

No. 895,105.

PATENTED AUG. 4, 1908.

A. E. NEWTON.
DRIVING GEARING FOR UPRIGHT DRILLS.
APPLICATION FILED AUG. 19, 1908.

3 SHEETS—SHEET 1.

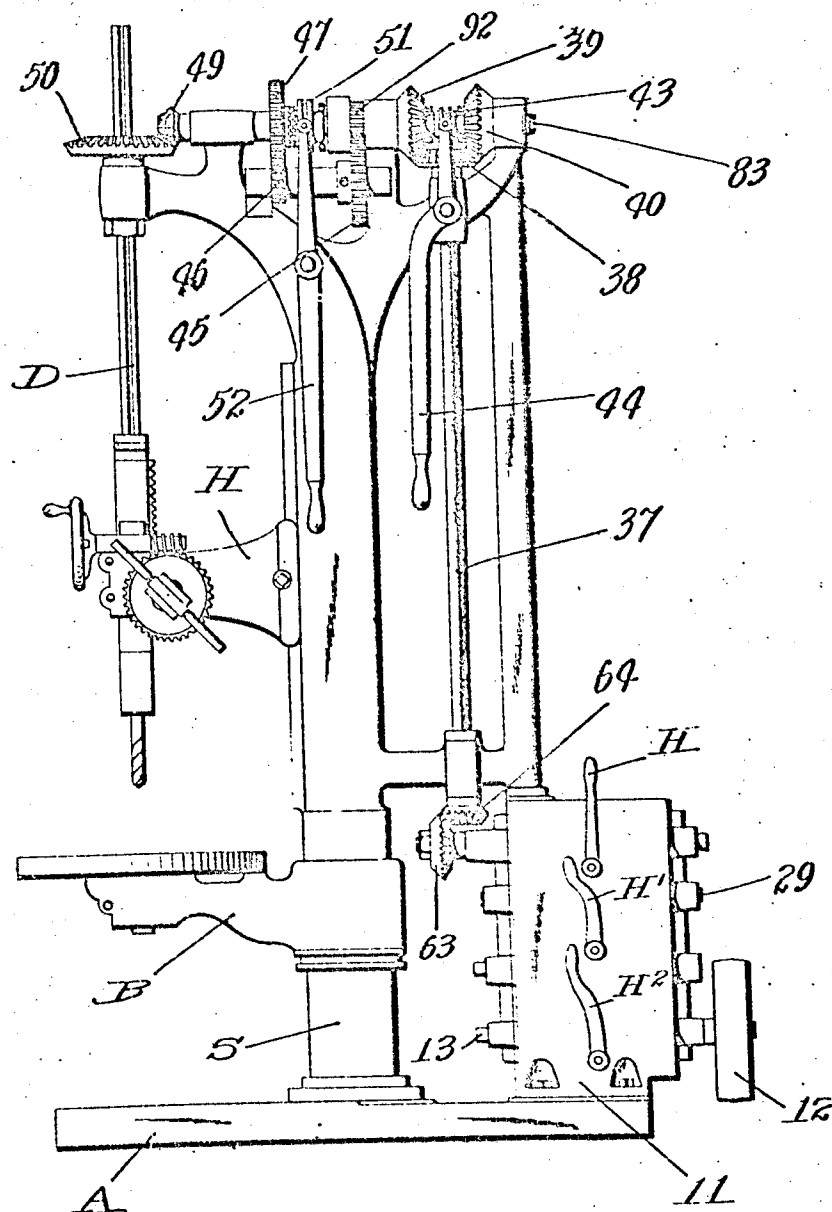


Fig. 1.

Witnesses:

