No. 855,841.

PATENTED JUNE 4, 1907.

O. L. DOSCH.

DRILL PRESS.

APPLICATION FILED DEC. 16, 1905.

3 SHEETS—SHEET 1.

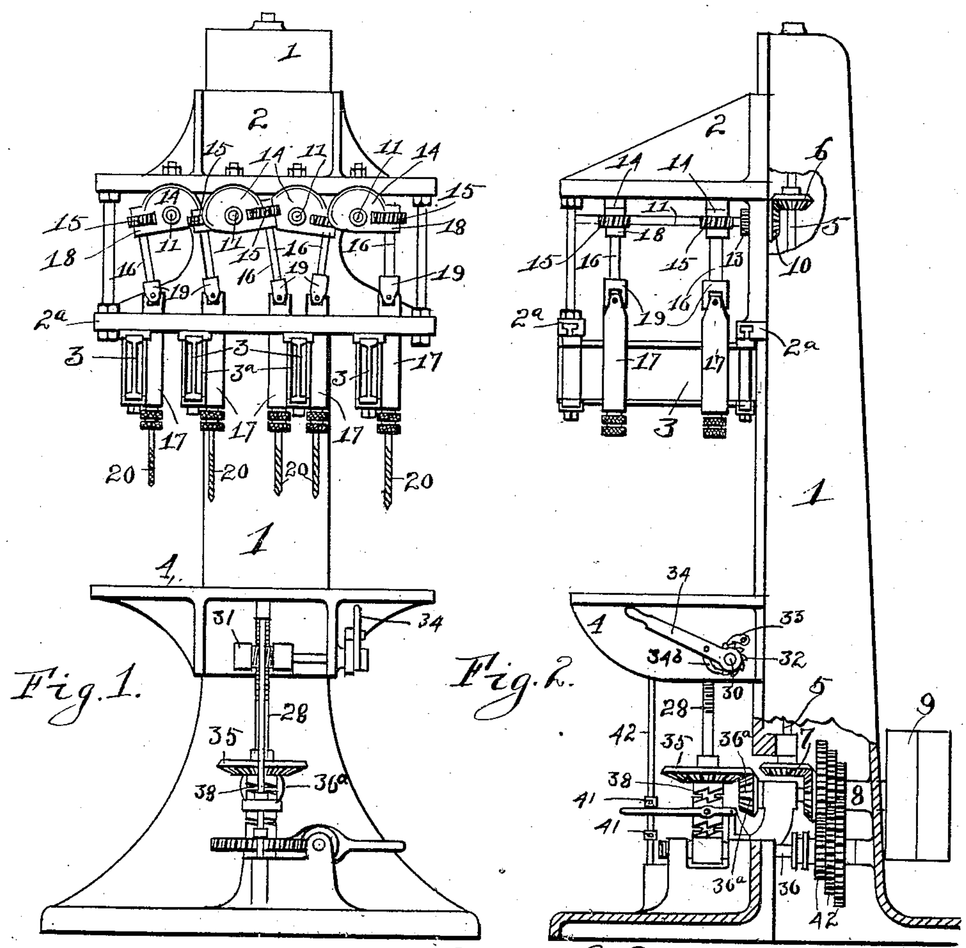

Fig. 1.

Fig. 2.

Witnesses

C. W. Theobald.

Matthew Siebler

Oliver L. Dosch, Inventor

By R. J. McCarty, Attorney

THE NORRIS PETERS CO., WASHINGTON, D. C.

