

Feb. 15, 1966

J. E. BYERS
POWER DRILLING DEVICE

3,234,977

Filed Oct. 29, 1962

3 Sheets-Sheet 1

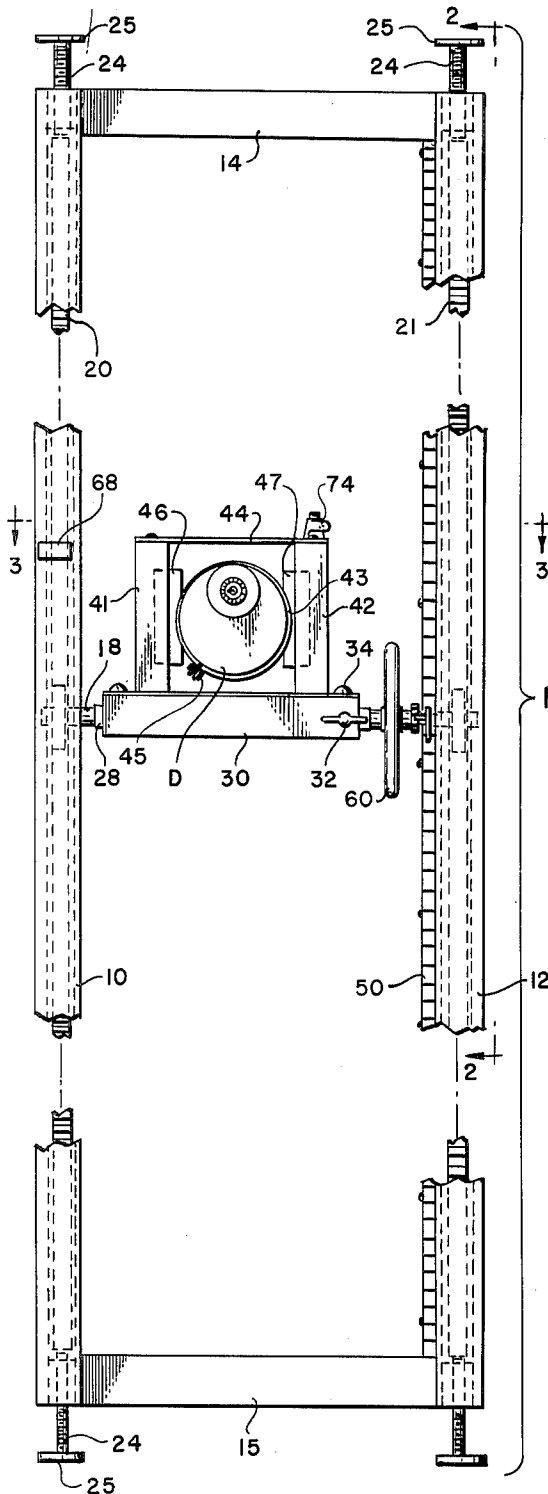


FIG. 1

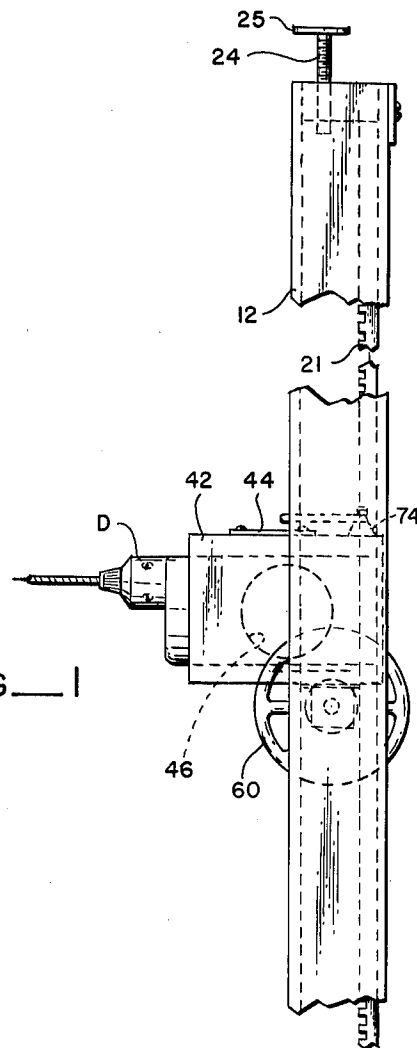


