(No Model.)

W. H. WARREN.

RADIAL DRILLING MACHINE.

No. 453,780 Patented June 9, 1891.

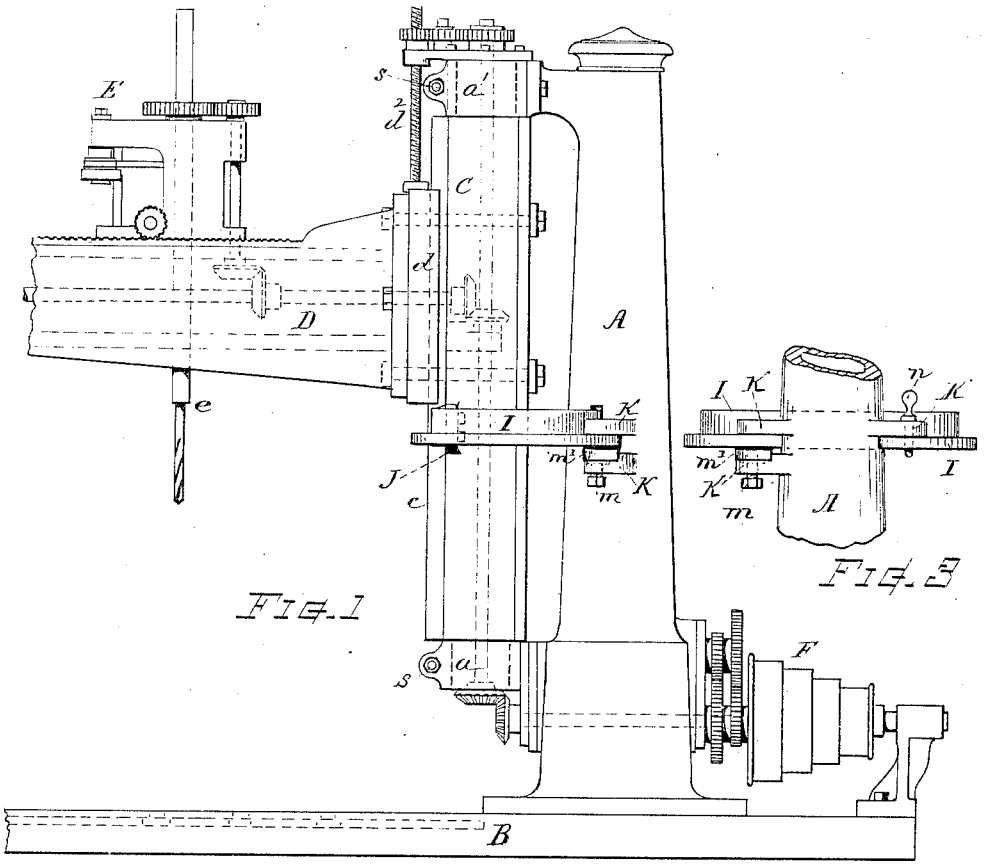

FIG. 1

FIG. 3

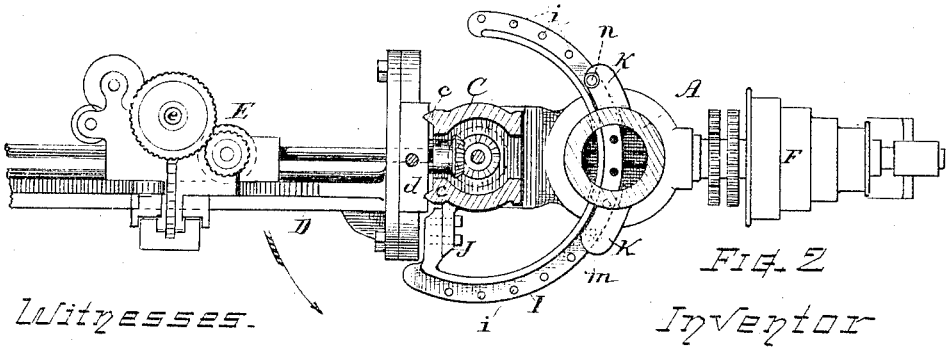

FIG. 2

Witnesses.

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WILLIAM H. WARREN, OF WORCESTER, MASSACHUSETTS.

RADIAL DRILLING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 453,780, dated June 9, 1891.

Application filed January 29, 1891. Serial No. 379,503. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. WARREN, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Radial Drilling-Machine, of which the following, together with the accompanying drawings, is a specification sufficiently full, clear, and exact to enable persons skilled in the art to which this invention appertains to make and use the same.

The object of my present invention is to provide in a radial drilling-machine an efficient means whereby the pivoting-post that supports the radial arm and drilling mechanism carried thereon is braced and sustained against displacement by lateral pressure on the radial arm while affording facility of adjustment to the various positions and without interfering with the adjustment of the radial arm to all positions within the range of its various movements.

