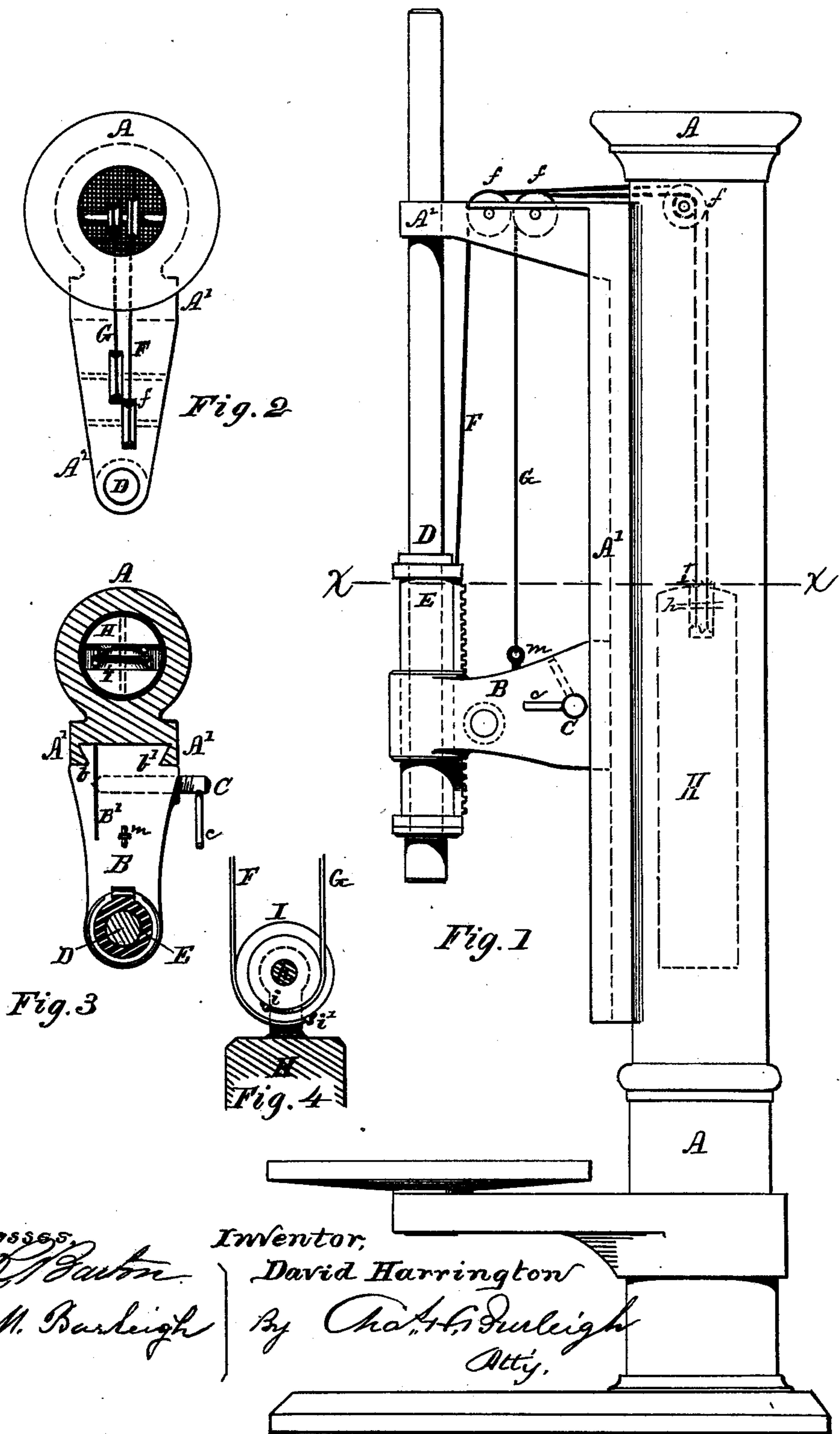


D. HARRINGTON.  
Metal-Drilling Machine.

No. 214,035.

Patented April 8, 1879.



Witnesses,

*E. M. Barleigh*

Inventor,

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Att'y.

# UNITED STATES PATENT OFFICE.

DAVID HARRINGTON, OF WORCESTER, MASSACHUSETTS.

## IMPROVEMENT IN METAL-DRILLING MACHINES.

Specification forming part of Letters Patent No. 214,035, dated April 8, 1879; application filed August 12, 1878.

*To all whom it may concern:*

Be it known that I, DAVID HARRINGTON, of Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Upright Drills; and I declare the following to be a description of my said invention sufficiently full, clear, and exact to enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a side view of such parts of an upright drill as are necessary to illustrate my invention. Fig. 2 is a plan view at the top of the same. Fig. 3 is a horizontal section on line *x x*, Fig. 1; and Fig. 4 shows the arrangement of the sheaves and chains at the top of the counterbalance-weight.