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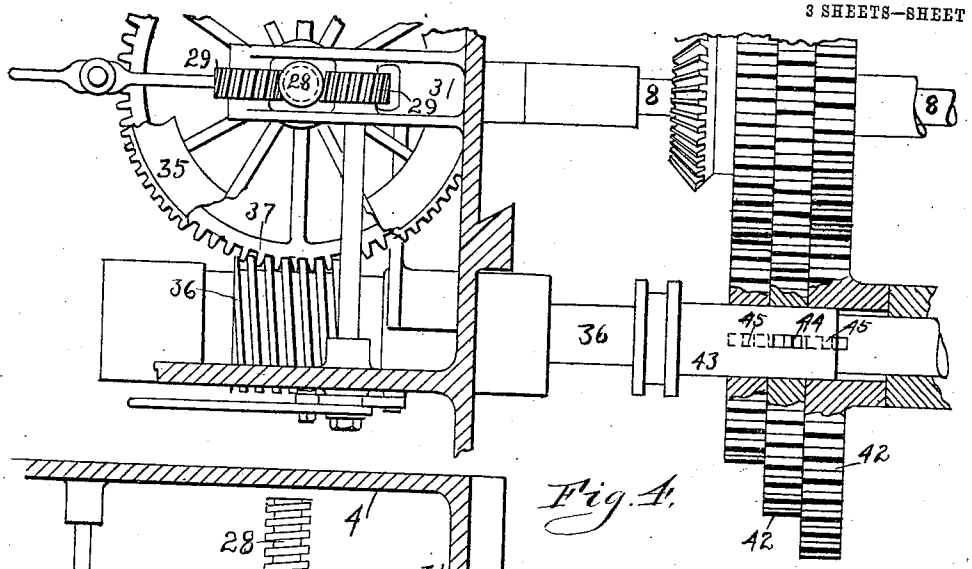

Fig. 1.

