

April 3, 1928.

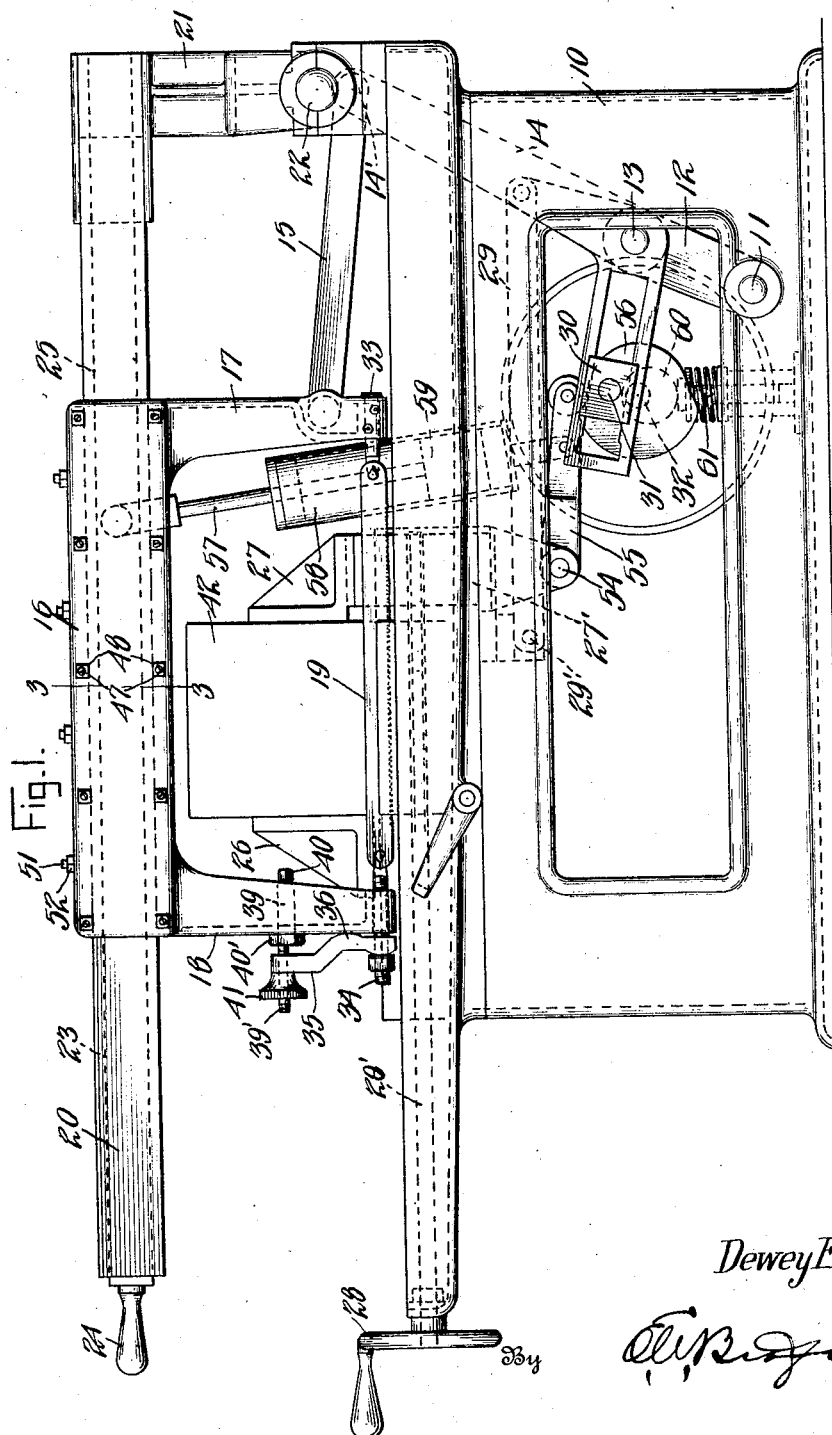
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D. E. GOMMEL

