May 16, 1961 J. C. ABBERLEY ET AL 2,984,270

CUTTING AND ABRADING TOOLS

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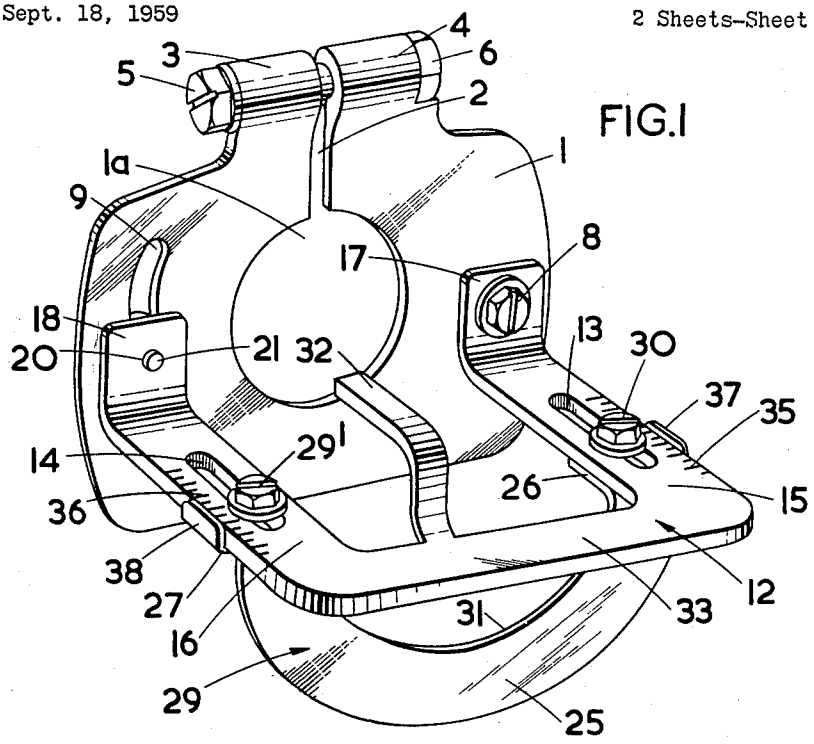
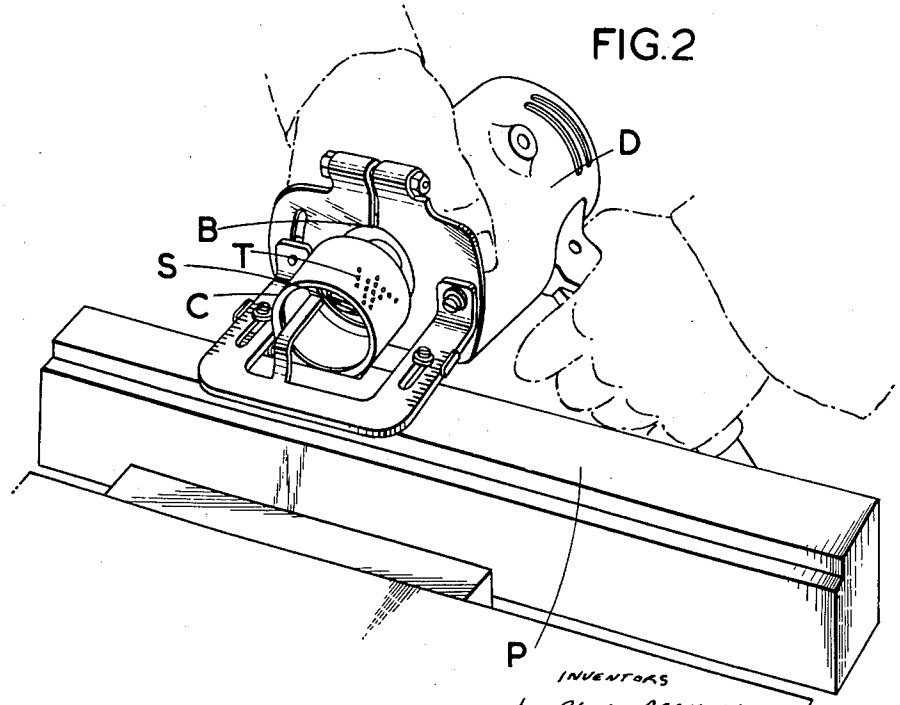


