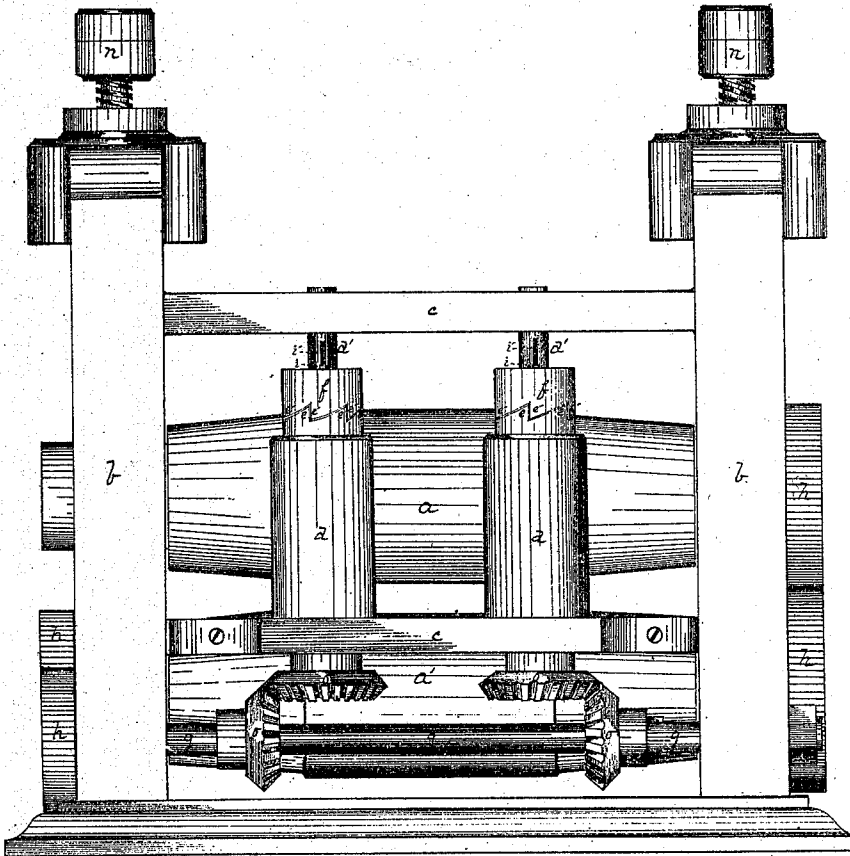


*A.C. Monan,*

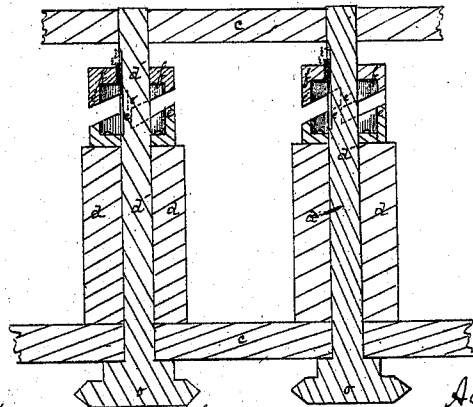
*Rolling Mill.*

*No. 105,952.*

*Patented Aug. 2. 1870.*



*Fig. 1.*



*Fig. 2.*

*Witnesses:*

*R. C. Orenshaw*

*Thos. W. Kern*

*Inventor:*

*Anthony C. Monan  
by Bakewell & Christy  
his Attys.*

# United States Patent Office.

ANTHONY C. KLOMAN, OF PITTSBURG, PENNSYLVANIA.

Letters Patent No. 105,952, dated August 2, 1870.

## IMPROVEMENT IN IRON-ROLLING MILL.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, ANTHONY C. KLOMAN, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Rolls for Rolling Iron; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawing making a part of this specification, in which—

Figure 1 is a front elevation of my improved rolls, and

Figure 2 is a vertical section of the upright rolls through their axes.

Like letters of reference indicate like parts in each.

My invention is designed, more particularly, for the rolling of broad bars or plates of iron, of definite width and finished edges; and

The nature of it consists in so constructing the operative devices for imparting motion to the upright or edging and feeding-rolls, that they may, while feeding in the bar, pile, or fagot, have a definite, positive motion, and such that, while the bar, pile, or fagot is being drawn or reduced in thickness between the horizontal rolls, such vertical rolls may have a motion independent of the shafts on which they work.

A difficulty has been experienced in the use of vertical or edging-rolls, when geared in connection with horizontal reducing-rolls, from the fact that the rapidity of motion desired in the vertical rolls varies according to the amount of the reducing and drawing action of the horizontal rolls, inasmuch as the less the billet or bar is reduced by the horizontal rolls, the more rapidly will the body of the billet or bar be fed in, and the more rapidly will the front vertical rolls be required to move.

