or left hand thread or groove, and the pitch of this groove either to the right or to the left may also be determined by the position of the tipping device 29.

The holder C is provided with a suitable groove or guideway, (shown in Fig. 4 as of dovetail shape,) in which enters a cutter-carrier, (shown as a slide 35,) a suitable gib 35<sup>x</sup> in said guideway and coacting with one edge of the slide and acted upon by suitable screws c enabling any wear in the slide to be readily compensated for. This slide serves as a support for a tapering hub 36, the larger end of the hub being outermost, and the rotating cutter or tool 25 has made in it a conical hole which fits the exterior of the hub 36, so that when said cutter is mounted upon said hub the rear side of the cutter may contact with the face of the slide 35, retaining the cutter in its operating position. The hub 36 has a central hole which receives a stud-screw 37, which enters a threaded hole in the slide 35, said stud-screw when set up confining the hub in place against any lateral movement with relation to the slide, and to prevent any rotative movement of the hub with the cutter I employ one or more dowel-pins 38, which by entering holes in the slide and in the hub prevent the rotation of the hub. The slide 35 has a guideway 42, said guideway receiving a block 46, which surrounds an eccentric 47, extended from one end of a stud 48, mounted loosely in a suitable hole in a hub 49, fixed to the lower end of an actuator 40, represented as a hand-lever. The hub 49 enters a cylindrical chamber formed in the holder C, and said hub turns in said chamber when the actuator is turned to move the slide 35, and in the movement of the actuator the stud is made to travel to and fro, causing the block 46, entered by it and standing in the slot 42, to move the slide or carrier backward and forward after the operation of each of the teeth of the cutting-tool in forming its cut in the work. The back stroke or movement of the actuator 40, to the

left in Fig. 2, is controlled as to its position by a suitable adjustable stop 80.

The cutter 25 herein described is of the class represented in United States Patent No. 632,678, dated September 5, 1899, and issued to Herman Dock. In the use of this cutter as provided for in said patent each tooth operates independently of the other, and in order that each tooth may cut its own proper part of the thread or groove the slide must be moved to and fro and the cutter must be rotated, and to provide for varying the forward throw of the carrier I have applied loosely in the hub 49 the stud 48, carrying the eccentric, and have provided the outer end of said stud with a suitable locking device, represented as a yielding or spring arm 62, having a suitable finger-piece or head 66, and by engaging said finger-piece or head a pin or projection 66<sup>x</sup>, extended from the under side of said locking device, may be withdrawn from any one of a series of holes 65, made in the actuator and put into any other hole of the series, the pin when retracted from a hole being normally pressed against the actuator ready to enter automatically another hole 65, the turning of the stud putting the same in a position to change the throw or stopping-point of the cutter when the actuator is moved to the right, viewing Fig. 2. The end of the stud 48 is reduced to provide a portion 63, over which is fitted a hub at the end of the arm 62, and said arm may be secured to said stud by means of a suitable pin put in a hole in the hub of said arm and entering a hole 60 in the reduced portion 63 of the said stud 48. Whenever the cutter is put into its operative position, the back of the tooth—viz., the tooth which is doing the work—rests against an adjustable abutment 76, which not only steadies the cutter and resists any tendency of the same to turn on the hub, due to the action of the tooth on the bar being cut, but by making the abutment adjustable provision is made for compensating for wear of the cutter and also for exactly positioning the cutting edge or corner of the cutter, that it may attack the work at exactly the proper angle. I have referred to a slot 42 as provided in the slide 35. In making this slot I first mill a round hole 43 into the slide from its inner side, said hole extending partially through the slide, (see Fig. 5,) and thereafter I insert in said round hole suitable segments 45 and attach them in any suitable manner with their faces exactly parallel, as by suitable screws or rivets 44. These segments are made from steel, and they add very largely to the durability of the apparatus, and they afford side walls for the groove 42, which will resist any amount of wear. The slot 42 must present straight sides, and to mill such a slot in the slide is a very difficult and expensive operation; but by first forming a circular cavity and thereafter filling in said cavity by the detachable segmental walls the expense of construction is greatly

