

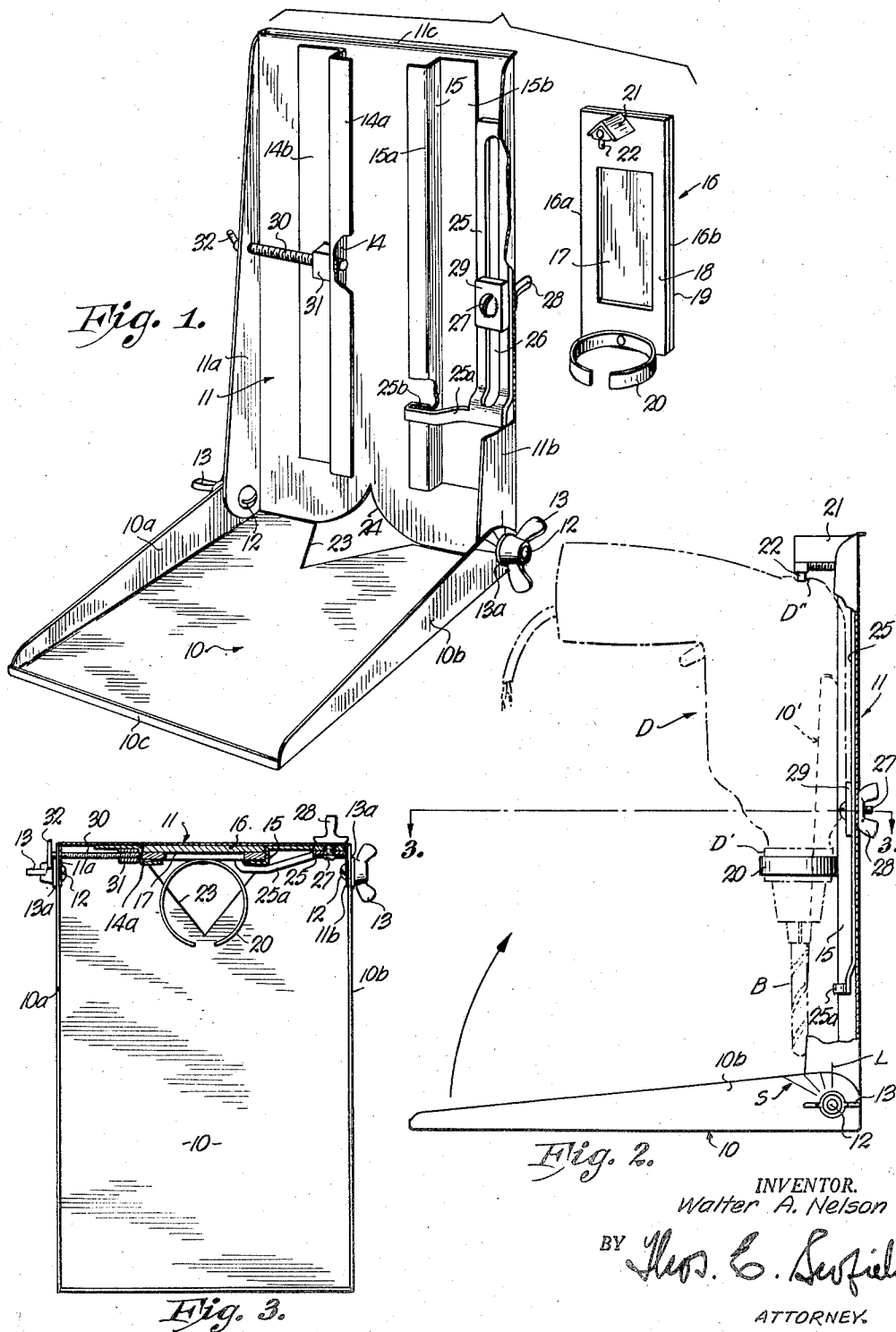
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W. A. NELSON

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PORTABLE DRILL STAND AND GUIDE APPARATUS

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INVENTOR.
Walter A. Nelson
BY *Thos. E. Seefeld*
ATTORNEY.

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PORTABLE DRILL STAND AND GUIDE APPARATUS

Walter A. Nelson, Hickman Mills, Mo., assignor to Nelson Brothers, Inc., Fort Scott, Kans., a corporation of Kansas

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This invention relates to the use of hand type electric drills and the like and refers more particularly to a combined drill stand and guide apparatus providing means for accurately indexing the drill with respect to the work both from the standpoint of angularity of the drill as well as depth of the drill hole.

