

(No Model.)

H. F. L. ORCUTT.
RATCHET DRILL.

No. 367,723.

Patented Aug. 2, 1887.

Fig. 1.

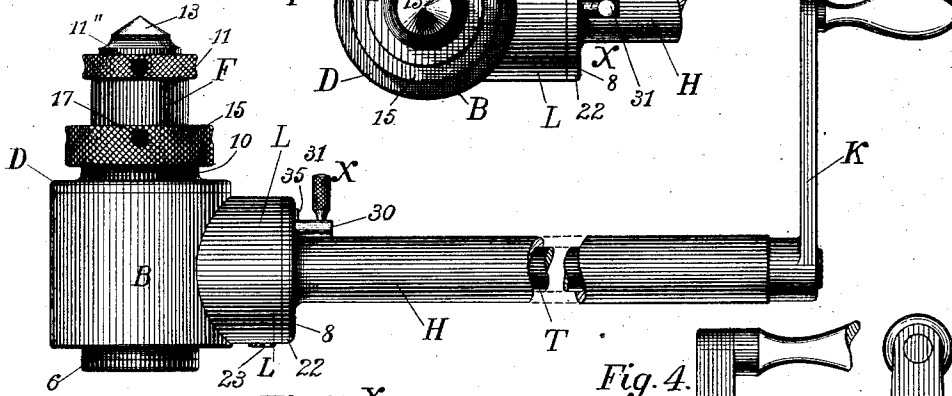


Fig. 2.

Fig. 3.

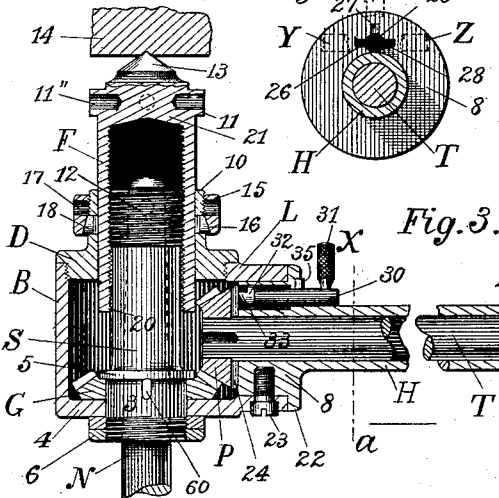


Fig. 4.

Fig. 5.

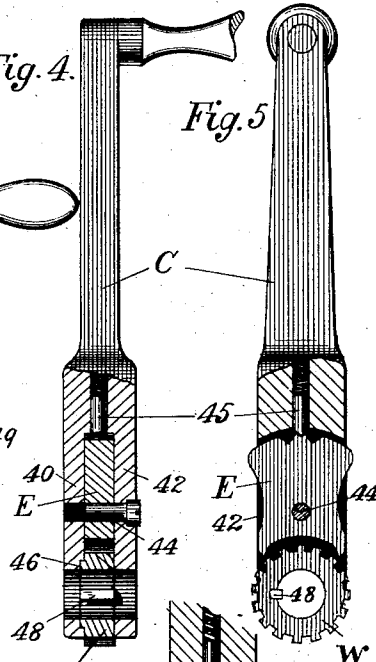


Fig. 8.

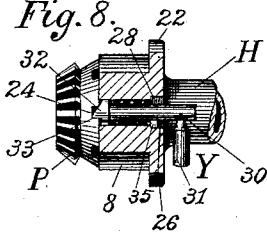


Fig. 9.

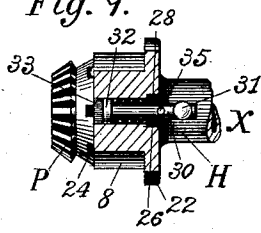
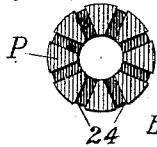


Fig. 10.



Witnesses:

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UNITED STATES PATENT OFFICE.

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RATCHET-DRILL.

SPECIFICATION forming part of Letters Patent No. 367,723, dated August 2, 1887.