reduced and also the apparatus is rendered far more durable. The hub 49 is provided with an annular groove 57, (see Fig. 5,) in which is entered a locking device (shown as a plug 55) having a projection 56 to enter said groove, said plug being confined in working position by means of a suitable set-screw 58. Should it be desired to remove the actuator, it is only necessary to turn out the screw 58 and drop the stud 55 from engagement with the groove 57. It will be assumed that when the holder occupies such a position by or through manipulating the tipping device 29 that the right-hand side of the holder occupies a truly-vertical position the rotary cutter or tool if moved forward into its working position, Figs. 1 and 2, would effect the cutting of an annular groove; but by turning the tipping device 29 to tip the holder to the left, Fig. 4, a thread, chase, or groove—say a right-hand groove—would be cut, but by tipping the holder in the opposite direction or to the right of the vertical line then a thread, chase, or groove of the opposite hand would be cut by the tool in its working position, and so by tipping the holder more or less out of true vertical position in either direction the desired pitch of either a right or left hand thread, chase, or groove may be determined to a nicety.

I believe that I am the first to mount a circular-toothed cutter or tool such as described in said patent upon or with relation to a tip-pable holder so that tipping the holder will enable the tool to cut either a right or a left hand thread, chase, or groove, and by tipping it for a greater or less distance to one or the other side of a vertical line the pitch of the thread, chase, or groove may be varied, and I therefore desire to claim, broadly, this novel feature of my invention. The holder has a suitable stud 48<sup>x</sup>, upon which is mounted a pawl or device 70 for imparting to the cutter or tool its rotary or step-by-step movement, as desired. This pawl is not in itself broadly new, but I have provided it, at its end, (see Fig. 7) with a notch 75, said notch enabling the teeth of the cutter or tool when the slide is moved forward to put the cutter or tool in working position from contacting over the sharp edge of a tooth of the cutter. Viewing Fig. 1, showing the cutter or tool in its working position, it will be seen that the end of the pawl rests by gravity upon the back of a tooth. The tooth then in operation has performed its work and has cut the thread or chase to the depth that the tooth is capable of cutting, the operator engages the actuator 40 and turns it to the right, viewing Fig. 1, and in so doing also moves the slide 35 to the right, taking with it the cutter or tool, and the tooth next to the left of the tooth on which the pawl rests contacts at one side with the ends of the pawl and the cutter is rotated to the proper extent; but when a new tooth has been brought into operative position and the actuator is turned in the opposite direction

or to the left, viewing Fig. 1, to put the next tooth to follow in the thread or chase in its operative position, the edge of that tooth or teeth which pass under the free end of the gravitating-pawl pass through the grooves 75 and the cutting edges of the tool are not impaired by contacting with the pawl. This provision enables a cutter to be kept sharp for a much longer period than when the sharp edges contact with the pawl. Preparatory to tipping the holder I loosen the set-nut 30, so that the holder may be moved up or down freely under the action of the tipping device 29, and thereafter, the holder having been put in the desired working position, the set-nut 30 is turned down to contact firmly with the holder.

The invention herein described is not intended to be limited to the exact construction of the different devices represented, and instead I may employ any other usual or suitable devices for accomplishing the novel purposes herein set forth, and hereinafter I shall designate the so-called "slide" in the claims at times as a "carrier."

By adjusting the eccentric in the actuator and in the block entering the groove of the cutter-carrier it is possible to provide for such fine adjustment of the cutter in its operative position as to insure the greatest possible accuracy in the depth of cut made in the work.

When the tipping device occupies such position in the holder as to enable the under side of the holder to lie flat on the support underneath it, the cutter may then be supposed to occupy a position in which it will cut a left-hand thread or groove of the greatest pitch, and by turning said screw to contact with said support and tip the holder the pitch of the left-hand thread may be greatly lessened until the cut made by the teeth of the cutter will represent an annular groove, and thereafter further tipping of the holder in the same direction or to the right will change the thread or groove to a right hand, and yet further tipping of the holder will vary the pitch of the right-hand thread.

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

1. In an apparatus of the class described, a holder, a cutting-tool, and a carrier therefor, said carrier having a slot provided with removable sides, a block in said slot, and means to move said block to actuate said carrier.

2. In an apparatus of the class described, a holder, a cutting-tool, a carrier therefor, an actuator to move said carrier, and an adjustable connection between said actuator and carrier to move the latter to and fro.

3. In an apparatus of the class described, a holder, a cutting-tool, a carrier therefor, an actuator to move said carrier, a connection carried by said actuator and engaging the carrier to move the same to and fro, change of position of said connection controlling the ex-

tent of movement of the carrier and its tool toward the stock being operated upon.

