(Model.) 2 Sheets—Sheet 1.

J. H. STOREY & H. J. BAMFORD.

MACHINE FOR GRINDING TWIST OR OTHER DRILLS.

No. 428,426. Patented May 20, 1890.

Fig. 1.

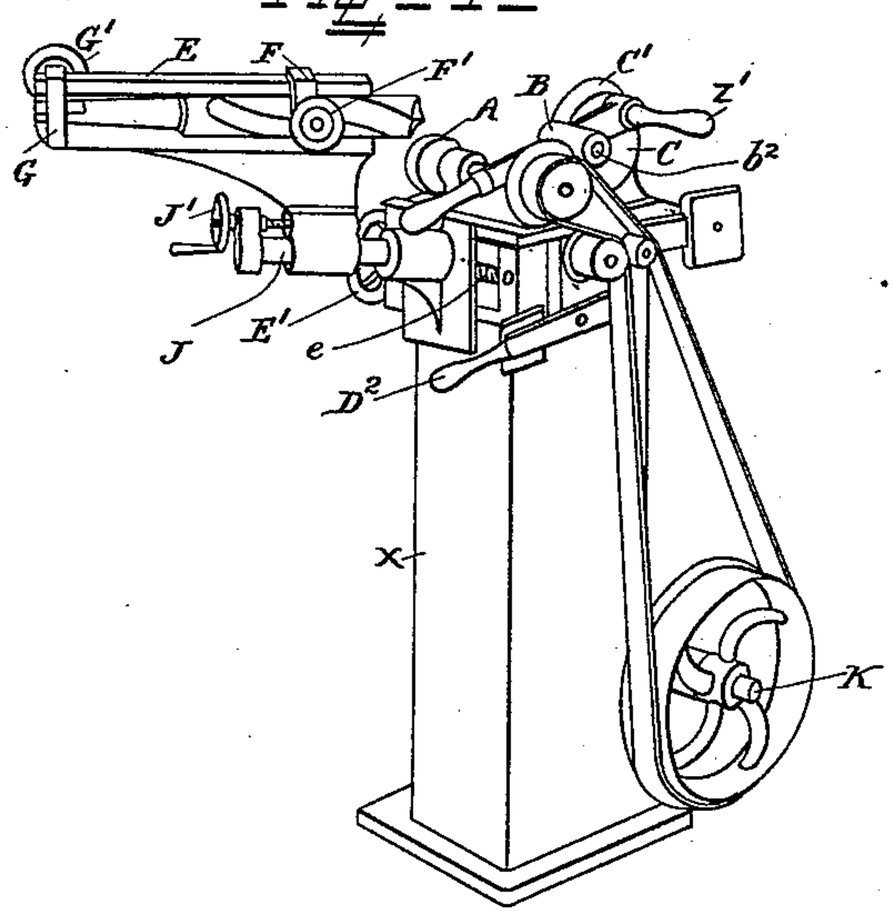

Fig. 2.