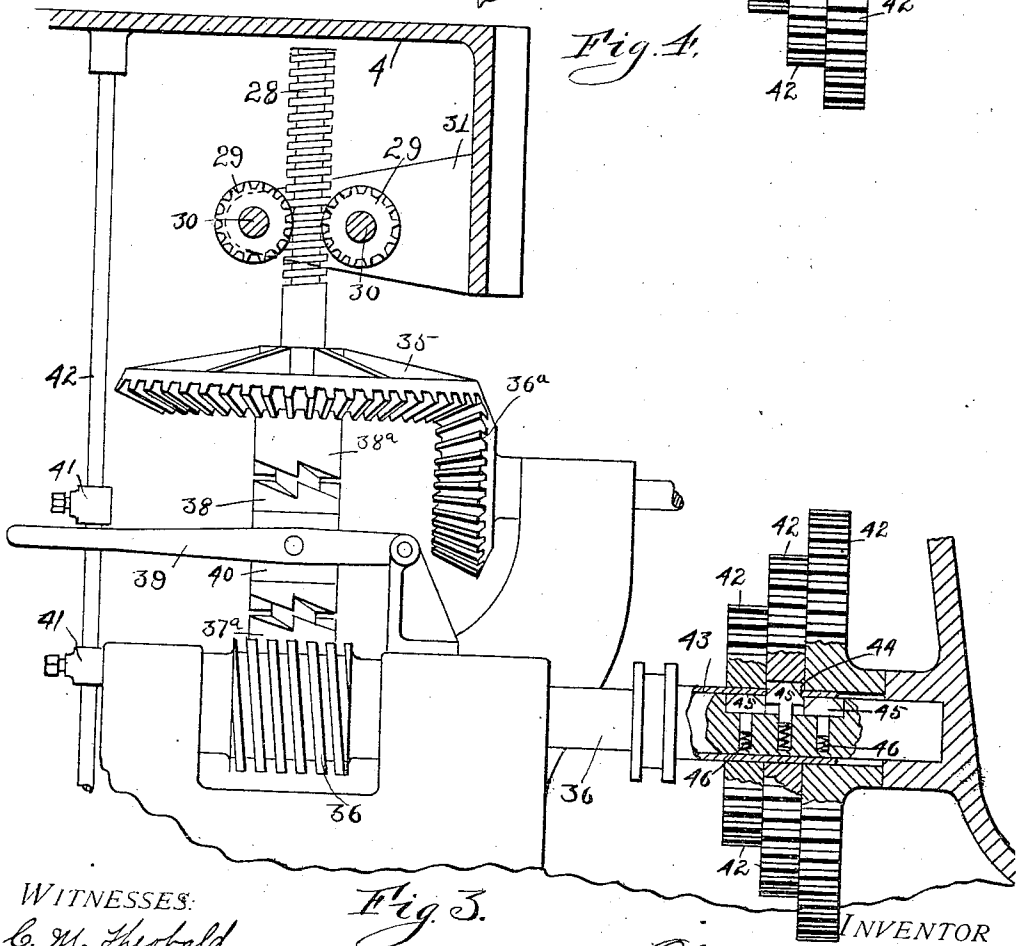

Fig. 3.

WITNESSES:

C. M. Theobald.

Matthew Schibler

INVENTOR

Oliver L. Dosch

BY R. J. McCarty

Attorney

THE NORRIS PETERS CO., WASHINGTON, D. C.

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3 SHEETS—SHEET 3.

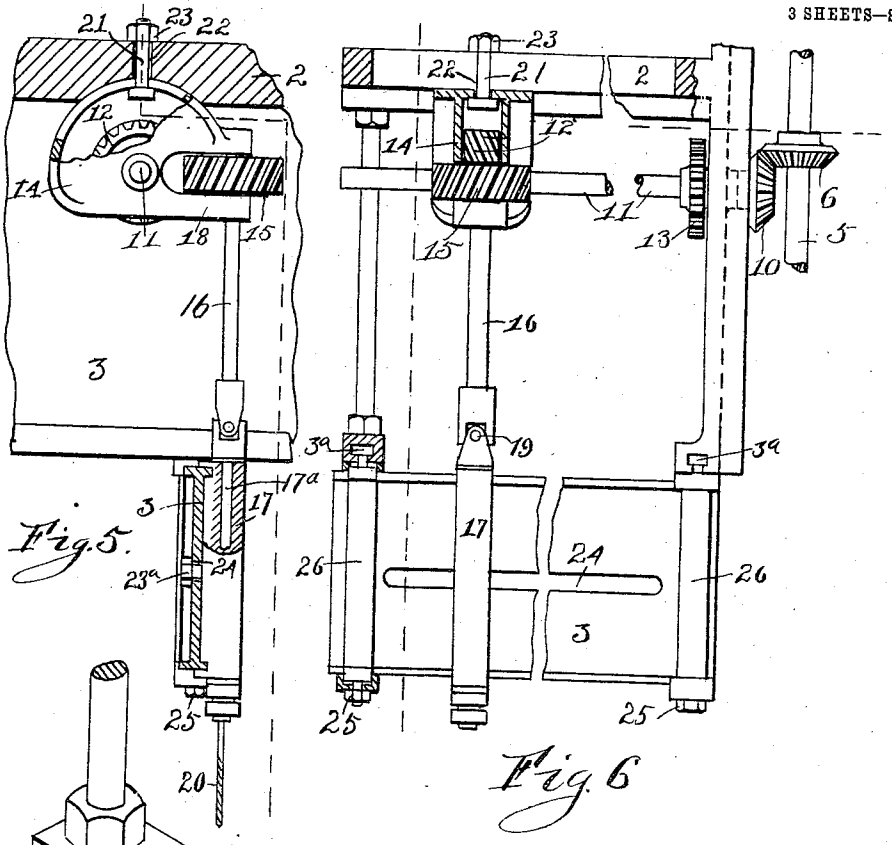

Fig. 5.

