(No Model.)

2 Sheets—Sheet 1.

S. G. RYDER.

MACHINE FOR GRINDING TWIST DRILLS.

No. 344,329. Patented June 22, 1886.

Fig. 1.

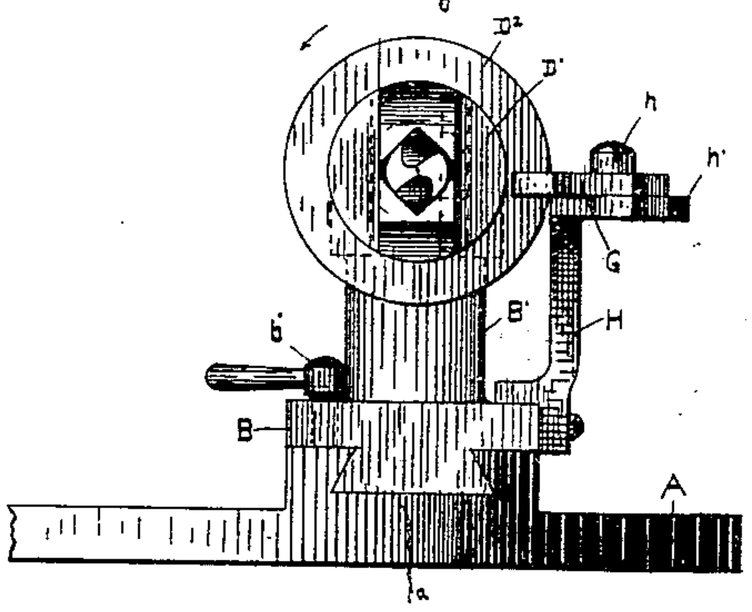
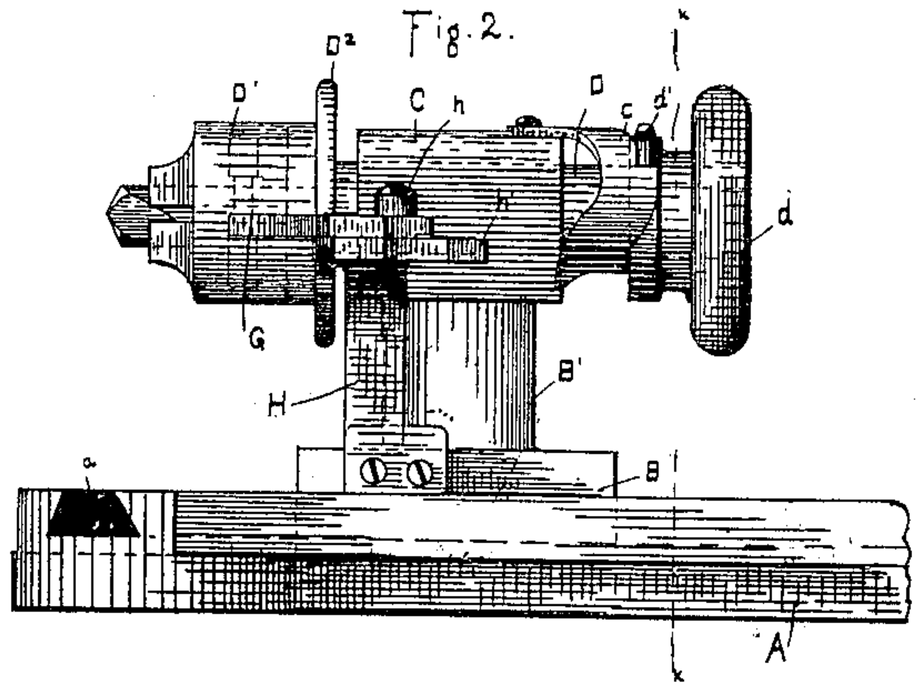


Fig. 2.