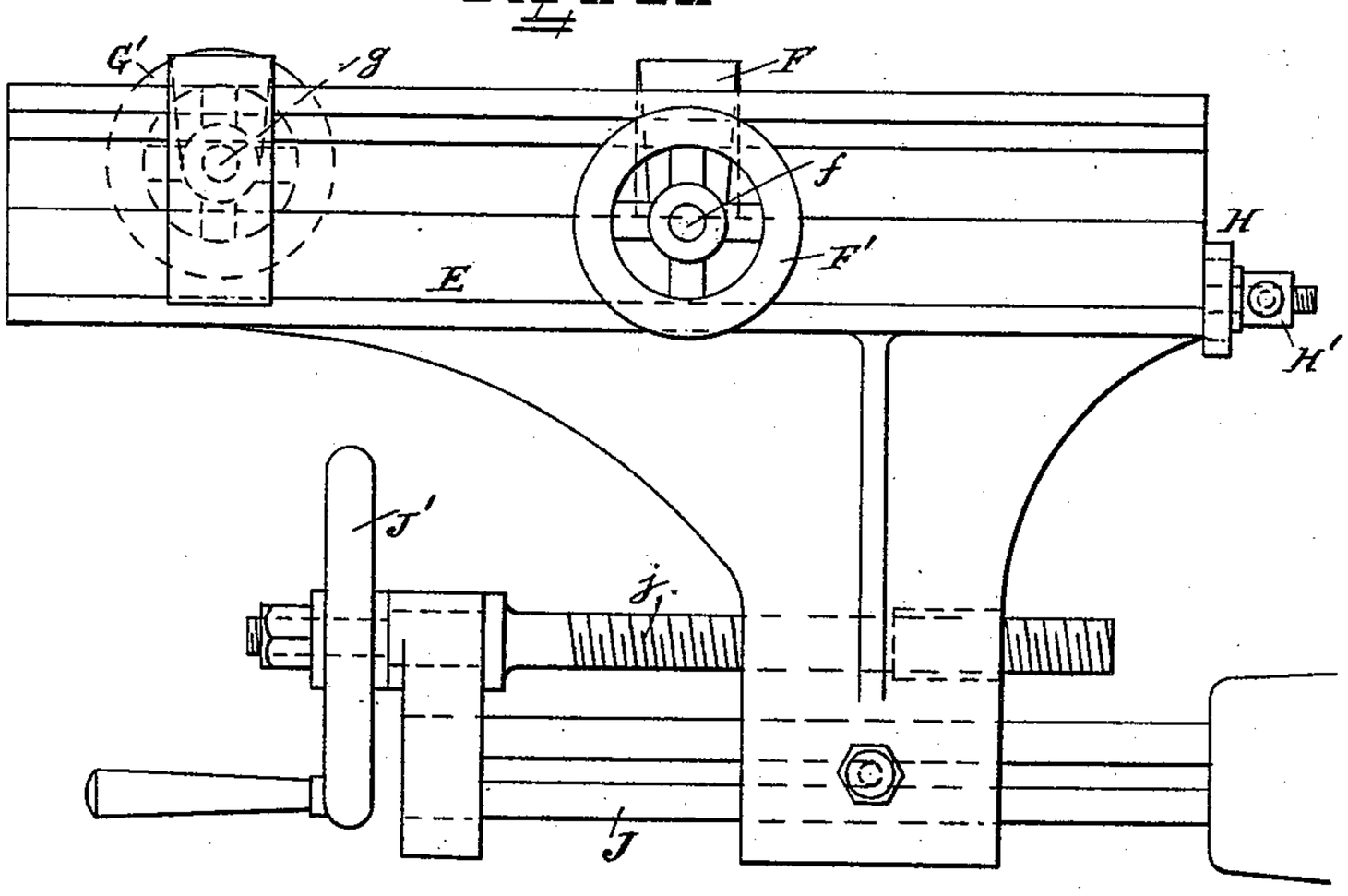

Fig. 3.

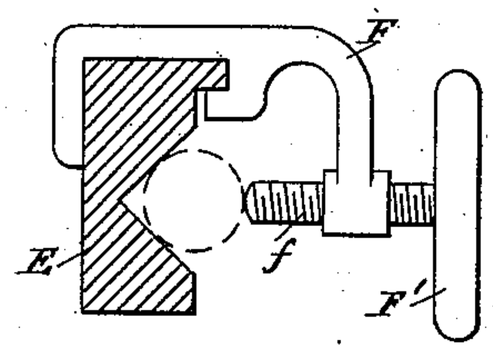

Fig. 5.

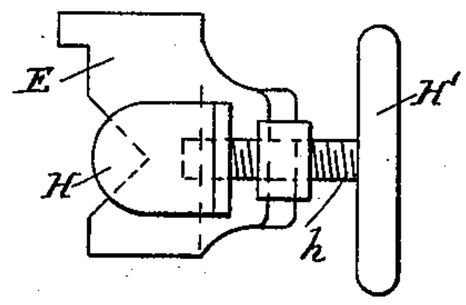

Fig. 4.

WITNESSES

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Attorney

(Model.) 2 Sheets—Sheet 2.

J. H. STOREY & H. J. BAMFORD.

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Fig. 6.

