Sept. 17, 1963 W. J. KEHALY 3,103,676

UNIVERSAL PORTABLE TOOL

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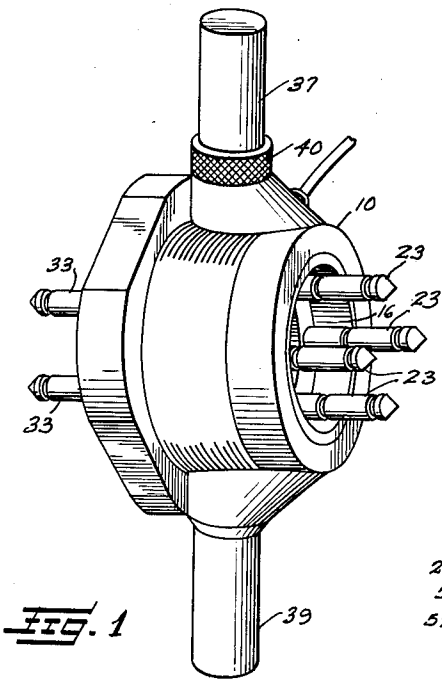


Fig. 1

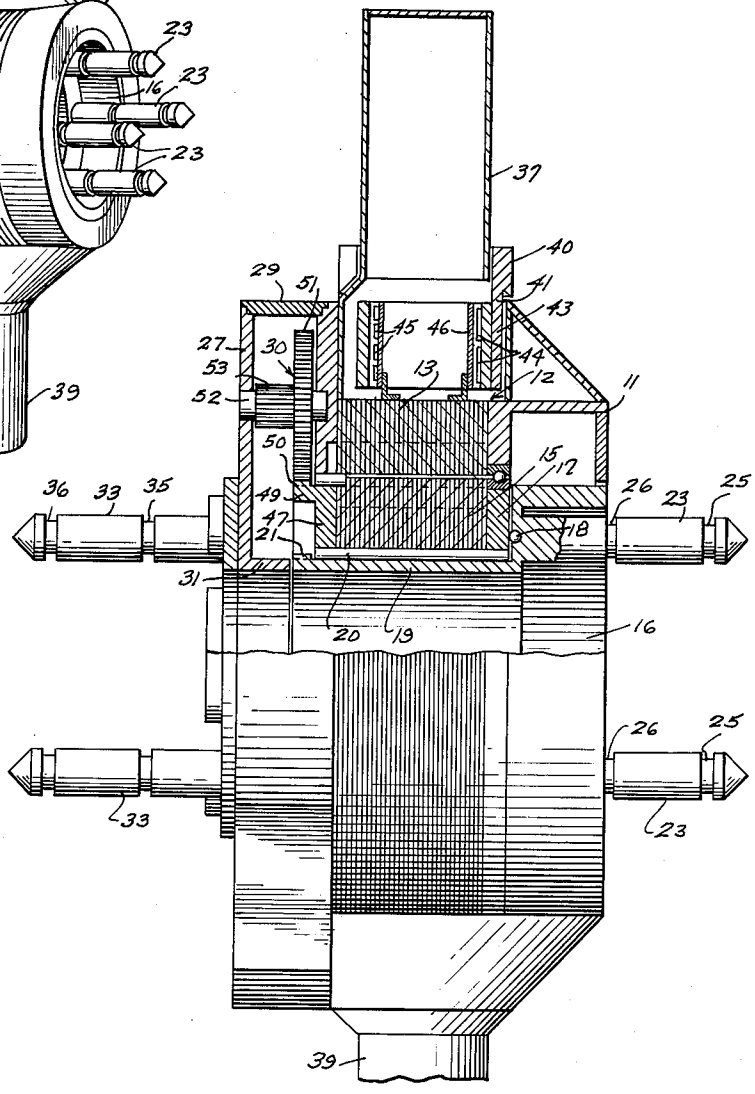


Fig. 2

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Fig. 3

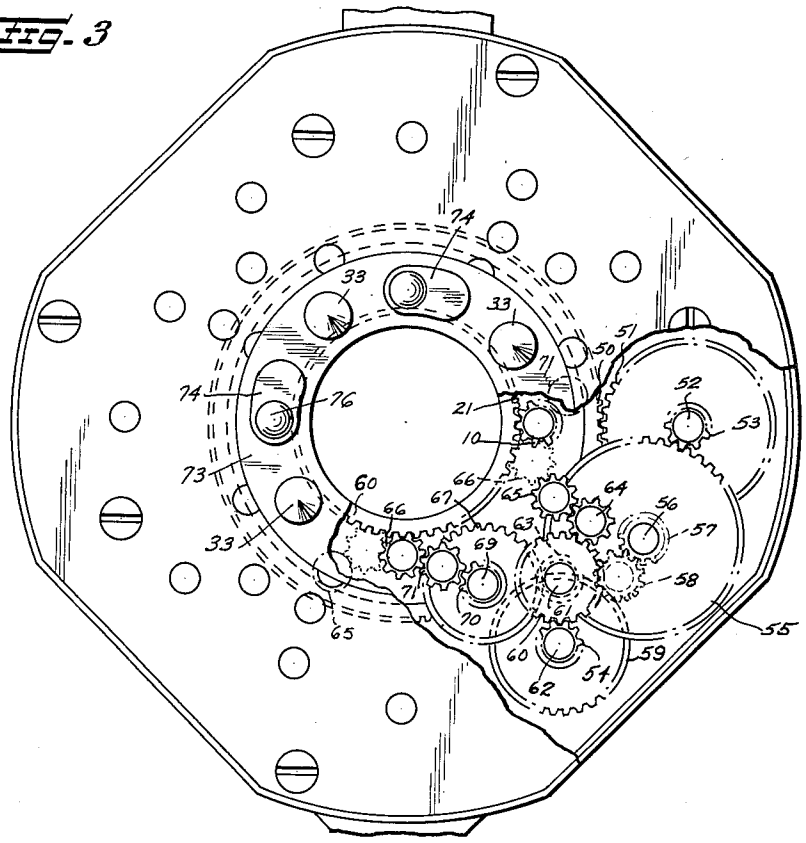


Fig. 4

