Sept. 28, 1943. E. W. PLUMB 2,330,618

PORTABLE ELECTRIC HACK SAW

Filed July 14, 1941 3 Sheets-Sheet 1

Fig. 1.

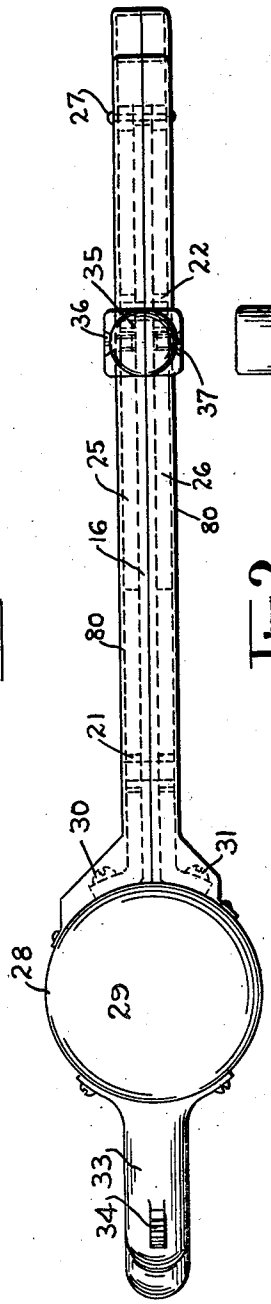
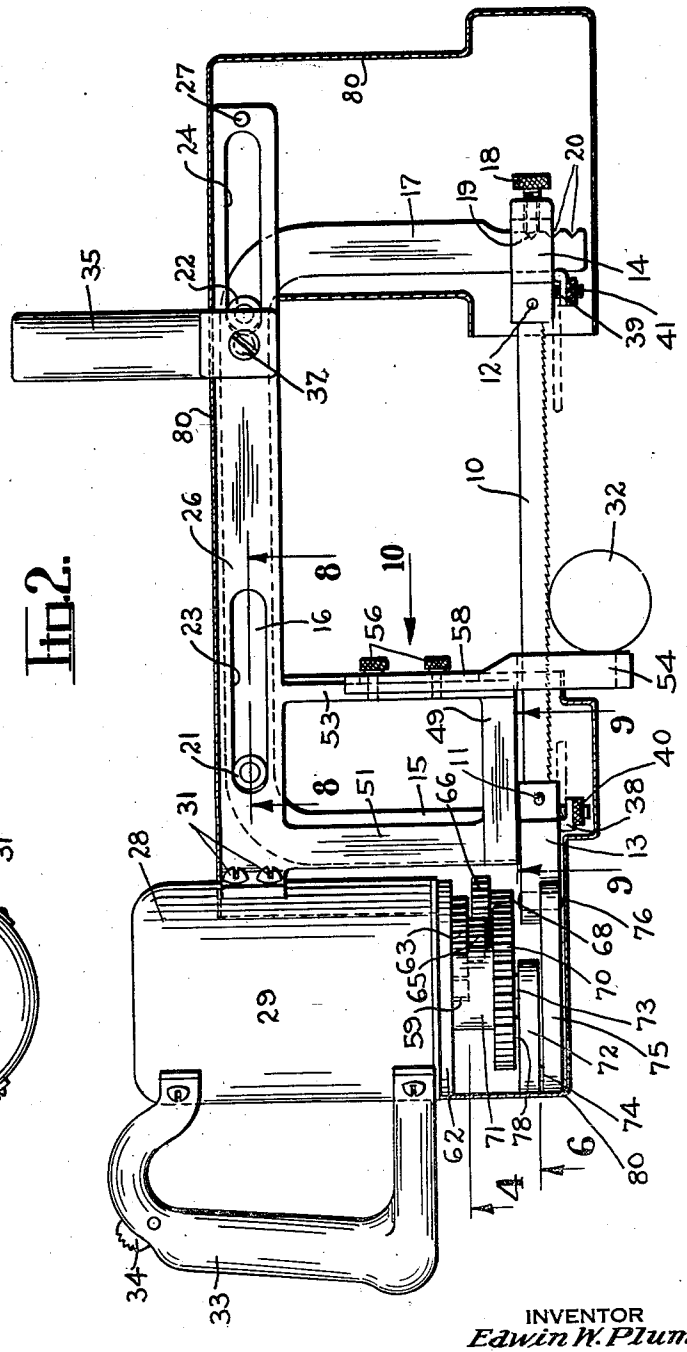


Fig. 2.