W. F. Mason.
C. M. Giddards.

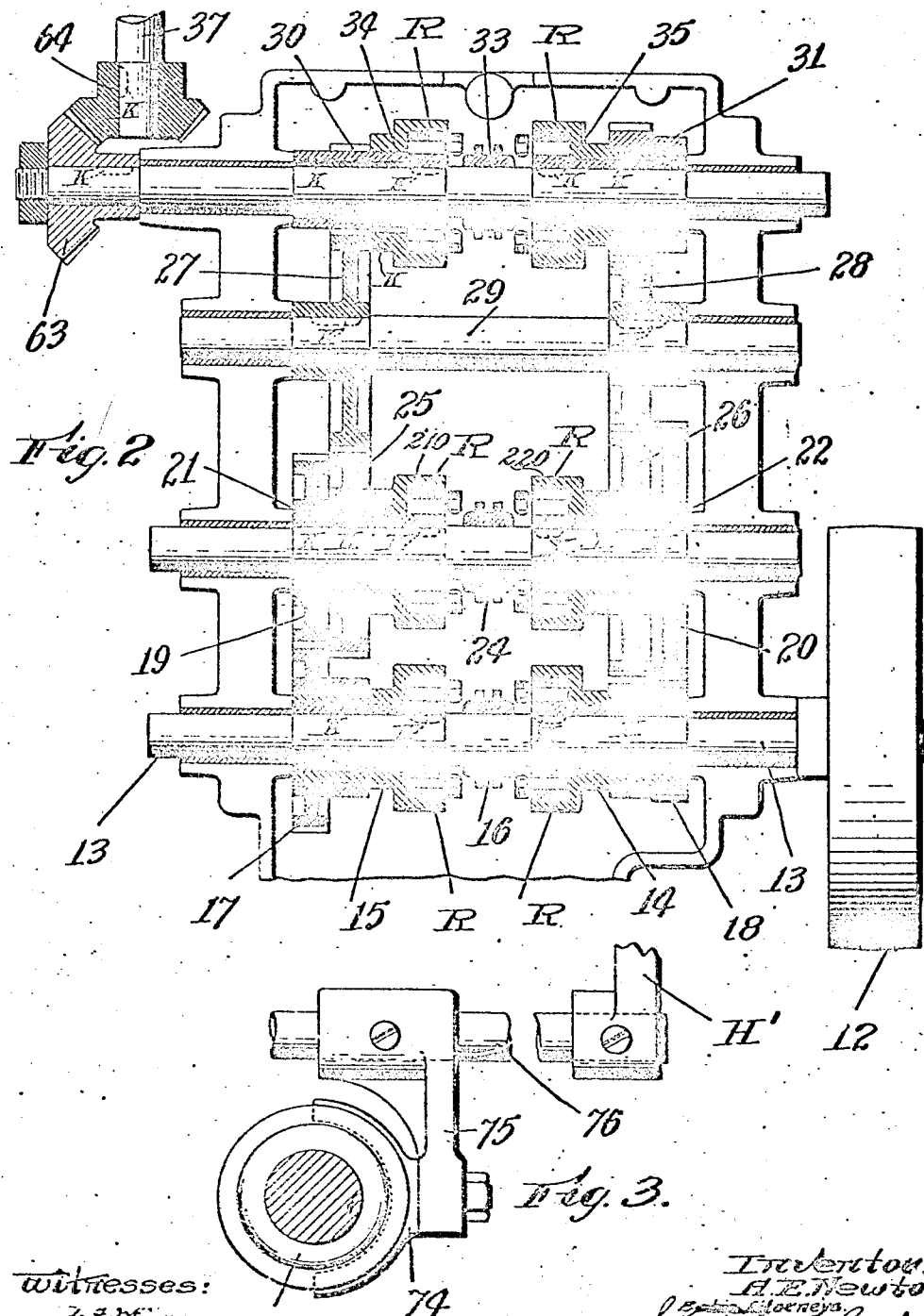
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3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