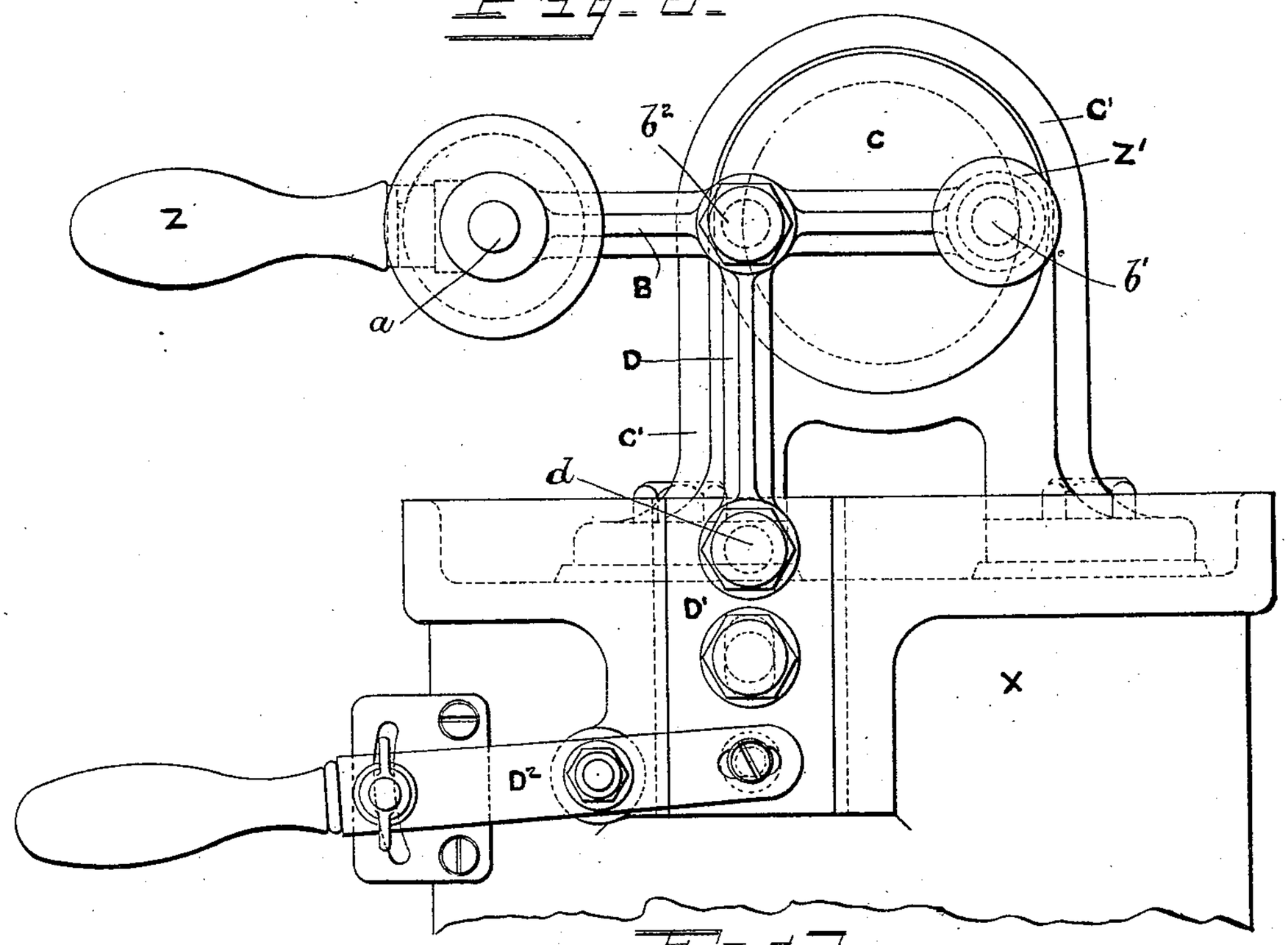
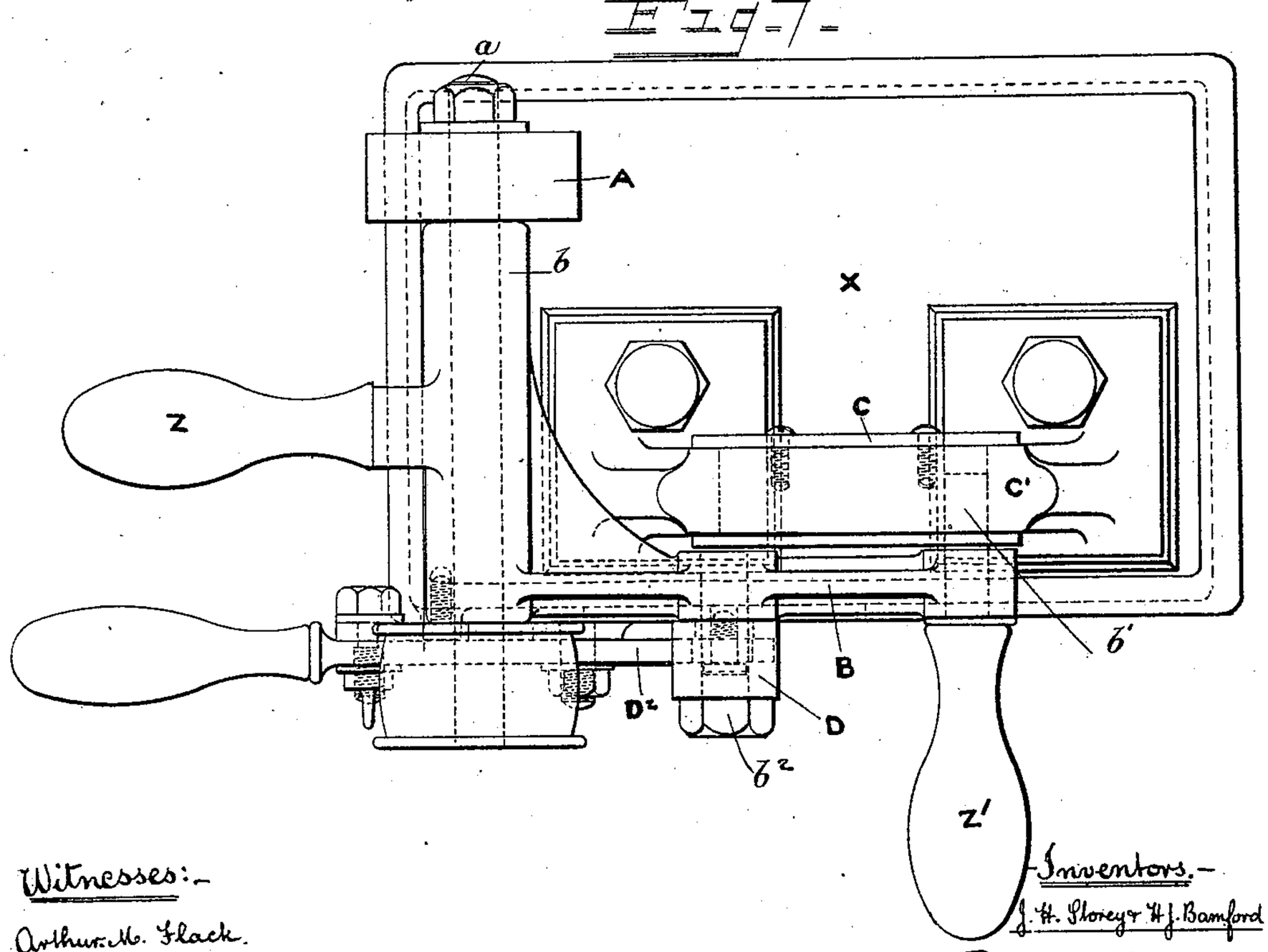


