

[54] WALL OUTLET AND SWITCH BOX HOLE CUTTER

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3,833,311 9/1974 Chailer 144/73

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[58] Field of Search 33/DIG. 10, 180 R, 180 A; 408/22, 48, 117; 144/73, 144 R

[56] References Cited

UNITED STATES PATENTS

1,667,347	4/1928	Field	144/73
2,536,650	1/1951	Martinez	144/144 R
2,985,204	5/1961	Kozak	144/73
3,499,353	3/1970	Ewell	408/22 X

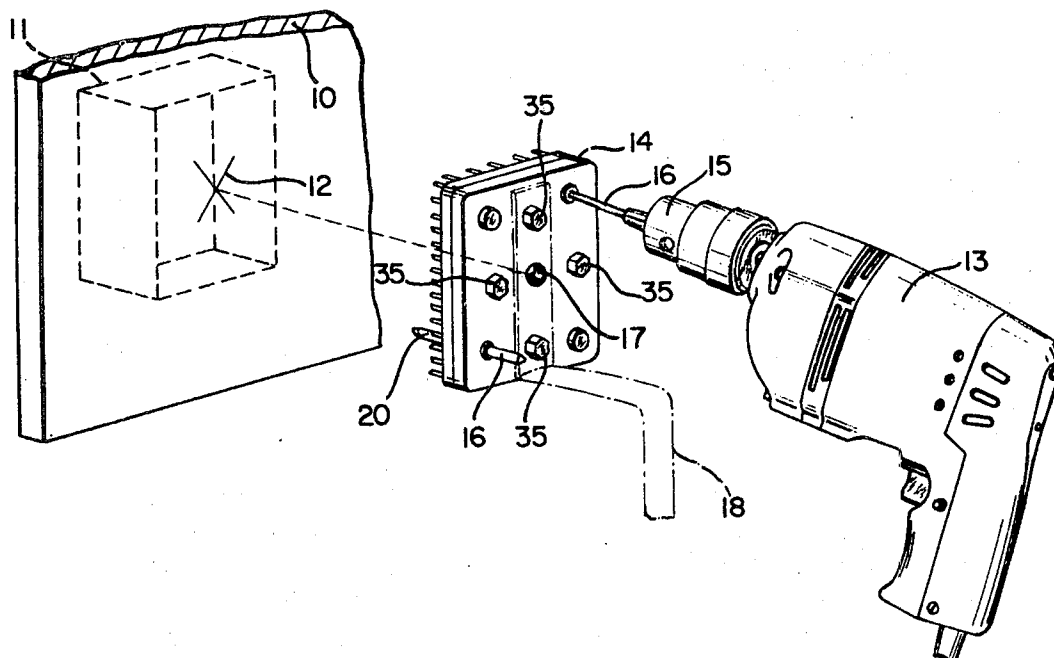
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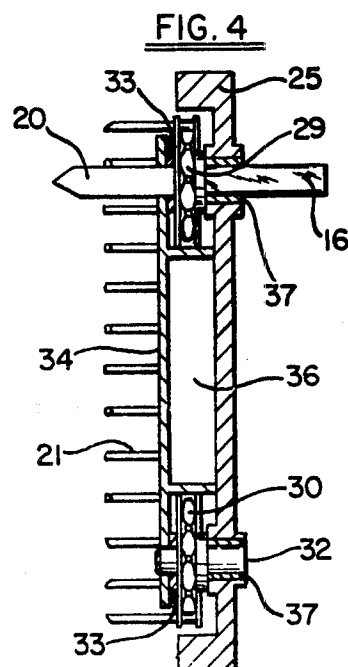
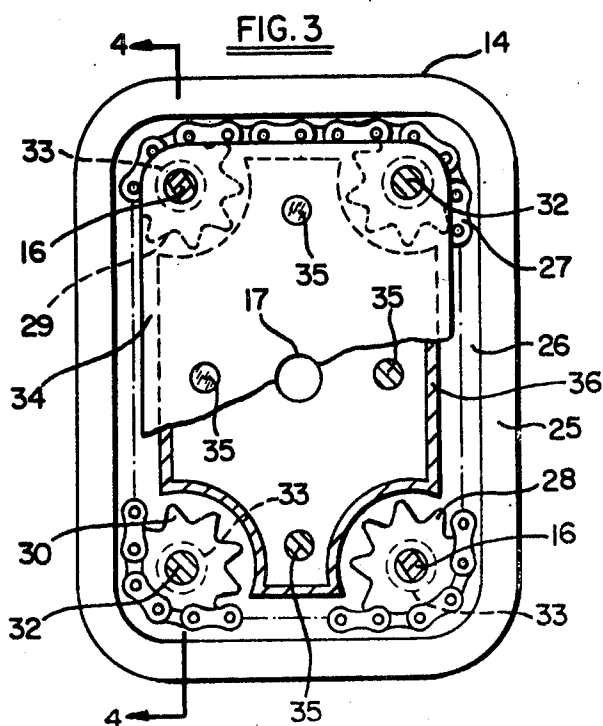
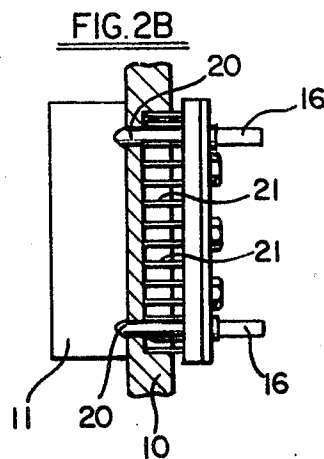
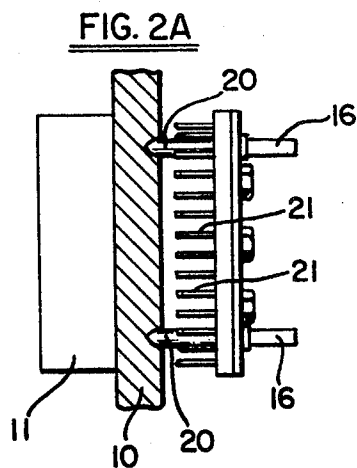
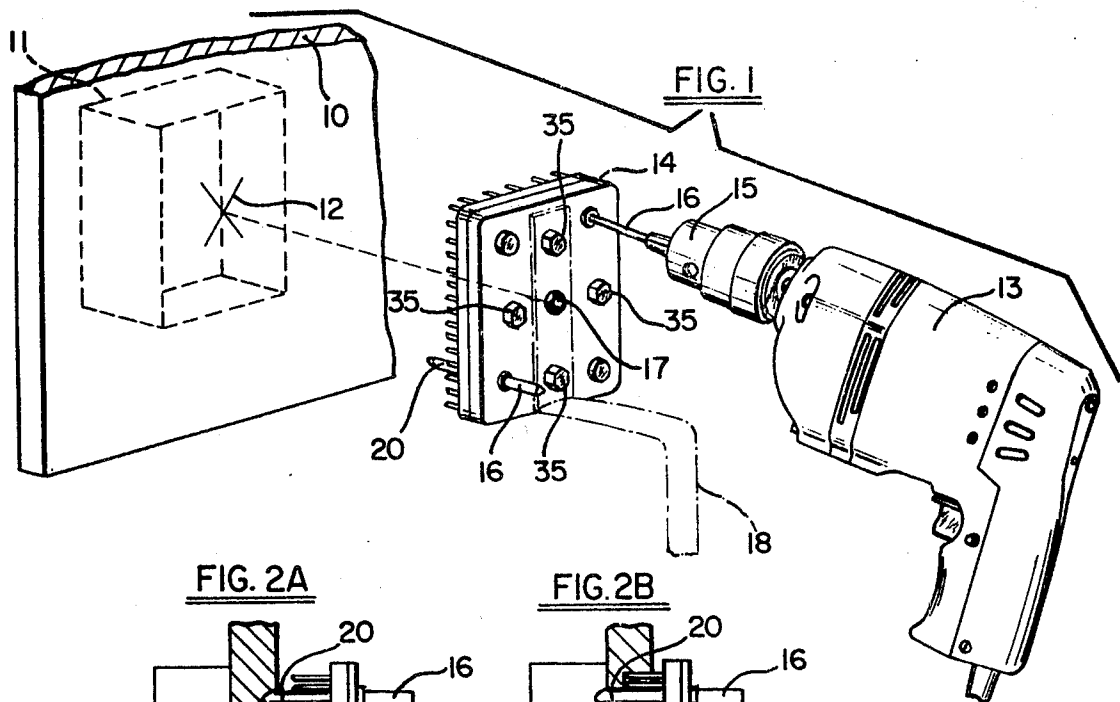
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ABSTRACT

