Feb. 4, 1936. W. BETZ 2,029,650

DRILL JIG

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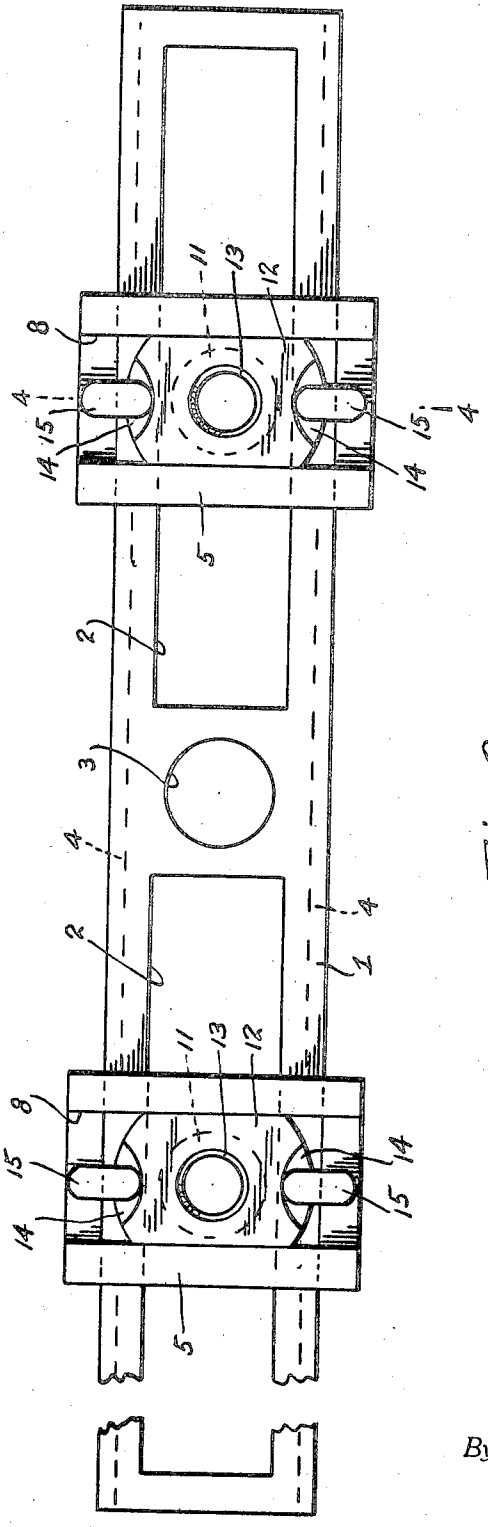


Fig. 1.

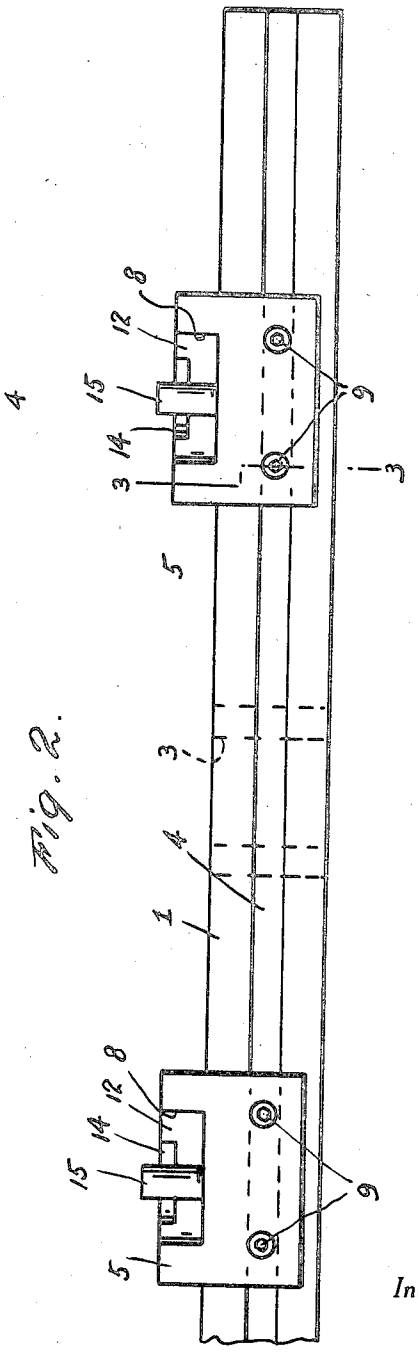


Fig. 2.