An important object of the invention is to provide a combined stand and guide apparatus for use in connection with hand-held electric drills which provides a means for confining the path of the drill bit, as it advances toward the work piece, to a direction which corresponds to the desired inclination of the drill hole relative the work piece. As should be evident, the invention finds particular advantage in the drilling of holes into a wall or other flat surfaced member, whether the holes are normal to the surface or at an angle thereto. A feature of the invention resides in the provision of visually observable means for indexing the direction of drill approach to a preselected and accurately measured angle with respect to the work.

A further object of the invention is to provide apparatus of the character described in which means are provided for obtaining holes of a predetermined depth, this depth being adjustable as desired. The depth control feature is employable whether the drill is at an angle with or normal to the work piece.

Another object of the invention is to provide apparatus of the character described in which the drill can be immobilized on the support when adjusting the angle of approach or when changing the depth control means, thus to free both hands of the operator for the necessary adjustment operation.

Still another object of the invention is to provide apparatus of the character described which can be readily associated with drills produced by different manufacturers to produce the desired results.

A further object of the invention is to provide a drill stand and guide apparatus which can be quickly and easily folded to a substantially flat collapsed condition when not in use, thus eliminating difficulty in storage.

Yet another object of the invention is to provide a drill stand and guide apparatus of the character described which is of sturdy construction yet low in cost, which is simple enough for easy operation, and which is capable of withstanding long and rugged use.

Other and further objects of the invention together with the features of novelty appurtenant thereto will appear in the course of the following description.

In the accompanying drawing which forms a part of and is to be read in conjunction with the instant specification, and in which like reference numerals indicate like parts in the various views;

Fig. 1 is a front perspective view of a preferred embodiment of my invention, the drill guide head being shown in exploded relation with the stand and parts of the stand being broken away for purposes of illustration;

Fig. 2 is a side elevation of the preferred embodiment

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showing a drill attached to the guide head, the head being shown in operative relationship with the stand and parts of the stand being broken away for purposes of illustration; and

5 Fig. 3 is a view taken along the line 3—3 of Fig. 2 in the direction of the arrows.

Referring to the drawing, the main body of my apparatus comprises a flat plate-like base member 10 and a similar support member 11 connected with the base member at one end for pivotal movement with respect thereto. The base and support members can conveniently be formed of sheet metal and are preferably rectangular in plan. The base member 10 is provided along opposite edges with upturned flanges 10a and 10b which are tapered in height from the inner end toward the outer end. A similar pair of tapered flanges 11a and 11b is provided on the support member 11. As is believed evident, the lower ends of the flanges 11a and 11b overlap and are in face contact with the adjacent ends of flanges 10a and 10b. The overlapping portions of the flanges are secured together by screw cap bolts 12 which extend through suitable apertures in the contacting flanges and which receive on their outer ends wing nuts 13. A lock washer 13a may be positioned between each wing nut 13 and the adjacent flange face. The bolts 12 are arranged on a common axis parallel to the base member 10, and it will be evident that the support member can be positioned at any desired angle with respect to the base member and thereafter locked at the desired position by means of tightening down the wing nuts 13. In the preferred embodiment, the lower ends of the flanges 11a and 11b are so formed as to provide a limiting means engaging the base member when the angle between the support and base members reaches 90°, thus providing a quick indexing at the 90° position. As shown in Fig. 2, a calibrated scale S can be imprinted on the outer face of the flanges 10a and 10b. To cooperate with this scale an indexing line L is provided on flanges 11a and 11b. Each of the lines in the scale S is arranged to indicate a particular angle for the support member 11 when the indexing line L is brought into register therewith.

As is best seen in Figs. 1 and 2, the flanges 10a, 10b, 11a and 11b are preferably coextensive with the base and support members, thus serving to strengthen the members against flexure out of plane of their faces. To add to the strength of the base and support members in this respect, lips 10c and 11c are formed on the outer edges of the respective members. The provision of the long flanges and the lips at the edges of the members makes it possible to construct the unit out of extremely thin sheet metal, thus saving in weight without detracting from the overall strength thereof.

Provided on the inside face of the support member 11 and extending lengthwise thereof are a pair of spaced parallel flanges 14 and 15 having lip portions 14a and 15a which are bent toward one another and spaced from the face of the support member. The flanges 14 and 15 can be secured to the face of the support member in any suitable fashion. In the preferred embodiment the flanges and lips constitute the intermediate and outside legs of a member which is generally Z-shaped in cross section, the base legs 14b and 15b of the Z-shaped members being disposed flat against the face of the support member and secured thereto by spot welding or any other convenient means of attachment.