FIG.1

FIG.2



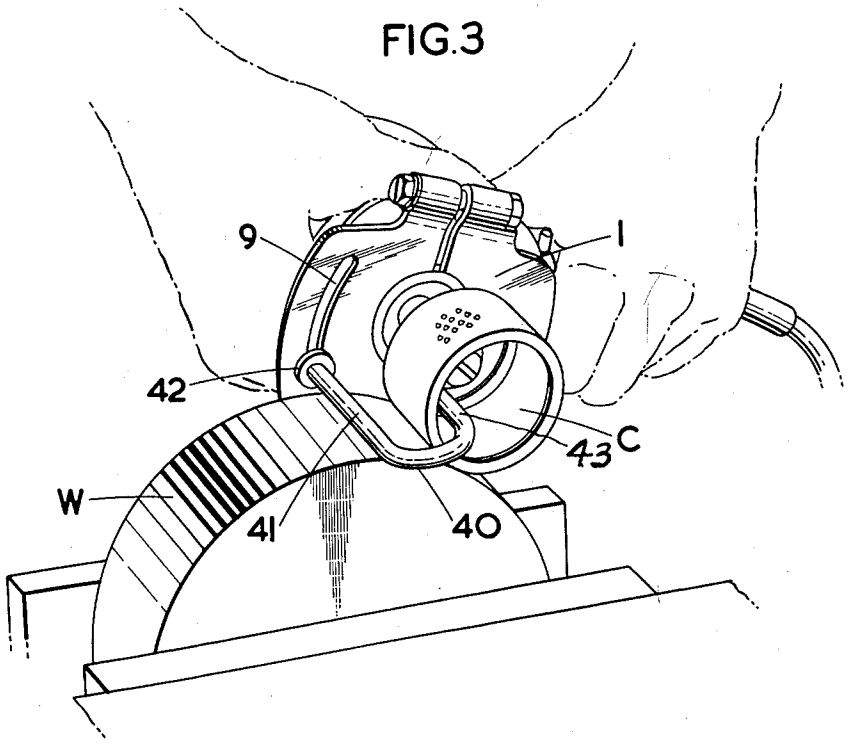
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FIG.3



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CUTTING AND ABRADING TOOLS

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6 Claims. (Cl. 144—134)

This invention relates to cutting and abrading tools of the rotatable type driven by portable electric motors; the invention relates more particularly to attachments for use with such tools.

Cutting elements have been proposed in the form of small drums with cutting teeth over their periphery and means to support the drum on a shaft for rotation thereby. The usefulness of such cutting drums has been limited by their being difficult to control when driven by portable electric motors.

The main object of the invention is to provide an attachment for use with a portable electric motor and cutting drum which enables the combination to be used for cutting to a desired depth and width in a work piece providing two flat surfaces at right angles.

The invention accordingly provides an attachment comprising a frame member adapted to be secured to a portable electric motor about the output shaft thereof, a U-shaped depth-of-cut gauge adapted to embrace a cutting drum secured on the shaft, the gauge being supported on the frame member for pivotal movement about an axis parallel to the shaft and providing a flat part parallel to the pivot axis to slide on a work piece, means to clamp the gauge in adjusted positions on the frame member and an adjustable guide plate adjustable on the frame and providing a flat surface perpendicular to the pivot axis to slide on a flat surface of a work piece perpendicular to the first-mentioned surface thereof, whereby the gauge and guide plate function, respectively, as depth-of-cut and width-of-cut determining elements.