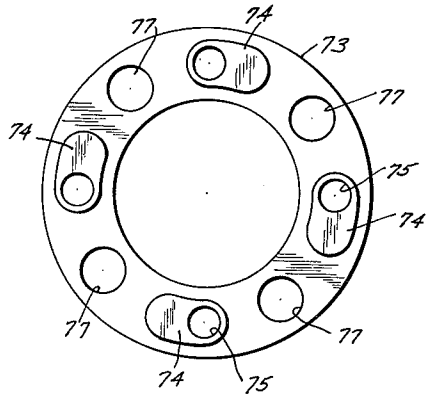
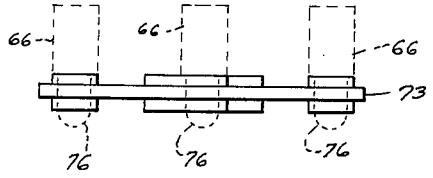


Fig. 5



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Fig. 6

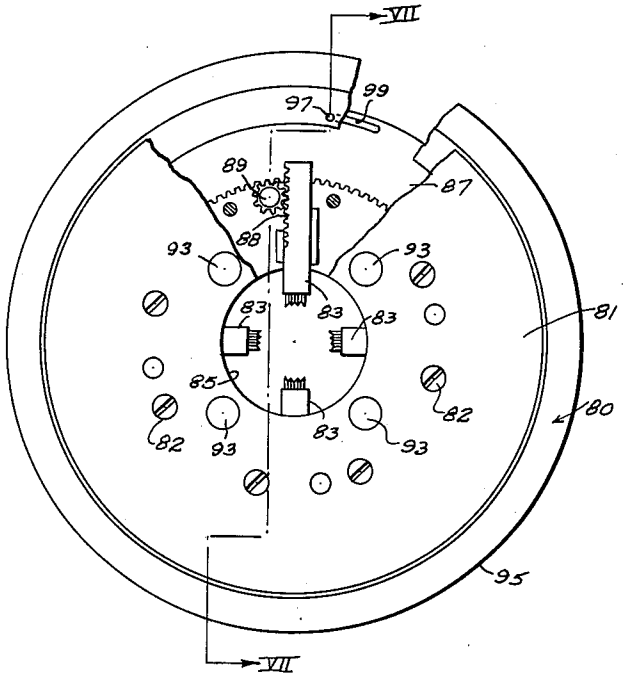


Fig. 7

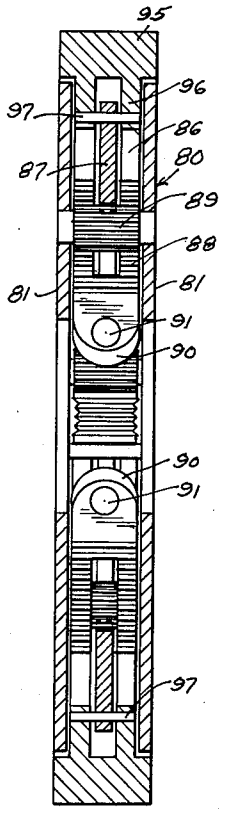


Fig. 8

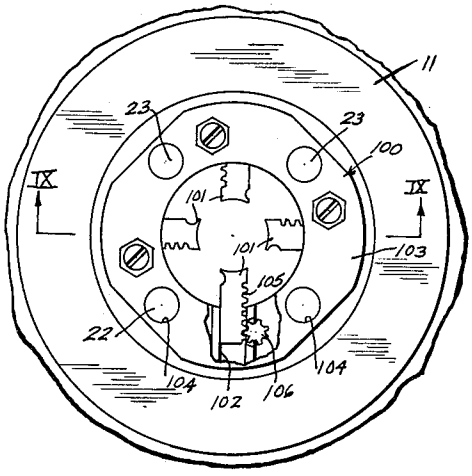
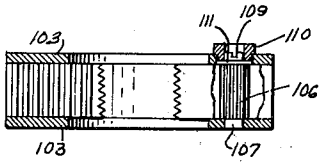


