A. B. Clemons.

Rolling Tapering Pieces of Metal.

No. 42,433. Patented Apr. 19, 1864.

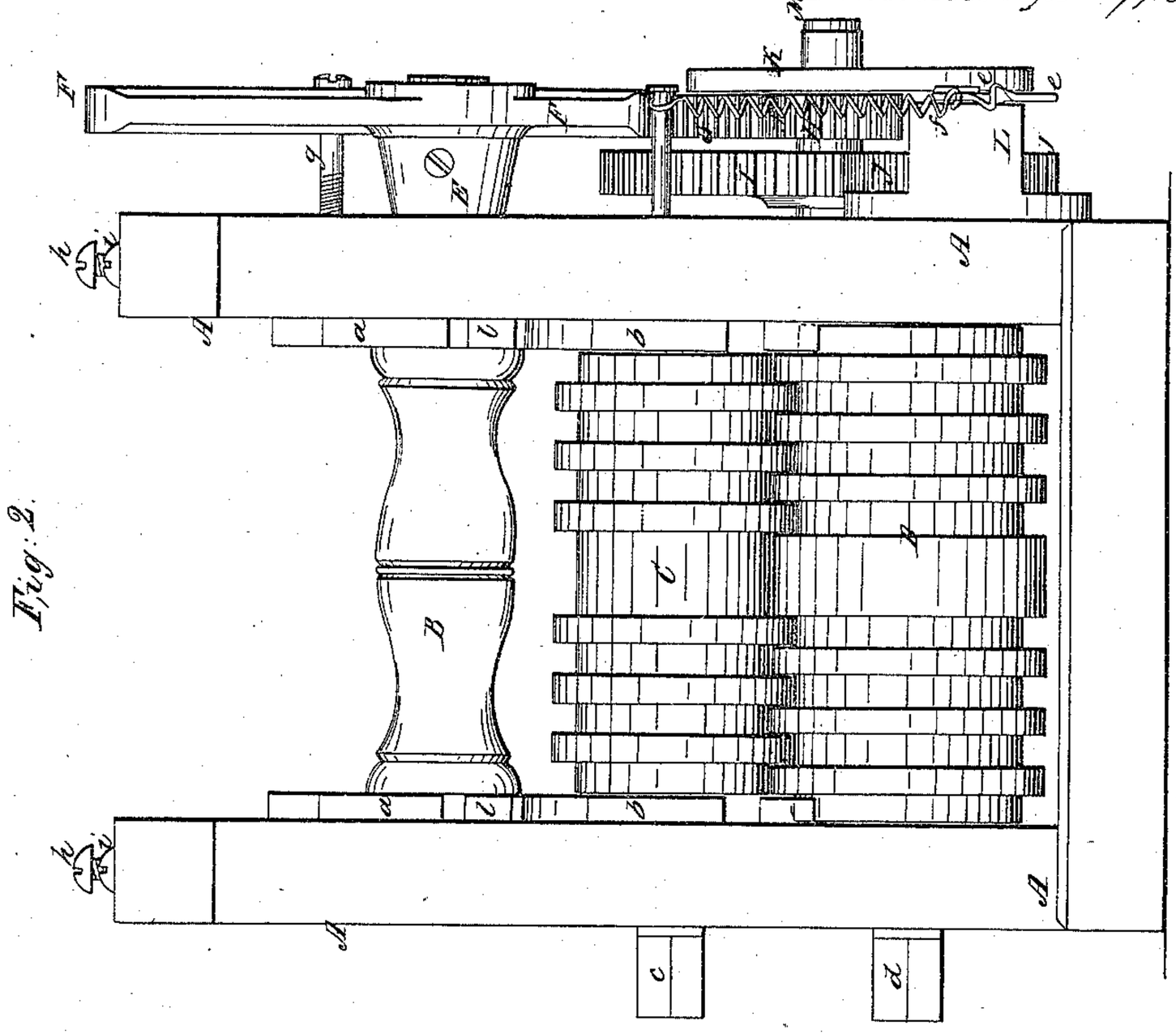

Fig. 2.

