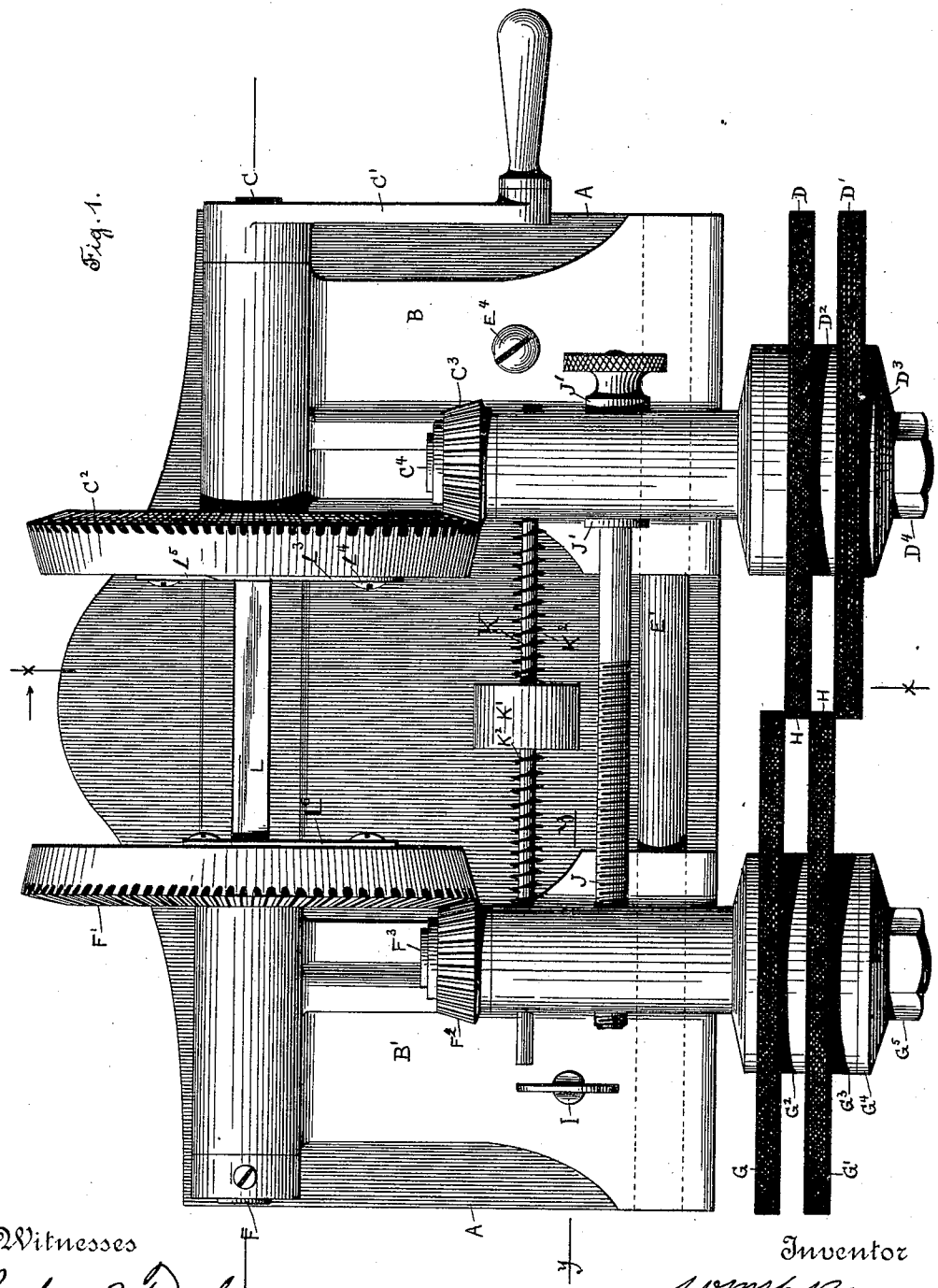
(No Model.) 3 Sheets—Sheet 1.

W. H. BROWN.

GRINDING MACHINE.

No. 461,663. Patented Oct. 20, 1891.

Fig. 1.



Witnesses

Rufus B. Fowler

H. W. Fowler

Inventor

Wm. H. Brown

(No Model.)

