

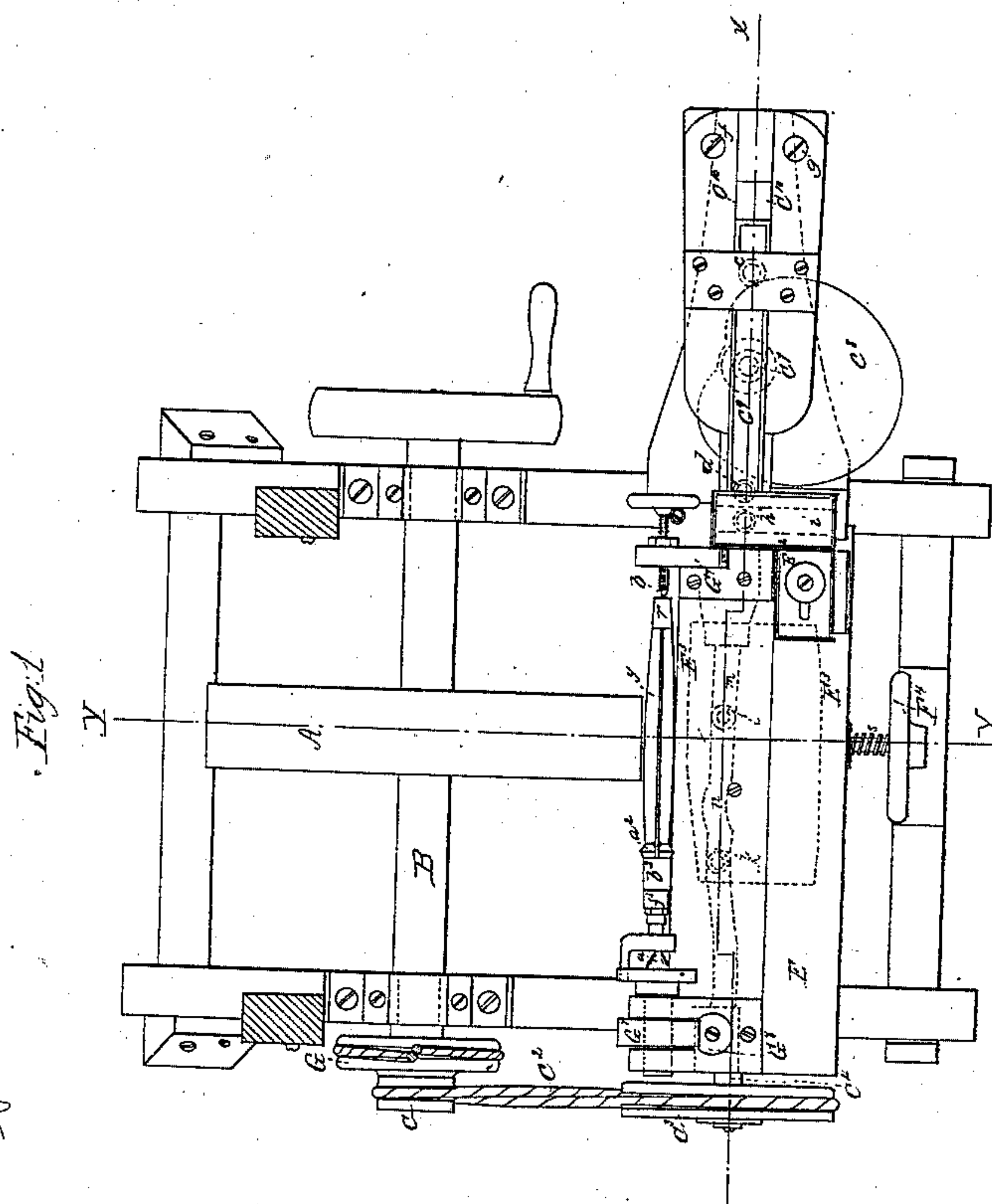
