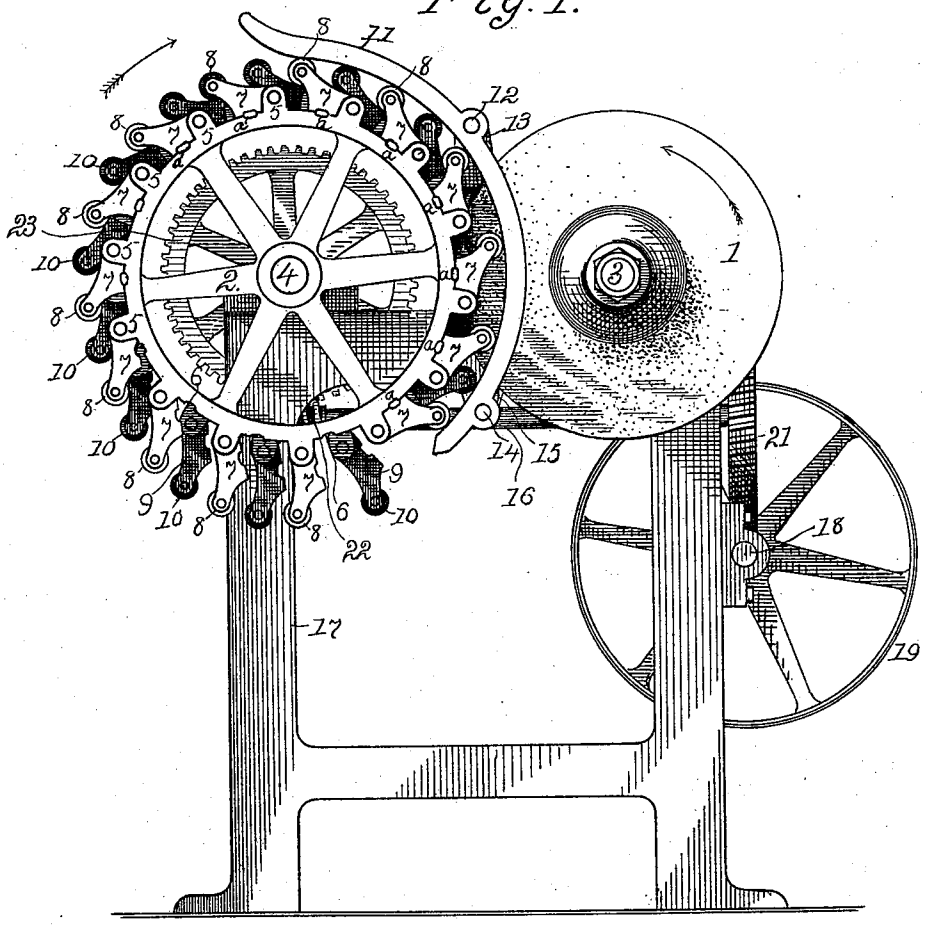
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C. F. SPERY.

AUTOMATIC GRINDING MACHINE.

No. 588,249. Patented Aug. 17, 1897.

Fig. 1.



Attest.
Nora Graham
Ira Graham

Inventor
Chas. F. Spery
by L. P. Graham
his attorney.

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Fig. 2.