HACK SAW

Filed Sept. 11, 1924

2 Sheets-Sheet 1



Inventor
Dewey E. Gommel

Elmer Ford
Attorney

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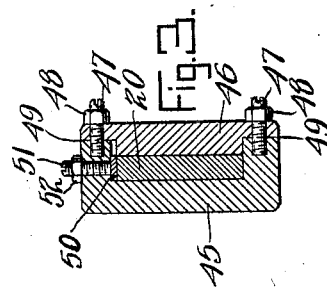
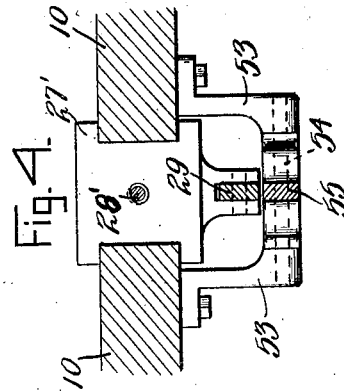
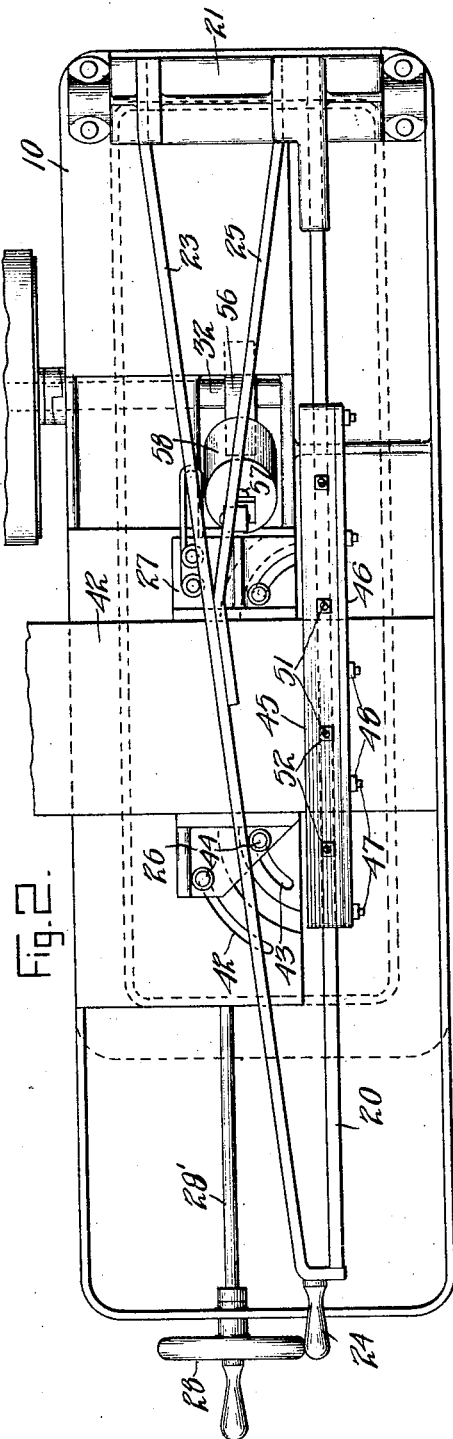
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2 Sheets-Sheet 2



Inventor
Dewey E. Gommel

By *D. E. Gommel*
Attorney

UNITED STATES PATENT OFFICE.

DEWEY E. GOMMEL, OF INDIANAPOLIS, INDIANA, ASSIGNOR TO E. C. ATKINS & COMPANY, OF INDIANAPOLIS, INDIANA, A CORPORATION OF INDIANA.

HACK SAW.

Application filed September 11, 1924. Serial No. 737,144.

My said invention relates to a power driven hack saw and it is an object of the same to provide improved and simplified means for driving a hack saw with strokes of variable length according to the size of the work.

Another object of the invention is to provide improved workholding means for a saw of the character described.

Referring to the accompanying drawings, which are made a part hereof and on which similar reference characters indicate similar parts,

Figure 1 is a side elevation of my improved machine,

Figure 2, a plan of the same,

Figure 3, a section on line 3—3 of Figure 1, and

Figure 4, a vertical cross section at the right-hand side of jaw 27 in Figure 1.

In the drawings reference character 10 indicates the fixed frame of the machine said frame being provided with a pivot 11 for a lever 12 on which lever a pivot 13 is provided which forms the fulcrum of a lever 14.

At its upper free end the lever 14 is connected by a pivot 14' to a link 15 and this in turn is pivoted to a frame 16 having depending arms 17 and 18 with means at the lower ends for supporting a hack saw blade 19. The frame 16 is supported for sliding movement lengthwise of the machine on a bar 20 fixed at one end to an upright 21 pivotally mounted on the main frame at 22. A brace 23 is connected at its forward end to the bar 20 and at its other end to the upright 21 said brace being provided at its forward end with a handle 24 by means of which the parts 20, 21, 23 may be moved on the pivot 22 carrying with them the frame 16 and the parts attached thereto. A brace 25 is connected to the brace 23 midway of its length and extends therefrom to the farther corner of the upright 21.