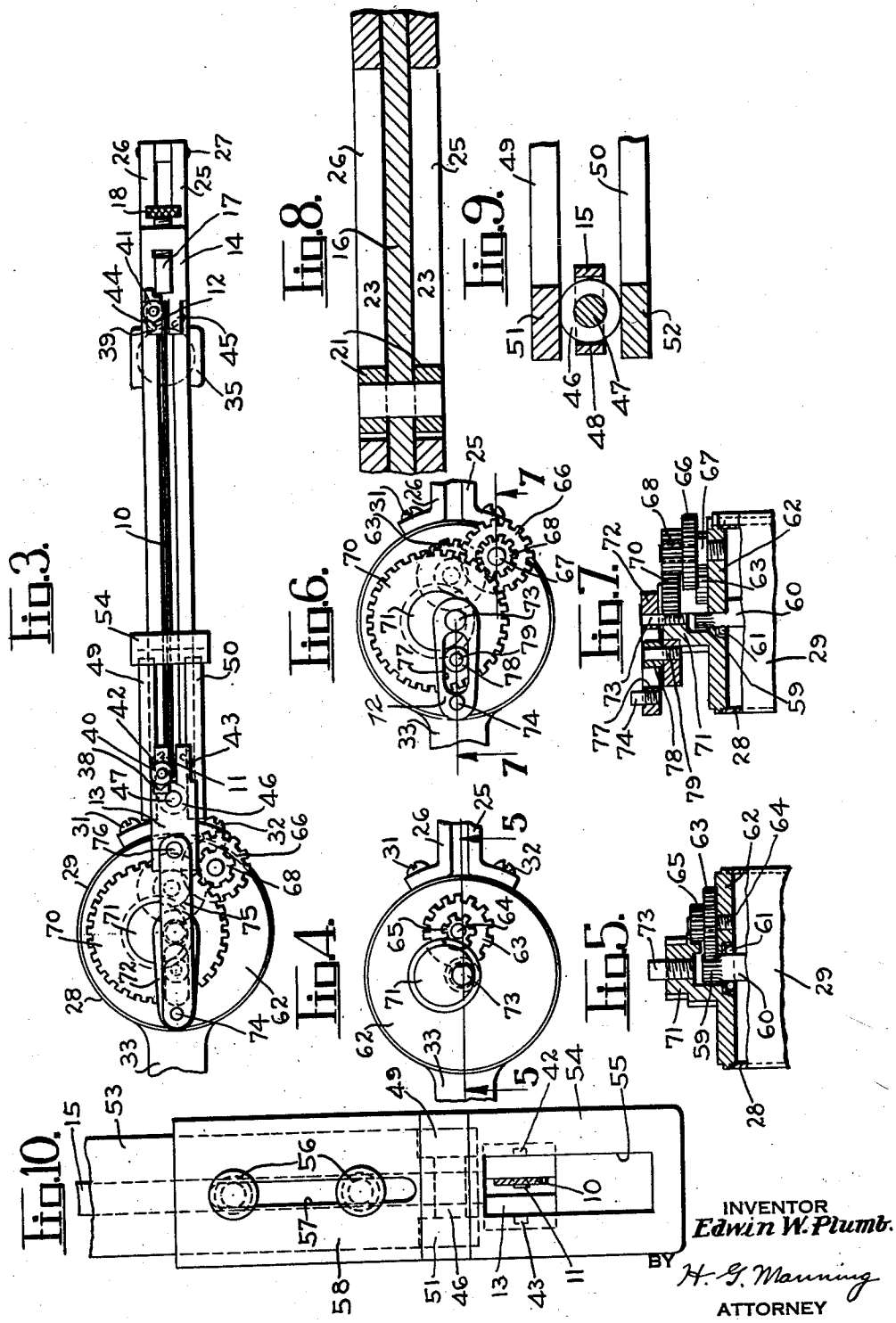
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PORTABLE ELECTRIC HACK SAW

