April 12, 1949. R. D. PITTS 2,466,965

PORTABLE DRILL

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Fig. 1

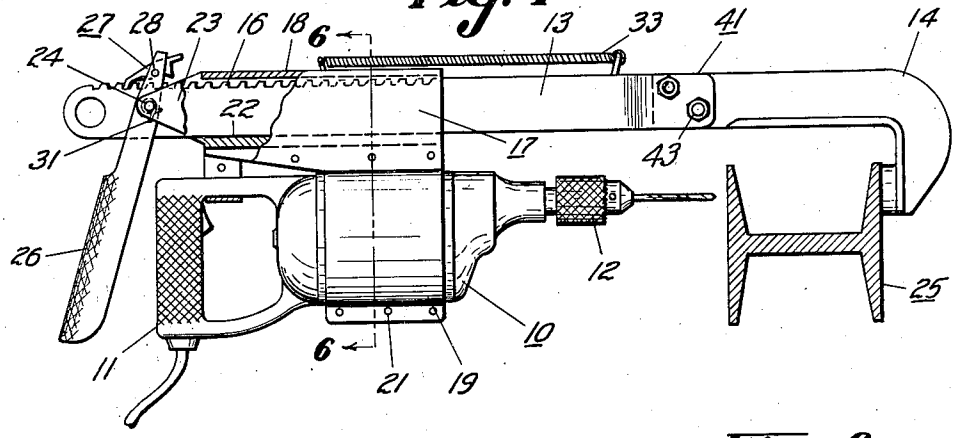


Fig. 3

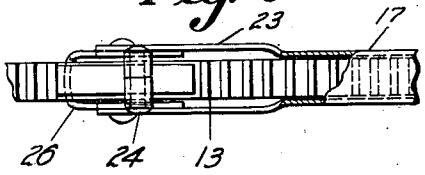


Fig. 6

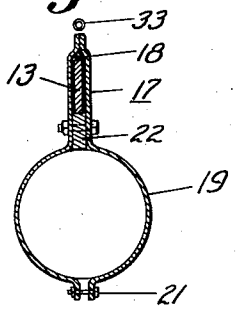


Fig. 5

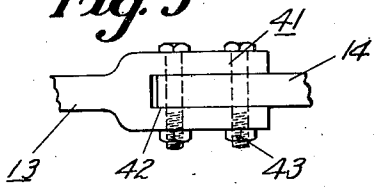
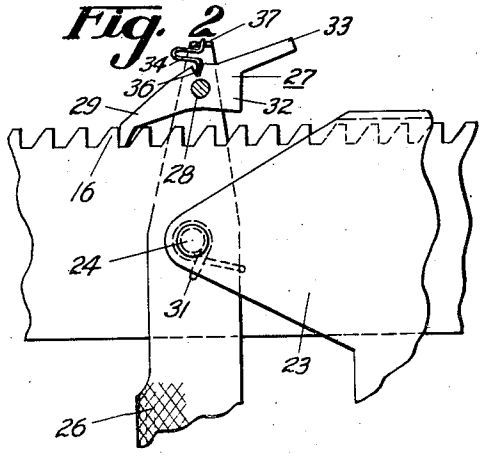


