Jan. 6, 1970 J. FRIEDMAN 3,487,777

ROTARY MARKING TOOL

Filed Sept. 18, 1967

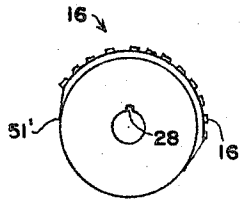


FIG.2

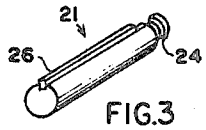


FIG.3

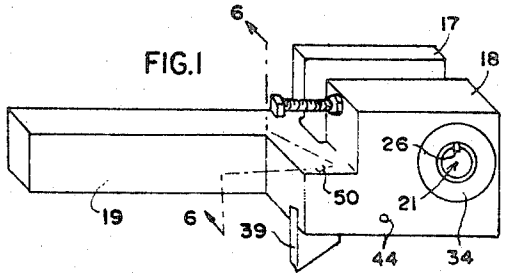


FIG.1

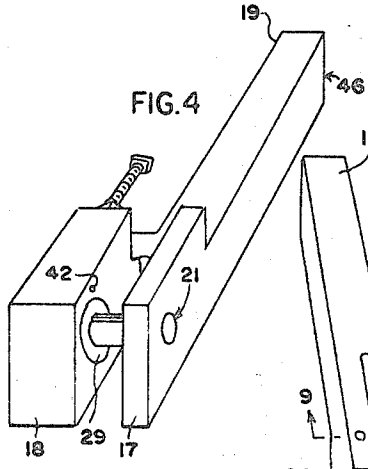


FIG.4

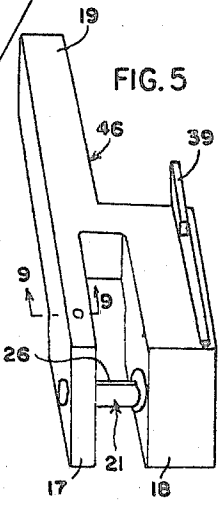


FIG.5

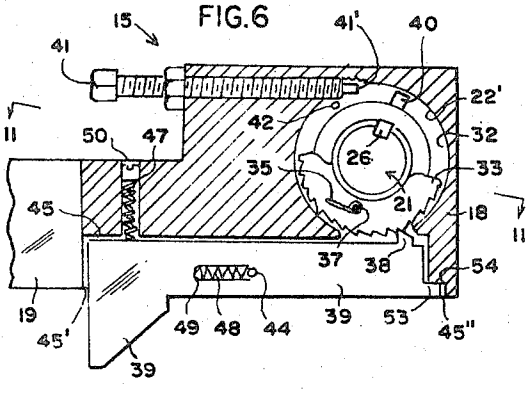


FIG.6

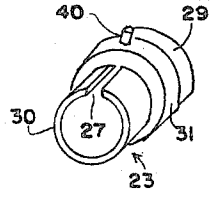


FIG.7

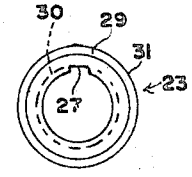


FIG.8

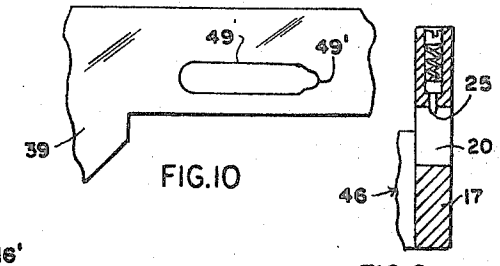


FIG.10

FIG.9

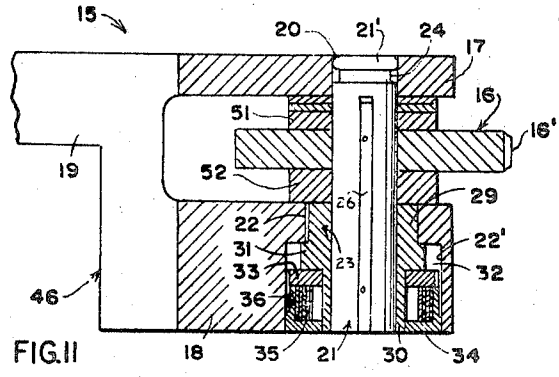


FIG.11

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ROTARY MARKING TOOL

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ABSTRACT OF THE DISCLOSURE

A rotary marking wheel is biased by a spiral spring to return to a start position. To return the wheel after marking, the tool is retracted from the surface being marked and a pawl is shifted to disengage from a ratchet included in the mechanism. The pawl is mounted for both a swinging movement and a straight line movement, to disassociate and then associate itself with the ratchet, either one of which movements is sufficient to shift the pawl. Pawl shift is accomplished by contact with a fixed stop on the machine mounting the tool, or by a cam. The pawl cooperates with the tool body to keep its mechanism free from chips entering therein. The start position of the marking wheel is determined by an adjustable set screw on the tool body, and an auxiliary pin is provided as a safety measure to keep the spiral spring from unwinding if the set screw is absent, or improperly set. The spindle is manually shiftable out of the assembly for replacement of marking wheels.

The present invention relates to rotary marking tools of the type employing a marking wheel which is brought to bear against a rotating piece of work to make its impression thereon. Upon completion of the marking operation and withdrawal of the marking tool from the work, the marking wheel which is spring-loaded, automatically returns to an initial start position. A suitable means is included to prevent reverse rotation of said wheel until the tool is withdrawn from the work.

An object of this invention is to provide a novel and improved rotary marking tool of the character mentioned, in which all control mechanism is permanently housed in the body of the tool and protected from flying chips which are incident to machining operations occurring in the environment and operation of said tool; said mechanism being engaged for proper action upon the mere insertion of a removable spindle which mounts the marking wheel.

Another object thereof is to provide a novel and improved rotary marking tool of the kind set forth, affording easy mounting, removal and change of the marking wheel by a simple hand manipulation without the use of any tool whatsoever, and without the necessity of moving any parts which hold the spindle in operational assembly.

