Nov. 24, 1953 D. D. BEEBE 2,660,206

JIG SAW

Filed March 12, 1949 4 Sheets-Sheet 1

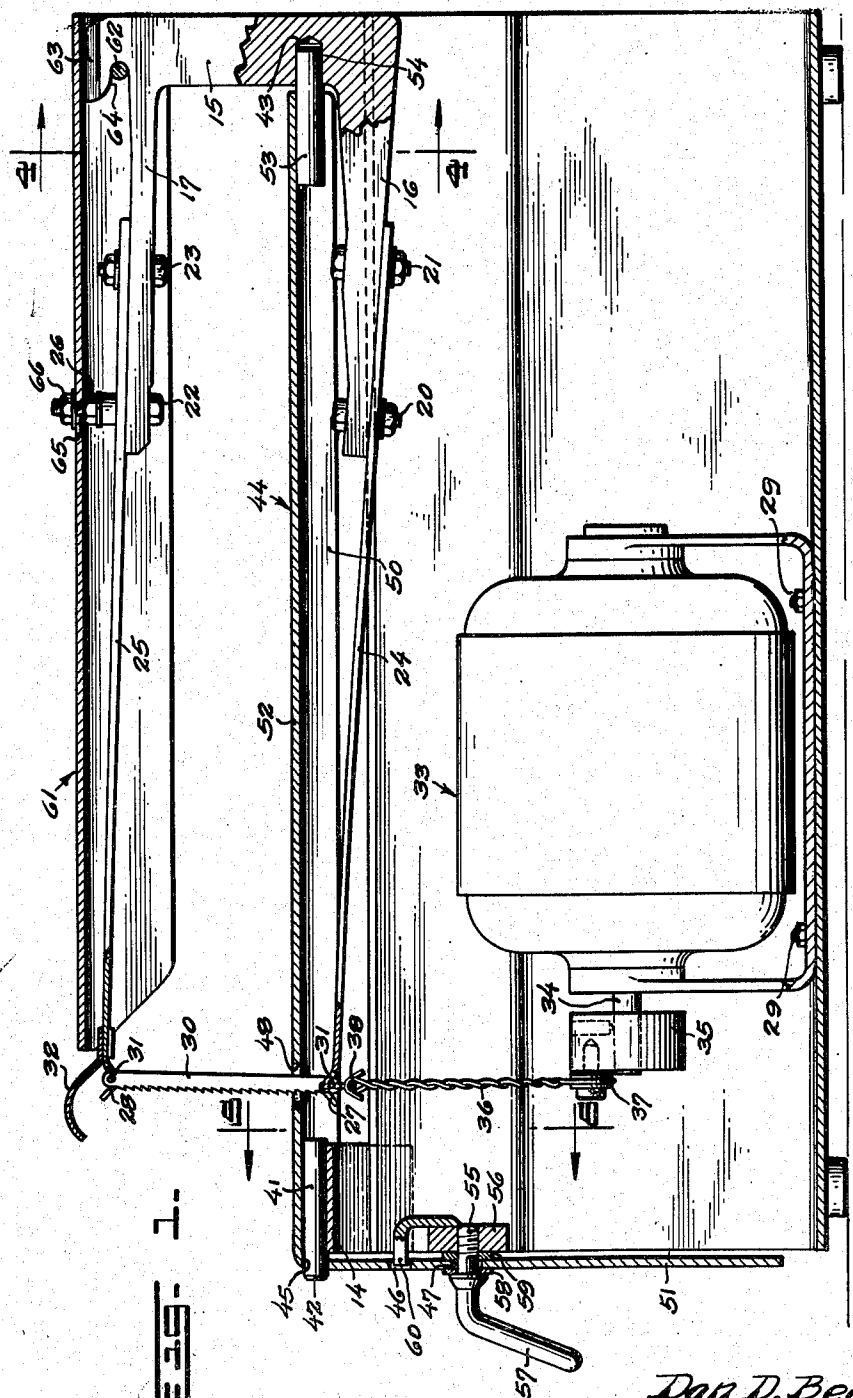


Fig. 1.

