Feb. 5, 1952 C. P. GESNER 2,584,863

RADIAL SAW

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Fig. 1.

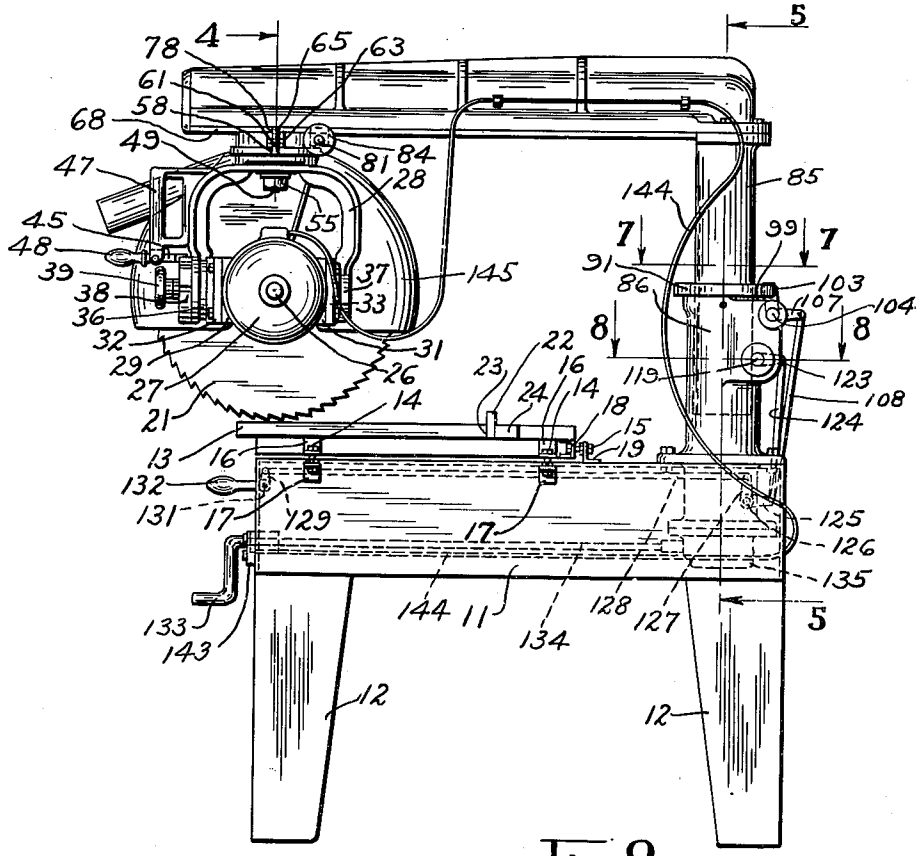


Fig. 7.

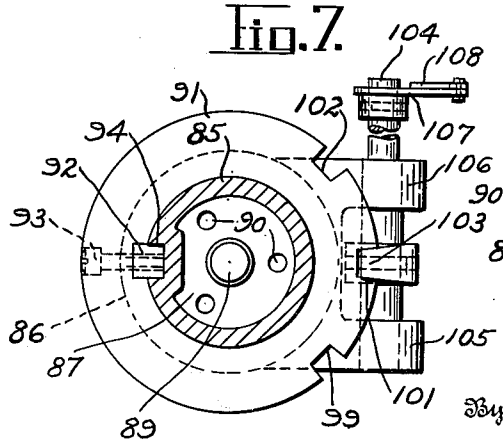
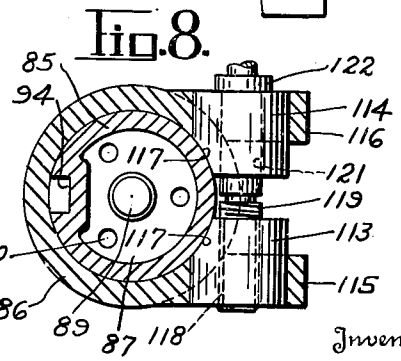


Fig. 8.



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Fig. 2.