A further object of this invention is to provide a rotary marking tool of novel and improved construction, affording means to adjust the start position of the marking wheel.

Another object of this invention is to provide a novel and improved rotary marking tool of the kind described, employing a spiral spring held in tensed condition to accomplish the return of the marking wheel to its prescribed start position, and including means which prevents said spring from accidently unwinding to untensed condition. This feature is also useful to facilitate assembly of the tool during its manufacture for it holds the spring in spiral form in its casing.

Another object thereof is to provide in such rotary marking tool, a ratchet which is biased by said spiral spring, so that upon shifting a holding pawl associated with said ratchet, the marking wheel will be caused to return to its start position. In various installations where this tool is used on lathe machinery, automatic screw

machines and the like, there is some means to shift the pawl after the tool is parted from the work. In some places, the work moves away from the marking tool. In any event the pawl meets or is shifted by an intercepting bar, cam bar, cam or push element upon the parting of the tool and the work. To make the tool adaptable to these various manners of pawl interception and shift, I provide that the pawl can be shifted to swing away from the ratchet, or be given a straight line sliding motion, to leave the ratchet.

Still a further object thereof is to provide a novel and improved rotary marking tool of the character set forth, having the features mentioned, and which is simple in construction, reasonable in cost to manufacture, and efficient in carrying out the purposes for which it is designed.

Other objects and advantages will become apparent as this disclosure proceeds.

In the accompanying drawing forming part of this specification, similar characters of reference indicate corresponding parts in all the views.

FIG. 1 is a perspective view of a preferred embodiment of a rotary marking tool in accordance with the teachings of this invention. The marking wheel is omitted.

FIG. 2 shows a flat face of the marking wheel whose periphery carries the indicia to be engraved.

FIG. 3 is a perspective view of the removable spindle on which the marking wheel is to be mounted.

FIG. 4 is a rear perspective view of FIG. 1.

FIG. 5 is a bottom perspective view of FIG. 1.

FIG. 6 is an enlarged section taken at line 6—6 in FIG. 1.

FIG. 7 is a perspective view of what may be called the main hollow shaft into which the spindle of FIG. 3 fits.

FIG. 8 is a rear view of FIG. 7.

FIG. 9 is a section taken at line 9—9 in FIG. 5, shown enlarged.

FIG. 10 is an enlarged fragmentary view of the pawl.

FIG. 11 is a section taken at line 11—11 in FIG. 6, and the marking wheel is shown on its spindle.