Fig. 2



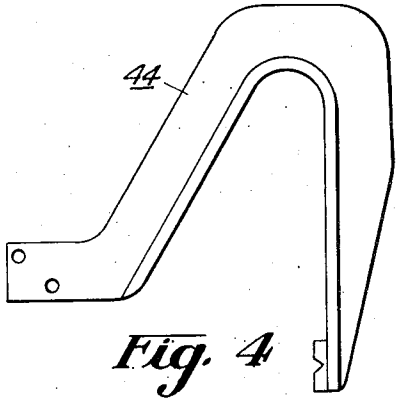


Fig. 4

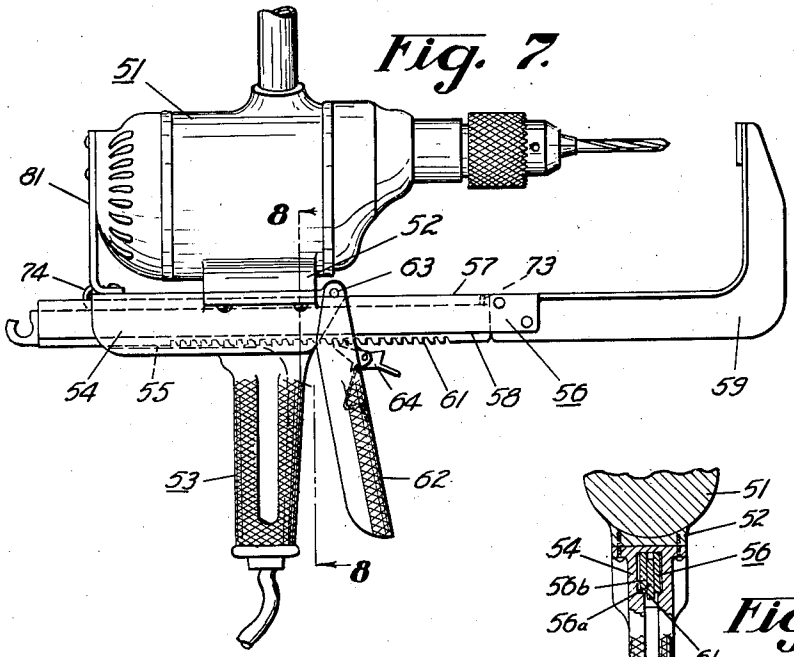
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PORTABLE DRILL

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Fig. 7.



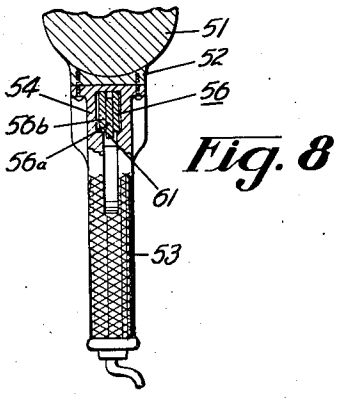


Fig. 8

Fig. 9

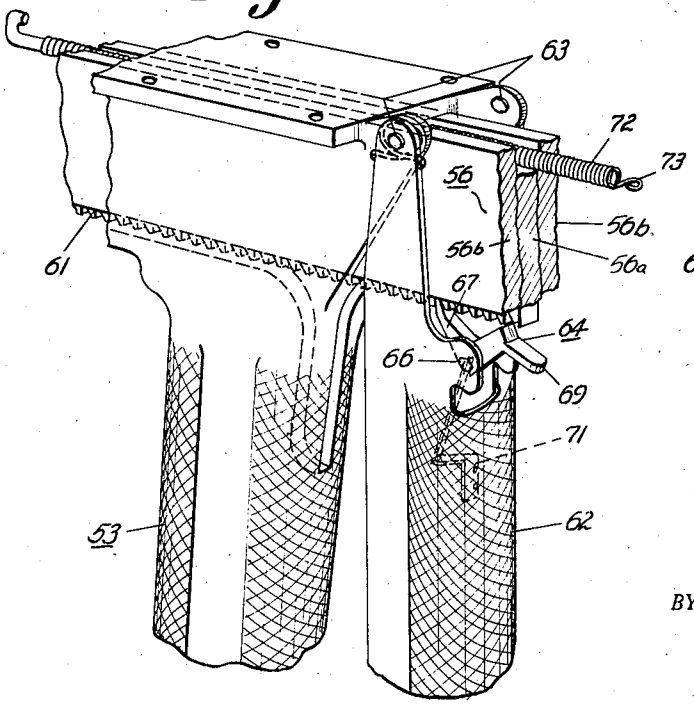
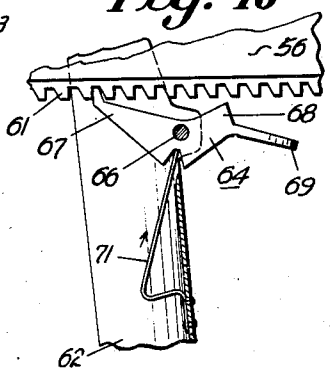


Fig. 10



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UNITED STATES PATENT OFFICE

2,466,965

PORTABLE DRILL

Robert Donald Pitts, Cedar Rapids, Iowa

Application July 24, 1944, Serial No. 546,317

2 Claims. (Cl. 77—7)

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This invention relates to portable drills and has particular relation to an auxiliary structure primarily for use in conjunction with drills of the portable, electric type for greatly increasing the range of usefulness of such devices.