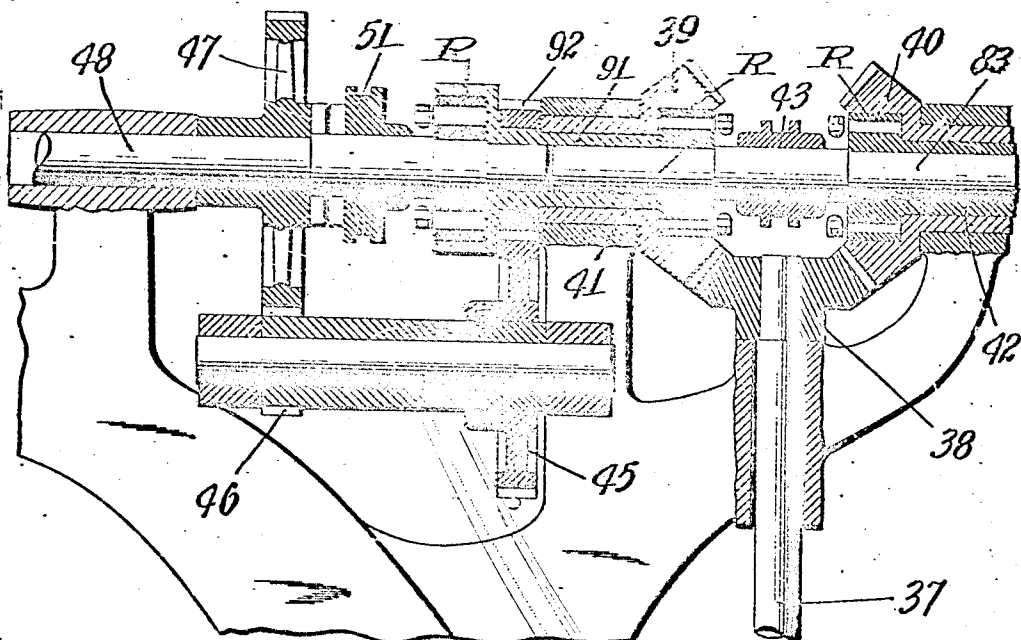


Fig. 4.

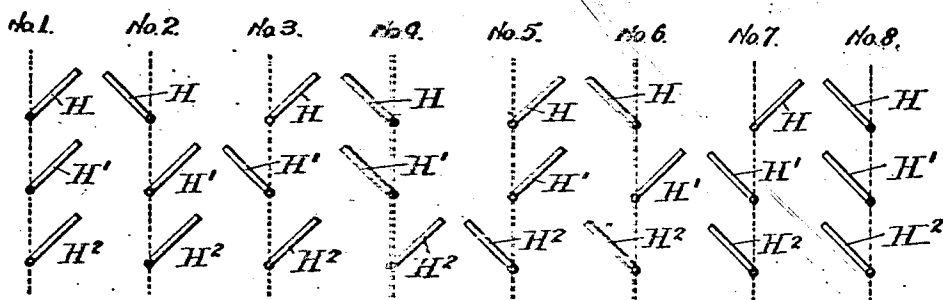
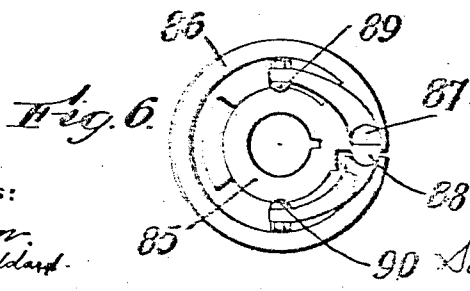


Fig. 5.



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UNITED STATES PATENT OFFICE.

ALBERT E. NEWTON, OF WORCESTER, MASSACHUSETTS.

DRIVING-GEARING FOR UPRIGHT DRILLS.

No. 895,105.

Specification of Letters Patent.

Patented Aug. 4, 1908.

Application filed August 19, 1903. Serial No. 170,039.

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 State of Massachusetts, have invented a new and useful Driving-Gearing for Upright Drills, of which the following is a specification.

This invention relates to that class of machine- which are known as upright drills or drill presses.

The especial object of this invention is to provide an upright drill having strong, simple and easily controlled driving connections which will give a large number of speed changes, and to provide a positively locked driving connection for the drill spindle when the same is being operated at low speeds.

To these ends, this invention consists of the parts and combinations of parts as hereinafter described and more particularly pointed out in the claims at the end of this specification.

In the accompanying three sheets of drawings, Figure 1 is a side view of an upright drill constructed according to this invention. Fig. 2 is a transverse sectional view of the change speed gear box therefor. Fig. 3 is a detail view of the connections operated by one of the change speed handles. Fig. 4 is a sectional view of the driving train at the top of the drill column or upright. Fig. 5 is a diagrammatic view showing positions of the handles for different speed changes, and Fig. 6 is a detail view of one of the friction clutches.

In the ordinary form of upright drills which are now used, changes of speed are ordinarily secured by the use of cone driving pulleys, which form in effect, a primary speed changing mechanism and, in some cases also, by combining therewith a set of back gears to act as a secondary speed changing mechanism.

In an upright drill constructed according to this invention, the primary speed changing mechanism consists of the change speed gear box having trains of gearing therein, which preferably give eight different speed changes and the secondary speed changing mechanism of the drill preferably consists of a novel arrangement of back gearing in which the gears are in constant mesh and in which the operating connection is shifted by a double clutch member, by means of which the drill spindle will be driven through frictional con-

nections when turning at its higher speeds and will be operated through a positive clutch connection when turning at its lower speeds.

In a complete drill constructed according to this invention the parts are preferably combined to secure sixteen speed changes.

