April 9, 1929. O. P. WODACK ET AL 1,708,345

PORTABLE POWER DRIVEN TOOL

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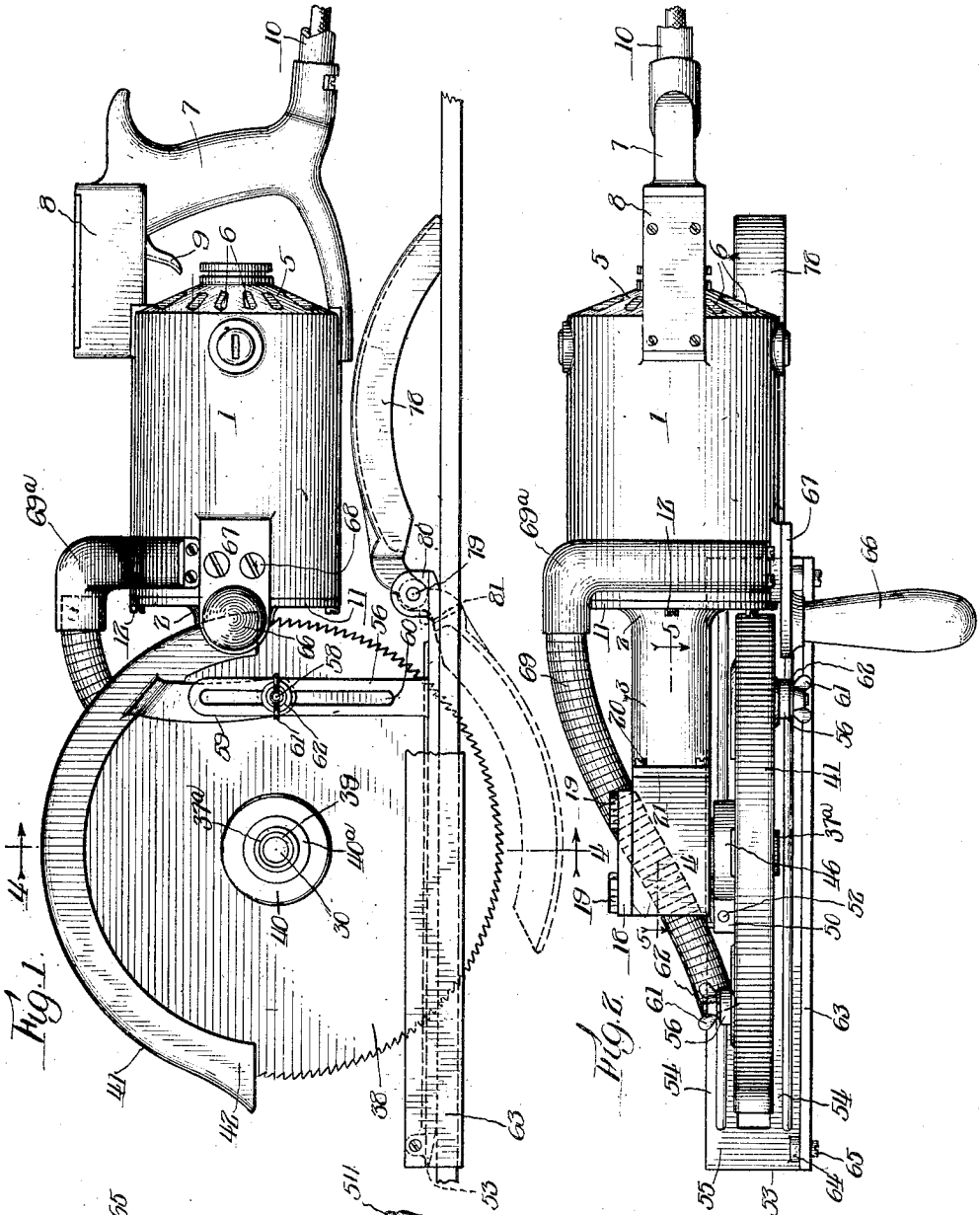


Fig. 1.