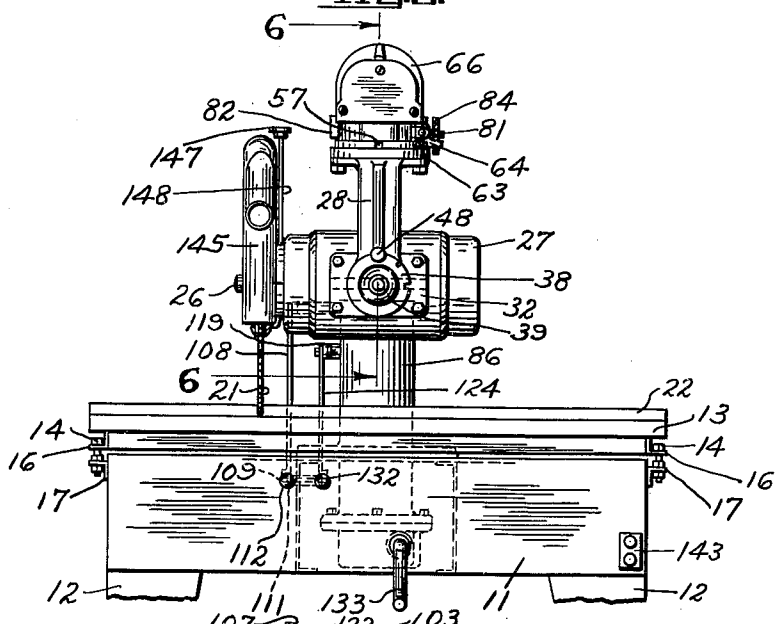


Fig. 3.

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Fig.4.

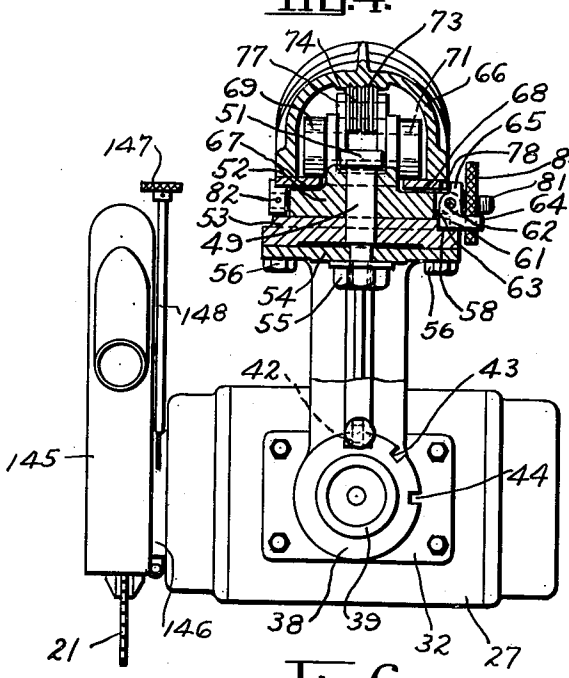


Fig.5.

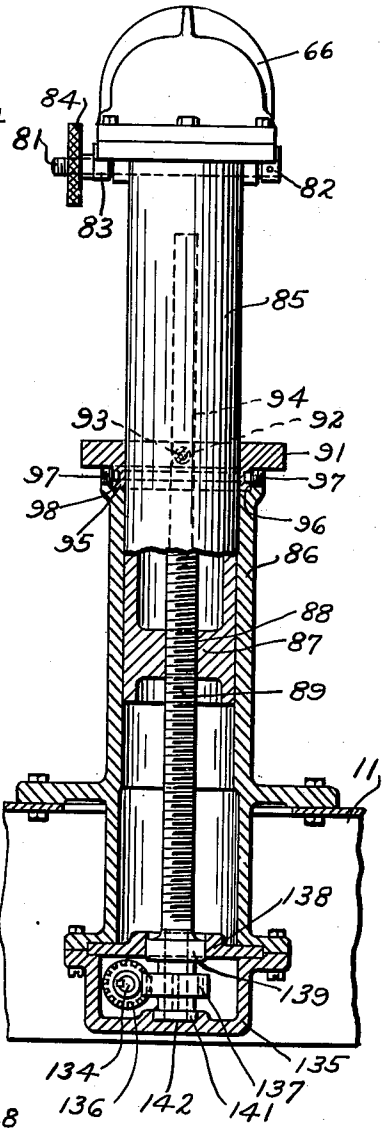
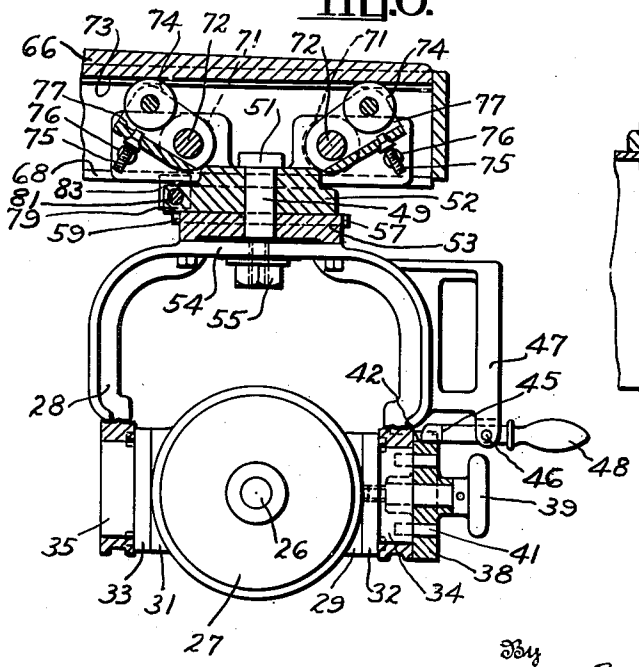