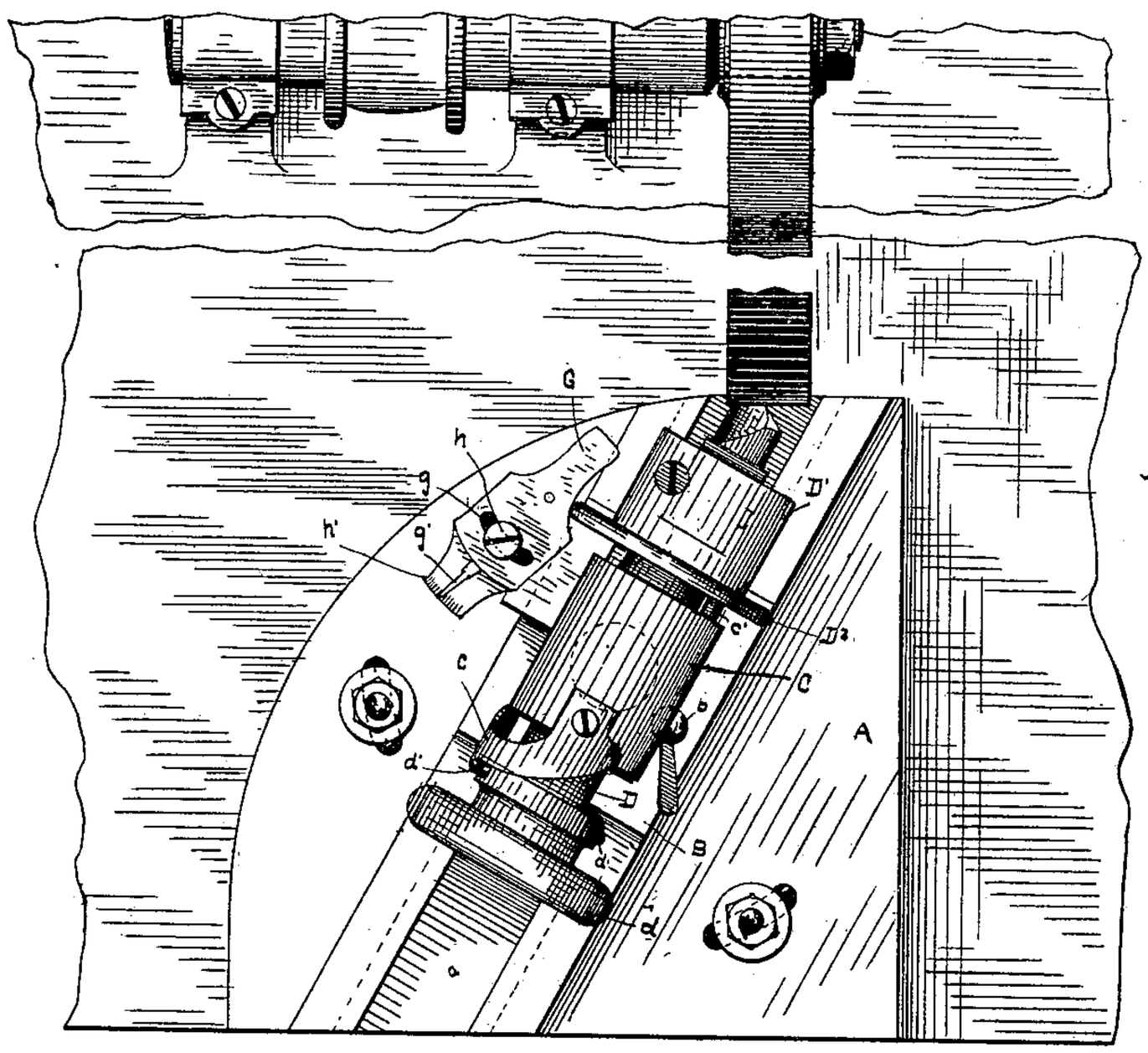


Fig. 3.

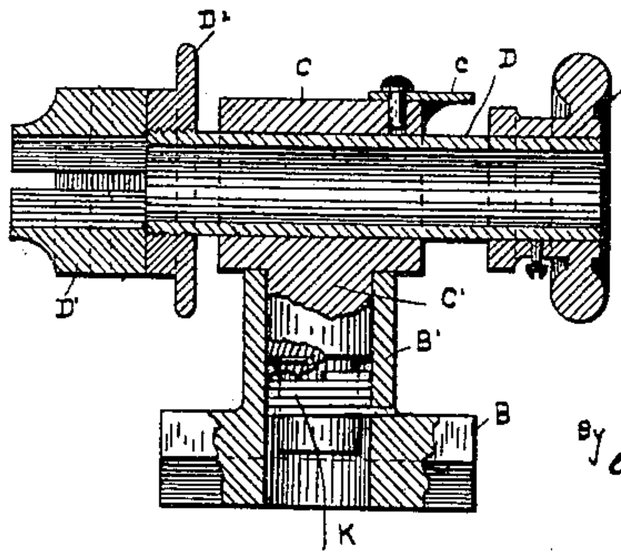


Fig. 4.

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(No Model.) 2 Sheets—Sheet 2.

S. G. RYDER.

MACHINE FOR GRINDING TWIST DRILLS.

No. 344,329. Patented June 22, 1886.

Fig. 5.