FIG. 2

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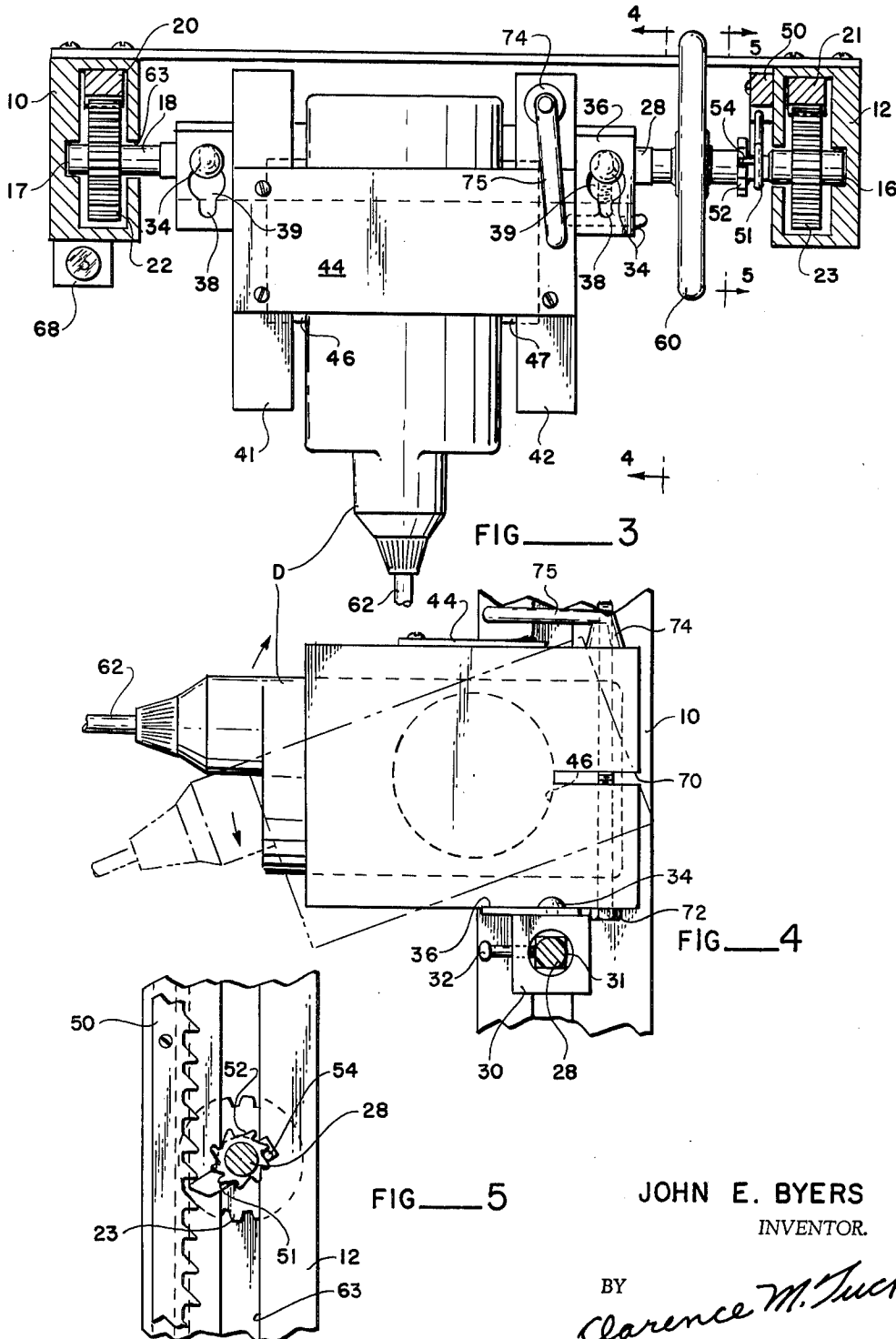
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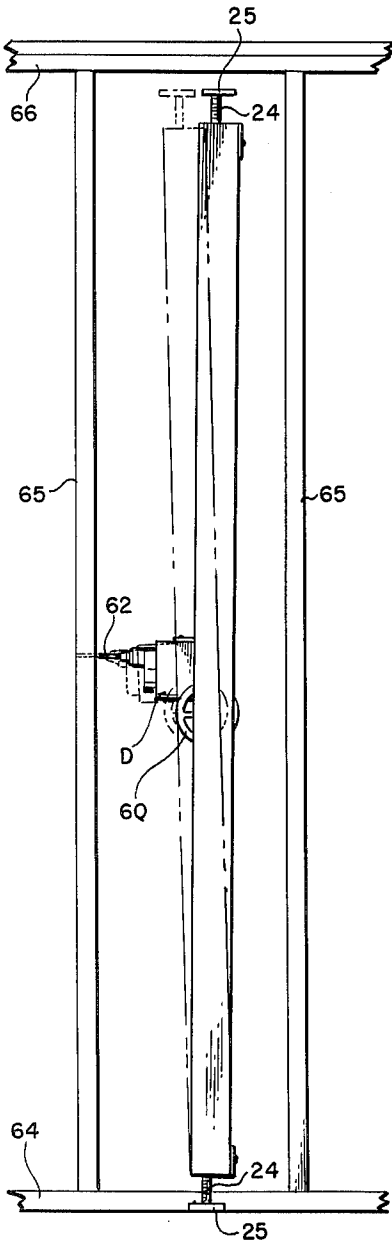