Fig. 2.

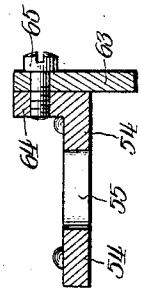


Fig. 6.

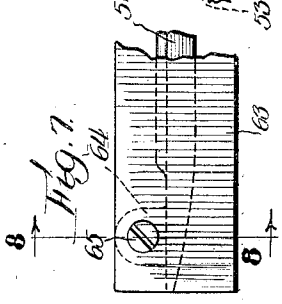


Fig. 7.

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Fig. 4.

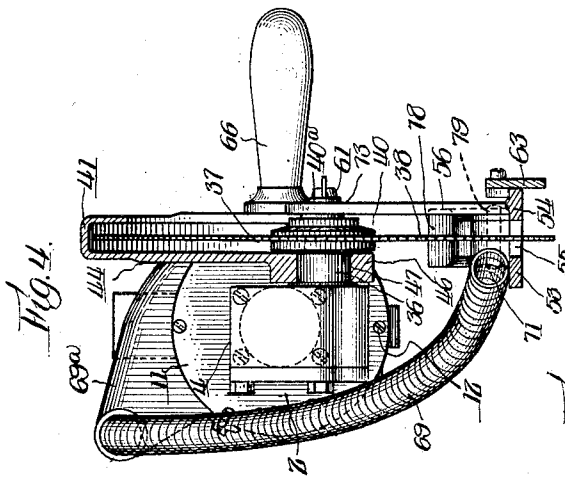


Fig. 6.

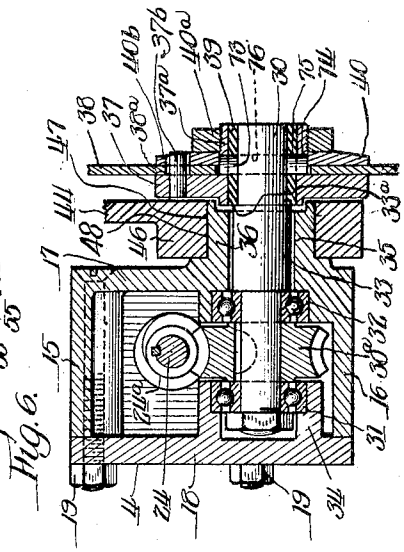


Fig. 3.

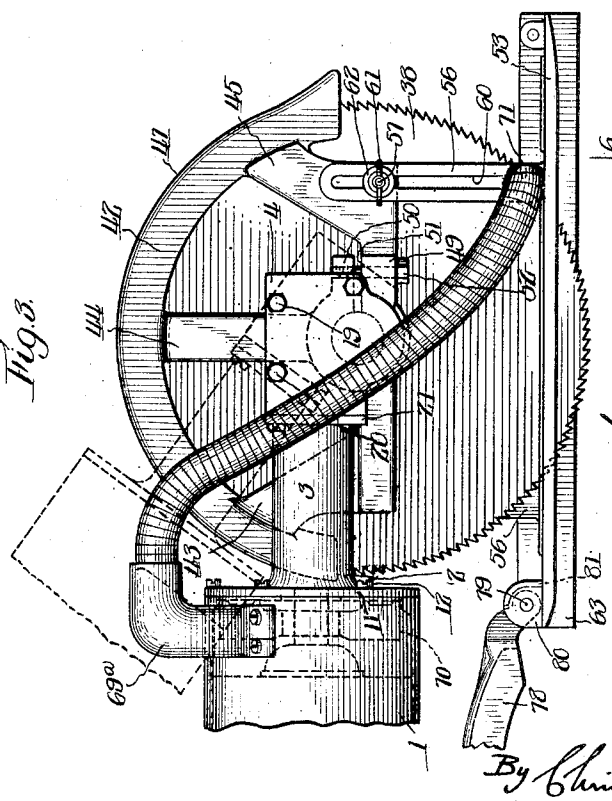
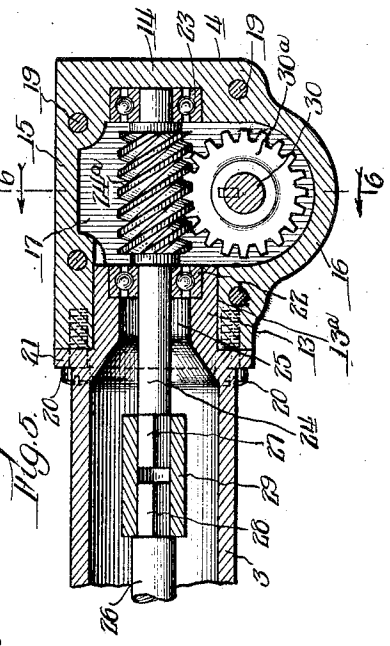