A cutter accessory adapted to be used with portable power tools for cutting holes in sheet material such as wallboard and panelling. The device includes a housing; an endless chain disposed in the housing for rotation therein, and a plurality of cutting edges carried by the chain and extending forwardly from the housing. A drive member located in the housing is adapted for coupling to a rotary power source such as a drill for driving the chain. Improvements are described which permit the hole to have any desired shape (e.g. rectangular), to be stable against motion in the plane of the workpiece and to facilitate centering of the cutter on a desired location.

15 Claims, 5 Drawing Figures





WALL OUTLET AND SWITCH BOX HOLE CUTTER

RELATED APPLICATION

This application is division of my co-pending application, Ser. No. 291,726 (now U.S. Pat. No. 3,833,311, issued Sept. 3, 1974) which is in turn a continuation in part of my application, Ser. No. 258,081, filed Aug. 23, 1972 now abandoned, entitled "Wall Outlet and Switch Box Hole Cutter."

This invention relates to hole cutters and is specifically directed to a device for cutting rectangular openings in panels or walls.

In the construction and remodeling of houses and buildings, it is frequently necessary to cut through an installed wall of plaster, plasterboard or panelling to mount an outlet or switch box or to make use of a previously installed box. At the present time, this requires locating the place where the box is or is to be mounted, then measuring carefully to mark a level, rectangular outline on the wall, and cutting to the outline. The cutting is also time-consuming as the operator must observe and follow the course of the outline rather carefully so as to remove all of the rectangular section without cutting into the adjacent wall. The purpose of this invention is the provision of an improved cutting device which simplifies this task and which makes it possible for the operator to locate and cut the desired opening much more quickly and easily than has previously been feasible.

It is accordingly an object of this invention to provide a new and improved cutter for producing rectangular holes.

Another object of this invention is the provision of a new and improved hole cutting accessory for power tools.

It is also an object of this invention to provide an improved hole cutter having provision for accurate centering and also for good lateral stability.

Further objects and advantages of this invention will become apparent as the description and illustration thereof proceed.

Briefly, in accord with one embodiment of this invention, a shaped hole cutter is provided which includes at least one drive shaft disposed along the periphery of the shape and adapted to be engaged with a power source such as a portable electric drill. Drive means such as a toothed wheel is provided to couple the shaft to a moving cutter, and idlers are positioned to guide the cutter along the desired shape. To prevent twisting during use, at least two points within the periphery are provided with drill points which enter the work prior to engagement of the cutter with the work. In a preferred embodiment, the shape to be cut is rectangular and a sight hole is provided in the center of the rectangle for positioning the cutter at a predetermined location.

In the drawings:

FIG. 1 is a perspective view illustrating a device in accord with the present invention in a specific use;

FIG. 2A is a side elevation illustrating the initial entry of the device of FIG. 1 into a wall section;

FIG. 2B is a side elevation similar to that of FIG. 2A, but illustrating a later stage in the operation of the device;

FIG. 3 is a front elevation of the device of FIG. 1 with a portion of the cover broken away; and

FIG. 4 is a cross sectional view taken along the lines 4-4 of FIG. 3.