Fig.6.



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UNITED STATES PATENT OFFICE

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RADIAL SAW

Carleton Peck Gesner, New Haven, Conn.

Application November 26, 1946, Serial No. 712,275

3 Claims. (Cl. 143—6)

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This invention relates to radial saws and more particularly to a radial saw having a work supporting table, a swinging arm overhanging the table, and a motor driven saw, or like tool, reciprocably mounted on the arm. In such machines it is desirable that the arm, when swung to the position desired, be securely locked while the saw is being used. It is also desirable that the motor, with the tool driven thereby, be capable of reciprocation along the arm and swingable in both horizontal and vertical planes. While a circular saw is usually used in machines of this type, other rotatable tools, such as routers, shapers, drills and the like, may also be efficiently used.

In view of the various uses for a machine of this type, it is desirable that the same be constructed to adapt it for any one of such uses, and to accurately locate and securely lock the parts in the operative positions and, therefore, it is one object of this invention to improve the structure of such machines whereby such desideratum will be efficiently obtained.

Another object of this invention is to generally improve the structure of a machine of the above nature whereby it may be conveniently operated and controlled.

Still another object of this invention is to provide improved locating and locking devices in machines of the above type.

A further object is to provide an improved radial saw, or like machine, which will be relatively inexpensive to manufacture, simple in construction, of a minimum number of parts, compact, convenient to operate, pleasing in appearance, and very efficient and durable in use.

With the above and other objects in view, which will appear as the description proceeds, there has been illustrated in the accompanying drawings, one form of machine of the above nature in which the features and principles of this invention may be conveniently and practically embodied.

In the drawings:

Figure 1 is a side elevational view of a radial saw embodying the features and principles of this invention;

Figure 2 is a broken front elevational view of the same;

Figure 3 is a top plan view of the same;

Figure 4 is a sectional view through the swingable arm taken on the line 4 of Figure 1;

Figure 5 is a sectional view through the arm supporting casing taken on the line 5—5 of Figure 1;

Figure 6 is a sectional view taken on line 6—6 of Figure 2, the section being only through the arm and motor support at the arm and at the ends of the motor casing;

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Figure 7 is a cross-sectional view taken on the line 7—7 of Figure 1; and

Figure 8 is a cross-sectional view taken on the line 8—8 of Figure 1.

Referring now to the drawings wherein like reference numerals designate like parts throughout the several views, the reference numeral 11 denotes a main supporting frame adapted to be supported from a floor by legs 12. A work supporting table 13 is disposed over the frame 11. The table 13 is secured to the frame for vertical and lateral adjustment by means of adjusting bolts 14 and bolts 15 respectively. The bolts 14, one adjacent each corner of the table 13, pass through angle pieces 16 secured to the table 13 and angle pieces 17 secured to the frame 11. The bolts 15 one adjacent each rear corner of the table 13 pass through angle pieces 18 secured to the table 13 and angle pieces 19 secured to the frame 11. Adjustment of any one or all, of the bolts 14 will adjust the table 13 in respect to the frame 11, to level the table 13 and/or to square it with the tool, or saw 21. The table 13 has a work guiding fence 22 detachably secured thereto and adjustment of the bolts 15 will adjust the table and through it the fence 22, which extends upwardly from the top surface of the table 13 at right angles thereto, square with the tool, or saw 21, either when the saw 21 is in the position shown, or when it is laterally swung at right angles to such position. The fence 22 is disposed across the table 13 in a slot 23, and is detachably secured in place by wedges 24 and 25.