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DRILL JIG

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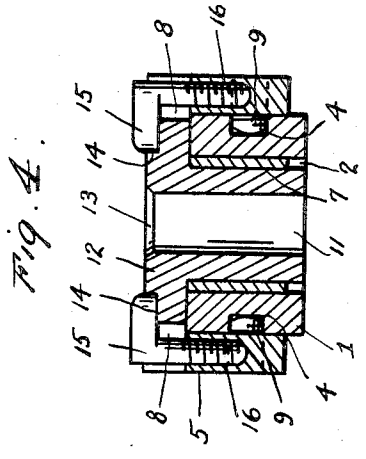


Fig. 4.

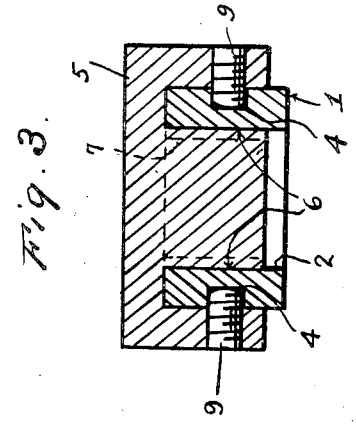


Fig. 3.

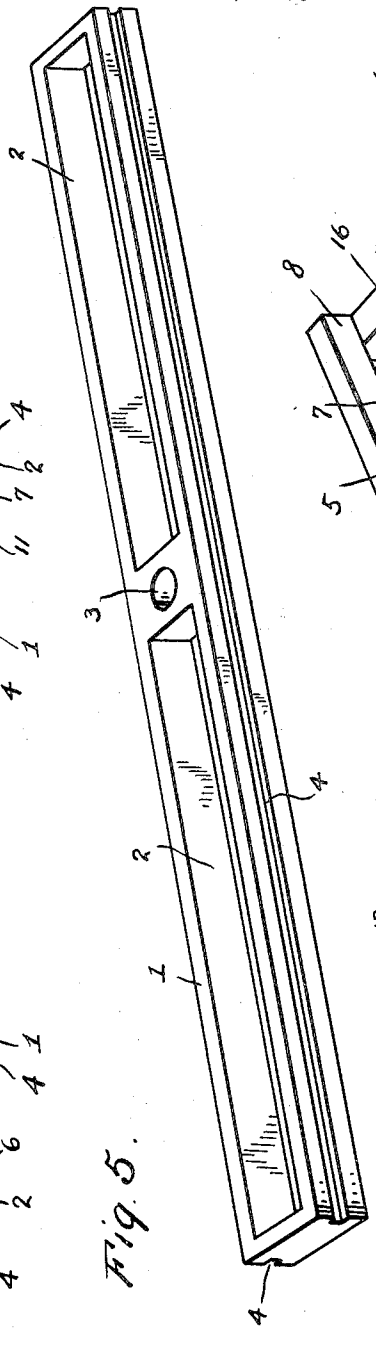


Fig. 5.

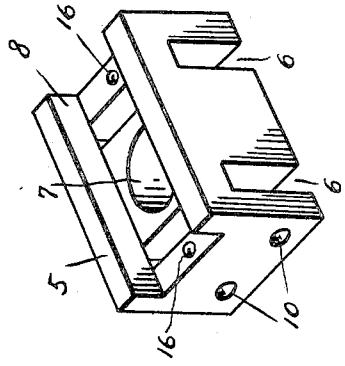


Fig. 7.

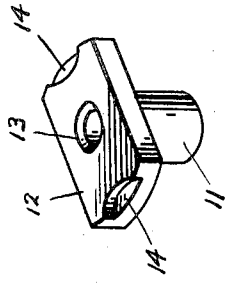


Fig. 6.

