No. 794,159. PATENTED JULY 11, 1905.

L. F. BRENING.

GRINDING MACHINE.

APPLICATION FILED JULY 25, 1904.

2 SHEETS—SHEET 1.

Fig. 1.

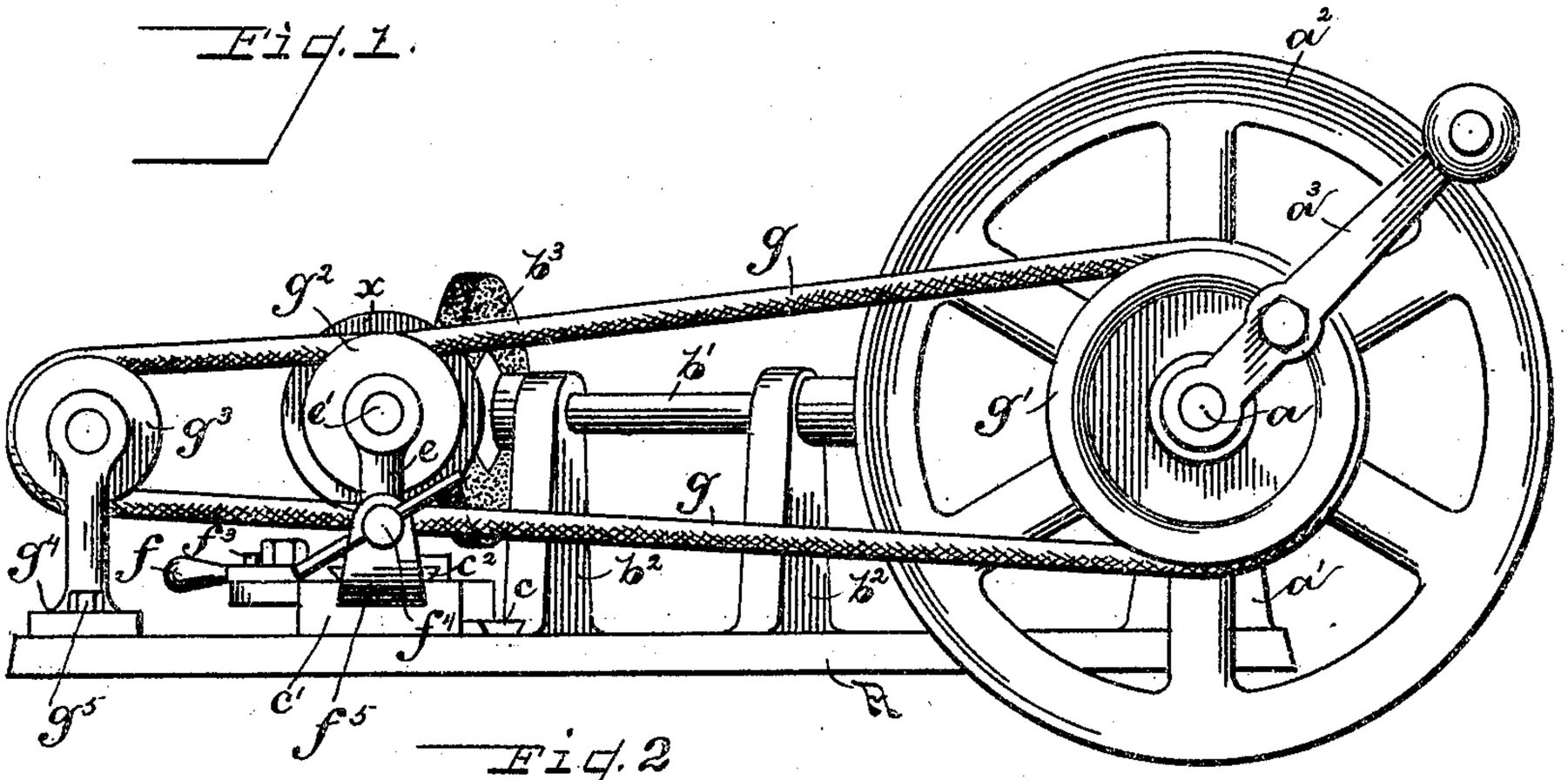


Fig. 2.

