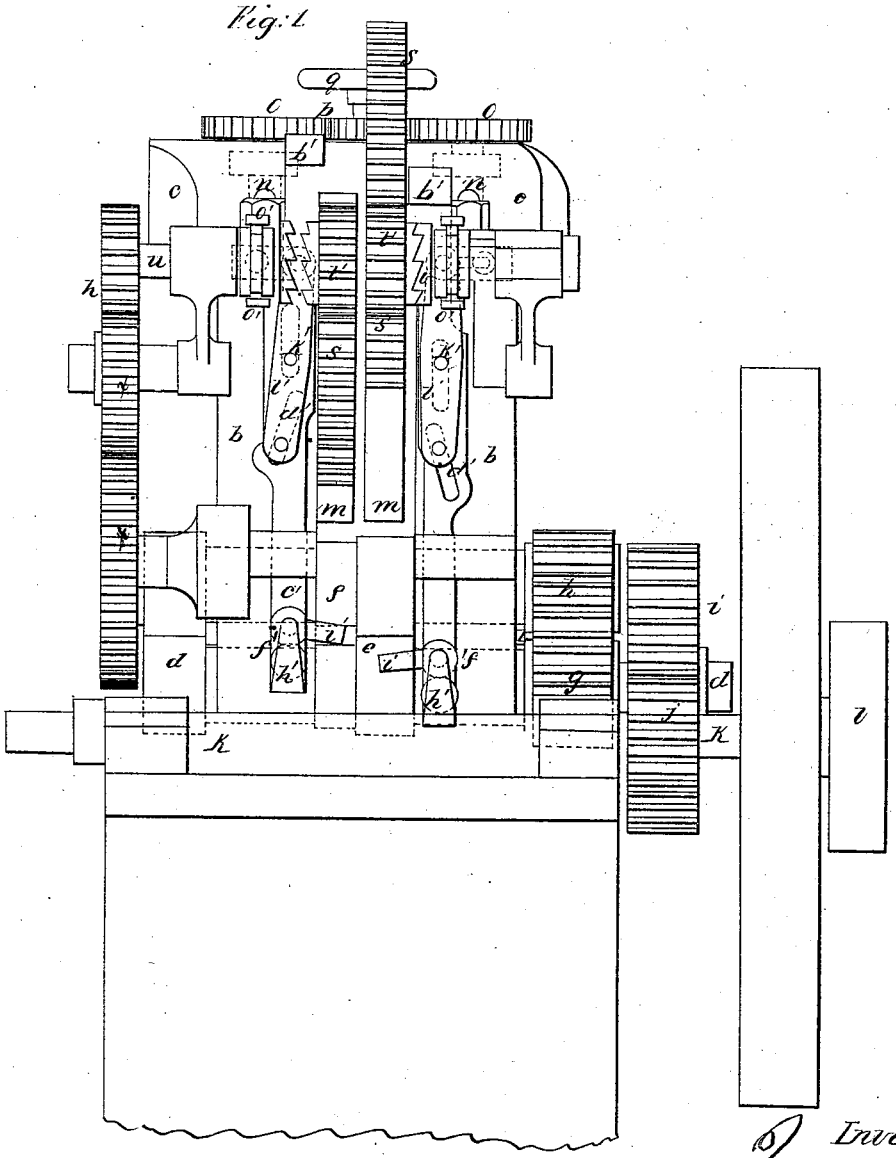
J. Dodge.

Making File-Blanks,

No. 48,915, Patented July 25, 1865.

Fig: 1.