The flanges 14 and 15 and their respective lips 14a and 15a form with the face of the support member a pair of spaced parallel guideways oriented transverse to the pivot axis between the base and support members and adapted to receive in confined slidable relationship the opposite edges 16a, 16b of a guide head 16. The

guide head is shown disassociated from the guideways in Fig. 1. As will be noted it preferably comprises a rectangular member of a thickness only slightly less than the space between the face of support member 11 and the guideway lips 14a, 15a and of a width only slightly less than the distance between the flanges 14 and 15. As shown in Fig. 2, the guide head is adapted to be secured to the top of a conventional electric hand drill D with its edges 16a and 16b parallel with the longitudinal center line of the drill and extending laterally somewhat like wings. To accommodate the guide head to the drill the body contacting face of the guide head is provided with a recess 17 in which the curved upper portion of the body is received. Conveniently the head can be composed, as shown, of two similar plates 18 and 19, one of which has an aperture which forms recess 17. Alternatively, the body contacting face of the drill guide head can be contoured to correspond with the circular body of the drill.

In the preferred embodiment of the invention the attaching means for securing the guide head 16 to the drill comprises a clamping ring 20 at one end which is adapted to encircle the smaller diameter spindle D' projecting from the end of the drill body, and a lateral extension 21 at the other end having a lug 22 which seats in a corresponding notch D'' in the back or hand end of the drill. In many drills this notch is already present in the item as manufactured and sold. In others such a notch can be quickly and easily formed. It will be understood, of course, that any other means than that described and shown can be used for securing the guide head 16 to the drill, or that the head can be cast as an integral part of the drill, the main object being to provide the edges 16a and 16b secured to the drill and adapted to be received in the guideways on the support member previously described.

To operatively assemble the drill D and its attached guide head 16 with the drill stand, the head is introduced into the open upper end of the guideways with the edges 16a and 16b of the head inside the lips 14a, 15a. As will be evident, this establishes a slidable connection between the drill and support, permitting movement of the drill either up or down in the guideways. To permit the drill bit B (Fig. 2) to move through the plane of base member 10 without interference, a cut-out 23 is provided in the inner edge of the base member. A similar cut-out 24 is provided in the bottom 11, this cut-out serving to provide an opening through which the operator can observe the progress of the bit as the drilling operation is carried out. This latter feature is particularly advantageous where drilling is being carried out at relatively acute angles.

While the drill guide head is, under ordinary circumstances, freely movable throughout the length of the guideways, I have provided a means of controlling the depth of penetration of the bit. Referring again to Figs. 1 and 3, positioned adjacent the flange 11b on the support member, and in contact with the face of the support member, is an elongate slide member 25 having at its lower end a laterally extending arm 25a which extends across the lip 15a and is reversely bent to provide a portion 25b within the guideway formed by flange 15 and lip 15a. The bend in arm 25a which forms portion 25b is sufficiently open to permit free sliding movement of the arm lengthwise of the lip 15a. The slide member 25 is provided with an elongate slot 26 running substantially its complete length. Extending through this slot is a bolt 27 which also extends through a suitable aperture in the support member 11 so that the threaded end of the bolt extends beyond the rear face of the support member. A wing nut 28 is received on bolt 27. The head of the bolt engages a clamping plate 29 through which the bolt extends, the clamping plate being large enough to contact the face of slide member 25

on opposite sides of the slot 26. Through the medium of loosening and again tightening wing nut 28 the slide 25 along with its arm 25a and terminal stop portion 25b can be shifted longitudinally to a desired position and locked in this position. As is believed evident, the terminal portion 25b will block downward advance of the guide head in the guideways when the lower end of the guide head comes into contact therewith. Thus a positive depth control for penetration of the drill bit is provided.

On the opposite side of support member 11 from the depth control slide 25 is located means for at times immobilizing the drill guide head in the guideways. This means comprises a threaded thrust member 30 which extends through an internally threaded aperture in a block 31 welded or otherwise secured adjacent flange 14. The thrust member extends through a suitable aperture in flange 14 so that its inner end can be brought into abutment with the edge of the drill guide head contained therein. The outer end of the thrust member extends in a loose fit through a suitable aperture in flange 11a, and a cross bar 32 is secured to the outer end to provide a convenient means for manipulation. To lock the drill guide head against movement in the guideways it is necessary only to rotate the thrust member so that its inside end abuts tightly against the edge 16a of the drill guide head and forces the opposite edge 16b into tight frictional engagement with the flange 15. When it is desired to again release the drill guide head, thrust member 30 need only be rotated in the opposite direction to relieve the pressure on the edge of the drill head and again permit sliding movement thereof in the guideways.