A primary object of my invention is the provision of an improved portable drill having means for increasing the speed and ease of operation of such a device.

Another primary object of my invention is the provision of an auxiliary structure which may, if desired, be constructed as an integral part of an electric drill of the portable type for providing a truly portable drill press which may be readily manipulated by the operator in any position without noticeable discomfort to the operator.

A further main object of my invention is the provision of a drill press of this nature which may be operated with one hand and which may, in a preferred embodiment of my invention, be controlled and pressure applied by the grip of one hand of the operator.

A further object of my invention is the provision of means, in a device of this character, which will provide for steady and positive feeding of the drill against the work.

Other and further features and objects of my invention will be more apparent to those skilled in the art upon a consideration of the accompanying drawings and following specifications, wherein are disclosed exemplary embodiments of the invention, with the understanding, however, that such changes may be made therein as fall within the scope of the appended claims, without departing from the spirit of the invention.

In said drawings:

Figure 1 is a view in side elevation of a portable drilling device constructed in accordance with a preferred embodiment of my invention, with portions thereof broken away to better illutrate the structure.

Figure 2 is a fragmentary view in side elevation and partly in section illustrating the ratchet feeding mechanism of the drill shown in Figure 1.

Figure 3 is a fragmentary view in top elevation of the ratchet mechanism illustrated in Figure 2.

Figure 4 is a view in side elevation of an auxiliary work engaging hook for use in conjunction with the drill shown in Figure 1.

Figure 5 is a fragmentary view in top elevation of the means employed for detachably

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mounting the work engaging hook to the feeding mechanism.

Figure 7 is a view in side elevation of a portable drilling device constructed in accordance with another embodiment of my invention.

Figure 8 is a fragmentary view, partly in section and partly in end elevation, of the device of Figure 7 as taken on the line 8—8.

Figure 9 is a fragmentary view in perspective and partly in section of the mounting and feeding mechanism of the device of Figure 7, and

Figure 10 is a fragmentary view, partly in section and in enlarged relation, illustrating the feeding and ratchet mechanism of the devices shown in Figures 7 to 9 inclusive.

Referring now to the drawings, and in particular to Figures 1 to 6 thereof inclusive:

The device in Figure 1 is illustrated as embodying an electrically powered portable drill 10 of standard construction, having a pistol grip handle 11 and a chuck 12 driven through reduction gearing (not shown).

The work feeding or clamping member, indicated generally at 13, hooked at its outer end, as indicated at 14, to provide a work engaging portion, is provided with a toothed portion or rack on its upper edge, as shown at 16, and the entire clamping bar 13 is mounted for sliding movement, in a direction parallel to the axis of the drill, within a housing which I have indicated generally at 17. This housing may be formed integral with the body of the drill 10, or may be formed of heavy sheet metal or the like, as shown, to provide a slot 18 for the reception of the clamping bar and formed, as at 19, to permit its lower portion to be clamped about the body or barrel of the portable drill by means of screws 21. The clamping bar 13 is made a snug sliding fit within the mounting member 17 and the upper and lower walls of the slot 18 of this mounting bracket are preferably provided with wear resisting slides, as at 22.

The mounting bracket 17 is provided with a pair of rearwardly extending ears 23, pierced at their rearmost ends to receive pivots 24 on which a feed handle 26 is pivotally mounted. This feed handle is preferably made of a heavy piece of sheet metal or the like so as to provide a pair of upright portions or lever members joined together at their lower portions to provide a rounded grip adapted to be closely engaged over the rear portion of the pistol grip handle of the drill when pressed thereagainst by the operator.

