

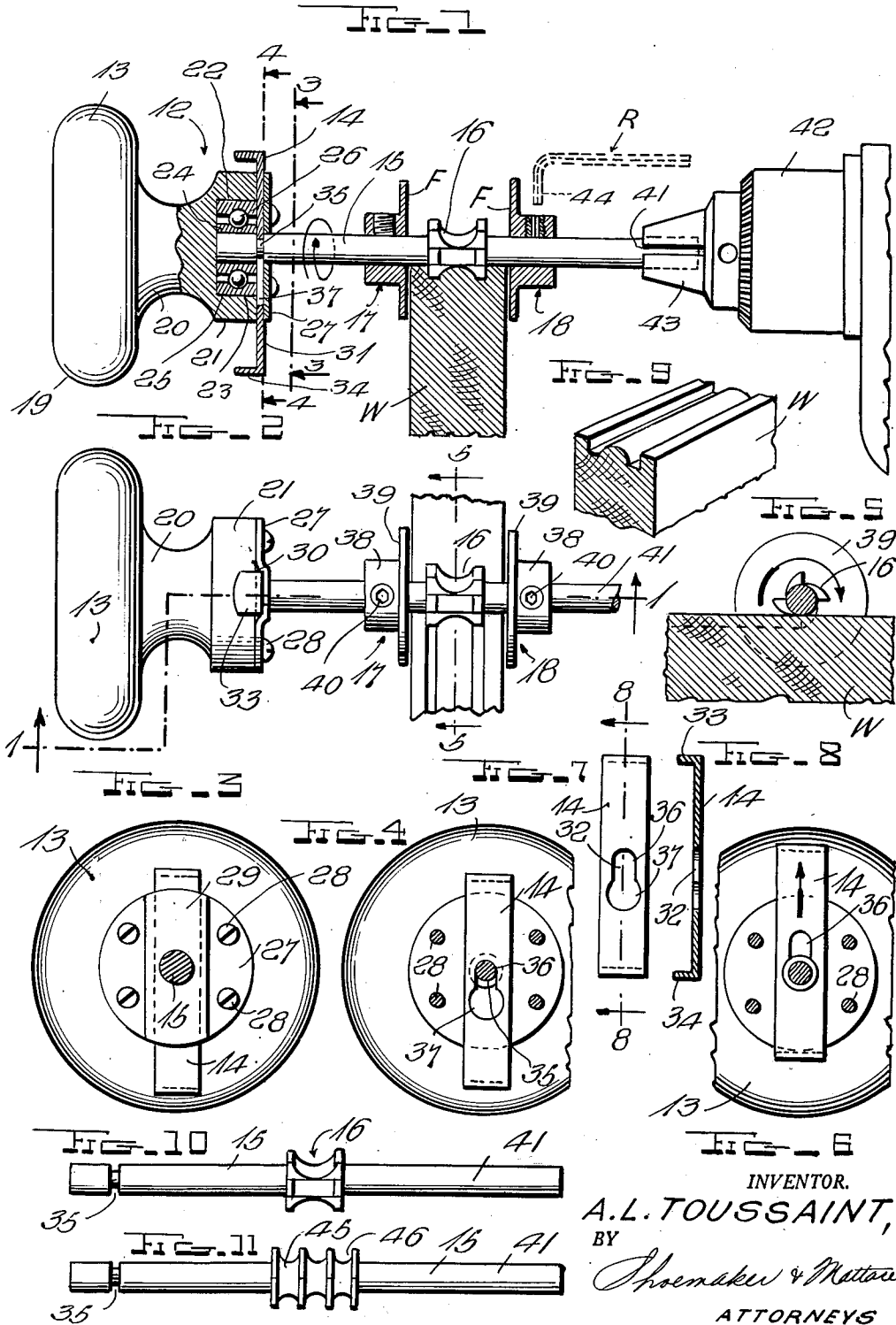
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WOODWORKING HAND POWER TOOL

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WOODWORKING HAND POWER TOOL

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This invention relates to wood working hand power tools.

The wood working hand power tools of my invention are adapted to be used with either an electric hand drill or a power driven shaft. The tools may also be used as an accessory for drill presses and/or lathes by using the cutter tools only as described more fully hereinafter.

