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RADIAL DRILLING MACHINE.

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Referring more specifically to the drawing by reference characters, 1 indicates the base, 2 the column and 3 the vertically adjustable arm of a radial drilling machine. The column 2 is preferably divided as shown in Patent No. 1,071,690 and the arm 3 or a carrying member 8 thereon extends between the two parts of the column and is suitably guided therein for vertical movement. Rigidly mounted at the rear end of the arm is a gear casing 4 which carries an electric motor 5. Slidably mounted on the other end 9 of the arm is a saddle 6 carrying a head 7 provided with a rotatable drill spindle 8. A driving shaft 9 extends longitudinally of the arm and is operatively connected to the spindle by means of bevel gears 10 and a short shaft 11.

Mounted on the shaft of the motor 5 is a pinion 12 which meshes with a gear 13 loosely mounted on the shaft 9. Connected with the gear 13 is a pinion 14 which meshes with a gear 15 on a countershaft 16. Mounted on the shaft 16 is a pinion 17 which is adapted to mesh with a gear 18 splined on the shaft 9 and movable by means of a hand lever 19. With the parts in the position shown in Fig. 1, the shaft 9 is driven at a relatively low speed indirectly from the motor through the countershaft 16. When the gear 18 is moved toward the left, it is disengaged from the pinion 17 and is engaged with clutch teeth on the end of the pinion 14, thus making a direct high speed drive from the gear 15 to the shaft 9.

It will be understood that the entire gear mechanism as described is mounted within the casing 4 and that this casing with the gearing and motor 5 is vertically movable with the arm 3.

As shown specifically in Patent No. 1,385,294, the head 7 may be rotatably adjusted about the shaft 11 on the saddle 6 by means of an operating shaft 20. The drill supporting portion 8 of the arm 3 is adapted to be rotatably adjusted about the arm shaft 9. The improved means for so adjusting the arm from the arm shaft 9 as hereinafter described comprises the main feature of this invention.

As shown specifically in Figs. 2 and 3, the drill supporting portion 8 of the arm 3 is rotatably mounted on a hub 21 of the carrying member 8 slidable vertically in the column 2 and such portion may be rigidly...
secured to the member 3° by means of bolts 22. The bolts are mounted in the part 3° and the heads thereof engage within an annular T-slot 23 in the member 3°. By tightening the nuts 24, the part 3° may be rigidly secured in adjusted position to the part 3°.

Secured to the end of the part 3° of the arm by means of screws 25 and pins 25° is an annular flanged member 26 provided with internal gear teeth 27, such member being positioned between the parts 3° and 3°. A bracket member 28 bolted to the member 3° engages the outer end of the gear 26 whereby to hold the arm portion 3° positioned on the hub 31. Pins 29 and 30 respectively on the parts 3° and 3° limit the rotary adjustment of the arm portion 3°.

Rotatably mounted in the part 3° are two pins 31 and 32. A portion of pin 31 is formed into a pinion 33 in mesh with a pinion 34 on the pin 32, the pinion 34 being in mesh with the internal gear teeth 27. Keyed to the outer end of the pin 31 is a gear 35. A pinion 36 forming a part of a sleeve 37 is splined on the shaft 9 for longitudinal movement into and out of mesh with the gear 35. A spring pressed detent 38 within a hand gripping portion 39 of the sleeve normally holds the pinion 36 disengaged from the gear 35. When it is desired to rotatably adjust the portion 3° of the arm, the operator loosens the nuts 24 and engages the pinion 36 with the gear 35.

An operative connection is thus made with the motor 5 whereby the arm may be rotatably adjusted therefrom.

The arm 3 may be moved vertically on the column from the motor as follows: A screw 40 is supported by the column at its upper end 41. A nut 42 provided with a bevel gear 43 thereon is rotatably mounted in the portion 3° of the arm and in threaded engagement with the screw. A bevel gear 44 on a shaft 45 coaxial with the shaft 16 is in mesh with the bevel gear 43. A clutch 46 shiftable by a handle 47 is adapted to connect shaft 16 with the shaft 45. A driving connection is thereby established between the motor 5 and nut 42 whereby such nut may be rotated in either direction to elevate or lower the arm 3.

What I claim is:

1. A radial drilling machine comprising the combination of a column, an arm movable vertically thereon, drill spindle supporting means on the arm, rotatable thereon, drill spindle supporting means on the arm, a drill spindle rotatably mounted therein, means including a power operated shaft extending longitudinally through the arm for rotating the drill spindle, and means adapted to be operated from the said shaft for rotatably adjusting the spindle supporting portion of the arm about the shaft.

2. A radial drilling machine comprising the combination of a column, an arm movable vertically thereon, drill spindle supporting means on the arm, a drill spindle rotatably mounted therein, means including a power operated shaft extending longitudinally through the arm for rotating the drill spindle, and means adapted to be operated from the said shaft for rotatably adjusting the spindle supporting portion of the arm about the shaft.

3. A radial drilling machine comprising the combination of a column, an arm movable vertically thereon, screw threaded means for moving the arm vertically, drill spindle supporting means on the arm, a drill spindle rotatably mounted therein, a shaft extending longitudinally of the arm and operatively connected to the spindle, power means for operating the shaft and the said screw threaded means, and means adapted to be operated from the said shaft for rotatably adjusting the spindle supporting portion of the arm about the shaft as an axis.

4. A radial drilling machine comprising the combination of a column, an arm movable vertically thereon, drill spindle supporting means on the arm at one side of the column, a drill spindle rotatably mounted therein, a motor on the arm at the other side of the column, means including a shaft extending longitudinally of the arm operatively connecting the motor with the spindle, and means adapted to be operated from the said shaft for rotatably adjusting the spindle supporting portion of the arm about the shaft.

5. A radial drilling machine comprising the combination of a column, an arm movable vertically thereon, drill spindle supporting means on the arm, a drill spindle rotatably mounted therein, means including a power operated shaft extending longitudinally through the arm for rotating the drill spindle, and driving including a pinion slideable on the shaft into and out of operative position for rotatably adjusting the spindle supporting portion of the arm about the shaft.

6. A radial drilling machine comprising the combination of a column, an arm movable vertically thereon, one portion of the arm being supported by the column and another portion thereof being mounted on the first portion for rotary adjustment about a horizontal axis extending longitudinally therethrough, drill spindle supporting means on the said adjustable portion of the arm, a drill spindle rotatably mounted therein, means for rotating the spindle, and power operated means including gearing supported respectively by the non-adjustable and the adjustable portions of the arm for rotatably adjusting the spindle supporting portion.
7. A radial drilling machine comprising the combination of a column, an arm movable vertically thereon, a power operated arm shaft extending longitudinally through the arm, one portion of the arm being supported by the column and another portion thereof being mounted on the first portion for rotary adjustment about the shaft, drill spindle supporting means on the said adjustable portion of the arm, a drill spindle rotatably mounted therein and operatively connected to the shaft, and means including a gear on the shaft connected to gearing on the non-adjustable and the adjustable portions of the arm for rotatably adjusting the spindle supporting portion about the shaft.

In testimony whereof, I hereeto affix my signature.

HAROLD L. BLOOD.