Witnesses;
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Jos. L. Coombs

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his attys

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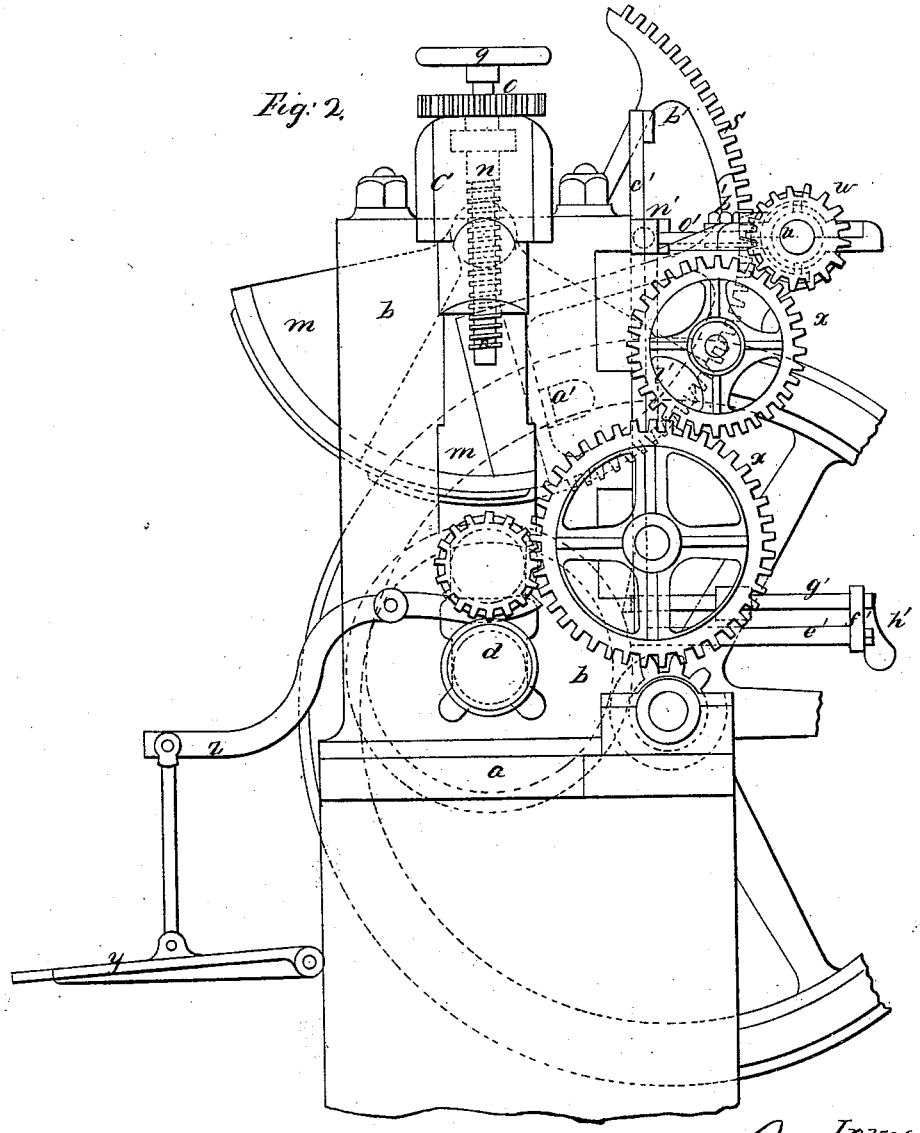
Making File-Blanks,

No. 48,915. Patented July 25, 1865.

Fig. 2.



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Sheet 3 - 3 Sheets.

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Making File-Blanks,

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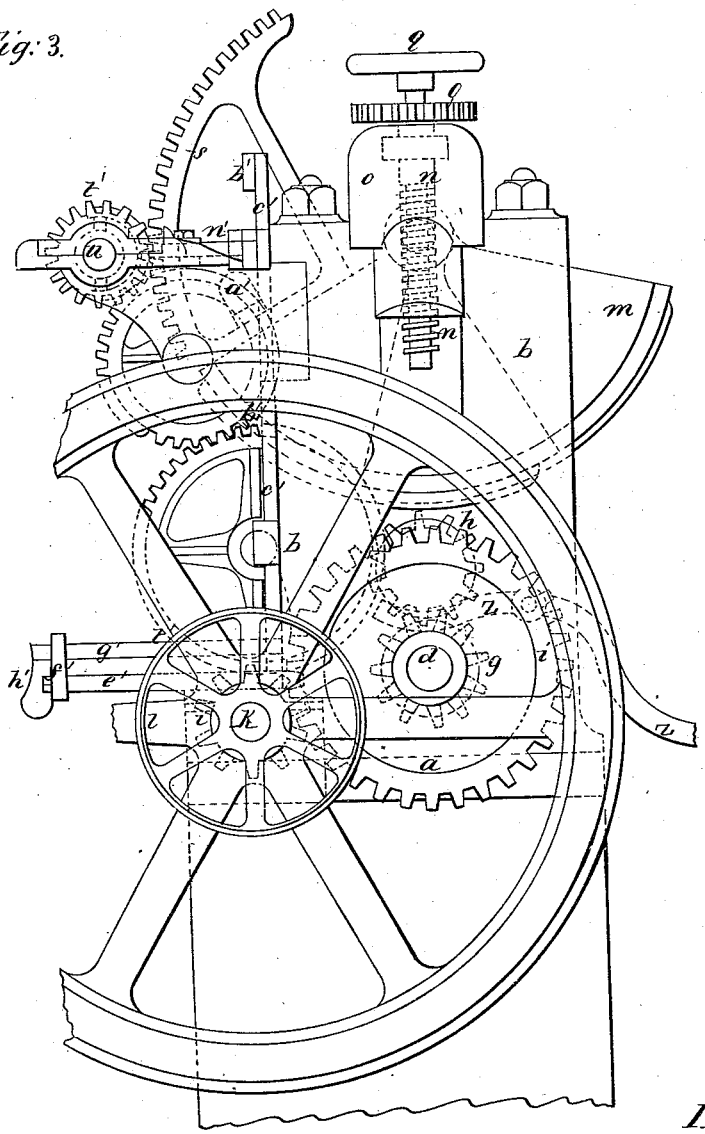
Fig: 3.



