

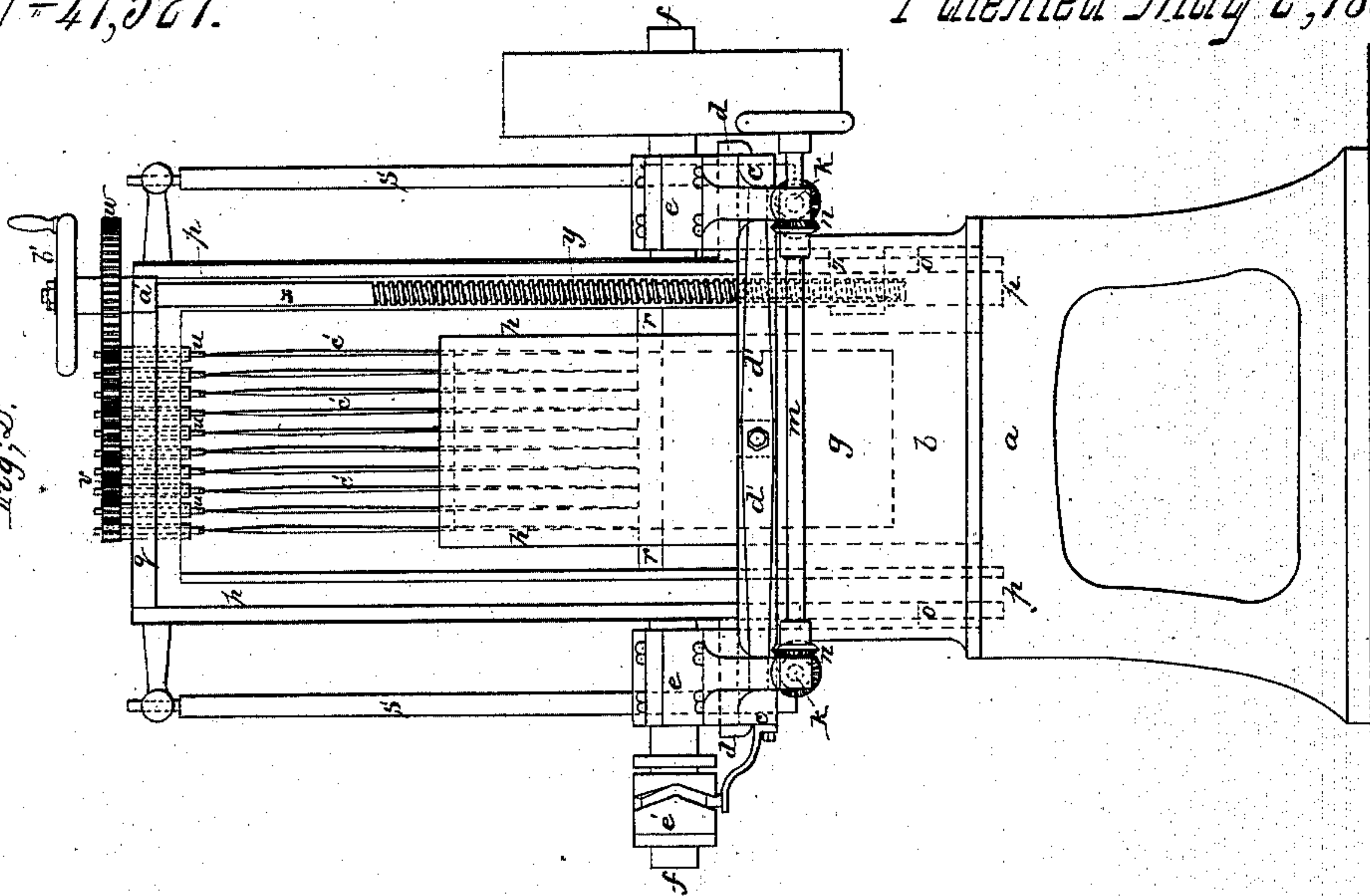
*J. Dodge,*

*Grinding and Polishing Metals.*

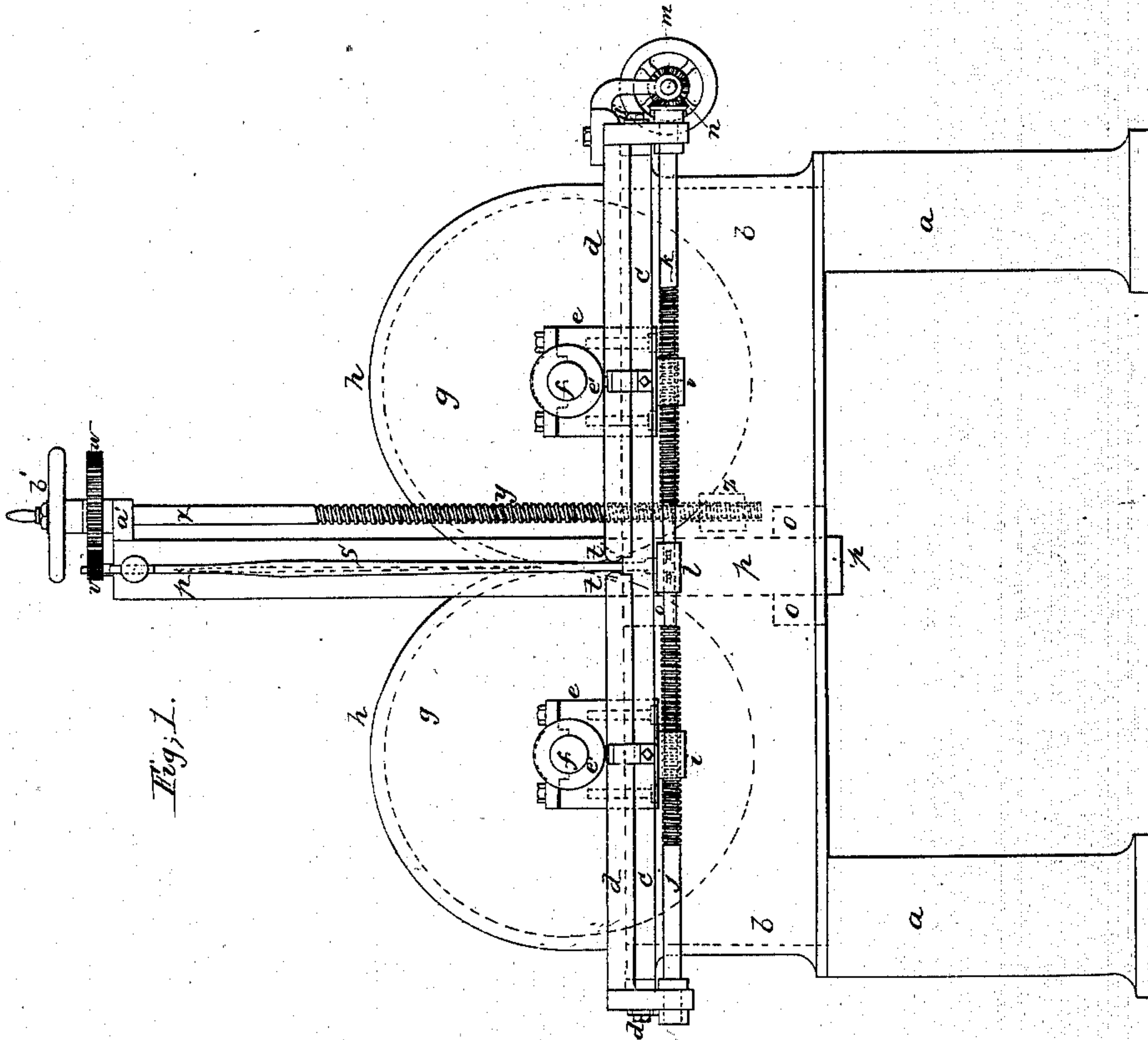
*No 47,527.*

*Patented May 2, 1865.*

*Fig. 2.*



*Fig. 1.*



*Inventor;*  
*James Dodge*



# UNITED STATES PATENT OFFICE.

JAMES DODGE, OF WATERFORD, NEW YORK.