The wood working hand power tools are ideally adapted as a small and inexpensive shaper for the home workshop or a manual training school workshop but, of course, the tools may be used as a complement to commercial wood working plants.

In performing wood working operations which involve the use of a power driven cutter, or the like, heretofore, a number of such individual tools were provided for edging straight-edged boards and outside curves; for putting a bead around a one-half inch hole; for shaping an edge on wood from one-eighth inch thick to two and one-half inches thick, both soft and hard woods; for cutting beads, flutes and other designs of various widths up to one inch, and forming tongue and grooves as well as to cut screen molding. Furthermore, in these individual hand power tools, known prior to my invention, it was quite impossible, by the use of any one tool, to cut a relatively wide pattern in the wood or to combine a combination of cuts in the wood. Moreover, in these prior tools, there is provided one or more of such tools for making shallow mortise joints by use of tongue and groove cutters.

With my wood working hand power tool, which includes readily interchangeable arbors having cutting surfaces thereon, by providing different interchangeable arbors to be power driven, I can perform all of the aforesaid wood working operations, and other wood working operations by the use of the single tool.

One of the features of my wood working hand power tool is that it is indeed very simple and provides for a wide range and flexibility of wood working operations. The tool consists of only four major parts or component elements; namely, a relatively small diameter cutting arbor which is a shaft approximately four inches long with the cutter substantially intermediate the ends thereof and preferably integral therewith, two adjustable guides mounted on the said shaft in spaced relationship at either side of the cutter and a ball bearing hand grip piece which enables the user to grip the same in the operation of the tool and in performing the various wood working operations aforesaid.

My different cutter designs are interchange-

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ably associated with my wood working hand power tool. The arbor or shaft speed of 2000 to 3000 R. P. M. performs quite satisfactorily but, of course, in the various wood working operations and functions of the tool, the shaft speed may be increased or decreased over the speed mentioned and produce satisfactory results.

My wood working hand power tool is of the two-handed type; namely, that a knob or hand grip piece is gripped in one hand and the arbor shaft is anti-frictionally mounted in that hand grip piece at one end thereof and the other end of the arbor shaft has attached thereto an electric hand drill or the end of a power driven flexible shaft, there being a driving connection or coupling between either the hand drill and the end of the arbor or a driving connection between the end of the power driven flexible shaft and the arbor.

With the foregoing in mind, it is, therefore, an object of my invention to provide a relatively simple and inexpensive wood working hand power tool for performing a series of different wood working cutting or similar operations.

Another object of my invention is to provide a relatively simple and inexpensive wood working hand power tool consisting of a minimum number of parts and yet being durable and capable of long use in performing various wood working cutting and similar operations.

Another object of my invention is to provide a wood working hand power tool whereby a plurality of individual arbors or shafts carrying cutters thereon intermediate the ends thereof are readily connected with and disconnected from a hand grip piece or similar element at one end of the arbor and a power driving means at the other end thereof.

Another object of my invention is to provide a wood working hand power tool whereby a plurality of individual arbors or shafts carrying cutters thereon intermediate the ends thereof are readily connected with and disconnected from a hand grip piece or similar element at one end of the arbor and a power driving means at the other end thereof, and with suitable guide means intermediate the ends of the arbor and at either side of the cutter or other wood working means and which guide means serve to enable the tool as a whole, including the cutter on the arbor, to be drawn over the work or to be held stationary and move the work relative to the rotating cutter.

Another object of my invention is to provide a readily and quickly disconnectible arbor cutter from a suitable hand piece.

Another object of my invention is to provide

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a readily disconnectible connection between an arbor carrying a cutter thereon and a hand grip piece that is at one end of the arbor and a readily disconnectible power driving and operating means at the other end of the arbor.

Another object of my invention is to provide a wood working hand power tool including an elongated shaft or arbor with a cutter intermediate its ends and a hand gripping means for one hand of the operator at one end of the arbor and a disconnectible power driven means at the other end of the arbor which is gripped and held in the other hand of the operator.