One embodiment of the invention will now be described by way of example with reference to the accompanying drawings in which:

Fig. 1 is a perspective view of the attachment;

Fig. 2 is a perspective view of the attachment assembled with a cutting drum and portable drill motor and in use to rabbet a piece of wood, and

Fig. 3 is a perspective view of a modification of the embodiment of Figs. 1 and 2 in use with a cutting drum and drill motor to cut a round piece of wood.

Referring to Figs. 1 and 2 of the drawings, the attachment comprises a frame member 1 in the form of a flat plate formed with a central aperture 1*a*, a slit 2 and a pair of outwardly projecting ears 3, 4 on either side of the slit which are curled over to locate a bolt 5 with its axis in the plane of the plate. The frame member 1 is intended for use with a portable electric drill motor D of the kind having a projecting boss B about the output shaft S, and is assembled with the motor by slipping the boss through the aperture 1*a* as far as it will go and tightening a nut 6 on the bolt 5 to close the slit 2 slightly and thereby clamp the member 1 about the boss. The frame member has a bolt hole on one side of the central aperture 1*a* through which a bolt 8 extends and an arcuate slot 9 centered on the bolt hole at the other side of the aperture.

A horizontal guide plate designated generally 12 in the

form of a U-shaped flat plate has a straight slot 13, 14 in each of its two legs 15, 16; the ends 17, 18 of the legs are bent up at a right angle and each is formed with a hole; only the hole 20 in the end 18 is shown and this hole is tapped. The bent-up end 17 is pivoted to the frame member 1 by means of the bolt 8 passing through the bolt hole in the members 1 and the hole in the end 17 and carrying a nut (not shown) at the rear of the frame members; the other bent-up end 18 receives in the tapped hole 20 thereof a bolt 21 passing through the arcuate slot 9 in the frame members. Tightening the two bolts 8, 21 allows the horizontal guide plate to be clamped in any angular position over the range defined by the extent of the arcuate slot 9. The horizontal guide plate embraces a 2" drum C (Fig. 2) having cutting teeth indicated at T formed over its cylindrical surface and provided with means (not shown) securing it to the output shaft S of the motor D. The drum may be made by wrapping into cylindrical formation a suitable length of cutting strip such as disclosed in United States Patent No. 2,769,225 issued May 17, 1955, to Booth, turning in the edges, and securing one turned-in edge to a disc by which the drum is supported on the shaft.

The horizontal guide plate 12 is adjustable between a position in which the drum C just fails to project beyond the lower surface of the plate and a second position in which it projects by the maximum usable amount.

A flat arcuate strip 25 having its ends 26, 27 bent out at right angles and lying in a common plane forms a vertical guide plate designated generally 29 and is adjustably secured to the horizontal guide plate 12 by bolts 29', 30 passing through the slots 13, 14 in the legs 15, 16 and received in tapped holes in the bent-out ends of the arcuate strip 25. The upper edge 31 of the arcuate strip 25 clears the cutting drum C in all positions of the horizontal guide plate 12 and is adjustable along the axial length of the drum from end to end thereof.

An integral finger 32 on the bight 33 of the U formed by the horizontal guide plate 12 extends inwardly thereof parallel to but above the plane of the legs 15, 16; the finger is located such as to extend within the cutting drum C without fouling it in all positions of the horizontal guide plate 12. This finger 32 helps the clearance of shavings from the inside of the drum C.

To facilitate adjustment of the vertical guide plate 29 the legs 15, 16 of the horizontal guide plate 12 carry stamped-on scales 35, 36. To guide the vertical guide plate 29 in movement along the horizontal guide plate 12, the ends of the vertical guide plate carry ears 37, 38 which engage the outside edges of the legs 15, 16.

If the combination of drill motor D, cutting drum C and attachment is to be used for rabbeting the edge of a plank P, for example, as shown in Fig. 2, the vertical guide plate 29 is set so that the drum C can engage the wood over the desired width and the horizontal guide plate 12 is set to allow the drum to cut to the desired depth such that, with the horizontal guide plate engaging the top edge of the plank and the vertical guide plate the side thereof, the combination can be moved steadily along the plank. In a similar way the attachment can be used for planing by setting back the vertical guide plate 29.

