

F. E. FARLEY.
 RATCHET DRILL.
 APPLICATION FILED AUG. 25, 1909.

977,176.

Patented Nov. 29, 1910.

Fig. 1.

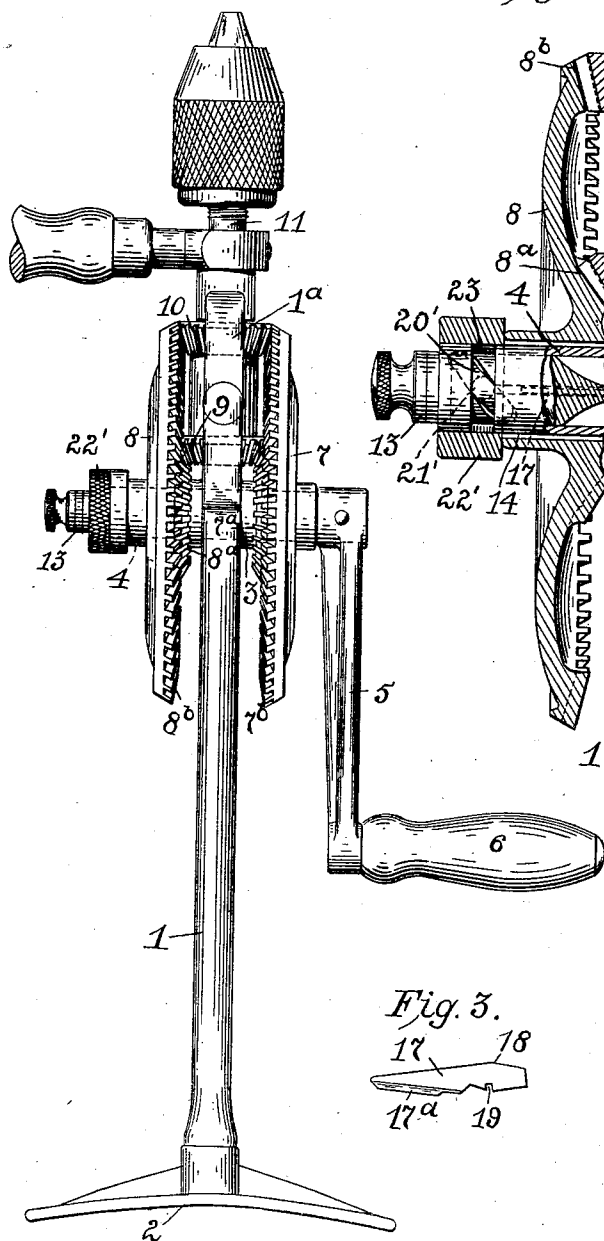


Fig. 2.

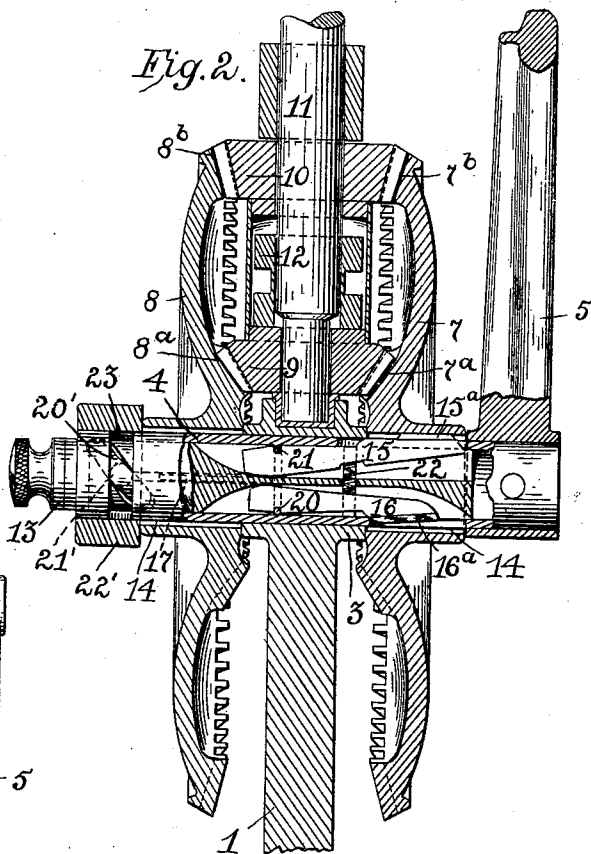


Fig. 4.

