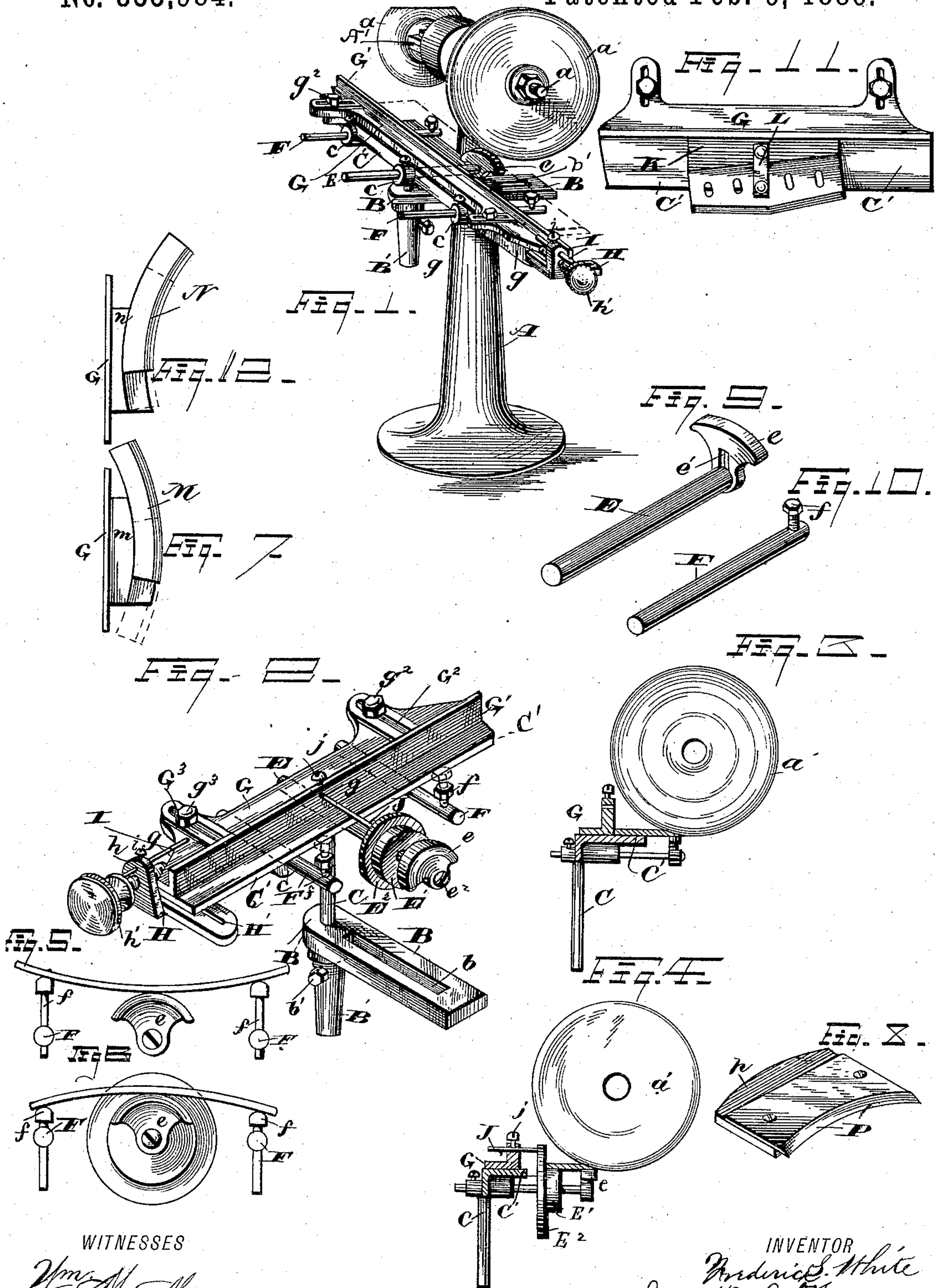


(No Model.)

F. S. WHITE.
GRINDING APPARATUS.

No. 335,984.

Patented Feb. 9, 1886.



WITNESSES

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GRINDING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 335,984, dated February 9, 1886.

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To all whom it may concern:

Be it known that I, FREDERICK S. WHITE, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Grinding Apparatus; 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 grinding apparatus, the object being to provide such guiding and supporting mechanism for the tool to be ground that a great variety of work may be done on the machine with accuracy.

A further object is to provide a grinding apparatus at a small initial cost.

With these objects in view my invention consists in certain features of construction and in combination of parts hereinafter described, and pointed out in the claims.

