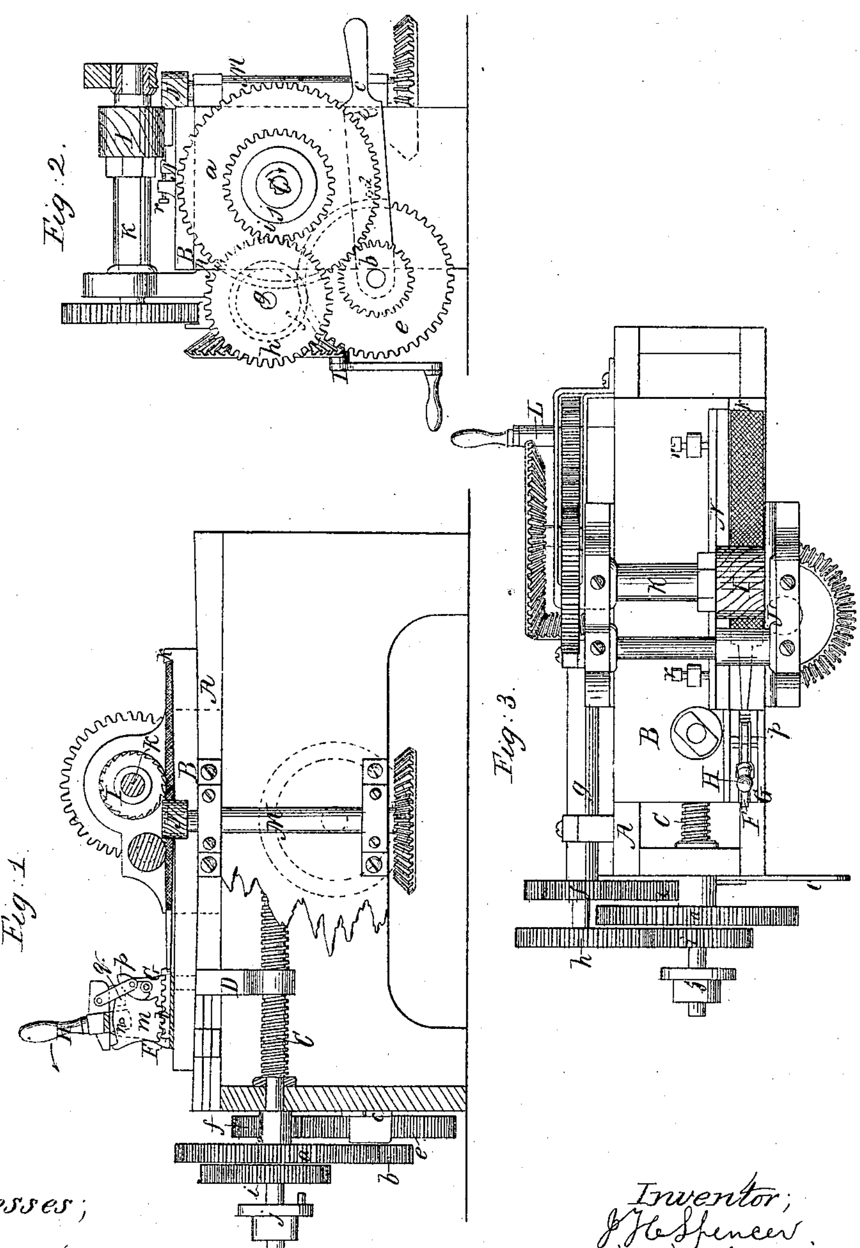
I. H. SPENCER.

MACHINE FOR GRINDING FILES.

No. 49,042. Patented July 25, 1865.



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UNITED STATES PATENT OFFICE.

ISAAC H. SPENCER, OF PAWTUCKET, RHODE ISLAND, ASSIGNOR TO HIMSELF AND ANDREW R. SLADE, OF SAME PLACE.

IMPROVED MACHINE FOR GRINDING FILES.

Specification forming part of Letters Patent No. **49,042**, dated July 25, 1865.

To all whom it may concern:

Be it known that I, ISAAC H. SPENCER, of Pawtucket, in the county of Providence and State of Rhode Island, have invented a new and Improved Machine for Grinding Files; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents a sectional side elevation of this invention. Fig. 2 is an end view of the same, partly in section. Fig. 3 is a plan or top view of the same.

Similar letters of reference indicate like parts.

The object of this invention is to grind file-blanks by machinery instead of by hand-labor, the usual method of grinding files being to hold them up against a grinding-stone until their surfaces become perfectly smooth and fit for cutting. This method not only requires much time and constant attention, but it is also very difficult, or, in fact, impossible to produce files of a perfectly uniform shape.

In the machine which forms the subject-matter of this present invention the files are secured, one after the other, on a carriage which moves under a revolving cutter or grinding-wheel on a curved bed in such a manner that the shape of each file depends entirely upon the curvature of the bed, and as long as this curvature remains unchanged all the files turned out by said machine are perfectly uniform in shape, and the operation of grinding can be conducted by a person of little mechanical knowledge or experience, and with little personal attention. The files, on being placed on the carriage, are held in position by a sliding clamp, which is operated by a toothed segment. This segment connects with a hand-lever by means of a strap and hinged dog in such a manner that when the clamp has been made to catch over the end of the file the hinged dog will lock the toothed segment and prevent the clamp from releasing the file spontaneously.

