2 Sheets--Sheet 1.

E. MORRIS.

Grinding-Machine.

No. 164,583. Patented June 15, 1875.

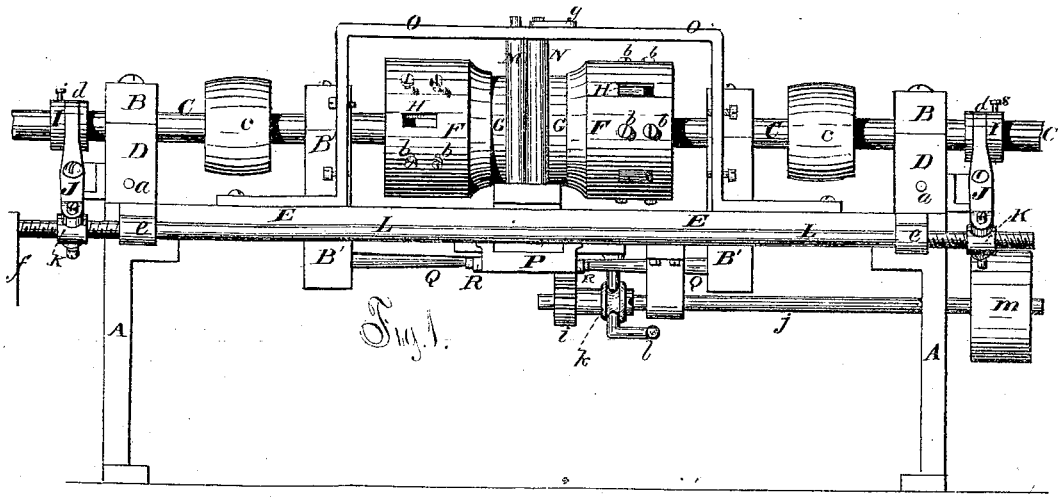

Fig. 1.

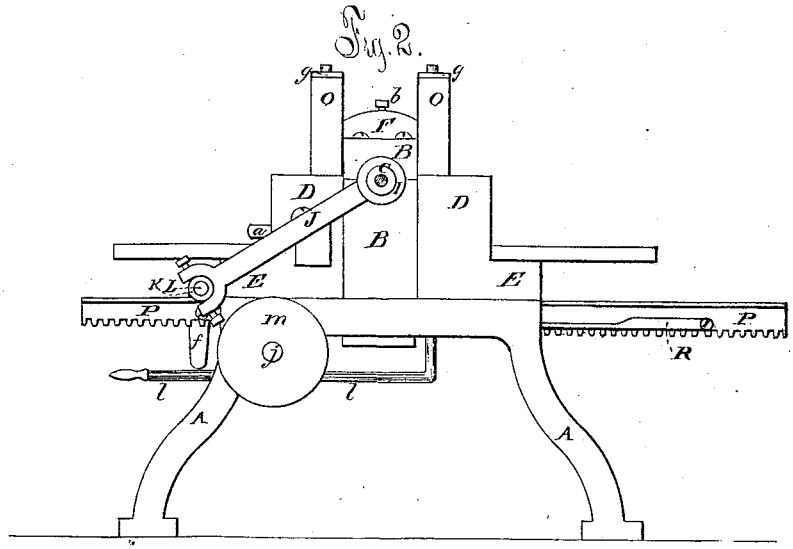

Fig. 2.

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J. P. Bradford

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Eli Morris
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Atty

2 Sheets--Sheet 2.

E. MORRIS.

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Fig. 3.