FIG. 6

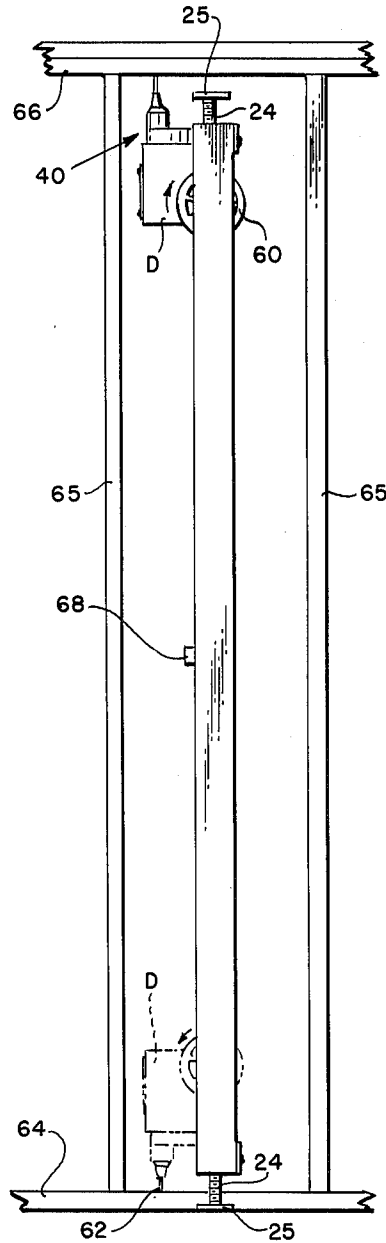


FIG. 7

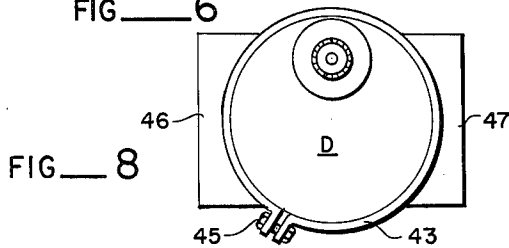


FIG. 8

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POWER DRILLING DEVICE

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6 Claims. (Cl. 144-93)

This present invention relates to the general art of drilling devices wherein a framework is employed to permit the adjustable positioning of a power drill so that it may best drill openings where desired. This invention relates more particularly to a power drilling device which is intended to drill a plurality of holes, at the same relative position, through spaced structural members of a building, such as through the wooden studding and the top plate and bottom sill and the adjacent floor or ceiling materials.