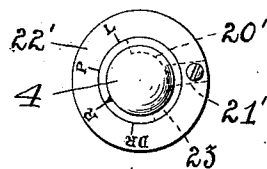
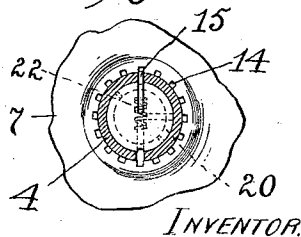


Fig. 5.



ATTEST.

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UNITED STATES PATENT OFFICE.

FRED E. FARLEY, OF GREENFIELD, MASSACHUSETTS, ASSIGNOR TO GOODELL-PRATT COMPANY, OF GREENFIELD, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

RATCHET-DRILL.

977,176.

Specification of Letters Patent.

Patented Nov. 29, 1910.

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To all whom it may concern:

Be it known that I, FRED E. FARLEY, a citizen of the United States, residing at Greenfield, Massachusetts, have invented 5 new and useful Improvements in Ratchet-Drills, of which the following is a specification.

My invention relates to improvements in ratchet drills of that type in which means 10 are provided by which the speed of the drill may be readily changed, and also means by which different ratchet motions may be imparted.

The invention comprises the novel construction and arrangement and combination 15 of parts hereinafter described and particularly set forth in the appended claims.

A drill constructed in accordance with my invention is illustrated in the accompanying 20 drawings, in which—

Figure 1 is an elevation of the drill; Fig. 2 is an enlarged longitudinal sectional view; and Figs. 3, 4 and 5 are views of details.

Referring by reference characters to the 25 above drawings, the numeral 1 designates the frame of the drill having the usual breast plate 2, and transverse bearing sleeve 3. The frame member is provided with a divided portion forming two arms or side 30 members 1^a, only one of which appears in side elevation, and between which is located the mechanism for changing the speed or motion of the spindle. This speed changing mechanism corresponds to the mechanism 35 illustrated and described in Letters Patent of the United States #557,328, dated March 31, 1896, and a particular description thereof herein is deemed unnecessary. Within the bearing 3 is rotatably mounted a hollow 40 or tubular sleeve 4, which carries, at one end, a crank 5 provided with a suitable crank handle 6, by the movement of which motion is imparted to the drill. On this sleeve are rotatably mounted the driving 45 gears 7 and 8, which have inner and outer annular rings of gear teeth or racks, as indicated at 7^a, 7^b, 8^a and 8^b, respectively. These inner and outer racks mesh with inner and outer beveled gears 9 and 10 rotatably journaled upon the drill holder spindle 11, and designed to be alternately locked to said spindle by means of the clutch member 12, so that accordingly as the clutch 50 member connects the gear 9 or the gear 10 to the spindle, the speed imparted to the

drill will be relatively slow or fast as described in said Letters Patent.