In the drawing, the numeral 15 designates generally the rotary marking tool comprising a marking wheel 16 positioned between the arms 17, 18 of an enlarged U-shaped body member which is at the end of a shank 19, thereby forming a clevis. The arm 17 is relatively thin in relation to the arm 18. Each of these arms is provided with a bore; said bores being coaxial. In the arm 17, its bore 20 serves as a bearing for one end of the spindle 21 which is for carrying the marking wheel 16. In the arm 18, its bore 22 which acts as a bearing for one end of the hollow shaft denoted generally as 23, has a relatively large and deep counterbore 22', which has its opening in the outer face of the arm. The length of said spindle 21 is equal to the distance between outer faces of said arms 17, 18. The end of said spindle which is supported in the arm 17, has an annular groove 24, which is releasably engaged by the spring-biased plunger pin 25, mounted through the arm 17; said pin normally extending into the bore 20. The balance of the length of said spindle, has a key 26 fixed therealong, for engagement with the keyway 27 which is along the entire length of the main shaft's interior, and for engagement with the keyway 28 through the central hole in the marking wheel 16.

The length of the tubular main shaft 23 is equal to the thickness of the arm 18, and its ends are flush with the faces of said arm respectively. Said spindle 21 fits slidingly within said tubular shaft, and is manually insertable and removable from the device 15. This tubular shaft comprises the end part 29 which revolvably fits in the bore 22, its other end part 30 of reduced outer diameter, and an intermediate collar 31, whose outer dia-

meter is smaller than the diameter of the counterbore **22'**, whereby the annular space **32** is provided. The reduced part **30** of said tubular shaft carries the ratchet wheel **33**, which is fixed thereto in any suitable manner. The numeral **34** denotes a ring casing housing a spiral spring **35**; said casing being force-fitted into the mouth of the counterbore **22'**, to act as a closure therefor; the rim of said casing, bearing slightly on the face of the ratchet wheel, whereby said main shaft **23** is held against longitudinal movement. The hole in said ring casing serves as a bearing for the free end of the shaft part **30**. The outer end of the spiral spring **35** is fixed at **36** to the casing **34**, and its inner end is fixed to an anchor pin **37** extending from the ratchet wheel **33**. The assembly is such that said spiral spring **35** is in constant stressed condition, and is further stressed upon rotation of the spindle **21**, in clockwise direction in FIG. 6. The teeth of the ratchet wheel **33** and the tooth **38** of the pawl **39** are arranged to allow only such clockwise rotation of the spindle **31**, when said pawl and ratchet are in engagement, and to make it necessary for said pawl to be disengaged from the ratchet, to allow counter clockwise movement of the spindle **21**. A pin **40** extends radially outward of the collar **31**, for cooperation with the adjustable set screw **41**, which is threadedly mounted in the arm **18**. The interception of the pin **40** by said screw **41**, determines the start position of the marking wheel **16**. A fixed pin **42**, extending from the body of the arm **18**, into the space **32**, a little further for the pin **40** to reach, is provided as a safety stop for the pin **40**, to hold the spiral spring **35** from unwinding, after it is installed during the manufacture of the device, and thereafter, should the screw **41** be withdrawn, out of the path of said pin **40**. The numeral **44** indicates the pivot pin supporting the pawl **39** for a slight swinging movement, as well as for a slight longitudinal movement, either movement when occurring accomplishing disengagement of the said pawl from the ratchet **33**, because normally, the pawl's tooth **38**, is in engagement with a tooth of the ratchet wheel **33**. due to the action of the stressed compression coil springs **47**, and **48**, on the pawl **39**.

In the embodiment illustrated herein, the pawl is a flat blade member in the general plane of, and positioned below said ratchet wheel, within a recess **45**, which extends upwardly from and opens in the bottom surface of the arm **18** of the body **46** of the tool **15**. This recess is along said arm, and is communicative with the annular space **32**, so that the pawls tooth **38**, can reach the ratchet **33**, for proper engagement therewith, and allow pawl movement along said arm, or a swing movement of said pawl, to cause disengagement from said ratchet. Said pawl **39** substantially fills said recess, for its faces are in wiping contact with the opposite recess walls **45'**, and there is only a required slight clearance to permit the said pawl movements, longitudinally and for the slight swing about the axis **44**, which is a pin across said recess and through the longitudinal slot **49** in said pawl, which slot houses the spring **48**. One end of this spring bears against said axis pin, while its other end bears against the end of the slot **49**, so the pawl **39** is biased so its tooth **38** seeks engagement with the ratchet wheel **33**. To permit this spring **48** to be of sufficient strength, and hence its size, not to be limited by the diameter of said axis pin, the slot **49**, at the end thereof against which said axis pin normally rests, is a reduced opening of semi-circular perimeter as indicated at **49'**, to admit one half of the axis pin **44**, while the remainder of said slot is of a larger width to serve as the space for said spring **48**. Said pawl **39** is also biased by the spring **47** housed in a bore **50** in the arm **18**; said bore **50** communicating with said recess **45**, so said spring **47** does press on said pawl, whereby said pawl is urged so that its tooth **38** seeks engagement with said ratchet **33**.