The object of my invention is to provide a convenient and efficient means for balancing and adjusting the sliding head and spindle in upright drilling-machines; and my invention consists in a counterbalancing mechanism constructed and organized for operation in the peculiar manner hereinafter set forth.

In the drawings, A denotes the main column or upright frame provided with dovetailed guides or ways *A*<sup>1</sup> and spindle-bearing or top guide, *A*<sup>2</sup>, as shown. B denotes the sliding head, the rear end of which is fitted to the ways *A*<sup>1</sup>, for supporting and guiding it in the proper vertical position. Said rear part of the head B is also bifurcated or slotted vertically at *B'*, and a screw, C, is arranged transversely to said slot, for the purpose of forcing the bearing-surfaces on the two portions *b b'* of the head against the bearing-surfaces on the ways or guides *A*<sup>1</sup>, and thus clamp the head B firmly at any adjusted position when desired.

The spring of the metal of the head is sufficient to loosen the joint when the screw-pressure is released, so as to permit the head to move freely up and down on the guides, though not enough to give lateral play between the parts.

A hand-lever, *c*, from the head of the screw C projects toward the front of the drill, so that the clamping devices can be conveniently operated by raising or depressing the end of

said lever *c* while standing at the front of the machine.

When the rear part of the head is of considerable width, two or more screws, C, may be employed for clamping the head in position, if desired.

The forward part of the head is provided with a guide-bearing for the drill-spindle D and feed-quill E, and arranged for supporting the feeding devices, (not herein shown,) which latter, together with the driving mechanism, may be constructed in the ordinary well-known manner, and therefore require no further description herein.

The counterbalancing devices (by means of which the drill-spindle D, and quill E, and the sliding head B are balanced by a single weight in such manner that either can be moved separately or both together, at pleasure, while remaining in proper balance or equilibrium) are constructed and organized to operate as follows: Cords or chains F and G are connected, respectively, with the quill or spindle E D and head B, which chains F G pass over suitable guide-pulleys *f* at the top part of the frame A and extend to the counter-weight H, which hangs within the hollow of the column A, as indicated. Said weight is provided with a double pulley or sheave, I, supported to turn easily on the pin or axis *h*, and to the peripheries of the two parts of the sheave I, at opposite sides, the cords or chains F G are secured, as indicated at *i i'*, Fig. 4, so that the unwinding of one of said chains from the sheave I will wind the other chain onto the sheave, and vice versa.

The two parts of the double sheave I are made of different diameters, their sizes being proportioned in accordance with the relative proportional weight of the head and spindle devices to be balanced, while the counter-weight is sufficiently heavy to balance both.

In case the spindle and head devices were of equal weight, the parts of the sheave I could be of equal diameter, or a single-grooved sheave could in such cases be used. Ordinarily, however, the spindle and head vary much in weight, which variation is met by the variation in diameter of the two parts of the sheave I.

It will be observed that with the balance device constructed as above described the parts are each comparatively perfectly balanced, so that either can be moved without reference to the other, or both may be moved together, while the balance is equally effective at any position in which the parts may be placed.

The eye *m*, connecting the chain *G* to the head-block *B*, may be arranged at any position best suited to balance said head-block and the mechanism supported thereon, so that there will be no tendency to cramp on the guideways *A*<sup>1</sup>.

By dividing the head-block at *B'* and clamping its two parts *b b'* to the ways *A*, a cheap and convenient fastening is provided, while no packing is required for the wearing bevels, and less care is required in fitting the parts to each other.

In lieu of forcing the parts *b b'* outward, the head may be made to embrace the guides, and the head be clamped thereto by drawing the parts *b b'* toward each other. I prefer, however, the construction herein shown.

Having described my improvement in upright drills, what I claim therein as of my invention, and desire to secure by Letters Patent, is—

1. In combination with the drill-spindle *D*, its quill *E*, and sliding head *B*, the counter-weight *H*, provided with the sheave *I*, and the cords or chains *F G*, substantially as and for the purpose set forth.

2. The combination, with a sliding head and drill-spindle and quill, of the counter-weight *H*, provided with double sheave or pulley *I*, having parts of unequal diameter, and the cords or chains *F* and *G*, attached to opposite sides thereof at *i i'*, as and for the purpose set forth.

3. The improved drill hereinbefore described, consisting of the drill-frame *A*, provided with guideways *A*<sup>1</sup>, the slotted head-piece *B B'*, fitted to said ways, with the clamping-screw *C*, the drill-spindle and quill *D E*, the counter-weight *H*, cords or chains *F G*, pulleys, and attaching-sheave *I*, combined and organized for operation as and for the purposes set forth.

Witness my hand this 8th day of August, A. D. 1878.

DAVID HARRINGTON.

Witnesses:

CHAS. H. BURLEIGH,  
GEO. M. RICE,