Fig. 9



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Fig. 10

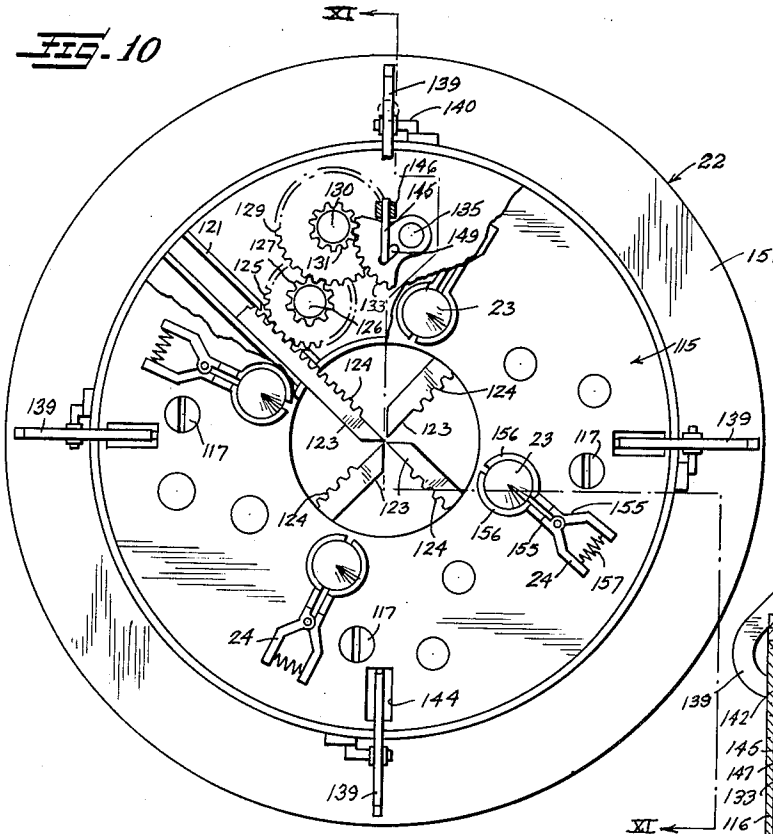


Fig. 11

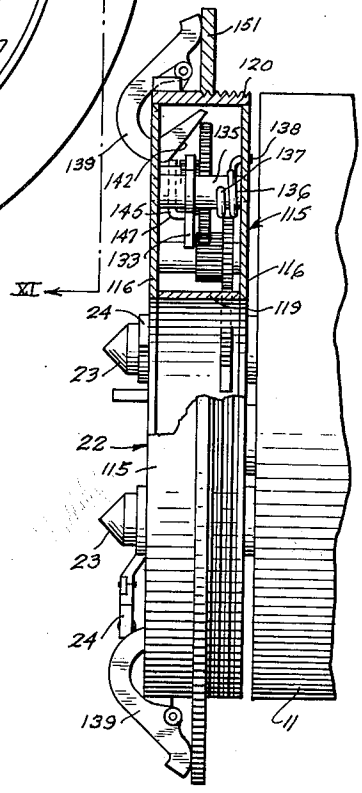
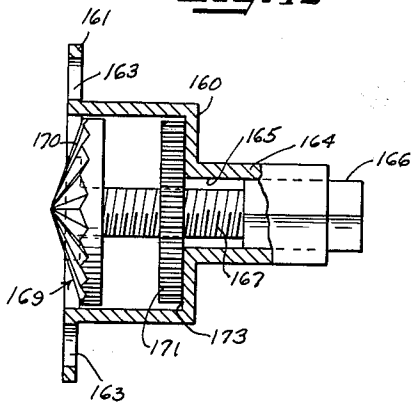


Fig. 12



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Attys

United States Patent Office 3,103,676 Patented Sept. 17, 1963

3,103,676

UNIVERSAL PORTABLE TOOL

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Filed June 21, 1960, Ser. No. 37,777
10 Claims. (Cl. 10—89)

This invention relates to improvements in portable tools and more partticularly relates to an improved form of power driven tool arranged to selectively perform a series of operations on pipe, rods, bolts and the like.

A principal object of the invention is to provide a simple and improved form of universal portable power tool arranged with a view toward adaptability of the tool to perform a large variety of operations on pipe, rods and the like.

Another object of the invention is to provide a novel and improved form of universal tool which may be held by the hand during operation of the tool and is so arranged that the object being worked upon may pass through the rotor of the drive motor for the tool.

A still further object of the invention is to provide a universal threading and cutting tool for pipe and the like, which may also internally ream pipe or sleeves of various kinds and is adaptable to tighten or loosen pipe joints and other threaded objects.

A still further object of the invention is to provide an improved form of universal portable power tool in which the casing for the tool encloses a motor having a hollow rotor and has a series of stationary retainers projecting from one side thereof and a series of rotatable retainers projecting from the opposite side thereof and rotatably driven by the hollow rotor, in which the retainers on one side of the rotor may detachably support a holding tool or chuck while the retainers on the opposite of the rotor may detachably support a die stock and the like.

Still another object of the invention is to provide a portable universal power tool for selectively performing a series of operations on pipe, rods and the like in which the motor for the tool has a hollow rotor through which an article may pass during the operation of threading, cutting or reaming the article, in which stationary retainers project from one side of the motor about the hollow rotor and rotatable retainers project from the opposite side of the motor about the hollow rotor, and in which a geared drive connection is provided to drive the rotatable retainers and includes a change speed disc mounted on the stationary retainers and having drive gears rotatably mounted thereon, adapted to effect a drive to the rotatable retainers at one speed when the disc is in one position on the stationary retainers, and to drive the rotatable retainers at a different speed when the position of the change speed disc on the stationary retainers is reversed.

A still further object of the invention is to provide a portable universal threading and cutting tool having stationary retainers projecting from one side thereof and rotatable retainers projecting from the opposite side thereof, in which the chuck for the object to be worked upon may be detachably mounted on either the stationary or rotatable retainers and consists in a rolling lock adapted to have gripping engagement with the object to be worked upon, and accommodating axial movement of the object, but preventing rotational movement thereof.

Still another object of the invention is to provide an improved form of chuck having a series of radially movable chuck members having rolling locking discs on the ends thereof adapted to have biting engagement with an article to be held, together with an impact disc for engaging the rolling locking discs with the article with an impact sufficient to bitingly engage the rolling locking discs with the article to hold the article from rotation and accommodate axial movement of the article.

A still further object of the invention is to provide a portable universal tool particularly adapted to thread and cut pipe and the like in which the drive motor for the tool has a hollow rotor through which an article being worked upon may pass during the operation of working on the article, and having stationary retainers projecting from one side thereof about the hollow rotor and rotatable retainers driven from the hollow rotor and projecting from the opposite side thereof about the hollow rotor, in which the handles for the tool are hollow and accommodate the placing of switch means and control means for the drive motor therein.

A still further object of the invention is to provide a novel and improved form of portable threading and cutting tool including a casing enclosing a motor having a hollow rotor, through which an article being worked upon may pass, and having stationary retainers projecting from one face of the casing for detachably holding a chuck and the like with rotatable retainers projecting from the opposite face of the rotor for detachably holding a die stock, for cutting or threading tools and the like.

