

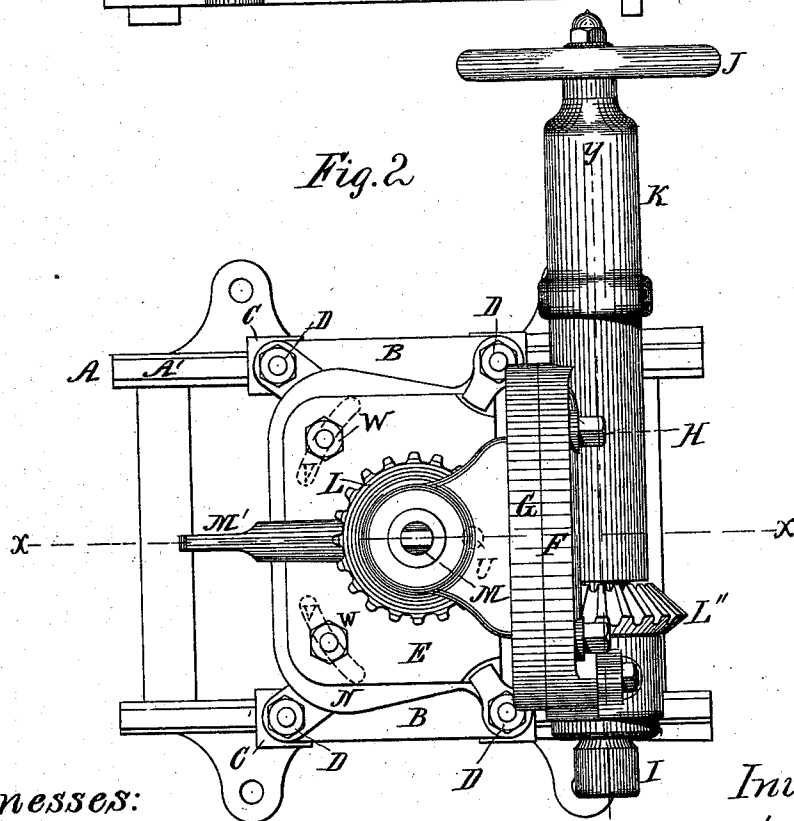
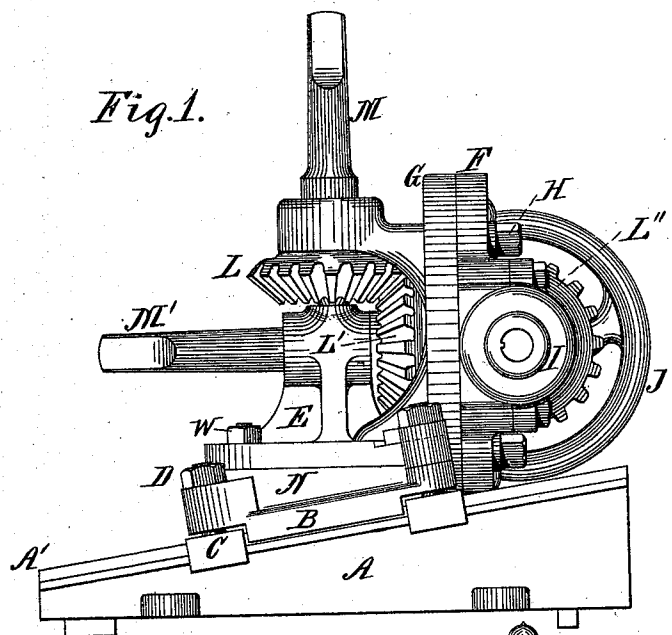
(No Model.)

4 Sheets—Sheet 1.

P. LEEDS.
DRILL.

No. 402,170.

Patented Apr. 30, 1889.



Witnesses:
W. C. Jiradinson.

