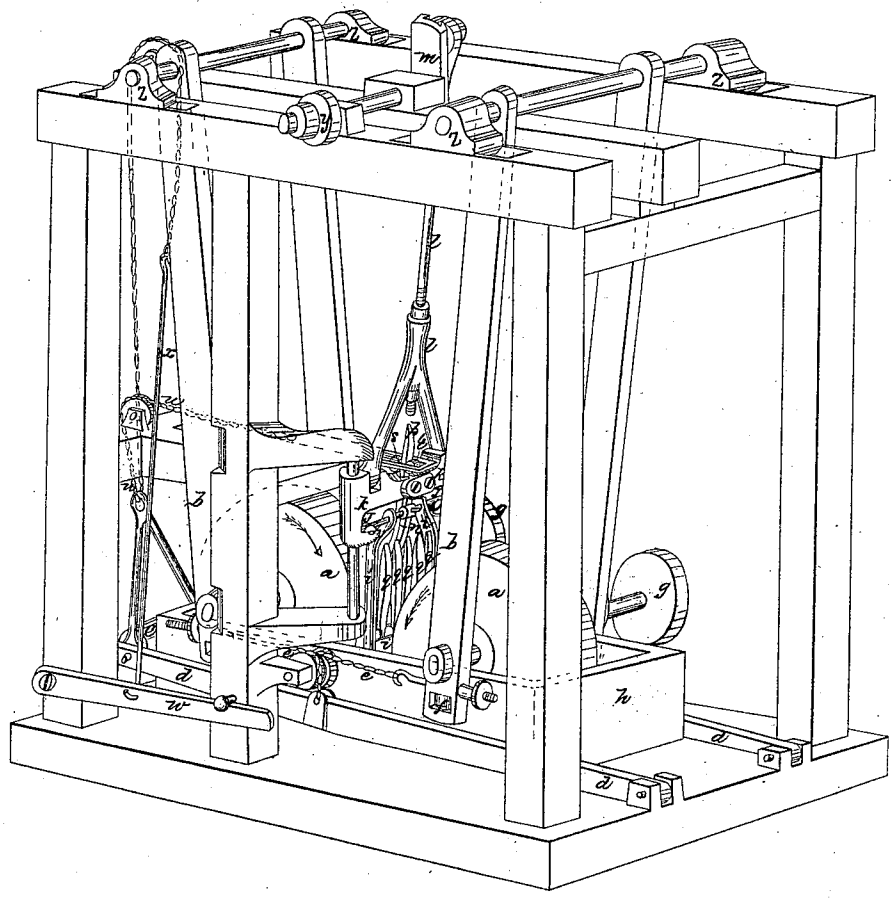
E. Norton,

Grinding File-Blanks.

No. 77,646. Patented May 5, 1868.



Witnesses.
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United States Patent Office.

EDWARD NORTON, OF BOSTON, MASSACHUSETTS.

Letters Patent No. 77,646, *dated May* 5, 1868.

IMPROVEMENT IN MACHINE FOR GRINDING FILE-BLANKS.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, EDWARD NORTON, of Boston, in the county of Suffolk, and State of Massachusetts, have invented certain new and useful Improvements in Machinery for File-Grinding; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawing, and to the letters of reference marked thereon.

The drawing represents a perspective view of a machine embodying the several features of my improvement.

Like letters refer to the same or corresponding parts.

Two grindstones, *a*, are suspended in bearings in the pendulous hangers *b*, so as to swing toward and from the grinding-peripheries of each other. The pendulous hangers *b* are hung on bearings *z*, which are susceptible of adjustment toward and from each other, so that positions may be given them which will enable the operator to avail of the weight of the grindstones, &c., to move them from each other or the work to be ground.

A weight, *c*, acting through suitable connections, as levers *d* and chains *e*, serves to move and hold the grindstones toward each other, or the work to be ground, with a yielding force or pressure. The chains or connections *e* are adjustable, for the purpose of adjusting the relation of the levers *d* or weight *c* to the required relative position of the stones *a*, the two chains *e* being connected to each lever *d*.

The lower ends of the pendulous hangers *b* are properly guided in their movements by means of rollers *f* in their lower ends. Pulleys *g*, on the grindstone-shafts, receive the belts for driving the stones, and *h* is a suitable trough for the stones to work in, and for containing water, &c. The stones revolve in the directions indicated by the arrows, and the file or other blanks *q* are arranged for grinding within the frame *i*, between them.

