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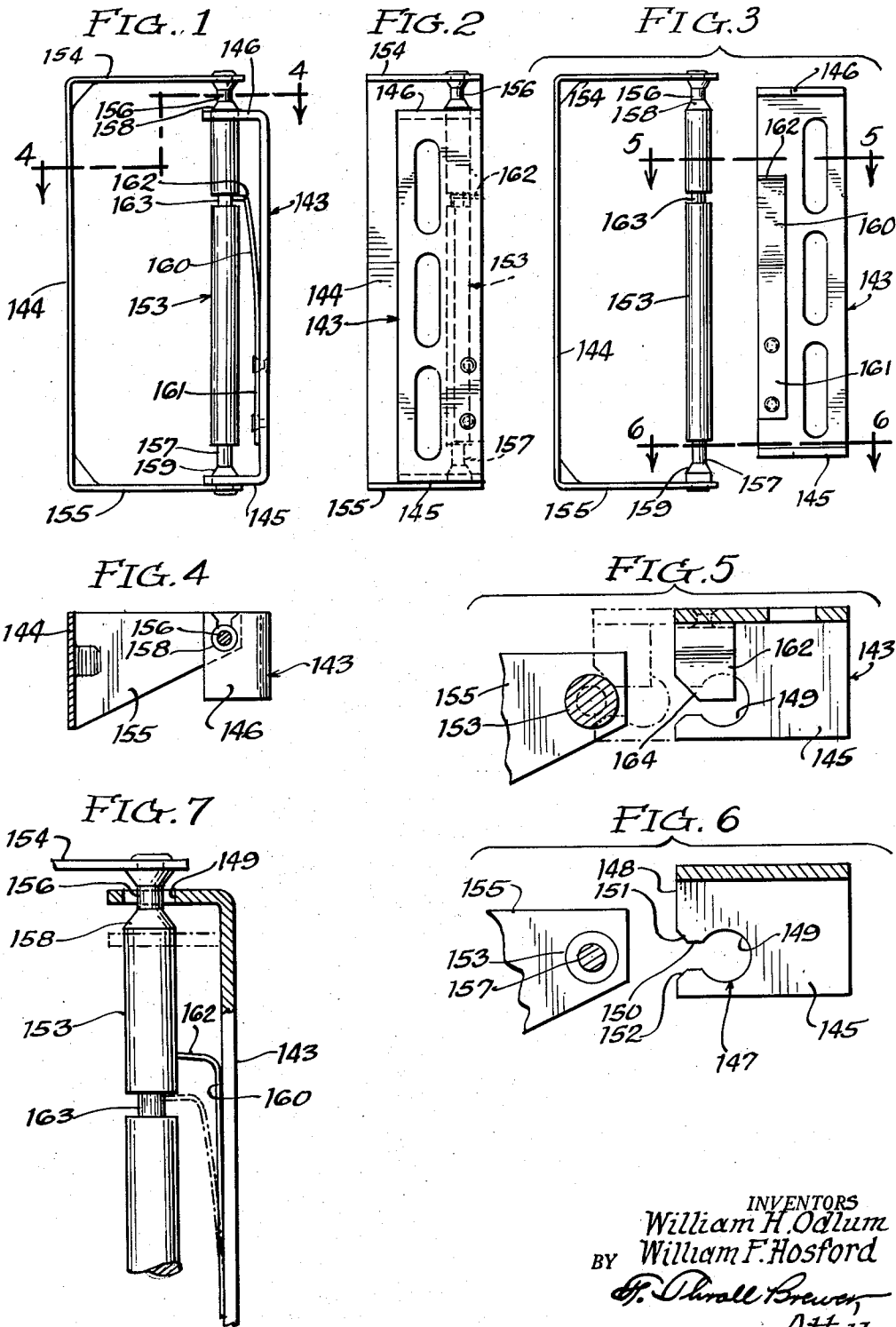
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SEPARABLE MOUNTINGS FOR ELECTRIC MOTORS OR THE LIKE

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SEPARABLE MOUNTINGS FOR ELECTRIC MOTORS OR THE LIKE

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3 Claims. (Cl. 16—171)

This invention relates to a readily separable mounting for electric motors or the like. For purposes of illustration it will be described with reference to its application to power tools of the woodworking class, but it is understood that the invention may be applied with equal facility to any implement or appliance employing a motor which it is desired at times to remove or replace.