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PORTABLE ELECTRIC HACK SAW

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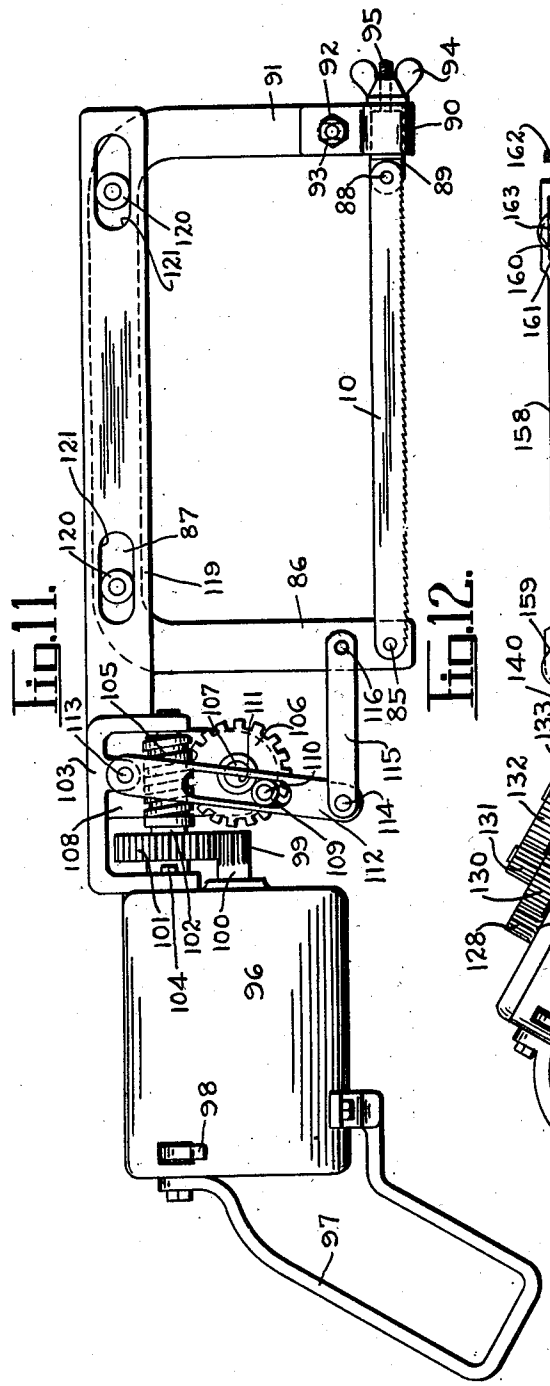


Fig. 11.

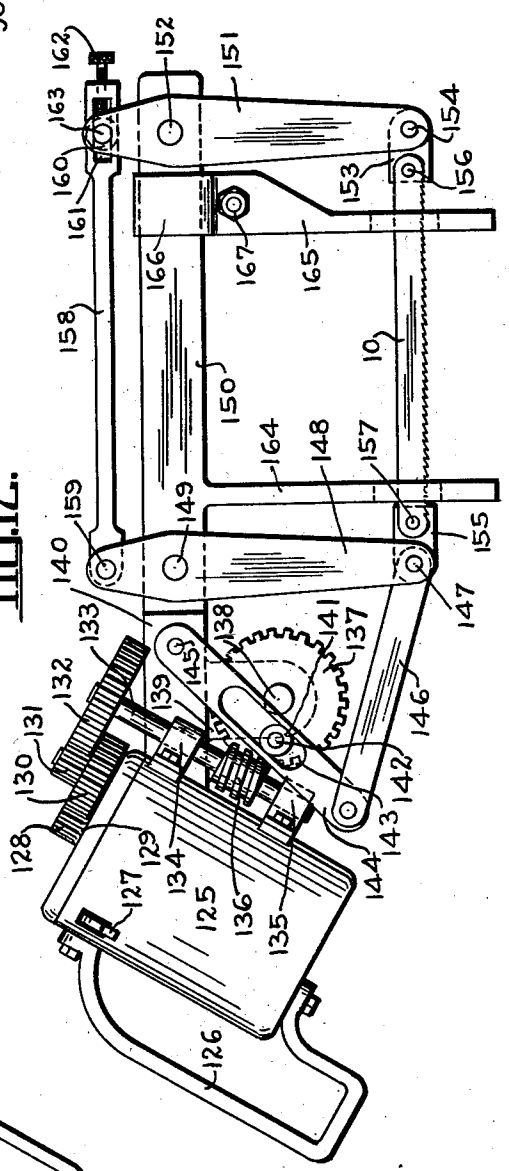


Fig. 12.

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2,330,618

UNITED STATES PATENT OFFICE

2,330,618

PORTABLE ELECTRIC HACK SAW

Edwin W. Plumb, Morris, Conn.

Application July 14, 1941, Serial No. 402,278

2 Claims. (Cl. 29—73)

This invention relates to metal working and more particularly to a portable hacksaw driven by an electric motor.