The frame *i* hangs on rollers *j* in the carriage, support, or cross-head *k*, which receives a reciprocating movement, up and down, by means of the connecting-rod *l* and the crank *m*. It also has a projection, playing in the inclined ways *n*, which gives it, from the up-and-down movement, a traversing-movement, with the blanks it carries, transversely to the plane of revolution of the grindstones. The movement up and down, or longitudinally to the blanks, is for bringing all points in the length of the blanks to the action of the stones. The transverse movement is to equalize the grinding action upon the surface of the blanks, and to prevent furrowing the stones. The wrist-pin in the crank-arm *m* is adjustable, for the purpose of regulating the throw to correspond to the length of surfaces to be ground, and the connecting-rod *l* is adjustable also as to length, so as to give the frame carrying the blanks to be ground a proper elevation with reference to the stones' point of action.

The action of the grindstones, with reference to grinding surfaces to the proper form and thickness, is controlled by means of a pattern, *p*, of the required form to be ground. The pattern *p* is fixed to the carriage *k*, and thereby has a movement up and down, corresponding to the movement of the blanks *q*. This pattern moves between a fixed roller, *s*, and a movable one, *t*. The movable one has suitable bearings in guides, and is connected to chain *u* and the weight *c*, so that, as the pattern moves between the rolls, from its thin to its thick part, the roll *t* receives a movement thereby, which, through connection *u*, raises the weight *c* and levers *d*, and allows the pendulous hangers *b*, with the stones *a*, to recede and leave a corresponding thickness to the blanks in process of grinding. When the pattern moves between the rolls from the thick to the thin portion, the roll *t* follows, and so allows weight *c* to recede or fall, thereby, through connections *e*, drawing the pendulous hangers *b* and stones *a* toward each other, so as to conform to the lesser required thickness.

The weight, controlled in its action by the pattern, secures a force for application to the stones which is not rigid, like a screw or other positive movement, while, on the other hand, the pattern furnishes a comparatively rigid limit in determining the positive grinding action of the stone upon the form or thickness of the article in process of grinding. Springs may be substituted for the weight, if preferred, and without material modification of the machine.

The frame or holder *i*, carrying the blanks *q* which are to be ground, is a detached one, and is removable from the carriage *k* by simply lifting off from the rollers *j*, so that the operator may have two or more of these

frames *i*, and while he is grinding one frame full he may be filling the other, or inspecting the last; thus no time will be lost in filling the frames.

A hand or foot-connection to the weight *c* and levers *d* is provided in lever *w* and connection *x*, by which the action of the stones may be controlled, independently of the pattern *p*, as occasion may require.

When only one stone is used, as in grinding but one side of the work, a roller may be substituted for the other driven stone.

I will also further explain that the pendulous hangers may be inverted, so as to convert them into rocking or oscillating-stands, and without essential modification of other portions of the machinery, and I intend to claim my improvements, whether inverted or otherwise.

Motion may be communicated to the crank-arm *m* by a belt applied to pulleys *y*, or otherwise. The best materials for the construction of the machinery, such as iron, steel, wood, &c., need not be further specified, as the appropriate ones will naturally suggest themselves.

Thus, having described the several features of my improvements so fully as to enable those skilled in the art to comprehend, construct, and apply the same in a practically-working machine, what I claim as my invention, and desire to secure by Letters Patent, is as follows:

1. I claim the employment of a pendulous or oscillating hanger or stand, in combination with the axis of a grinding-stone, arranged parallel to its own axis of oscillation, or equivalent device, substantially as described.

2. I claim the arrangement of the oscillating grindstone-stand or hanger, with an inclination from its supporting and oscillation-axis toward the work to be ground, so that the weight of the stone and hanger may be employed to effect all movements of the stone in the opposite direction, substantially as shown.

3. I claim, in combination with the inclined arrangement of frame for moving the stone in one direction, the arrangement of a weight, *c*, or spring, to move it in the opposite direction, substantially as set forth.

4. I claim the frame *i*, or its equivalent, operating substantially as and for the purposes set forth.

5. I claim the employment of the adjustable connecting-rod *l*, in combination with the crank *m* and the carriage *k*, and operating substantially as and for the purpose set forth.

EDWARD NORTON.

Witnesses:

IRAH D. SPAULDING,

JOSEPH H. LEWIS.