The workholder is in the form of a vise and preferably comprises a fixed jaw 26 and a movable jaw 27 although both jaws may be movable if preferred. For moving the jaw 27 I have provided a hand wheel 28 and a rod 28' connected to the jaw 27 by screw-threads or other suitable means. A link 29 is pivoted at one end at 29' to the movable support 27' for the jaw 27 and at the other end is pivotally connected to the lever 12.

The lever 14 has a slot to receive a slide 30 on a crank pin 31 said crank pin being operated by a shaft 32. This slot is shown as being formed in a bent arm of the lever but it will be understood that the lever may be straight or may be bent at various angles other than that shown.

For tightening the saw blade I have provided connections comprising a bolt 33 at one end of the blade, preferably held in fixed position by set screws. A bolt 34 flattened on each side passes loosely through a depending arm 18 and has a nut bearing against a lever 35 through which the bolt also extends loosely. This lever is loosely fulcrumed at 36 against the depending arm 18. A bolt 39 at the other end of said lever has an eccentric extension 39' and a squared head 40 by means of which the bolt may be turned to vary the position of the eccentric extension and thus bring the saw into alignment by swinging the lever about a horizontal pivot. The bolt 40 is held in place by a nut 40' and the eccentric extension 39' has a nut 41 threaded thereon by means of which the lever 35 may be locked on its fulcrum to tension the saw.

The jaws of the vice are pivotally adjustable about points, or more accurately about vertical axes, in the same plane as the center line of the saw cut so as to utilize the full length of the blade at all times and at all angles. With this object in view slots 42 and 43 are formed in the parts supporting the adjustable jaws 26 and 27, each pair of slots being concentric and being formed on arcs drawn about the pivot points or axes of the respective jaws. Each jaw is provided with a pair of guide-pins or bolts 44 projecting into the respective slots 42 and 43 and adapted to secure the jaws in adjusted position in any desirable or conventional manner. By adjusting the position of the jaws it is possible to make a cut at right-angles to the length of the work as in Figure 2 or at any angle through a wide range.

Figure 3 illustrates adjustments for taking up wear between the saw frame 16 and the support 20. The saw frame comprises outer and inner members 45 and 46 one of which may overlap the other as shown in said figure. These parts are held together by screws 47 and nuts 48. A slight clearance is left between the meeting edges of

the two parts at 49 so that the nuts 48 may be gradually tightened to draw the parts 45 and 46 down on the bar 20. A shim 50 is entered between the bar 20 and the over-
 5 hanging arm of the frame member 45. A series of screws 51 extend through holes in said arm into engaging relation with the shim 50 whereby the screws may be turned
 10 down at necessary intervals for taking up wear between the shim and the bar. Nuts 52 are provided for locking said bolts in adjusted position.

The movable support 27' for the jaw 27 has parallel flanges at opposite sides (Fig. 4) extending over adjacent parts of the base, whereby it is guided for sliding adjustment by the threaded rod 28'. Brackets 53 are mounted on the respective guiding portions of the frame at opposite sides
 20 of the block 27' and said brackets support a pivot 54 for a lever 55 having at its free end a roller resting on the periphery of a cam 56 on the shaft 32. The cam moves the lever up and down about its pivot as the
 25 shaft rotates and thereby operates a longitudinally yieldable pitman 57 having upper and lower parts pivoted respectively to the lever 55 and the saw frame 16. The lower part includes a cylinder 58 and the
 30 upper part includes a piston 59 within the cylinder. Any convenient opening, with or without valves may be provided for admitting air or liquid in sufficient quantity so that when the lever 14 swings to the right
 35 to retract the saw, the saw frame and guide are swung upward about the pivot 22 to prevent engagement of the saw with the work in its retracting movement. The parts are so proportioned that sufficient fluid will have
 40 escaped by the time the saw frame reaches the rearward limit of its movement to permit the saw to again engage the work at the beginning of the cutting stroke.

In addition to the parts heretofore described the shaft 32 carries an eccentric 60 operating the piston of a pump 61 of conventional character for supplying, cooling, and cutting compounds to the saw cut.

In the use of my device the jaws will be
 50 opened to receive a piece of work 42 and the jaw 27 will be brought to holding position by manipulation of the hand wheel 28. The variation in position of the jaw 27 causes movement of the link 29 and the
 55 lever 12 thereby moving the fulcrum 13 and the lever 14 relatively to the shaft 32 and the parts carried thereby. By this arrangement the stroke of the saw is varied according to the size of the work so as to use
 60 the full length of the saw under all conditions. The pivot 14' returns to the same position at the end of each stroke so that it is necessary only to move one vise jaw to secure the desired results.