In the roughing in of plumbing and the installation of water pipes, waste pipes, vents, and also conduits such as are used for electrical current supply, it is desired to have runs of pipe which are straight, where conditions permit, to the end that joints can be made without overstressing the materials near their ends and thus permanent pipe joints can be achieved. In the construction of frame buildings it is normally necessary that the studding and associated members be in place before any of the utility tubing or pipe is installed. Otherwise in many cases it would be necessary to cut away the studding at any place where it crosses any of the service conducting conduits or pipes. It therefore becomes necessary to drill holes through the studding so that both edges remain unbroken and to provide an accurate placement of the holes so that they can be sufficiently closely aligned so that pipes or conduits can be passed through them without undue local bending which would make it difficult to pass any length of pipe through a series of holes. Since it is also necessary that a single person be able to handle any drilling device it must be possible to break the equipment down into at least two principal components, one, the power drill itself, and the other the framework and transversely positioned carriage and bases to which the power drills are secured. In this present invention it is believed that means are provided to achieve these various purposes.

A principal object, therefore, is to provide a light weight power drilling device so constructed that it may be easily transported and put into operational position by a single individual.

A further object is to provide means whereby a power drill can be positioned at any point throughout the length of the supporting framework of the drilling device so that the drill can be accurately positioned and once positioned, maintained in that position for the subsequent drilling of a plurality of holes without the slow process of measuring each one for individual drilling, yet each hole will be the same distance above the floor or below the ceiling of the structure.

A further object of this invention is to provide a unit in which the framework extends substantially the distance between the floor and ceiling of the building under construction and to have terminals preferably screw positioned so as to facilitate the accurate drilling of a plurality of openings.

A further object of this invention is to provide a drill carriage and a drill base which coact to provide an exact placement of the power drill at any point within the length of the supporting framework.

Further objects, advantages and capabilities will be apparent from the disclosure in the drawings or may be comprehended or are inherent in the device.

In the drawings:

FIGURE 1 is a front view of my power drilling device with the side frames broken away in order to increase the scale of the essential parts of the device.

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FIGURE 2 is a fragmentary view, broken away in part, and taken from the side of the device of FIGURE 1 along the line 2-2.

FIGURE 3 is a top sectional view taken along the line 3-3 of FIGURE 1 and particularly showing the drill carriage and the drill base and their operational coaction.

FIGURE 4 is a fragmentary view taken along the line 4-4 of FIGURE 3 to illustrate the adjustability of the mount for the power drill.

FIGURE 5 is a fragmentary cross-sectional view taken along the line 5-5 of FIGURE 3 and showing the ratchet holding device which insures the maintenance of the vertical positioning of the power drill.

FIGURE 6 is a side elevation with one dashed line position illustrating how the entire device may be pivoted which is very practical when drilling through studding and the like.

FIGURE 7 is a front view of a pair of studdings with associated end frame members and showing two positions of the power drill which are different from FIGURE 6 and thus illustrate the general range of application of this equipment.

FIGURE 8 is a drill end view of a power drill suitable for use with my drilling device and illustrating trunnions secured by a friction band transversely to said power drill.