Inventor
Dan D. Beebe
By
Attorney

Nov. 24, 1953 D. D. BEEBE 2,660,206

JIG SAW

Filed March 12, 1949 4 Sheets-Sheet 2

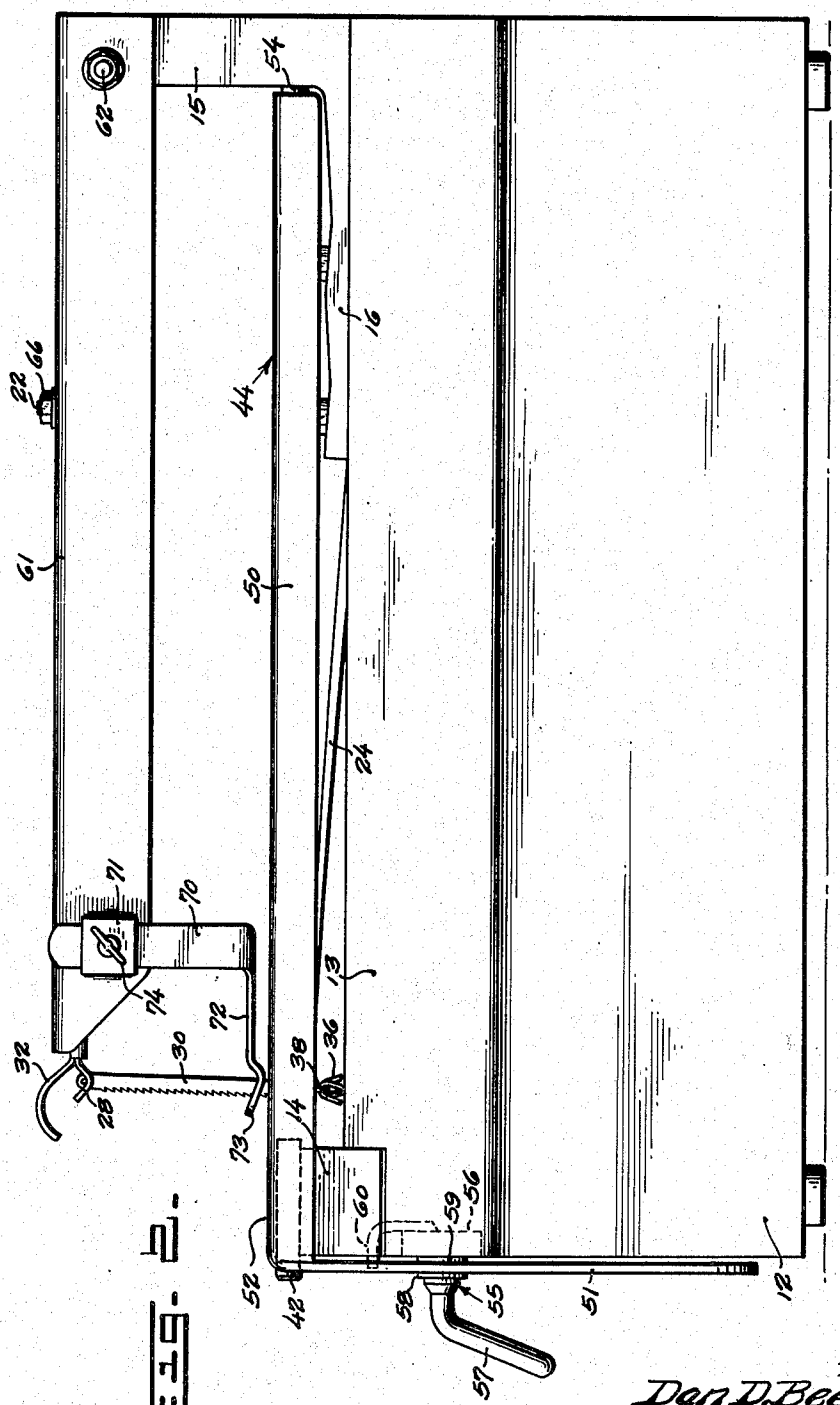


FIG. 2.

Inventor
Dan D. Beebe
By
Attorney

Nov. 24, 1953 D. D. BEEBE 2,660,206

JIG SAW

Filed March 12, 1949 4 Sheets-Sheet 3

Fig. 4.

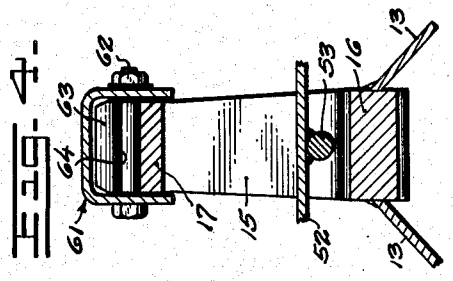


Fig. 5.