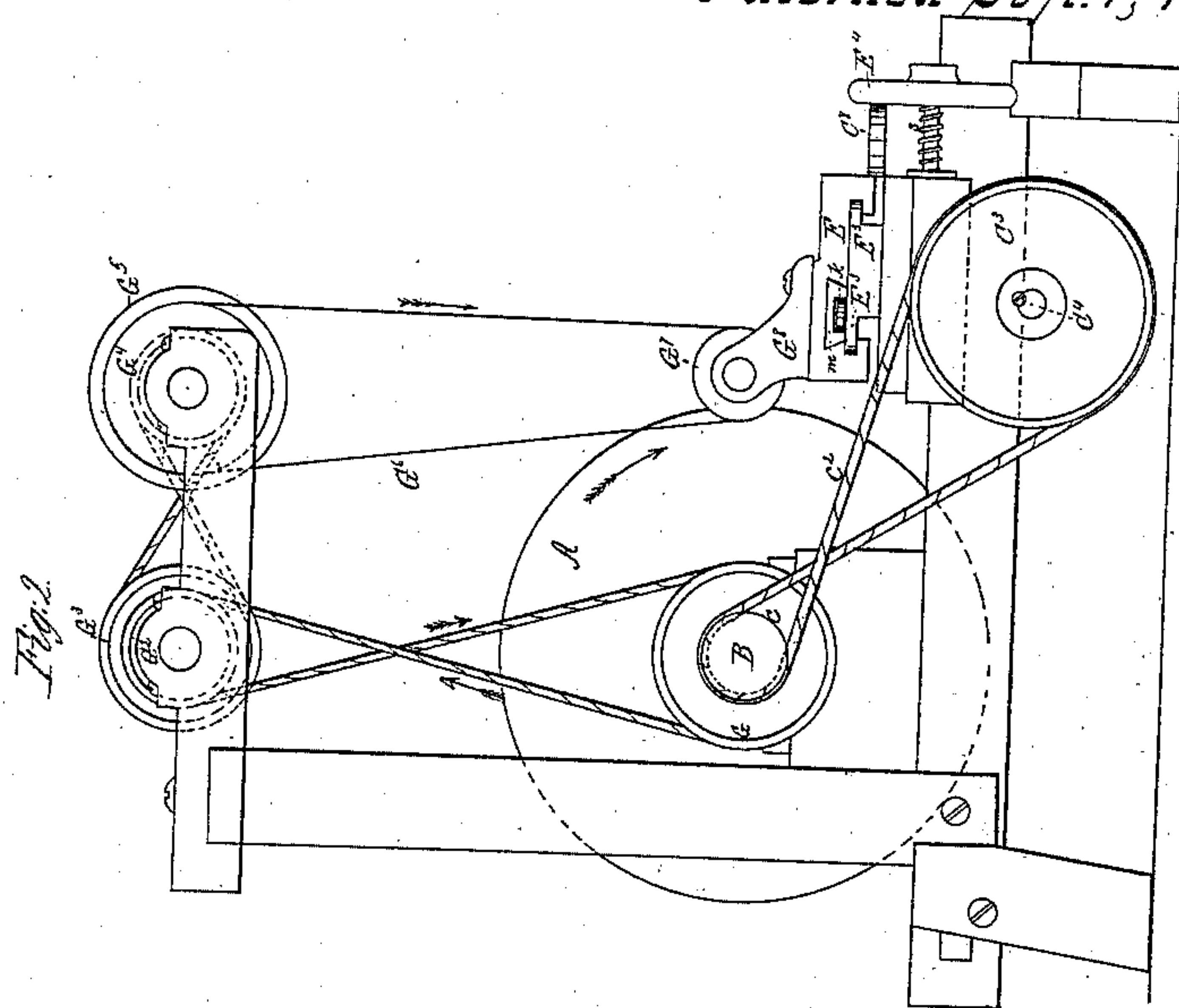
Smith & Stafford