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UNITED STATES PATENT OFFICE.

JAMES DODGE, OF WATERFORD, NEW YORK.

MACHINE FOR ROLLING IRREGULAR FORMS.

Specification forming part of Letters Patent No. **48,915**, dated July 25, 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 in the city of Manchester, in the county of Lancaster and Kingdom of England, have invented new and useful Improvements in Machinery for Rolling, Shaping, or Forging Metals; 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 improved machinery for rolling, shaping, or forging metals into irregular shapes or forms, such as rolling steel for files and steel and other metals for other articles. I employ two side frames of suitable strength, each having a bearing for a roller which can revolve, but not slide up and down. In connection with this roller there is another roller which is capable of revolving and also moving up and down, and to the shafts of the rollers are fixed toothed wheels gearing into each other. At any required distance from the last-mentioned roller there is a pattern or cam roller or segment, formed either of one piece or the pattern fixed to the boss or center, which cam roller or segment is turned by gearing or friction. The article to be rolled, shaped, or forged is entered between the two first-mentioned rollers and the resistance causes the middle roller to be forced in contact with the cam roller or segment, and thereby enable the article to be rolled, shaped, or forged according to the shape of the cam or pattern roller or segment.

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

Figure 1 is a back and Figs. 2 and 3 side elevations of one arrangement of my improved machinery for rolling, shaping, or forging metals into irregular shapes.

The bed-plate of the machine is shown at *a*. It has upon it two side frames, *b*, into which is fitted the cross-head *c*, so that it can be raised or lowered. Each side frame has at the bottom a stationary bearing for carrying the bottom roller-shaft, *d*, having circular projections or rollers *e*.

Above the shaft *d* there is another roller-shaft, *f*, having projections or rollers corresponding with these in the shaft *d*, and the shaft *f* either works in movable or sliding bearings fitted to guides in the side frames or the necks of the shaft work in the guides.

To the roller-shafts *d* and *f* are fixed the toothed wheels *g* G gearing into each other, and to the shaft *d* is also fixed the toothed wheel *i*, which gears into the pinion *j* on the driving-shaft *k*, having upon it the driving-pulley *l*, for which a toothed wheel may be substituted when desired.

Above the rollers *f* there are pattern or cam segments *m*, the axes of which are fitted to bearings in the cross-head *c*, and kept in their places by caps and screws. The cross-head is moved up and down to suit different dimensions of pattern rollers or segments by the screws *n* fitted to nuts in the side frames, the screws being held in the cross-head by collars and plates.

To the tops of the screws are fixed the toothed wheels *o* gearing into the toothed wheel *p* fixed to the boss of the hand-wheel *q*, and working on a stud fixed to the cross-head, and when the hand-wheel is turned the toothed wheel connected to it turns the wheels *o* and screws *n*, so as to move the cross-head up or down, according to the direction in which the hand-wheel is turned.

To the pattern or cam segments are fixed toothed quadrants or segments *s* gearing into toothed wheels *t*, each of which works loose on the shaft *u*, and has half a clutch-box connected to it, the other half, *v*, of the clutch-box being held by a key or feather on the shaft in such manner that it can slide to and fro, but revolve with the shaft.

At one end of the shaft is fixed the toothed wheel *w* communicating by means of the intermediate gearing *x* with a toothed wheel on the top roller-shaft, diameters of the wheels being so arranged that the peripheries of the rollers and the peripheries of the pattern or cam segments shall travel at the same speed.

This machine is arranged for forging or shaping file-blanks, one of the rollers and cam-

segments being for the two flat sides of the blank and the other roller and segment for the edges of the blank, and when the heated steel has to be placed between the rollers the upper roller is raised by means of a treadle, *y*, jointed by a rod to the lever *z*, working on studs fixed to the side frames. Thus the pattern or cam segments are put in motion by self-acting mechanism, so that when the article is forged or shaped the segment shall be free to return for a fresh operation, and then be connected with the gearing for the purpose of turning and exerting its pressure. The said self-acting mechanism for disconnecting the pattern or cam segments from the driving power is the same on both sides of the machine, and therefore for the sake of clearness I describe one only.