To have the tool ready for use, the head end **21'** of the spindle **21**, is pushed inward with a finger, whereupon said spindle is released from the spring plunger **25**, free for removal, or else is slid to clear the space between the arms **17** and **18**, so the marking wheel **16** and any necessary spacer washers **51**, **52** are mounted on said spindle as shown in FIG. 11. The periphery of said head end **21'** is rounded to facilitate disengagement and then engagement by the spring plunger **25**. One manner of use of the tool **15**, is to mount the shank **19** thereof in a proper tool post on the cross feed of a lathe, with the marking characters **16'** of the marking wheel nearest the work rotating with the lathe's chuck. When the tool is advanced to the work in the lathe so that the characters **16'** will bear with pressure onto the work, the marking wheel **16** will be turned a part of a revolution, and will halt when the marking operation is completed because of the relief at **51** in the marking wheel; no reverse rotary movement of said marking wheel being permitted due to the action of the spring-biased pawl whose tooth **38** holds the ratchet wheel **33**.

An element fixed on the frame of the lathe, in the path of the pawl's tab **39'**, when the tool **15** is withdrawn from the work, serves to shift the pawl, either to cause the pawl to swing about the axis pin **44**, or to slide longitudinally, as the set up may have been arranged to act, whereupon the pawl's tooth **38** is disengaged from the ratchet **33**, and thereupon the spiral spring **35** which became further stressed by the forced rotation of the marking wheel when the latter contacted the work piece, will automatically unwind to return the marking wheel **16** to its start position determined when the pin **40** contacts the tip **41'** of the set screw **41**. Adjustment of said set screw will of course alter the normal rest position of the marking wheel. The stop element on the lathe to trip the pawl, or some cam means to shift the pawl, being well known in the machine art, no further illustration of the lathe or its equipment is believed necessary.

When mounted for use, the marking wheel end of the tool **15** is in an environment where metal chips fly during cutting operations occuring thereat. It is important to note, that the construction of this tool prevents any chips from entering its mechanism. None can enter the channel recess **45**, between its side walls and the pawl **39**, because said pawl is fitted in wiping contact with said walls. Flying chips would be in directions towards the advance portion of the marking wheel **16**, so there is no occasion for such chips to enter the tool body at its shank end through the opening **45'**. Good provision is made so none can enter at **45''**, by having the dado offered by the normally contacting upright step **53** extending from the pawl **39**, and the inverted step **54** on the arm **18**.

It is evident that it is extremely easy to change the marking wheel, for which replacement no tools are necessary, since merely using a finger to push out the spindle **21**, is all that is required to allow the dismounting of one wheel and then to mount another.

In review, my new tool of which a preferred embodiment **15** has been set forth, besides being closed against chips from entering its mechanism, and offering easy marking wheel mounting and change without the use of tools, also provides the safety stop pin **42**, to hold the spiral spring **35** from accidental unwinding, and that pawl release movement may be selectively, by either a slight rotary or longitudinal shift.

I claim:

1. In a marking tool of the type comprising a body member, a rotary spindle positioned through said member; said member having an interior space about said spindle, a first wheel within said space, turning with said spindle, a spiral spring within said space, one end of said spiral spring moving with said spindle and the other end thereof being anchored to said member, a marking wheel having marking elements along its periphery and a region of said marking wheel immediately after the end of the last marking character being of reduced radius; said marking wheel being carried on said spindle to turn therewith,