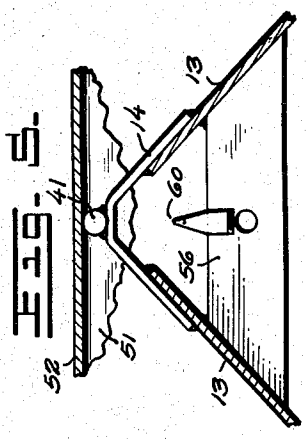
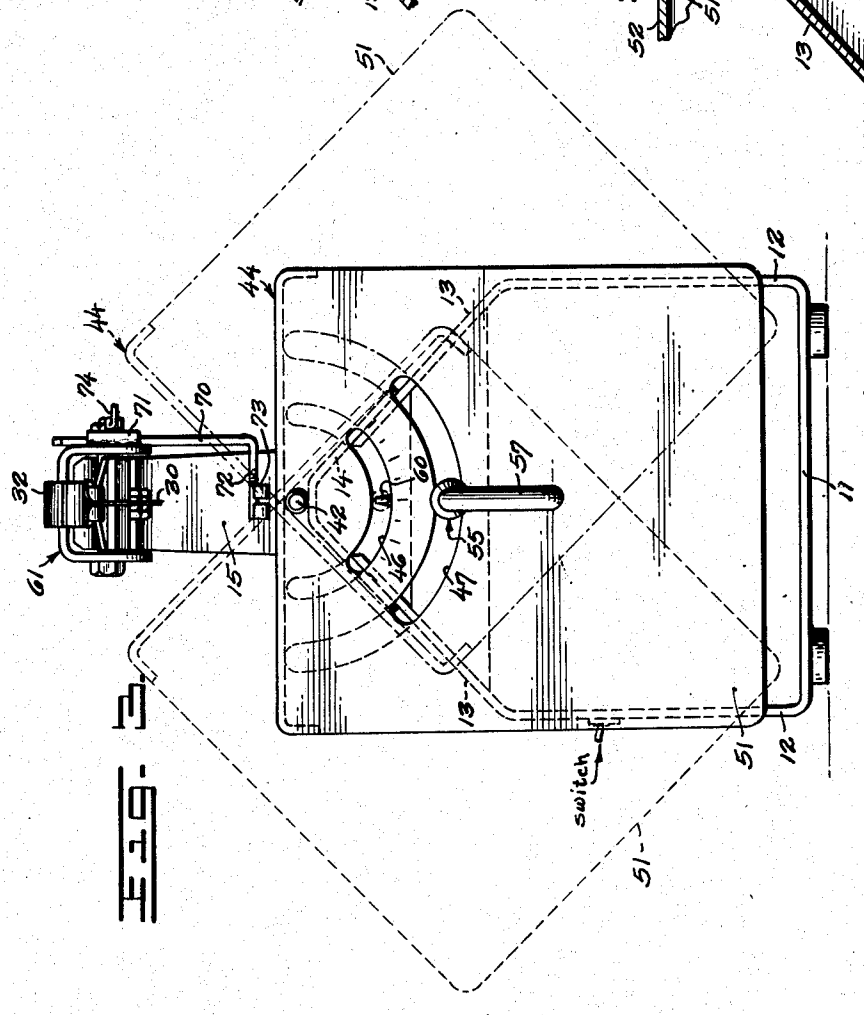


Fig. 3.