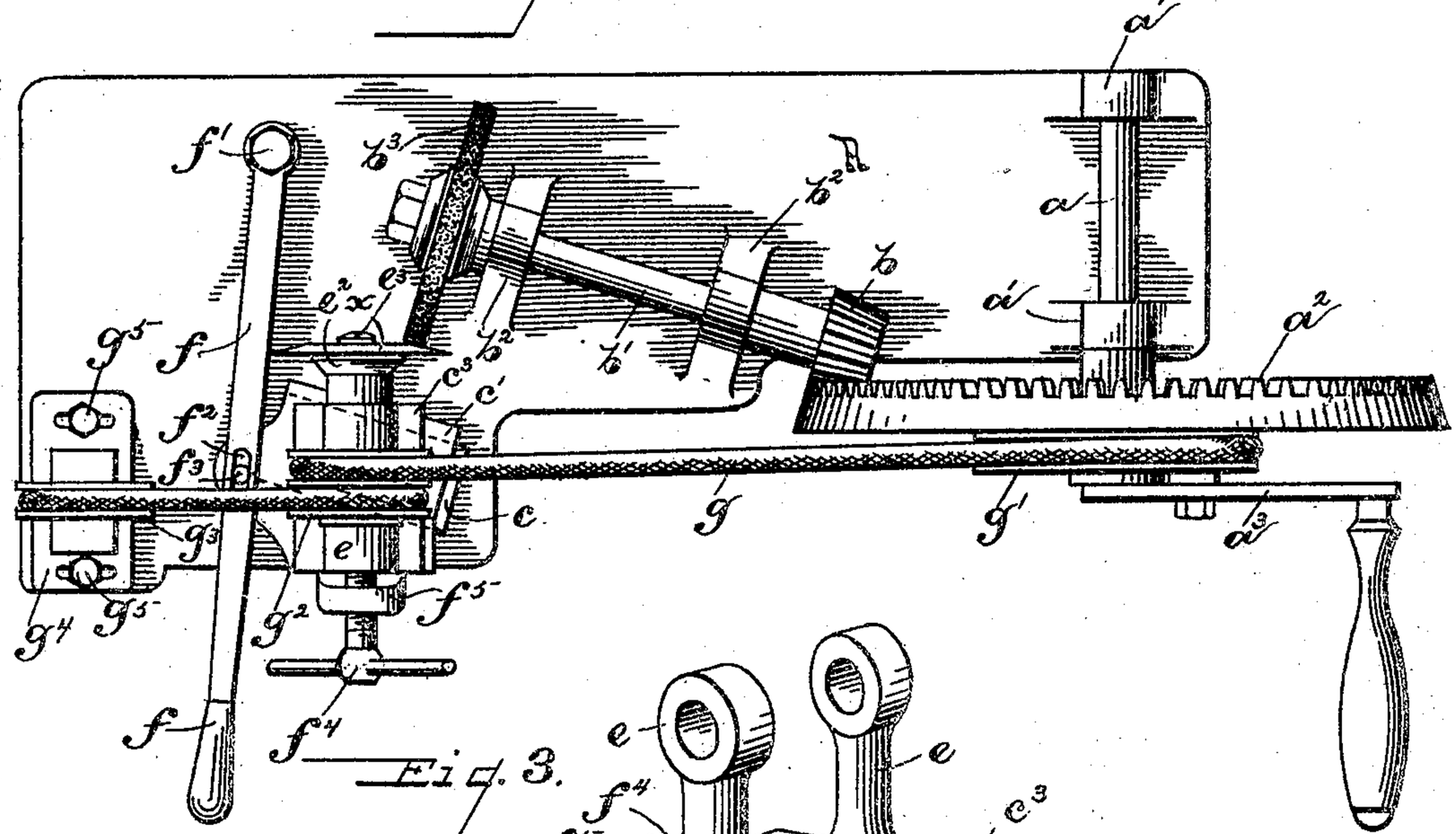
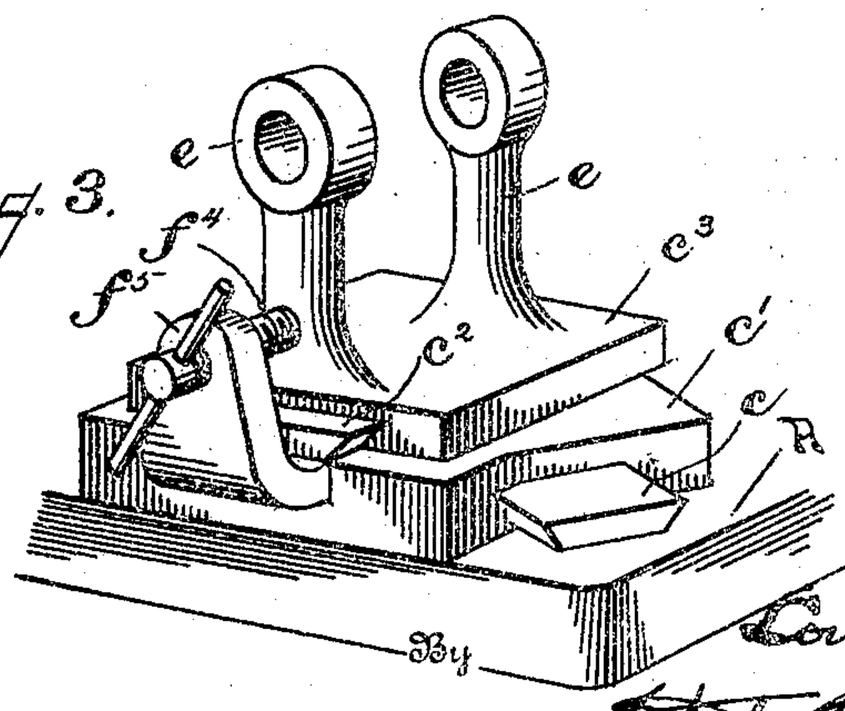


