

**G. A. CHALFANT & I. HAHN.**  
**Rolling-Mills.**

No. 153,239.

Patented July 21, 1874.

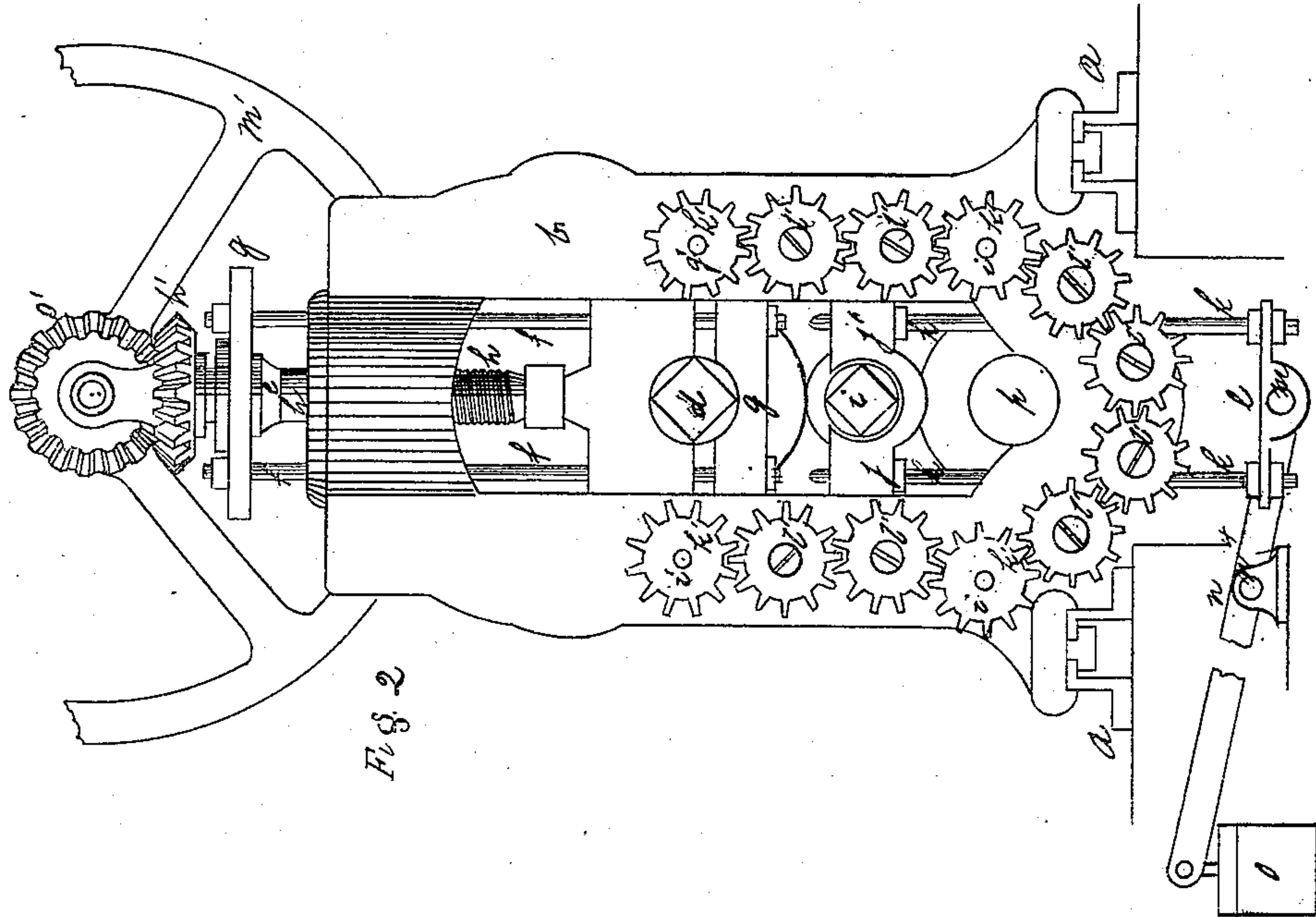


Fig. 2

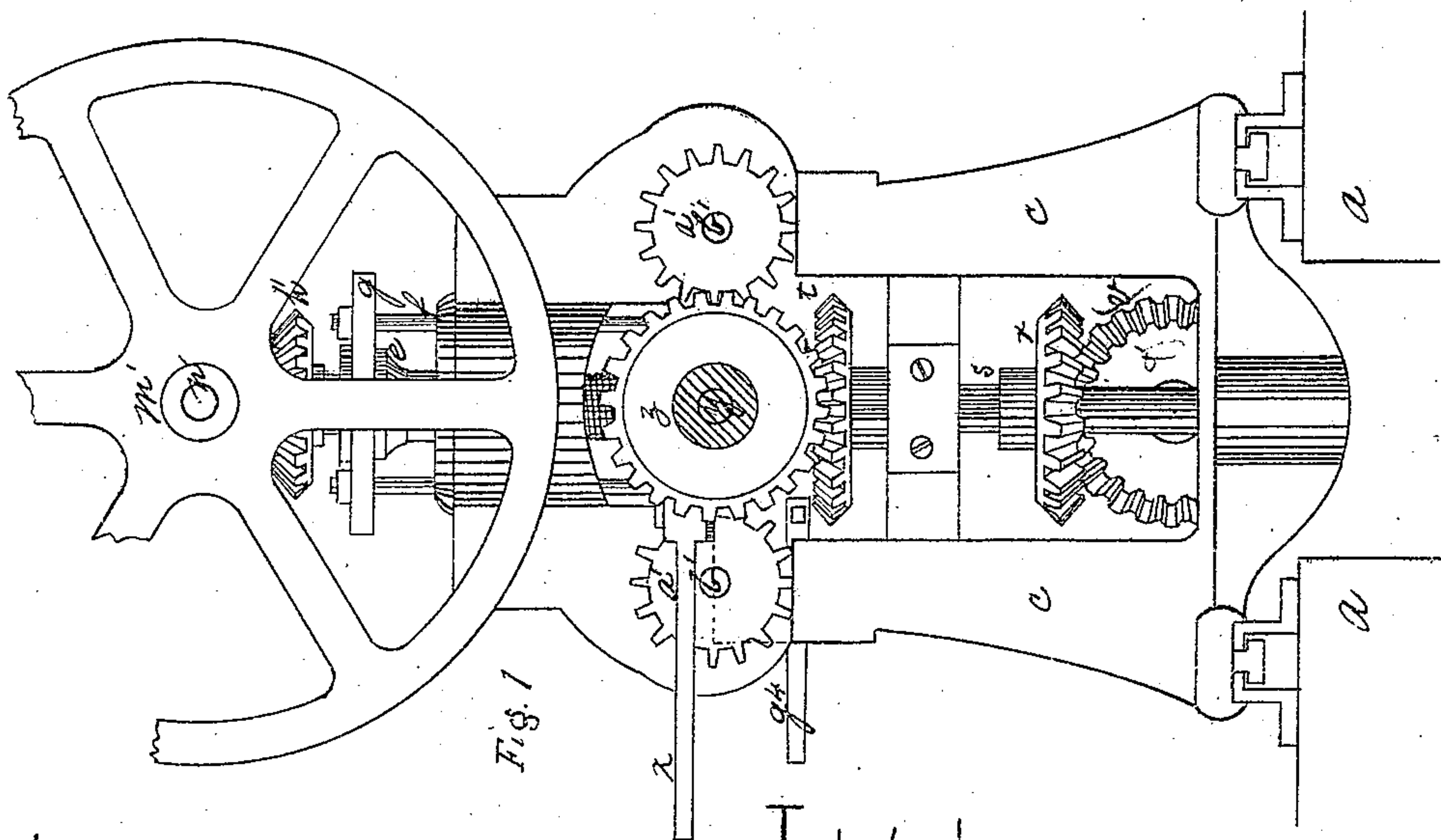


Fig. 1

WITNESSES

*James B. Kay*  
*Frederick Standish*

INVENTORS

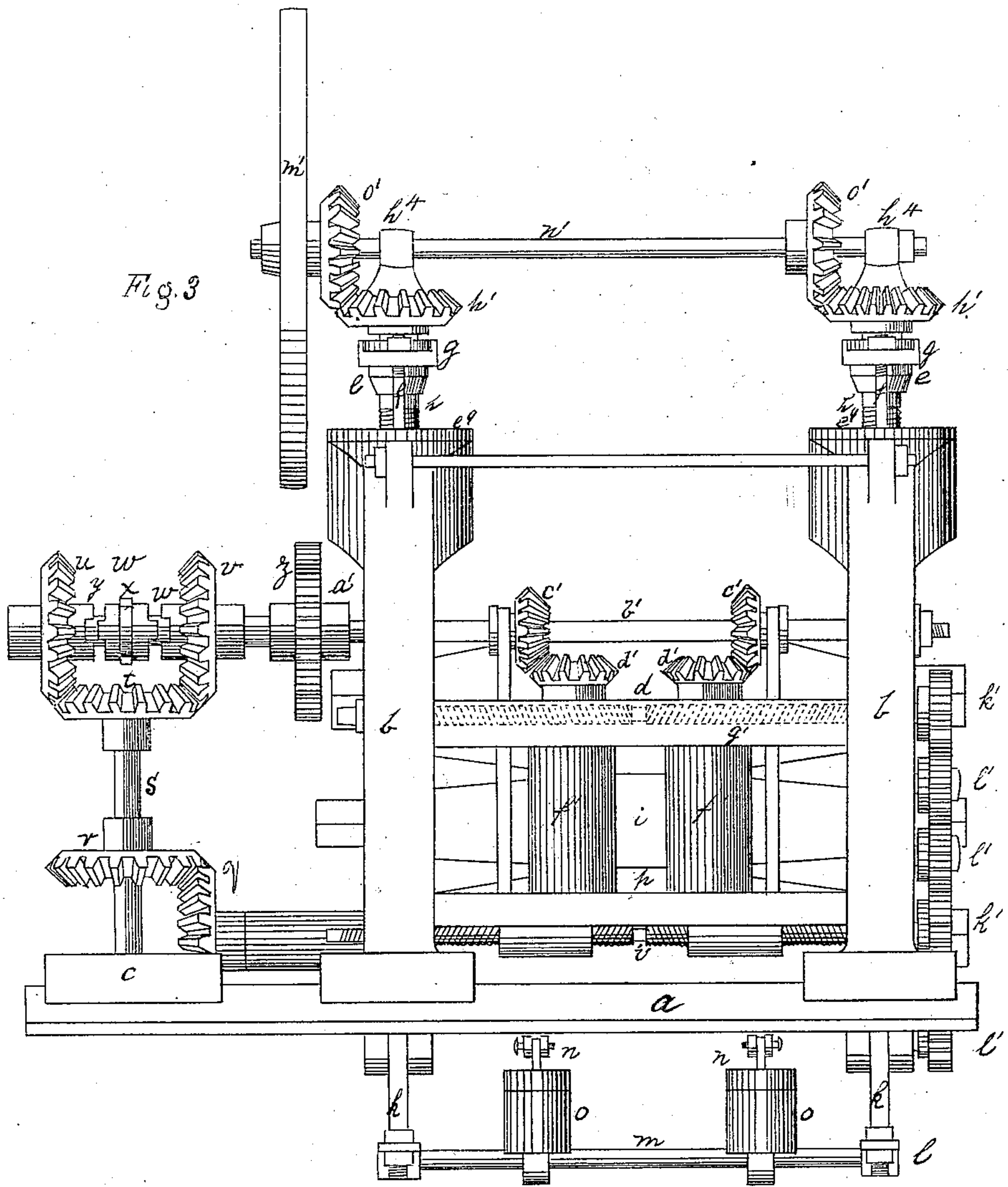
*George A. Chalfant*  
*Ignatius Hahn*  
*By Bakewell & Kerr*  
*Attys*

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1844



# UNITED STATES PATENT OFFICE.

GEORGE A. CHALFANT, OF ETNA BOROUGH, AND IGNATIUS HAHN, OF  
PITTSBURG, PENNSYLVANIA.

## IMPROVEMENT IN ROLLING-MILLS.

Specification forming part of Letters Patent No. **153,239**, dated July 21, 1874; application filed  
May 1, 1874.

*To all whom it may concern:*

Be it known that we, GEORGE A. CHALFANT, of Etna Borough, and IGNATIUS HAHN, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Rolling-Mill; and we do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawing forming a part of this specification, in which—