Application filed April 13, 1887. Serial No. 234,706. (No model.)

To all whom it may concern:

Be it known that I, HARRY F. L. ORCUTT, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Ratchet-Drills, of which the following is a specification.

This invention relates to that class of ratchet-drills in which the drill-spindle is actuated through gearing either intermittently or continuously, and in which the drill is automatically fed to its work.

The object of the invention is to provide a more efficient tool of its class, which can be readily operated under the various conditions of actual shop practice.

To this end my invention consists in the improvements and combinations hereinafter more fully set forth.

In the drawings accompanying and forming a part of this specification, Figure 1 is a side elevation of my improved ratchet-drill, having thereon an ordinary crank. Fig. 2 is a top view of the parts at the left hand in Fig. 1. Fig. 3 is a vertical sectional elevation of the drill complete, with the ratchet crank-arm thereon. Fig. 4 is an enlarged side view, partially in section, of said ratchet crank-arm. Fig. 5 is a similar front view of the same. Fig. 6 shows a part of Fig. 5, with certain details in a changed position. Fig. 7 is a sectional view of the handle in line *a*, Fig. 3, the ratchet-spindle being removed. Figs. 8 and 9 are sectional top views of the parts shown in Fig. 7, illustrating the operation of the ratchet in connection with the ratchet-teeth on the driving-pinion. Fig. 10 is an end view of said pinion, showing said teeth.

Similar characters designate like parts in all the figures.

The drill-spindle, designated by S, is bored to receive the shank N of the drill to be used. Near its lower end said spindle has a journal, 3, which is fitted to turn in a bearing bored in the lower wall, 4, of the gear-casing B. Keyed on the drill-spindle above said journal and below a collar, 5, on said spindle there is a bevel-gear, G, which rests against the inner surface of said lower wall, 4. Below this wall a nut, (or check-nuts,) 6, screwed on the spindle and acting in conjunction with gear G,

serves to hold in place the spindle in said casing.

The gear-casing B has, besides the spindle-bearing, two other and larger openings—one at the top, covered by the casing-head D, and one at the side, within branch L, for receiving the enlarged end 8 of the hollow handle H. (See Fig. 3.) The head D is or may be screwed into said upper opening, which is large enough to admit through it the gear G. Rising on said head D there is a tubular extension or sleeve, 10, in which the hollow feed-screw F is fitted to freely slide and turn. This screw F is threaded on its inner surface and screws onto a corresponding thread, 12, on the upper end of spindle S. In using the ratchet-drill, the point 13 of screw F bears against some suitable blocking or the like, as 14, and thus directly acts to force down the drill and its spindle without transmitting the working-pressure through the revolving surfaces of the other parts. Said feed-screw may be turned by hand by means of the milled surface 11, or by means of a pin entering holes 11', in the usual manner.

For automatically feeding the drill to its work I employ an improved frictional feed apparatus, which in a preferred form is constructed and arranged as follows: Sleeve 10 is threaded on its outer side, and has thereon an internally-threaded ring, 15, adapted to be turned by hand or by a lever entering holes 17 therein. The lower part, 16, of ring 15 is bored tapering, largest at the lower edge, and this tapered surface bears on the beveled outer ends of the friction-plugs 18, which slide in holes bored through wall 10, and whose inner ends bear on the outer surface of the feed-screw. In practice a layer of leather or the like is placed between said plug 18 and screw F, to form the frictional surface and to prevent abrasion. By screwing down the ring 15 the desired resistance to the rotation of the feed-screw may be obtained. The spindle S being rotated in the proper direction, that resistance tends to turn screw F upon said spindle and thus feed the drill to its work. At the same time the several parts are of a form and arrangement permitting an efficient and durable construction thereof at a small cost.