3 Sheets—Sheet 2.

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GRINDING MACHINE.

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Fig. 2.

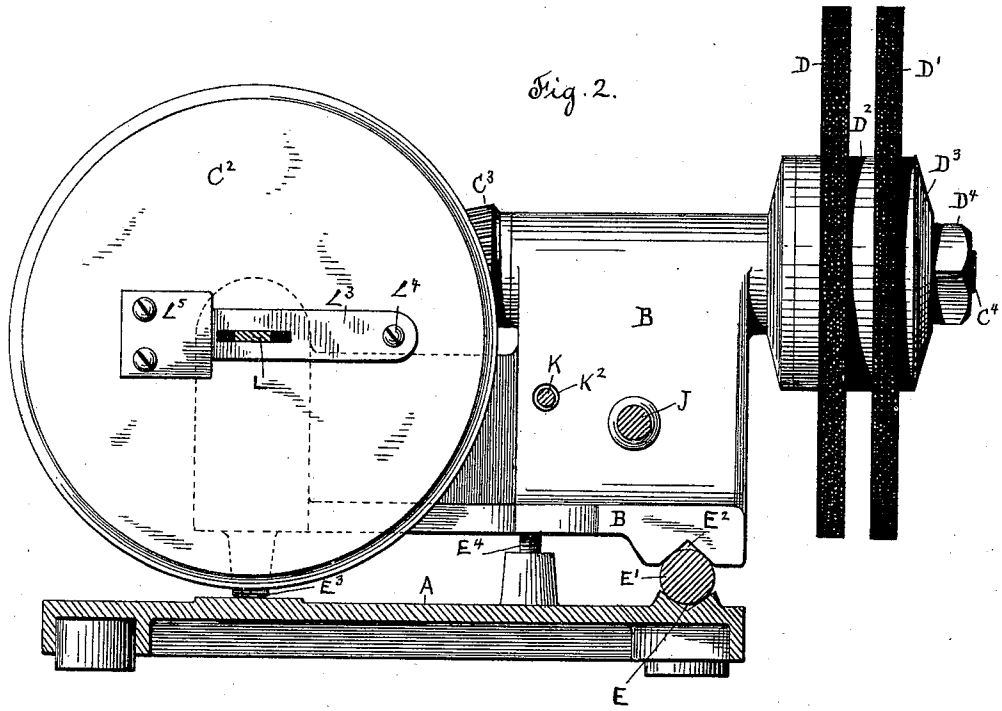


Fig. 3.

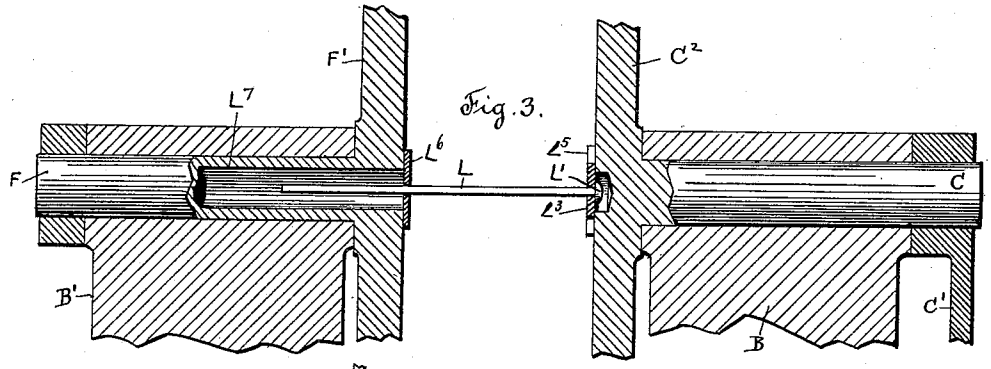
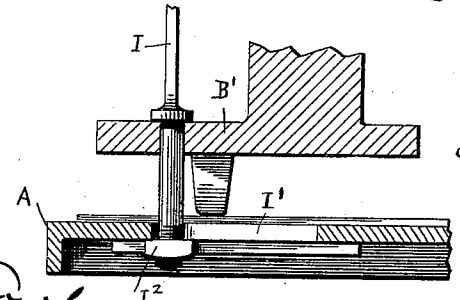


Fig. 4.



