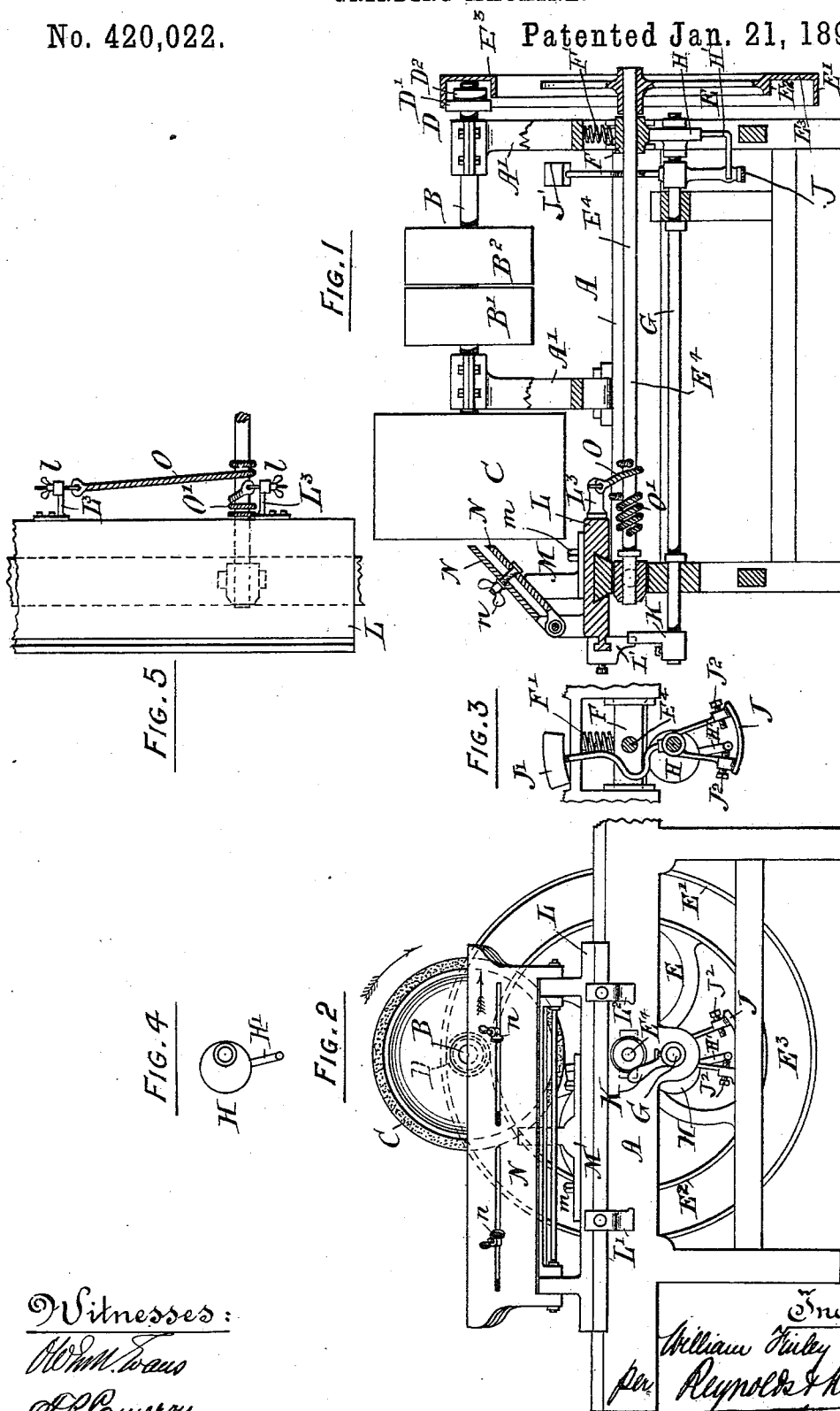


(Model.)

W. F. STEINHOFF.  
GRINDING MACHINE.

No. 420,022.

Patented Jan. 21, 1890.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

WILLIAM FINLEY STEINHOFF, OF SIMCOE, ONTARIO, CANADA.

## GRINDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 420,022, dated January 21, 1890.

Application filed September 8, 1887. Serial No. 249,155. (Model.) Patented in Canada June 8, 1887, No. 26,907.

*To all whom it may concern:*

Be it known that I, WILLIAM FINLEY STEINHOFF, of the town of Simcoe, in the county of Norfolk and Province of Ontario, Canada, have invented certain new and useful Improvements in Grinding-Machines; and I do hereby declare that the following is a full, clear, and exact description of the same.

This invention relates to machines for grinding the knives of planing-machines, and those for cutting leather, paper, cloth, &c., its object being to simplify as much as possible the construction and to improve the working of such machines, and to provide means whereby the grinding of the knives to a desired edge can be performed in a perfect manner automatically.

It may be said to consist in the combination, with the oscillating hand-slide and other parts of the old machines, of special mechanism for rendering the oscillating movement more accurate than heretofore, and of controlling the grinding automatically, all this mechanism being fully illustrated in the accompanying drawings and specified in the claims.

In the said drawings, Figure 1 is a transverse vertical sectional elevation of a grinding-machine with my improvements combined with it; Fig. 2, a front side elevation of same; Fig. 3, a sectional view showing part of apparatus for obtaining reverse movement from one way movement of main driving-shaft; Fig. 4, a detail of eccentric device; and Fig. 5, a part plan view showing shafts, cords, &c., for operating slide-carrying knives.

Similar letters of reference indicate like parts.

A is the frame-work of the machine, substantially constructed to resist the vibration of the operating parts, B' B<sup>2</sup> being the driving-pulleys (respectively fast and loose) mounted on main shaft B, carried in the standards A' A' of the frame.

C is the emery or other grinding-wheel, mounted on front end of shaft B, as usual. On the opposite or rear end of this main shaft B a cone friction-pulley D is arranged. This pulley is formed of a pulley D' of a certain diameter and another D<sup>2</sup> of smaller diameter.

E is a large rimmed wheel, E' E<sup>2</sup> being, respectively, the outside and inside peripheries

or rims, connected together by a backing E<sup>3</sup>. This wheel is mounted on the rear end of a shaft E<sup>4</sup>, extending centrally across the machine parallel with main shaft B, the end nearest the wheel E of which revolves in movable transverse boxing F, sliding in suitable ways in the frame of the machine and pressed downward by a spiral spring F', while the other end has a bearing in the frame of the machine.

The cone friction-pulley D is arranged to work in between the two rims of the wheel E, the larger part D' and smaller part D<sup>2</sup> working at intervals, respectively, upon the outside one E' and inside E<sup>2</sup>, the object being to impart a reverse action to the shaft E<sup>4</sup> of wheel E, the differences in size of D' and D<sup>2</sup> equalizing the speed at which the wheel will be revolved in both directions. The means by which the rims E' E<sup>2</sup> are caused to alternately make contact with and be operated by the respective parts D' D<sup>2</sup> of pulley D will now be described.

On a trip-shaft G, running parallel with the other shafts from front to back sides of the machine and carried in suitable bearings in same immediately under the transverse boxing F, which rests on its periphery, is mounted loosely an eccentric H, provided with a right-angled arm H', extending downward and outward from a point on its periphery. Besides this eccentric is secured rigidly on the same shaft a segment or quarter-circle J, (shown in detail in Fig. 3,) formed of a hub, two radial arms, and a segment of periphery, J' being a counterbalance-weight carried on the outer end of a bent arm projecting from its hub, and J<sup>2</sup> J<sup>2</sup> adjusting bolts or screws screwed through each radial arm from the outside, as shown, so that their ends will project into the open space between the two radial arms. On the front end of the shaft G an upwardly-projecting arm K is fixed, and on the sliding bed L, carrying the knife to be ground, are arranged stops L' L<sup>2</sup>, (adjustable to the length of the knife,) which alternately come in contact with and throw the arm K a certain distance in either direction, and thereby partially rotate the shaft G in reverse directions.