Figure 1 is a view in perspective of a grinding apparatus embodying my invention. Fig. 2 is an enlarged view in perspective of the same, with the emery-wheel and standard omitted. Figs. 3 and 4 are elevations, partly in section, the former showing the position of parts engaging a flat knife and the latter showing the position of parts in grinding a knife curved flatwise. Figs. 5 and 6 are elevations showing the position of parts respectively in grinding tools known as "hollows" and "rounds." Figs. 7 and 12 are plan views, showing, respectively, a block concaved and convex on the edge for guiding flat knives of the corresponding curvature. Fig. 8 is a view in perspective, showing a false back applied to a knife to bring the edge and back on parallel lines. Fig. 9 is a view in perspective of the rod E and head *e*. Fig. 10 is a view in perspective of the rod F and supporting-screw *f*. Fig. 11 is a view in perspective, showing a wedge-shaped backing for the knife.

A represents a supporting standard, usually forked at the upper end, and provided with suitable boxes, A', in which is journaled the spindle *a*, on which are mounted one or more emery-wheels, *a'*, all of the ordinary construction.

B is a slotted arm secured by a bolt to the part A, and by means of the bolt *b'*, passing through the slot *b*, the arm B and attachments may be adjusted toward or from the emery-wheel, or turned at any angle to the plane of the wheel, if desired. The arm B has a hub, B', with a vertical bore that forms a socket for the upright rod C. A set-screw, *b'*, is provided, by means of which the rod C and attachments, when adjusted vertically, may be held in the desired position. The rod C is rigidly secured to the rest C', the latter being a flat plate lying in a horizontal plane. The rest has depending lugs *c*, each provided with a lateral bore for receiving, and suitable set-screws for holding, respectively, the rods F and F. Upon the rest C' rests the guide G, that has a straight vertical face, G', on the side toward the emery-wheel, and has transverse slots G² and G³, through which pass, respectively, the bolts *g*² and *g*³, that screw into the rest C'. One end of the guide is beveled, as shown at *g*, Fig. 2, forming an incline with a vertical face. A block, H, with a slot, H', and an upwardly-projecting ear, *h*, is secured at one end underneath the rest C', a bolt (not shown) passing up through the slot H' and screwing into the rest C' for securing the block. By loosening this bolt the block H may be adjusted lengthwise of the slot H'. Through a threaded hole in the ear *h* passes the thumb-screw *h'*, the end of which abuts against the incline *g* for pressing the guide toward the emery-wheel. A rod, I, passes through a hole in the ear *h*, and is secured by a set-screw, *i*. This rod is intended to be parallel with the body of the thumb-screw, and the outer end of the rod, by abutting against the shoulder of the thumb-screw, forms a stop for the latter. The rod E has a head, *e*, the face or upper side of which is curved, as shown more clearly in Fig. 9. This head is secured to the rod E by means of a screw, *e*², that passes through a slot, *e'*, in the head and screws into the end of the rod E. By loosening this screw the head may be adjusted vertically the length of the slot *e'*. This head supports the knife or tool directly under the point where the latter is being ground, and by means of its curved upper surface the tool is ground to the same thickness regardless of curves or bends in the

knife or tool. Large knives for planers are frequently curved a trifle, although when bolted to the planer-head these knives assume a straight form. Such knives can be ground just as accurately as a perfectly straight knife by means of the curved head *e* operating as aforesaid. A roller, *E'*, is journaled on the rod *E*, back of the head *e*, and has a rim or flange, *E*².

In assembling the parts the rod *E* is placed in the central lug, *c*, and the rods *F* are placed on either side and secured in their respective lugs *c*. (See Figs. 1 and 2.) A rod, *J*, passes through a hole, *g'*, in the guide *G*, and is secured by a set-screw, *j*. The forward end of the rod abuts against the rear side of flange *E*² of the roller *E'*, and holds the roller the required distance from the face of the guide *G*, the distance that the guide and roller are separated being greater or less, according to the adjustment of the rod *J*.

In adjusting the apparatus for grinding by means of the rod *C* and slotted arm *B*, the rest *C'* is brought to the required position relative to the emery-wheel and secured. Next the guide *G* is adjusted to bring the face thereof a suitable distance from the emery-wheel, according to the width of the knife to be ground. Next the block *H* is adjusted so that the end of the screw *h'* will engage the incline *g* near the outer end of the latter. The bolt *g*² is tightened enough to hold the guide upon the rest *C'*, but not enough to prevent this end of the guide from sliding on the plate. The bolt *g*² is tightened, so as to prevent the adjacent end of the guide from sliding, and this bolt therefore forms a pivot for the guide to swing upon laterally. Usually a thin washer is placed between the guide and plate *C'* and around the bolt *g*². By screwing in the thumb-screw *h'* by means of its engagement with the incline *g*, the guide is swung toward the emery-wheel.

If the tools to be ground are in sets of two or more, after the first one is ground and before the screw *h'* is backed out, the rod *I* is brought in contact with the shoulder of the screw and fastened. After this any number of tools can be ground and brought to the same width as the first by turning the screw *h'* in until the shoulder thereof abuts against the rod *I*. The rod *E* is adjusted so that the head *e* is brought close to the emery-wheel, and extends under the wheel more or less, according to the bevel required on the knife. If a thin edge is required, the rest *C'* is depressed, so that the head *e* extends well under the wheel. If a thicker edge is required on the knife, the rest *C'* is elevated so that the head *e* would not extend so far under the wheel.