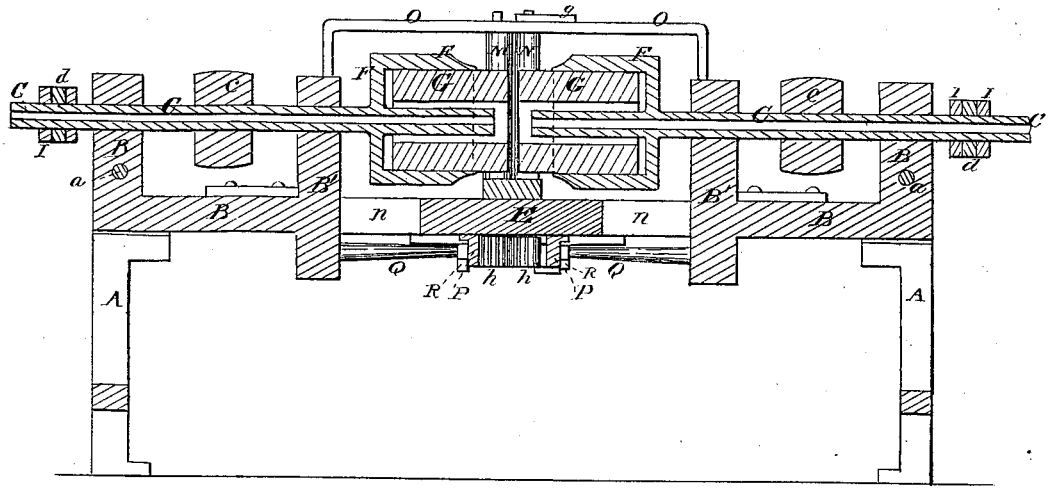


Fig. 6.

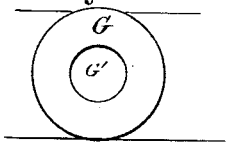


Fig. 4.

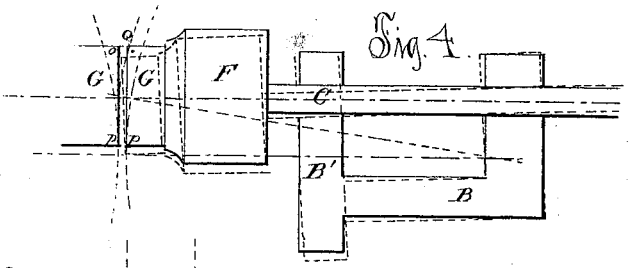


Fig. 5.

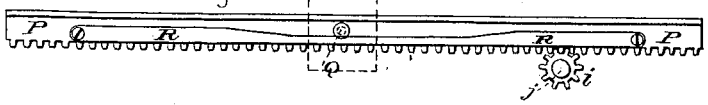
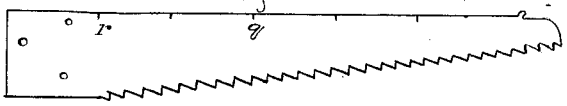


Fig. 7.



Witnesses.

E. H. Johnson.

J. P. Crawford

Inventor.

Elv Morris

by Duncan Atty

UNITED STATES PATENT OFFICE.

ELI MORRIS, OF NEW HAVEN, CONNECTICUT.

IMPROVEMENT IN GRINDING-MACHINES.

Specification forming part of Letters Patent No. **164,583**, dated June 15, 1875; application filed May 23, 1874.

To all whom it may concern:

Be it known that I, ELI MORRIS, of New Haven, in the county of New Haven and State of Connecticut, have invented an Improved Machine for Grinding Metal Surfaces, of which the following is a specification:

My invention relates to machines for grinding metal surfaces, such as those of saws, knife-blades, carriage-springs, &c., and consists in a novel construction, combination, and arrangement of parts which have for their object to produce a simple and efficient machine, capable of automatically feeding and grinding to different gages or thicknesses on their length, saw and other blades, as will be fully hereafter set forth.

Figure 1 is a side elevation; Fig. 2, an end elevation; Fig. 3, a vertical longitudinal section, and the remaining figures parts in detail.

A A is the frame of the machine; B B′ B B′, bearings carrying the horizontal hollow shafts C C, which are capable of a longitudinal movement in them. These bearings are pivoted at *a a* to the standards D D secured to the frame or table E, so that their inner ends can rise and fall in the arc of a circle with the pin *a* for a center, (as shown in Fig. 4.) The inner extremities of the shafts C C have secured to them the heads or cylinders F F, in which the chambered cylindrical grindstones G G are secured by set-screws *b b*. H H are slots cut through the periphery of the heads F for the insertion of a tool to set the stones out as they wear away. *c c* are pulleys for driving the stones.