In a modification of the invention shown in Fig. 3 the horizontal and vertical guide plates 12, 29 are removed from the mount 1 and replaced by a J-shaped bolt 40 having the extremity of its longer arm 41 threaded and provided with a shoulder 42, the extremity being secured by a nut (not shown) in the slot 9 in the frame member 1, so that the longer arm 41 extends perpendicularly to the member 1 and the shorter arm 43 lies within the cutting drum C. The J-shaped bolt 40 then acts as a support to place on the work W and enable better

control of the tool; the bolt is particularly useful on curved work.

The invention can also be applied to small circular saws driven by portable electric drill motors. Thus the apparatus shown in Figures 1 and 2 can be modified in dimensions to cooperate with a small circular saw (say 4"–5" diameter) mounted on the motor shaft in place of the cutting drum C. Cuts of any desired depth can be made by suitable adjustment of the horizontal guide plate on the frame member, and these cuts can be made at any desired distance from the edge of a block of wood by suitable setting of the vertical guide plate 29. Thus rabbets can be cut by working with the horizontal guide plate first against the top and then against the side of the block.

We claim:

1. In a motor-operated hand tool having a casing and an output shaft provided with a cylindrical cutting element, an attachment secured to the casing, said attachment including a frame member mounted on the output end of the output shaft, in a plane normal to the axis of the motor, said frame member having an arcuate slot in one side edge thereof, a U-shaped depth-of-cut gauge pivotally supported by one of its legs at the other side edge of the frame member, and having its other leg adjustably supported by means disposed in the arcuate slot, whereby this gauge and the frame member are disposed in mutually perpendicular planes, the legs of the gauge being provided with parallel, elongated slots, an arcuate guide plate adjustably supported by means disposed in these slots, beneath the gauge and in a plane parallel to that of the frame member, whereby the gauge and guide plate function, respectively, as depth-of-cut and width-of-cut determining elements.

2. The combination according to claim 1, wherein the arcuate guide plate has its extremities bent at right angles to the central portion of the plate, said extremities being in sliding contact with the legs of the gauge, and said extremities of the guide plate carrying extensions projecting at right angles both to said central portion of the guide plate and to the plane containing said extremities which extensions engage the sides of the gauge to maintain the guide plate in parallelism with the frame member during sliding of said guide plate.

3. The combination as claimed in claim 1, wherein the cylindrical cutting element is hollow, open-ended and formed of cutting strip with cutting edges and through holes in front of each cutting edge, the U-shaped depth-of-cut gauge carries a tongue projecting inwardly therefrom the bight of the U, and said tongue extends within the cutting element to promote removal therefrom of shavings cut by said cutting edges and discharged through said holes.

4. For a motor-operated hand tool having a casing and output shaft and being provided with a cylindrical cutting element, an attachment adapted to be secured to the casing, said attachment including a frame member to be secured to the casing about the output shaft in a plane normal to the axis thereof, a depth-of-cut gauge defining a pair of coplaner legs connected at one end and being pivotally supported by one of its legs at one side of the frame member and having its other leg adjustably secured to the other side of the frame member, whereby the gauge and the frame member are disposed in mutually perpendicular planes, an arcuate guide plate having its extremities bent out into a plane at right angles to the central portion of the guide plate which extremities slidingly engage and are guided by the legs of the gauge whereby the guide plate is maintained in parallelism to the frame member, and means releasably securing said extremities of the guide plate to said legs of the gauge, whereby the gauge and guide plate function, respectively, as depth-of-cut and width-of-cut determining elements.

5. The combination according to claim 4, wherein the frame member is a plate having a central aperture receiving a boss about the motor shaft and a slit extends from the central aperture to the periphery of said member, and said member carries means for closing said slit whereby to clamp the member about said boss.

6. The combination claimed in claim 4, wherein the legs of the depth-of-cut gauge are slotted and the releasable securing means for the guide plate comprise a pair of threaded elements extending through the slots and through apertuers in said extremities.

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