The pattern or cam segments perform their part of the work when they are moving upward, and to each segment is connected a stopping-piece, *a'*, which is adjusted to any required position, according to the length of the article to be forged or shaped, which stopping-piece at the proper instant comes in contact with a projection, *b'*, on the top of the plate *c'*, which is guided by studs fixed to the back of its corresponding side frame, *b*, and has in it the inclined slot *d'*. At the bottom of the plate *c'* there is a cross-piece, *e'*, carrying a support, *f'*, through which and also through the plate *c'* is passed the bolt *g'*, which is pressed at the back by a weight or by the spring *h'*, and carries between its bearings the adjustable stop *i'*, the spring *h'* causing the opposite end of the bolt to enter a recess or catch in the back of the side frame and hold up the plate until the forging or shaping operation is to be put in action, and the stop *i'* is employed as a gage to determine the position of the article between the rollers, and at the same time to release the bolt from the recess or catch in the side frame.

On the stud *k'* is placed the lever *l'*, which has at the bottom end a bowl or stud placed in the inclined slot *d'* in the plate *c'*, and to the top of the lever is fixed a sliding block, *n'*, having a spherical cavity in which is fitted a spherical bowl, placed on one end of the clutch-lever *o'*, working on the stud or fulcrum *p'*, and has its other end formed as a fork with studs or bowls placed in a recess in the sliding half *v* of the clutch-box.

When the machine is to be used for forging or shaping the articles the driving-shaft *k* is put in motion, and the gearing and rollers are continuously revolving with it, and when the metal is properly heated its front end is pressed by the workman against the stop *i'*, so as to release the bolt *g'* from the recess or catch in the back of the side frame, which operation unlocks the plate and allows it to fall down and cause its inclined slot *d'* to give motion to the lever *l'*, block *n'*, and clutch-lever *o'*, and thereby move the sliding half *v* of the clutch into gear with the half on the toothed wheel *t*, and cause it to turn with the shaft *u* and give upward motion by means of the toothed segment *s* to the pattern or cam segment, which, according to its shape, allows the upper roller to move up and down and forge or shape the article, the upper roller turning in an opposite direction to the segment, and returning back the article at the same time that it is being forged or shaped, and when the stopping-piece *a'* comes in contact with the projection *b'* on the top of the plate *c'* it raises the plate and causes the slot *d'* to give a reverse motion to the lever *l'*, so as to move the half of the clutch-box *v* out of gear with the half on the toothed wheel *t*, and thereby leave the wheel loose on the shaft *u* and allow the pattern or cam segment *s* to turn back by its own gravity, ready for a fresh operation. The plate *c'* is now held up by the bolt and catch, and when the bolt is released by the workman pressing another article against the stop *i'* the plate falls down and connects the two halves of the clutch-box together, and then the wheel *t* turns up the cam-segment and again completes the forging or shaping of the article, which operations take place continuously on both sides of the machine as long as desired. Thus the stopping-piece *a'*, which is adjusted and fixed to each pattern or cam-segment or roller, is the means of raising the plate *c'* and giving motion to the levers for putting the segment out of gear at the exact time desired, and the bolt and spring *g'* and *h'* and the recess or catch in the side frame retain the plate and levers and also the segment in that condition as long as required. The stop *i'* on the bolt *g'* is employed not only as a gage for determining the length of the article placed between the rollers, but for enabling the workman to release the bolt and allow the plate *c'* to fall by its own gravity, and thereby reverse the motion of the levers and put the segment into gear at the same instant that the article is placed in position.

It is well known that a great variety of combinations of mechanism can be arranged for putting the pattern segment or roller in and out of gear instead of the plate *c'* and the levers and parts in connection with it; but they would all require an adjustable stopping-piece to be connected to the aforesaid pattern segment or roller, for the purpose of being the self-acting agent for working the levers and parts to put the segment out of gear, and also a bolt or slide which can be released from a recess or catch for enabling the levers and parts to have reverse movements and put the segment into gear; and although in the drawings I have shown the stopping-piece on the segment and the bolt and parts in connection with it as acting and influencing one arrangement of mechanism, it is evident they can be employed in all combinations for the same purpose.

When desired, I work the pattern or cam segment or roller by friction instead of toothed gearing, and in some cases I cause the cam roller or segment to turn loose upon a station-

ary shaft, and also employ several cam-rollers of different patterns upon one shaft.

In machinery for rolling, shaping, or forging metals, constructed with two rollers, one of which can revolve but not slide up and down, while the other is capable of revolving and also of moving up and down, and with one or more pattern or cam rollers or segments, I claim—

The mechanism for driving the said pattern or cam rollers or segments with a positive motion—that is, by gear for starting the patterns or cams by the introduction of the article to be shaped and for stopping the movement by the action of the machine itself, all substantially in the manner as herein described.

Done at Manchester, England, this 5th day of April, 1864.

JAMES DODGE.

Witnesses:

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G. SEPTIMUS HUGHES,

Patent Agents, both of 20 Cross Street, Manchester.