Witnesses

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(No Model.) 3 Sheets—Sheet 3.

W. H. BROWN.

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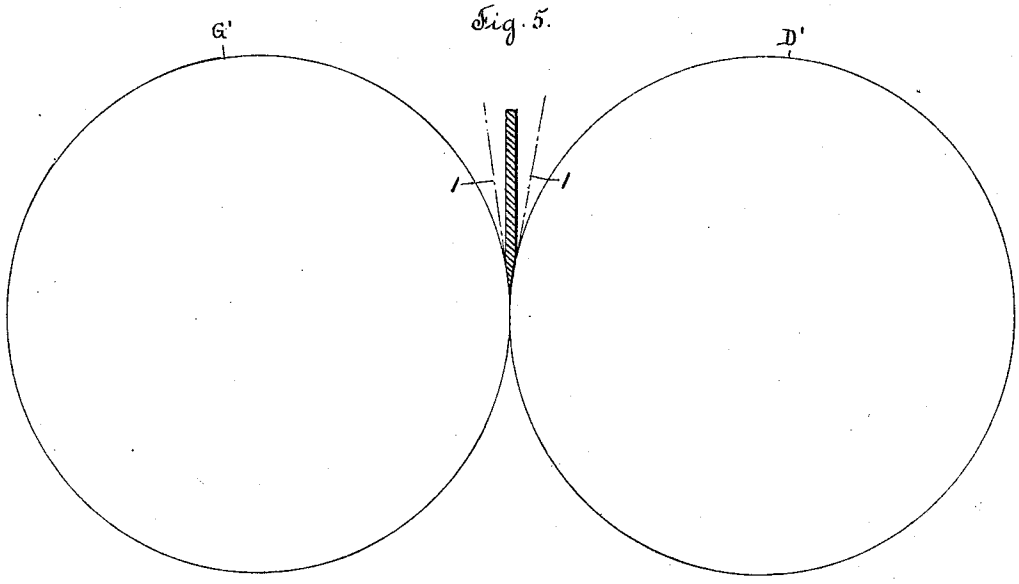
Fig. 5.



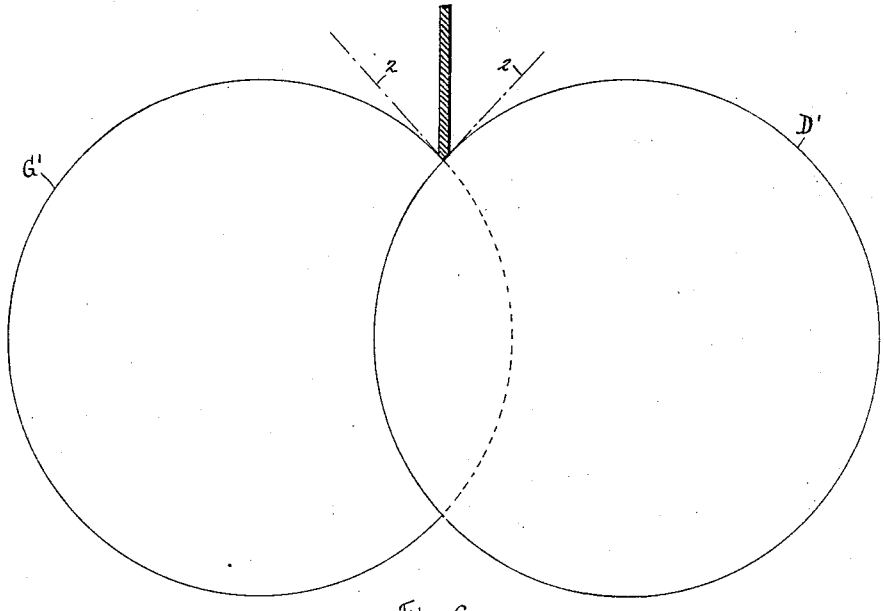


Fig. 6.

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UNITED STATES PATENT OFFICE.

WILLIAM H. BROWN, OF WORCESTER, MASSACHUSETTS.

GRINDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 461,663, dated October 20, 1891.