A further object of the invention is to provide a universal threading and cutting tool having stationary and rotatable retainers projecting from opposite sides thereof with a hollow rotor through which the material being worked upon may pass, and having an improved form of cutter adapted to be detachably mounted on either stationary or rotatable retainers.

Still another object of the invention is to provide an improved form of reamer for mounting on a universal threading and cutting tool for reaming pipe, sleeves and the like.

Still another object of the invention is to provide an improved form of threading die stock for detachably mounting on a universal portable cutting and threading tool to perform a threading operation on pipe, rods and the like.

These and other objects of the invention will appear from time to time as the following specification proceeds and with reference to the accompanying drawings wherein:

FIGURE 1 is a perspective view of a universal threading and cutting tool constructed in accordance with the principles of the invention;

FIGURE 2 is a view in side elevation of the cutting tool shown in FIGURE 1, with certain parts broken away in order to show the upper half of the tool in transverse section;

FIGURE 3 is a fragmentary end view of the tool shown in FIGURE 1 with certain parts broken away in order to show the reduction gearing for selectively driving the drive socket for the tool at a plurality of speeds;

FIGURE 4 is a detail view of the speed selecting disc shown in FIGURE 3;

FIGURE 5 is a view in side elevation of the speed selecting disc shown in FIGURES 3 and 4 and showing the drive gears rotatably mounted therein in dotted lines;

FIGURE 6 is a view in side elevation of the chuck or locking device, with certain parts thereof broken away and certain other parts shown in section in order to illustrate certain details of the invention;

FIGURE 7 is a sectional view taken substantially along the line VII—VII of FIGURE 6;

FIGURE 8 is an end view of the threading die stock mounted on the stationary retainers for the tool, with certain parts broken away in order to show the adjustable connection to the threading dies;

FIGURE 9 is a sectional view taken substantially along line IX—IX of FIGURE 8 and illustrating the means for locking and threading dies in position;

FIGURE 10 is a view in side elevation of a cutting die stock constructed in accordance with the invention, with

certain parts broken away and certain other parts shown in section in order to illustrate certain details of the adjusting means for the cutting dies and showing the cutting die stock mounted on the portable tool;

FIGURE 11 is a fragmentary sectional view of the cutting die stock, showing the die stock mounted on one set of retainers for the tool, and taken substantially along the line XI—XI of FIGURE 10; and

FIGURE 12 is a view in side elevation of a reamer constructed in accordance with the invention, with certain parts thereof broken away and shown in section, in order to more clearly illustrate the details of the reamer.

In the embodiment of the invention illustrated in the drawings, I have shown in FIGURES 1 and 2 a casing **11** for a motor **12**, herein shown as having a stator **13** and a hollow rotor **15** journaled within said stator for rotational movement with respect thereto. I have also shown a drive socket **16** extending outwardly of one side of the rotor **15**, adjacent an end wall **17** thereof, with ball thrust bearings **18** interposed between the inner wall of said socket and the end wall **17**. The drive socket **16** has a sleeve portion **19** extending inwardly therefrom through the hollow rotor **15** and suitably journaled thereon on a bearing **20**, which may be in the form of a roller or needle bearing of a well known form. The end of the sleeve **19** opposite the drive socket **16** has an external ring gear **21** thereon, which may be formed integrally therewith for driving sleeve **19** and drive socket **16** from the rotor **15** at a slower speed of rotation than the speed of rotation of said rotor, through change speed gear trains, which will hereinafter be more clearly described as this specification proceeds.

The drive socket **16** has a plurality of retainers or dowels **23** equally spaced about said drive socket and extending outwardly therefrom parallel to the axis of said drive socket. The dowels or retainers **23** form drive means for die stocks or chucks and the like and are shown in FIGURES 10 and 11 as having a threading or cutting die stock **22** detachably mounted thereon and retained thereto by spring clips **24** engageable with outer grooves **25** extending about the retainers **23**. The retainers also have inner grooves **26** formed therein, inwardly of the grooves **25**. If desired a spring clip or snap ring may be placed in each inner groove **26** to limit inward movement of the die stock while a spring clip or ring may be placed in the outer groove **25** to retain the die stock in position. The spring clips **24** may be placed in the grooves **26** when the die stocks are so constructed as to fit entirely within the socket **16**.

The opposite side of the casing **11** from the socket **16** has an end plate **27** mounted thereon and spaced from said casing by a spacer **29**, shown as being of a modified, octagonal form, and forming a peripheral wall for a housing for reduction gearing **30** for driving the sleeve **19** from the rotor **15** at a plurality of selected speeds, as will hereinafter more clearly appear as this specification proceeds. The end plate **27** conforms to the form of the spacer **29** and has an inner internal flange **31** extending inwardly from the inner margin thereof and forming a continuation of the sleeve **19**. The end plate **27** also has a plurality of stationary retainers or dowels **33** projecting therefrom and adapted to have a chuck or the like detachably mounted thereon for holding an article being worked upon from rotation. The stationary dowels **33** have inner and outer grooves **35** and **36**, to receive snap rings or spring clips like the spring clips **24**, and retain various desired holding devices or tools thereto.

It may be here seen that a chuck mounted on the retainers **33** may hold the pipe, rod or the like from rotation while a die stock having threading or cutting dies may be mounted on the rotatable retainers for threading or cutting a pipe. It should be understood, however, that if desired the chuck may be mounted on a rotational retainer and a die stock may be mounted on the stationary retainers, the chuck rotatably driving the pipe or rod or other article being worked upon.