FIG. 1 illustrates one application of the preferred embodiment of this invention. In this illustration, a newly installed wall 10, typically of plasterboard or panelling, has been put in place over a previously installed junction box 11 which is to receive an electrical wall outlet. The junction box is, of course, placed at a known location so that its position behind the wall 10 can readily be determined and marked, for example with a penciled X 12 at its center. The installer of the outlet must next cut an opening in the wall at the position of the junction box so that the outlet can be connected and mounted and the opening covered with a suitable cover plate. The device of the present invention simplifies and speeds this operation.

The installer simply makes use of an electric drill 13 connected to a wall cutter 14 in accord with this invention which is shaped and sized to correspond to the opening required for the junction box. The drill is connected via its chuck 15 to one of two drive shafts 16, the device is centered over the junction box by means of a sight hole 17 and the penciled X, and the device is operated by turning on the drill to cut the opening in one, simple operation. The installer may then proceed to place the outlet and cover plate. A handle 18 may be provided on the cutter if desired.

As is shown more clearly in FIG. 2A, the cutter 14 includes a pair of drill points 20, which preferably are extensions of the drive shafts 16, and a series of cutting teeth 21 which extend around the periphery of the cutter 14. The drill points 20 are longer than the teeth 21 so that the points may be engaged with the wall 10 and started before the teeth engage. This provides for a degree of self-feeding action as the drill points act to draw the cutter into the wall, but more importantly, the use of two points stabilizes the cutter against twisting which might otherwise occur as the cutting teeth engage the wall.

FIG. 2B shows the cutter at a later point in its operation. As the drill points break through the wall, the teeth have cut a path on the desired outline and there is no further danger of twisting. Continued operation of the cutter separates the severed wall portion from the wall 10 and it is removed with the cutter.

FIG. 3 shows a front elevation of the cutter 14 with a portion broken away to illustrate the internal construction. The cutter includes a housing member 25 which encloses a track 26 for a chain 27 on which the cutting teeth 21 are carried. The four corners of the rectangular shape are defined by sprockets, two of which, 28 and 29, are mounted on the shafts 16 to form alternative drive means while the other two, 30 and 31, are idlers on short shafts 32 mounted in the housing 25. Thrust washers 33 may be provided for each of the sprockets and a cover plate 34, held in place by bolts 35, completes the assembly. The cover plate may also include an internal flange 36 which defines an inner boundary of the track 26.

FIG. 4 is a cross sectional view which illustrates the manner in which the drive sprocket 29 and idler sprocket 30 are mounted in the housing 25. Sleeve bearings 37 are preferably provided to receive the shafts 16 and 32.

In accord with the present invention, the specific shape followed by the chain, and thus cut by the teeth, is defined by the combination of drive means and idler

means, specifically the sprockets 28-31. In the particular embodiment shown, the desired shape is that of the typical junction box for outlets and switches. However, it is noted that other shapes and arrangements of sprockets, both drive and idlers, may easily be devised to meet the needs of particular instances. For example, the installation of such items as central vacuum cleaners, overhead lighting fixtures, telephones and multiple switch locations could all be benefitted by devices in accord with this invention. Suitable tools specific to particular applications could be produced, as in the illustrated embodiment, or an adjustable device might be made to accommodate a variety of shapes. In either case, a key aspect of this invention is the use of idler means to shape the cutter to the desired path.

Another important aspect of this invention is the provision of a plurality of drill points which enter the work ahead of the cutting teeth. Since the cutting elements are operating in one direction, they may produce sufficient torque, when they engage the work, to twist the cutter and damage the adjacent surface. The use of at least two drill points longer than the teeth prevents this and causes the cutter to enter the work at the desired position. The provision of drive shafts on both of the sprockets having drill points is not necessary, but it does provide added convenience for situations where one side of the cutter may be too close to an obstruction to permit use of the drill.