Another object of my invention is to provide a wood working hand power tool including an elongated shaft or arbor with a cutter intermediate its ends and a hand gripping means for one hand of the operator at one end of the arbor and a disconnectible power driven means at the other end of the arbor which is gripped and held in the other hand of the operator, and with a cutter on the arbor substantially intermediate its ends and with suitable guide means fixed to the arbor in spaced relation to each other and to engage on opposite sides of the work so as to guide the tool relative to the work or the work relative to the tool when the work is being operated on by the said cutter.

With the above and other objects in view, the invention consists in the construction and novel combination and arrangement of parts herein-after fully described, illustrated in the accompanying drawings and pointed out in the claims hereto appended, it being understood that various changes in the form, proportions, and minor details of construction, within the scope of the claims, may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings, wherein the same numerals designate the same parts in the different figures thereof

Fig. 1 is a front elevational view of the wood working hand power tool showing certain parts thereof in cross section;

Fig. 2 is a top plan view of the power tool of Fig. 1;

Fig. 3 is a transverse sectional view on the line 3—3 of Fig. 1 looking in the direction of the arrows and showing the slide locking means for the hand grip piece with the end of the arbor;

Fig. 4 is a view along the line 4—4 of Fig. 1 looking in the direction of the arrows and showing the specific slide locking means in locked position;

Fig. 5 is a vertical sectional view on the line 5—5 of Fig. 2;

Fig. 6 is a view similar to Fig. 4 and showing the slide locking means in unlocking position—unlocking the end of the arbor to the hand piece;

Fig. 7 is a front elevational view of the slide locking means;

Fig. 8 is a vertical sectional view on the line 8—8 of Fig. 7;

Fig. 9 is a fragmentary perspective view of a piece of woodwork that has been formed by the arbor with its cutter as shown in Fig. 1;

Fig. 10 is a front elevational view of the arbor with cutters mounted intermediate its ends; and

Fig. 11 is a front elevational view of another type of arbor and cutter carried thereby.

The invention will be more readily understood by referring to the drawings in detail wherein the wood working hand power tool is denoted generally by the numeral 12 and includes the four

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main elements; namely, the hand grip piece or knob 13; the slide locking means 14 carried by the hand grip piece; the arbor 15, the cutter 16 mounted intermediate the ends thereof and the similarly shaped guides or guide means 17 and 18 fixed to the arbor shaft at opposite sides of the cutter 16.

More specifically, the hand grip piece 13 of the wood working hand power tool consists of a preferably circular and rounded hand gripping portion 19 laterally projecting from which there is a concave medial portion 20 of less diameter than the gripping portion of the hand grip piece, and the end of this hand grip piece 21 is substantially circular in outline and is cut out as at 22 to provide a recess wherein there is disposed a suitable anti-friction bearing unit 23 consisting of inner and outer races 24 and 25 respectively between which the balls 26 are disposed and held in proper relationship to the said races.

A cover or closure plate 27, which is more or less flat and of the same size as the end of the hand piece wherein the ball race is positioned, serves to maintain the ball race in the recess in the end of the hand grip piece and is attached thereto by several screws 28. This closure, which is preferably of sheet metal or, of course, may be cast, is provided with an embossed or struck out guide forming portion 29 which provides a recess 30 between an inner face portion of the closure and the outer diametrically oppositely disposed portions of the end of the hand piece and the anti-friction bearing mounted therein.

The slide locking means 14, which is in the form of an elongated and substantially rectangularly shaped flat metal strip and provided intermediate its ends with a key hole slot 32, is flanged over at its respective ends 33 and 34, the flanges extending substantially at a right angle thereto. This slide locking means is disposed in the recess or chamber 30 provided between the closure 27 and the end of the hand grip piece and is adapted to slide within predetermined limits within that chamber or passageway and is maintained therein due to the turned over ends 33 and 34.