A woodworking shop, whether it be a hobby shop such as one might find in a home, or a carpenter shop where the products of a carpenter's skill are used as a means of making a livelihood, should include a number of woodworking tools of different character to enable the operator of the shop to perform all of the necessary operations upon wood required of a carpenter. Thus, the shop should contain a saw of the rotary disk type, a band-saw, a jointer-planer, a lathe and a drill press. Each of these tools performs a distinctly different operation upon a piece of wood and requires the use of a different basic structure for the accomplishment of that result.

A completely equipped woodworking shop would require the purchase of some five different basic tools, each provided with a structure specifically designed for its function, and with suitable power means, preferably individual electric motors, for driving the tool. The purchase of five individual tools involves the expenditure of a considerable sum of money which, although possibly justified in the case of a carpenter, whose livelihood depends upon the tools, would hardly be justified in the case of a homeowner who uses the tools in the furtherance of a woodworking hobby.

Efforts have been made in the past to reduce the cost of a complete set of tools, the efforts being directed toward designing the tools as a single multi-purpose tool utilizing one base and one motor, with means for dismantling certain portions of the tool or assembling other portions of the tool in predetermined combinations to change the character of the tool from one basic tool to another. Although this approach to the problem results in tools which may be satisfactory for their individual purposes, nevertheless the effort required and time consumed in effecting a change from one tool to another, is so great as to render the practicability of the tool as a whole doubtful. For example, where two or three different operations such as cutting, drilling and planing are to be performed upon a single piece of wood, more time and energy may be consumed in making changes in the tool than in the actual woodworking operations involved.

Another approach to the problem has been to provide two or more tools which may or may not have multiple functions and to provide a single motor which may be taken from one tool and used on the next. This latter approach recognizes that substantially half of the cost of the tool is in the electric motor used to drive it, and that if a single motor can be used on a plurality of tools which are initially supplied without motors, a great reduction in the cost of the complete set of tools can be

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effected. Such single motor multiple tools as have been heretofore proposed, however, failed to provide a mounting for the motor which would be readily separable to make possible a quick removal of a motor from one tool and its ready assembly on the next tool. It must be borne in mind that an electric motor having sufficient capacity to drive each of the tools of a woodworking shop must necessarily be rather heavy if it is to be efficient as well as powerful. A good motor as presently constructed weighs between 25 and 30 pounds, and the handling of such a motor in connection with a readily separable mounting, therefore, must be such that the operator need not be required to hold the motor with one hand while the other hand is used to manipulate the motor mounting.

It is accordingly one of the objects of this invention to provide a motor mounting for an electric motor or the like which may be readily separated and re-assembled without requiring that the weight of the motor be supported by one hand of the operator while the mounting is manipulated for assembly or disassembly.

Another object of this invention is the provision of a mounting for an electric motor or the like wherein the mounting is readily assembled and disassembled, each operation of assembly or disassembly being accomplished by the performance of two steps, the first step involving the release of a catch or latch mechanism on the mounting while the full weight of the motor is still taken by some part of the mounting and the other involving the actual physical removal of the motor from the mounting, so that the motor may be supported by both hands of the operator while the motor is being so removed.

Another object of this invention is the provision of a separable mounting for an electric motor or the like wherein said mounting may be adapted to support an electric motor with its axis either in a vertical plane or a horizontal plane, and when in a horizontal plane, with its axis either above or below the point of attachment of the motor to a frame.

A more specific object of this invention is to provide a separable motor mounting for an electric motor or the like wherein said mounting, when in use, permits the motor to swing by its own weight about an axis substantially parallel with the axis of rotation of the tool, such that a belt connecting the motor and tool may be tightened by the swinging movement of the motor.

As a still more specific object, this invention seeks to provide a separable mounting for an electric motor for power tools or the like, wherein said mounting is inexpensive to make, is easy to take apart and put together again, is foolproof and is strong and durable.

