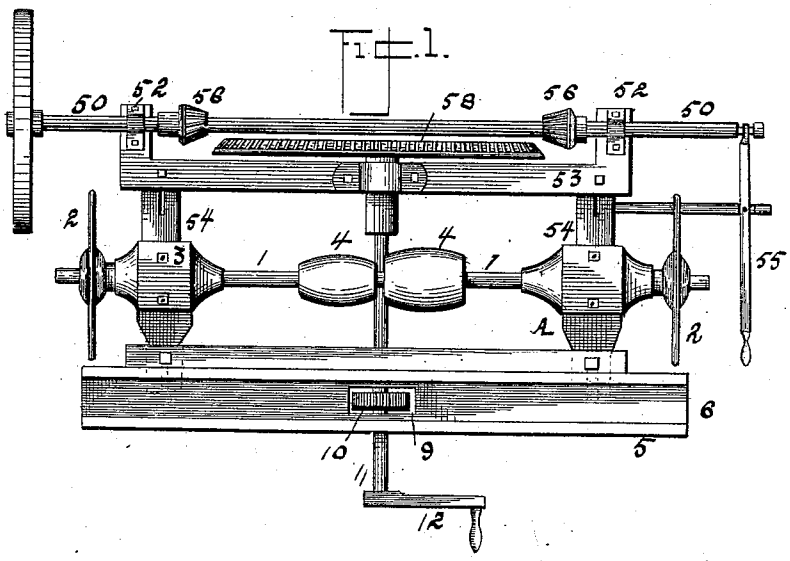
(No Model.) 2 Sheets—Sheet 1.

R. J. CHRISTY.

GRINDING MACHINE.

No. 469,772. Patented Mar. 1, 1892.

FIG. 1.



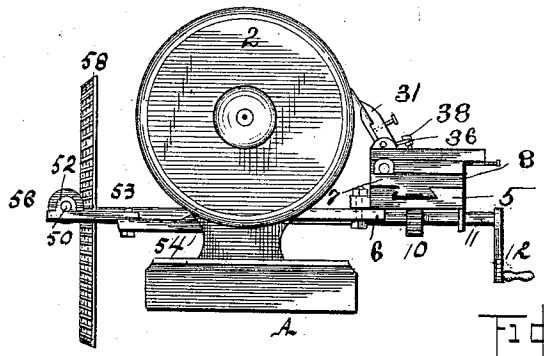


FIG. 2.

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(No Model.) 2 Sheets—Sheet 2.

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FIG. 3.

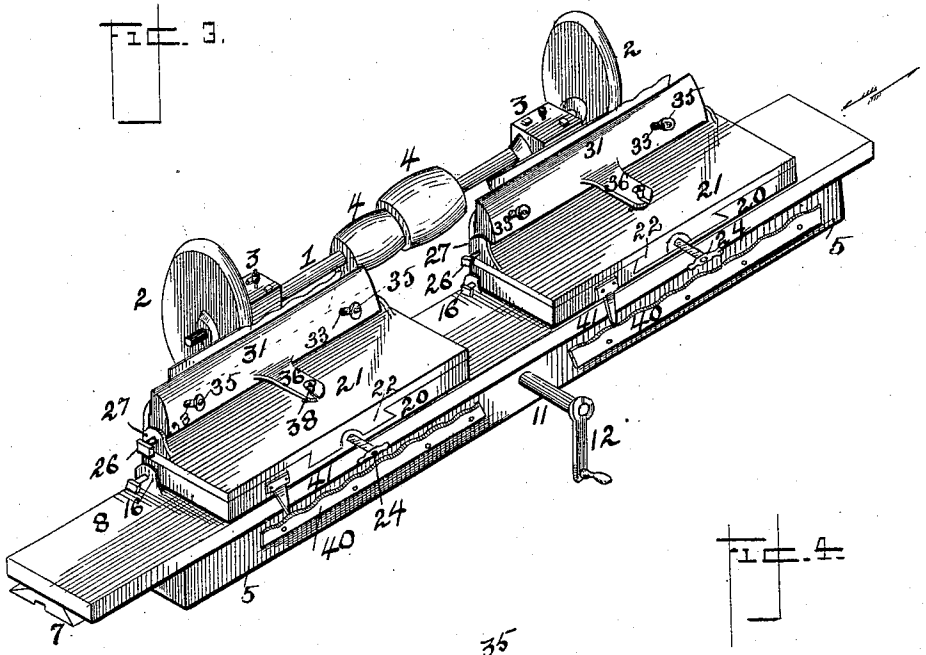

FIG. 4.