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DRILL JIG

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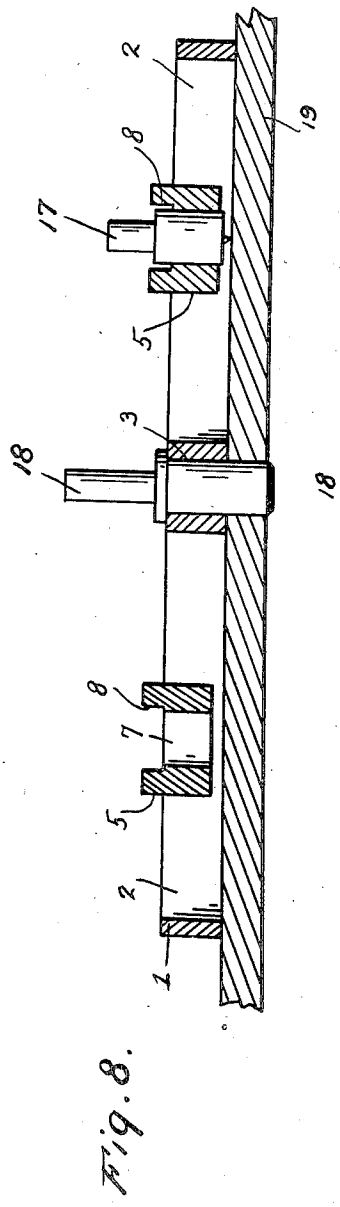


Fig. 8.

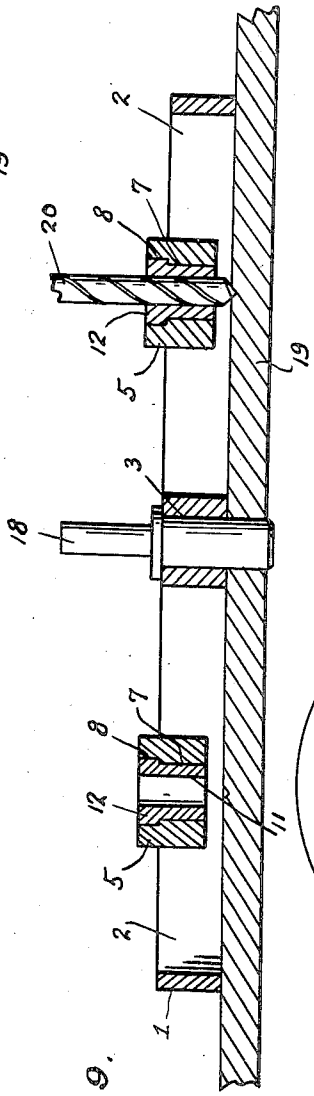


Fig. 9.

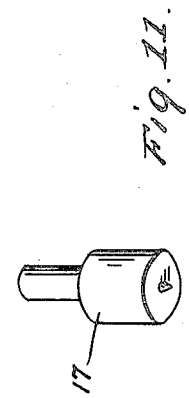


Fig. 11.

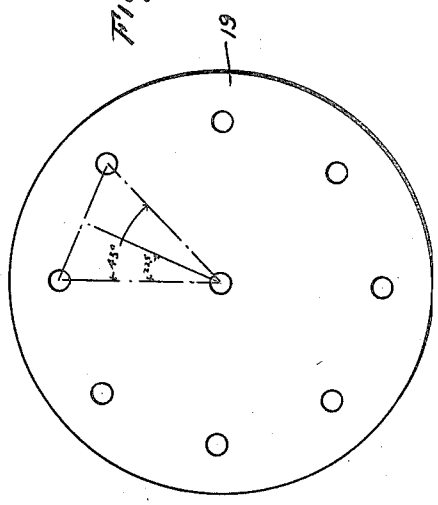


Fig. 10.

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Patented Feb. 4, 1936 2,029,650

UNITED STATES PATENT OFFICE

2,029,650

DRILL JIG

William Betz, Detroit, Mich.

Application January 14, 1933, Serial No. 651,800

3 Claims. (Cl. 77—62)

The present invention relates to new and useful improvements in drill jigs, and has for its primary object to provide, in a manner as hereinafter set forth, a jig of this character embodying a novel construction, combination and arrangement of parts through the medium of which a center hole and a plurality of holes equally or unequally eccentric with respect to the center hole may be expeditiously drilled in the work.