O O' are cords attached at one end to adjusting-screws l l, working in arms L<sup>2</sup> L<sup>3</sup>, pro-

jecting inside from either end of sliding bed L, their opposite ends being secured to and wound round shaft B, so that its reverse rotation will give to the slide the necessary oscillating movement.

M is an adjustable stop, held in place by set-screws *m* on the sliding bed L, for regulating the grinding of the knives, the knife holders or jaws N N, provided with thumb-screws *n n*, resting upon it, as shown in Fig. 1.

The end of the right-angled arm H' of eccentric H projects into the open space between the two radial arms of segment J, and the eccentric being so set that the transverse boxing F, carrying end of shaft G, will rest upon the quarter-section of the periphery nearest its shaft, the transverse boxing F will be at its lowest point, and therefore the upper or outside periphery E' of wheel E be drawn down onto the larger part D' of pulley D, and rotated in one direction by it until by the action of the slide mechanism just mentioned the shaft G is partially rotated to operate the quarter-circle or segment J, it acting on the arm H' of the eccentric to rotate it a sufficient distance to elevate the transverse boxing F, and with it the wheel E, so that its lower or inside rim will be pressed against its part of pulley D and be revolved in a contrary direction.

The operation of the machine will now be described. A planing-machine or other knife having been set centrally in the jaws N N, the stop M adjusted to control the extent of grinding, and the stops L' L<sup>2</sup> set to correspond with the length of the knife, the machine is started, and, as will be readily understood, should the upper or outside rim of wheel E be in contact with pulley D and revolving to the right, as shown by arrow in Fig. 2, the wheel E will be turned in that direction, will rotate its shaft B, and by the winding of cord O draw the slide L to the right until stop L' strikes arm K and throws it over, as before described. This throwing over of K rotates the shaft G to a certain extent, and, helped by counterbalance-weight J', the segment or quarter-circle J is swung and the end of either bolt J<sup>2</sup> strikes the interposed end of arm H' to operate the eccentric with the result before explained—viz., to throw the lower or inside rim of wheel E into contact with pulley D and reverse the revolution of shaft B and necessarily slide L.

The bolts J<sup>2</sup> J<sup>2</sup> are for the purpose of taking up the wear of the eccentric, for the sooner one strikes the arm H' and the farther it carries it along the more lift is given to the eccentric.

What I claim is as follows:

1. In a grinding-machine, the combination, with a main driving-shaft carrying a grinding-wheel, of a friction-pulley mounted on such shaft, and a wheel constructed with two peripheries arranged to come in contact alternately with said friction-pulley and be driven thereby in reverse directions, all as and for the purposes described.

2. In a grinding-machine, the combination, with a main driving-shaft carrying a grinding-wheel and friction-pulley, and with a slide-bed for carrying knives, of a wheel constructed with two peripheries arranged to come in contact alternately with said friction-pulley, a shaft carrying said wheel, a movable bearing for one end of said shaft, and cords secured at one end to and wound round said shaft and secured at the other end to opposite ends of the slide-bed, all as and for the purposes described.

3. In a grinding-machine, the combination, with a friction-pulley mounted on a main driving-shaft, and with a wheel constructed with two peripheries, and with a shaft carrying said wheel, and with a movable boxing carrying one end of said shaft, and with cords connected to and wound on said shaft and connected to said slide-bed, of an eccentric mounted on a shaft and adapted to be operated to raise said movable boxing and allow of the lowering of the same, with means for so operating such eccentric, all as and for the purposes described.

4. In a grinding-machine, the combination, with eccentric H, mounted loosely on shaft G and having arm H', of quarter-circle or segmental device J, provided with weight J', and bolts J<sup>2</sup> J<sup>2</sup>, mounted rigidly on shaft G, with means for partially rotating such shaft alternately in reverse directions, as and for the purposes described.

5. The combination, in a grinding-machine, of a shaft journaled at one end in a vertically-movable boxing, a shaft parallel with and disposed under said shaft and carrying an eccentric engaging the boxing, for the purpose set forth, an arm mounted on the free end of the eccentric-carrying shaft, and an oscillating slide-bed provided with adjustable stops adapted to alternately engage said arm, substantially as and for the purpose set forth.

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