One object of this invention is to provide a power hacksaw of the above nature in which the reciprocating blade is normally inclined to the line of travel of the hacksaw frame so that on the forward idle stroke of the blade, the teeth will be withdrawn from the work to prevent dulling of the hacksaw.

A further object is to provide a portable power hacksaw of the above nature in which the hacksaw frame is mounted in anti-friction bearings.

A further object is to provide a power hacksaw of the above nature provided with a stationary anvil member adapted to be held tightly against the work.

Another object is to provide a portable power hacksaw of the above nature in which the hacksaw will be moved rapidly on the forward idle stroke and more slowly on the rear cutting stroke.

A still further object of this invention is to provide an improved portable power hacksaw of the above nature which will be relatively inexpensive to manufacture, simple in construction, compact, ornamental in appearance, and very efficient and durable in use.

With these and other objects in view, which will appear as the description proceeds, there have been illustrated in the accompanying drawings several forms in which the invention may be conveniently embodied in practice.

In the drawings:

Figure 1 is a top plant view of a portable power hacksaw embodying the features and principles of this invention.

Figure 2 is a side view of the same, with the enclosing shield sectioned to expose the interior working parts thereof.

Figure 3 is an underside view of the same with the enclosing shield omitted.

Figure 4 is a broken section on the line 4 of Figure 2.

Figure 5 is a section on the line 5—5 of Figure 4.

Figure 6 is a broken section on the line 6 of Figure 2.

Figure 7 is a section on the offset line 7—7 of Figure 6.

Figure 8 is an enlarged broken section on the line 8—8 of Figure 2.

Figure 9 is an enlarged broken section on the line 9—9 of Figure 2.

Figure 10 is an enlarged broken view looking in the direction of arrow 10 in Figure 2.

Figure 11 is a side view of a modified form of power hacksaw.

Figure 12 is a side view of still another form of power hacksaw in which the motor is mounted on an inclined axis.

Referring now to the drawings wherein like reference numerals designate like parts throughout the several views and particularly to the first form of the invention illustrated in Figures 1–10 inclusive, the numeral 10 denotes a hacksaw blade detachably mounted in the usual manner upon pins 11 and 12, carried by holding members 13 and 14 respectively. The holding member 13 is permanently secured, as by welding to one leg 15 of a frame 16, and the other member 14 is detachably secured to the other frame leg 17 by a clamp screw 18. The frame leg 17 passes through a slot 19 in the member 14 and is clamped thereto by the screw 18 which has a pointed end 19 adapted to engage the leg 17 in any one of a plurality of notches 20 provided therein for a purpose to be hereinafter disclosed.

The frame 16 is provided with two spaced apart pairs of rollers 21 and 22, one roller of each pair being disposed at each side of the frame and being adapted to ride in elongated slots 23 and 24 formed in guide bars 25 and 26 respectively, and which are disposed one at either side of the frame 16. The guide bars 25 and 26 are secured together by a rivet 27 at their outer ends, and at their inner ends to the casing 28 of an electric motor 29 by screws 30 and 31, respectively. By means of the above construction, the frame 16 carrying the blade 10 will be guided in its reciprocating movements over a stationary workpiece 32 with which the saw blade is engaged.

An inclined handle 33 is provided extending from the motor casing 28, and a switch 34 is conveniently located in the handle 33 for operating the motor 29. Another handle 35 is provided, which extends upwardly from and is secured, as by screws 36 and 37, to the guide bars 25 and 26 respectively, which it straddles.

The blade holding members 13 and 14 are provided with clamp fingers 38 and 39 respectively which are adapted to clamp the respective ends of a file to the members 13 and 14 by means of screws 40 and 41 respectively, in case it should be desired to replace the blade 10 with a file (not shown). The members 13 and 14 are each also provided, in addition to the centrally located pins 11 and 12, with side pins 42, 43, and 44, 45 (see Fig. 3) whereby the hacksaw blade 10 held thereby may be enabled to cut closer to a shoulder on the work-piece than would otherwise be the case.

The blade supporting member 13 has a roller 46 journaled on a pin 47 extending upwardly therefrom and into a slot 48 formed in the frame leg 15 for this purpose. The roller 46 rides between a pair of horizontal bars 49 and 50 supported in position at their rear ends by vertical frame parts 51 and 52 extending downwardly from the guide bars 25 and 26 and at their forward ends by a vertical frame part 53 which ex-

tends from the guide bars 25 and 26 and is secured to the roller guide bars 49 and 50. An anvil 54 slotted at 55 (see Fig. 10) to permit the blade 10 to pass therethrough, is adjustably secured to the frame part 53 by thumb screws 56 which pass through an elongated slot 57 provided in the shank 58 of the anvil 54, and screw thread into the part 53. The shank 58 is preferably arranged to embrace the sides of the part 53 to prevent misalignment or wobbling.