A represents a frame or bed made of cast-iron or any other suitable material of sufficient strength for the occasion. The surface of this bed is curved to correspond to the shape of the files to be produced, and on it slides the carriage B. This carriage is moved back and forth on the bed by the action of a screw-spindle, C, which is tapped into an arm, D, extending down from the carriage B, and said screw-spindle is provided with a suitable back gear, which is composed of a large cog-wheel, *a*, keyed firmly to the rear end of the spindle, and gearing in a pinion, *b*, the axle of which has its bearings in an adjustable hand-lever, *c*. This lever has its fulcrum on a pivot, *d*, secured in the end of the bed A, and by raising the handle of the same the pinion *b* is depressed and thrown out of gear with the cog-wheel *a*. On the same axle which bears the pinion *b* is also mounted the cog-wheel *e*, which gears in a pinion, *f*, mounted on the horizontal shaft *g*, and by the action of the pinion *f*, cog-wheel *e*, pinion *b*, and cog-wheel *a*, the motion of the shaft *g* is transmitted to the screw-spindles C. By using the handle of the hand-lever the cog-wheel *e* is disengaged from the pinion *f*; and at the same time the pinion *b* is thrown out of gear with the cog-wheel *a*, and the connection between the shaft *g* and screw-spindle C is broker or interrupted. The connection between the shaft *g* and spindle C can, however, be effected also by a cog-wheel, *h*, which is mounted on the shaft *g*, and which gears in a similar wheel, *i*, that turns loosely on the spindle.

A sliding clutch, *j*, serves to render the cog-wheel *i* rigid with the screw-spindle, and in this case the motion of the shaft *g* is transmitted to the spindle C by the action of the cog-wheels *h i*. It must be remarked, however, that whenever the wheel *i* is rendered rigid with the screw-spindle the pinions *b* and cog-wheel *e* must be depressed or thrown out of gear with the pinion *f* and cog-wheel *a*, since the action of one set of wheels would interfere with that of the other set. The proportion of the wheels and pinions *a b e f* is such that by their action the screw-spindle receives a slow rotary motion with the direction of the

arrow marked near it in Fig. 2, and the requisite feed-motion is imparted to the carriage B. By the action of the wheels *h i* the screw-spindle rotates quick in the direction opposite the arrow marked near it in Fig. 2, and this motion is used for gigging back.

The file is secured on the upper surface of the carriage B by passing its tip under a V-shaped lip, *k*, and by pushing over its tail the sliding clamp F. This clamp moves back and forth in a guide-bracket, G, and it is provided with a socket in its end, which catches over the point of the tail of the file. It is furnished with cogs *l* on its upper surface, which gear in a toothed segment, *m*. This toothed segment swings freely on the pivot *n*, which also forms the fulcrum for the hand-lever H, and it is operated by a hinged dog, *p*, which connects with an arm extending from the hand-lever by means of a strap, *g*, as clearly shown in Fig. 1 of the drawings.

If the hand-lever is thrown back in the direction of the arrow marked near it in Fig. 1, the dog *p* locks the same and holds it in such a position that the clamp is not allowed to release the file spontaneously. By turning the hand-lever in the direction opposite said arrow the sliding clamp is drawn back and the file is released.

The surface of the file is ground off by a cutter, I, and its edge by a cutter, J. The cutter I is mounted on a shaft, K, which has its bearings in adjustable boxes, so that the teeth of the cutter can be made to bear with more or less force on the surface of the file. Motion is imparted to said shaft by suitable gear-wheels from the driving-shaft L, and its speed is adjusted to correspond to the nature of the files and to the cutter.

The cutter J is mounted on a vertical spindle, M, which has its bearings in suitable boxes on the side of the bed, and to which motion is imparted by suitable gear-wheels from the driving-shaft. This cutter is intended to act on the edge of the file, as previously stated, and in order to keep the file up to the cutter an adjustable strip, N, is fastened to the top of the carriage, and set-screws *r* serve to force the same up against the file and bring the file in the proper position in relation to the cutter.

By the combined action of the two cutters I J the surface and the edge of the file are ground off simultaneously, and after one side and edge have been finished the file is turned round and the other side and edge are ground off in the same manner. The edges of the file are thus rendered perfectly parallel, and by the curved bed both surfaces are turned out of a uniform shape. A large number of files can thus be ground perfectly alike and of a uniform shape, and the operation of grinding requires little time and no skill.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The within-described method of grinding files by placing them on a carriage moving on a curved bed and exposing them to the action of one or more cutters, substantially in the manner and for the purpose herein set forth.

2. The sliding clamp F, in combination with the toothed segment *m*, hand lever H, and hinged dog *p*, constructed and operating substantially as and for the purpose described.

3. The combination of the cutters I J with the carriage B and curved bed A, constructed and operating as and for the purpose specified.

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Witnesses:

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