Application filed May 13, 1891. Serial No. 392,558. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. BROWN, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in Grinding-Machines, of which the following is a specification, reference being had to the accompanying drawings, representing a grinding-machine embodying my invention, in which—

Figure 1 represents a plan view of a grinding-machine embodying my invention. Fig. 2 is a sectional view on line X X, Fig. 1. Fig. 3 represents a central sectional view of a portion of the two driving-shafts having coincident axes, showing the method by which rotary motion is conveyed from one of said driving-shafts to the other. Fig. 4 is a sectional view of a portion of the base and supporting frame-work on line Y Y, Fig. 1, showing the method of adjustably attaching the movable portion of the frame upon the base; and Figs. 5 and 6 are diagrams illustrating the variation in the angle between the peripheries of the grinding-wheels as produced by changing the distance between the centers of the grinding-wheels.

Similar letters refer to similar parts in the several figures.

My invention relates to a machine for grinding knives, scissors, and similar cutting-tools; and it consists in the construction and arrangement of the several parts, as hereinafter described, and set forth in the claims.

Referring to the drawings, A denotes the base adapted to be attached by screws or clamps to any supporting stand or table, and upon which is mounted the frame-work B B′, upon which are mounted the operating parts of the grinding-machine.

The portion B of the frame-work is rigidly attached to the base A, and in the fixed portion B is journaled a driving-shaft C, carrying a crank C′, by which it is rotated, and a driving-gear C^2, engaging a pinion C^3 upon a spindle C^4, journaled in a bearing upon the frame B and carrying the grinding-wheels D D′, separated slightly more than the thickness of the wheels by a washer D^2 and held in place by the washer D^3 and nut D^4.

The base A is provided with a V-shaped groove E near its front edge, in which is placed the cylindrical rod E′, and the under side of the frames B B′ are provided with similar V-shaped grooves, that in the frame B being shown at E^2, Fig. 2. The frame B is placed in position upon the base A, with its V-shaped groove E^2 resting upon the rod E′ and with the rear portion of the frame supported upon the base by the leg E^3. An attaching-screw E^4, passing through the frame B and entering a screw-threaded hole in the base A, holds the frame B firmly upon the base and upon the cylindrical rod E′, which, being held in the V-shaped groove E^2, restrains the frame B from rotating about the attaching-screw E^4.

Journaled in the frame B′ is a shaft F, carrying the driving-gear F′, which engages the pinion F^2, attached to a spindle F^3, journaled in a bearing upon the frame B′ and carrying the grinding-wheels G G′, separated slightly more than the thickness of the wheels by the washer G^2 and held in place by the washers G^3 G^4 and a nut G^5. The grinding-wheels, of emery or similar material, are held upon their respective spindles in different planes, so as to allow their edges to interlock, as at H H.

The frame B′ is capable of being moved upon the base A, so as to vary the distance between the frames B and B′, and is adjustably attached to the base A by means of the tightening-screw I, passing through the frame B′ and through the slot I′ and entering a nut I^2 beneath the base A.

The frame B carries an adjusting-screw J, rotating in the frame B and held from longitudinal movement by the collars J′ J′ and entering a screw-threaded hole in the frame B′, allowing the frame B′ when the clamping-screw I is loosened to be moved toward or away from the frame B upon the rod E′ by the rotation of the adjusting-screw J. The frame B also carries a rod K, upon which a wooden roll K′ turns loosely, and is held in a central position between the frames B B′ by the tension of the springs K^2 K^2, the rod K having a sliding motion through the frame B′.

The driving-shafts C and F have coinci-

dent axes, and the rotary motion of the shaft C is imparted to the shaft F by means of the rectangular blade L, provided with a head L′, entering a concentric chamber in the shaft C, the rotation of the shaft C being imparted to the blade L by means of a slotted plate L^3, pivoted at L^4 to the driving-gear C^2 and having its opposite end held against the driving-gear C^2 by means of the clamping-plate L^5, attached to the gear C^2.

The blade L passes through a rectangular slot in the plate L^6, attached to the driving-gear F′, and enters a concentric chamber extending nearly the entire length of the shaft F, as represented in sectional view in Fig. 3. When the frames B B′ are removed their extreme distance apart, the rectangular blade L just enters the rectangular slot in the plate L^6, and as the frame B′ is moved toward the frame B the end of the rectangular blade L enters the chamber L^7. The plate L^3 is pivoted at L^4 to the gear C^2 in order to permit a lateral swinging motion to the plate to allow for any variation in the alignment of the shaft C and F. The grinding-wheels D D′ and G G′ can be made of any suitable material, such as emery, corundum, &c., and they are mounted upon their respective shafts in different planes in order to allow the edges of the wheels to move by each other and interlock as the frame B′ is moved toward the frame B.