65 Various modifications of my device will be

obvious to those skilled in the art and therefore I do not limit myself to the specific form of the invention shown in the drawings and described in the specification but only as indicated in the appended claims. 70 For example the shaft 32 might be moved instead of the fulcrum 13 and many other changes may be made without departing from the spirit of the invention. A hack saw is shown in the drawings, but features 75 of the invention may be used in other sawing machines within the scope of my invention.

Having thus fully described my said invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a power hack saw structure the combination of a table, a saw guide pivoted on one end of the table, a saw slidably mounted upon said guide, a lever pivotally mounted underneath the table and having its upper end extending above the table and formed with an angular slotted arm beneath the table, a sliding block mounted in said slot of said arm, a link connecting the upper end of said lever with the saw, a power shaft 80 mounted beneath the table adjacent the lever, means connecting said power shaft with the sliding block in the slotted angular arm of said lever, a work-holding vise mounted on said table one jaw of which is fixed and the other of which is slidable, a connection between the lower end of said slidable jaw and the power shaft for operating the same, and means connecting said slidable jaw with the saw frame for controlling the 100 length of its stroke as said movable jaw is adjusted, all substantially as set forth.

2. The combination of a table, a saw guide pivoted on one end of said table, a saw slidably mounted on said saw guide, a work 105 holder comprising a fixed jaw and a movable jaw mounted on said table in a position to hold the work to be cut by said saw, a drive shaft mounted transversely beneath said table, a bell crank lever pivoted in substantially the horizontal plane of said drive shaft and having one arm slotted and disposed in substantially horizontal position and engaging an eccentric carried by said 110 drive shaft, a connection between said eccentric and said movable jaw, and a link connecting the opposite end of said bell crank lever with said saw, the connection between the bell crank lever and the shaft being such that the saw will be moved in 120 one direction at a slow speed and in a reverse direction at an accelerated speed, substantially as set forth.

3. The combination of a table, a saw guide pivoted on one end of said table, a saw slidably mounted on said saw guide, a work 125 holder comprising a fixed jaw and a movable jaw mounted on said table in a position to hold the work to be cut by said saw, a drive shaft mounted transversely beneath said 130

table, a bell crank lever pivoted in substantially the horizontal plane of said drive shaft and having one arm slotted and disposed in substantially horizontal position and engaging an eccentric carried by said drive shaft, a connection between said eccentric and said movable jaw, a link connecting the opposite end of said bell crank lever with said saw, the connection between the bell crank lever and the shaft being such that the saw will be moved in one direction at a slow speed and in a reverse direction at an accelerated speed, substantially as set forth.

4. The combination of a table, a work holder adjustably mounted on said table, a saw guide pivotally mounted on one end of the table, a saw slidable on said saw guide, a shaft mounted transversely beneath the table, a cam mounted on said shaft, a pin mounted eccentrically of said cam, a lever pivoted adjacent the bottom of the table below the horizontal plane of said drive shaft and having its upper ends extending upwardly to substantially the same distance above the drive shaft, a link connecting the upper end of said lever and the work holder whereby the lever will be rocked on its pivot when the work holder is moved into engagement with work of various sizes, a bell crank lever fulcrumed substantially midway on the first mentioned lever and having one end slotted for accommodating the pin on the cam whereby such slotted end will be operated for reciprocating the bell crank lever, a link connecting the bell crank lever with said saw, a pivotally mounted arm engaging the periphery of the cam on the drive shaft and adapted to be oscillated by said cam, a

dash pot having one end connected to said pivotally mounted arm and having its other end connected to the saw guide, the arrangement being such that when the drive shaft is rotated the pin will move outwardly in the slotted end of the bell crank lever in a semi-circle and operate the saw at a slow speed and will move in the inner end of said slotted arm of the bell crank lever in a semi-circle and operate the saw at a greater rate of speed and at substantially the same time the pivotally mounted arm and dash pot will elevate the saw guide and saw, substantially as set forth.

5. In a power hack saw the combination of a table, a work-holder mounted on said table on supports adapted to adjust said work-holder in the arc of a circle said work-holder consisting of two jaws one mounted in fixed position and the other adapted to move, a lever pivotally mounted underneath the table and formed with an angular slotted arm, the upper end of said lever being connected to the saw frame, a power shaft mounted beneath the table adjacent to said lever, a sliding block mounted in the slot of said slotted arm of said lever and an operating connection between said slotted arm and the movable jaw and also the saw frame whereby adjustment of said movable jaw controls the length of the stroke of the saw, regardless of in what position the movable jaw may be, substantially as set forth.

In witness whereof, I have hereunto set my hand at Indianapolis, Indiana this 27th day of August, A. D. nineteen hundred and twenty-four.

DEWEY E. GOMMEL.