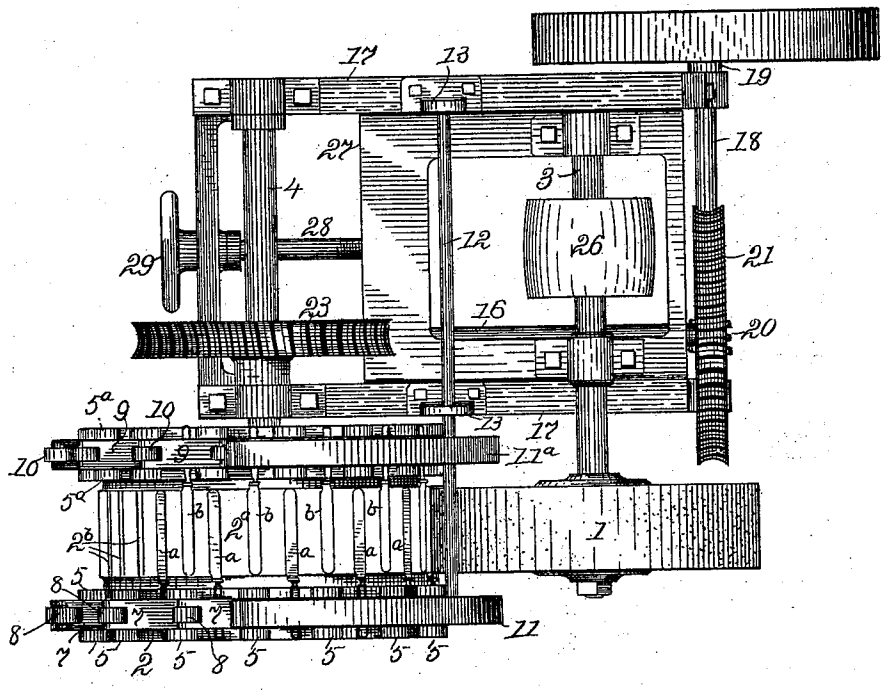
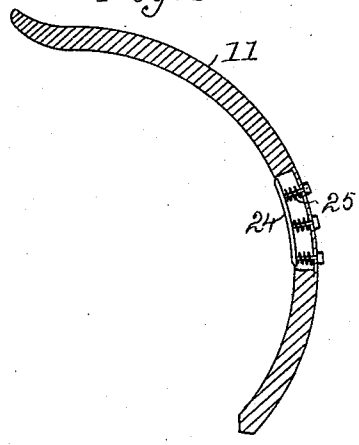


Fig. 3.



Attest.
Nora Graham
Ina C. Graham.

Inventor.
Chas. F. Spery
by L. P. Graham
his attorney

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

CHARLES F. SPERY, OF DECATUR, ILLINOIS.

AUTOMATIC GRINDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 588,249, dated August 17, 1897.

Application filed February 1, 1897. Serial No. 621,486. (No model.)

To all whom it may concern:

Be it known that I, CHARLES F. SPERY, of Decatur, in the county of Macon and State of Illinois, have invented certain new and useful Improvements in Grinding-Machines, of which the following is a specification.

This invention is particularly designed for grinding knife-blades, though it is applicable to other articles having convex surfaces.

It is exemplified in the structure hereinafter described, and it is defined in the appended claims.

The invention consists in provision whereby the extent of convexity of the knife-blades or other articles may be accurately and uniformly produced, and such provision resides in a work-holding wheel having a perimeter conforming to the desired convexity of the blades, and a grinding-wheel opposed to the work-holding wheel on a shaft parallel with the shaft of such work-holding wheel.

The invention further consists in provision for forming the convex surfaces of the blades accurately and uniformly without danger of burning or overheating the same and in a manner to permit ready placing of the articles in operative connection with the work-holding wheel, and this provision resides in a work-holding wheel and a grinding-wheel having the peculiarities hereinbefore described and mounted on horizontal or approximately horizontal shafts.

The invention further consists in details of construction and combinations of parts, as hereinafter particularized, whereby the articles are held in position to the ground.

In the drawings forming part of this specification, Figure 1 is a side elevation of a machine embodying my improvements. Fig. 2 is a plan of same. Fig. 3 is a section lengthwise through a clamp-controller, showing a preferred detail of construction thereof.

The drawings illustrate a structure in which my invention is embodied. Many of the details of the structure are not essential. Some are old and many are capable of variation in form and arrangement, so I will describe the structure as it is, and then by means of the claims distinguish between the essentials and the non-essentials, between the old and the new, and between the features that are attributable to the inventive act and those that result from the exercise of mechanical skill.