Fig. 3.



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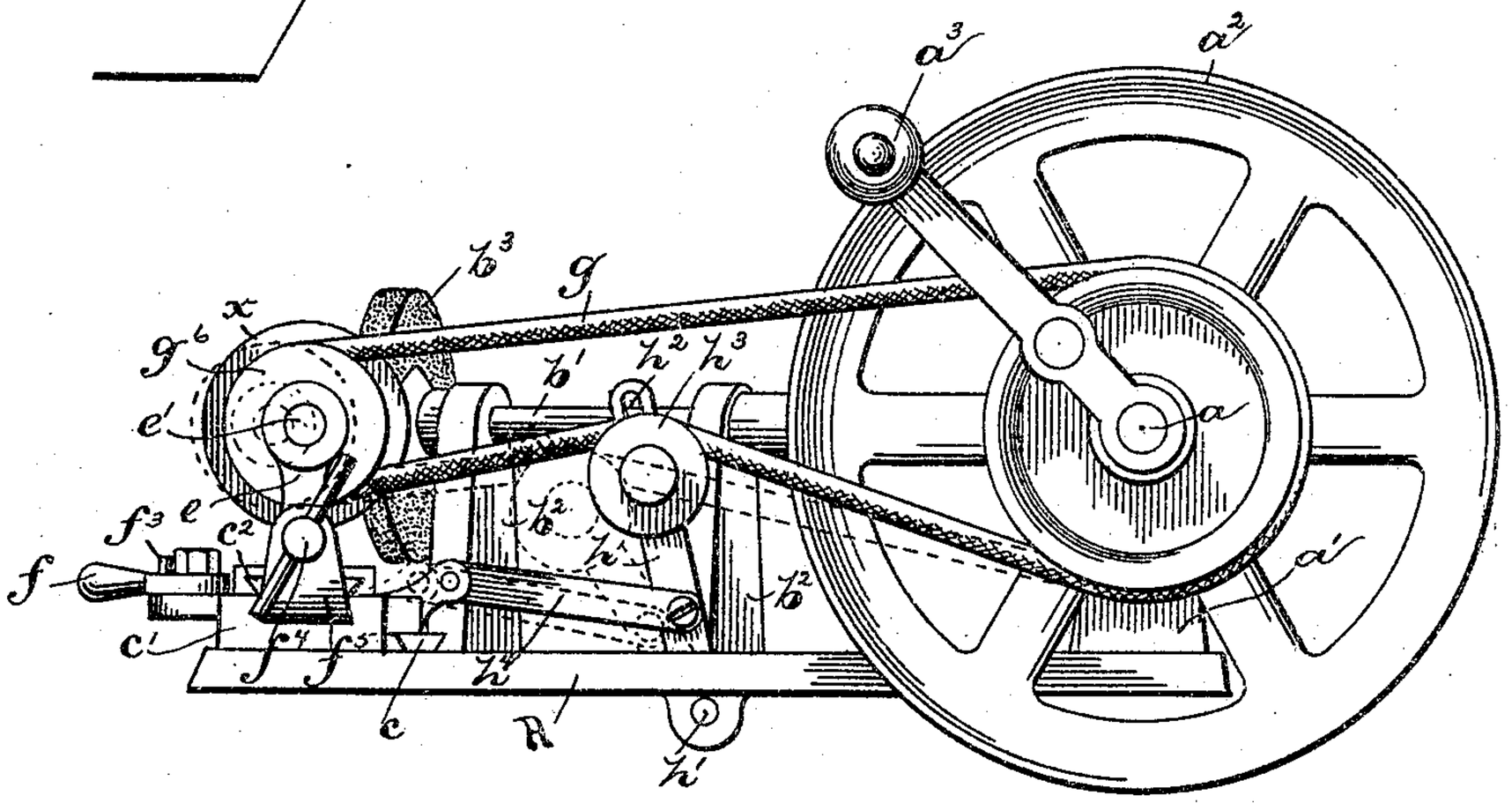
2 SHEETS—SHEET 2.