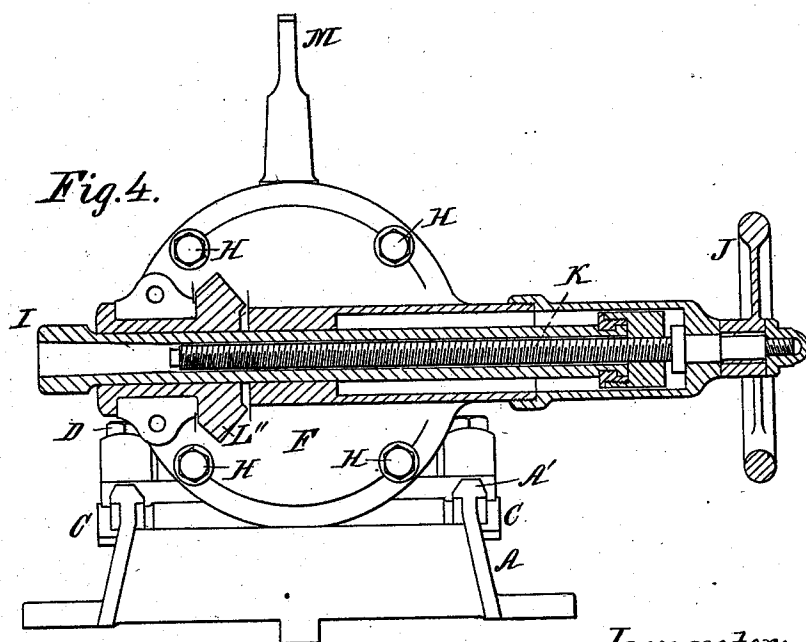
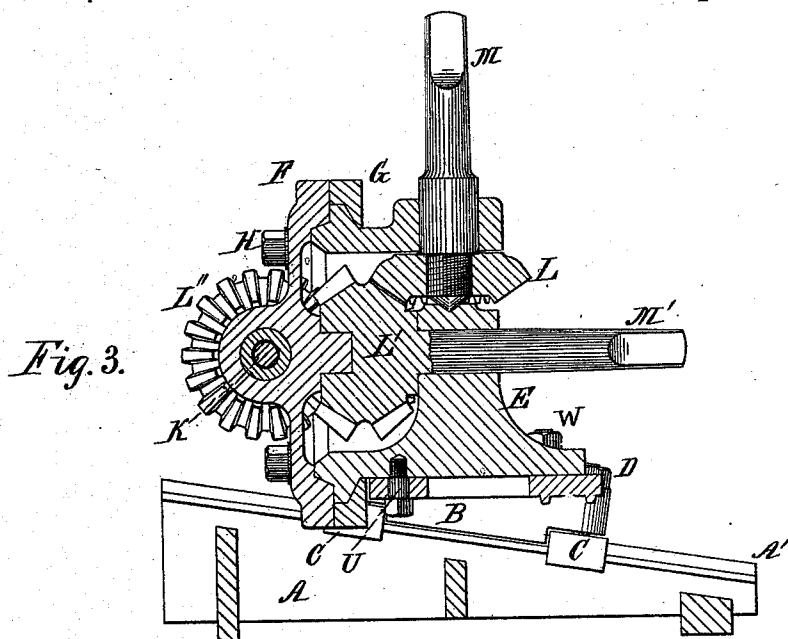
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Fig. 5.

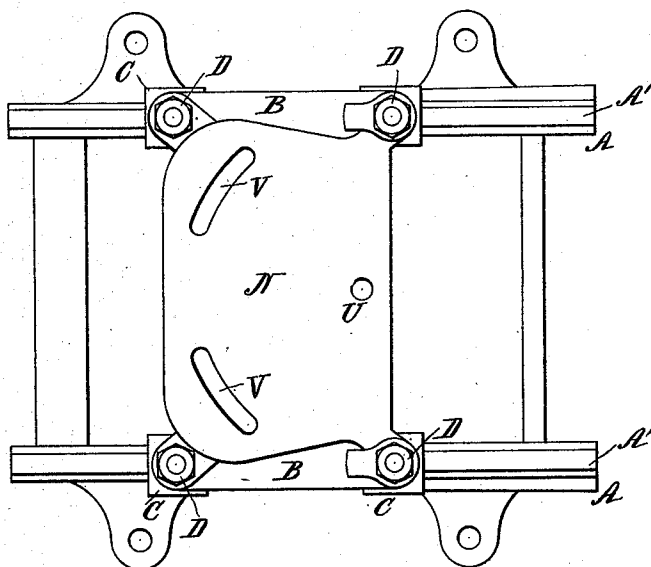


Fig. 6.