The hacksaw frame 15, 16, 17, the pin-holding members 13 and 14, and the blade 10, are adapted to be reciprocated as a unit with respect to the work-piece 32 by the motor 29 through speed reduction gearing, a crank arm, and a link arranged in accordance with the "Whitworth" quick return principle, and a link whereby the blade will be moved slowly during its cutting stroke and more quickly during its idle stroke. In this instance, the forward stroke of the hacksaw is idle, and the cutting takes place on the rearward stroke toward the anvil 54 so that the work 32 will be pressed thereagainst by the teeth of the saw 10 during cutting.

The angle of the hacksaw blade 10 may be selectively adjusted, by means of the clamp screw 18, to engage in any one of the notches 20, whereby said hacksaw will be disposed out of parallel with the path of the rollers 21—thus causing a tendency for the teeth to be relieved from pressing on the work during the idle forward stroke. The screw 18 also serves to tighten the blade 10 between the pins 11 and 12.

The speed reduction gearing above referred to includes a pinion 59 on the end of the motor shaft 60 which is journaled in a ball bearing 61 supported by the motor end plate 62 (see Fig. 5).

A side gear 63 rotatable on a stud shaft 64 secured in the plate 62 is in mesh with the pinion 59 to be driven thereby. Provision is also made of a pinion 65 rigidly connected with the side gear 63 meshing with a gear 66 which is rotatably mounted on a stud shaft 67 extending from and secured to the plate 62. A pinion 68 rigidly secured to the gear 66 meshes with a gear 70 rotatably mounted on a circular stud 71 extending from and preferably integral with the plate 62. The stud 71 is eccentric to the axis of the motor shaft 60 and of the pinion 59.

A crank arm 72 is pivoted at its inner end upon a stud shaft 73 extending outwardly from the stud 71 concentric to the axis of the motor shaft 60 and of the pinion 59. The outer end of the crank arm 72 is pivotally secured by a pin 74 to one end of a link 75 which extends therefrom and has its other end pivotally secured by a pin 76 to the blade holding member 13. The arm 72 is provided with an elongated slot 77 in which rides a roller 78 rotatably mounted on a stud shaft 79 secured to and extending from the gear 70 eccentric to its axis and the axis of the stud 71.

A sheet metal shield 80 indicated in Figures 1 and 2 may be provided for enclosing the operating parts of the mechanism to protect the operator and exclude dust.

Operation

In the operation of the first form of the invention (Figs. 1–10), when it is desired to install a hacksaw blade 10 in the frame 16, said blade will be placed upon the pins 11 and 12 of the holding members 13 and 14, and then tightened by the screw 18. The motor 29 will then be started by manipulation of the switch 34, causing the hacksaw blade 10 to reciprocate. The anvil 54 will then be pressed against the work-piece 32, and the mechanism lowered to bring the reciprocating hacksaw blade into cutting engagement with the work-piece 32. The required pressure of the blade 10 upon the work-piece 32 may be obtained by manually pressing the handles 33 and 35 downwardly. The blade holding frame will be guided with the minimum of friction by the rollers 21, 22, and 46, which ride in the slots 23, 24, and 48 respectively. Should it be desired to use a file in place of the hacksaw blade 10, the latter will be removed and replaced with the file which will be clamped to the holding members 13 and 14 by means of the clamp fingers 38 and 39 and clamp screws 40 and 41 described above.

Second form (Figure 11)

In the modified form shown in Figure 11, the saw blade 10 is secured at one end upon a pin 85 extending from a leg 86 of a frame 87, and at its other end upon a pin 88 extending from a blade holding member 89 slidably held in a lug 90 which is secured to the other leg 91 of the frame 87 by a bolt 92. The bolt 92 passes through an elongated slot 93 in the frame leg 91 whereby the saw blade 10 may be adjusted out of parallel with the path of the roller 120. The blade may be held between the pins 85 and 88 with any desired degree of tightness by means of a thumb nut 94 screw-threaded on a stud 95 extending from the member 89.