The tool, or saw 21, is mounted on an end of the shaft 26 of an electric motor 27. The motor 27 is pivotally supported on a yoke 28. The motor 27 is provided with plate-like lugs 29 and 31, one on either side of its casing. Front and rear yoke plates 32 and 33 are bolted to the lugs 29 and 31 respectively. The plates 32 and 33 have trunnion extensions 34 and 35 which have bearings in the lower ends 36 and 37 respectively of the yoke 28 (see Figures 1 and 6). A circular motor dial plate 38 is secured to the motor lug 29 by a handle 39 and to the yoke plate 32 by pins 41. The dial plate 38 has locating notches 42, 43, and 44 (Fig. 4) cut into its periphery into which a catch 45 may be engaged to locate and lock the motor 27 in any one of three positions when it is rotated in the yoke ends 36 and 37, the positions being when the axis of the motor shaft 26 is vertical, at a 45 degree angle, or horizontal. The

catch 45 is pivoted at 46 on a hand gripping extension 47 extending forwardly from the yoke 28 and has a manually engageable actuating handle 48.

The yoke 28 is pivotally hung from a carriage structure by a bolt 49 the head 51 of which rests on a carriage frame 52 with the body of the bolt 49 extending downwardly through a carriage dial plate 53 and then through the yoke base 54. A nut 55 clamps the parts together. The plate 53 is bolted to the yoke 28 by bolts 56. The upper portion of the carriage dial plate 53 is circular and has three notches 57, 58 and 59 formed in its periphery (see Figures 1, 2, and 6). The notches 57 and 59 are 180 degrees apart and notch 58 is midway between them 90 degrees from each whereby the yoke 28 with the motor 27 may be swung on the bolt 49 and properly located by a catch 61, adapted to engage in the notches in any of the three positions in respect to the carriage, or with the table 13. The catch 61 is pivoted by a pin 62 (Fig. 4) to a lug 63 extending outwardly from the carriage frame 52. The catch 61 has an outwardly extending hand engaging portion 64 and an upwardly extending movement control lug 65, the use of which will be hereinafter described.

The tool and motor supporting carriage frame 52 is adapted to be reciprocated within a hollow arm 66 which extends forwardly and overlies the table top 13. The arm 66 is inverted U shaped in cross-section and has inwardly directed transversely spaced apart flat tracks 67 and 68, see Figure 4, one separately secured upon the lower edge face of each side of the arm and extending substantially the length of the arm. A cover plate 70, see Figure 2, is detachably secured as by screws onto the front end of the arm 66 to cover the same and also the ends of the tracks 67 and 68. Straight faced rollers 69 and 71, see Figure 4, freely rotatable on a shaft 72 supported by, and each side of, the carriage frame 52 ride on the tracks 67 and 68. Another track 73 at the top within the arm 66 is engaged by a swinging roller 74, one at each end of the carriage frame 52 to guide the carriage along the arm. A screw-threaded stud 75 threaded through a pin 76 is adapted to engage a bracket 77, in which the roller 74 is mounted, to press the roller 74 against the track 73 and in so doing maintain the rollers 69 and 71 upon the tracks 67 and 68. The structure of the tool carriage illustrated is shown and described in detail in a pending application of Edwin E. Gesner, Serial No. 706,856, filed October 31, 1946.

The track 68 has a notch 78 provided in its outer edge adjacent the forward end of the track to receive the movement control lug 65 of the catch 61, whereby the catch 61 may be raised to be disengaged from any one of the notches 57, 58, and 59 in the dial plate 53. The catch 61 is retained in whichever one of the notches 57, 58 and 59 it is disposed due to the movement control lug 65 engaging the side edge of the track 68 during the movement of the carriage 52 in the arm 66. Thus the catch 61 can only be raised for convenient and safe disengagement with the notches 57, 58, and 59 when the carriage is in its forward position in the arm 66, and the tool, or saw, is entirely removed from the work. The carriage frame 52 has a lug 79 extending rearwardly therefrom to receive a rod 81 which extends laterally across the carriage and beyond the sides of the arm 66 (Fig 5). A clamp piece 82 is securely fastened at one end of the rod 81 and a clamp piece 83 is slidably mounted on the other end of the rod 81. This latter end of the rod 81 is screw-threaded to threadingly receive a hand operated clamp nut 84. Each of the clamp pieces extend upwardly from the rod 81 to overlie the respective side edges of the arm 66 at the tracks 67 and 68 so that upon tightening of the clamp nut 84 the clamp pieces 82 and 83 are engaged against the outer edges of the tracks 67 and 68 to securely lock the carriage frame 52 in the position along the arm 66 to which the carriage has been moved and desired to be held while the machine is operated.