## IMPROVEMENT IN GRINDING AND POLISHING METALS.

Specification forming part of Letters Patent No. 47,527, dated May 2, 1865.

*To all whom it may concern:*

Be it known that I, JAMES DODGE, of Waterford, Saratoga county, State of New York, United States of America, mechanical engineer, at present temporarily residing at the city of Manchester, in the county of Lancaster, and Kingdom of England, have invented new and useful improvements in machinery or apparatus for grinding and polishing spindles, tools, file-blanks, and other regular or irregular shaped articles; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying sheet of drawings, and to the letters of reference marked thereon.

This invention consists in various improved arrangements of machinery or apparatus for grinding one or more regular or irregular shaped articles at one operation with speed and exactness. In one arrangement I employ two ordinary or composition grindstones, and cause them to revolve and move to and fro simultaneously according to the pattern, and also, when desired, have a to-and-fro traversing motion sidewise. The bearings for the shafts of the stones are connected to right and left handed screws, and are also placed on slides working horizontally on the bed of the machine. The outer ends of the slides are connected to the aforesaid right and left handed screws and their inner ends are in contact with templets or pattern-bars, or plates fixed to the outside of a frame adapted for vertically sliding up and down at the exterior of the sides of the stones. This frame slides in guides fixed to the bed and holds one or more articles to be ground at one operation, the articles being either revolving or stationary, as required.

The manner in which this arrangement of my invention is to be performed will be clearly understood by referring to the figures and letters in the accompanying sheet of drawings, in which—

Figures 1 and 2 are side and end elevations of the machinery adapted for grinding mule and other spindles for spinning, round file-blanks, and other similar articles.

To the standards or legs *a* is fixed the bed *b*, having at the top projecting side flanges, *c*, on which work the slides *d*, having upon them the pedestals or bearings *e*, which carry the

shafts *f*, to which are fixed the grindstones *g*, the upper parts of which are surrounded by casings *h*. To the under side of the pedestals are fixed the nuts *i*, which pass through slots in the slides and the flanges of the bed and fit right and left handed screws *j k*, the top ends of which are attached by collars to the outer ends of the slides and their other ends connected by the boss *l*, having in it pins which work in slotted holes at the ends of the screws, so that the slides, pedestals, stones, and screws may be able to move to and from each other the length of the slots in the screws without the screws being turned. The outer ends of two of the screws are connected by the shaft *m* and bevel-gear *n*, so that all the screws may be turned simultaneously and draw the pedestals *e* and stones *g* nearer together or move them farther apart, according to the direction in which the screws are turned. At each side of the bed *b* there are guides *o*, to which are fitted the vertical frame *p*, having at the top the cross-bar *q* and at any required distance below it the cross-bar *r*, which is thinner than the diameter of the articles to be ground. To the top of the frame at each side are connected the templets, pattern-bars, or plates *s*, which are guided in holes in the bed *b*, and have two of their sides in contact with the inner ends, *t*, of the slides *d* when the machine is working. The upper cross-bar, *q*, carries short spindles or chucks *u*, having at the bottom center holes and at the top the small toothed wheels or pinions *v*, one of which gears into the toothed wheel *w*, fixed to the shaft *x*, having a screw, *y*, fitting a nut, *z*, fixed to the bed *b*. The shaft *x*, near the upper end, works in a bearing, *a'*, on the sliding frame *p*, and to the top of the shaft is fixed a wheel and handle *b'* for working it by hand, or a pulley or toothed wheel for working it by power. The lower cross-bar, *r*, has also a number of center holes corresponding with those in the spindles or chucks *u*, and in the centers in both bars are placed the spindles *c'*, or the round file-blanks or other articles to be ground, the short spindles or chucks *u* being raised for the purpose, and afterward lowered and pressed on the articles, the sides of the center holes in the bar *r* being cut away to allow the stones to reach the bottom of the articles.



At the center of each end of the bed there is a bolt or screw, to which is fixed a strong double spring,  $d'$ , the ends of which are in contact with the outer ends of the slides  $d$  for the purpose of keeping the inner ends  $t$  of the slides close up to the varied form of the templets or pattern-bars, the slotted holes in the ends of the screws enabling them to do so.