Fig. 5.



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UNITED STATES PATENT OFFICE.

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PORTABLE POWER-DRIVEN TOOL.

Application filed June 11, 1926. Serial No. 115,226.

The invention relates to portable power driven tools, and more particularly to portable power driven circular saws.

One object of the invention is to produce a portable power driven saw having a supporting structure including a motor casing, with a guide rest through which the saw blade projects, and means adjustably connecting the guide rest to the supporting structure so as to permit the angular relation of the guide rest and motor frame to be varied at will, and also the depth of cut to be changed as desired.

Another object of the invention is to provide a portable power driven saw having a supporting structure equipped with a carrying handle, and a guard automatically movable into and out of operative relation to the saw blade when the tool is removed from the work and suspended by the handle, thereby protecting the user when carrying the saw from place to place, and furthermore providing a protective rest for the saw when not in use.

Further objects and advantages of the invention will become apparent as the description proceeds.

In the drawings:

Figure 1 is a side elevation of the invention in its preferred form.

Fig. 2 is a plan view thereof.

Fig. 3 is a view taken from the side opposite to that of Fig. 1, showing, in dotted lines, a pivoted position of the saw frame.

Fig. 4 is a section along the line 4—4 of Fig. 1.

Fig. 5 is a section along the line 5—5 of Fig. 2.

Fig. 6 is a section along the line 6—6 of Fig. 5.

Fig. 7 is an enlarged view of a portion of the tool rest and guide.

Fig. 8 is a section along the line 8—8 of Fig. 7.

While we have shown in the drawings and will herein describe in detail the preferred embodiment of the invention, it is to be understood that we do not thereby intend to limit the invention to the specific form disclosed, but aim to cover all modifications and alternative constructions falling within the spirit and scope of the invention as expressed in the appended claims.

In the form selected for purposes of disclosure the invention comprises an electric motor housed in an aluminum casing 1, one end shield 2 of which extends axially therefrom in the form of a tubular shell 3 to provide a support for a bearing member 4, these parts being secured rigidly together to form a frame for the tool. At the opposite end of the motor casing 1 an end shield 5 is formed integrally therewith to provide a bearing for the armature shaft of the motor and to partially enclose that end of the casing. Apertures 6 in this end shield permit air to enter for ventilating and other purposes.

A handle 7 rigid with the motor casing 1, carries a rectangular box 8 which is formed in the upper portion of the handle and serves to house a switch (not shown). The switch is preferably operable by means of a trigger 9 positioned conveniently to the forefinger of the hand of an operator, manipulation of this trigger closing the switch to connect the motor terminals to the power lines in a cord 10.

The end shield 2 at the saw end of the motor frame has a circular plate or disk portion 11 secured to the frame by means of set screws 12. The tubular shell 3 hereinbefore mentioned as being integral with this end shield, extends axially outward from this disk portion, to support the bearing member 4. This member is shown in the drawings (Figs. 5 and 6) in the form of a hollow rectangular block having an end wall 14, a top wall 15, a bottom wall 16, and a rear wall 17. A detachable cover 18 is secured thereto by means of bolts 19.