Within the hollow sleeve 4 is located a longitudinally movable cylinder 13, which is provided with a plurality of longitudinal 60 recesses in which are seated dogs or pawls which are designed to engage with notches 14 formed in the inner surfaces of the hubs of the gear wheels 7 and 8, as shown in detail in Fig. 5. I provide, in connection with 65 this cylinder, pawls corresponding in number to the number of variations which I desire to make in the transmission between the crank handle and the spindle. In the present drawings, I have shown three pawls, 70 as this number is amply sufficient for the purposes of illustration, but I wish it understood that I do not limit myself to any special number, as the number may be varied according to conditions. The pawls are 75 designated 15, 16 and 17, the pawl 17 being shown in detail in Fig. 3. They are provided with rounded edges 18 designed to rest against the bottoms of the grooves, and with notches 19, which receive a split ring 80 20 which rests in an annular groove 21 in the cylinder, and, by its engagement with the notches 19 of the pawls, holds them in place and against longitudinal movement. Beneath each pawl is located a spring 22 85 which tends to force the pawl normally outward. The spring associated with the pawl 17 is similar to the spring shown associated with the pawls 15 and 16. The pawls are adapted to be forced by their springs out- 90 ward through slots formed in the hollow sleeve or shaft 4, when they are brought into coincidence with the slots, and they are brought into such coincidence by the movement of the cylinder 13 longitudinally with- 95 in the sleeve.

It will be seen, from an examination of Fig. 2, that the pawls 15 and 16 have their portions which are adapted to engage with the notches of the hub of the wheel 7, beveled in opposite directions, and located the one farther to the right than the other. These notch engaging portions, which are designated 15^a, 16^a and 17^a, are provided with inclined ends, as shown, so that when 105 the cylinder is moved longitudinally within the sleeve, the requisite distance, the inclined end of any particular dog which extends through the slot in the crank sleeve will ride on and against the end of the slot, 110

and cause the dog to be forced inwardly. If pawl 15 be projected through its slot, and pawls 16 and 17 be held retracted, it will be seen that a left hand ratchet motion is obtained. If pawls 15 and 16 are both allowed to project through their slots, then a positive motion is communicated by the crank through the gearing of the spindle either of right or left hand motion, according to the direction of rotation of the crank. If pawl 16 only is allowed to project through the slot, then a right hand motion is obtained, while if pawls 16 and 17 are both allowed to project through the slots and engage with the notches in the hubs of the gears 7 and 8, then an oscillating movement of the crank handle will, through the gearing, impart a continuous right hand motion to the gears.

In order to move the cylinder longitudinally within the sleeve to cause the pawls to move into and out of the position, as thus described, I prefer to provide a spiral groove 20' in the cylinder, which is engaged by a pin 21' carried by a collar 22', this pin projecting through a circumferential slot 23 in the sleeve or tubular shaft 4. The collar 22' is milled on its outer periphery, and designed to be rotated so as to cause the engagement of the pin with the spiral slot 20' to move the cylinder endwise. The collar is provided on its base with indicating marks designed to be brought opposite a corresponding mark on the cylinder to indicate when the parts are in the proper position to give certain motions. Such indicating marks are shown in Fig. 4, L indicating the position for left hand ratchet motion, P the position for positive motion, R the position for right hand ratchet motion, and DR the position for double ratchet motion. Any indicating characters, however, can be used as desired.

Having thus described my invention what I claim is:—

1. The combination in a breast drill, of a frame, a spindle journaled therein, a crank shaft also journaled in said frame, a bevel gear on the spindle, a pair of bevel gears journaled on the shaft and meshing with the gear on said spindle, and means carried by said shaft adapted to be moved into and out of engagement with said second mentioned bevel gears for altering the character of movement of said spindle with respect to said shaft, substantially as described.