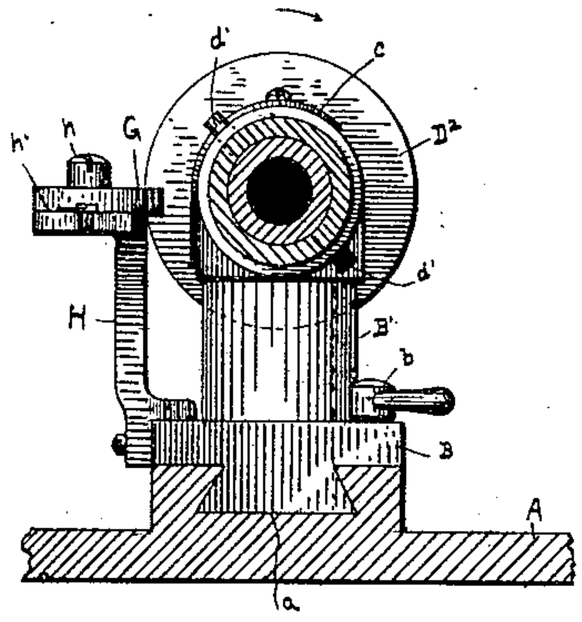


Fig. 6.

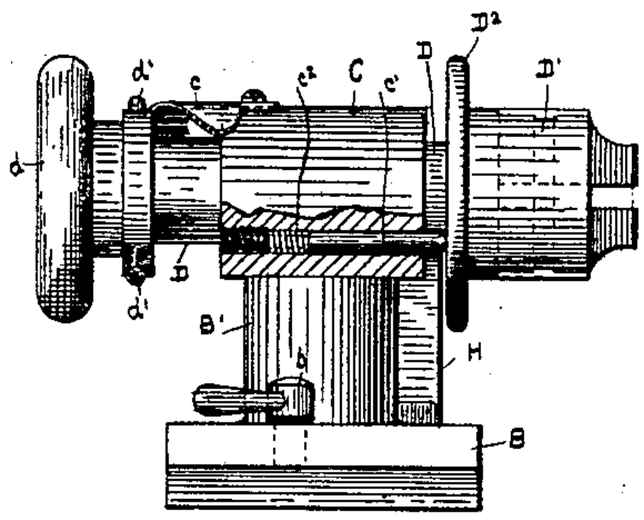
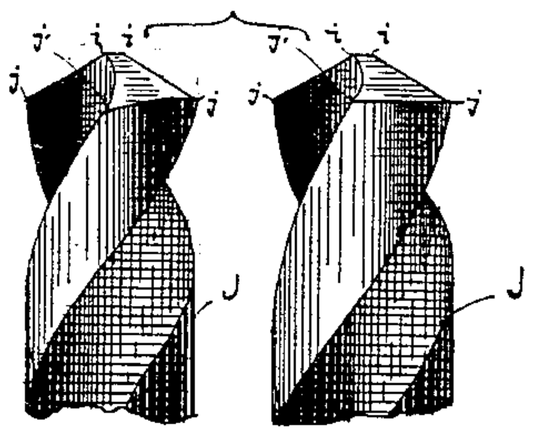


Fig. 7.



Witnesses:
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UNITED STATES PATENT OFFICE.

SUMNER G. RYDER, OF CLEVELAND, OHIO, ASSIGNOR TO THE STANDARD TOOL COMPANY, OF SAME PLACE.

MACHINE FOR GRINDING TWIST-DRILLS.

SPECIFICATION forming part of Letters Patent No. 344,329, dated June 22, 1886.

Application filed December 26, 1885. Serial No. 186,743. (No model.)

To all whom it may concern:

Be it known that I, SUMNER G. RYDER, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Machines for Grinding Twist-Drills; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

My invention relates to improvements in machinery for grinding twist drills, in which the drill, while engaging the emery-wheel, is rotated, moved endwise toward the wheel and swung laterally a limited distance, these combined movements resulting in grinding straight cutting-edges, and grinding the clearance on curved lines extending from the extremes of each cutting-edge to the rear outer parts of the drill.

In the accompanying drawings, Figure 1 is a front end elevation of my improved drill-holding device. Fig. 2 is a right-hand side elevation of the same. Fig. 3 is a top plan view of the same, showing a portion of the grinding-wheel. Fig. 4 is a longitudinal vertical section through the center of the machine. Fig. 5 is a transverse section on the line *x x*, Fig. 2, looking forward. Fig. 6 is an elevation of the left-hand side of the holding device. Fig. 7 is a plan of drills before and after grinding the clearance.