Fig 4



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No. 794,159. Patented July 11, 1905.

UNITED STATES PATENT OFFICE.

LOUIS F. BRENING, OF SPRINGFIELD, OHIO, ASSIGNOR TO THE RIDGELY TRIMMER COMPANY, OF SPRINGFIELD, OHIO, A CORPORATION OF WEST VIRGINIA.

GRINDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 794,159, dated July 11, 1905.

Application filed July 25, 1904. Serial No. 217,907.

To all whom it may concern:

Be it known that I, LOUIS F. BRENING, a citizen of the United States, residing at Springfield, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Grinding-Machines, of which the following is a specification.

My invention relates to improvements in grinding mechanism for truing and grinding disks, and particularly the rotary cutters employed in paper-trimmers.

The object of my invention is to provide simple and efficient means whereby the disk may be ground perfectly circular, the edge given a bevel of a predetermined degree, and a fine cutting edge produced.

A further object is to produce a device automatic in its operation, whereby a minimum amount of care on the part of the operator will be required to grind the disk equally at all points and to provide automatic adjustment of the driving-belt to compensate for the movement of various parts.

With the above primary and other incidental objects in view, my invention consists of the constructions, combinations of parts, and mode of operation hereinafter described, and set forth in the claims.

In the drawings, Figure 1 is a side elevation of the device. Fig. 2 is a plan view of the device. Fig. 3 is a detail of the sliding head upon which the disk to be ground is carried. Fig. 4 is a side elevation of a modified form.

Like parts are represented by similar characters of reference throughout the several views.

Briefly stated, the operation of truing and grinding is as follows: The disk or cutter is mounted on a revoluble spindle and is brought into contact with a revolving wheel of abrasive material, the grinder and disk being rotated in opposite directions, as hereinafter described. The face of the grinder being arranged at an angle to the plane of the disk thereby gives the required bevel.

Referring to the drawings, a indicates the main operating-shaft journaled in supports a' a', located on the base A of the machine. Mounted on the shaft a is an internal bevel-gear a^2 of comparatively large size which meshes with a bevel-pinion b on a shaft b'. The gear-wheel a^2 is preferably made with sufficient weight to serve as a balance-wheel and is adapted to be rotated by means of a crank-arm a^3, secured thereto, or from any other source of power. The shaft b' is provided with bearings in supports b^2 b^2, similar to the supports a' a', and carries at the end opposite the bevel-pinion b a grinder b^3, preferably of emery or other abrasive material.

The disk x to be ground is supported on a sliding head similar in construction and operation to the slide-rest in lathe constructions, and consists of the lower slide or way c, to which is slidably secured a gibbed lower slider c', which has formed integrally therewith a cross-slide c^2, on which is mounted a gibbed slider c^3. The upper slider c^3 carries upright supports e e for the revoluble spindle e', to which is secured the disk to be ground, which may be mounted on a mandrel, in a chuck, or by other suitable means, the preferable means being as illustrated, in which e^2 is a face-plate on the end of the spindle e', to which the disk is secured by a screw e^3. The spindle e' is arranged at an angle to the shaft b' of the grinding-wheel b^2, the angle being such that the face of the grinding-wheel b^2 will form with the plane of the disk an angle of the required bevel. The lower slide or way c is arranged parallel to the shaft b' and the lower slider c' is adapted to be operated by a lever f, pivoted at f' to the base A and provided with a slot f^2, which engages a pin f^3 in said lower slider. By this construction the point of operation may be quickly and easily varied from the edge of the disk to the highest point of the bevel without varying the contact of the grinder with the disk.

The cross-feed of the upper slider is accomplished by a feed-screw f^4, which has a screw-threaded bearing in a lug f^5 of the lower slider c' and a swivel connection with the upper slider c^3. By this means the disk and grinder are brought into contact and

during the operation the disk is fed toward the grinder sufficiently to compensate for the material removed by the grinding operation.