Fig. 7.



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UNITED STATES PATENT OFFICE.

JOHN HENRY STOREY AND HENRY JESSE BAMFORD, OF LONDON, COUNTY OF MIDDLESEX, ENGLAND.

MACHINE FOR GRINDING TWIST OR OTHER DRILLS.

SPECIFICATION forming part of Letters Patent No. 428,426, dated May 20, 1890.

Application filed January 7, 1889. Serial No. 295,710. (Model.) Patented in England September 15, 1888, No. 13,347; in France October 16, 1888, No. 193,561; in Germany October 19, 1888, No. 47,930, and in Switzerland January 21, 1889, No. 354.

To all whom it may concern:

Be it known that we, JOHN HENRY STOREY and HENRY JESSE BAMFORD, both subjects of the Queen of Great Britain, residing in the city of London, county of Middlesex, England, have invented new and useful Improvements in Machines for Grinding Twist or other Drills, (for which we have obtained patents in Great Britain, No. 13,347, bearing date September 15, 1888; in Germany, No. 47,930, October 19, 1888; in France, No. 193,561, October 16, 1888, and in Switzerland, No. 354, January 21, 1889,) of which the following is a specification.

Our invention relates to a machine or apparatus for grinding twist and other drills; and it has for its objects effecting the grinding of the drills in a simple and efficient manner, and also of regulating the amount of clearance or rake, technically known as "backing off," to be given to the cutting-nose of the drill. We attain these objects by mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a view in perspective of the entire machine. Fig. 2 is a view in side elevation of the rest or arm for carrying the drill to be ground. Fig. 3 is a view in transverse section of the rest or arm, showing the clamp for fixing the drill. Fig. 4 is a view in end elevation of the rest or arm, showing the adjustable stop for defining the position of the flank of the drill, so that both flanks are ground accurately in relation to the axis of the drill; and Fig. 5 is a view in end elevation of the rest or arm, showing a modification of the adjustable stop. Figs. 6 and 7 are views in side elevation and plan, respectively, of the grinding mechanism.