Inventor
Dan D. Beebe
By
Attorney

Nov. 24, 1953 D. D. BEEBE 2,660,206

JIG SAW

Filed March 12, 1949 4 Sheets-Sheet 4

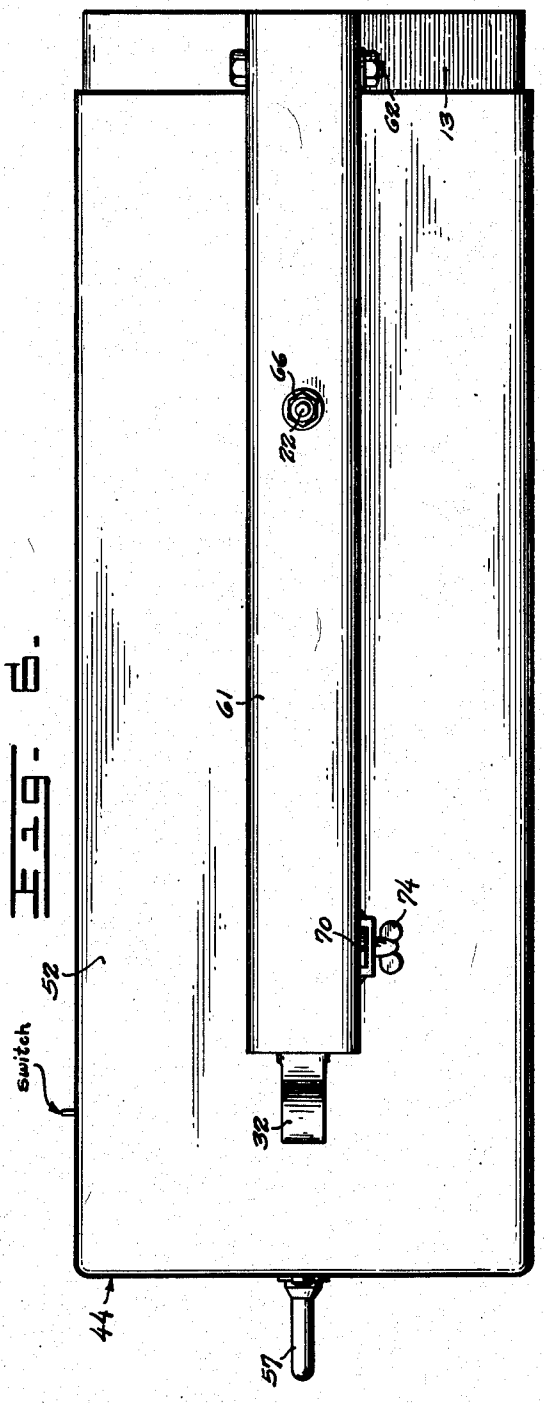


Fig. 6.

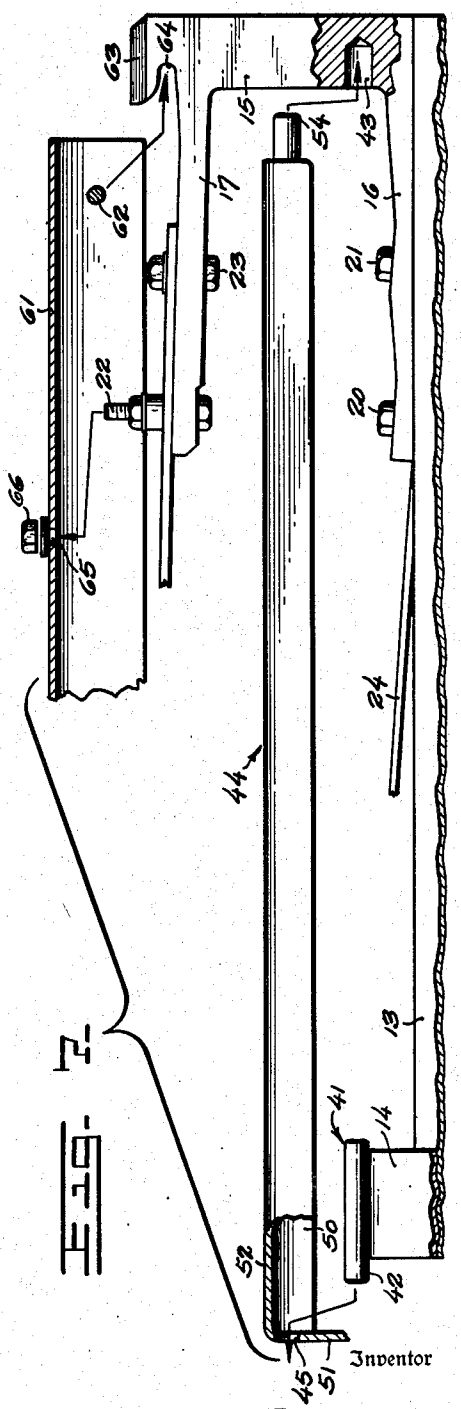


Fig. 7.

Inventor

Dan D. Beebe

By Edward L. Dame

Attorney

Patented Nov. 24, 1953

2,660,206

UNITED STATES PATENT OFFICE

2,660,206

JIG SAW

Dan D. Beebe, Seattle, Wash.

Application March 12, 1949, Serial No. 81,187

9 Claims. (Cl. 143—73)

1

This invention relates to jig-saws, and has for its general objects the provision of a perfected machine of this nature engineered to give fast, easy, and accurate cutting, which is ruggedly constructed, which will assure long and trouble-free service, which is extremely attractive from the standpoint of ornamental appeal, and which introduces a safety factor, uncommon to jig-saws, in that all of the operating mechanism of the machine other than the cutting blade itself is effectively housed to preclude liability of injury to the operator occurring in consequence of the operator's hand or any part of his clothing coming into contact with these normally exposed blade-driving parts.

The invention has the further and particular object of providing a jig-saw which requires almost no attention, other than that of replacing the cutting blades, in order to maintain the saw in a condition of peak efficiency, and which, however, makes all of the housed operating parts easily and quickly accessible for the infrequent servicing which these parts require.

As a yet further and particular object, the invention aims to provide a jig-saw the work-supporting table of which is permitted a full tilting movement, and by which I mean that the table can be tilted to any angle up to 45° in both directions from a normal horizontal.

