(No Model.) 2 Sheets—Sheet 1.

# J. D. COX, Jr.

## MACHINE FOR BACK CLEARING TWIST DRILLS.

No. 407,577. Patented July 23, 1889.

Fig. 6.

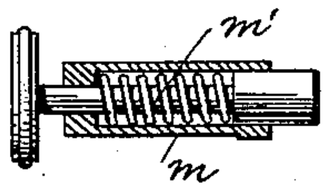


Fig. 1.




Fig. 8.




Fig. 7.




Fig. 4.







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(No Model.) 2 Sheets—Sheet 2.

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## MACHINE FOR BACK CLEARING TWIST DRILLS.

No. 407,577. Patented July 23, 1889.

Fig. 2.

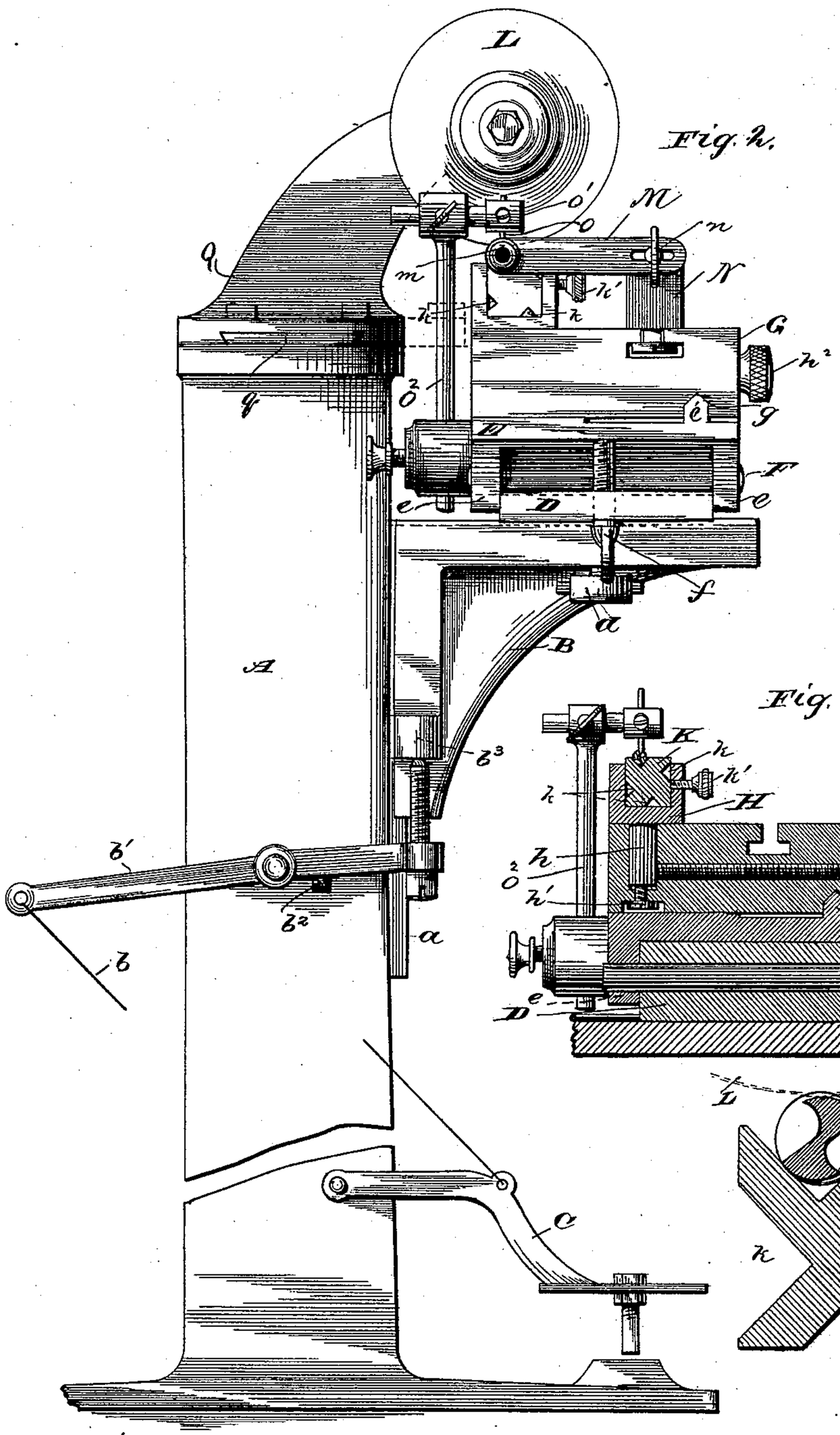


Fig. 3.




Fig. 5.




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# UNITED STATES PATENT OFFICE.

JACOB D. COX, JR., OF CLEVELAND, OHIO, ASSIGNOR TO COX & PRENTISS, OF SAME PLACE.

## MACHINE FOR BACK-CLEARING TWIST-DRILLS.

SPECIFICATION forming part of Letters Patent No. 407,577, dated July 23, 1889.

Application filed January 24, 1887. Serial No. 225,254. (No model.)

*To all whom it may concern:*

Be it known that I, JACOB D. COX, Jr., a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Machines for Back-Clearing Twist-Drills; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to machines for back-clearing twist-drills, especially of the smaller variety, and has for its object to simplify and improve the machine for holding the drill while under the action of the abrading or grinding wheel.

My invention consists in certain features of construction and the combination of parts, hereinafter described, and more particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a front elevation of my invention, showing a drill partially cleared. Fig. 2 is a side elevation of the same. Fig. 3 is a transverse section on line *x x*, Fig. 1. Fig. 4 is a perspective view of my invention. Fig. 5 is a cross-section of a drill on its rest, showing the clearance. Fig. 6 is a longitudinal section of the spring-clamp for holding the drill; Fig. 7, the stop on the drill-holder, and Fig. 8 the guide-finger.

A represents the standard of the machine, and is provided with a dovetail slide *a* on its vertical front, upon which the bracket B is supported. This bracket is adjustable on the said dovetail support and may be raised above its position of rest thereon by means of the foot-lever C, pivoted upon the standard A, and connected with the bracket B by means of link *b* and arm *b'*, likewise pivoted upon the standard A. The lever C and the arm *b'* are each provided