The grinding-wheel A, which may be of emery or other suitable material, is mounted on a spindle *a*, carried in a bearing *b*, forming one end of a lever B, the other end of which is pivoted by a pin *b'* eccentrically to a disk C. This disk C is mounted so as to be capable of rotating smoothly and easily in a strap or sheave C', fixed to the stand X of the machine. At or about the center of its length the lever B is pivoted by a pin b^2 to one end of a link D, the other end of which is pivoted on a pin or stud *d*, mounted on a slide D', adapted to be capable of adjustment in a vertical plane on the frame X of the machine by means of a suitable hand-lever D^2, as illustrated. This vertical adjustment of the fulcrum of the link D regulates the amount of clearance or backing off given to the cutting-nose of the drill.

Suitable handles Z Z' are provided on the lever B for operating and controlling the lever and grinding-wheel carried by it, the one being fixed to the bearing *b*, carrying the spindle on which the grinding-wheel is mounted at right angles thereto and longitudinally with the said lever, and the other Z' at or near the other extremity of the lever and at right-angles thereto.

The drill to be ground is fixed in the V-shaped rest E by means of the clamp F, operated by a screw *f* and hand-wheel F'. A butt-clamp G is also provided for the end of the drill to bear against. Both these clamps are adapted to be adjusted in any position on the rest E by means of their respective screws *f* and *g* and hand-wheels F' and G', as illustrated by Figs. 1, 2, and 3 of the accompanying drawings. On the end of the rest E is also mounted a stop H, adapted to be adjusted by means of a clamp-nut H', or its equivalent, as illustrated by Figs. 2 and 4, to bear against the flank of the drill and so keep it in position and insure, when the drill is turned for the purpose of grinding the other flank, that it is fixed in the right position for accurately grinding both flanks in relation to the axis of the drill. As a modification, this stop H may be operated by a screw *h* and hand-wheel H', as illustrated by Fig. 5. The rest E is mounted on an arm or spindle J, mounted on a slide capable of being laterally adjusted with respect to the frame of the machine, as illustrated by Fig. 1, by means of a screw *j* and hand-wheel J', or by any other equivalent device. The rest E is fitted with a traversing screw *e* and hand-wheel E', or with any other suitable feed-motion, whereby the drill may be advanced against the grinding-wheel.

Motion is imparted to the spindle *a*, carry-

ing the grinding-wheel, from a counter-shaft K by means of a belt running over pulleys, as illustrated by Fig. 1. Motion may be imparted to the counter-shaft in any approved manner.

It will be seen that in operation the drill is a fixture in the rigid rest E and does not move, but that the grinding-wheel is constrained to move in a parabolic path about the nose of the drill by reason of the manner in which it is mounted, and its movement is controlled as hereinbefore described.

It will further be understood that the amount of clearance or backing off given to the cutting-nose of the drill will depend on the position which the center or axis of the drill occupies vertically with respect to the path of motion of the grinding-wheel.

We wish it to be clearly understood that we do not limit ourselves to the exact details of construction set forth, but hold ourselves at liberty to make such changes and alterations as fairly fall within the spirit and scope of our invention.

What we do claim as our invention, and desire to secure by Letters Patent, is—

1. In a drill-grinding machine, the combination, with the rest E, provided with a groove for supporting the drill, of the adjustable sliding clamp F, provided with a hooked front portion and a single screw opposite the center of said groove for confining the drill in said groove and fixing the clamp, and the adjustable clamp G for the end of the drill to butt against, substantially as and for the purpose set forth.

2. In a drill-grinding machine, the combination, with the rest E, provided with a groove and clamps for supporting the drill, of the slotted adjustable stop H, having a curved end adapted to engage with the spiral grooves in the drill, and the clamp-nut for attaching said stop to the end of the rest, substantially as and for the purpose set forth.

3. The combination, with the grinding-wheel A, mounted on spindle *a*, of the lever B, provided with a bearing *b* at one end for said spindle to revolve in, a vertically-adjustable link pivotally supporting the middle part of the lever, and the revoluble disk C, having the other end of said lever pivoted eccentrically to it, substantially as and for the purpose set forth.

4. The combination, with the grinding-wheel A, mounted on spindle *a*, of the lever B, provided with the spindle-bearing *b* at one end, the stand X, the guide-strap C′, secured to said stand, the disk C, journaled in said strap and having the other end of lever B eccentrically pivoted to it, the slide D′, sliding in a groove in the stand, the link D, pivoted to said slide and pivotally supporting the middle part of lever B, and a pivoted hand-lever for moving the slide, substantially as and for the purpose set forth.

In witness whereof we have hereunto signed our names in the presence of two subscribing witnesses.

JOHN HENRY STOREY.
HENRY JESSE BAMFORD.

Witnesses:
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