The arbor 15 with the cutter 16 between its ends, is in the form of an elongated shaft. Adjacent one end thereof, there is provided a circumferential groove 35, which groove is in a plane so as to be disposed in the key hole slot 32 in the slide lock 14 and, when the small upper portion 36 of the key hole slot is disposed in the circumferential groove 35 adjacent the end of the arbor, the latter is securely rotatably locked in its association with the hand grip piece 13, and release of the arbor from the hand grip piece is effected by simply pressing on the flanged portion 34, as seen in Fig. 1, to move the enlarged portion 37 of the key hole slot in axial relationship with the arbor and which arbor can then be withdrawn totally from the hand grip piece and, of course, is thereby disassociated therefrom.

The guide means 17 and 18, which are identical in formation, each is in the form of a collar consisting of a hub portion 38 which is preferably circular in outline, and a disc-like flange 39 integral with the hub having opposed face portions F which may be plane surfaced or slightly crowned. The hub portions of the guide means are fixed to the arbor by means of headless and socketed screws 40 and, of course, are adjustable axially along the length of the arbor and capable of being affixed thereto by means of the said screws so that work of different widths may be

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disposed between these guides, and intermediate such guides, there is positioned the cutter 16 that is carried by and preferably integral with the arbor or shaft.

The other end of the arbor or shaft 41 has drivingly attached or connected therewith a suitable electric hand drill 42 and which hand drill is of the conventional type including the chucking head 43 thereof and, of course, the hand drill is electrically motor driven or otherwise motivated. In lieu of the electric hand drill 42, I may use, and do, in some instances, the end of a power driven flexible shaft that grips the end portion 41 of the arbor.

Indicated in pale lines, as at R, there is a small wrench having a right-angular polygonal portion 44 that extends into the polygonal openings in the headless set screws 40 and allows for quick adjustment or movement of the guides 17 and 18 on the arbor or cutter shaft.

In Fig. 11, I have shown the arbor 15 having intermediate its ends tool cutters 45 and 46 but, it is to be distinctly understood that any number of cutting edges of the cutter elements may be utilized in connection with the arbor or shaft, depending upon the particular wood working function that is to be performed by the tool.

In using the wood working hand power tool, as hereinbefore described, and, as stated, the tool is of the two-handed type; namely, that the operator grips the hand grip piece 13 in one hand, either the right or left, and holds the electrically driven hand drill in the other hand, or the end of a power driven flexible shaft is to be held in that hand, and the cut of the wood W is started on the far end of the work and gradually drawn forward toward the operator. Thus, it will be seen that, by providing for the ready interchangeability of the arbor or shaft with the different cutters intermediate the ends thereof, and the adjustable guides, the wood working hand power tool is indeed very flexible in its operations and functions with regard to woodwork or similar material to be operated on.

In examining the drawings Figs. 1 and 5 it will be noted that the integral cutter and arbor serve to limit the depth of the cut into the wood. By utilizing the integral arbor and cutter no definite stop means or any other means for limiting the depth of cut into the wood is required. In other words, due to the particular formation of the arbor and cutter in each instance either the arbor in part or some other point in the cutter itself limits the depth of cut into the wood, and the depth of cut into the wood is determined by the particular design and construction of each individual cutter, note the cutters in Figs. 10 and 11 of the drawings.

I claim:

1. A wood working hand power tool consisting of a hand grip piece having a lateral extension, an anti-friction bearing mounted in the hand grip piece, a slide locking means carried by the hand grip piece, an arbor having a cutter thereon intermediate its ends, the arbor being in the form of an elongated shaft with one end of the shaft detachably rotatably positioned in and supported by the bearing in the hand grip piece, the other end of the arbor being of a size and shape to be detachably coupled to a power driven shaft and rotated thereby, and adjustable guide means on the arbor at opposite sides of and spaced from the cutter, the arbor being entirely free from obstruction except for the parts referred to permitting the arbor and cutter thereon to be disposed

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close to a work piece, and that end portion of the arbor that is mounted in the hand grip piece being provided with a circumferential groove cooperating with the slide locking means carried by the hand grip piece, whereby the arbor carrying the cutter and guide means thereon may be readily disconnected from the hand grip piece by manipulating the said locking means.

2. A wood working hand power tool as described in and by claim 1 wherein the end of the arbor disposed in the hand grip piece is provided with a circumferential groove and the slide locking means is provided with a key hole slot, and which groove and key hole slot are adapted to cooperate with each other to maintain the arbor in rotatable position with the hand grip piece or the locking means to be disengaged from the groove in the arbor and allow the latter to be readily disconnected from the hand grip piece.