I will first describe the operation of grinding knives that are curved longitudinally and flatwise, also spiral knives—such, for instance, as are commonly on lawn-mowers. The roller *E'*, by means of an adjustment of the rod *J*, is brought in position toward or from the emery-wheel, according to the width of the knife.

The knife is placed in position, resting on the roller and on the head *e* with the back of the knife abutting against the flange *E*². (See Fig. 4.) The knife may curve upward or downward, (see Figs. 5 and 6,) and in either case the rods *F* and screws *f* are adjusted to support the ends of the knife. The screw *h'* is turned in until the knife is brought in contact with the emery-wheel, after which the knife is moved endwise by hand, the screw *h'* being turned a trifle from time to time to advance the knife toward the emery-wheel. By reason of the head *e*, roller *E'*, and bolts *f* supporting the knife from the bottom, and the flange *E*² supporting the back of the knife, but little labor is required to hold the knife in position and to move it endwise. The knife will of course move in a circular line according to the curvature of the blade; but all portions of the knife in passing the emery-wheel will be under like position relative to the wheel, and the knife will consequently be ground evenly.

In guiding spiral knives the operator has only to keep the knife approximately at right angles to the plane of the emery-wheel at the point of contact with the latter. With flat knives the roller *E'* is removed from the machine. If the cutting-edge and back are parallel, the back rests upon the rest *C'* and abuts against the guide *G*, and in all cases the cutting-edge is supported by the head *e* and is forced toward the emery-wheel by the screw *h'* and the knife slid endwise by hand. If the cutting-edge and back are not parallel, a block, usually of wood, is attached to the knife, of such shape that the back of the attached block and the knife-edge are parallel, and in such cases the false back moves against the guide and is moved with the knife. (See Fig. 11.)

In guiding flat knives that are segmental in form—such, for instance, as *M* and *N*, (see Figs. 7 and 12)—blocks *m* and *n*, having an edge curved to correspond, are secured to the guide *G*. If the cutting-edge and back are straight lines, but not parallel, a wedge-shaped piece of wood or other suitable material is placed between the guide *G* and the back of the knife, to bring the cutting-edges parallel with the guide, the wedge being slid along with the knife.

In Fig. 11 the wedge *K* is shown in position for grinding the left-hand portion of the knife, after grinding which the wedge is reversed to grind the right-hand portion of the knife. A strip, *L*, is shown connecting the wedge and knife so that they both slide together.

In Fig. 8 a knife, *P*, is shown with a flat back and concaved edges, and a block, *p*, is secured to the blade and has a curved back parallel with the cutting-edge of the knife. The curved back of this block, opposite the point where the blade is engaging the emery-wheel, is kept in contact with the guide *G*, or with an intermediate block, *n*, if preferred.

With the apparatus shown almost every

variety of knife can be ground accurately and without being clamped to the machine.

The machine is simple in construction, and can be made at a small initial cost.

5 What I claim is—

1. In a grinding-machine, the combination, with a rest consisting of a flat plate lying in a horizontal plane, and mechanism, substantially as shown, for adjusting the rest vertically and laterally and at any desired angle to the plane of the emery-wheel, of a guide placed upon said rest, said guide having lateral slots and bolts for adjustably securing the guide to the rest, an incline arranged on one end and rear of the guide, a thumb-screw for engaging said incline to swing the guide laterally toward the emery-wheel, one of the fastening-bolts serving as a pivot for the guide to turn upon, substantially as set forth.

2. In a grinding-machine, the combination, with an adjustable rest and guide, substantially as indicated, of the rods E and F, adjustably secured to the rest, the rod E having the adjustable head *e*, and having the flanged roller E' mounted thereon, and the rods F having screw-bolts *f* passing laterally through them, substantially as set forth.

3. The combination, with the rest C', the guide G, adjustably secured to the rest, as indicated, and having its end inclined, of the block H, adjustably secured to the rest, said

block having a thumb-screw, *h'*, attached for engaging the inclined end of the guide, and a rod, I, for limiting the advance of the thumb-screw, substantially as set forth. 35

4. In a grinding-machine, the combination, with the rest C' and guide G, and means, substantially as indicated, for adjusting the parts and swinging the guide toward the emery-wheel, of the rod E and head *e*, the latter having a round upper surface serving as a rest for the edge portion of the knife or tool, said rod being adjustably secured to the rest C' in such a manner that the head *e* may be arranged to support the tool directly under the point where the grinding is done, substantially as set forth. 40 45

5. The combination, with the rod E, the head *e*, and flanged roller E', arranged substantially as indicated, of the rod J, adjustably secured to the guide G, and arranged to engage the roller E' and feed it toward the emery-wheel by moving or swinging the guide G in the same direction, substantially as set forth. 50

In testimony whereof I sign this specification in the presence of two witnesses this 4th day of June, 1885. 55

FREDERICK S. WHITE.

Witnesses:

CHAS. H. DORER,
ALBERT E. LYNCH.