4. In an apparatus of the class described, a holder, a cutting-tool, a carrier therefor, an actuator mounted in said holder and provided with an eccentric-stud engaging and moving the carrier positively in both directions, and means to adjust the eccentric in said actuator to define the operative position of the cutting-tool.

5. A holder, a cutter-carrier having a slot, an actuator, an eccentric-stud mounted in said actuator and entering said slot, and locking means carried by said stud and cooperating with said actuator, said locking means retaining the eccentric-stud in its adjusted position as and for the purposes set forth.

6. A movable cutter-carrier having a slot, a holder for the same, an actuator mounted in said holder and provided with an eccentric-entering said slot, and means to turn said eccentric in said actuator.

7. In an apparatus of the class described, a holder, a carrier, an actuator, an eccentric-stud, a block cooperating with said stud and entering the slot in the carrier, and a locking device made as a spring-arm which may be disengaged from and again reengaged with different parts of the actuator whenever desired.

8. A cutter-carrier, a holder to guide said carrier in its movements, a tapered hub connected with said carrier and serving as a pivot for a rotary cutting-tool, and a pin engaging said hub and carrier to prevent rotation of the hub on the carrier.

9. A cutter-carrier having a screw-threaded opening and a hole at one side thereof, a tapered hub bored centrally to receive a stud-screw the latter entering the threaded hole of the carrier, and a pin entering holes in the carrier and hub to prevent rotation of the hub upon the carrier.

10. A holder, a cutter-carrier, a toothed cutting-tool mounted thereon, a pawl having its end notched and engaging the teeth of said tool to rotate it about the hub when the carrier is moved in one direction, the edge of the teeth of the cutter when the carrier is moved in the opposite direction passing through said notch, thereby avoiding dulling the edges of the teeth of the toothed cutter.

11. In an apparatus for cutting a thread, chase or groove, a holder for a cutter-carrier, and a support to sustain said holder, the holder and support presenting one a projection and the other a groove, said projection and groove cooperating to prevent the movement of said holder and said support in a direction longitudinal of the axis of the stock being acted upon.

12. A holder, a support therefor, a movable cutter-carrier, a cutter of the character specified mounted on said carrier, and means to tip said holder to determine the direction of the thread to be cut by the cutter.

13. A holder, a support therefor, a cutter-

carrier movable in said holder, a rotatable toothed cutter mounted on said carrier, a holder for said carrier, means to tip said holder to determine the direction of the thread to be cut by the cutter, means to rotate said cutter that its teeth may be brought successively into operative position.

14. A holder, a support for the same, a cutter-carrier movable in said holder, a toothed cutter mounted on said carrier, means to tip said holder to determine the direction of the thread to be cut, means to move said carrier toward and from the work, and to rotate said cutter that its teeth may be brought successively into operative position.

15. In an apparatus of the class described, a holder having a projection and a screw entering a threaded portion of said projection, a carrier and a rotary toothed cutter mounted thereon, combined with a tipping device to tip said holder and throw the axis of rotation of the cutter more or less out of a horizontal plane to thereby determine the pitch of the thread, chase or groove to be cut by the cutter.

16. In an apparatus of the class described, a holder, a support therefor, a carrier and a toothed cutting-tool mounted thereon, a screw carried by said holder, the rotation of said screw tipping said holder in one or the other direction to thereby incline the axis of rotation of the cutter in one or the other direction with relation to the longitudinal axis of the stock being cut to thereby enable the teeth of the cutter to cut either a right or a left hand thread, chase or groove, as desired.

17. In an apparatus of the class described, a holder for a cutter-carrier, a support to sustain said holder, a projection on one entering a groove of the other, a cutter-carrier, a cutting-tool mounted on said carrier, and a tipping device to tip said holder on said support to enable the teeth of the cutter to cut a thread, chase or groove either right or left hand, as desired.

18. A holder, a cutting-tool, a carrier therefor, an actuator to move said carrier in said holder, a support on which said holder is mounted, a tipping device occupying a normal position on said support when the face of said tool occupies a position in a vertical plane, the turning of said tipping device in one direction tipping the holder and cutter in a direction to cut a left-hand thread, while tipping the holder and cutter in the opposite direction enables it to cut a right-hand thread.