The rear end of the arm 66 is formed integral with, or, as shown, secured to the upper end of a column 85 which is slidingly mounted for vertical movement in a cylinder 86 secured to and extending upwardly from the upper surface of the frame 11 to the rear of the table 13. The column 85 is hollow and at its lower end is provided with a cross-web 87 (Fig. 5) through which a screw threaded hole 88 is formed to receive a vertically extending threaded shaft 89. The web 87 is provided with vent and oil holes 90 (Figs 7 and 8). The column 85 passes through a circular dial collar 91, being keyed thereto to prevent relative rotation by a key 92 secured to the collar 91 by a screw 93 and sliding in a key slot 94 formed in the column 85. The slot 94 extends along the column to allow sliding covement of the column in the cylinder 86 and through the collar 91. The dial collar 91 is provided with a circular boss 95 which extends into a counterbore 96 in the upper end of the cylinder 86, and is held in place by screws 97 extending into an annular groove 98 provided about the periphery of the annular boss 95 whereby the column 85 and dial collar 91 may rotate in respect to the cylinder 86. The dial collar 91 has three notches 99, 101, and 102 formed in its periphery to receive a catch 103 (see Figure 7) whereby the column 85 and with it the arm 66 may be quickly located and securely held in any one of three positions in which it may be rotated in respect to the cylinder 86 and the table 13.

The catch 103 is secured on a shaft 104 having bearings in the upper portion of ears 105 and 106 extending outwardly from the cylinder 86, and a crank arm 107 is secured to one of its outer ends. A link rod 108 is pivoted to the crank arm 107 and extends downwardly to be pivoted to an arm (see Figures 1 and 2) of a bell crank pivoted to the frame 11 at 109. The other end of this bell crank is pivoted to a rod 111 which extends forwardly and has its forward end pivoted to a crank arm pivoted to the frame 11 and having a handle 112 extending forwardly from the frame 11.

To securely lock the column 85 with the arm 66 in any other rotated position in respect to the cylinder 86 and the table 13, means is provided to clamp against the column 85 within the cylinder 86. This column clamping means includes a pair of cylindrical slides 113 and 114 (Fig. 8) slidingly supported in the lower portions 115 and 116 respectively of ears 105 and 106, which extend outwardly from the wall of the cylinder 86 said slides extending into the cylinder. The slides 113 and 114 are each provided with a transverse arcuate cut 117 at opposing ends, the radius of said cuts 117 being the same as the radius of the column 85 to adapt the slides 113 and 114 to firmly engage the pe-

riphery of and to clampingly grip, the column 85 when they are drawn toward each other. The slide 113 is provided with a threaded hole 118 to receive the threaded end of a shaft 119 which extends through a hole 121 provided in the slide 114. A collar 122 provided on the shaft 119 at the outer end of the slide 114 engages this slide when the shaft 119 is rotated to draw the slide 113 toward the slide 114 to securely grip the column 85.

The shaft 119, carrying the slides 113 and 114, has a crank arm 123 secured to its outer end (see Figures 1 and 2) to which is pivoted a link rod 124. The link rod 124 extends downwardly to be pivoted to an arm 125 of a bell crank pivoted to the frame 11 at 126. The other arm 127 of this bell crank is pivoted to a rod 128 which extends forwardly to be pivoted to a crank arm 129 pivoted at 131 to the frame 11 and which has a handle 132 extending forwardly from the frame 11. In Figure 1 the bell crank pivoted at 109 to which the link rod 108 is pivoted, the rod 111 extending forwardly from this bell crank, and the crank arm to which the rod 111 is pivoted are directly in line transversely with, and are similar in shape to, the bell crank arm 125, the rod 128 and the crank arm 129 above described.

The column 85, and with it the arm 66 is raised and lowered in respect to the cylinder 86 and the table 13 by rotating the screw threaded shaft 89 (see Figure 5). This is accomplished by turning a crank handle 133, extending out from the forward face of the frame 11. The handle 133 is integral with, or secured to a shaft 134 which extends rearwardly from the handle and into a gear casing 135 secured to the bottom end of the cylinder 86. A spiral toothed gear 136 is secured to the shaft 134 within the casing 135 and meshes with a spiral toothed gear 137 secured to the lower end of the threaded shaft 89. A plate 138 located and clamped between the gear casing 135 and the lower end of the cylinder 86 forms a support for a bearing 139 for the threaded shaft 89, the lower end of the shaft being journaled in a thrust bearing 141 seated in a counterbore 142 in the bottom of the gear casing 135.