A still further and particular object is to provide a jig-saw the frame structure of which is largely made up from sheet metal, thus effecting a saving in the production cost as compared with the more commonly used castings without sacrifice of strength or rigidity, and additionally obtaining the advantage of lighter weight.

With the foregoing and other objects and advantages in view and which will appear and be understood in the course of the following description and claims, the invention consists in the novel construction and in the adaptation and combination of parts hereinafter described and claimed.

In the accompanying drawings:

Figure 1 is a longitudinal vertical sectional view illustrating a jig-saw constructed in accordance with the now-preferred embodiment of the present invention.

Fig. 2 is a side elevational view thereof.

Fig. 3 is a front elevational view with dotted lines being employed to indicate the positions occupied by the table top as it is tilted to opposite extremes of its permitted swivel adjustment.

Fig. 4 and Fig. 5 are each a fragmentary transverse vertical sectional view, the section lines

2

therefor being shown at 4—4 and 5—5, respectively, of Fig. 1.

Fig. 6 is a top plan view of the jig-saw; and

Fig. 7 is an exploded fragmentary longitudinal vertical sectional view with arrows and trailing lead lines employed to give a clear understanding of the correlation of parts.

According to the present invention there is provided a box-like body serving as a mounting base for the machine. Being open to the front and rear, said box-body is produced from a rectangular blank of sheet metal—12-gauge stock by preferance—and in the forming of this blank the side portions are bent upwardly and thence inwardly to describe, when viewed in end elevation, a pentagonal figure suggesting the substantial outline of a gable-roofed house. There is thus provided a horizontal floor section designated by the numeral 11, vertical side sections 12, and sloping roof sections 13.

The two roof sections terminate in spaced relation to present a ridge slot, and other than for an inverted-V strap 14 welded in place to extend as a connector across the slot at the front end of the box-body and a frame-piece also welded in place and occupying the rear end of the slot, the slot is left open. The frame-piece is given an oxbow or U-shape and in the mounting thereof is placed perpendicularly on edge with the throat of the U directed forwardly, and this is to say that the cross-arm of the U lies to the rear and serves the function of a post sustaining the upper branch of the U in elevated relation above the box-body. 15 designates the post, and 16 and 17 designate the lower horizontal arm and the upper horizontal arm, respectively, of said frame-piece. Each said horizontal arm has the root end of a spring leaf member 24 and 25, respectively, secured thereto as by bolts 20—21 and 22—23, with the spring leaf 24 applied to the underside of the lower arm and the spring leaf 25 applied to the upperside of the upper arm, and for a purpose which will be hereinafter described the threaded end of the bolt 22 projects upwardly well beyond the clamping nut 26 which is applied thereto. The two spring leaves extend forwardly on the substantial longitudinal median line of the box-body and are of a length to terminate somewhat short of the front-end limit of the slot, being further characterized in that they lie parallel to one another in upwardly sloping planes to have the free ends normally located above the horizontal planes in which the respective fulcrum of bending moment occurs. Each spring leaf has its free extremity curved to pre-

sent substantial saddle-hooks, as 27 and 28, with the curvature being such that the saddle notch of the upper said hook is turned downwardly and the saddle notch of the lower said hook is turned upwardly, and these saddle-hooked ends are each made bifurcate for the insertion, through the slots thereby provided, of the ends of a jig-saw blade 30. Transverse pins 31 traversing the blade-ends establish saddling engagement within the notches. In the use of the saw, these blade-carried pins occasionally shear or the blade itself may snap and as protection against liability of the operator being endangered in consequence of either a broken section of the blade or its pin flying upwardly there is provided a guard 32 secured as a fixed appendage of the upper spring leaf and projecting as an overhanging lip above the saddle-notch 28 thereof.

As a source of energy to act in conjunction with the retractile force of the spring leaves for imparting vertical reciprocation to the saw-blade the invention employs an electric motor 33 housed within the box-body and removably secured, as by the bolts 29, to the floor 11. On the arbor 34 of the motor is a fly-wheel 35, and carried by this fly-wheel in off-set relation to the rotary axis is a crank-pin which connects with the lower of the two spring leaves by a connecting rod 36. The crank-pin which I prefer to employ is one in which a race-ring 37 formed in its perimeter with a circumscribing groove is given a ball-bearing journal upon a hub member securely bolted to the fly-wheel, and the associated connecting rod is made up from a length of wire doubled back upon itself and caught by the produced loop within the groove of the race-ring, the two free ends of the wire being wound one upon the other to draw the loop tight and having the free extremities hooked over a staple 38 which is securely connected to the lower spring leaf 24.