2 Sheets Sheet 1.

Grinding Files.

N<sup>o</sup> 39,782.

Patented Sep. 1, 1863.



Witnesses  
N. W. Stearns  
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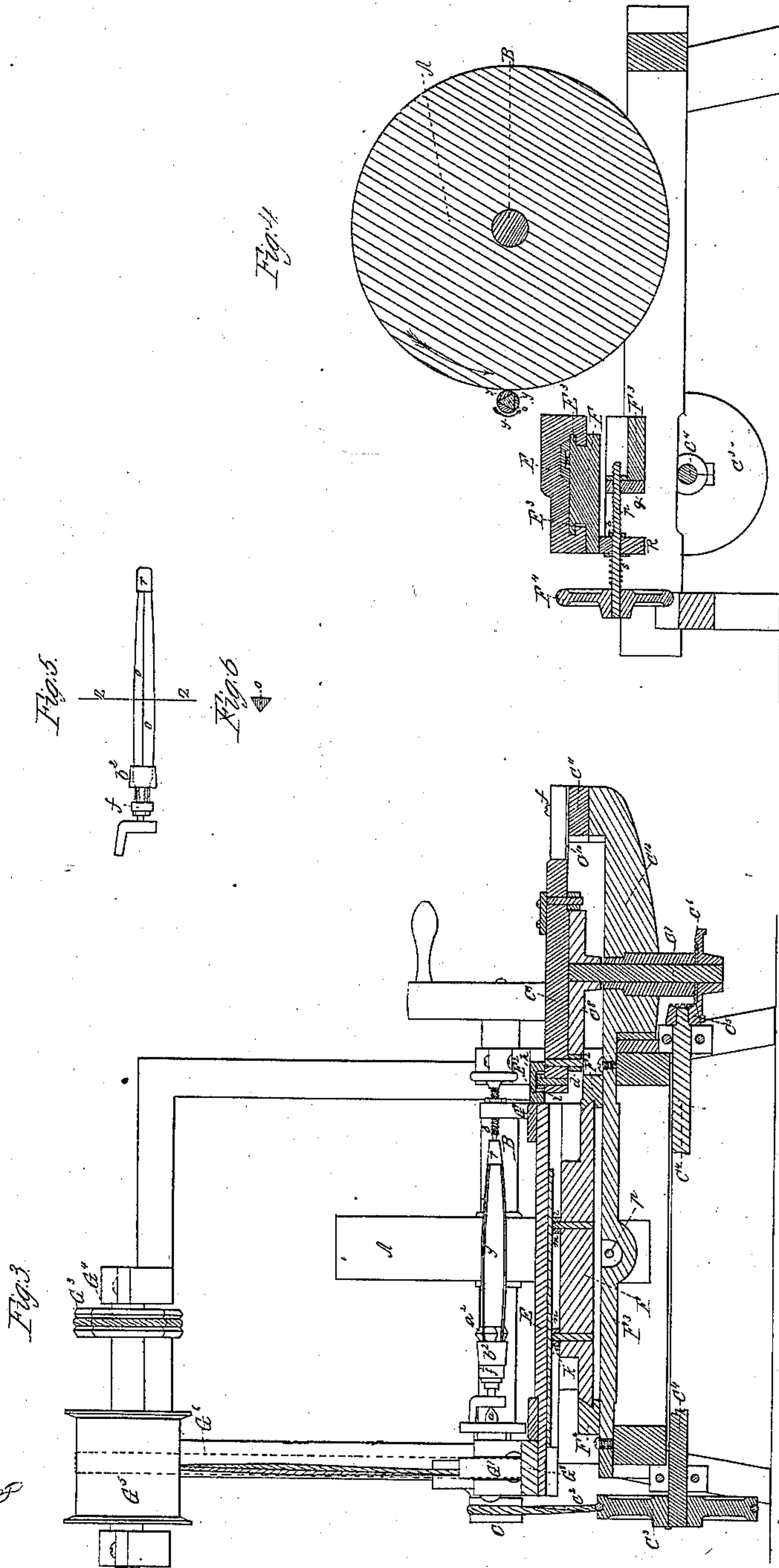
Smith & Stafford,

2 Sheets, Sheet 2.

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Witnesses.  
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# UNITED STATES PATENT OFFICE.

TIMOTHY SMITH, OF CHARLESTOWN, AND JAMES A. STAFFORD, OF BOSTON, MASSACHUSETTS, ASSIGNORS TO THE WHIPPLE FILE MANUFACTURING COMPANY.

## IMPROVED MACHINE FOR GRINDING HALF-ROUND FILES.

Specification forming part of Letters Patent No. 39,782, dated September 1, 1863.

*To all whom it may concern:*

Be it known that we, TIMOTHY SMITH, of Charlestown, in the county of Middlesex and State of Massachusetts, and JAMES A. STAFFORD, of Boston, in the county of Suffolk and State aforesaid, have invented a new and useful machine for grinding file-blanks for "half-round" files, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a plan of the machine; Fig. 2, an end elevation; Fig. 3, a vertical section on the line X X, and Fig. 4 a vertical section on the line Y Y, of Fig. 1; Fig. 5, an elevation of the mandrel to which the blanks are secured; Fig. 6, a cross-section through the same in line Z Z of Fig. 5.

The file-blanks are rolled or forged with a curved surface of about one hundred and twenty degrees, or one-third of a circle. They are then secured to a mandrel, *o*, having three sides. The blanks *y* are then secured upon the mandrel (as seen in Fig. 1) by the following means: The smaller ends of the blanks *y* having been cut off, so as to give them a chamfer, this chamfer is entered beneath the edge of a stationary ferrule, *r*, upon the end of the mandrel, and a small block, *a*<sup>2</sup>, is placed upon the tang of each blank. A ring, *b*<sup>2</sup>, or short confining-cylinder is then slipped over the blocks, and is caused to pass them down upon the tangs by means of a nut, *j*<sup>2</sup>, which works upon a screw on the mandrel, and thus the blanks are held immovable thereon.