The casing **10** also has two hollow handles **37** and **39** projecting therefrom in diametrically opposite directions. The hollow interior portions of the handles **37** and **39** may form wells for capacitors (not shown), where the motor **12** may be a single phase motor. The handle **37** is shown as having a switch ring **40** guided for movement thereabout. The switch ring **40** has an inwardly extending leg portion **41** extending within the handle **37** in a direction generally parallel to the axis of said handle and having connection with a generally cylindrical member **43** having a series of movable contacts **44** thereon. The movable contacts **44** are adapted to engage stationary contacts **45** on a stationary cylindrical ring **46** suitably mounted within the handle **37**. The switch ring **40** may thus serve as an on and off and reversing switch and may also serve to change the speed of rotation of the motor **12**, by changing the stator winding connections, where the motor may be a two speed motor.

It should here be understood that the motor **12** is preferably a reversible alternating current motor of the squirrel cage type, and may be either a single phase, a two phase or a three phase induction motor. The stator windings may be connected by certain of the contacts **43** and **45** to effect various output speeds of the rotor **15** as desired, in a manner similar to that shown and described in my Patent No. 2,913,236 dated November 17, 1959, and forming no part of the present invention, so not herein shown or described further.

Referring now in particular to the change speed drive from the rotor **15** to the sleeve **19** and socket **16**, said rotor has a side frame member **47** having a flanged portion **49** projecting outwardly therefrom and having an external ring gear **50** formed integrally therewith. The ring gear **50** meshes with and drives a gear **51** on a shaft **52** journaled in the casing **11** at one end and in cover plate **27** at its opposite end. A pinion **53** is suitably secured to the shaft **52** and meshes with and drives a gear **55** on a shaft **56** having a pinion **57** suitably secured thereto. The pinion **57** in turn meshes with an idler pinion **58**, which meshes with a gear **59** on a shaft **62** having a pinion **54** suitably secured thereto. The pinion **54** meshes with a gear **60** on a shaft **61** having a pinion **63** suitably secured thereto.

The gear **60** and pinion **63** form drive gears for high and low speed drive trains. The high speed drive train includes a pinion **64** meshing and driven from the gear **60** and driving an idler pinion **65**. The idler pinion **65** may mesh with and drive a drive pinion **66**, shown by dotted lines in FIGURE 3 as meshing with the external ring gear **21**.

The pinion **63** meshes with and drives a gear **67** on a transverse shaft **69** having a pinion **70** suitably secured thereto. The pinion **70** in turn meshes with an idler pinion **71**, shown in FIGURE 3 as meshing with and driving a drive pinion **66** meshing with and driving the gear **21**.

Four sets of drive trains are provided for driving the external gear **21** from the gear **50** at either a high or low speed, one set of said drive trains only being herein shown and described, in order to simplify the drawings and description. As shown in FIGURE 3, two drive pinions **66** are provided for each set of high and low speed gear trains, one drive pinion **66** being driven from the idler pinion **65** to drive the gear **21** at a relatively high rate of speed and the other drive pinion **66** meshing with the idler pinion **71** to drive the gear **21** at a lower speed.

The drive pinions **66** are journaled in a change speed disc **73**. The change speed disc **73** is shown in FIGURE 4 as being annular in form and as having enlarged generally segmental boss portions **74** extending from opposite sides thereof, having holes **75** therein, which may con-

tain bearings (not shown) for shafts 76 extending from the drive gears 66.

The change speed disc 73 also has four equally spaced holes 77 extending therethrough, adapted to fit on the stationary retainers or dowels 33 and be held in position thereon by spring clips or like retainers (not shown). The segmental bosses 74 register with and fit through corresponding apertured portions (not shown) in the end plate 47, and when the change speed disc 73 is in the position shown in FIGURE 3, one drive pinion 66 will mesh with an idler gear 71 of one slow speed drive train while the other drive pinion 66 will mesh with another idler gear 71 of an adjacent low speed drive train.

When it is desired to increase the speed of rotation of the gear 21 and the socket 16, the change speed disc 73 is removed from the dowels 33 and inverted on said dowels. The drive pinions 66 are also removed from the bearings in the change speed disc 73 and placed in said bearings to project from the opposite face of the change speed disc 73 from the face shown in FIGURES 3 and 5. This will position the drive pinions 66 to mesh with the idler pinions 65 of each gear train, for driving the gear 21 and socket 16 at a relatively high rate of speed, when the change speed disc 73 is placed on the dowels 33.

It may here be seen that a simplified form of change speed mechanism has been provided, which may change the speed of the tool in addition to the various motor speeds that may be obtained, and requires no shifting collars or mechanisms, and is so arranged that a change in speeds may be attained by merely inverting a change speed disc on the dowels 33, and inverting the drive pinions with respect to said change speed disc.

Referring now to the rolling chuck shown in FIGURES 6 and 7, said rolling chuck comprises an annular casing 80 including parallel spaced annular end plates 81, connected together in spaced apart relation with respect to each other as by machine screws 82. The plates 81 are shown as having four jaw members 83 suitably guided therebetween for radial movement with respect thereto into an inner open portion 85 of the casing 80. The jaw members 83 have bifurcated inner end portions 86 extending along opposite sides of an annular internal gear 87, and having rack teeth 88 cut therein. The rack teeth 88 of each jaw member 83 mesh with a separate pinion 89, journaled at its end in the end plate 81. The pinion 89 in turn meshes with and is driven from the internal gear 87.

The jaw members 83 each have a series of discs 90 recessed therein and rotatably mounted on a pivot pin 91, mounted at its end in said jaw members and extending transversely of the axis of the chuck. The discs 90 have V-shaped peripheries adapted to have biting engagement with an article being worked upon, such as, a pipe or rod, and retaining the article from rotation but accommodating linear movement of the article along the sleeve 19 and socket 16.

The casing 80 also has four uniformly spaced holes 93 extending through the end plates 81, of substantially the same diameters as the diameters of the dowels or retainers 33, to accommodate the chuck to be mounted on said dowels or retainers. It will be understood, however, that if desired the chuck may be mounted on the rotary retainers 23 where it may be desired to rotate a pipe or rod, as where it may be desired to interiorly ream a pipe or loosen or tighten a pipe connection.