The member 4 is secured to the shell 3 by means of bolts 20 passing through apertures in an end flange 21 on the shell and into threaded engagement with the block. A cylindrically formed tubular member 13 projecting beyond the flange 21 is adapted to fit snugly within a bore 13^a in the block 4. As shown in Fig. 5 the member 13 and the end wall 14 form supports for a pair of ball bearings 22 and 23 in which a shaft 24 is journaled. This shaft extends through a bore 25 in the member 13 and into the shell 3 to a point adjacent the end of the motor shaft 26. The ends 27 and 28 of these shafts are preferably squared off and connected by

means of an internally squared sleeve coupling 29. This coupling is sufficiently rigid to permit the bearings of the shaft 24 to act as a support for the saw end of the motor shaft.

A saw arbor 30 is journaled in the block 4 in ball bearings 31 and 32 at right angles to the shaft 24. This arbor has a worm gear 30^a keyed thereto which meshes with a worm 24^a on the shaft 24 whereby to establish a driving connection between the motor and saw arbor. The bearing 31 is supported in a cup shaped projection 34 on the inside of the cover 18, and the bearing 32 is supported similarly in the rear wall 17 of the bearing block.

In portable tools any vibration such as caused by an imperfect dynamic balance of a rotating part, not only produces inaccurate work, but because the tool is held tightly in the hands of an operator when being used, exerts a tiring effect on the operator. For the purpose of eliminating such vibration, which is usually due to an imperfectly balanced saw mounted rigidly upon the arbor, a mounting for the saw is provided which permits the saw to rotate about its center of gravity.

As illustrated herein this saw mounting comprises a yieldable means supporting the saw on the arbor. Thus a saw 38 is clamped between collars 37 and 40, the collar 37 having a sleeve portion 37^a upon which the saw and collar 40 may be positioned. A nut 40^a engaging screw threads on the sleeve 37^a serves to clamp the collars and saw together. This sleeve portion 37^a of the collar is adapted to fit over the outer end of the arbor and against a shoulder 33^a formed by an enlarged portion 33 of the arbor which is adapted to rotate freely within a bore 35 through the rear wall 17 of the bearing block and within an annular flange 36 extending therefrom. A yieldable bushing 39 of rubber or other suitable material is interposed between the arbor and the sleeve 37^a to permit radial movement of the saw relative to the arbor. A pin 73 entered through concentric apertures 74, 75 and 76 in the collar 37^a, bushing 39 and arbor 30 respectively, is held in place by the saw 38 and collar 40. The apertures 74 and 75 are slightly larger than the pin. In this way the collars 37 and 40 and the saw 38 clamped therebetween are free to float radially on the arbor so that if this unit is not perfectly balanced it may "find its center" and rotate thereabout. A pin 37^b carried upon the collar 37 is adapted to enter apertures 38^a and 40^b in the saw blade and collar 40.

A guard 41 is provided for the upper portion of the saw to protect the operator. As illustrated herein this guard comprises a substantially semi-circular ring 42 of U-shaped cross section adapted to overlie the edge of the saw. Integral inwardly extending arms 43, 44 and 45 carry a hub 46 which is supported on the frame of the tool. This hub has a central bore 47 adapted to engage a bearing surface 48 formed on the outside of the annular flange 36 on the bearing block, thereby to permit of pivotal adjustment of the guard relative to the bearing block. Suitable means may be provided to clamp the guard in its adjusted position, such means being herein shown as comprising a pair of lugs 49 and 50 extending outwardly from the hub adjacent a slit 51 therein so as to permit a set screw 52 which passes freely through an aperture in one lug and into threaded engagement with the other, to clamp the hub on the annular flange.