Referring to the drawings, throughout which like reference characters indicate like parts, the numerals 10 and 12 designate respectively the two elongated side frame members of my drilling device. These are secured together at each end by the end tie bars 14 and 15. The side frame members may be variously produced; however aluminum extrusions are preferably used and these are shown quite clearly in FIGURE 3. This makes it possible to provide the slide bearings or guideways 16 and 17 for the ends of the transverse shaft 18. The side frame members also provide protective housing for the rack gears 20 and 21 which extend substantially the full length of the frame members. The side frames also provide a suitable housing for the pinion gears 22 and 23 which are fixedly secured to shaft 18 and mesh respectively with rack gears 20 and 21. The rack gears do not go to the extreme ends of the frames but correspond to the showing of FIGURE 1 in which each end of the frame is provided with threaded adjusting bolts 24, which in turn are all provided with a bearing pad 25. These screws 24 threadedly engage the ends of the frame members 10 and 12 and provide leveling means or, when all four are used, they may provide means for securing the frame rigidly in place between the floor and ceiling of a building during its construction.

Referring to FIGURES 3 and 4, shaft 18 is provided, as shown, with a flat sided cross section through the central portion of its extent as indicated at 28. In the smaller sizes of equipment this may be square or in the larger sizes it might take on the form of a hexagonal or octagonal cross section which would give an increased number of positions as will be clear later in this explanation, it is believed. Surrounding shaft 28 is the power drill carriage 30. This is longitudinally bored to provide the round opening 31 of a size so that the flat sided portion 28 of shaft 18 is free to turn therein.

As will be observed in FIGURE 4, with a four sided shaft 28, a locking screw 32 can be used to position the power drill carriage member 30 in any one of the major quadrants. Carriage 30 is further provided with headed studs 34 for engagement with the power drill base 36. This is achieved by the double ended key hole arrangement shown at 39. The body size of the headed studs are of a diameter to be snugly accommodated in the reduced portions 38 of the keyhole. Thus, as illustrated in FIGURE 3, there are two positions available, the one shown in FIGURE 3, preferably for use when working down-

wardly, while the other takes care of the condition shown in FIGURE 7 at 40 which is encountered in overhead drilling and the like. In effect, this arrangement doubles the different positions normally provided by the four sided carriage.

Secured to the power drill base 36 is an enclosure consisting of the side members 41 and 42 and the top plate 44. The power drill D is encircled by friction band 43 having tightening screws 45 and provided with oppositely extending trunnions 46 and 47 which seat within the side members 41 and 40, thus permitting the power drill to be rocked about the axis of the trunnions. A locking bolt 48 and handled nut 49 is provided to lock the motor in its position of use if desirable. This arrangement makes it possible to have an infinite number of angular positions such as is illustrated in FIGURE 4 and makes the power drill readily capable of substantially universal movement. When swinging the entire framework this should be freed so the drill can continue in its original starting course. The friction band 43 and its associated tightening screws 45 permits moving the drill 62 around the longitudinal axis of the motor assembly of drill D. This permits drilling very close to partition walls and the like.

In order to hold the power drill and its associated carriage and base in a desired vertical position, a ratchet lock mechanism is provided having the ratchet bar 50. Associated with bar 40, which normally extends the length of one of the frame members as 10 or 12, is the ratchet pawl 51 which is associated with a ratchet wheel 52 which in turn is fixedly secured to shaft 28. Outwardly extending from pawl 51 is a pawl engagement pin 54, the operation of which will probably be best understood from a study of FIGURE 3 which illustrates that the pawl, with its pin, is slidable on shaft 28 so that it may be moved to the right as viewed and disengage the ratchet wheel 52. However, when it is engaged as shown in FIGURE 3, any tendency to revolve shaft 28 in a manner to lower the drill causes ratchet wheel 52 to engage pin 51 and to thus force the pawl out into locking engagement with the pawl or ratchet bar 50. Minor vertical adjustment of the drill carriage and base is achievable by turning hand wheel 60 which is fixedly secured to shaft 28 and, in addition to making adjustments in position, may be employed to feed the drill bit 62 when this is desirable. It will be appreciated that it is only when the drill is drilling upwardly or downwardly in an essentially vertical direction that the screw 32 is unlocked from shaft 28. Normally, such use of wheel 60 would be attempted only after the drilling had started, so that the drill would not fall of its own weight.