These and other objects of this invention will become apparent from the following detailed description when taken together with the accompanying drawings in which:

Fig. 1 is a side elevational view of the two principal parts of a motor mounting incorporating this invention, the parts being shown in assembled relation;

Fig. 2 is an elevational view of the assembled mounting of Fig. 1 looking to the left in that figure;

Fig. 3 is an exploded view of the mounting of Fig. 1, showing one part thereof turned through 90°;

Fig. 4 is a plan view in section of the assembled mounting of Fig. 1, the view being taken along line 4—4 thereof and looking in the direction of the arrows at the ends of said line;

Fig. 5 is an exploded and enlarged fragmentary plan view in section of the mounting of Fig. 3, the section being taken along line 5—5 thereof and looking in the direction of the arrows at the end of said line;

Fig. 6 is a view corresponding to Fig. 5, but taken along line 6—6 of Fig. 3;

Fig. 7 is an enlarged fragmentary side elevational view, partly in section, of the upper portion of the

mounting of Fig. 1 in an intermediate stage of assembly;

Fig. 8 is an exploded view in perspective of a modification of the mounting of Figs. 1 to 7; and

Fig. 9 is a side elevational view, greatly reduced in size, of the assembled mounting of Fig. 8.

The form selected to illustrate this invention is one in which a latch is provided for holding the two parts of the mounting in assembled relation. The latch is operated automatically as the two parts are assembled so that no conscious effort on the part of the operator is required to make the latch effective. The unlatching function is performed manually, but as an adjunct to a necessary movement of one part relative to the other part in the disassembly of the mounting.

Referring to Fig. 1, the hinged motor mounting assembly is comprised of a hinge member 143 which is adapted to be secured to a motor base (not shown) and a relatively fixed hinge member 144 which remains with the tool to be driven. Hinge member 143 is preferably comprised of a single-piece elongated stamping having its ends 145, 146 bent substantially at right angles to the main body thereof, said ends, as shown more clearly in Fig. 6, being formed with keyhole slots 147, both of which slots open on corresponding sides 148 of each end. Said keyhole slots are comprised of a generally circular opening 149 and a slot 150 cut into the side of said opening 149 and having the corners 151 and 152 thereof chamfered. Hinge member 144 has a generally cylindrical pin 153 riveted or otherwise secured to the ends of the turned-up sides 154, 155 of said member 144. Pin 153 thus ties the ends of the turned-up sides 154, 155 together to produce a stronger structure.

The diameter of pin 153 is slightly less than the diameter of circular opening 149 and is adapted to be received therein so that hinge member 143 may swing freely about pin 153. Pin 153 is grooved at 156, 157, the diameter of the pin at the grooves being substantially the same as, or slightly less than, the width of slots 150. The axial spacing of grooves 156 and 157 is substantially the same as the distance between corresponding portions of ends 145, 146 of hinge member 143.

To assemble hinge member 143 upon hinge member 144, said member 143 is placed beside pin 153 with slots 150 on either end thereof substantially aligned with grooves 156, 157. Hinge member 143 is then moved transversely of pin 153 to allow the pin to move through slots 150 until its axis substantially coincides with the center of openings 149, whereupon hinge member 143 is slid axially through openings 149 until they are aligned with, and ride on, the portions of pin 153 adjacent to grooves 156, 157. The aligning of pin 153 with the center of openings 149 is facilitated by providing tapers 158, 159 on corresponding sides of grooves 156, 157, respectively.

After hinge members 143 and 144 are assembled, they are latched in place by a leaf spring type of latch which functions automatically when the desired assembled relationship of the hinge members 143, 144 is attained. The spring latch is shown at 160 and is comprised of a strip of flat spring steel which is riveted at one end 161 to the inside surface of member 143, its free end 162 being bent to lie in a plane which is substantially parallel with the plane of ends 145, 146. A groove 163 having parallel radial sides is formed in pin 153 at a point wherein it will be in axial alignment with free end 162 of spring 160 when ends 145, 146 have left grooves 156, 157 and are riding on the main portion of pin 153.

As shown more clearly in Fig. 7, the first stage of the assembly operation of hinge member 143 and its associated motor with hinge member 144 comprises passing pin 153 through slots 150 and then sliding the motor and hinge member 143 axially downwardly as viewed in said Fig. 7 until the grooves 156, 157 are entirely outside the confines of opening 149. At this point, free end 162

of spring 160 will be aligned with groove 163 and will snap into said groove, thereby providing an abutment which substantially prevents further relative axial movement between the hinge members 143 and 144.