Figures 1 and 2 are end views of our improved mill, and Fig. 3 is an elevation thereof.

Like letters refer to like parts in the several figures.

Our invention consists in the combination of non-reversing three or four high rolls with reversible vertical rolls arranged on opposite sides.

To enable others skilled in the art to make and use our invention, we will describe its construction and mode of operation.

Upon the bed-plate *a*, which is designed to be bolted to the foundation in the usual manner, are housings *b* and the reversing-stand *c*. In the housing *b* are mounted three horizontal rolls, *d*, *i*, and *p*, or, in other words, three-high rolls. The top roll *d* hangs in the collars *e* by means of the rods *f*, holders *g*, and housing-screws *h*. The housing-screws *h* are threaded, and pass through the threaded boxes *e*<sup>2</sup>. The rods *f* are attached to the holder *g*, and pass through the housings *b* by means of suitable openings. Mounted on the upper end of the screws *h* are the pinions *h*<sup>1</sup>, and extending from the hand-wheel *m*<sup>1</sup>, through the bearings *h*<sup>4</sup>, is a shaft, *n*<sup>1</sup>, carrying beveled pinions *o*<sup>1</sup>, which mesh into the pinions *h*<sup>1</sup>. By turning the hand-wheel *m*<sup>1</sup> the roll *d* will be raised or lowered in the stationary boxes *e* by the screws *h*. The middle roll, *i*, is mounted on the hands *j*<sup>1</sup>, which are sustained by bolts or rods *k* extending up from the cross-heads *l*, the latter being mounted on a shaft, *m*, which is situated below the housings. Loosely attached to the shaft *m* are levers *n*, which have their fulcrums at *n*<sup>4</sup>, and are provided with counter-weights *o* at their outer ends. These weights counter-balance the roll *i* just sufficiently to cause it