The internal gear 87 is rotatably driven through an annular impact disc 95 extending about the end plates 81 and having a bifurcated portion 96 extending inwardly between said end plates. A series of pins 97 extend transversely through the furcations of the bifurcated end portion 96, and through slots 99 in the internal gear 87. In FIGURE 7 two pins 97 are shown although it may readily be understood that any number of pins desired may be provided.

When it is desired to engage the discs 90 with an article to be held, the impact disc 95 is turned in a direction to engage the V-shaped peripheries of the discs 90 with the article. The impact disc 95 is then reversed to move the pins 97 along the slots 99 and is sharply moved in an opposite direction to engage the pins 97 with the end slots 99 with an impact, and set the discs 90 into biting engagement with the article to be held from rotation. When it is desired to release the discs 90 it is merely necessary to strike the impact disc 95 in an opposite direction until the discs 90 are released. The chuck may then be spun to a wide open position.

In FIGURES 8 and 9 I have shown a generally annular die stock 100 having a series of threading dies 101 adjustably mounted therein, for radial movement with respect thereto. The die stock 100 includes a pair of spaced plates 103 suitably connected together in spaced relation with respect to each other and having four equally spaced holes 104 extending therethrough, shown as being mounted on the rotatable dowels or retainers 23. The plates 103 have the dies 101 guided therein for radial movement with respect thereto in radial guides 102. The dies 101 have rack teeth 105 cut in one side thereof which mesh with pinions 106, journaled in the plates 103.

As shown in FIGURE 9 each pinion 106 has a shaft portion 107 journaled in one plate 103 and an opposite slotted head portion 109 rotatably carried in a nut 110 externally threaded and threaded within the opposite plate 103 from the shaft portion 107. The pinion 106 may thus be turned by a screw driver or the like to position the cutting end of the die 101 in proper position to thread a desired article. The nut 110 may then be turned against a shouldered portion 111 of the pinion 106, to retain the pinion 106 and threading dies 101 in position.

In FIGURES 10 and 11 I have shown a cutter mounted on the rotatable retainers or dowels 23, for cutting a desired article. As shown in these figures, the cutter comprises a casing 115 in the form of two annular end plates 116 connected together in spaced apart relation with respect to each other, as by machine screws 117. The inner peripheries of the annular end plates 116 are connected together by a sleeve 119 while the outer peripheries of said end plate are connected together by a sleeve 120. A series of radial guides 121 are disposed between the end plates 116 and form guides for a series of knives 123, guided therein for radial movement with respect to the casing 115. Each knife 123 is shown as having rack teeth 124 extending along one side thereof and meshed with a gear 125 on a shaft 126, journaled at its ends in the end plates 116. A pinion 127 on the shaft 126 meshes with and is driven by a gear 129 on shaft 130, journaled at its ends in the end plates 116. A pinion 131 on the shaft 130 meshes the teeth of a gear sector 133 mounted on a shaft 135 rotatably mounted at its ends in end plates 116. A torsion spring 136 is shown in FIGURE 11 as encircling the shaft 135 and biases the gear sector 133 in a direction to retractably move the cutters 123. The spring 136 is connected at one end to said shaft, as indicated by reference character 137, and is connected at its opposite end to the inner end plate 116, as indicated by reference character 138.

The cutters 123 are extensibly moved toward the center of rotation of the casing 115 by means of levers 139 pivotally mounted intermediate their ends on pivot pins 140 extending transversely of the rotational axes of the sleeve 120. Each lever 139 has a camming inner end portion 142 extending within an opening 144 in the outer end plate 116 and having camming engagement with the outer end of an actuating rod 145 for the gear sector 133. Each actuating rod 145 is slidably guided between the plates 116 in a separate radial guide 146, extending inwardly of the outer plate 116, and has an end portion 147 extending at right angles to said rod through a radial slot 149 formed in the gear sector 133.

Pivotal movement of the lever **139** in a direction, which in FIGURE 11 is shown as being a counterclockwise direction, will pivotally move the gear sector **133** in a similar direction through the rod **145**, and will move the cutters **123** radially toward the center of casing **115**.

The torsion spring **136** biases the rod **145** into engagement with the camming surface of the lever **139** and biases the lever **139** to engage a feed disc or wheel **151** threaded on the periphery of the outer sleeve portion **120** of the casing **115**, for axial movement along said casing upon rotation of said feed wheel.

The feed wheel **151** may be turned by hand to position the cutters **123** into engagement with the pipe or rod to be cut. Pressure may then be applied to said feed wheel by the fingers to hold the feed wheel from rotating as rapidly as the casing **115** is rotated and thereby gradually feed the cutters into the pipe or rod to be cut. The operator may maintain sufficient pressure on the feed wheel to feed the cutters to cut the required depth and to entirely sever an article where desired. When an article has been cut to the required depth, or has been severed, the direction of rotation of the feed wheel **151** may be reversed to effect axial movement of said feed wheel **151** toward the inner side of the casing **115**, the torsion spring **136** moving the gear sector **133** in a direction to return the respective cutter **123** and maintaining the lever **139** into engagement with said feed wheel **151**.

It should here be understood that if the article being worked upon is held on the stationary dowels, the cutter is on the rotating dowels and rotates with said dowels. The cutter also turns at a relatively low rate of speed and when the operator has finished cutting to the required depth, the feed wheel **151** is spun by hand in the direction of cutter rotation and at a greater speed than the speed of rotation of the cutters. This relieves pressure from the levers **139**. The torsion springs **136** may then retract the cutters **123**.

On the other hand where the cutter is mounted on the stationary dowels and the chuck is mounted on the rotating dowels and rotates the article being worked upon with said dowels, the operator turns the feed wheel **151** at a relatively low rate of speed until the desired depth of cut has been attained. It then is merely necessary to reverse the direction of rotation of the feed wheel **151** by hand to withdraw the cutter from the work.