As viewed in FIGURE 5 it will be apparent that the side frame members 10 and 12 are provided with a longitudinal slot 63 that extends for the full expected travel of shaft 28. Attention is invited to FIGURES 6 and 7 particularly where different positionings of the power drill D for drilling in different directions is shown. In addition to these positions, a study of FIGURE 4 shows that intermediate positions are accomplished by swinging the drill about the axis of trunnions 46 and 47. The trunnions 64 are lockable by means of the bifurcation 70 in one of the side members 42 and a bolt 72 and a clamp nut 74 to pinch the two branches together. A nut bar 75, fixedly secured to nut 74, facilitates this operation. FIGURE 6 shows a limited amount of movement of the frame on the lower screw pad 25. This swing can be much greater than shown in FIGURE 6, which makes it possible to drill individual holes very quickly by the mere movement of the entire frame about its lower supports. In order to insure that a hole drilled in sill 64 and in plate 66 will be in the same vertical line, a spherical type spirit level is provided at 68. When leveled, this insures the vertical position of the frame and makes it possible to adjust the lower adjusting screws if necessary to achieve a vertical position transversely for the frame even though the floor upon which it rests may be uneven.

It is believed that it will be clearly apparent from the above description and the disclosure in the drawings that the invention comprehends a novel construction of power drilling device.

Having thus described my invention, I claim:

1. A power drilling device, comprising:

- (a) two elongated parallel members fixedly spaced apart by short tie bars disposed adjacent the ends of said elongated members, providing a framework for the adjustable positioning of a power drill;
- (b) adjustable screws disposed coaxially with said elongated members, extending outwardly therefrom and each having bearing pads;
- (c) a power drill carriage disposed for movement along said framework;
- (d) a gear rack secured to each of said elongated members and operatively engaged by pinion gears, said pinion gears being secured on a common rotatable, transverse shaft extending between said members and which shaft is revolvably supported by said drill carriage;
- (e) a drill base having a power drill which provides limited rotation of said drill in a vertical plane at right angles to the plane of said framework;
- (f) quick detachable means for securing said drill base to said drill carriage, means for locking said transverse shaft in a plurality of angular positions to position said drill within said vertical plane at right angles to the plane of said framework;
- (g) a locking means to hold said drill carriage in an adjusted vertical position, and
- (h) hand operated means for making adjustments in the vertical positioning of said drill carriage.

2. A power drilling device, comprising:

- (a) two elongated parallel members fixedly spaced apart by short tie bars disposed adjacent the ends of said elongated members, providing a framework for the adjustable positioning of a power drill;
- (b) adjustable screws disposed coaxially with said elongated members, extending outwardly therefrom and each having bearing pads;
- (c) a power drill carriage disposed for movement along said framework;
- (d) a gear rack secured to each of said elongated members and operatively engaged by pinion gears, said pinion gears being secured on a common rotatable, transverse shaft extending between said elongated members and which shaft is revolvably supported by said drill carriage;
- (e) a drill base having a power drill which provides limited rotation of said drill in a vertical plane at right angles to the plane of said framework;
- (f) quick detachable means for securing said drill base to said drill carriage, means for locking said transverse shaft in a plurality of angular positions to position said drill within said vertical plane at right angles to the plane of said framework;
- (g) ratchet and pawl means for locking said transverse shaft against rotation due to the weight of said drill and supporting means therefor;
- (h) hand operated means for making adjustments in the vertical positioning of said drill carriage.

3. A power drilling device, comprising:

- (a) two elongated parallel members fixedly spaced apart by short tie bars disposed adjacent the ends of said elongated members, providing a framework for the adjustable positioning of a power drill;
- (b) adjustable screws disposed coaxially with said elongated members, extending outwardly therefrom and each having bearing pads;
- (c) a power drill carriage disposed for movement along said framework;
- (d) a gear rack secured to each of said elongated members and operatively engaged by pinion gears, said pinion gears being secured on a common rotatable,

transverse shaft extending between said elongated member and which shaft is revolvably supported by said drill carriage;