to follow the top roll, *d*, in its upward adjustments. This counterbalance is sufficiently nice to cause the roll *i* to be thrown down by a slight pressure, so that when the bar or plate is fed between it and the upper roll it will immediately be forced down on the lower one. On one end of the bottom roll, *p*, is mounted a beveled gear-wheel, *q*, which meshes into a similar wheel, *r*, mounted upon a shaft, *s*, on the upper end of which is a similar wheel, *t*, meshing into and turning two wheels, *u* and *v*, which are mounted loose on the round portion of the shaft *y*, and by the operation of the wheel *t* turned in opposite directions. That portion of the shaft *y* which stands between the wheels *u* and *v* is square, and upon it is mounted a clutch, *w*, which moves laterally by means of a lever, *x*, arranged on the stand *c* at one side. The wheels *u* and *v* are provided with claws, which correspond to the adjacent faces of the clutch *w*. Mounted on the inner end of the shaft *y* is a pinion, *z*, which gears into pinions *a*<sup>1</sup> mounted on the shafts *b*<sup>1</sup>, on which are mounted the sliding beveled wheels *c*<sup>1</sup>, which, in turn, mesh into the beveled wheels *d*<sup>1</sup> secured to the shafts *e*<sup>1</sup> of the vertical rolls *f*<sup>1</sup>. By placing the clutch *w* in connection with either of the wheels *u* or *v* the shaft *y* is caused to rotate in the direction of the rotation of that wheel, thereby turning the wheel *z*, which, by the wheels *a*<sup>1</sup>, the shafts *b*<sup>1</sup>, pinions *c*<sup>1</sup>, and pinions *d*<sup>1</sup>, operate the rolls *f*<sup>1</sup>. By throwing the clutch *w* against the opposite wheels *u* or *v*, which turn in opposite directions, the vertical rolls *f*<sup>1</sup> are reversed, or caused to turn in the opposite direction. For the purpose of gaging the distance between the vertical rolls *f*<sup>1</sup> with respect to the width of the bars or plates, we have arranged a shaft with right and left hand thread *g*<sup>1</sup>, which extends through the nuts of the vertical roll-bearings *h*<sup>1</sup>, and then, by means of the pinions *k*<sup>1</sup> mounted on its rear end, communicating, by idlers *l*<sup>1</sup>, with the pinions *k*<sup>1</sup> mounted on the ends of similar right and left hand screws *i*<sup>1</sup>, passing through the lower bearings of the same pair of rolls and the upper and lower bearings of the opposite pair of vertical rolls, the power from the shaft *g*<sup>1</sup> is thus communi-



cated to the other three shafts,  $i'$ . The adjustment is made by means of the lever  $g^4$  placed on the square end of the shaft  $g^1$ . By turning the lever  $g^4$  in the desired direction the vertical rolls  $f'$  are caused to approach or recede from each other.

It will be noticed that the wheel  $m'$  for adjusting the horizontal rolls to the proper thickness of plate, the lever  $g^4$  for adjusting the vertical rolls to the proper width, and the lever  $x$  for reversing the motion of the vertical rolls are concentrated at one point, so that they can all be operated and managed by a single workman.

The operation of this machine is evident, its purpose being to save the necessity of idle passes by arranging the rolls in such a way that the vertical rolls may be reversed with ease and quickness, so as to feed in either direction, so that, after the plate or bar has been passed through the lower and middle roll, it can be immediately returned through the middle and upper roll without loss of time in adjustment. The plate or bar, being passed through, is carried up and placed in between the top and middle roll for return. The top roll turns in opposite directions to the bottom roll by the friction of the middle one.

It will be evident to the skilled mechanic

that the mechanical devices and arrangements for transmitting power to the vertical rolls for the purpose of reversing them or causing them to move in reverse directions may be altered by the use of friction-gearing, belting, &c. The arrangements herein shown may also be applied to four-high rolls.

The middle or the upper horizontal roll may be the fixed roll, if desired. In the first case the two outer rolls would have to be mounted in adjustable boxes, and in the latter case the lower roll only would require to be so mounted. The changes and the manner of making them are well known to the skilled constructor of rolling-mills.

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

The combination of non-reversing three or four high rolls with reversible vertical rolls arranged on their opposite sides.

In testimony whereof we, the said GEORGE A. CHALFANT and IGNATIUS HAHN, have hereunto set our hands.

GEO. A. CHALFANT.  
IGNATIUS HAHN.

Witnesses:

FRANCIS TORRANCE,  
N. B. HATCH.