Fig. 6

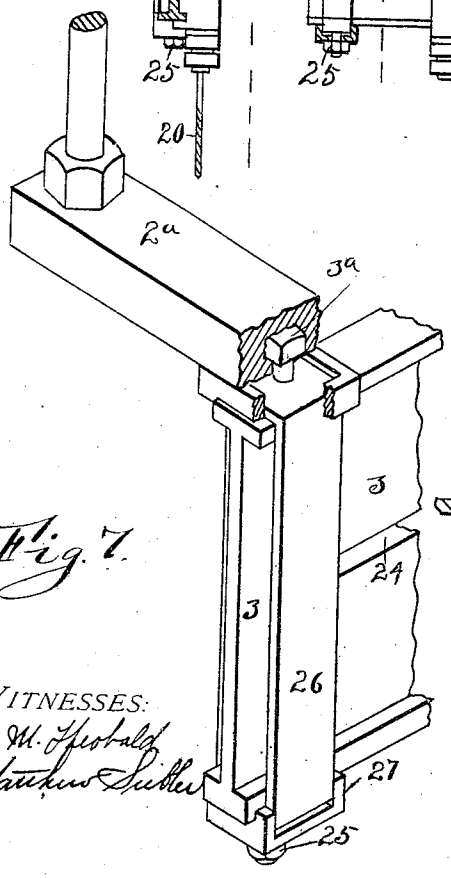

Fig. 7.

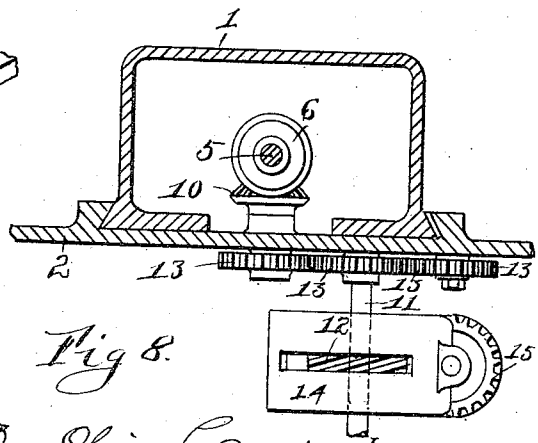

Fig 8.

WITNESSES:

C. M. Fitzgerald

Matthew Siebler

Oliver L. Dosch, INVENTOR

BY L. J. McCarty

Attorney

THE NORRIS PETERS CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

OLIVER L. DOSCH, OF DAYTON, OHIO.

DRILL-PRESS.

No. 855,841. Specification of Letters Patent. Patented June 4, 1907.

Application filed December 16, 1905. Serial No. 291,992.

To all whom it may concern:

Be it known that I, OLIVER L. DOSCH, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Drill-Presses; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to drill presses of a type employing a multiplicity of spindles.

The invention relates more specifically to means whereby each individual driving spindle may be set on any desired angle independently of the other driving spindles, so that a single drill spindle may be located at various points. This setting or adjusting of each individual driving spindle is obtained by means of an individual oscillating bearing for each drill spindle which is rotated in an arc of a circle on either side of its axis, said oscillating bearings affording supports for the driving spindles of the drill spindles, and also supports for the main driving shaft of each individual driving spindle. The oscillating bearings before referred to are each movable along each main driving shaft to locate the drill spindles in position prior to the adjustment of the oscillating bearing.

The invention further relates to a change-speed gearing whereby the main feed driving shaft may be given three different rates of speed.

The invention further consists in the feed table and means for actuating the same.

Preceding a detail description of the invention, reference is made to the accompanying drawings, of which—

Figure 1, is a front elevation of my improved drill press. Fig. 2, is a side elevation of the same with parts at the base broken away. Fig. 3, is an enlarged vertical sectional view of the change-speed and the feed table mechanisms. Fig. 4, is a detail top plan view of the main driving mechanism. Figs. 5 and 6, are enlarged detail views of the driving mechanism for the drill spindles. Fig. 7, is a detail perspective view of the rail-clamping devices. Fig. 8, is a horizontal sectional view of the head of the drill press as shown in Figs. 1 and 2.

In a detail description of the invention, similar reference characters indicate corresponding parts.