Hence, the horizontal and vertical rolls, being geared so as to operate together, and at uniform relative speed, on a bar or billet, while it is reduced, a certain amount at a single pass, if, at the next pass, the amount of such reduction be changed, the faces of the vertical rolls must slip or slide on the edges of the bar or billet, always with a great waste of power, and frequently resulting in the breakage of the gearing or other part of the machine.

By my invention, I arrange the vertical rolls each loosely on a shaft, and connect them with a clutch, the motion of which is secured by means of the same shaft, and a key or feather, so that when a positive motion is desired, as when feeding the end of the bar or billet up to the "bite" of the horizontal rolls, the vertical rolls, operated by means of the clutch, shall feed in and edge up the bar or billet, and while the horizontal rolls are drawing the bar through, and drawing and reducing it, the vertical rolls may operate independ-

ently of their shafts, according to the speed with which the, as yet, unrolled body of the bar or billet is passing through.

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

The horizontal rolls *a a'*, of the usual or any known construction, may be mounted in any suitable housings *b*. The distance between their operative surfaces at the point of bite may be varied at pleasure by pressure-screws *u u*, or in any of the ways known to the art.

In front of the reducing-rolls, in any suitable framework *c*, I adjust a pair of upright rolls, *d d*, which work loosely on their shafts *d'*.

The upper end of each such vertical roll is made with steps *e*, like one-half crab-clutch, and corresponding reversed steps *e'*, like the other half of a crab-clutch, are made in each clutch-piece *f*, which latter is fitted onto the shaft *d'*, and secured so as to rotate with it, by means of a key or feather, *i*, playing in a longitudinal groove, *i'*, or by other equivalent device, but still so as to permit of its moving vertically.

The power to operate the vertical rolls is communicated through gearing *h*, shaft *g*, and miter-wheels *o*, or in other equivalent mode.

The vertical rolls also may be made adjustable to and from each other, in any of the ways known to the art.

The pile, billet, plate, or bar to be rolled, being heated, is first fed in between the upright rolls *d d*, they being set at such distance apart that they will take a bite on it, edge it up, and feed it forward to the point of bite of the horizontal roll *a a'*.

The gearing is so constructed and arranged that the upright rolls will, as operated by their shafts *d'* and clutches *f*, have a motion corresponding with the forward feed of the bar, when it is being reduced the minimum amount which it is to be reduced at a single pass, and in no case shall they give the bar or billet a motion forward more rapid than the horizontal rolls are designed to give it.

The horizontal rolls are set, so as to give the desired reduction to the plate or fagot. After they take a bite on such plate or pile, it is designed that they alone shall give it a forward motion. The rapidity of this forward motion depends on the amount of the reduction, as related to the entire thickness of the plate or pile reduced. The greater the reduction, the less rapid the forward feed. At the first pass, the reduction is commonly greatest, and the vertical rolls may be geared so as to feed the body of the plate or pile forward, as fast as it goes in between the horizontal rolls, but no faster.

As the proportionate amount of reduction from one pass to the next becomes less and less, the speed desired in the vertical rolls becomes greater.

By the use of the clutch described, this increase of speed, which may be greater or lesser, according to circumstances, is provided for. The half clutches on the upper ends of the rolls *d d*, (the latter playing freely on their shafts,) force the clutch-pieces upward by the inclined faces of the two playing against each other, so as to disengage roll and clutch, whereby the vertical rolls rotate with an independent motion of their own.

The shafts *d d* are kept well oiled, so as to reduce friction to a minimum. In this way, I avoid all sliding of the vertical rolls on the edges of the plates, bars, piles, or fagots, and secure their full measure of usefulness, as feeding, edging, and guide-rolls.

The same beneficial result is secured by making the upright rolls of less diameter than the horizontal rolls, and gearing them together, so that they shall operate with a motion more nearly uniform.

Although in describing my improvement I have described the crab-clutches, by means of which the desired effect is produced, as being placed on the shafts of the vertical rolls, it may be more convenient to place this device on the horizontal shaft, in connection with the miter-wheels, or any gear-wheels be-

tween the main driving-wheel and rolls, with precisely a like result, but, in this case, the crabs which slide along the shaft would have to be furnished with springs or similar device, to keep them up to their work, whereas, in the arrangement I have described, the upper crabs are kept in contact with the lower ones by their own weight. In like manner, the crab-clutches may be arranged on the lower ends of the vertical rolls, and be kept up in like manner.

Having thus described my improvement,

What I claim as my invention, and desire to secure by Letters Patent, is—

In combination with the pair of horizontal reducing-rolls and the pair of vertical feeding and edging-rolls, the crab-clutches, arranged to drive the vertical rolls, and cause them to feed the metal forward to the horizontal rolls, but which may slide over each other, without interlocking, when the speed of the vertical rolls is accelerated beyond that which is due to the driving-gear, substantially as described.

In testimony whereof, I, the said ANTHONY C. KLOMAN, have hereunto set my hand.

ANTHONY C. KLOMAN.

Witnesses:

JOHN GLENN,  
THOS. D. KERR.