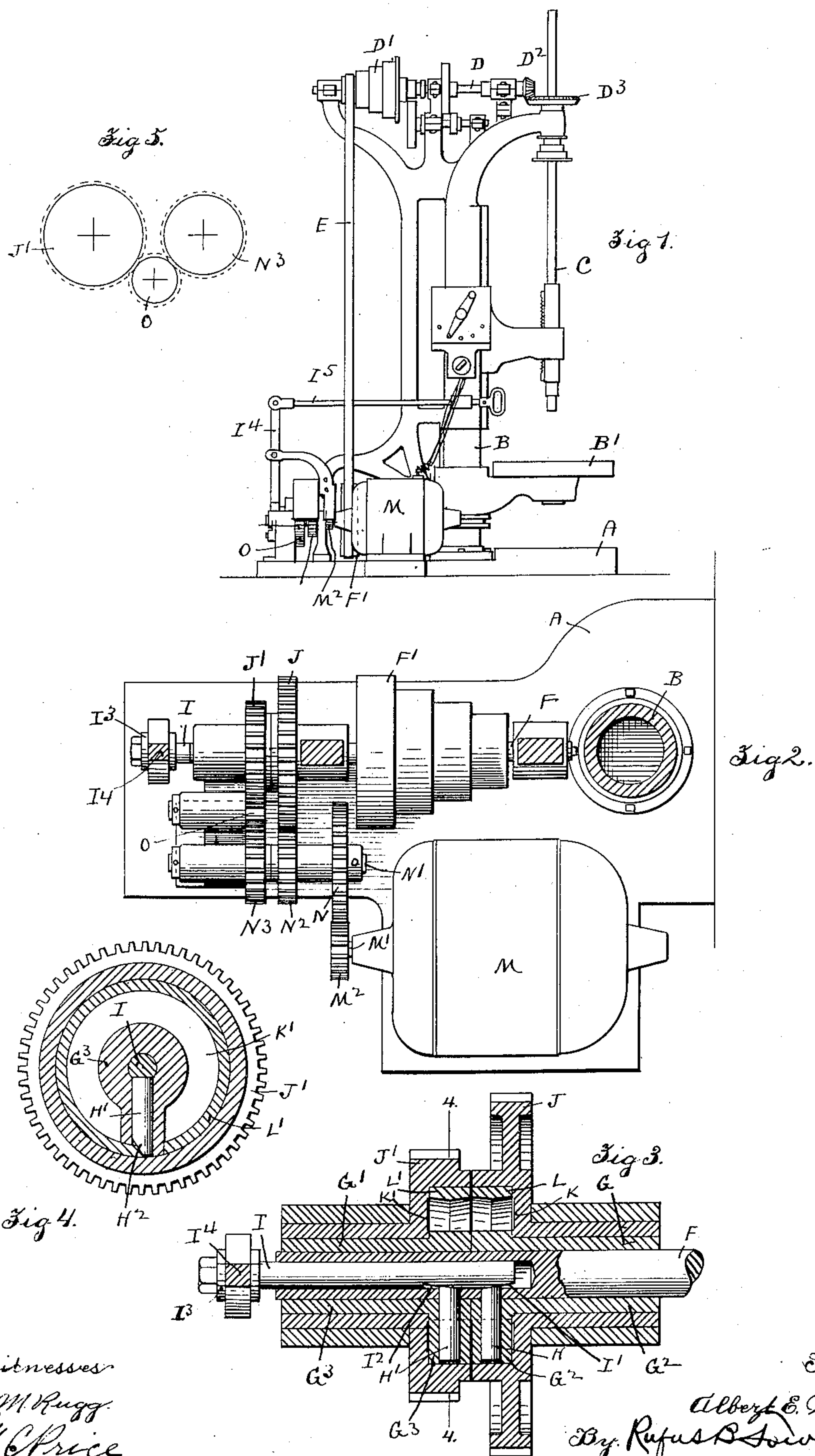


No. 844390.

PATENTED FEB. 19, 1907.

A. E. NEWTON.  
GEARING FOR DRILLING MACHINES, &c.  
APPLICATION FILED AUG. 3, 1901.





# UNITED STATES PATENT OFFICE.

ALBERT E. NEWTON, OF WORCESTER, MASSACHUSETTS.

## GEARING FOR DRILLING-MACHINES, &c.

No. 844,390.

Specification of Letters Patent.

Patented Feb. 19, 1907.

Application filed August 3, 1901. Serial No. 70,737.

*To all whom it may concern:*

Be it known that I, ALBERT E. NEWTON, a citizen of the United States, residing at Worcester, in the county of Worcester and Commonwealth of Massachusetts, have invented a new and useful Improvement in Gearing for Drilling-Machines and the Like, of which the following is a specification, accompanied by the drawings forming a part of the same, in which—

Figure 1 represents a side elevation of an upright drilling-machine embodying my invention. Fig. 2 is a plan view of the base-plate upon which the upright framework is supported and showing a top view of the counter-shaft, driving-motor, and intermediate gearing. Fig. 3 represents a portion of the counter-shaft with the gearing carried thereon shown in central sectional view in order to disclose the clutching mechanism by which the gearing is connected with the counter-shaft. Fig. 4 is a sectional view taken on line 4 4 of Fig. 3. Fig. 5 is a diagrammatic view showing the relative position of a portion of the gearing intermediate the counter-shaft and the electric motor.

Similar reference figures and letters refer to similar parts in the different figures.

