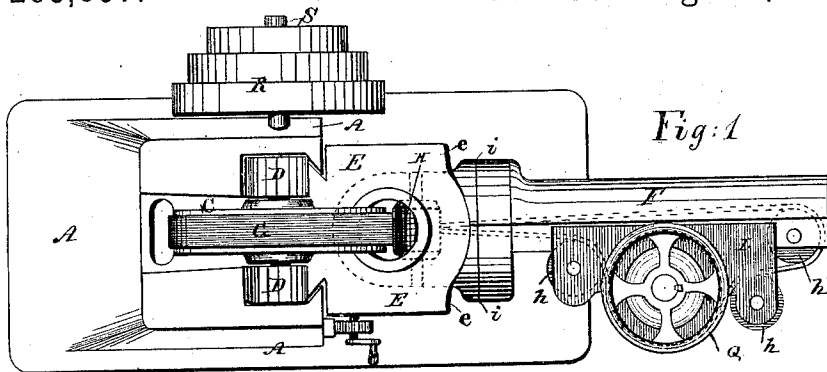
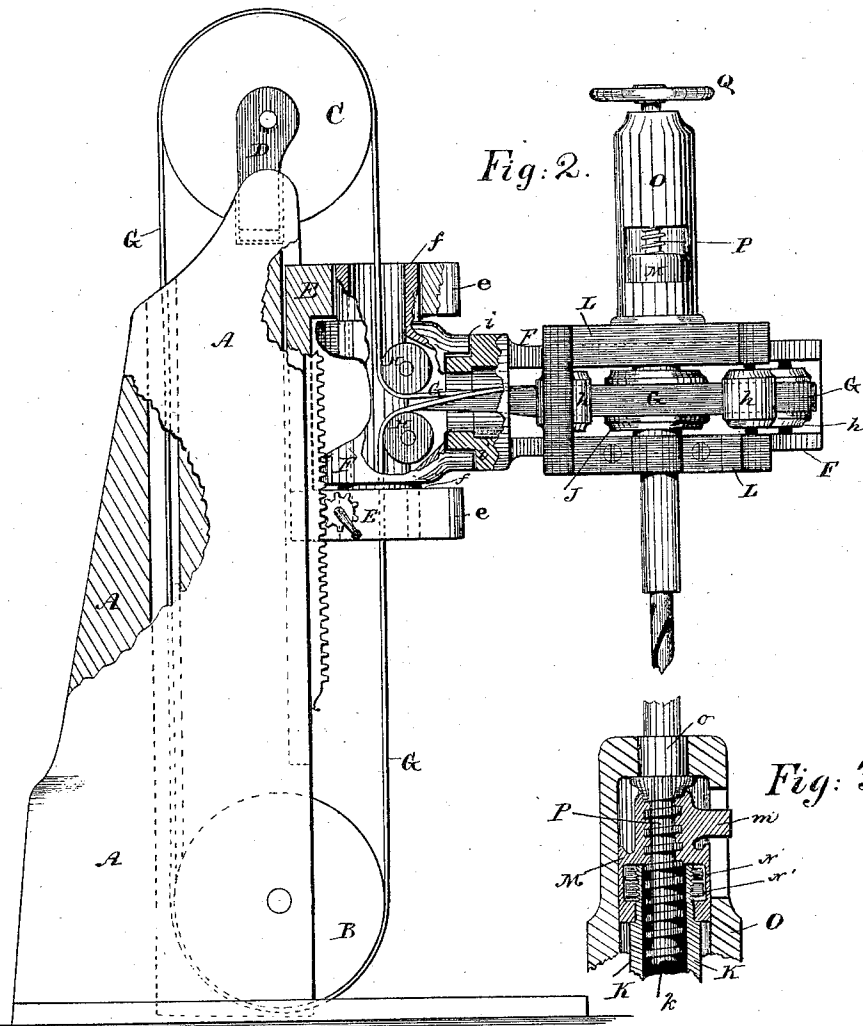
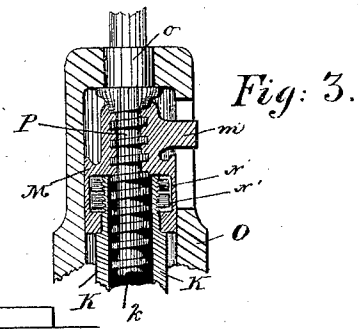


(No Model.)

A. BOX.
RADIAL DRILLING MACHINE.

No. 283,857.

Patented Aug. 28, 1883.



Witnesses
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UNITED STATES PATENT OFFICE.

ALFRED BOX, OF PHILADELPHIA, PENNSYLVANIA.

RADIAL DRILLING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 283,857, dated August 28, 1883.

Application filed March 12 1883. (No model.)