Another notable feature of this invention is the provision of the sight hole 17. This hole, which can be provided in this device because the peripherally mounted drive is off-set, enables the opening to be cut as soon as the center is located without need to measure or mark the outline of the box. This permits a significant reduction in the amount of time spent in making the opening.

It will of course be appreciated that, while certain specific embodiments have been described and illustrated, many changes and modifications will occur to those skilled in the art which do not depart from the essence of this invention. For example, one such modification is the substitution of a band saw-type blade or other cutting element with suitable modification of the internal drive and idler means. Accordingly, it is intended that the appended claims cover all such changes and modifications as fall within the true spirit and scope of this invention.

I claim:

1. A cutting device adapted for use with a source of rotary power for cutting shaped openings in sheet material comprising a housing; an endless driven member mounted for movement within said housing, said member being provided with cutting means extending forwardly of said housing; rotatable drive means for causing movement of said member; a sight opening formed through said housing at a location corresponding to the center of the shaped opening to be cut by said device; and a plurality of idler means mounted within said housing and positioned so that said member is constrained to move along a desired closed path.

2. A cutting device as claimed in claim 1 wherein said cutting means is adapted to simultaneously engage a workpiece along an outline corresponding to the path of movement of said member.

3. A cutting device as claimed in claim 1 wherein said driven member comprises a chain and wherein said cut-

ting means comprises a plurality of individual cutting elements secured to said chain.

4. A cutting device as claimed in claim 3 wherein driving means and said idlers comprise sprockets engaged with said chain.

5. A cutting device as claimed in claim 1 wherein said shaped path includes at least two rectilinear portions intersecting at a corner and wherein one of said idlers carries said driven member along an approximation of said corner.

6. A cutting device as claimed in claim 5 wherein said path comprises a rectangle and at least one of said drive means and idlers is provided at each corner of said rectangular path.

7. A cutting device as claimed in claim 1 wherein said drive means is offset from the center of said path.

8. A cutting device adapted for use with a source of rotary power for cutting shaped openings in sheet material comprising a housing; an endless driven member mounted for movement within said housing, said member having cutting means extending forwardly from said housing, said member and said cutting means being arranged in the shape of said opening; drive means within said housing for driving said member, said drive means being located at a point offset from the center of said opening; and said housing including an aperture in the center thereof to enable an operator to center said device over the desired location of said opening.

9. A cutter accessory adapted to be used with a portable drill for cutting rectangular holes in sheet material comprising a housing; an endless chain mounted for movement within said housing, a plurality of cutting blades carried by said chain and extending forwardly of said housing; drive means for driving said chain within said housing positioned at one corner of said rectangular shape and having a portion extending forwardly of said housing; and a plurality of idlers juxtaposed with said drive means to lead said chain around the corners of a desired rectangular shape.

10. A cutter accessory as claimed in claim 9 wherein said drive means comprises a shaft, said shaft having a driving member mounted thereon and coupled to said chain; said shaft including a portion extending rearwardly of said housing for engagement with a portable drill.

11. A cutter accessory as claimed in claim 10 wherein said shaft further includes said portion extending forwardly of said housing.

12. A cutter accessory as claimed in claim 9 and including a second drive means independent of said first drive means.

13. A cutter accessory as claimed in claim 12 wherein first and second drive means are offset from the center of said rectangle.

14. A cutter accessory as claimed in claim 13 wherein said housing includes an aperture extending therethrough for sighting on the center of a location to be cut.

15. A cutter accessory adapted to be used with a portable drill for cutting rectangular holes in sheet material, said cutter comprising a housing; a plurality of blades extending from said housing and arranged in a rectangular shape; drive means within said housing for driving said blades upon engagement thereof with a portable drill; said drive means being located at a point removed from the center of said housing; and said housing further including an aperture in the center thereof to enable an operator to sight on the center of a desired hole location.

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