3. A wood working hand power tool consisting of a hand grip piece in the form of a knob to be readily grasped by an operator and having a lateral extension therefrom with a recess in the end of said extension, an anti-friction bearing mounted in the said recess, a closure plate for the end of the hand grip piece for maintaining the anti-friction bearing in the recess, the closure plate having a guideway formed therein, a slidable locking means in the form of a flat plate mounted in the guideway, the locking means being provided intermediate its ends with a key hole slot, an arbor having a relatively small cutter thereon intermediate its ends and having one end thereof disposed and supported by the anti-friction bearing in the hand grip piece and having a circumferential groove inwardly of that end, and which groove is disposed in alignment with the key hole slot in the slide locking means, so that when the small portion of the key hole slot is engaged with the circumferential groove in the arbor the hand grip piece and the arbor are locked together, and when the slide means is moved so that the large portion of the key hole slot is in axial alignment with the grooved end of the arbor, the latter can be totally removed from the hand grip piece, a cutter on the arbor intermediate its ends, a guide member on the arbor on each side of and spaced from the cutter, the arbor being entirely free from obstruction except for the parts referred to permitting the arbor with the cutter thereon to be disposed close to a work piece, the other end of the arbor being of a size and shape to be detachably coupled to a power driven shaft and rotated thereby.

4. A power operated wood working hand tool consisting of an elongated arbor, a wood working means on the arbor fixed thereto intermediate the ends thereof, a guide member on the arbor at each side of and spaced from said wood working means, a hand grip piece having a tubular bearing, means detachably connecting the hand grip piece directly to one end portion of the arbor with said end portion of the arbor fitting within and supported by said bearing for rotation of the arbor relatively to the hand grip piece, the other end of the arbor being of a size and shape to be detachably coupled to a power driven shaft and rotated thereby, said guide members being adapted to engage upon opposite sides of the work piece and to maintain the tool in a fixed path relatively to the work piece as the tool is moved along the same, the arbor being entirely free from obstruction except for the parts referred to permitting the arbor and wood working means thereon to be disposed close to a work piece.

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5. A power operated wood working hand tool consisting of an elongated arbor, a relatively small wood shaping cutter on the arbor fixed thereto intermediate the ends thereof, a guide collar slidably mounted on the arbor at each side of and spaced from said wood shaping cutter, set screws on the guide collars for securing the same in different positions of adjustment along the shaft, a hand grip piece having a tubular bearing, means detachably connecting the hand grip piece to one end portion of the arbor with said end portion of the arbor fitting within and supported by said bearing for rotation of the arbor relatively to the hand grip piece, the other end of the arbor being of a size and shape to be detachably coupled to a power driven shaft and rotated thereby, said guide collars being adapted to engage upon opposite sides of a work piece and to maintain the tool in a fixed path relatively to the work piece as the tool is moved along the same, the arbor being free from obstruction except for the parts referred to permitting the arbor and wood shaping cutter thereon to be disposed close to a work piece.

6. A wood working tool attachment for electric hand drills, said tool attachment comprising an elongated arbor, a wood shaping cutter on the arbor substantially centrally of the ends thereof formed integral therewith, a guide collar on the arbor at each side of and spaced from the shaping cutter, a hand grip piece having at one side a recess and an anti-friction bearing within said recess for one end portion of said arbor, and means detachably connecting the hand grip piece directly to one end portion of the arbor with

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said end portion of the arbor fitting within and supported by said anti-friction bearing for rotation relatively to the hand grip piece, the other end of the arbor being of a size to fit within the chuck of an electric hand drill, said guide members being adapted to engage upon opposite sides of a work piece and to maintain the tool in a fixed path relatively to the work piece as the tool is moved along the same, the arbor being free from obstruction except for the parts referred to permitting the arbor with said shaping cutter to be disposed close to the work piece.

7. A wood working tool attachment as defined in and by claim 6 wherein due to the cutter and arbor being integral the depth of cut into the wood is limited.

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