As shown in FIGURES 10 and 11 the casing **115** is mounted on the rotatable dowels **23** and is retained in position on said dowels, as by the spring clips **24** engaging the outer grooves **26** in said dowels. The spring clips **24** may be of any well known construction, and are herein shown as being of a scissor like form including a pair of levers **155**, pivoted intermediate their ends and having semi-annular end portions **156** at one end thereof, engageable within the selected groove in the retainer or dowel **23** and resiliently maintained in engagement with said groove as by a spring **157** seated between the opposite ends of the levers **155**. While I have shown a particular form of spring clip herein, it should be understood that snap rings of well known forms or various other detachable retainers may be provided for retaining the cutters or various die stocks to either the rotatable dowels **123** or the stationary dowels **33**.

In FIGURE 12 I have shown a form of internal reamer that may be used to ream a hollow object. As shown in FIGURE 12, the reamer includes a spider like frame **160** having an annular flange **161** extending about the inner side thereof, and having four equally spaced holes **163** leading therethrough, for mounting the spider on either the stationary dowels **23** or the rotatable dowels **33**. The spider **160** has a hub portion **164** having a squared socket **165** therein for slidably receiving a squared end **166** of a threaded shaft **167**. The shaft **167** is shown as having a reamer **169** mounted on its outer end. The reamer **169** is shown as being in the general form of a disc having a serrated conical reaming face **170**. A hand wheel **171** is rotatably mounted on the threaded shaft **167** and abuts a shoulder portion **173** of the spider **160**, to effect axial movement of the threaded shaft **167** to feed the reamer **169** into the article to be reamed during rotation of the article, where the reamer may be mounted on the stationary dowels **33**. It should be understood, however, that the reamer may be mounted on either the stationary or the rotatable dowels and that where the reamer is used to ream a pipe or other hollow article, suitable jaws (not shown) may be substituted for the jaws **83**, which will hold the pipe from axial as well as rotatable movement.

It may be seen from the foregoing that I have provided a simple form of power driven universal tool which may be used for threading and cutting pipes, rods and the like and which may also tighten and loosen pipe or rod couplings and nuts or bolts by power in a simple operation.

It may further be seen that the cutting tool consists simply in a portable power unit having a hollow rotor through which the article being worked upon may extend during an operation thereon, and having stationary retainers projecting from one side of the power unit and rotatable retainers driven by the power unit and projecting from the opposite side thereof, and that a wide variety of tools and holding devices may be placed on either the stationary or the rotary retainers to effect a desired operation.

While I have herein shown and described one form in which my invention may be embodied, it may be understood that various modifications and variations in the invention may be attained without departing from the spirit and scope of the novel concepts thereof, as defined by the claims appended hereto.

I claim as my invention:

1. In a universal portable power tool, a casing, a motor having a hollow rotor mounted within said casing, a sleeve rotatably journaled within said hollow rotor and having a drive gear at one end thereof and a socket at the opposite end thereof in communication with said sleeve, a plurality of retainers projecting outwardly from said socket and adapted to interchangeably support a selected tool for working on an article, a plurality of stationary retainers projecting from the opposite side of said casing outwardly of said sleeve and adapted to support a holding device for an article to be worked upon, a geared drive connection from said motor to said annular gear for rotatably driving said annular gear and socket, said geared drive connection including two circumferentially spaced idler pinions and geared drive trains driving said pinions at different speeds, a change speed disc detachably mounted on said stationary retainer and positionable in two different positions on said retainer, said change speed disc having two circumferentially spaced drive pinions rotatably carried thereby and meshing with said annular gear in each position of said change speed disc, and meshing with one idler pinion in one position of said change speed disc and with the other idler pinion in another position of said change speed disc.

2. In a universal portable power tool, a casing, a motor having a hollow rotor carried within said casing, a sleeve rotatably journaled within said hollow rotor and having a drive gear at one end thereof and a socket at the opposite end thereof, a plurality of spaced retainers projecting from said socket and adapted to interchangeably support tools for working on pipe and the like, a geared drive connection from said rotor to said drive gear, for rotatably driving said socket, a plurality of stationary retainers projecting from the end of said casing opposite from said socket and spaced outwardly of said sleeve and adapted to support a chuck and the like, said geared drive connection including two idler pinions, a high speed gear train for driving one idler pinion at one speed, a low speed gear train for driving the other idler pinion at a lower speed, a change speed disc detachably mounted on said stationary retainers, and said change speed disc being invertibly mounted on said stationary retainers and having two drive pinions removably mounted thereon to project from either

side of said disc, said drive pinions meshing with said drive gear and one of said idler pinions in one postion of said disc and meshing with said drive gear and the other of said idler pinions upon inversion of said disc on said retainers and reversal of the drive pinions carried thereby.

3. A universal portable tool in accordance with claim 2 wherein the casing has hollow handles projecting diametrically therefrom, and wherein a switch ring is rotatably mounted on one of said handles and switch means operated by said switch ring are carried within said hollow handle.

4. In a universal portable power tool for pipe and the like, a casing having a sleeve journalled therein and opening to opposite ends thereof, a motor within said casing and having a hollow rotor concentric with said sleeve and extending thereabout, a plurality of stationary dowels extending from one end of said casing and spaced radially of said sleeve, a plurality of rotatable dowels extending from the opposite end of said casing and mounted on and rotated by said sleeve and spaced radially from the axis of rotation of said sleeve, said stationary and rotatable dowels being adapted to interchangeably retain holding devices and working tools for performing a working operation, an annular gear on said sleeve, drive gearing within said casing driven by said motor for driving said sleeve and rotatable dowels, and the drive connection from said drive gearing to said annular gear comprising a change speed disk having a series of drive gears carried thereby for changing the speed of rotation of said rotatable dowels about the axis of rotation of said sleeve by changing the position of said change speed disk.