To this end my invention consists in providing, in connection with the pivot-post, a circular supporter or swing-brace that operates in conjunction with the fastening devices combined with the standard-column, whereby said brace can be locked, clamped, or retained at any position required for giving rigid support against rotative movement of the pivot-post and horizontal swing of the radial arm and drilling mechanism carried thereon.

In the drawings, Figure 1 is a side view of such portions of a radial drilling-machine as will illustrate the nature of my invention. Fig. 2 is a horizontal sectional view of the same; and Fig. 3 is a back view of a portion of the standard-column, circular brace, and fastening devices.

Referring to parts, A denotes the standard-column fixed in upright position upon the floor-table B and standing about nine feet (more or less) in height.

C denotes the upright pivot-post, having its upper and lower ends pivotally supported in bearings *a* and *a'*, fixed on the standard-column, and fitted on its front side with vertical guideways *c*, whereon the head-plate or slide *d* of the radial arm D is adjustably fitted in a manner to be shifted up or down on said guides *c*, as desired, by the power-screw d^2 or otherwise.

D indicates the radial arm carrying the head or drill mechanism E, with the drill-spindle *e* and feed devices, all suitably mounted and adjustable to any desired position. Power and motion are transmitted to the drill from the pulleys F by means of the system of shafts and gearing arranged in the usual well-known manner.

The drill-head mechanism and means for effecting operation and adjustment of the drilling-tool, being all well known and not features of my present invention, are not illustrated in detail, and need not be herein more fully described.

I indicates a swing-brace circular arm or segment, one end of which is rigidly attached to the side of the pivot-post, or to an ear-piece or boss J, formed therein in such manner that the rim or circle of the brace is concentric with the pivoting-axis of the post C. Said swing-brace passes around or through the standard-column, and is disposed in conjunction with lugs or projections K fixed thereon. It is made of sufficient length to accommodate the pivotal movement or swing of the radial drill-supporting arm D from its foremost to its rearmost limit of adjustment. The brace is preferably made in annular form, with a horizontal rim and an upward flange, as indicated, and is provided with a series of holes or recesses *i* for engagement with a locking dog or pin *n*. The lugs or projections K, fixed on the column A, embrace the circular brace, and a clamp device *m'* or screw *m* is arranged thereon for firmly clamping the rim, as indicated, or in other equivalent manner, for securely retaining or holding said swing-brace at any position of adjustment. In one lug or projection K, fixed on the standard-column, is arranged a locking dog or pin *n*, that engages any one of the holes or recesses *i* in the brace-circle for positively holding the same at intervals of adjustment corresponding with the spacing of the several recesses.

In former practice it has been customary to hold the adjusted position of the radial arm D by tightening the pivot-bearings *a a'* by means of their caps or clamp-screws *s*, so

as to give friction on the pivots of the post C; but when using the drill in horizontal position the strain and pressure tending to swing the arm are so great that it is very difficult to attain sufficient friction at the pivot-bearings to sustain the strain; but with my improvement the curved brace I acts to give the desired degree of rigidity to the pivot-post and to sustain the radial arm against lateral pressure in a very firm and substantial manner. In the present instance I have shown the circular brace as attached to the central part of the pivot-post; but, if preferred, it might be disposed at the upper end of said post, or at the lower end of the same, or at such position as may be deemed preferable in any particular instance; also, if in any instance preferred, instead of passing the circular brace through an opening in the standard-column, it can be made to pass around or adjacent to the outer surface of the column, the lugs K and clamping devices being located upon the column more or less near the outer or inner side thereof to accommodate the position of the brace. This would simply involve a variation in the diameter of the circle on which the brace is formed without material change in structure or operation.

I claim as my invention herein to be secured by Letters Patent—

1. In a radial drilling-machine, the combination, with the standard-column, the upright rotatable pivot-post provided with the vertical guideways, and the radial arm carrying the drilling mechanism mounted thereon, of a swing-brace segment attached to the upright pivot-post and arranged to swing through a recess in said standard-column, and a locking device in connection with the standard-column that engages said swing-brace segment for retaining the parts at positions of adjustment and sustaining said radial arm against lateral pressure, substantially as set forth.

2. The combination, with the standard-column, the upright pivot-post mounted in bearings upon said column, and the radial arm carrying the drilling mechanism supported thereon, of the curved brace having one end rigidly attached to said pivot-post, its arm disposed in conjunction with lugs fixed on said standard-column, and the clamp-screw or binding device connected therewith for clamping said brace in connection to said column, substantially as and for the purpose set forth.

3. The combination of the standard-column A, the pivot-post C, mounted in bearings on said standard-column, the semicircular brace I, rigidly attached at one end to said pivot-post and provided with a perforated or recessed flange that passes through or between projecting lugs K on said standard-column, and the adjustment lock or pin *n*, that engages said recessed flange, substantially as and for the purpose described.

Witness my hand this 26th day of January, A. D. 1891.

WILLIAM H. WARREN.

Witnesses:
CHAS. H. BURLEIGH,
EDWARD WRIGHT.