In the manufacture of drills of this class, it

is not considered practicable to construct gear G integral with spindle S. For this reason said gear is made separate, and the spindle has the collar 5 for governing the position thereon of said gear. It is also desirable to be able to remove the spindle S, leaving the gear G in place. For this reason the spindle is fitted to be readily slid out of the gear, and is held from turning therein by the key 60, or by some like device. Collar 5 has also another function, in that it serves as a stop for screw F. When this screw is turned clear down, its lower end, 20, strikes the collar 5, before its upper end strikes the upper end, 21, of spindle S. By this means is overcome the sticking down of the spindle, as when the upper end thereof is allowed to serve as such stop the upper part of the thread in screw F is apt to become clogged with dirt and gum, which promotes the sticking therein of thread 12. Said collar 5 also prevents screw F from bearing against gear G, which would clamp wall 4 against collar 6, and thus prevent the free rotation of the spindle in the casing.

The enlarged end 8 of the handle H is fitted into branch L of the gear-casing by a "slip-joint"—that is, by a sliding fit therein. A rim or collar, 22, on said part 8 may be provided to stop the handle entering too far; but the same function is performed by the crosswise pin or screw 23, which holds the handle in place against both sliding and turning movements. This construction permits the ratchet bolt or pawl to be placed in the handle, as hereinafter explained.

Power is applied to gear G through the driving-pinion P, which is affixed to the end of a shaft, T, that extends through the hollow handle H. The extreme diameter of said pinion I make less than the opening in L, so that it may be inserted through the same. On the outer end or face of pinion P, I make notches 24, whereby it may be turned by a ratchet in said handle H. This ratchet is placed in a hole, 25, Fig. 7, formed in the enlarged part 8, and it consists in a sliding bolt, 30, having a handle, 31, for setting the same to the different positions, X, Y, or Z. The hole 25 is counterbored to receive a spiral spring (not fully shown) which acts against the enlarged inner end, 32, of said bolt to hold the beveled point thereof, 33, into engagement with notches 24. Said point 33 is beveled on one side and formed straight on the other, after the manner of ordinary ratchet-pawls, so as to hold against said notches 24 in one direction only. (See Fig. 8.) In the outer end of part 8 there are formed three depressions, 26 27 28, corresponding to the aforesaid three positions, X, Y, and Z. The depression or detent notch 27 is of less depth than the other two, so that the guide-pin 35, fixed in bolt 30, will, when resting in the notch, hold the point 33 away from ratchet-notches 24, and thus render said bolt 30 inoperative. (See Fig. 3.) The notches 26 and 28 being deeper, the pin 35 acts merely as a guide to hold the bolt in proper position

for turning the pinion either in one direction or the other, as the case may be. (See Fig. 8.) This ratchet device serves to turn the drill-spindle intermittently as the handle is moved back and forth, after the manner of ordinary ratchet-drills; but said construction has an important practical advantage over the old forms of ratchet-drills, in that the driving-pinion and the ratchet device for actuating the same are all assembled on the removable handle, so that these parts of themselves constitute a separate mechanism, which may be put in place and removed as a single part. By this means the construction and the keeping in repair of the tool are both facilitated and cheapened.

For the purpose of operating the drill in certain situations where a back-and-forth movement cannot be given to handle H, the shaft T may have imparted thereto a continuous rotary movement by means of the ordinary crank, K, Fig. 1, affixed to the outer end of said shaft; but many times in practice the handle H cannot be operated nor the crank turned as described. To provide for such cases, I furnish said shaft T with the improved ratchet-crank C. (Shown in Figs. 3 to 6, inclusive.) This crank is bifurcated and is bored to turn freely on the end of shaft T. Between the two branches 40 42 thereof I place the ratchet-wheel W and the swinging pawl E for actuating said wheel. Said pawl is pivoted at 44, and is constructed and arranged to stand in a middle position out of engagement with the wheel W, as in Fig. 5, or to stand to the one or the other side, as in Fig. 6. It is thus operated by a spring-actuated plunger, 45, which acts in connection with notches formed in said pawl in the usual manner, and as illustrated in the drawings. To prevent the wheel W from dropping out when the crank is removed, said wheel has on one side thereof a short hub, 46, fitting a corresponding counterbore on the inner side of arm 40. The wheel is put in place by first springing apart arms 40 42, next slipping in the wheel, and then allowing said arms to spring together again. After this the pawl is inserted and the pivot-screw 44 put in, thereby holding said arms together. This ratchet-wheel W has a key, 48, fitting a spline, 49, in shaft T, whereby said shaft is turned.