Means is also provided in the form of a tool rest to support and guide the tool relative to the work being cut. For this purpose a slotted plate or frame 53 (Fig. 2) formed with a pair of ribbed side members 54 and end members 55, is provided with upstanding arms 56 on opposite sides of the saw which are adjustably connected with the saw guard 41. The frame is of a size adapted to surround the saw diametrically to permit the saw to protrude therethrough. The adjustable connection between the arms 56 and the saw guard comprises a bolt 57 anchored in the arm 45 on one side of the guard, and a bolt 58 anchored in a downwardly extending bracket 59 on the opposite side of the guard, these bolts being adapted to enter longitudinal slots 60 in the arms 56. Wing nuts 61 and washers 62 are provided on these bolts to clamp the arms against the guard, thereby to secure the support in its adjusted position relative to the guard.

When the saw is to be used for cutting strips a guide edge 63 may be attached to the frame 53. For this purpose lugs 64 are formed on the frame 53, adapted to receive the threaded ends of cap screws 65 which pass through apertures in the edge 63 to clamp the edge to the frame.

A handle 66 for the left hand of the operator, is preferably provided to permit of ready manipulation of the tool. This handle, as illustrated herein, has an extending bracket 67 which is secured to the motor frame by means of set screws 68.

It will be apparent from the foregoing description that the frame of the tool may swing in the plane of the saw to permit the tool to be used in restricted spaces. Thus the angular adjustment of the saw guard is possible without reducing the depth of cut obtainable with the saw.

It will also be apparent that with the tool rest secured to the pivoted guard, the tool may be inclined with respect to the work without disturbing the adjustment of the tool rest relative to the saw axis. This is

particularly desirable as it greatly simplifies the adjustment and manipulation of the tool.

A flexible conduit 69 may be secured at one end to the motor casing 1 of the motor frame by means of a fitting 69ª to communicate with the interior of the frame at a point adjacent the discharge end of a fan 70 (Fig. 3) which is suitably secured to the motor shaft. The other end 71 of this conduit is adapted to be placed in a position to discharge air from the fan to blow the saw-dust away from in front of the saw. This conduit is preferably of a spiral metallic type adapted to remain in its adjusted position without the use of a clamp adjacent its free end. As apparent from the drawing, if the tool is inverted the fitting 69ª, the guard 41 and the switch box 8 are adapted to serve as a three-point support for the tool and permit of its use as a saw bench.

When a tool of this type is not in use, it is customary for the operator to carry it from place to place by holding the handle 7 in one hand and permitting the tool to hang vertically. This method of carrying the tool often results in the under side of the saw blade swinging against the leg of the operator.

To protect the operator from injury and also to protect the projecting portion of the saw from striking other objects, we provide a means which is herein illustrated as comprising an arcuate guard 78 of U-shaped cross section. This guard is preferably pivoted at one end thereof on a pin 79 supported between a pair of upstanding lugs 80 on the rear end of the frame 53 of the tool rest. As shown in Fig. 1 this guard, when the saw is in use, is swung up so that its free end is supported upon the work and the guard trails the tool rest. When, however, the saw is withdrawn from the work and the tool is held with the handle 7 uppermost, the guard 78 swings by gravity to the dotted line position wherein it hangs adjacent the projecting portion of the saw, an adjacent portion 81 of the frame 53 being adapted to engage the edge of the guard to prevent the guard from rubbing against the saw. Thus the guard effectively protects both the saw and the operator from injury.

The means for yieldably mounting the saw blade on the arbor is not herein claimed, the same having been made the subject of divisional application Serial No. 175,651 filed March 16, 1927, by Joseph F. Haas.

We claim as our invention:

1. A portable power driven tool of the character described comprising, in combination, a frame, a motor having a casing rigid with the frame, a saw arbor journaled on said frame, driving means connecting the motor and said arbor, a saw guard carried pivotally on said frame so as to be swingable about said arbor while overlying the upper edge of a saw blade on the arbor, and a tool rest carried adjustably on said guard.