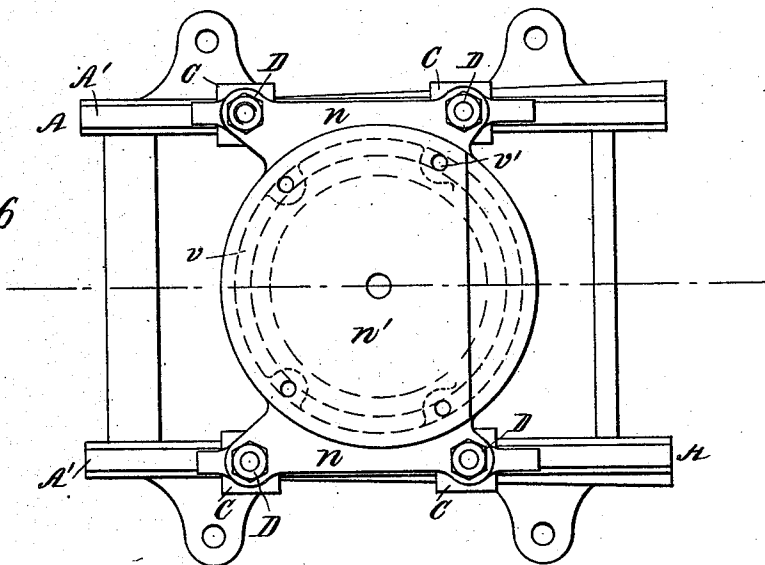
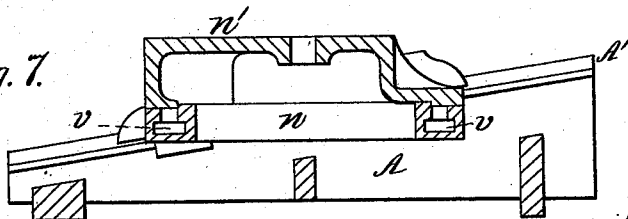


Fig. 7.



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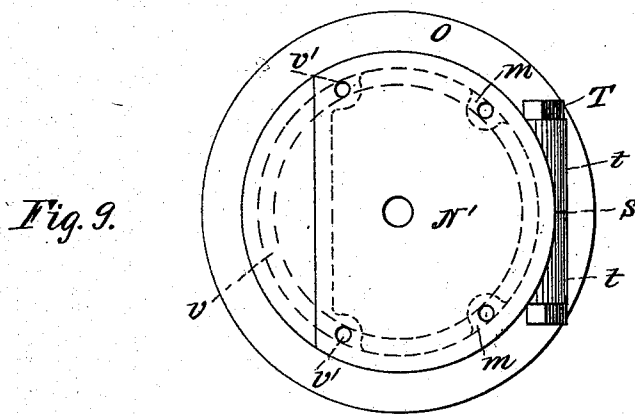
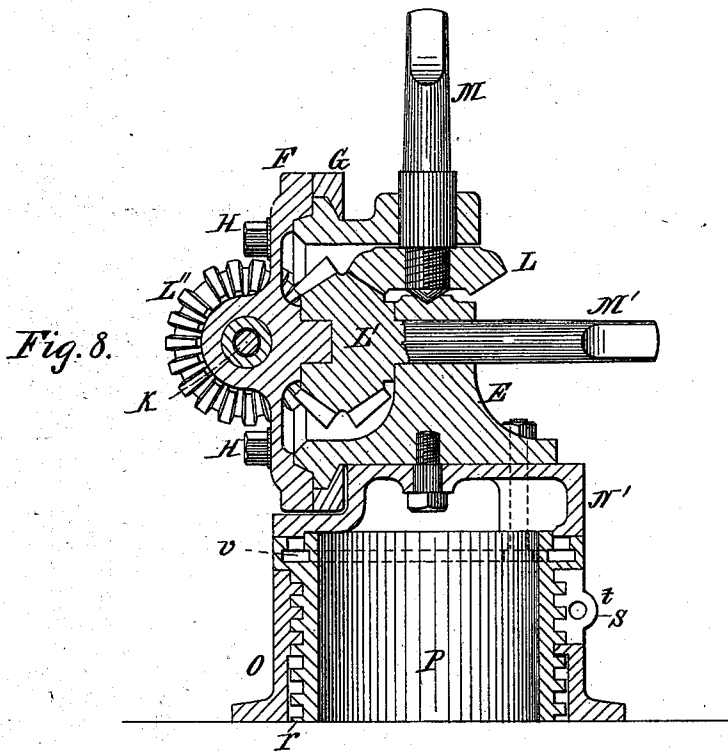
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UNITED STATES PATENT OFFICE.

PULASKI LEEDS, OF LOUISVILLE, ASSIGNOR TO R. T. MILLER, OF COVINGTON, KENTUCKY.

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SPECIFICATION forming part of Letters Patent No. 402,170, dated April 30, 1889.

Application filed December 17, 1888. Serial No. 293,817. (No model.)

To all whom it may concern:

Be it known that I, PULASKI LEEDS, a citizen of the United States, residing at Louisville, State of Kentucky, have invented certain new and useful Improvements in Universal Drills, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to an improvement in drill-presses, and provides certain means of adjustment by which the drill may be set at different heights and directed at different angles.

Figure 1 represents the improved drill-press in elevation. Fig. 2 is the same in plan. Fig. 3 is a vertical section through xx , Fig. 2. Fig. 4 is an elevation with section through yy , Fig. 2. Fig. 5 is a plan with the upper portions removed. The remaining four figures relate to modified forms of construction.