a spring-loaded element movably mounted on said member and extending into said space in such member, normally bearing against said first wheel and acting to hold it against rotary movement in a predetermined direction; said spring-loaded element when shifted away from said first wheel, releasing said wheel for rotation in said predetermined direction; said spiral spring being stressed upon rotation of the marking wheel in a direction opposite to said predetermined direction, the improvement being that the first wheel is a ratchet and the spring-loaded element is a pawl extending along the said member and mounted thereon for longitudinal movement therealong and for swinging movement thereon; either of such movements being sufficient for the disassociation and then the association of said pawl and ratchet; said body member having an elongated recess in the general plane of the ratchet; said recess having opposite parallel walls; the pawl being a flat blade within and along said recess; said recess being communicative with the mentioned space in said member; said blade having a pawl tooth at one end, extending into said space and said blade also having a longitudinal slot intermediate its ends; said slot extending and being open between and at said opposite walls of said recess, an axis pin extending through said slot and fixed to said member, a stressed spring housed in said slot, pushing against said pin and blade whereby the blade is biased to move longitudinally so its tooth engages the ratchet, and stresed spring means carried by said member, biasing said blade to swing it towards said ratchet whereby said tooth engages the ratchet; said blade being shiftable so that said axis pin is at different positions with respect to the ends of said slot.

2. The marking tool as defined in claim 1, wherein said blade substantially fills said recess and its faces are in wiping contact with the opposite walls of said recess respectively; said blade having an upright step extending therefrom towards the end of said body member nearest said tooth, and said member having an inverted step leading to said recess; said steps being in wiping contact.

3. In a marking tool of the type comprising a body member, a rotary spindle positioned through said member; said member having an interior space about the spindle, a first wheel within said space, turning with said spindle, a spiral spring within said space, one end of said spiral spring moving with said spindle and the other end thereof being anchored to said member, a marking wheel having marking elements along its periphery and a region of said marking wheel immediately after the last marking character thereon, being of reduced radius; said marking wheel being carried on said spindle to turn therewith, a spring-loaded element movably mounted on the said member and extending into said space in such member, normally bearing against said first wheel and acting to hold it against rotary movement in a predetermined direction; said spring-loaded element when shifted away from said first wheel, releasing said wheel for rotation in said predetermined direction; said spiral spring being stressed upon rotation of the marking wheel in a direction opposite to said predetermined direction, the improvement consisting of having a pin moving with the spindle upon rotation of said spindle; said pin extending in the mentioned space, a set screw threadedly engaged in the said member, extending into such space and in contact with said pin, adapted to push said pin to give some rotary movement to the spindle; the action of said spring being to urge said pin into contact with said set screw, and a second pin fixed to said member and extending into said space in the path of the first mentioned pin and clear of said set screw, in such position that if the first pin is not intercepted by the set screw, it will be intercepted by the second pin.

4. The marking tool as defined in claim 3, wherein the second pin is close to the region of entrance of the set screw into said space.

5. In a marking tool of the type comprising a U-shaped body member, a spindle positioned through one of the arms of said U-member, in rotatable and slidable relation therewith, a hollow shaft element positioned through the second arm of said U-member, only in rotatable relation therewith; said second arm having an interior space about said hollow shaft element, a spiral spring within said space, a first wheel carried on said hollow shaft element within said space; said first wheel and one end of said spiral spring being secured to the hollow shaft element; the other end of said spring being anchored to the U-member; said spindle extending through said hollow shaft element and fitting therein, a marking wheel having marking elements along its periphery and a region of said marking wheel immediately after the end of the last marking character thereon being of reduced radius; said marking wheel being carried on said spindle between the arms of said U-member; said hollow shaft element and said marking wheel each having a keyway, key means along the spindle engaging said marking wheel and the hollow shaft element in their said keyways whereby on rotation of said spindle, said hollow shaft element and the marking wheel will rotate therewith, means on the U-member releasably holding said spindle against sliding movement and upon release of its hold, said spindle being manually slidable out of said U-member, the marking wheel and the hollow shaft element, a spring-loaded element movably mounted on the U-member and extending into said space in such member, normally bearing against said first wheel and acting to hold it against rotary movement in a predetermined direction; said spring loaded element when shifted away from said first wheel, releasing such wheel for rotation in said predetermined direction; said spring associated with the hollow shaft element being stressed upon rotation of the marking wheel in a direction opposite to said predetermined direction, the improvement being that the means releasably holding the spindle against sliding movement, comprises a spring plunger device mounted on the other arm of the U-member; the spindle having an annular groove in that portion thereof which is within said other arm; the plunger extending into said annular groove and automatically retractable therefrom upon longitudinal movement of said spindle; said spindle being manually shiftable on said U-member to disengage it from said plunger by longitudinal sliding movement whereby it is separated from the U-member, the marking wheel and the hollow shaft element.

6. The marking wheel as defined in claim 5, wherein the spindle is substantially equal to the width of the said U-member.

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U.S. Cl. X.R.

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