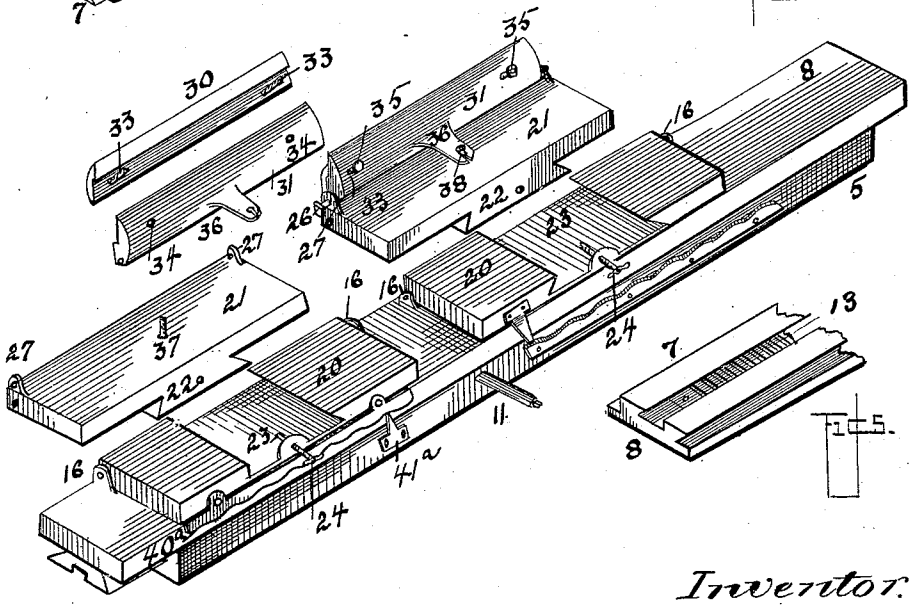

FIG. 5.

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UNITED STATES PATENT OFFICE.

RUSS J. CHRISTY, OF FREMONT, OHIO, ASSIGNOR TO ROBERT H. RICE, OF SAME PLACE, AND LEONIDAS H. CRESS, OF NEW YORK, N. Y.

GRINDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 469,772, dated March 1, 1892.

Application filed October 2, 1891. Serial No. 407,488. (No model.)

To all whom it may concern:

Be it known that I, RUSS J. CHRISTY, residing at Fremont, in the county of Sandusky and State of Ohio, have invented certain new and useful Improvements in Grinding-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to grinding-machines, especially to machines for grinding metal.

The object of the invention is to produce a machine in which blades or other articles may be ground to an angle or bevel or in curves or irregular or wave lines; also, to improve the mechanism for holding the article to be ground and for presenting it to the grinder; also, to increase the capacity of grinding-machines, and, in general, to improve machines of the character described.

Figure 1 is a plan view of the grinding-machine, the blade-holding tables being omitted. Fig. 2 is an end view with pulley of feed-driving gear omitted. Fig. 3 is a front perspective view of the grinding-machine with power-driving attachment omitted. Fig. 4 is a front perspective of the clamping and feed tables, the component parts thrown a little apart. Fig. 5 is a broken perspective detail of under side of feed-table.

The numeral 1 indicates the shaft on which the grinding or emery wheels 2 2 are mounted, said shaft being supported in suitable bearings 3 3 and driven by power applied to one of the pulleys 4 4.

The main bed 5 of the machine is parallel with the shaft 1, but on a different plane, and preferably a lower plane than said shaft. This bed has a guiding-track or dovetail groove 6, which serves as a guideway for the tongue 7, which is connected to the traveling table 8. The bed 5, as shown in Fig. 1, has a central mortise 9, in which there is a small pinion 10, which pinion is mounted on a shaft 11, extending transversely below the top of bed 5. The table 8 has a rack 13 on its lower surface in position to engage the teeth of pinion 10, and by rotating shaft 11, as by means of a crank 12 or other means to be explained, the table 8 may be moved along the bed 5. The guide-track or groove-and-tongue connection will insure a movement of the table 8 in a direction parallel with the bed 5. The table 8 has a pair of lugs 16 16 near its rear edge—that is, at the side of the table toward the grinding-wheels 2. A tool-base 20 is pivoted at its rear corners between these lugs 16, so that said base 20 may be lifted up at the front, as on a hinge. The tool-bases or work-supports 20 may be duplicated to any extent and hinged to the bed 8 in similar manner. Two such supports are shown in Figs. 3 and 4. By preference there will be a work-support for each grinding wheel or stone; but two such supports may be used with one wheel, and thus the work may be changed in one support while the grinding goes on at the other. Each tool-base or work-support 20 has a transverse slide 21. The slide 21 is guided transversely across the base 20, as by a tongue 22 entering a transverse groove 23 in the base. The slide 21 may be adjusted crosswise of bed 20 by means of screw 24, held in bearings in one of the parts and engaging the other part. This side movement of slide 24 is to put the top of clamp in proper relative position to the grinding-wheel and enables the clamp to be set closer to the grinding-wheel as said wheel wears away. The tool-clamp is hinged to the rear edge of the slide 21, as by pins 26 passing through lugs 27 on said slides and into the ends of one of the clamp-plates. The tool or work clamp shown consists of two parts 30 and 31. This clamp is specially fitted for knife-grinding. One of the parts or jaws 30 has two projecting bolts 33, which bolts pass through holes 34 in the jaw 31. The work—such as a knife-blade—may thus be clamped between the two jaws and held fast by means of nuts 35, applied to the bolts 33. One or both of the jaws may be recessed to give a firm seat to the work held between the jaws. The jaw 31 has a side lug 36, which projects toward the front of the machine when the jaws are in place, as in Figs. 2 and 3. A set-screw 37 projects from the slide through a hole or slot in this lug 36, and by a set-nut 38 this lug may be pressed nearer to or farther