A is a bed, consisting, essentially, of two parallel inclined T-rails, A' . The base-pieces B rest upon the rails and form part of the table N, the upper surface of which is flat and horizontal to support the parts above. Two circular slots, v , Fig. 2, are cut in table N to receive the bolts W, which project downward from frame E, carrying the drilling mechanism, and which, when loosened, allow of a limited horizontal rotation of E upon N about the pivot-bolt U, and when tightened clamp the support E firmly to the base N. Blocks C clasp the rails, as shown at Fig. 4, on their lower edge, and, with the bolts D extending therefrom and passing through the projecting corners of the base B, serve to clamp the base B at any desired point of the bed.

E is a supporting-frame, having a plane surface at the bottom, resting on N and pivoted to it at U, Fig. 3. The supporting-frame E is fashioned with suitable bearings to receive the horizontal and vertical spindles M M' , carrying, respectively, the bevel-wheels L L' , which gear into each other, and to it is also secured the supporting-frame F by means of the ring G, the form and relations of which are shown in the sectional drawing, Fig. 3. The ring G is secured, Fig. 3, to the supporting-frame F by the bolts H, which are loosened to allow the frame F to rotate thereon in a vertical plane

and are tightened to secure the frame F at any angle desired. The support F carries the drill-stock I and the bevel-wheel L'' , by which a drill inserted at I is operated at any vertical angle, and which is fed by the usual screw mechanism. (Shown in Figs. 2 and 4.) The bevel-wheel L'' receives its motion from the double bevel-wheel L' , which in turn receives its motion either from the spindle M' or through the bevel-wheel L and spindle M, as convenience may require.

Figs. 6 and 7 show a modification of my devices to provide for complete horizontal rotation of the drill mechanism. In this form the base n has a slot, v , which is a complete circle, in which screw-bolts v' work, attaching the revolving base n' , allowing it to be rotated or clamped accordingly as the bolts are loosened or tightened. The supporting-frame E is bolted to the base n' , as in Fig. 8, carrying its attachments as described above.

Still another modification is shown in Figs. 8 and 9, in which, instead of the inclined base A, previously described, a cylindrical base, O, is provided, the interior of which is threaded with a screw, fitting into which is the exterior screw of an interior cylinder, P, having at its top a plane surface and a circular slot, v , the use and construction of which being the same as described above in connection with Figs. 6 and 7. The outer cylinder, O, is split downward vertically on one side about half-way, as shown at S, to allow of its being tightened upon the inner cylinder by the bolt T, passing through the lugs t , which bolt being loosened, the inner cylinder, P, turns freely within the outer cylinder, O, thus by means of the screw v adjusting the drill to any desired height.

The bases B and O, the clamp C, and the frame A are not parts of my invention, but are shown as means for securing my drill to the bench and for raising and lowering said drill as convenience in working may require.

I claim as my invention—

1. A universal radial drill having horizontal and vertical angular adjustments, consisting of supporting-frame F, carrying the drill-stock I and the bevel-wheel L'' , the bearings of the shaft, which are secured by the ring G to the supporting-frame E, said frame

carrying the bevel-wheel L, the double bevel-wheel L', and the driving-spindles M and M', and being pivoted to a slotted base-plate, as shown and described.

5 2. In a universal drill, the combination of the horizontally-rotatable frame E, carrying suitable driving-shaft, and the vertically-rotatable frame F, supported on the frame E and carrying suitable drill-shaft, said
10 shafts having suitable connecting-gearing, for the purposes explained.

3. In a universal drill, the combination, with a suitable drill and its movable support or supports, of two driving-shafts gearing
15 with said drill and projecting in different directions for convenience in driving the drill when in its different positions, as fully explained.

4. In a universal drill, the combination, with
20 the horizontal rotatable frame and the drill and drill-shaft carried thereby, of additional drive-shaft gearing with the first and extend-

ing at right angles therefrom for convenience in driving when the first shaft is out of reach, as explained.

5. In a universal drill, the combination of a suitable base, a horizontally-rotatable supporting-frame mounted on the base, a horizontal driving-shaft, a vertical driving-shaft, a vertically-rotatable supporting-frame
30 mounted on the horizontal frame, and a suitable drill mounted on the vertical frame and gearing with the said driving-shafts, said frames being also provided with suitable clamping devices, all substantially as set
35 forth.

The foregoing specification of my invention signed by me this 27th day of October, A. D. 1888.

PULASKI LEEDS.

Witnesses:

P. J. CADWALLADER,
JEPHTHA GARRARD.