The machine on which the blanks are ground will now be described: The grindstone *A* is carried by the driving-shaft *B*, upon the end of which is a pulley, *C*, which drives, by means of a belt, *C*<sup>2</sup>, a pulley, *C*<sup>3</sup>, upon a shaft, *C*<sup>4</sup>, which carries at its opposite end a pinion, *C*<sup>5</sup>, that drives in turn a wheel, *C*<sup>6</sup>, upon a vertical shaft, *C*<sup>7</sup>, to the top of which is secured the heart-cam *C*<sup>8</sup>, by means of which the mandrel with its blanks is traversed past the stone as the grinding proceeds. The cam *C*<sup>8</sup> operates upon two pins *c* and *d*, projecting down from a bar, *C*<sup>9</sup>, which slides freely (as it is moved by the cam) in grooved ways *C*<sup>10</sup>, secured at *f* and *g* to a short standard, *C*<sup>11</sup>, ris-

ing from the projecting bench *C*<sup>12</sup>. The mandrel *o* with its three blanks is held in the centers *a* and *b* upon a traversing carriage, *E*, which is connected with the sliding bar *C*<sup>9</sup> by means of a pin, *h*, rising from the latter, which enters a groove, *i*, in a connecting piece, *E*<sup>2</sup>, which is secured to the carriage by screws or otherwise, the groove *i* running at right angles to the bar *C*<sup>9</sup>, so that while the carriage follows all the motions of the bar it is allowed also to move to and from the stone, and also to vibrate upon its center independently of the bar, as will be presently explained. The carriage *E*, as it is traversed by the cam *C*<sup>8</sup>, slides upon ways *E*<sup>3</sup>, rising from a table, *F*, the center of the ways fitting snugly in the grooves upon the under side of the carriage. At each end, however, the ways are so curved and cut away that the carriage is allowed to vibrate slightly round a point opposite the center of the stone, for the purpose of bringing the ends of the file-blanks up to the stone. This vibration of the carriage is produced as follows: From the top of the table *F* rise the pins *k* and *l*, which fit in a groove, *m*, in the under side of the carriage, the groove being so formed, as seen in the drawings, as to hold every portion of the blanks parallel with the grinding-surface of the stone, the carriage tilting as the pins *k* and *l* enter the portion *n* of the groove, in order to form the taper at each end. The mandrel with its blanks is thus traversed to and fro across the face of the stone as the grinding proceeds. In order to force the blanks up to the stone with a uniform pressure, which shall at the same time be under the control of the operator, the table *F* is allowed to slide to and from the stone in ways or grooves, *F*<sup>2</sup>, rising from a bench, *F*<sup>3</sup>, secured to the frame-work of the machine. A screw, *p*, passes through an ear, *R*, projecting down from the table *F* and working in a nut, *q*, in the bench *F*<sup>3</sup>. The screw has a collar, *t*, secured to it inside of the ear *R*, and upon its outward end it carries a wheel, *F*<sup>4</sup>. Between the hand-wheel and the ear is a spring, *s*, and thus, while the table (and consequently the carriage and the work upon it) can not approach nearer to the stone than is permitted by the collar *t*, it is allowed to move slightly



in the opposite direction by the yielding of the spring *s*. The operator has it thus in his power, by turning the screw *p*, to press the work up to the stone with greater or less power, as may be required.

While the grindstone is revolved in the direction of its arrows and the blanks are traversed to and fro, as explained, the latter are revolved with a surface motion, contrary to that of the stone, in the following manner: *G* is a pulley on the main shaft, which drives by means of a strap the pulley *G*<sup>2</sup>, upon the shaft of which is a pulley, *G*<sup>3</sup>, from which motion is communicated by a belt or strap to the pulley *G*<sup>4</sup> upon the shaft of a long drum, *G*<sup>5</sup>, which drives by means of a belt, *G*<sup>6</sup>, (seen in red in Fig. 3,) a pulley, *G*<sup>7</sup>, upon the arbor of the center *a*, running in a standard, *G*<sup>8</sup>, upon the carriage *E*, the center *b* being carried by a

similar standard, *G*<sup>9</sup>, at the opposite end of the carriage.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The method herein described of grinding blanks for half-round files by revolving and traversing them in contact with a revolving grindstone, substantially as set forth.

2. The method of vibrating the blanks to form the taper by means of the groove *m* and pins *k* and *l*, as described.

3. The combination of the carriage *E*, the table *F*, and screw *P*, arranged and operating as described.

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