Referring to the accompanying drawing for a detail description of an upright drill constructed according to this invention, as shown in Fig. 1, A designates the bed-piece or foundation plate, extending up from which is the drill column or upright S. Adjustably supported on the upright S is the bracket B carrying the ordinary work table. Vertically movable on the ways at the front of the drill column or upright S is the drill head H. Journaled in the drill head H is a quill extending up from which is the vertical drill spindle D. These parts may be of the ordinary or preferred construction and need not be herein described at length.

The driving connections for the drill comprise a change speed gear box 11 which is bolted on to the base plate A. Power is applied to the driver or bottom shaft of the change speed gear box through a pulley 12 and the final shaft of the change speed gear box is connected by beveled gears 63 and 64 to the vertical shaft 37, which vertical shaft 37 is connected to the drill spindle D by a special train of gearing at the top of the drill standard or upright.

The interior construction of the change speed gear box 11 is most clearly illustrated in Fig. 2 in which keys k indicate which parts are secured together. As shown in this figure, the bottom shaft 13 is provided with oppositely facing sleeves 14 and 15. Fitting into sockets in the inner faces of the sleeves 14 and 15 are the expansion rings or friction clutch elements R which may be expanded by the operating piece 16 to connect either one of the sleeves 14 or 15 to the driver shaft 13.

Fixed on the sleeves 14 and 15 respectively are gears 17 and 18 which mesh with gears 19 and 20 fastened on sleeves 21 and 22 fixed on a second or intermediate shaft of the gear box. Fitting on the inner faces of sleeves 21 and 22 are loosely mounted on the sleeves 21 and 22 is a second set of expansion rings R which may be expanded by the central operating piece 24 to connect either one of the sleeves 21 or 22 to the shaft.

action of the back gearing and change speed gear box providing a driving train which will secure sixteen different drilling speeds.

I am aware that numerous changes may be made in the construction of my upright drill by those who are skilled in the art and I do not wish, therefore, to be limited to the construction I have herein shown and described, but

What I do claim and desire to secure by

10 Letters Patent of the United States is:—

1. In an upright drill, the combination of a casing, a shaft to be driven located at the top of said casing, an idle shaft, and a third shaft located below the first-named shaft, two transmitting trains, each comprising gears loose upon the final shaft and third shaft, and a gear secured on the idle shaft, the gears on the driven and third shaft each having an inwardly extended hub with an expansion friction ring therein, an operating piece located between said hubs and a vertical shaft located above and at one side of the casing and geared to said final shaft.

2. In an upright drill, the combination of a casing, shafts journaled therein, comprising a driven shaft located at the top of said casing, an idle shaft, a third shaft located below the first-named shaft, two trains of gears for connecting said shafts, each train comprising gears loose upon the driven shaft and third shafts respectively, with an intermediate gear on the idle shaft, the hubs of the gears on the driven shaft and third shaft each having friction clutch mechanism for connecting 3. the same to the shafts, a single operating piece for both of the friction clutch mechanisms of each shaft, an operating handle for each of the operating pieces and a vertical shaft located above and at one side of the casing and geared to said final shaft.

3. In an upright drill, the combination of a casing, horizontal shafts journaled therein comprising a final shaft located at the top of the casing, an idle and third and fourth shafts located below and parallel with the final shaft, gear trains in said casing connecting said shafts and comprising two gears loosely mounted on each of the final and third and fourth shafts, friction clutches for connecting any one of the loose gears to its shaft, and a vertical shaft located at one side of the casing and extending upwardly from the top thereof and geared to said final shaft.

4. In an upright drill, the combination of a casing, shafts journaled therein, comprising a final shaft near the top of the casing projecting therefrom, a gear thereon outside the casing, an idle shaft and third and fourth shafts below said final shaft, trains of gearing connecting the final, idle and third and fourth shafts, each gear train comprising three gears including the gears loose on the final and third shafts and an intermediate gear on the idle shaft, gears turning with the loose gears on the third shaft and meshing with gears loose on the fourth shaft, friction clutches, means for operating the same for connecting the desired ones of the loose gears to their shafts, a shaft above the casing, and a gear thereon meshing with said gearing on said final shaft.

In testimony whereof I have hereunto set my hand, in the presence of two subscribing witnesses.

ALBERT E. NEWTON.

Witnesses:

PHILIP W. SOUTHWATE,
JOHN F. CROWELL.