A push button off and on switch 143 (see Figure 1) is located on the front face of the frame 11 to control the operation of the motor 27 through an electric cable 144. The switch 143 is suitably connected to a source of electrical energy. A suitable guard 145 for the saw 21 is mounted for swinging movement on a circular hub 146 (Fig. 4) of the motor 27 and is adapted to be clamped in place thereon in any of its swung positions by means of a hand grip 147 on the upper end of a clamp rod 148 and above the extreme upper portion of the periphery of the guard 145.

The machine above described is especially convenient to operate as all controls for the locks, clamps and actuating means are located at or adjacent to the forward face of the machine, readily accessible to an operator. The arm raising handle 133, the locating dial catch handle 112 and the column clamping handle 132 with the motor control switch 143 are in front upon the face of the frame 11. The motor dial catch 45 and rotating handle 39 are directed forwardly from the yoke 28 and the carriage dial catch 61 and carriage clamp hand nut 84 are accessibly located to the right of the arm 66 above the yoke 28. The guard clamp hand grip 147 is readily accessible to the left of the arm 66 above the guard 145. The quickly operable locating catches

and clamps are efficiently and simply constructed and are particularly durable in use.

While there has been shown and described herein a mechanism in which the features and principles of this invention may be embodied, it will be understood that the same may be embodied in other specific forms without departing from the spirit and essential attributes thereof, and it is therefore desired that the present embodiment be considered in all respects as illustrative, and not restrictive, reference being had to the claims rather than to the foregoing description to indicate the scope of the invention.

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

1. In a radial saw, the combination of a frame, a work supporting table on said frame, a cylinder, open only at its upper end, supported by said frame, a column freely slidable and rotatable in said cylinder, an arm fixed to the upper end of said column to positively move therewith and extending over said table, a circular saw mounted on the arm for movement lengthwise thereof, a dial collar having notches in its periphery rotatably mounted at and secured to the upper end of said cylinder against vertical movement in respect thereto and keyed to said column for rotation therewith, means in said cylinder to raise and lower said column in said cylinder and through said collar, means secured to said cylinder to engage the notches in said dial collar to lock the column in predetermined rotated position, means carried by said cylinder and entering the same to engage said column to lock it in any desired rotated and vertically moved position, actuating means for said column raising and lowering means, actuating means for said predetermined position column locking means, actuating means for said desired position column locking means, and means located outside of the front face of said frame for individually operating each of said actuating means.

2. In a radial saw, the combination of a frame, a work supporting table on said frame, a cylinder, open only at its upper end, secured to the frame at the rear of said table and extending upwardly therefrom, a column freely slidable and freely rotatable in said cylinder, said column having an arm extending forwardly therefrom and with its rear end fixed to the upper end thereof to move and rotate therewith, a dial collar keyed to said column and axially secured to said cylinder to only rotate with the column in respect to the cylinder, said collar having notches in its periphery, a catch member pivoted to the outer wall of said cylinder in position to engage in said dial collar notches, an operating handle pivoted to the front face of said frame substantially midway between the sides of the table, means to operatively connect said catch to said operating handle, opposing clamp members mounted on said cylinder and entering the same, said clamp members being movable toward each other to simultaneously engage said column at adjacent spaced points to lock it in any of its rotated, or axially moved, positions in respect to said cylinder, an operating handle pivoted to the front face of said frame substantially midway between the sides of said table, means to operatively connect the last mentioned handle to said column clamping members, a threaded shaft extending upwardly into said cylinder, a threaded web in said column to receive and be engaged by said threaded shaft to raise and lower said column when said

shaft is rotated, means in said cylinder at the lower end of said shaft to rotate said shaft, an operating member rotatably mounted at the front face of said frame substantially midway between the sides of said table, and means to operatively connect said operating member to said shaft rotating means.

3. In a radial saw in accordance with claim 2 and wherein the catch member is pivoted to the rear of said cylinder adjacent its upper end and wherein said clamp members enter said cylinder in opposite directions substantially midway between the ends of the portion thereof extending above said supporting table.

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