A frame 17 is made of suitable size and strength to meet the requirements of machines of this class, and it is provided with horizontal guideways for the slide-plate 27. A hand-wheel 29 is fastened onto a threaded rod 28, that engages the slide-plate, and by means of the hand-wheel and the threaded rod the slide-plate is shifted in the guideways formed in frame 17. A shaft 3 is journaled on the slide-plate. One of its ends projects beyond a side of the frame and carries a grinding-wheel 1, and it has a drive-pulley 26 between its ends. Shaft 4 is journaled in bearings mounted on frame 17. It extends parallel with shaft 3. One of its ends projects beyond the frame and carries a work-holding wheel 2, and it has a worm-wheel 23 between its ends. A shaft 18 is journaled in bearings attached to an end of frame 17. It has a drive-pulley 19, and it is also provided with a worm 20. (Seen only in Fig. 2.) A shaft 16 extends lengthwise of the machine, and it has on one end a worm-wheel that meshes with worm 20, such worm-wheel being designated by 21, and on the other end is a worm 22, (seen only in Fig. 1,) that meshes with worm-wheel 23. Motion is imparted to the grinding-wheel 1 through pulley 26 and shaft 3. Motion is imparted to the work-holding wheel through pulley 19, shaft 18, worm 20, worm-wheel 21, shaft 16, worm 22, worm-wheel 23, and shaft 4, all in the order named. The grinding-wheel is made to approach the work more or less closely, and take-up for wear is effected through the slide-plate, the screw, and the hand-wheel.

The rim of wheel 2 is divided into three portions, two of which constitute work-holders and the other of which forms a grinding-surface. The blade-sustaining surface—*i. e.*, the surface against which the blades or other articles rest while being ground—occupies the space between the work-holder portions of the rim. It is designated in Fig. 2 by the character 2^a. It is preferably divided from the side portions by peripheral grooves, and it has a set of transverse grooves or recesses, as 2^b in Fig. 2, in which the blades of the knives are placed when the device is used for knife-

grinding, and which are shaped to conform to the article to be ground, whatever such shape may be. The central portion of the rim, which I have designated as a "blade-sustaining surface," is the same width as the grinding-wheel 1, with which it alines, and consequently the work-holding portions of the rim are one on each side of the grinding-wheel. The work-holders consist of transverse recesses in the rim, as shown at 6, which are shaped to receive a side of a knife-handle or a projecting part of whatever article is ground, and clamps that embrace the handle or projecting part and hold the article firmly in proper position. Lugs 5 and 5^a extend radially from the periphery of the rim, and they form bearings with which swinging clamps 7 and 9 are pivotally connected. The swinging clamps have rollers 8 and 10 in their swinging ends, and their surfaces that oppose the rim have recesses that coincide with the transverse recesses of the rim.

The clamps are arranged at regular intervals, and they are staggered or so placed that a clamp on one side of the rim is opposite a space between clamps on the other side. This last-named peculiarity enables the knives to lie at regular intervals against the face of the blade-sustaining surface, those held by the clamps on one side alternating with those held by the clamp of the other side, as suggested in Fig. 2 of the drawings. A pair of clamp-controllers 11 and 11^a are mounted on shafts 12 and 14. Their inner surfaces, except at the upper ends, describe arcs of circles concentric with the work-holding wheel and of a radius equal to the distance from the center of the wheel to the outer surface of a roller of a closed clamp, and their upper ends incline upward or away from the wheel. The clamp-controllers preferably are recessed, as shown in Fig. 3, and supplied in the recess with a plate 24, that conforms to the internal curvature of the controller. Bolts connect the plate with the back of the controller in a manner permitting motion of the plate toward and from the back, and springs 25 tend to keep the plate forced inward toward the work-holding wheel. The plate occupies a position in the controller adjacent to the working face of the grinding-wheel. It ordinarily projects beyond the inner face of the controller, and its function is to impart extraordinary pressure on the clamps at the time they present the articles they hold to the action of the grinding-wheel.

The shafts 3 and 4 are horizontal, and consequently the work-holding wheel and the grinding-wheel are both compelled to rotate vertically in the respective directions indicated by the arrows.

The diameter of the external surface of the work-holding wheel is proportionate to the degree of convexity that it is desired to impart to the articles to be ground—the smaller the wheel the greater the convexity, and the reverse.