The grinder b^3 is caused to revolve, as has been described, by means of the gear a^2, the pinion b, and shaft b'. The disk x is revolved, but in the opposite direction, by means of an endless belt g. The belt g passes over a pulley g', rigidly secured to the main gear a^2, thence entirely around a double-grooved pulley g^2, secured on the spindle e', and thence over an idler-pulley g^3. The idler-pulley g^3 is preferably mounted in a movable base g^4, secured to the base A by adjusting-bolts g^5, by means of which the slack of the belt may be taken up. By this construction the driving connection will afford no resistance to the movement of the slidable head by means of the lever f. The small amount of cross-feed which is required is readily permitted by the elasticity of the belt g.

In Fig. 4 there is shown a modified form of connection between the driving-gear a^2 and the spindle e', in which the endless belt g passes over the pulley g', as in the former construction, and thence around a single pulley g^6 on the spindle e'. It will be seen that the movement of the slidable head along the way c will cause more or less slack in the belt g, according to the position of said head on the way c. To automatically adjust the belt g and take up the slack, there is provided an arm h, pivoted at h' to the base A. Adjustably secured in a slot h^2 of the arm h is an idler-pulley h^3, over which the belt g passes intermediate of the pulleys g^6 and g'. Pivotally connected at one end to the arm h and at the other to the lower slider c' is a link h^4. The connection is such that as the slider c' is moved toward the arm h said arm will be moved toward a perpendicular position, and when moved in the opposite direction said arm will be lowered, as indicated by dotted lines, thus keeping the belt g always at the proper tension.

It will be seen that I thus provide a simple, cheap, and efficient machine for the purpose, and one which does not require special care or skill on the part of the operator to grind the disks evenly and true and which automatically adjusts its driving mechanism to the movement of the parts.

It is obvious that instead of being hand-operated by means of the crank a^3 a pulley may be located on the shaft a and the machine driven from an electric motor or other motive power.

Having thus described my invention, I claim—

1. The combination of operating mechanism, a grinding-wheel operated thereby, a knife-blade, a support for same, a driving connection between the operating mechanism and support and means for adjusting the blade-support and the driving connection simultaneously.

2. The combination of main operating mechanism, a grinding-wheel operated thereby, a movable blade-support, a belt connecting said blade-support with the operating mechanism, and means for simultaneously adjusting the belt and support, for the purpose specified.

3. The combination of main operating mechanism, a grinding-wheel operated thereby, a movable blade-support, a rotatable shaft supported by said blade-support, connecting mechanism between the shaft and the operating mechanism, and means for simultaneously changing the location of the shaft and its support and adjusting the connecting mechanism, for the purpose specified.

4. The combination of main operating mechanism, a grinding-wheel operated thereby, a blade-support movable longitudinally and laterally, connecting mechanism between the support and the operating mechanism, means for adjusting the connecting mechanism simultaneously with the lateral movement of said support, for the purpose specified.

5. The combination of main operating mechanism, a grinding-wheel operated thereby, a movable knife-blade support, an endless belt extending from said operating mechanism to said blade-support, and means whereby said endless belt will be automatically adjusted to the various positions assumed by said knife-blade support.

6. In a grinding-machine, the combination of a main operating-wheel, a grinding-wheel operated thereby, a movable blade-support and a pulley supported therein, a stationary pulley located in the base of said machine, an endless belt extending from the operating-wheel around both of said pulleys, and means for moving the blade-support and pulley supported thereon, for the purpose specified.

7. In a grinding-machine, a main operating-wheel, a grinding-wheel operated thereby, a pulley located in proximity to the grinding-wheel, a movable support for said pulley, a pulley on stationary supports, and connecting mechanism extending from the main operating-wheel to both of said pulleys, for the purpose specified.

8. In a machine as described, the combination of a revoluble grinder, actuating means therefor, an adjustable article-support, a revoluble article-carrier, a driving-belt for said article-carrier, and means for automatically maintaining said belt in driving connection with said article-carrier throughout the various degrees of adjustment of said article-carrier, substantially as specified.

9. In a machine as described, the combi-

nation of a grinder-actuating mechanism, a movable article-support, a belt whereby said article will be caused to rotate, an idler-pulley, and a driving connection between said movable article-support, said idler-pulley, and said actuating means and means for constantly maintaining same in operative engagement, substantially as specified.

10. The combination of a main operating-shaft, a knife-supporting spindle arranged parallel to said shaft, a grinder-supporting shaft arranged at an angle to said main shaft and to said spindle, a sliding support for said spindle movable parallel with said main shaft, and a second sliding support for said spindle movable parallel with said grinder-supporting shaft, substantially as and for the purpose specified.

In testimony whereof I have hereunto set my hand this 18th day of July, A. D. 1904.

LOUIS F. BRENING.

Witnesses:
CHAS. I. WELCH,
CLIFTON P. GRANT.