Other objects of the invention are to provide a drill jig of the aforementioned character which will be simple in construction, strong, durable, light in weight, compact accurate, and which may be manufactured at low cost.

All of the foregoing and still further objects and advantages of the invention will become apparent from a study of the following specification, taken in connection with the accompanying drawings wherein like characters of reference designate corresponding parts throughout the several views, and wherein:—

Figure 1 is a view in top plan of a drill jig constructed in accordance with the present invention.

Fig. 2 is a view in side elevation thereof.

Fig. 3 is a view in vertical transverse section, taken approximately on the line 3—3 of Fig. 2.

Fig. 4 is a view in vertical transverse section, taken approximately on the line 4—4 of Fig. 1.

Fig. 5 is a detail view in perspective of the base of the jig.

Fig. 6 is a detail view in perspective of one of the removable bushings.

Fig. 7 is a detail view in perspective of one of the slidable bush blocks.

Fig. 8 is a view in vertical longitudinal section, showing the manner of marking the work for the outer drills.

Fig. 9 is a view in vertical longitudinal section, showing one of the outer drills in operative position in one of the bush blocks.

Fig. 10 is a plan view of a piece of completed work.

Fig. 11 is a detail view in perspective of one of the center punches.

Referring now to the drawings in detail, it will be seen that the reference numeral 1 designates an elongated metal base having a pair of longitudinally spaced and aligned longitudinal slots or openings 2 therein. A center hole 3 extends vertically through the bar 1 between the slots or openings 2, the purpose of which hole 3 will be presently set forth. Extending longitudinally in the longitudinal side edges of the base 1 are grooves 4, the purpose of which also will be presently set forth.

Mounted for longitudinal sliding movement on the base 1 in each of the slots 2 is a generally rectangular bush block 5. As the bush blocks 5 are of identical construction, a detailed description of one will suffice for both. Each of the bush blocks 5 has formed in its bottom a transversely spaced pair of vertical channels 6 for slidably receiving the side portions of the base 1 for slidably mounting the bush blocks on the base for longitudinal adjustment. Each block 5 is centrally provided with a vertical hole 7. A transverse channel 8 in the top of the block, communicates with the upper end of the hole. Set screws 9 are threaded horizontally through openings 10 provided in the lower part of opposite sides of the blocks 5, said set screws being arranged to be engaged in the grooves 4 of the base for locking the blocks in adjusted positions on the bar 1 in a manner to preclude movement of the bush blocks in any direction while so locked.

The vertical holes 7 of the blocks 5 are for the reception of removable bushings 11 having elongated, substantially flat supporting heads 12 on their upper ends which rest or seat in the transverse channels 8 of said blocks so as to prevent the bushings from turning while a drill is being operated therein. The bushings 11 are counterbored at their upper ends, as indicated at 13. The ends of the heads 12 of the bushings are curved and have formed in the upper surface thereof half-moon shaped rabbets or notches 14 for the reception of the lateral lug of bushing locking screws 15 which are threaded into the vertical sockets 16 which are provided therefor in the side portions of the blocks 5.

In Figure 11 is shown a center punch 17 which is to be placed in the opening 3 of the base or in either of the openings 7 of the bush blocks 5 (the bushings having been removed) for marking the work in an obvious manner. The reference numeral 18 designates a plug which is to be placed in the center hole 3 of the base while the work is being marked for the outer holes and while such outer holes are being drilled, the plug 18 being arranged to extend below the base when engaged in the opening 3 of the base 1 and be engaged in the center hole which is first drilled in the work. The plug 18 constitutes an axle about which the base 1 is to be rotatably adjusted for giving the bar different angular positions for marking or drilling the outer holes. In Figs. 8 to 10, inclusive, of the drawing, the work is designated by the reference numeral 19.

Briefly, the manner of using the jig is as follows:—

The center of the work is first located and a comparatively shallow socket or hole is then drilled therein. The base 1 is then positioned on the work with the center hole 3 over the comparatively shallow socket and the punch 17 is then placed in the center hole with its pointed end lowermost. As the lower end of the punch becomes seated in the said socket, the jig is retained in the desired position on the work, and is then to be clamped by suitable means (not shown). If a center hole is desired in the work, the punch 17 may then be removed and a bushing substituted therefor in the center hole 3, a drill of the desired size being then inserted in the bushing and the drilling operation performed. After the drill has been withdrawn at the completion of the drilling operation and the bushing removed, a plug 18 may be inserted in the bushing in the center hole 3 to extend into the center hole in the work resulting from the drilling operation and hold the jig against translatory movement and to constitute a center pivot about which to rotate the base, as shown in Figures 8 and 9.