In case the machine is used for the purpose for which it is particularly designed—namely, the grinding of knife-blades—the mode of operation is as follows: Knives *a* are held by their respective handles between clamps 7 and the rim of the wheel 2, and their blades rest in recesses in the periphery 2^a with their backs presented forward or in the direction of the motion of the wheel. In a similar manner knives *b* are held by the opposite set of clamps, and they occupy positions between knives *a* in regular alternation. This arrangement brings the sharpened end of one knife on one side of the grinding-surface of the work-holding wheel, the sharpened end of the next blade on the opposite side, and so on indefinitely. As the work-holding wheel moves forward the rollers of the clamps successively engage the controller-bars 11 and 11^a and are thereby prevented from releasing the handles of the knives, and by the time the knife held by any particular clamp is presented to the action of the grinding-wheel the yielding plate 24 is pressing the clamp with increased force against the handle. As the blade passes into and out of contact with the grinding-wheel it is ground to the required degree of convexity, and the sharpened end is ground thinner than the handle end and further travel carries the clamp clear of the restraint of the controller-bar and permits the clamp to swing downward and release the knife. The knife next following is treated in precisely the same manner, except for the rather important distinction that its sharpened end is presented to the opposite side of the grinding-wheel from that employed to grind the sharpened end of its predecessor, and so the hard work is thrown alternately to opposite sides of the grinding-wheel and the wear is thereby equalized. As the work-holding wheel revolves an attendant places knives in proper position to be held by the clamps, which is an easy operation, for the reason that the placing act is not difficult and several knives may be placed at one time, and so the operation continues indefinitely.

The vertical positions of the wheels is of utility in feeding, as it permits the knives to be simply laid in place. It is of utility in discharging, as it enables the knives to simply fall out of contact with the clamps, and in addition to this it is of utility in permitting the use of water or of water and sand between the grinding-wheel and the knives. The water or water and sand is poured downward between the wheels, and it or they cannot escape except by passing between the wheels and doing work either in cooling the metal or assisting the grinding operation, or both.

In case it is desired to grind articles other than knives the clamps are shaped to conform to the portion of the article that they are to grasp. Such changes are made in the grinding-surface of the work-holding wheel as the

form of the articles necessitate, and the operation is performed as described.

By substituting a polishing-wheel or a buffing-wheel for the grinding-wheel 1 the operation of polishing or of buffing may be satisfactorily performed in substantially the manner that the grinding operation is effected.

Having thus described the embodiment of my idea and explained the operation thereof, I now claim as new and desire to secure by Letters Patent—

1. In a machine for grinding articles having convex surfaces, the combination of a vertically-rotating wheel for grinding, or the like, a vertically-rotating work-holding wheel having an external circumference corresponding in convexity with the articles to be treated, and a set of swinging clamps pivotally connected with the periphery of the work-holding wheel.

2. In a machine for grinding, or otherwise treating, articles having convex surfaces, the combination of a vertically-rotating wheel for grinding, or the like, a vertically-rotating work-holding wheel having an external circumference corresponding in convexity with the articles to be treated, a set of swinging clamps pivotally connected with the periphery of the work-holding wheel, and an arc-formed, stationary guideway for holding the clamps closed against the articles to be ground during a portion of the rotation of the wheel.

3. In a machine for grinding, or otherwise treating, knife-blades, a rotating work-holder wheel having two sets of clamps arranged staggered fashion on opposite sides of its periphery.

4. In a machine for grinding, or otherwise treating, knife-blades, the combination of a wheel for grinding, or the like, a rotating work-holder wheel having a set of transverse recesses in the central part of its periphery and two sets of clamps arranged staggered fashion on opposite sides of the central portion, rollers journaled in the swinging ends of the clamps, arc-formed, stationary guideways for engaging the rollers and holding the clamps closed against the knife-handles, and spring-sustained plates forming part of the bearing-surfaces of the guideways and normally extending beyond the same, substantially as set forth.

In testimony whereof I sign my name in the presence of two subscribing witnesses.

CHAS. F. SPERY.

Attest:

CHAS. E. DAWSON,

J. N. BAKER.