19. In an apparatus of the class described, a holder, a support on which said holder is mounted to be tipped, means to tip said holder on said support, a bolt extended through said support and holder, a nut applied to said bolt and having at its under side a spherical bearing-surface adapted to be seated firmly upon the holder in any of its tipped positions to confine said holder firmly in the proper position to cut a thread, chase or groove of the desired hand.

20. In an apparatus of the class described, a cutter-carrier, a holder for said carrier having a circular opening, an actuator having a circular hub extended from one side thereof and entering said opening, means to retain said hub in said opening, and a device carried by said hub and engaging the carrier.

21. In an apparatus of the class described, a cutter-carrier, a toothed cutter mounted thereon loosely and a notched pawl to rotate said cutter, the notch in the pawl avoiding contact with the cutting edges of the teeth of the cutter.

22. A holder, an actuator mounted thereon, a carrier, a cutting-tool carried thereby, a stud carried by said actuator and engaging said carrier, and an adjustable stop to arrest the backward stroke of said actuator at the predetermined point.

23. A holder, an actuator mounted thereon, a slotted carrier, a cutting-tool carried thereby, a stud carried by said actuator and provided with an eccentric, a block entered by said eccentric, said block entering a slot in said carrier.

24. In a machine of the class described, a holder, a cutter and a support to sustain said holder embracing a groove and ridge upon which said holder may be tipped or rocked means of raising and lowering the side of said holder remote from said groove and ridge, and means of clamping the holder to the support located intermediately of the groove and ridge and the means of raising and lowering the holder and thereby firmly clamping the holder in different positions of angular adjustment to the support.

25. The combination with a cutter-carrier and a toothed cutter rotatably mounted thereon, of a notched pawl and means to actuate it to engage the side walls of the teeth of the cutter to rotate it at the desired times, said pawl having a groove to span and clear the cutting edges of the teeth of the cutter when the slide is being moved to put the cutter in its operative position.

26. In an apparatus of the class described, a tippable holder, means to tip the holder to place it at any desired inclination, means to lock the tipped holder in place, and a cutter-carrier and cutter movable with said holder as the latter is tipped, whereby the teeth of the cutter may be so inclined with relation to the axis of rotation of the stock as to enable a thread, chase or groove to be cut right or left hand as desired.

27. A rotatable cutter, a separate tapering hub therefor, said hub having a central opening for the reception of a screw by which to attach it in position.

28. A carrier, a rotatable cutter having a conical eye and a separate conical hub fitted therein and attached to said carrier, said hub supporting said cutter loosely and maintaining said cutter against the carrier.

29. In an apparatus of the class described, a holder having a guideway, a tool-carrier, a tool-carrying slide fitted in said guideway and provided at one face with a circular cavity extending partially through the slide, said circular cavity having fixed in it segmental wear-blocks leaving straight-sided slots between the parallel faces of said blocks.

30. In an apparatus of the class described, a cutter-carrier, a toothed rotatable cutter mounted thereon, an actuator operatively connected with said carrier, and an eccentric movable with the actuator, the adjustment of said eccentric providing for accuracy and fine adjustment as to depth of thread to be cut in the stock.

31. In an apparatus of the class described, a cutter-carrier, a toothed rotatable cutter mounted thereon, an actuator operatively connected with said carrier, a back-stop to limit the movement of said actuator as the carrier and cutter are moved into their inoperative positions, an adjustable eccentric carried by the actuator, the movement of which enables the teeth of the cutter mounted on the cutter-carrier to be exactly positioned with relation to the center of rotation of the bar or rod being cut.

32. In a machine of the class described, a holder, a support for said holder, a cutter of the class described and means cooperating with said holder to present said cutter in position to act upon the work, means to tip the said holder and adjust the axis of rotation and plane of cutting action of said cutter at a proper inclination to the axis of rotation of the work to equalize the side clearances of the cutting-surfaces of the tool below the cutting edges in the threads or grooves of differing degrees and directions of pitch.

33. In a machine of the class described, a holder, a cutter-carrier mounted in said holder, an actuator having a hub entering a chamber in said holder, and having only rotative movement therein, and a device to retain said hub in said chamber and yet permit the actuator to be moved to and fro to actuate the cutter-carrier.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EDWARD RIVETT.

Witnesses:

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MARGARET A. DUNN.