from the face of the table 21, the nut engagement with lug 36 being made in usual way for the purpose. By turning nut 38 the jaws may be rocked on their pivotal connections or hinge 26. The elevation of the lug 36 swings back the top of the jaws and changes the angle of the blade or other article held between the jaws with reference to the face of the grinding-wheel. To cause the wheel to grind along a curved or irregular line, I attach a templet or gage 40 to the bed 5, the outline of this templet having a fixed relation to that of the desired surface to be produced by grinding. A finger 41, firmly attached to the tool-support 20, bears on this templet. When the table 8 is moved lengthwise of bed 5, the finger 41, moving with the table and work-support, will follow the contour of gage 40, and will thus serve to raise or lower the front edge of work-support 20 and tilt the clamping-jaws toward or away from the grinding-wheel, of course carrying the work with them.

The machine illustrated is fitted to grind a serpentine or waved edge to cutting-blades, and the templet 40 causes the blade to be rocked toward and away from the wheel as the table moves lengthwise. The general direction of bevel is determined by the position of the clamp. The grinding-wheel should have a convex face. The same result will be attained by reversing the position of the templet and bearing-finger, as shown at 40^a and 41^a, Fig. 4.

It is apparent that the entire grinding need not be done at one reciprocation of the table. The work may be clamped in the jaws and part of the grinding effected by passing the table lengthwise on its bed, when by changing nut 38^a further grinding may be effected by a return movement of the table. It will be understood of course that different forms may be ground by changing templets, the general idea being that the work-support moves at one edge to follow the inequalities of the templet, the other edge being a hinge with a fixed pintle or pivot line.

The feed of table 8 may be effected by turning crank 12; but I may provide a power-feed also. In Fig. 1 shaft 50 is a power-driven shaft supported in bearings 52, which bearings are on a frame-piece 53 of suitable form, bolted or otherwise detachably secured to rests 54 from the main frame A of the machine. The shaft 50 may be shifted lengthwise in its bearings, as by a lever 55, having horns engaging a reduced portion of the shaft or in other usual manner. Shaft 50 has two bevel-gears 56 56, the bevel being in opposite directions. Shaft 11 is extended to the rear of the machine and carries a large bevel-gear 58, which has its plane face near the shaft 50 and its teeth near the position of gears 56. When shaft 50 is in its intermediate position as in Fig. 1, the gears 56 do not engage gears 58. By shifting shaft 50 in either direction one of the gears 56 may be brought into engagement with gear 58, and if shaft 50 is in rotation the gear 58 will also be rotated and the shaft 11 and its pinion will drive the feed-table of the machine. By shifting shaft 50 in the opposite direction a reverse movement is obtained.

The machine is suspectible of various modifications without departing from the spirit of the invention. Thus where several work-supports are used the templets may not be alike, and the table may carry one kind of work after another to the same grinding-wheel without delay. The work-support may rock with, instead of on, the table. Other driving means than these shown may be employed, and, in general, the substitution of mechanical equivalents is contemplated.

What I claim is—

1. In a grinding-machine, the grinding-wheel and its shaft, the bed parallel with the grinding-wheel, the table longitudinally movable on said bed, the work-support hinged at one side of said bed and supported at the other side by a bearing-finger resting on a gage on the bed, and the transversely-movable piece on said work-support having the work-clamp hinged thereto, in combination, substantially as described.

2. In a grinding-machine, the grinding-wheel and shaft, the bed parallel with said shaft, a traveling table thereon, the work-support hinged to said table and supported at the edge opposite the hinge by a templet and bearing-finger, as described, the clamping-jaws hinged to said work-support, and means for adjusting the angle of the jaws relatively to the work-support, in combination, substantially as described.

3. The grinding-wheel and its shaft, the bed having a guide-track on which the table moves lengthwise, the work-support pivotally connected to said table, and a templet or gage extending lengthwise of the machine and a finger bearing thereon, said templet and finger connected, respectively, to the bed and to the work-support, whereby the work-support is rocked to follow the contour of the gage by means of its longitudinal travel relatively to the bed, all in combination, substantially as described.

4. In a grinding-machine, the grinding-wheel and shaft, the bed, a longitudinally-moving work-support having hinged connection to the bed, and a templet and bearing-finger connected, respectively, to the bed and work-support and engaging with each other, whereby the longitudinal movement of the work-support causes it to rock corresponding to the outline of the templet, all combined substantially as described.

5. In a grinding-machine, the grinding-wheel, its shaft, and the bed, a traveling table on the bed, the hinged work-support,

a templet and bearing-finger connected, respectively, to the bed and work-support and having engagement as described, so that the lengthwise movement of the work-support rocks the same, and driving-gear engaging said table to produce longitudinal movement, all combined substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

RUSS J. CHRISTY.

Witnesses:
R. H. RICE,
T. H. CRESS.