The stones have revolving motion imparted to them by means of pulleys or by gearing, and, when desired, traversing motion may be given to the stones in the same or opposite direction by cams  $e'$  or by any other means.

When the sliding frame  $p$  is charged with the articles to be ground and the inner ends,  $t$ , of the slides  $d$  placed in contact with the templets or pattern-bars, both grindstones are made to revolve, and then simultaneously brought up to their work by the right and left handed screws, after which the shaft  $x$  is turned by hand or power, and descends as the screw  $y$  passes through the nut  $z$ , bringing down the sliding frame with its contents and the templets or pattern-bars, and at the same time turning by means of the toothed wheel and pinions the short spindles or chucks  $u$ , and with them the articles to be ground. When the shaft  $x$  is turned the reverse way, it raises the sliding frame and parts connected with it, and the articles revolve in a reverse direction, and as the templets or pattern-bars move up and down they work in unison with the double springs  $d'$ , and cause the slides and stones to move to and fro and grind the articles at the same time to the required pattern.

When the articles to be ground are sufficiently thick, I place them in the sliding frame in the diagonal or angular direction, so that when in contact with the grindstones they will turn by the friction of the grinding, and thus dispense with the necessity of turning them by gearing, and although I have only shown a screw for giving the up-and-down movement to the sliding frame and templets, I may employ racks on the sliding frame gearing into pinions revolving alternately in different directions; or the frames may be worked by a mangle motion or any other reciprocating movement.

Instead of the strong, double springs which press against the outer ends of the slides, I may employ india rubber or coiled metal springs placed in any suitable position, and instead of having stationary cross-bars in the sliding frame, I may make them adjustable for adapting them to the varied length of the articles to be ground.

When it is required to grind one or more flat irregular pieces, such as square or flat file-blanks, tools, or other articles of any number of sides, I arrange the cross-bars with clamps or holders for holding the pieces stationary in the sliding frame, and thereby enable two sides of the piece to be ground of the same

shape as the templets, and when two or more flat and thin regular pieces are to be ground, I place them in pairs, one behind the other, and insert between them a yielding bed for the purpose of equalizing the pressure.

I modify the arrangement of the machinery shown in the drawings by placing the sliding frame and templets horizontal instead of vertical, but in this case only one article can be ground at a time.

In some cases, instead of giving the traversing motion to the grindstones for the purpose of keeping them flat and even, I give the traversing motion to the articles to be ground, and instead of employing two stones I sometimes use one only, and maintain the articles to be ground in proper contact with it by rollers or other suitable supports, the stone being moved from the supports or the supports from the stone, according to the pattern required.

In all cases when the articles are to be polished emery and other polishing wheels are used instead of the grindstones.

Thus the mechanism shown in the drawings is adapted for grinding and polishing one or more round articles of a regular or irregular shape, and, by changing some of the parts, for grinding one or more flat articles of an irregular shape, and also two or more thin flat articles of a regular shape, when the said articles are placed back to back with a yielding substance between them.

The same results can be obtained from one grindstone or polishing-wheel when the sliding frame and templets work up and down vertically; but when either one or two grindstones or polishing-wheels are used and the sliding frame and templets move horizontally, one article only is ground.

I claim—

1. The method of and machinery or apparatus for grinding and polishing spindles, tools, file-blanks, and other regular or irregular shaped articles, substantially as herein described—that is to say, by the employment of two revolving grindstones or polishing-wheels in combination with a mechanism for moving in accordance with a pattern the said stones or wheels, or either of them, while revolving, to and from each other, substantially as herein set forth.

2. For grinding and polishing round articles, in combination with the above, causing the said articles to revolve in contact with the grindstone or polishing-wheels, substantially as set forth.

JAMES DODGE.

Signed by said JAMES DODGE in presence of—

JOHN BLOODWORTH, *Patent Agent, 20 Cross street, Manchester.*

G. SEPTIMUS HUGHES, *Patent Agent, 20 Cross street, Manchester.*