To all whom it may concern:

Be it known that I, ALFRED BOX, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Radial Drilling-Machines, of which the following is a specification.

My invention relates to a radial drilling-machine, being an improvement on the machine described in my Patent No. 184,060, granted November 7, 1876, the object of the invention being to produce a machine in which power shall be transmitted to the drill-spindle, in whatever position it may occupy, by a belt in place of bevel-gears and shafting, heretofore employed, by this means providing a simpler, cheaper, and less noisy machine.

The present improvement particularly consists, first, in the provision, in lieu of the oscillating rod supporting the driving and idle pulleys within the column, of bearings for the said driving and idle pulleys, fixed as to horizontal rotation, the desired movement of the radial arm in a horizontal plane being attained by pivoting it vertically, by means of hollow journals, in a slide traveling vertically on the side of the column. By this means the universal joint shown in the above-described patent is dispensed with, and I am enabled to so support the bearing of the upper or idle pulley, before mentioned, as to adapt it to be vertically shifted to take up slack in the belt.

The invention consists, second, in an improved thrust-bearing for the drill-spindle for facilitating the feeding of the drill and means for keeping the thrust-bearing constantly lubricated.

In order that my invention may be fully understood, I will proceed to describe it with reference to the accompanying drawings, in which—

Figure 1 is a plan, and Fig. 2 is a side elevation, of my improved drill-press. Fig. 3 is an axial section of the improved thrust-bearing.

A is the stationary supporting-column of the improved drill-press, B the driving-pulley, and C an idle-pulley. The idler C is mounted in a frame, D, which is vertically adjustable in grooves in the sides of the column A. The

frame D is wedged or otherwise forced upward in its ways when it is desired to tighten the belt. Motion is communicated to the driving-pulley B by customary cone-pulleys R through shaft S.

Traveling within a vertical dovetail groove on one side of the column A is a slide, E, having upper and lower horizontal arms, *e e*, between which is supported, by vertical journals *f f*, the radial arm F. The journals *f f* are made hollow, as shown, to receive the belt G, which runs over driving-pulley B and idle-pulleys C H H, and is twisted within the hollow arm by means of the vertically-journaled idle-pulleys *h h h'*. The arm F is jointed at *i*, the two parts being held together by suitable tongue and groove to allow the outer member freedom of rotation and thus enable the working of the drill at various angles. The pulleys *h h* and J are all supported upon the carriage L, which is capable of longitudinal movement on the outer portion of arm F. The sheave J surrounding the drill-spindle K imparts the movement of the belt thereto by tongue and groove or other suitable connection, allowing the axial movement of the drill-spindle within the sheave.

The improved thrust-bearing is illustrated more clearly in Fig. 3, where the drill-spindle K is shown drawn up to its extreme position. The upper end of the drill-spindle is shouldered and screw-threaded externally, and has bearing within a socket in the bottom of a casing, M, called the "thrust-bearing." Nut N and jam-nut N' retain the spindle and permit the taking up of wear on its bearing-shoulder. To hold the thrust-bearing to vertical movement only, I form on one side thereof a projection, *m*, which travels in a slot or groove in the side of vertical guide-sleeve cylinder O. The head of thrust-bearing M has an internal screw-thread within which works a screw, P, capable of turning by means of hand-wheel Q, or by power in any suitable manner, and having bearing at *o* in the head of the guide-cylinder O. It is apparent that by turning the hand-wheel Q the thrust-bearing M will be raised or lowered, carrying with it the drill-spindle, whether the latter be rotating or not. The upper end of the drill-spindle is recessed or socketted, as shown at *k*, to allow the screw to work

freely therein, thus economizing space by enabling the telescoping of these parts. The said socket is also utilized as an oil-cup, serving by the motion of the screw therein to keep the screw and spindle-bearings both constantly lubricated.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

10 1. The combination, with the main supporting-column, of the vertically-adjustable slide carrying a radial drill-arm, having hollow vertical journals bearing in the said slide, substantially as set forth.

15 2. In the radial drilling-machine, substantially as hereinbefore described, the stationary supporting-column A, having the driving-pulley B in the base thereof, in combination with the frame D, vertically adjustable in the top of
20 the supporting-column A for the purpose of

taking up slack in a driving-belt, and provided with an idle-pulley, C, as set forth.

3. In the radial drilling-machine, substantially as hereinbefore described, the vertically-adjustable thrust-bearing, socketed in its lower end and screw-threaded in its upper end, provided with a nut and jam-nut adapted to retain the spindle and to take up the wear on its bearing-shoulder, substantially as set forth.

4. The combination, with socketed and screw-threaded thrust-bearing, of the socketed drill-spindle supported therein, the guiding sleeve or cylinder and the feeding-screw bearing in the guide and thrust-bearing, substantially as set forth.

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Witnesses:

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