To disassemble the hinge members 143 and 144, the operator inserts his finger between pin 153 and spring 160 and then exerts a pressure on the free end of said spring 160 in a direction to withdraw end 162 thereof from groove 163. Hinge member 143 may then be slid axially along pin 153 until slots 150 are aligned with grooves 156, 157 whereupon a transverse movement of member 143 relative to the axis of pin 153 away from the pin will result in a complete disassembly of the hinged motor mounting.

Due to the flexibility of spring 160 it is not desirable to have the weight of the motor sustained by end 162. To avoid such relationship it is contemplated that end 145 of hinge member 153 will rest upon the turned-up side 155 of hinge member 144 when the motor is to be so mounted that pin 153 is in a vertical position. When said pin 153 is in a horizontal position, the weight of the motor is taken upon pin 153 at the regions adjacent grooves 156, 157 and hence a maximum bearing area is provided for any pivoting action which the action of the motor might occasion.

The movement of end 162 of spring 160 across pin 153 is facilitated by providing a chamfer 164 on the leading edge of said end 162, the chamfer 164 serving to cam end 162 upward over the surface of pin 153. It may be observed from Fig. 5 that chamfer 164 does not extend across circular opening 149 and hence would not decrease the holding ability of end 162 against the side of groove 163.

Where the demand for readily separable motor mountings of the type herein described is sufficiently great to warrant special tooling by the motor manufacturer, the motor base, hinge member 143 and the latch keeper can be combined into a single stamping. One such combined form is shown in Fig. 8. A substantially rectangular plate 165 is provided, said plate having a die-formed cradle 166a disposed substantially in the center thereof to which the curved outer surface of the motor 86 may be secured by spot-welds, bolts, or the like. Four elongated slots 166 are punched through plate 165, the disposition of the slots being of a size and spacing to satisfy the N.E.M.A. standards.

At the hinge end of plate 165, a pair of ears 167, 168 are struck upward from the sides of the plate at substantially ninety degrees from the general plane of the plate, said ears having formed therein keyhole slots 169, 170 which are identical with keyhole slot 147 of Fig. 6, the open ends 171, 172 of the slots facing outwardly in a direction parallel with the plane of plate 165. A leaf spring 173, identical in every respect to spring 160 of Figs. 1, 3, 5 and 7, is riveted to plate 165 between ears 167, 168. At the end opposite the hinge, plate 165 has slots 174, 175 formed therein, the bottom 176, 177 of each slot being formed into sharp teeth which may be utilized as keepers for latches to limit swinging movement of plate 165 as described in a co-pending divisional application Serial No. 774,781, filed November 18, 1958. Plate 165 can be used with a pin 153 on any one of a plurality of tools.

It is understood that the foregoing description is merely illustrative of a preferred embodiment of this invention and that the scope of this invention is not to be limited thereto, but is to be determined by the appended claims.

We claim:

1. A separable hinge mounting for a motor or the like, said mounting including a U-shaped bearing member having an elongated web for attachment to a motor or the like and upstanding ends, said ends having substantially circular openings therein and side slots connecting the openings with the edge regions of the said

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ends, a relatively fixed hinge member having spaced sides between which the ends of the U-shaped member are adapted to be received, a hinge pin secured to said sides and having spaced regions of reduced diameter adapted to be received in the side slots of the upstanding ends of the bearing member, the openings in the upstanding ends being adapted to receive the hinge pin upon an axial movement of the bearing member relative to the pin and means for preventing axial movement of the bearing member on the hinge pin in the direction of the regions of reduced diameter, whereby to maintain the hinge in assembled relation.

2. A separable hinge mounting as described in claim 1, the means for preventing the movement of the bearing member along the pin comprising means on the bearing member adapted to move radially with respect to the pin and an abutment on the pin adapted to be engaged by the radially movable means on the bearing member.

3. A separable hinge mounting for a motor or the like, said mounting including a U-shaped bearing member having slotted openings in the ends of the U, a relatively fixed hinge member having spaced sides between which the ends of the U-shaped member are adapt-

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ed to be received, a hinge pin secured to said sides and adapted to be received within the slotted openings, said pin having regions of reduced diameter adapted to be received within the slots of the slotted openings, said bearing member being adapted to be slid axially upon said pin to cooperate with the regions of the pin adjacent the regions of reduced diameter and automatically operable latch means for preventing a return movement of the bearing member to the regions of reduced diameter.

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