A ratchet dog or pawl, which I have indicated generally at 27, is mounted on a pivot 28 between

the upwardly extending lever portions of the handle 26 and immediately above the toothed rack of the clamping bar. The structure of this ratchet mechanism is best illustrated in Figures 2 and 3. The pawl 27 is preferably provided with a relatively long arm 29 for engagement with the forward sides of the tooth members 16 and it will now be understood that when the clamping bar is engaged over the work to be drilled, the pistol grip 11 and the feed handle 26 may be gripped by the operator and forced slowly together. The pawl 27 is engaged against the forward surfaces of the ratchet teeth and will move the clamping bar rearwardly within the supporting housing so as to draw the hooked portion 14 and thus the work firmly against the rotating drill.

The force applied to the pistol grip is of course multiplied and the rate of feed of the drill against the work is readily controlled due to the relative length of the lever arm provided in the handle 26 by the relative spacing of the pivot members 24 and 28. The handle 26 is biased away from the handle 11 of the drill by means of torsion spring 31 disposed about one of the pivots 24.

As the drill point enters the material being drilled and the feed handle 26 reaches the end of its stroke and comes to bear against the pistol grip handle 11, it may be released and the spring 31 will again force it rearwardly. The pawl 27 will, of course, be moved forwardly and will engage a new tooth and the handle 26 may immediately be forced forwardly to feed the drill point still further into the work.

The forward end of the pawl 27 is provided with a tooth engaging portion 32 which is adapted to be moved into engagement with the rear surface of a ratchet tooth for holding the clamping bar 13 in extended position, as in Figure 1, against the tension of the coil spring 33. This spring 33 is employed merely to hold the clamping bar in engagement with the work when the feed handle 26 is released after the end of a stroke.

The pawl 27 may be moved by means of the thumb lever 33 to engage either the rear tooth 29 or the forward tooth 32 with the teeth of the rack and is resiliently held in either operating position by means of a leaf spring 34, which is disposed between a notch 36 in the upper surface of the pawl 27 and the inwardly extending upper ends of the handle member 37. The notch 36 is so positioned in the pawl that it will be in dead center position or in line with the pivot 28 and the upper mounting point 37 of the spring 34 when both tooth portions 29 and 32 of the dog are disengaged from the teeth of the rack. Thus it will be seen that when the pawl is placed in either forward or reversed positions the notch 36 will be off-center and the spring will hold the pawl in position.

It may be understood that other means than the spring 33 may be employed for holding the clamping bar in engagement with the work when the feed handle 26 is released for a new stroke. The clamping bar 13, for example, may be made a snug sliding fit within the guide bracket 17 so as to hold the clamping bar in position by frictional engagement alone. The spring 33 and the forward tooth 32 of the dog may thus be dispensed with. If desired, a ratchet pawl, independent of the pawl 27, may be employed adjacent the upper edge of the slot 18 to engage the rack and prevent releasing of the clamping bar upon release of the feed handle 26.

It is preferable that the hook or work engaging portion 14 of the clamping bar be made interchangeable as indicated at 41 and as best illustrated in Figure 5. The forward end of the clamping bar is bifurcated, as at 42, to receive the end of the hook member 14 and the two members are secured together by means of bolts 43.

Auxiliary hook members may thus be employed, and I have shown one of these auxiliary hook members at 44 in Figure 4 which hook is provided with a deeper throat to provide for drilling holes at greater distances from the edges of the work than the device of Figure 1 is capable of doing.

In the modified form of my invention illustrated in Figures 7 to 10 inclusive I have shown a structure somewhat better adapted to larger sizes of portable electric drills. The drill 51 is provided with a mounting pad 52 on which a handle may be mounted. This handle, which I have indicated generally at 53, embodies a body portion 54 having a slot 55 extending longitudinally therethrough in a direction parallel to the axis of the drill for the reception of the clamping bar 56. This clamping bar is preferably provided with upper and lower sliding edges 57 and 58 for free sliding movement within the slot 55. The clamping bar is provided with a work engaging hook 59 as previously described and the bar is also provided with a toothed portion 61 along the lower edge thereof.

The feed handle 62 is preferably pivotally mounted at its upper end on a pair of ears extending forwardly from the body portion 54 of the handle and as shown at 63.