It may be here stated that jig-saws the blades of which are guided for reciprocal movement along a fixed axis tend in their upstroke activity to lift the work off the surface of the supporting table, and my utilization of spring leaves, mounted as described, in lieu of the more conventional cross-head guides is to overcome this objection. The blade of the present saw, in consequence of the path of reciprocal movement prescribed by the spring leaves, is given a slight forward travel in the downstroke cutting motion and a corresponding degree of backward movement in the following upstroke of reciprocation. While it is not practical to so exaggerate this forward and backward motion as to completely eradicate the lifting tendency, the slight retractive movement is highly advantageous as a means of minimizing the condition. I profess no novelty in and to this feature.

Proceeding to describe those details of the present invention which, with the box-base, are responsible for greater efficiency, safety, and attractiveness, it will be seen that a bullet-shaped pin 41 is welded or otherwise made an integral surmounting part of the inverted-V strap 14 and this pin, disposed to lie horizontally on the longitudinal median line of the machine, has its nose 42 projected forwardly beyond the front-end limit of the box-base. There is also provided, at the rear end of the machine and bored in the frontal face of the post 15, a socket 43 co-axial to the pin. Designated generally by 44 is a tilting table. This table, as with the box-base, is produced from sheet metal and the blank therefor is generally rectangular in shape excepting that the side edges are cut back at one end of the blank for, say, one-third the overall length, hence giving to the major two-thirds of the blank a width somewhat wider than the minor one-third. In stamping out the blank this minor section has a circular hole 45 punched through the same, this hole having a diameter corresponding to the nose 42 of the strap-carried pin and being placed on the longitudinal median line of the blank in close proximity to the transverse line of juncture between major and minor sections. Also punched through the minor section on differing radii taken about the center of the hole as an axis are two quarter-circle slots 46 and 47. The major section also has a hole 48 punched therethrough with its location being on the longitudinal median line spaced from the free end of the major section a distance approximating the horizontal spacing between the free ends of the spring leaves and the inner limit of the frame-piece's U-throat.

In forming the table from such blank, the minor section is bent at substantial right angles to the major section, and the laterally prolonged edges of the major section are pressed downwardly as skirting flanges 50, these flanges being then welded by their inner end edges to the depending terminal tongue 51 which the minor section produces. Designated by 52, the major section serves as the table proper and at its rear end has welded to the underside a pin 53 located co-axial to the hole 45 of the depending tongue. A nose portion 54 of this pin projects rearwardly beyond the table proper.

In mounting the table the nose 42 of the strap-carried pin and the nose 54 of the table-carried pin are adapted to be inserted the former through the hole 45 of the tongue 51 and the latter within the socket 43 of the post 15, thus giving to the table a front-end and a rear-end pivot journal, and the table is held against endwise displacement by a removable headed screw 55. Such screw, inserted through the arcuate slot 47 of the tongue 51, finds thread engagement in a cross-bar 56 welded as a spanner across the open front of the box-body. The head of the screw carries a radial arm 57 serving as a lever-handle. In addition to its function of holding the tiltable table against endwise displacement, said screw 55 operates to lock the table at adjusted positions within the permitted limits of tilting movement, there being provided as a complement to the screw two washers 58 and 59 one of which is engaged by the head of the screw and the other of which bears against the spanner-bar 56, working together to establish a clamping purchase upon opposite faces of the tongue. A pointer 60 integrated with the spanner-bar projects through the arcuate slot 46 and by its association with a graduated scale impressed into the frontal face of the tongue gives visual indication of the angle of tilt.

From the foregoing it will be apparent that the motor 33, the crank-operated connecting rod 36, and the lower spring leaf 24 are each housed in a manner to substantially isolate the same against liability of an operator's hand or any part of the operator's clothing coming into contact therewith, yet in consequence of the facility with which the table can be removed permitting ready access to each of these working parts. I further consider it desirable, for reasons of safety to the operator, that the upper leaf spring 25 be also shrouded, and for such purpose there is employed a shield 61, sectionally of an inverted-U

configuration, arranged to have its head wall overlie and its depending side walls skirt the spring leaf. Traversing the side walls adjacent the heel end of this shield is a fixedly secured transverse bolt 62, and as a socket for this bolt, or which is to say that portion of the same which extends between the walls, there is provided a transversely extending notch 64 cut horizontally into a frame extension 63 prolonged upwardly beyond the upper branch of the frame-piece. Also presented by the shield and punched through the head wall as a complement to the heel mounting is a bolt-hole 65 arranged to register with the bolt 22, a nut 66 applied to this bolt serving to rigidly clamp the shield in position. As will, it is believed, be readily apparent, a removal of the nut 66 allows the shield to be lifted free of the frame-carried bolt and the shield-carried transverse bolt can be then drawn forwardly from the heel socket 64.