5. In a universal portable power tool for pipe and the like, a casing having a sleeve journalled therein and opening to opposite ends thereof, a motor within said casing having a hollow rotor, the hollow interior portion of which is concentric with and extends about said sleeve, a plurality of stationary dowels spaced radially from said sleeve and extending from one end of said casing parallel to the axis of rotation of said sleeve, a plurality of rotatable dowels spaced radially from the axis of rotation of said sleeve and extending parallel thereto from the opposite end of said casing from said stationary dowels and mounted on and rotated by said sleeve, certain of said dowels being adapted to detachably support a holding device for an article being worked upon and certain other of said dowels being adapted to detachably support a tool for working on the article, an annular gear on said sleeve, an annular gear driven by said hollow rotor, drive gearing within said casing driven by said annular gear on said hollow rotor and including a high speed gear train and a low speed gear train, and a change speed disk having at least two drive pinions rotatably journalled thereon, each meshing with said annular gear on said sleeve, one of said drive pinions being driven from said high speed gear train in one position of said disk and the other of said drive pinions being positioned to be driven from said low speed gear train upon a change in position of said disk.

6. In a universal portable power tool for pipe and the like, a casing having a sleeve journalled therein and opening to opposite ends thereof, and accommodating an article being worked upon to pass therethrough, a motor within said casing having a hollow rotor encircling said sleeve and coaxial with the axis of rotation thereof, a plurality of stationary dowels spaced radially outwardly from the axis of rotation of said sleeve and extending parallel thereto from one end of said casing, a plurality of rotatable dowels extending from the opposite end of said casing parallel to the axis of rotation of said sleeve and spaced radially outwardly therefrom and mounted on and rotated by said sleeve, and an annular gear on said sleeve, an annular gear driven by said rotor, drive gearing driven by said annular gear driven by said rotor including two circumferentially spaced idler pinions journalled within said casing, a high speed gear train driving one of said pinions, a low speed gear train driving the other of said pinions, a change speed disk detachably mounted on said stationary dowels for inversion with respect to said casing, said change speed disk having at least two circumferentially spaced drive pinions rotatably mounted on opposite sides of said disk, one of said drive pinions meshing with one of said idler pinions and said annular gear on said sleeve in one position of said disk, and the other of said drive pinions meshing with the other of said idler pinions and said annular gear on said sleeve in an inverted position of said disk.

7. In a universal portable power tool for pipe and the like, a casing, a motor within said casing and having a hollow rotor, a sleeve journalled in said casing coaxial with the axis of rotation of said rotor and extending through the hollow interior portion of said rotor and opening to opposite ends thereof and driven by said rotor, an end plate for one end of said casing having a central open portion registering with said sleeve, a plurality of stationary dowels carried by and projecting from said end plate parallel to the axis of rotation of said sleeve and spaced radially of the central open portion of said end plate, a plurality of rotatable dowels carried by said sleeve and projecting from the opposite end of said casing from said stationary dowels in radially spaced relation with respect to the axis of rotation of said sleeve to accommodate an article being worked upon to pass through said sleeve, said stationary and rotatable dowels being adapted to interchangeably retain chucks and tools thereto, to hold the article being worked upon from free rotation and to perform a work operation thereon, an annular gear on said sleeve and disposed within said casing, a geared drive connection from said hollow rotor to said annular gear, said casing having hollow handles projecting therefrom, and switch means within one of said handles and operable from the outside of said handle to control rotation of said motor and rotatable dowels.

8. A universal portable power tool comprising a casing having two handles projecting from opposite sides thereof, at least one of which is hollow, a motor carried within said casing and having a hollow rotor, a switch operating member mounted on said hollow handle and switch means operated by said member carried within said hollow handle for controlling operation of said motor, a sleeve extending along said hollow rotor, concentric therewith and opening to opposite ends of said casing to accommodate an article to be worked upon to pass through the hollow interior portion of said rotor, means journalling said sleeve for relative rotation with respect to said hollow rotor, a ring gear on said sleeve and a geared drive connection between said hollow rotor and said ring gear, a plurality of stationary dowels projecting from one end of said casing parallel to and spaced radially from the axis of rotation of said sleeve, a plurality of rotatable dowels projecting from the opposite end of said casing parallel to the axis of rotation of said sleeve and mounted on and rotatably driven by said sleeve, and a chuck and a cutting tool interchangeably mounted on said stationary and said rotatable dowels to hold a workpiece within said sleeve and effect a cutting operation thereon.

9. In a portable power tool for pipe and the like, a casing, a motor mounted within said casing and having a hollow rotor, a sleeve encircled by said hollow rotor and journalled for relative rotation with respect thereto, a ring gear on said sleeve, a ring gear on said rotor and a geared drive connection from said ring gear on said rotor to said ring gear on said sleeve, stationary dowels carried by and projecting from one end of said casing and spaced radially of said sleeve and extending parallel to the axis of rotation thereof, a plurality of rotatable dowels carried by said sleeve and projecting from the opposite end of said casing from said stationary dowels and extending axially from said sleeve in radially spaced relation with respect to the axis of rotation thereof, and chuck means for interchangeably mounting on said stationary and said rotatable dowels

including an annular frame having an open central portion registering with the hollow interior portion of said sleeve, a plurality of jaw members guided in said frame for radial movement with respect thereto, an annular gear rotatably mounted within said casing, said jaw members being bifurcated and slidably extending along opposite sides of said annular gear and having racks thereof, pinions meshing with said annular gear and racks, and a disk extending about said annular gear and connected therewith for turning said annular gear by hand to bring said jaw members into biting engagement with an article to be held.

10. A portable power tool for pipe and the like in accordance with claim 9 in which a pin and slot connection is provided between said disk and said annular gear to accommodate the engagement of said disk with said annular gear with an impact upon the spinning of said disk by hand.

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