The ratchet mechanism, which is indicated at 64, is best shown in Figure 10. This member is pivotally mounted in the handle, as at 66, and provided with toothed portions 67 and 68 on opposite sides thereof and a thumb lever 69, as previously described in connection with Figure 1. The spring 71, which is located within the handle 62, is formed so as to direct its force toward the pivot 66 and thus selectively hold tooth 67 or 68 in engagement when the pawl is once moved to off-center position.

If desired, the clamping bar 56 may be built of three laminations of strap-iron or the like riveted or welded into one unit, as is shown in Figures 8 and 9, with the center member 56*a* extending outwardly along one edge from between the outer guide members 56*b* to provide for the toothed portion 61 and also to provide for a recess along the opposite edge for the reception of a tension spring 72. This spring may be secured at its forward end 73 to the clamping bar, as indicated in Figure 7, and at its rearward end to the rear edge of the handle body 54, as indicated at 74.

A brace 31 may be mounted between the rearwardly extending portion of the body of the handle and the rear end of the drill 51.

I have devised a portable drilling device which may be readily manipulated by an operator by the use of one hand only, when necessary, and which may be readily operated in any position as, for example, in cramped or overhead positions where it is impossible or extremely tiring for an operator to apply the force necessary for the operation for an ordinary portable drill. I have provided a portable drilling device, the feed and control of which is accomplished by the gripping action of the operator's hand. The feeding mechanism, such as I have shown and described, makes it possible to smoothly and positively feed the drill into the work and the power of the drill may be utilized to its full capacity.

The drilling of a relatively few holes of any depth in metal is usually quite tiring to the operator, whereas with a device such as I have herein described, it is possible to drill large numbers of holes without noticeably tiring the operator and it is possible to drill these holes in considerably less time than would be required when using an ordinary portable electric drill.

Furthermore, in a device constructed in accordance with my invention, the drill point requires sharpening much less frequently since the point of the drill is not permitted to merely slide over the surface of the work and thus burn or become smooth and dull. The drill is held in firm contact with the work and, in addition to this, there is less tendency toward the breaking of drills since the weight of the drill is generally transferred to the clamping bar.

Although I have shown and described specific embodiments of my invention, it is apparent that modifications thereof may be made. For example, the toothed rack for clamping the bar may be mounted, relative to the body of the drill, in other positions and by other means than those shown. The toothed rack may be placed on the opposite side of the clamping bar and the pawl mechanism on the feed handle placed in a different relative position with respect to the pivot point of the feed handle. The guide mechanism for the clamping bar may, if desired, be made integral with the body of the drill. Furthermore, portable drills of extremely large size may be provided with a pair of feed mechanisms or a single feeding mechanism with a pair of feed handles so as to permit the operator to use both hands in feeding the drill into the work. These and other modifications may be made without departing from the spirit and scope of my invention as set forth in the appended claims.

I claim as my invention:

1. In combination with a portable drill having rotatable drilling means and a fixed handle adapted for the manual support of said drill, an auxiliary feed mechanism therefor including a guide member having a guide slot extending longitudinally therethrough, means for attaching the said guide member to the portable drill with the slot thereof extending substantially parallel with the axis of the drilling means, a clamping bar extending through said guide slot, hook-

like work engaging means operatively secured to one end of said clamping bar, the said clamping bar having ratchet teeth on one side thereof, an operating handle disposed adjacent the fixed handle of the portable drill and movable relative thereto, and pawl means for operatively connecting the said operating handle and said ratchet tooth portion of the clamping bar the said operating handle and fixed handle adapted to be both received in an operator's hand and forced together by gripping action of the operator's hand, the said connecting means being so arranged as to force the said work engaging means toward the said drilling means when said handles are forced together.

2. In combination with a drilling mechanism, means for biasing work to be drilled, toward the said drilling mechanism and in a direction parallel with the axis thereof, a supporting handle for manual support of said drilling mechanism, a feeding handle pivotally mounted near one end thereof in close proximity to said supporting handle and mounted for movement relative thereto, and means including a rack on the biasing means and a dog on the feeding handle spaced from the point of pivotal attachment of the said feeding handle for converting movement of said feeding handle into movement of the biasing means toward the drilling mechanism when the feeding handle is forced toward the supporting handle by the gripping pressure of the hand of the operator about both of said members.

ROBERT DONALD PITTS.

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