Provided for the machine and carried for vertical adjustment by one of the skirt-forming flanges of the shield 61 is a hold-down arm made by preference from an angular blank of sheet metal. One limb 70 of this angular blank is received for vertical sliding movement through a U-bracket 71 welded to the skirt of the shield, and the other limb 72, in the forming of the arm from its blank, is bent over at substantial right angles to the limb 70. When mounted upon the machine, limb 72 occupies a horizontal plane between the upper spring leaf and the table and has its free end made furcate and deformed downwardly to present bearing fingers 73 straddling the blade 30. 74 denotes a wing-headed set screw working in the U-bracket to releasably secure the hold-down arm in selected vertically adjusted positions.

It is thought that the invention will have been clearly understood from the foregoing detailed description of my now-preferred illustrated embodiment. The table top admits of being tilted abouts its pivotal axis in either direction of swing, and should it be desired to remove the table this is quickly accomplished by simply removing the locking screw 55 and giving forward endwise movement to the table. With the top removed, lubrication of the bearings of the motor can be easily performed by inserting the spout of an oil can through the ridge slot of the box-base or, should it be desired, such lubrication can be accomplished without removing the table by pushing the tongue of the table to either side for access to the oil cup which lubricates the motor's front-end bearing, the oil cup for the rear-end bearing being perforce accessible at all times through the open back of the box-base. Should the motor brushes require servicing, the motor is unbolted from the floor 11 and removed through the open back of the box-base. Excepting for ease of access to the oil cups of the motor, or to give greater freedom in removing the motor bolts and disconnecting the crank pin should the brushes need servicing, there is ordinarily no call for a removal of the table other than, perhaps, to give access to the lower spring leaf for periodically coating the same with grease to protect against rust. The object in permitting the shield 61 to be likewise removed with unusual ease and expedition is, similarly, for periodic greasing of the housed leaf spring. Given normal care, the spring leaves will remain in good condition indefinitely.

It is thought to be self-evident that changes in the details of construction may be resorted to

without departing from the spirit of the invention. I intend that no limitations be implied and that the hereto annexed claims be given a scope fully commensurate with the broadest interpretation which the employed language fairly permits.

What I claim, is:

1. In a jig-saw, an apertured work-supporting table swivel-mounted to admit of being tilted in either direction from a normal horizontal means through an approximate quarter circle of total movement, a saw-blade received through said aperture of the table and guidably supported for vertical reciprocatory movement, an electric motor located below the table and operatively interconnected with the blade for reciprocally driving the latter, and a member stamped from a single piece of sheet metal to produce a housing boxing in the motor along the bottom and both sides and serving as a supporting base for the swivel-mounted table, said sheet metal base member, considered in end elevation, having a pentagonal shape suggesting the outline of a gable-roofed house the ridge line of which lies in the perpendicular plane occupied by the swivel axis of the table and is open to the front and rear and the table has a pendant tongue at the front end thereof which overlies and serves as a closure for the open front of the base member.

2. In a jig-saw, an electric motor, a member stamped from a single piece of sheet metal to produce a housing boxing in the motor and serving as a mounting base for the saw, said member being open to the front and rear, an apertured work-supporting table removably supported upon the base member and presenting a depending tongue arranged to overlie and serve as a closure for the open front of the base member, said table and its depending tongue being also stamped from a single piece of sheet metal, a saw-blade received through said aperture of the table and guidably supported for vertical reciprocatory movement, and a driving connection from the motor to the saw-blade.

3. In a jig-saw, an apertured work-supporting table swivel-mounted to admit of being tilted in either direction from a normal horizontal mean through an approximate quarter circle of total movement, a saw-blade received through said aperture of the table and guidably supported for vertical reciprocatory movement, an electric motor located below the table and operatively interconnected with the blade for reciprocally driving the latter, and an open-front member of sheet metal construction boxing in the motor and serving as a supporting base for the swivel-mounted table, said table presenting a depending tongue arranged, when the table occupies its normal horizontal mean position, to overlie and serve as a closure for the open front of the base member, the tilting axis of the table being located at the approximate upper limit of the depending tongue and thus by tilting movements of the table acting to swing the tongue laterally into a position which exposes the open front and gives access therethrough for servicing the housed motor.

