The present invention relates generally to portable drills and in particular to a guide attachment for a drill. Previously proposed and presently in use are guide attachments for portable electric drills designed to enable an operator of the drill to drill perpendicularly into a surface. Generally, the drill attachments have consisted in one or more extensible or retractable legs having surface contacting means on the free ends thereof, the legs retracting as the drill enters the surface to be drilled and being extended after the operator begins to drill so that the operator is informed by separation of the surface contacting means from the surface when the drill is out of the perpendicular position.

Such drill guide attachments as have been proposed or are in use have not been entirely satisfactory for many reasons. A chief defect in the guide attachments proposed is that it is difficult for the operator of the drill to observe when the surface contacting means is out of engagement with the surface. Another defect resides in the fact that when extensible and retractable legs or bars are employed in the guide attachment for an electric drill, the legs or bars are spaced relatively near the drill bit and do not in most cases reflect the true perpendicular position of the drill bit relative to the surface to be drilled. Other defects reside in the means for mounting the legs or bars on the housing of the drill, such means including resilient members such as coil springs or the like, one spring being employed with each leg or bar. It is difficult to accurately gauge the resistance to movement of the legs or bars when so biased by springs and an operator employing such a drill attachment has difficulty in maintaining the drill bit perpendicular to the surface being drilled.

An object of the present invention is to provide a guide attachment for a portable electric drill which has surface contacting means spaced from the drill bit of the drill and in such a position as to readily enable an operator to observe when one or the other of the surface contacting means is disengaged from the surface to be drilled.

Another object of the present invention is to provide a drill attachment for a portable electric drill which has extensible and retractable guide legs or posts with positive drive means for retracting both of the posts when one post is engaged with the surface to be drilled and pressure is applied to the drill moving the drill bit through the surface.

A further object of the present invention is to provide a guide attachment for a portable electric drill which is automatic in operation, one requiring no adjustment for drilling holes of different depths, one which is foolproof in operation, one having few components which lend themselves to manufacture and assembly at reasonable cost, and one which is highly effective in action.

These and other objects and advantages of the present invention will be fully apparent from the following description when taken in conjunction with the annexed drawings, in which:

FIGURE 1 is an elevational view of a portable electric drill with the guide attachment of the present invention installed thereon;

FIGURE 2 is a side elevational view of the assembly shown in FIGURE 1, portions of the drill being broken away;

FIGURE 3 is a view taken on the line 3—3 of FIGURE 1;

FIGURE 4 is a view taken on the line 4—4 of FIGURE 1;

FIGURE 5 is a view taken on the line 5—5 of FIGURE 3;

FIGURE 6 is a view on an enlarged scale, taken on the line 6—6 of FIGURE 5.

Referring in greater detail to the drawings in which like numerals indicate like parts throughout the several views, in FIGURES 1 to 4, the reference numeral 10 designates generally a portable electric drill having a drill bit 12.

The present invention provides a mounting means firmly attached to the housing 14 of the drill 10, the mounting means being designated generally by the reference numeral 16.

The mounting means 16 includes a base plate 18 having a dovetail groove 20 cut in its outer face. A second plate 22 is conformationally shaped to fit within the groove 20 and is provided with a shoulder 24 (FIGURES 2 and 3) which limits the upward sliding movement of the plate 22 with respect to the base plate 18. A detent pin 26 and ball seat, as at 28 in FIGURE 3, releasably retains the plate 22 in its position on the base plate 18 until manually removed therefrom.

The base plate 18 is secured to the body of the drill 10 by means of machine screws 28, as shown most clearly in FIGURE 4.

A pair of accurately curved posts 30 and 32 are arranged in spaced relation and are connected to the plate 22 for movement relative to the plate 22.

The posts 30 and 32 have means, embodying rollers 34 and 36, respectively, on the lower ends for contact with a surface to be drilled, a dotted line designated by the reference numeral 38 in FIGURES 1 to 3, representing such a surface.

The posts 30 and 32 are slidable upwardly and downwardly in accurately curved channel members 40 and 42, respectively.

The channel members 40 and 42 are fixedly secured to a disc 44 by welding or other means, as shown in FIGURE 6 with reference to the channel member 40. The disc 44 is mounted for adjusted rotational movement in the plate 22 in a recess 46 provided therein, as shown in FIGURE 5. The periphery of the disc 44 is provided with a groove 48 into which projects a position pin 50, shown in dotted lines in FIGURE 5, projecting into the recess 46 from one side edge of the plate 22. A second position pin 52 is carried on the free end of a thumb bolt 54 threadedly mounted in the opposed side edge portion of the plate 22.

Tightening of the bolt 54 secures the disc 44 against rotation in any position of its rotational movement relative to the plate 22.

Each of the channel members 40 and 42 has at least two rollers 56 rotatably mounted therein and backing up the respective posts 30, 32.

Means carried by the mounting means and engaging means on the posts 30 and 32 drivably connects the posts 32 from movement together. This driving means is operable when one of the rollers 34 or 36 engages a surface to be drilled by the bit 12 to move both of the posts 30 and 32 together responsive to feeding of the drill bit 12 into the surface represented by the line 28 in FIGURES 1 to 3.