The operation of my improved drill will have been understood from the drawings and preceding description. The tool is set to its work in the usual manner, and is operated by imparting to the handle H or to the crank C a back-and-forth movement, as the situation may demand. Sometimes the hole to be drilled may be started by using one said movement, and completed by using the other, the situation being such that, owing to the lowering of handle H as the drill enters deeper, the one movement will be interrupted by some adjacent obstacle before the work is finished. Sometimes, again, both movements may be used simultaneously, the operator taking handle H in one hand and the crank-handle in the

other and moving them in opposite directions. This, indeed, I deem one of the most effective ways of operating the tool.

It will be understood that the ratchet-drill, and especially the several details thereof, are capable of modification in various ways and degrees, after the manner of machines in general within the scope and limits of my invention.

10 Having thus described my invention, I claim—

1. The combination, in a geared hand-drill of the class described, of the drill-spindle and the handle projecting laterally therefrom, the shaft geared to the drill-spindle and extending 15 through said handle, and a crank-arm projecting laterally from the outer end of said shaft, and two ratchet devices, substantially as described, one for the handle and another for the 20 crank, whereby the drill may be operated by either the handle or by the crank without interference from the other, all substantially as described.

2. The combination, in a geared ratchet-drill, with the gear-casing having the lower wall bored to receive the spindle and provided with the upper head bored to receive the hollow feed-screw, of the drill-spindle journaled in said lower wall, and provided 30 above said journal with a driving-gear fitted and keyed thereto, as described, and above said gear with the fixed collar serving as a stop for the feed-screw, and at its upper end with an external screw-thread, and the hollow 35 feed-screw internally threaded to engage with said spindle-thread, and constructed to stop against said fixed collar on the spindle, all substantially as described.

3. The combination, in a geared ratchet-drill, with the casing having the lateral branch bored to admit the driving-pinion, of the vertical spindle journaled in said casing and provided with the driving-gear, the hollow handle enlarged at one end, and this enlarged end 40 fitted by a slip-joint into said branch, means (as a removable screw or the like) for holding said handle in place, the shaft in said handle,

provided with a driving-pinion meshing with said spindle-gear, said pinion having ratchet-teeth on the outer face thereof, and a ratchet-pawl carried in the said enlarged part of the handle and engaging with said ratchet-teeth, 50 all substantially as described.

4. The combination, with the handle H, having the enlarged part S, of shaft 33, carrying a pinion, P, having notches 24, and ratchet-bolt 30, having pin 35 and handle 31, said part 8 having shallow notch 27, and the deeper side notches, 26 and 28, and said bolt 30, having its movement in the direction of the said shaft, 60 substantially as described.

5. The combination, in a ratchet-drill, with the spindle and the hollow internally-threaded feed-screw thereof, and with the head D, having the sleeve externally threaded and horizontally bored, as described, of the friction-plugs in the horizontal holes and bearing on said screw, and the internally-threaded ring screwing on said sleeve, said ring having its lower end bored tapering and bearing on said 70 plugs, all substantially as shown and described.

6. The combination, in the handle of a ratchet-drill, of the handle-arm C, bifurcated, as shown, one of the branches, as 40, being bored on its inner face to receive the short 75 hub of the ratchet-wheel, of the ratchet-wheel W, fitting to turn between the two branches, and having the short hub fitting said bore, said branches being adapted to be sprung apart for the insertion of said wheel, all substantially 80 as described.

7. The combination, in the handle of a ratchet-drill, of the crank-arm C, having branches 40 42, adapted to be sprung apart, as described, wheel W, having the short hub 85 46, fitting a bore in one of said branches, pawl E, and a screw, as 44, serving as a pivot for said pawl and to hold said branches from opening to release said wheel, substantially as set forth.

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Witnesses:

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