2. The combination in a breast drill, of a frame, a spindle journaled therein, a hollow crank shaft journaled in said frame, and extending at an angle with respect to said spindle, a bevel gear on said spindle, bevel gears journaled on said shaft meshing with said first mentioned bevel gear and having their hubs provided with internal notches, a pawl carrier mounted within said

hollow shaft and having pawls, said shaft having slots through which the pawls may project to engage the notches in the gear hubs, and means for projecting and retracting said pawls, substantially as described. 70

3. The combination in a breast drill, of a frame, a spindle journaled therein, a hollow crank shaft journaled in said frame, and extending at an angle with respect to said spindle, a bevel gear on the spindle, a bevel gear journaled on the shaft, and having a notched hub, said shaft having slots therein, a pawl carrier longitudinally movable within the hollow shaft, and having pawls tending to project outwardly through said slots to engage the notches in the gear, said pawls having bevel ends for engaging the ends of the slots, and means for moving the pawl carrier longitudinally within the hollow shaft, substantially as described. 85

4. The combination in a breast drill, of a frame, a spindle journaled therein, a hollow crank shaft journaled in said frame, a bevel gear on the spindle, a bevel gear journaled on the shaft, and having a notched hub, said shaft having slots therein, a pawl carrier longitudinally movable within the hollow shaft, and having pawls tending to project outwardly through said slots to engage the notches in the gear, said pawls having bevel ends for engaging the ends of the slots, and means for moving the pawl carrier longitudinally within the hollow shaft, said means comprising a sleeve rotatably mounted on the shaft and having a pin engaging a spiral groove in the pawl carrier, substantially as described. 100

5. The combination, in a breast drill, of a frame, a spindle journaled therein, a hollow driving shaft journaled in said frame, a gear operatively associated with said spindle, a gear operatively mounted upon said shaft and meshing with said first-mentioned gear, means for operatively connecting said second-mentioned gear to said shaft when the latter is rotated in one direction only and means for operatively connecting said second-mentioned gear to said shaft when the latter is rotated in the opposite direction only. 115

6. The combination, in a breast drill, of a frame, a bit spindle journaled therein, a hollow shaft journaled in said frame, a gear on the spindle, a gear journaled on the shaft and meshing with said first gear, said shaft being provided with slots, a pawl carrier movably positioned within said shaft and pawls mounted upon said carrier and adapted to pass through said slots into operative engagement with said second-mentioned gear, said slots being so positioned that either one or both of said pawls may be caused to engage said gear. 125

7. The combination, in a breast drill, of a frame, a spindle journaled therein, a hol- 130

low crank shaft journaled in said frame, a gear on the spindle, a gear journaled on the shaft and meshing with said first gear and having a notched hub, said shaft having 5 slots therein, a pawl carrier movably positioned within said shaft and a pair of pawls mounted upon said carrier and adapted to pass through said slots to engage the notched hub, said pawls having oppositely inclined 10 notched engaging surfaces, said slots being so positioned that either one or both of said pawls may be caused to engage said notched hub.

8. The combination, in a breast drill, of a 15 frame, a spindle journaled therein, a shaft journaled therein, a gear mounted upon said spindle, a pair of gears journaled in said shaft and meshing with said first-mentioned gear, said pairs of gears being positioned 20 upon opposite sides of said frame, means for engaging one of said pair of gears to cause rotation thereof when the shaft is rotated in one direction only, means for engaging the other of said pair of gears to cause rota- 25 tion thereof when the shaft is rotated in the opposite direction only and means for rendering one only or both of said engaging means operative.

9. The combination, in a breast drill, of

a frame, a spindle journaled therein, a hol- 30 low crank shaft journaled therein, a gear mounted on said spindle, a pair of gears having notched hubs journaled on said shaft and meshing with said first-mentioned gear, 35 said shaft being provided with slots, a pawl carrier movably positioned within said shaft and a pair of pawls mounted upon said carrier and adapted to be moved through said slots into engagement with said notched hubs 40 to lock the gears to said shaft, one of said pawls being beveled to cause the gear with which it is associated to be rotated when the shaft is rotated in one direction only, 45 the other of said pawls being beveled to cause the gear with which it is associated to be rotated when the shaft is rotated in the opposite direction only, said slots being so positioned that one only or both of said pair of pawls may be moved into operative po- 50 sition.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FRED E. FARLEY.

Witnesses:

J. A. VAN SLYKE,
C. B. VAN SLYKE.