1 designates an upright frame with a head 2, the lower portion of which supports rails 3. The head is movable up and down on the frame 1 and is clamped in the desired position. The clamping mechanism is not shown, but it may consist of any suitable clamping means. 4 is a feed table which also moves up and down on the frame 1 and is operated by means presently described.

5 is a vertical shaft through which motion is transmitted to the driving spindles 16 of the drill spindles. This shaft 5 extends up into the frame and carries at its upper end a miter gear 6, and at its lower end a similar gear 7, the latter gear being driven from the main power shaft 8 through belt pulleys 9. Meshing with the upper miter gear 6 is a similar gear 10 on shaft 11 which carries gears 12. Any desirable number of these shafts 11 may be employed according to the number of drill spindles, by gearing from the main one of said shafts by means of pinions 13, the main one of said shafts being that one which is directly driven from shaft 5. The shaft or shafts 11 have bearings at one end in the head 2, and at other portions in the oscillating bearings 14. The said shafts 11 run loosely in the bearings 14, and the said bearings 14 support wheels 15 which are on the driving spindles 16 which rotate the drill spindles 17^a, which rotate in holders 17. The driving spindles 16 before referred to project into an extended portion 18 of the oscillating bearings 14, and the lower ends of said driving spindles 16 are connected to the drill spindles 17^a by universal couplings 19, so that the drill spindles 17^a may always be in a perpendicular position, while their driving spindles 16 occupy an inclined position on either side of a perpendicular line. The worm wheels 15 run loosely in the oscillating bearings 14, and said bearings 14 may be moved to any desired position along the shafts 11; therefore, each drill spindle 20 may be moved back and forth on its shaft 11, and at the same time be swiveled to the proper position by means of the universal coupling 19. The rails 3 are clamped to the lower part of the head 2^a, and are received in the lower sides of said part 2^a by T slots which receive the rail clamp 3^a, so that the rails may be moved horizontally to carry the spindle holders 17 to the proper positions.

The drills 20 are set by shifting the rails 3 to the desired position along the part 2^a of the head, and in this manner the proper position for each drill spindle is obtained; the rails are then tightened by the clamps 3^a. I have thus described the two adjustments of the drill spindles for work, one by means of the rails 3 which throw the driving spindles 16 and the oscillating bearings 14 on the desired angle to place the drill spindles at the proper working place. The other adjustment being as before stated, along the shafts 11.

Referring to Fig. 5, when each of the oscillating bearings 14 is moved to the desired position, the same is clamped in such position by means of a bolt 21 which passes through a slot 22 in the head 2. Each slot 22 is in line with a driving shaft 11, and the bolts projecting through said slots engage a flange of the oscillating bearing 14, and by means of nuts 23, the bolts 21 are fastened so that the oscillating bearings 14 are held securely in position. The drill spindle holders 17 are clamped in the rails 3 by means of cap screws 23^a which penetrate slots 24 in the rails 3 and enter the holders 17 a suitable distance, so that in tightening the cap screws, the holders 17 will be drawn in rigid contact with the rails; the rails themselves are tightened in their adjusted positions by nuts 25. At each end of said rails, there is a stirrup or loop 26 which extends around the top and bottom thereof, and on both sides. At the bottom of the rail this stirrup is engaged by a cap 27 which is drawn upwardly when the nut 25 is turned, and the result is—the rail clamp 3^a is tightened in the portion 2^a of the head; the rails being thus drawn rigidly in contact with the lower portion of the head.