4. In a jig-saw, an electric motor, an open-front base member housing the motor, an apertured work-supporting table swivel-mounted upon the base to admit of being tilted to any angle up to 45° from a normal horizontal, said table presenting a depending tongue arranged when the table occupies its said normal horizontal position to overlie and serve as a closure for the open front of the base member, a saw-blade received through said aperture of the table and

guidably supported for vertical reciprocatory movement, and a driving connection from the motor to the saw-blade, the tilting axis of the table being located at the approximate upper limit of the depending tongue and thus by tilting movements of the table acting to swing the tongue laterally into a position which exposes the open front and gives access therethrough for servicing the housed motor.

5. In a jig-saw, a mounting base of sheet metal construction having a pentagonal shape in end elevation suggesting the outline of a gable-roofed house, and with the roof sections thereof terminating in spaced relation to describe a ridge slot, a strap extending across the ridge slot at the front-end limit of the base and made integral with the roof sections, a pin rigid with the strap and placed horizontally in the vertical plane of the ridge slot, a U-shaped frame-piece disposed on edge with the throat of the U opening to the front and with the lower limb introduced between and welded to the roof sections of the base at the rear end of the ridge slot, the post produced by the cross-arm of the U presenting a socket opening to the front and axially aligned with the strap-carried pin, a work-supporting table providing mating complements for said pin and socket to establish a journal mounting by which the table is tiltably carried, the top of said table being apertured, complementary leaf springs anchored by an end of one to the upper limb of the frame-piece and by an end of the other to the lower limb of the frame-piece to have said leaf springs occupy approximately horizontal planes one above and the other below the table with the free ends of the springs in vertical alignment with the aperture of the table top, a saw-blade received through said aperture and connected by its ends to the free ends of the leaf springs, and an electric motor housed within the mounting base and operatively interconnected with the lower leaf spring for reciprocally driving the blade.

6. Structure according to claim 5 in which the strap-carried pin projects forwardly beyond its sustaining strap and wherein the table-carried complement for the socket which is presented by the post projects rearwardly beyond its sustaining table in order that mating engagement as between the elements which form the journal support for the table is accomplished by moving the table endwise to the journal axis, thus enabling the table to be applied or removed at will.

7. Structure according to claim 5 in which the frame-piece is produced with a head portion prolonged upwardly beyond the upper limb and which is formed in its frontal face with a re-entrant transverse notch, and a guard of an inverted-U sectional configuration removably secured to the frame-piece to overlie and house the upper leaf spring, said guard having a transverse pin extending between the skirting flanges at the mounting end of the guard arranged when applying the guard over the leaf spring to be lodged in said re-entrant notch of the frame-piece, the guarded leaf spring being anchored by a nut-and-bolt combination characterized in that the threaded end of the bolt projects upwardly well beyond the nut and registers with a bolt-hole provided in the guard, thus to take a second nut for clamping the guard to the frame-piece.

8. In a tilting-table saw structure, a frame including a base boxed in along the bottom and sides and having an access opening at one end, an electrically energized source of power housed in said mounting base, an apertured work-supporting table overlying said base and swivel-mounted from the frame to admit of being moved from a normal horizontal position into a tilted position, a saw-blade supported by the frame so as to work in the aperture of the table, operative interconnection from the source of power to the saw-blade for driving the saw-blade, and a tongue hanging as a rigid dependency from one end of the table to overlie said access opening of the base and in the normal horizontal position of the table serving as a closure for the latter, the tilting axis of the table being located at the substantial upper limit of the depending tongue and thus acting by tilting movements of the table to swing the tongue laterally into a position exposing the access opening.

9. In a tilting-table saw structure, and in combination with a work-supporting table having at one end a protruding pin of circular cross-section welded to the underside on the longitudinal median line of the table and at the other end providing a flange-like dependency pierced to present a round hole axially aligned with the pin, and a supporting framework for the table providing, as journal mountings for the table, a socket and a pin, the former to serve as a mating complement of the first-named pin and the latter as a mating complement of the round hole, the table being engaged and disengaged from said journal mountings by movement in a direction endwise to the journal axis.

DAN D. BEEBE.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
47,777	Wright	May 16, 1865
105,120	Ogden	July 5, 1870
129,874	Trump	July 23, 1872
236,163	Jones	Jan. 4, 1881
322,748	Perry	July 21, 1885
623,786	Humphrey	Apr. 25, 1899
1,467,720	Field	Sept. 11, 1923
1,502,088	Colby	July 22, 1924
1,826,983	Beebe	Oct. 13, 1931
2,072,590	Lowry et al.	Mar. 2, 1937
2,111,036	Wippel	Mar. 15, 1938
2,116,123	Ocenasek	May 3, 1938
2,165,002	Ocenasek	July 4, 1939
2,469,981	Nelson	May 10, 1949

FOREIGN PATENTS

Number	Country	Date
575,800	Germany	May 3, 1933