2. A portable power driven saw comprising a main body having a handle at one end and means for supporting a circular saw to rotate on a transverse axis at the other end of the body, a guard for the saw, and a rest carried by and adjustable toward and from said guard, said guard and body being relatively adjustable about the axis of the saw to permit a variation in the angular relation of the body to the rest.

3. In a portable power driven tool of the character described, the combination of a frame, a handle at one end of the frame, a saw arbor journaled in the other end of the frame, a saw on said arbor, and a guard for the under side of said saw, said guard being mounted so as to be movable into an inoperative position when the tool is in use and adapted to gravitate into an operative position relative to the saw when the tool is vertically supported with the handle uppermost.

4. In a portable power driven tool having a circular saw, the combination of a saw guard pivotally adjustable about the axis of said saw, and a guiding rest carried by said guard, said rest being mounted for adjustment substantially radially from said saw axis.

5. In a portable power driven tool having a circular saw, the combination of a saw guard pivotally adjustable about the axis of said saw, and an adjustable guiding rest having front and rear support on said guard permitting variable positioning of said rest relative to the axis of said saw.

6. In a portable power driven tool, the combination of a saw, a supporting frame having a handle, a relatively fixed guard extending about the cutting edge of said saw excepting the normal cutting portion thereof, and a second guard pivotally supported between said handle and said saw whereby said second guard swings into a trailing position free of said saw when the latter is in normal cutting position and swings adjacent the exposed cutting portion of said saw when said supporting frame is suspended by said handle.

7. In a portable power driven tool the combination of a saw, a supporting frame for said saw, a relatively fixed guard extending about the cutting edge of said saw excepting the normal cutting portion thereof, a guide rest mounted on said guard and having the cutting portion of said saw extending thereby, and a second guard pivotally supported to be swung free of said saw by the work being operated upon, and adapted to gravitate into protective relation

to the cutting portion of said saw when said supporting frame is carried with said saw in suspended position.

8. In a portable power driven tool the combination of a saw, a supporting frame, a relatively stationary guard extending about the cutting edge of said saw excepting the normal cutting portion thereof, a guide rest mounted on said guard and having the cutting portion of said saw extending thereby, and a second guard pivoted on said guide rest and normally positioned in adjacent protective relation to the cutting portion of said saw, said second guard being adapted to be swung free of said saw by the work being operated upon.

9. A portable power driven tool having, in combination, a saw blade, a supporting structure on which said blade is mounted and including a guard extending about the cutting edge of the saw blade excepting the normal cutting portion thereof, a guide rest mounted on said structure in operative relation to the saw blade, and a second guard pivoted on said rest on an axis disposed in a plane offset from the guiding surface of said rest so as to be slidable in a trailing position upon the surface of the work being cut, said second guard being adapted to automatically assume an operative position relative to the saw blade when the tool is removed from the work.

10. A portable power driven tool having, in combination, a saw blade, a supporting structure on which said blade is mounted and including a guard extending about the cutting edge of the saw blade excepting the normal cutting portion thereof, a guide rest mounted on said structure in operative relation to the saw blade, and a second guard pivoted on said rest so as to be slidable in a trailing position upon the surface of the work being cut, said second guard having a part adapted to engage with the rest to limit the swinging movement of the guard toward the saw blade.

11. A portable power driven saw comprising a supporting structure including a motor casing, a handle rigid with one end of the casing, a saw arbor journaled transversely in said supporting structure at the other end of the casing and adapted to carry a saw blade, said supporting structure including an arcuate guard for the upper portion of the saw blade, a guide rest in the form of an elongated plate having a slot therein through which the lower portion of the saw blade projects, means adjustably connecting the guide rest to the supporting structure, and a second guard pivoted to said guide rest at the end thereof adjacent the motor casing and adapted to gravitate into protective relation to the blade when the saw is suspended by the handle.

In testimony whereof we have hereunto affixed our signatures.

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JOSEPH F. HAAS.