Upon completion of the described operations, the blocks 5 are then adjusted to the desired position on the base 1, the exact distance from the center of the base being ascertained by measuring with a micrometer the distance between the plug 18 and a center punch 17 inserted in the block, allowance being made for the diameter of the plug 18 and for the diameter of the punch 17. After the bush blocks have been adjusted to the desired positions and locked in place by the set screws 9, the center punches 17 are removed, replaced by bushings 11, and the drills inserted in the bushings. In Figure 9 of the drawings, a portion of a drill bit is indicated at 20. It will thus be seen that a diametrically aligned series of three holes may be drilled without moving the jig.

It is obvious that one of the center punches 17 or plugs 18 may be utilized in one bush block while engaged with the work, while the remaining bush block is occupied in a drilling operation, to prevent rotation of the base out of its appointed position. Any proper method for gauging the rotation of the jig to the next angular position may be utilized after the first series of holes has been made.

It is believed that the many advantages of a drill jig constructed in accordance with the present invention will be readily understood, particularly by those skilled in the art, and although the preferred embodiment of the invention is as illustrated and described herein, it is to be understood that changes in the details of construction and in the combination and arrangement of parts may be resorted to which will fall within the scope of the invention as claimed.

Having thus described my invention, what I claim as new is:—

1. A drill jig comprising a base for resting on the work and provided with an elongated opening defining a pair of spaced parallel bars, the outer sides of said bars being formed with a groove, a block provided in its bottom with a pair of spaced longitudinal grooves arranged to receive the respective bars so that the bottoms of the grooves slide on the tops of said bars and the opposite sides of the grooves slidably engage the opposite sides of the bars, set screws traversing the outer sides of said block and engaging in the respective grooves in the outer sides of the bars so as to lock the block in adjustable positions on said base, said block being formed in its top with a transverse groove into which the said bottoms of the grooves open, said block being further formed with a vertical bore placed between said grooves and between the sides of said transverse groove, a drill bushing having a tubular shank fitting in said bore and a lateral shoulder on its upper end conformably seating in said transverse groove and resting on the tops of said bars appearing in the open portion of said bottoms, and screw clamp means threaded into the floor of said transverse groove outwardly of said open portions of the bottoms, said clamp means having a lateral arm arranged to swing over and forcibly engage the top of the bushing as the screw means is turned in a direction to thread the same into said floor.

2. A drill jig comprising a base for resting on the work and formed with a longitudinal groove in one side, a bush block provided in its bottom with a slot arranged to receive said base and rest slidably on the upper part of said base, a set screw traversing one side of said block and engaging said longitudinal groove, said block being formed with a vertical bore arranged to receive a drill bushing, the top of said bush block being provided with a wide transverse groove into which said slot opens, a bushing seated in said vertical bore and having a flange fitting into said transverse groove and resting on the top of said base, and a screw threaded vertically in the top of said block and having a lateral arm arranged to swing over and forcibly engage the top of said flange as the screw is turned down, said arm and said set screw then cooperating to clamp said bushing, said block, and said base together.

3. A device of the character described, said device comprising a base for resting on the work, said base having a longitudinal groove formed along one vertical side thereof, a slide mounted on said base and formed with a longitudinal slot in its bottom receiving said base and a transverse slot in its top, said slots opening into each other so as to expose the top of said base within said transverse slot, a set screw traversing one side of said slide and engaging in said longitudinal groove of the base, said slide being formed with a vertical bore opening into said transverse groove, a bushing seated in said bore and having a flange fitting in said transverse groove and resting on the floor thereof, a clamp screw threaded into the top of said slide and having a lateral arm arranged to swing onto and forcibly engage the top of said flange when said clamp screw is turned so as to thread the same into said slide whereby said clamp screw and said set screw cooperate in frictionally locking said base, said slide, and said bushing together.

WILLIAM BETZ.