The position of the frame B′ is adjusted with reference to the frame B in order to bring the grinding-wheels closer together, in order to compensate for wear, and also to vary the angle inclosed between the peripheries of the wheels for the purpose of varying the bevel upon the tool to be ground. The diagrams in Figs. 5 and 6 illustrate the variation in the bevel produced upon the tool to be ground by the variation of the distance between the centers of the wheels.

In Fig. 5 the lines 1 1 represent the tangents of two opposite wheels at their greatest distance apart and inclosing between them a small angle, rendering the edge of the cutting-tool correspondingly thin, and in Fig. 6, the lines 2 2 represent tangents of the opposing wheels at the points of intersection when the wheels are moved together, the angle between the lines 2 2 being much greater than the angle inclosed between the lines 1 1 and producing a corresponding change in the edge of the cutting-tool.

In operation the cutting-wheels are arranged in suitable relative position to produce the desired angle upon the edge of the cutting-tool. The cutting-tool is then laid across the grinding-wheels with its edge downward and placed in the angle inclosed between the peripheries of the grinding-wheels, and as the grinding-wheels are revolved by the rotation of the crank C′ a traversing movement is imparted to the cutting-tool backward and forward across the edge of the cutting-tool. The wooden roll K′ is held centrally between the spindles C^4 and F by the spiral springs K^2, and it prevents the edge of the cutting-tool from being lowered and brought in contact with the rectangular blade L.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a grinding-machine, the combination of the driving-shafts having coincident axes, spindles operatively connected with said driving-shafts and carrying grinding-wheels, and intermediate connecting mechanism, substantially as described, whereby the rotary motion of one of said driving-shafts is imparted to the other, substantially as described.

2. In a grinding-machine, the combination of opposing grinding-wheels carried upon parallel spindles, driving-shafts operatively connected with said spindles, and a blade held concentrically in said driving-shafts and capable of sliding in one of said shafts, whereby the rotary motion of one of said driving-shafts is communicated to the other of said shafts at varying distances apart, substantially as described.

3. In a grinding-machine, the combination of a base supporting fixed and movable frames, a fixed frame carrying a rotating spindle, a grinding-wheel carried on said spindle, a movable frame adjustably attached to said base, a rotating spindle carried by said frame, a grinding-wheel carried on said spindle, driving-shafts journaled in said fixed and movable frames and operatively connected with said grinding-wheel, spindles, and intermediate mechanism, substantially as described, whereby the motion of one of the driving-shafts is communicated to the other, substantially as described.

4. In a grinding-machine, the combination, with a pair of spindles carrying pinions and grinding-wheels, of driving-shafts having coincident axes and carrying gear-wheels engaging the pinions on said spindles, a rectangular blade with its ends entering concentric chambers in said driving-shafts, plates attached to said gears and having rectangular openings to receive said blade, substantially as described.

5. In a grinding-machine, the combination, with spindles carrying grinding-wheels, of driving-shafts having coincident axes and operatively connected with said spindles, a blade held concentrically in said shafts, by which the motion of one shaft is imparted to the other, and a pivoted plate carried by one of said shafts and provided with an opening to receive said blade, substantially as described.

6. In a grinding-machine, the combination, with grinding-wheels having connected operating mechanism, of a spindle held in the frame-work and carrying a guard-roll to hold the tool while being ground out of contact with the operating mechanism, substantially as described.

7. In a grinding-machine, the combination,

with grinding-wheels capable of adjustment relatively to each other, of a spindle K, a roll K′, held on said spindle, and springs K^2 K^2, by which said roll is held centrally on said spindle, substantially as described.

8. The combination of a base A, having a groove E, a fixed frame B, a movable frame B′, said fixed and movable frames having grooves E^2, and a rod E′, inclosed by said grooves, substantially as described.

WM. H. BROWN.

Witnesses:
RUFUS B. FOWLER,
H. M. FOWLER.