In operation, the base member 10 is placed on or against the work piece and the angle of the support member with respect to the base member, as established by the desired inclination of the drill hole, is set as previously described. If a definite depth for the drill hole is desired, the slide member 25 is positioned so that the reversely bent stop portion 25b of arm 25a will engage the guide head when the proper depth has been reached. The guide head is then inserted into the open upper end of the guideways and the drill lowered until the bit comes into contact with the work surface. The drill is then energized, and as the bit penetrates, the drill will move parallel to the guideways, being confined to this path by the operative relationship between the head and the guideways. When the drill bit has penetrated to the desired depth, the lower end of the guide head will be engaged by the terminal portion 25b of arm 25a and further movement of the head in a direction toward the work will be positively prevented. If it becomes necessary at any time to readjust the arm 25a to change the permissible drilling depth, the drill can be raised slightly and the thrust member 27 tightened against the head as earlier described to lock the drill in the support member. Both hands of the operator are thus free for making such further adjustments as are necessary.

When it is desired to store the drill stand away, the head is removed from the guideways by drawing the drill upwardly until the head is free of the guideways. The base member 10 then can be folded to a position in which it is substantially parallel with the support member 11, as shown at 10' in Fig. 2. The head can be left on the drill without interfering with its use for other operations.

From the foregoing it will be seen that this invention is one well adapted to attain all of the ends and objects hereinabove set forth together with other advantages which are obvious and which are inherent to the structure.

It will be understood that certain features and subcombinations are of utility and may be employed without reference to other features and subcombinations. This is contemplated by and is within the scope of the claims.

As many possible embodiments may be made of the invention without departing from the scope thereof, it is

to be understood that all matter herein set forth or shown in the accompanying drawing is to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, I claim:

1. A collapsible drill stand and guide apparatus for use in combination with a hand-type electric drill, comprising a flat base member adapted to be placed against a work piece and having a pair of spaced upstanding flanges thereon, a substantially flat drill support member superimposed on said base member and having a collapsed position in which said support member is substantially parallel with but spaced from said base member, a pair of spaced flanges on the support member which overlap and are in face to face contact with the flanges on said base member, means connecting the face contacting flanges on each of said members to provide for pivotal movement of said support member with respect to said base member about an axis parallel to said base member, mechanism operable to releasably rigidify said support member relative to said base member in a plurality of raised positions in which said support member is non-parallel with said base member, guide means carried by the support member and located on that face of the support member which confronts the upper face of the base member when the support member is in said collapsed position, said guide means forming spaced parallel guideways open at one end and oriented transverse to said axis, and a guide head adapted to be secured to a drill and having parallel edges slidably received and confined in said guideways whereby said guide head is freely movable along said support member in a direction parallel to said guideways.

2. A collapsible drill stand and guide apparatus as in claim 1 including cooperating indexing means on said base member and said support member for visually indexing the angle of the support member relative the base member.

3. A collapsible drill stand and guide apparatus as in claim 1 including adjustable thrust means extending laterally into one of said guideways and operable to engage said guide head to immobilize said guide head at a selected position.

4. A collapsible drill stand and guide apparatus as in claim 1 including adjustable stop means positioned in the path of said guide head during its travel toward said base member.

5. A collapsible drill stand and guide apparatus for use in combination with a hand-type electric drill, comprising

a pair of substantially flat plate-like members providing a base member and a drill support member, means hinging said members together at one end for swinging movement relative to each other about a common hinge axis, said means including a releasable locking mechanism for locking said members relative one another at a plurality of selected angular positions, guide means carried by one face of the support member, said guide means forming spaced parallel guideways open at one end and oriented transverse of the hinge axis to extend lengthwise of the support member, and a guide head adapted to be secured to the drill and having parallel edges slidably received and confined in said guideways whereby said guide head is movable along said support member in a direction transverse to said axis.

6. A collapsible drill stand and guide apparatus as in claim 5 wherein said guideways are formed by parallel spaced members providing flanges extending from the face of said support member, said flanges bent toward one another along their outer edges to provide lips spaced from the face of said support member.

7. A collapsible drill stand and guide apparatus as in claim 6 including a thrust member having one end extending laterally through one flange, said member adjustable to contact one edge of said guide head and force the opposite edge laterally against the other flange to releasably lock said guide head in a fixed position.

8. A collapsible drill stand and guide apparatus as in claim 6 including a slide member disposed to the outside of one of said flanges, said member adjustable in a direction parallel to said flanges and including a laterally extending stop arm extending over one of said lips and reversely bent to provide a portion fitted within the space between the lip and face of the support member, and means for immobilizing said slide member at a selected position thereby to cause said portion to limit the movement of the guide head past the location of said portion.

9. Apparatus as in claim 5 wherein said guide head is formed integral with the drill.

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