A represents the bed-plate having a dovetailed way, *a*, on which slides the block B, a set-screw, *b*, being provided for holding the block rigid on the way. The block has an upwardly-projecting hub, B′, in the vertical bore of which fits the depending arm C′ of the box C. In the box C is journaled the hollow spindle D, to the front end of which is attached a chuck, D′, of any suitable construction for holding a drill, and to the rear end of the spindle is attached a hand-wheel, *d*, for revolving the same. To the box C is attached a cam, *c*, overhanging the rear end of the box, and the hub of the hand-wheel has pins *d′* extending laterally in opposite directions, that in turn engage the cam *c* when the spindle is rotated. A rod, *c′*, actuated by a spring, c^2, operates in a horizontal hole arranged longitudinally with the box C. This rod abuts the rear side of the flange D^2, connected with the spindle, by means of which the spindle is pushed forward while being rotated as far as the engagement of a pin, *d′*, with the cam *c* will admit. The machine is set to bring the drill at a proper angle to the emery-wheel F, as shown in Fig. 3. Now, as the drill and spindle are rotated in the direction of the arrow, as the cutting-edge of the drill moves upward and away from the emery-wheel, the drill is pressed forward by the spring c^2, but regulated to a uniform spiral movement by the cam *c* and engaging pin *d′*. Now, these movements thus far described would grind the drill from the line *i j* to the curved line *i j′*, but would at the same time curve the line *i i*, which latter would not be desirable, and to avoid which the box C is turned on the arm C′ by means of the flange D^2 engaging a cam, G, arranged so as to swing the drill to the right hand—that is, away from the emery-wheel. This lateral movement of the drill is coincident with the end movement of the drill toward the emery-wheel. When the emery-wheel is engaging the cutting-edge *i j* a pin, *d′*, is engaging the longest part of the cam *c*. Now, as the drill is rotated, the edge *i j* is turned up away from the emery-wheel, and at the same time the cam G causes the drill to swing laterally, carrying the line *i i* away from the emery-wheel, the result of these combined actions being to grind the clearance on curved lines *j j′* and *i j′*, while leaving the lines *i i* and *i j* approximately straight, or as near so as is desirable. The cam G is supported on a standard, H, and may be adjusted by the screw *h* that passes through an elongated slot, *g*, in the cam. By such adjustment the lateral throw of the cam may be regulated according to the size of the drills. A scale is marked at *h′* on the standard, and at *g* on the cam, so that any adjustment of the cam for different sized drills may be noted for use. A spring, K, holds the flange D^2 against the cam G. The cam *c* extends a half-circle, so that when one pin, *d′*, has passed forward down and off of the face of the cam in thrusting the drill forward the second pin, *d′*, is ready to engage the heel of the cam and draw the drill back

rearward, this second pin, *d'*, reaching the extreme throw of the cam just as the said cutting-edge engages the emery-wheel, after which the three movements already described are had in grinding the clearance on the second part of the drill.

What I claim is—

1. In a drill-grinding machine, the combination, with means, substantially as described, for revolving the drill, of a cam and spring for moving the drill forward toward the emery-wheel, and a cam and engaging flange for swinging the drill laterally in the direction away from the drill, the parts being arranged substantially as described.

2. In a drill-grinding machine, the combination, with a box pivoted to turn laterally, a spindle journaled in the box, said spindle having end-play, of a flange connected with the spindle, and a cam for engaging the flange so as to turn the box and spindle laterally as the spindle is moved endwise, substantially as set forth.

3. In a drill-grinding machine, the combination, with a box and spindle pivoted to turn in a horizontal plane, said spindle journaled and having end-play in the box, of a flange connected with the spindle, a cam to swing the box and spindle laterally, and a spring for holding the flange and cam in contact, the parts being arranged substantially as set forth.

4. In a drill-grinding machine, the combination, with a box and spindle pivoted to turn laterally, the said spindle being journaled in said box, a flange and cam for turning the box laterally, of a cam connecting with the box, and pins or projections connected with the spindle to engage the lateral cam to control the end movement of the spindle, substantially as set forth.

5. In a drill-grinding machine, the combination, with a box mounted on a depending arm or trunnion, a spindle journaled and having end-play in the box, a flange and cam for turning the box laterally, of a cam and engaging pins for controlling the end movement of the spindle, and a spring for driving the spindle forward, the parts being arranged substantially as set forth.

In testimony whereof I sign this specification, in the presence of two witnesses, this 22d day of December, 1885.

SUMNER G. RYDER.

Witnesses:

G. W. SHUMWAY,

N. S. AMSTUTZ.