This driving means consists in a pair of pinions 58 and 60 in meshing engagement with each other and interposed between the posts 30 and 32 and rotatably secured to the mounting means or disc 44 by means of machine screws 62, as shown most clearly in FIGURE 4.

The confronting faces of the posts 30 and 32 are pro-
vided with teeth 64 constituting a rack on each of the posts 30 and 32, the teeth 64 on the posts 30 being in engagement with the pinion 58 and the teeth 64 on the posts 32 being in engagement with the pinion 60, as shown most clearly in FIGURE 5.

Spring means is operatively connected to each of the posts 30 and 32 and to the mounting means 16 for biasing the latter to the position in which the rollers 34 and 36 are remote from the mounting means or plate 22. Specifically, this spring means consists in a pair of coil springs 66, each having one end connected to the disc 44 and having the other end attached to the end portion of the adjacent post 30 or 32 so that when the posts 30 and 32 are moved upwardly with respect to the disc 44, as in dotted lines in FIGURE 1, the springs 66 are extended or stretched, as shown in dotted lines.

In use, the base plate 18 is fixedly secured to the housing 14 of the drill 10 and the attachment of the present invention is with ease and facility attached to the plate 18 by sliding the dovetail portion of the plate 22 into the dovetail groove 20 of the plate 18. When the shoulder 24 on the plate 22 abuts the end of the plate 18, the detent ball and ball seat, as at 26, will retain the plate 22 in position on the plate 18.

With the free end of the drill bit 12 in drilling engagement with the surface 38 to be drilled, downward pressure on the drill 10 will feed the drill bit 12 into the surface 38. The rollers 34 and 36 when both engage the surface 38 will be observed by the operator of the drill and when either one leaves its position of engagement with the surface 38, the operator will be in a position to observe this disengagement and will know that the drill bit 12 is out of its set position with respect to the surface 38.

As the bit 12 feeds into the surface 38, pressure of the rollers 34 and 36 on the surface 38 will effect the movement of the posts 30 and 32 through the channel members 40 and 42, respectively, and, in all position of their movement in the channel members 40 and 42, if the rollers 34 and 36 maintain engagement with the surface 38, the operator of the drill will know that the bit 12 is in its preset position.

If the drill bit 12 is tilted out of the preset position and is continued in its feeding movement into the surface 38, one or the other of the rollers 34 or 36 will become disengaged from the surface 38 and its associated post 30 or 32 will be moved upwardly through its channel member responsive to further feeding of the drill bit 12 into the surface. This movement of one post 30 or 32 responsive to movement of the other post 30 or 32 is due to the interengagement of the respective teeth of the racks of such posts and the pinions 58 and 60.

The widespread initial position of the rollers 34 and 36 enable the operator of the drill 10 to position the bit 12 perpendicularly, in one plane at least, with respect to the surface 38 with greater accuracy than with the drill attachments herefore proposed or those presently in use. The sliding simultaneous movement of the posts 30 and 32 upwardly in their channel members maintains the preset position of the bit 12 in all positions of their sliding movement as the bit 12 is fed into the surface 38.

It is possible to shift the disc 44 with the recess 46 of the plate 22 so as to position the bit 12 at an angle to the surface 38. The action of the legs 30 and 32 as they move upwardly through the channel members 40 and 42 will be the same whether the bit 12 is perpendicular to the surface 38 or at an angle to the surface 38.

What is claimed is:

1. A guide attachment for a portable drill comprising a mounting means adopted to be fixedly attached to said drill, a disc carried by said mounting means for adjustable rotational movement relative to said mounting means, a pair of posts arranged in spaced relation and connected to said disc for movement relative to said mounting means, each of said posts having means on the lower end for contact with a surface to be drilled, a pair of pinions in meshing engagement with each other interposed between said posts and rotatably secured to said disc, a rack on each of said posts in meshing engagement with the adjacent pinion, said pinions being operable when the surface contact means of only one of said posts engages a surface to be drilled to move both of said posts together in one direction responsive to feeding of said drill into said surface, and spring means operatively connected to said posts and to said disc for biasing said posts to the other direction position.

2. A guide attachment for a portable drill comprising a mounting means adapted to be fixedly attached to said drill, a pair of arcuately curved posts arranged in spaced relation and connected to said mounting means for movement relative to said mounting means, each of said posts having means on the lower end for contact with a surface to be drilled, a pair of pinions in meshing engagement with each other interposed between said posts and rotatably secured to said mounting means, a rack on each of said posts in meshing engagement with the adjacent pinion, said pinions being operable when the surface contact means of only one of said posts engages a surface to be drilled to move both of said posts together in one direction responsive to feeding of said drill into said surface, and spring means operatively connected to said posts and to said mounting means for biasing the latter to the other direction position.

References Cited in the file of this patent

UNITED STATES PATENTS

2,373,785 Seabold ---------------- Apr. 17, 1945
2,430,812 Goldberg -------------- Nov. 11, 1947
2,483,060 Niedelman et al. ------ Sept. 27, 1949