My present invention has for its object to provide means for applying power, preferably generated by an electric motor, to the drill-spindle of a drilling-machine, whereby the intermediate connecting mechanism between the drill-spindle and the motor is rendered compact and means are provided for readily reversing the motion of the drill-spindle with an increase in speed without reversing the motor, and I accomplish these results by means of the mechanism hereinafter described and represented in the accompanying drawings, the novel features being set forth in the annexed claim.

Referring to the drawings, A denotes the base-plate, upon which the upright framework is mounted. B is the upright post holding the work-supporting table B' and the revolving drill-spindle C. The drill-spindle C is rotated by a driving-shaft D, carrying a cone-pulley D' and connected with the drill-spindle C by the beveled gears D<sup>2</sup> D<sup>3</sup>. The cone-pulley D' is driven by a belt connection E from a similar cone-pulley F', carried upon a counter-shaft F. The counter-shaft F is inclosed by a sleeve G, having a radial arm G<sup>2</sup>, and a sleeve G', having a radial arm G<sup>3</sup>. The inner or adjacent ends of these sleeves are

of greater diameter than the arms whereby the shoulders 1 1 are formed, and against these shoulders the gears hereinafter mentioned abut and are prevented from longitudinal movement in one direction thereby. The arms G<sup>2</sup> G<sup>3</sup> hold the radially-sliding pins H H', having their inner ends bearing against the beveled faces 1<sup>1</sup> 1<sup>2</sup> of a sliding spindle I, held concentrically in the hollow end of the counter-shaft F.

The sliding spindle I is provided with a grooved collar I<sup>3</sup>, which is engaged by the forked end of a lever I<sup>4</sup>, connected with a sliding shipping-rod I<sup>5</sup>. Turning loosely upon the sleeves G G' is a gear J and a smaller gear J', each of said gears being provided with chambers K K', within which are placed the elastic split rings L L'. The elastic ring L' has one end bearing against the radial arm H' and the opposite end bearing against the beveled end H<sup>2</sup> of the radially-sliding pin H, so that as the pin H is crowded radially outward its beveled end H<sup>2</sup> will press against one end of the elastic ring L', thereby expanding the ring and crowding it against the inner cylindrical wall of the chamber K'. Similarly the pin H is crowded against the end of the split ring L to connect the gear J with the counter-shaft F. The pressure of the split ring L against the gear J forms a friction-clutch and causes the rotation of the gear to be imparted to the counter-shaft F. The counter-shaft and sleeves are rotatably supported in the journals 2 2, formed on the base A.

The pressure of the split ring L' in the same manner connects the counter-shaft C and gear J'. The beveled faces I<sup>1</sup> I<sup>2</sup> of the concentric sliding spindle I are beveled in opposite directions, so that the longitudinal movement of the spindle I in one direction will expand the clutch-ring L and connect the gear J with the counter-shaft, and the longitudinal movement of the spindle I in the opposite direction will release the gear J and expand the ring L' and connect the gear J' with the counter-shaft. The gears J and J' are constantly rotated by means of an electric motor M, which has a motor-shaft M', carrying a pinion M<sup>2</sup>, engaging a gear N, attached to an intermediate shaft N'. The shaft N' carries a gear N<sup>2</sup>, engaging the gear J on the counter-shaft C. The intermediate shaft N' also carries a third gear N<sup>3</sup>, attached thereto and engaging the gear O, which turns loosely upon a stud, the gear O engag-



ing the gear J' of the counter-shaft, so that the rotation of the motor-shaft M' will rotate the gear J in one direction and the gear J' in the opposite direction at an increased speed.

5 When the counter-shaft F is operatively connected with the gear J, the drill-spindle is rotated in the proper direction to impart a cutting action to the drill, and when the counter-shaft is connected with the gear J' a reverse motion is given to the drill-spindle  
10 with an increase in speed during the withdrawal of the drill from the work.

The withdrawal of the drill-spindle is accomplished by means of the sliding shipping-rod I<sup>5</sup> through the medium of the clutching  
15 mechanism, by which either one of the oppositely-driven gears J J' are connected with the counter-shaft without reversing the rotation of the electric motor M.

20 While my improved driving mechanism by which the counter-shaft F and motor M are connected is especially adapted to be used in connection with an electric motor, it may, however, be employed when the motor-shaft M' is driven by a belt or when other  
25 means is employed to drive the drilling-machine than an electric motor.

What I claim as my invention, and desire to secure by Letters Patent, is—

30 The combination, with a motor-shaft, of a hollow counter-shaft, a plurality of sleeves se-

cured to the counter-shaft, a hollow radial arm secured to each sleeve, the sleeves abutting each other and being of slightly-larger diameter than the arms whereby shoulders are  
35 formed, a gear-wheel loosely mounted on each sleeve and abutting the shoulders which prevent movement of the gears in one direction, the gears being recessed, journal-boxes for the counter-shaft and sleeves, the gears  
40 engaging the journal-boxes and prevented from movement in the opposite direction thereby, expansible rings located within the recesses of the gears, an oppositely-beveled rod slidably received in the hollow counter-  
45 shaft, pins carried in the hollow arms and alternately engaged by the beveled surfaces of the rod to clutch one or the other of the gears to the counter-shaft, a suitably-supported pinion meshing with one of the loose  
50 gears, an intermediate shaft driven in one direction by the motor-shaft, a gear on the intermediate shaft meshing with the pinion, a second gear on the intermediate shaft meshing directly with the remaining loose gear  
55 and means for reciprocating the rod to clutch one or the other of the loose gears alternately to the counter-shaft.

ALBERT E. NEWTON.

Witnesses:

RUFUS B. FOWLER,  
M. C. PRICE.