On the outer end of each of the shafts C is secured by a set-screw a grooved collar, I, in the groove of which a yoke or fork, *d*, on the upper ends of the arms J J straddles. These arms are pivoted at their middle to the frame A, and at their lower extremities are pivoted to sleeve-nuts K, traveling on the right and left screw-threads cut on each end of the shaft L, which is supported in the bearings *e e*, and provided at one extremity with a crank, *f*. M N are the feeding-rolls situated in pairs on each side of the grinding-cylinders and in close proximity thereto. Their upper extremities have bearings in the frames *o o*. One of the bearings in each pair of rolls is a spring-box, *g*, to allow the roller to accommodate itself to varying thicknesses of blades. Each pair of rolls is geared together at its lower extremity by the pinions *h h*, and they are driven by a rack, P, gearing with one of the gears *h*. This rack reciprocates transversely of the machine, and is operated by the pinion *i* on the shaft *j*, gearing with teeth on the under side of the rack P. The pinion *i* slides on the shaft *j*, and is engaged therewith by the clutch *k*, which is operated by the lever *l*. *m* is a pulley at the outer extremity of the shaft *j*. The bearings carrying the shafts C C, are, as before stated, pivoted at their outer extremities to the uprights D D, and work through slots *n* in the table. The inner bearings B′ B′ extend downward below the table, and from their lower ends an arm, Q, projects horizontally, and is provided at its extremity with an anti-friction roll. R R are pattern-bars secured to the sides of the rack P, on which patterns the extremity of the arms Q Q rest. To connect the outer ends of the hollow shafts C C with a water-supply pipe any ordinary coupling may be employed. The chamber G′ in the stone G forms a reservoir within the stone for the water, from which it issues to the circumference.

The operation of the machine will be as follows: It having been set in motion, a saw-plate is introduced between the rollers M N, which, by the spring-boxes *g g* adjust themselves to its thickness and pass it in between the stones G G, which are then set up against it by turning the screw-shaft L in a direction to run the sleeve-nuts K K out, and throw in the upper ends of the arms J J. The pinion on the shaft *j* gradually advances the rack P, which operates the feed-rolls and feeds the saw, until the incline portions of the patterns R R, secured to the sides of the rack-frame P, arrive at the arm Q, projecting from and supporting the end of the bearings B′ B′ when the stones are gradually lowered by these inclines, so that their upper points *o o*, Fig. 4, approach each other, while the lower points *p p*, which are situated in the vicinity of the straight line connecting the centers *a a*, change their distance from one another imperceptibly, so that while the back of the saw will be ground thinner at the point *q* than it will at the point *r*, yet the gage of the teeth will re-

main unaltered for the whole length. After the stones have been so reduced by wear that they cannot be set up to the work by the shaft L, the collars I, which are secured to the shafts C C by set-screws *s s*, can be moved out on the shaft, which will allow of the stones being fed in. After they have worn to the head F they can be set out by an instrument inserted through the slots H H in the heads F F.

It will be seen that the stone being confined and supported in the cylinder, there will be no possibility of its bursting from centrifugal force when revolving at the speed most advantageous for grinding, and that an indefinitely long stone may be used in the cylinder, which, as it wears away, can be set out simply by loosening the binding-screws at one point and forcing the stone out.

By securing the pattern R to the rack P, which operates the feed-rollers M N, it will be seen that the feeding and gaging are directly connected with and dependent on each other; for so long as the saw is being fed through, the rack is traveling and the pattern operating the stones to suit the various thicknesses of metal; but should the belt running the shaft *j* slip, the rack does not advance and the saw is not fed, nor are the stones operated by the pattern.

With slight modifications, my machine could be used for grinding circular saws, knife-blades, carriage-springs, and other articles.

I claim—

1. The combination, with the cylindrical head F of the cylindrical-chambered grindstone G, constructed and operating substantially in the manner described and specified.

2. The combination, with the cylindrical head F and cylindrical-chambered grindstone G, of the hollow shaft C for supplying the stones with water at their center, constructed and operating substantially in the manner described and specified.

3. The combination, with the pivoted bearings B B′, of the pattern R, for operating the stones in grinding different gages in saws, &c., constructed and operating substantially in the manner described and specified.

4. The combination, with the shaft C, forked arms J, and right and left hand screw-shaft L, for setting the stones, of the adjustable collar I, constructed and operating substantially in the manner described.

5. The combination, with the feed-rolls and grinding-stones, of the pattern R secured to the rack P, operating the feed-rolls, whereby the gaging of the article ground is made dependent on its feeding, substantially in the manner described and specified.

ELI MORRIS.

Witnesses:
C. A. DURGIN,
E. H. JOHNSON.