with a set-screw to govern and limit the action upon the bracket B, whereby the said bracket may be regulated in its upward movement, and when said parts are satisfactorily adjusted be lifted with unerring accuracy to the same height with each repeated depression of the foot-lever. The arm *b'* has a rest $b^2$ upon the standard A inside its pivot-point to prevent its dropping below a certain level, and its set-screw bears against a shoulder $b^3$ on the side of the bracket. The object of this chain of mechanism will appear farther on in the description.

Upon the horizontal surface of the bracket B is a bed-plate D, adjustable laterally in a guide or guides therein and held in adjustment by a set-screw, as at *d*. Upon this bed-plate is placed a second plate E, pivoted transversely at its center on a rod or spindle F, passing through side flanges *e* and controlled upon its respective ends by set-screws *f*, which serve to tilt said plate upon its pivot according to the needs of the superposed mechanism, and to compensate for uneven wear upon the grinding stone or cutter.

G represents a rectangular block provided with a groove *g*, which slides freely on a guide *e'* on the plate E. One or more of these guides and corresponding grooves may be used, although one is sufficient, and the block has no other means of holding it upon the plate E. At one side of the top of this block I secure the box H, open at its ends and having a spindle *h* extending into the block G, which is provided with locking-screws *h'* and $h^2$ in its bottom and at its sides, respectively. These screws serve to hold the box in its desired adjustment.

K is the drill-holder, made preferably rectangular in section to correspond to the form of the box H; but any other form that would hold it securely in said box and prevent its turning would answer as well. The drill-holder is provided with grooves *k* on its respective faces running longitudinally therein its entire length and of different sizes to accommodate different sizes of drills. These grooves are about half the depth of the diameter of the drill, or of such depth that the grinding-wheel L, supported in suitable bearings above the drill and running transversely to its axis, may act upon the drill without coming in contact with the sides of the holder. A set-screw *k'* at the side of the holder serves to fasten it in the box.