- (e) a drill base having a power drill which provides limited rotation of said drill in a vertical plane at right angles to the plane of said framework; 5
 - (f) quick detachable means for securing said drill base to said drill carriage, means for locking said transverse shaft in a plurality of angular positions to position said drill within said vertical plane at right angles to the plane of said framework; 10
 - (g) a second means for locking said transverse shaft against rotation;
 - (h) hand operated means for making adjustments in the vertical positioning of said drill carriage; and 15
 - (i) an adjustable friction band encircling said power drill and providing adjustable positioning angularly of said power drill about its longitudinal axis.
4. A power drilling device, comprising:
- (a) two elongated parallel members fixedly spaced apart by short tie bars disposed adjacent the ends of said elongated members, providing a framework for the adjustable positioning of a power drill; 20
 - (b) adjustable screws disposed coaxially with said elongated members, extending outwardly therefrom and each having bearing pads; 25
 - (c) a power drill carriage disposed for movement along said framework;
 - (d) a gear rack secured to one of said member and operatively engaged by a pinion gear, said pinion gear being secured on a transverse shaft extending between said members and which shaft is revolvably supported by said drill carriage; 30
 - (e) a drill base having a power drill which provides limited rotation of said drill in a vertical plane at right angles to the plane of said framework; 35
 - (f) quick detachable means for securing said drill base to said drill carriage, means for locking said transverse shaft in a plurality of angular positions to position said drill within said vertical plane at right angles to the plane of said framework; 40
 - (g) a pawl and ratchet locking means for holding said drill carriage in an adjusted vertical position; and
 - (h) a hand wheel secured to said transverse shaft for making minor adjustments in the vertical positioning of said drill carriage. 45
5. A power drilling device, comprising:
- (a) two elongated parallel members fixedly spaced apart by short tie bars disposed adjacent the ends of said elongated members, providing a framework for the adjustable positioning of a power drill; 50
 - (b) adjustable screws disposed coaxially with said elongated members;
 - (c) a power drill carriage disposed for movement along said framework; 55
 - (d) a gear rack secured to each of said elongated members and operatively engaged by pinion gears, said pinion gears being secured on a common rotatable, transverse shaft extending between said members and

which shaft is revolvably supported by said drill carriage;

- (e) a drill base having a power drill which provides limited rotation of said drill in a vertical plane at right angles to the plane of said framework;
 - (f) quick detachable means for securing said drill base to said drill carriage, means for locking said power drill in a plurality of angular positions to position said drill within said vertical plane at right angles to the plane of said framework;
 - (g) a second means for locking said transverse shaft against rotation;
 - (h) hand operated means for making minor adjustments in the vertical positioning of said drill carriage.
6. A power drilling device, comprising:
- (a) two elongated parallel members fixedly spaced apart by short tie bars disposed adjacent the ends of said elongated members, providing a framework for the adjustable positioning of a power drill;
 - (b) adjustable bearing means disposed coaxially with said elongated members, extending outwardly therefrom and each having bearing pads;
 - (c) a power drill carriage disposed for movement along said framework;
 - (d) a gear rack secured to each of said elongated members and operatively engaged by pinion gears, said pinion gears being secured on a common rotatable, transverse shaft extending between said elongated members and which shaft is revolvably supported by said drill carriage;
 - (e) a drill base having a power drill which provides limited rotation of said drill in a vertical plane at right angles to the plane of said framework;
 - (f) quick detachable means for securing said drill base to said drill carriage; means for locking said transverse shaft in a plurality of angular positions to position said drill within said vertical plane at right angles to the plane of said framework;
 - (g) a locking means to hold said drill carriage in an adjusted vertical position;
 - (h) hand operated means for making minor adjustments in the vertical positioning of said drill carriage;
 - (i) trunnions adapted to be secured transversely of the axis of a power drill, supporting side member forming part of said power drill base having recesses for receiving said trunnions; and
 - (j) one of said side members being bifurcated and having a clamp bolt for frictionally securing one of said trunnions in various angular positions.

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