Referring now to the feed table 4, this moves upwardly by a worm shaft 28 which is engaged on opposite sides by gear wheels 29; the shafts 30 of these gear wheels are mounted in a bearing or arm 31 that extends from the feed table. The worm wheels 29 perform the function of nuts to raise and lower the table when the worm shaft 28 is given rotary movement, and said gear wheels 29 are kept from turning during the movement of the shaft 28 by means of a ratchet 32 on one of the shafts 30. This ratchet 32 is engaged by a pawl 33 which is pivoted on the feed table. It will be understood that the weight of the table will prevent the worm gear 29 from turning in an opposite direction. When this pawl engages the ratchet 32 as shown in Fig. 2, the worm wheels are locked against rotation. The worm shaft 28 is rotated by bevel gears 35 and 36^a, the former of which is on said worm shaft. The said worm shaft is rotated in one direction by gear 35 driven from main power shaft 8, and in the opposite direction by the worm shaft 36, the latter engaging a worm wheel 37.—See Fig. 4. The gears 37 and 35 run loosely upon the upright worm shaft 28 which moves the feed table. The worm shaft 28 is driven by clutch mechanism 38 which alternately engages the clutch collar 38^a of the gear 35, and the clutch collar 37^a of gear 37. The lever 39 is engaged by trip pieces 41 which are fast upon a rod 42 carried by the feed table 4. When the feed table has reached the upper limit of its movement, the lower trip piece 41 strikes the lever 39 and throws the upper clutch 38 in gear with the wheel 35, and when the lower limit of the table is reached, the position is as shown in Fig. 3, where the table is allowed to remain stationary. When the table is started, the clutch 38 is in gear with the lower gear 37; this is done by the hand moving the shifting lever 39. The worm shaft 36 is driven at variable speed by change-speed mechanism consisting of three or more spur gears 42 of different diameters; these gears are arranged upon the worm shaft in the following manner: The said gears run loosely upon the shifting sleeve 43, which in turn, runs loosely on the worm shaft. This sleeve 43 has a slot 44 with bevel edges. In the portion of the worm shaft 36 which is inclosed by said sleeve, there is mounted a series of three dogs 45 which are pressed outwardly by springs 46. The sleeve 43 is shifted to a certain extent upon shaft 36, the extent of such shifting being about equal to the combined width of three gears 42, and when the slot 44 in said sleeve is brought in line with any of the dogs 45, such dog is thrown out through said slot to engage with the adjacent spur wheel, and by this means any one of the spur wheels may be geared to the worm shaft. As shown in Fig. 3, the middle spur wheel is so engaged owing to the slot 44 in the sleeve being in a position to release the middle dog. Each spur wheel has a suitable recess to receive the dog operating therewith. The feed table 4 may be elevated independently of the feed mechanism to place said table in position for work, by means of the hand lever 34 which is loose on shaft 30—Fig. 2, and carries a pawl 34^b engaging the ratchet wheel 32 tight on shaft 30.

Having described my invention, I claim:

1. In a drill press, the combination with a series of spindles and holders therefor, means for permitting said holders to be laterally adjusted, of a series of driving spindles each connected respectively to said spindles by a universal joint, a gear on each driving spindle a gear in mesh with each spindle gear, an oscillating bearing concentric with each driving gear and in which said spindle gear is mounted, permitting said driving spindles to be moved out of perpendicular position, and means for rotating the driving gears supported in said oscillating bearings.

2. In a drill press, the combination with a series of spindles and holders therefor, means

for permitting said holders to be laterally adjusted, of a series of driving spindles connected to said holders by universal couplings, a driving gear on each of said driving spindles, a gear in mesh with each of the driving spindle gears, an oscillating bearing in which each of said driving gears is mounted and by means of which the driving spindles are movable out of perpendicular positions, a shaft supporting each oscillating bearing and along which each bearing is movable, and means for rotating the gears supported in said oscillating bearings.

3. In a drill press, the combination with a series of spindles and holders therefor, means for adjusting said holders laterally, of a series of driving spindles connected to said holders by universal joints, a driving gear on each of said driving spindles, an oscillating bearing supporting each of said driving gears, and by means of which the driving spindles are movable out of perpendicular positions, horizontal shafts upon which said oscillating bearings are slidingly mounted, and a series of shiftable rails engaging the spindle holders to adjust the positions thereof laterally.

In testimony whereof I affix my signature, in presence of two witnesses.

OLIVER L. DOSCH.

Witnesses:
C. M. THEOBALD,
R. J. MCCARTY.