The ends of the drill rest or are held in bearings, as clearly shown in Figs. 1 and 4. The bearing at one end consists in a plate M, having a tubular portion *m* at right angles

thereto, and containing a spring device $m'$ for engaging the outer end of the drill, while the inner end rests against or in the adjustable stop $m^2$. The slotted plate M is supported by a post N, adjustable longitudinally in a T-slot in the plate G, to accommodate the holder to the length of the drill. If the machine is used for heavier grades of drills, the grooved holder may be dispensed with and the drill held alone in the end bearings, substantially as described. These bearings then would constitute what I term the "holder."

The purpose of all the several adjustments hereinbefore mentioned is to bring the drill in its holder into the exact position necessary to apply the grinding or cutting tool and obtain the desired back clearance thereon uniformly throughout its length; hence the location of the several adjustments and the slots and screws and the like may be considerably varied without departing from the spirit and scope of my invention.

To revolve the drill when it is under the grinder, I provide a finger $o$, which is supported in an arm $o'$, held in a standard $o^2$ on the plate E. All these parts are adjustable, as shown, at their respective connections with each other and the plate E, so as to give the finger $o$ the desired position in the spiral groove of the drill. This finger is formed with a point $o^3$, eccentric to its axis, which enables the operator, after the drill is otherwise fixed in position in the holder, to make the finer adjustment of the drill preparatory to grinding by merely turning the finger axially either way, as may be required.

It will be observed by the foregoing description that the drill while under the action of the dressing or cutting device, whether it be an emery-wheel or other suitable means, is carried in its holder entirely past the said cutting device as well as beneath it the length of the twist in the drill.

In operation the work is begun at the upper end of the drill and carried toward the point. To do this it is only necessary to move the block G by hand forward beneath the grinding-wheel to the proper position, and then by pressing the foot on the lever C and raising the bracket and the superposed parts, so as to bring the wheel into cutting engagement with the drill and moving the drill in the holder gradually back, the drill is turned by the finger $o$ and cleared according to the depth at which the mechanism is set. The passage of the grinder from one end of the drill to the other is the work of but a moment, and if sufficient clearance has not been obtained in one action the movement may be repeated.

It is obvious that if desired the drill-holder may be the fixed or stationary part of the machine and the grinding or cutting device the traveling or movable part. In this case the frame Q, supporting the cutting or metal-removing device L, would be free to be carried back and forth by hand on the sliding surface $q$, and the standard $o^2$ would be attached to said frame Q.

In Figs. 1 and 4, at R, is shown a sheet of iron for protecting the sliding surfaces of the plate E from dust.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a twist-drill-clearing machine, a sliding holder for the drill, having an open groove in which the drill lies supported and is exposed substantially through its entire length, substantially as set forth.

2. In a twist-drill-clearing machine, a holder having an open groove on its face for supporting the drill, and bearings in the line of the groove in which the holder is advanced, substantially as set forth.

3. In a twist-drill-clearing machine, a sliding holder for supporting the drill, having an open groove in which the drill is exposed above the surface of the holder substantially throughout its entire length, in combination with an emery-wheel to operate on said exposed portion, substantially as set forth.

4. In a twist-drill-clearing machine, a sliding holder for the drill, having a longitudinal groove in which the drill is supported substantially throughout its entire length, in combination with a device, as a finger, fixed to turn the drill, substantially as set forth.

5. In a twist-drill-clearing machine, a metal-removing device rotating in fixed bearings, in combination with a holder having an open groove along one side to support the drill, a base, and guides in the holder and base, in which the holder is adapted to slide past the metal-removing device, substantially as set forth.

In testimony whereof I hereunto set my hand.

JACOB D. COX, JR.

Witnesses:
H. F. FISHER,
WM. M. MONROE.