In this instance the hacksaw frame 87 is reciprocated by means of a horizontal motor 96, having a handle 97 and a switch 98, through a speed reduction gearing, connected by a crank arm and linkage secured to the frame leg 86. The speed reduction gearing includes a pinion 99 on the motor shaft 100, which pinion meshes with a gear 101 having a shaft 102 rotatably supported on a bracket 103 secured to the motor casing by bolts 104. The shaft 102 extends from the gear 101 and has a worm 105 secured thereto. The worm 105 meshes with a worm wheel 106 rotatably supported by a stud shaft 107 extending from an arm 108 depending from the bracket 103.

A roller 109 rotatably supported on a stud shaft 110 extending from the worm wheel 106, and eccentric to its axis rides in an elongated slot 111 provided in a crank arm 112. The crank arm 112 is pivoted at one end to the bracket 103 upon a pin 113 and is pivotally connected at its other end by a pin 114 to one end of a link 115. The other end of the link 115 is pivotally connected to the frame leg 86 by a short pin 116. As in the previously described form, the frame 87 is guided between the guide bars 119 and is supported by means of rollers 120 which ride in elongated slots 121 provided in the bars 119.

Third form (Figure 12)

In the form shown in Figure 12, the blade 10 is reciprocated by an inclined motor 125 having a handle 126 and a switch 127. A pinion 128 on the motor shaft 129 meshes with a gear 130 to drive it. The gear 130 has a pinion 131 integral therewith and which meshes with a gear 132 to drive it. The gear 132 is secured to an inclined shaft 133 which extends alongside the casing of the motor 125, being supported therefrom in bearings 134 and 135. A worm 136 secured to the shaft 133 meshes with a worm wheel 137 rotatably supported on a stud shaft 138 in turn supported by a depending arm 139 from a bracket 140 suitably secured to the motor 125. The worm wheel 137 carries a roller 144 rotatably mounted on a

stud shaft 142 extending from the worm wheel 137 and which is eccentric to the axis thereof. The roller 141 rides in an elongated slot 143 provided in an inclined crank arm 144, one end of which is pivoted to the bracket 140 by a pin 145. The other end of the crank arm 144 is pivotally connected to one end of an inclined link 146 pivotally secured by a pin 147 to the lower end of a rocker arm 148 which in turn is pivoted by a pin 149 to a horizontal bar 150 extending from the bracket 140. The bar 150 has another rocker arm 151 pivoted to it adjacent its remote end by a pin 152. The lower end of the rocker arm 151 has a blade-holding member 153 pivoted to it by a pin 154 and the arm 148 also has a blade holding member 155 pivoted to it by the pin 147. The blade 10 is secured to the members 153 and 155 by pins 156 and 157 respectively. The upper ends of the rocker arms 148 and 151 are connected together by a rod 158 parallel to bar 150 and is pivoted at one end to the arm 148 by a pin 159 and at the other end to a block 160 slidable in a slot 161, provided in this end of the rod 158, and adjusted by means of an adjusting thumb screw 162 engaging said block 160. A pin 163 connects the block 160 to the upper end of the rocker arm 151. By means of this construction it will be seen that adjustment of the screw 162 will tighten the blade 10 between the blade holding members 153 and 155.

A pair of work-engaging anvils are provided in this instance and comprise a depending bar 164 adjacent the rocker arm 148 and which is suitably secured at its upper end, as by welding, to the bar 150, and a bar 165 having clamp jaws 166 adapted to be clamped to the bar 150 by a bolt 167.

While there have been disclosed in this specification several forms in which this invention may be embodied, it is to be understood that these forms are shown for the purpose of illustration only, and that the invention is not to be limited to the specific disclosures, but may be modified and embodied in various other forms without departing from its spirit. In short, the invention includes all the modifications and embodiments coming within the scope of the following claims.

Having thus fully described the invention, what is claimed as new and for which it is desired to secure Letters Patent is:

1. In a portable power-driven hacksaw adapted to be carried in the hands of an operator, a frame having an electric motor rigidly mounted thereon, a pair of rocker arms pivoted at spaced points on said frame, said rocker arms being adjustably connected together at their upper ends by a horizontal link, the lower ends of said rocker arms being connected by a hacksaw blade, and means for drivingly connecting the lower end of one of said rocker arms to said motor for reciprocating said hacksaw blade, said frame having an elongated portion extending beyond the pivot points of said rocker arms to support said motor.

2. A portable power-driven hacksaw as defined in claim 1, in which said frame has an integral anvil to engage the work being sawed, an adjustable anvil slidable on said frame, and means to lock said slidable anvil in any desired position on said frame.

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