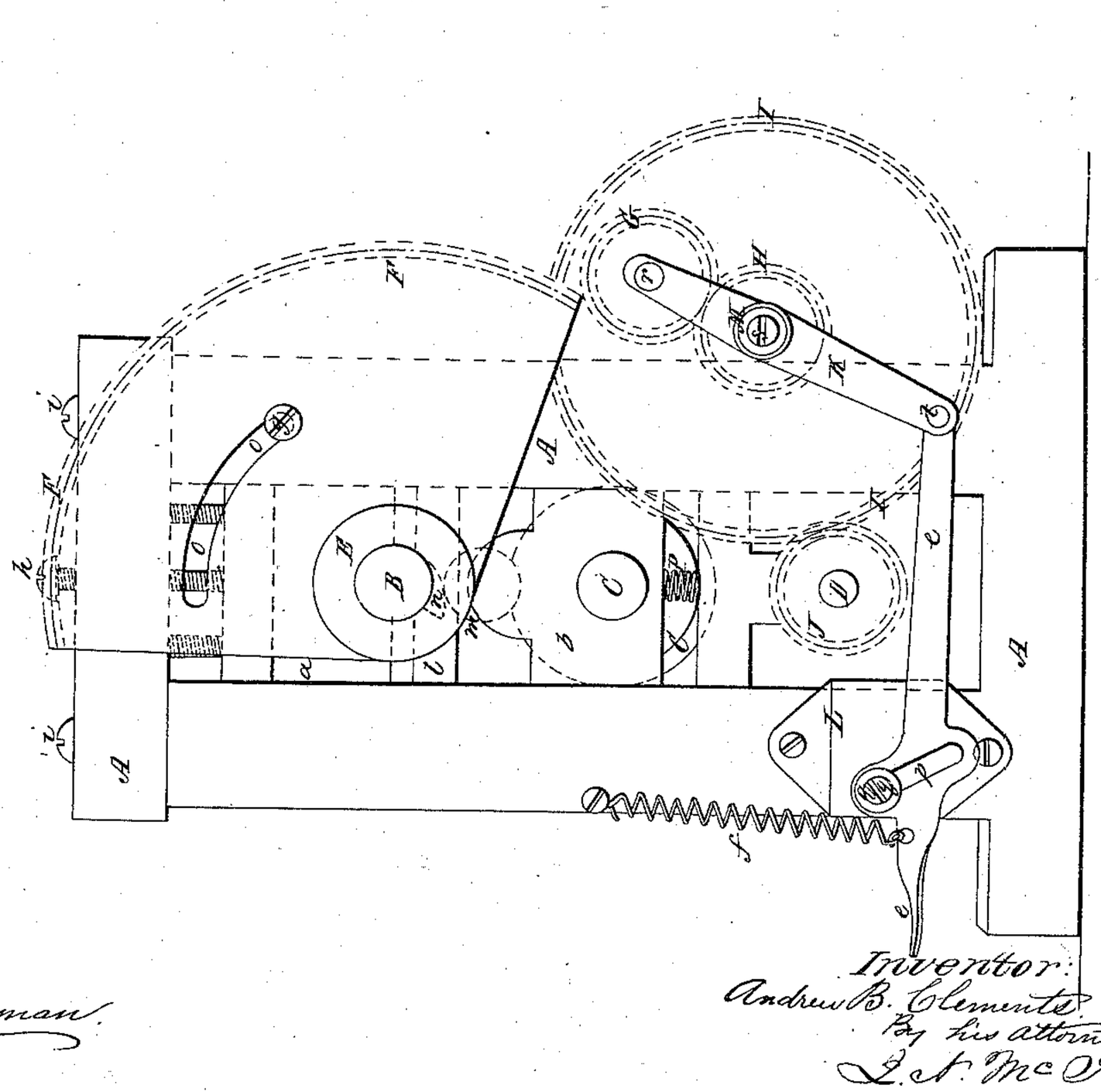

Fig. 1.

Witnesses:
A. DeLacy.
George Hageman.

Inventor:
Andrew B. Clemons
By his attorney
L. A. McIntire

THE GRAPHIC CO. PHOTO-LITH. 39 & 41 PARK PLACE, N.Y.

UNITED STATES PATENT OFFICE.

ANDREW B. CLEMONS, OF DERBY, CONNECTICUT, ASSIGNOR TO HIMSELF AND ROYAL M. BASSETT.

IMPROVEMENT IN ROLLERS FOR ROLLING IRON.

Specification forming part of Letters Patent No. **42,433,** dated April 19, 1864.

To all whom it may concern:

Be it known that I, ANDREW B. CLEMONS, of Derby, of the county of New Haven, in the State of Connecticut, have invented certain new and useful Improvements in Machinery for Rolling Tapering Pieces of Metal; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification.

My invention relates to the ordinary mill, consisting of a pair or pairs of concentric rolls, (that is, the surfaces of which are concentric with the journals,) having their faces grooved or plain, as may be required, and has for its objects to render this kind of mill capable of rolling out strips or pieces of metal of tapering form, (longitudinally,) and of various tapers and lengths; and to these ends my invention consists in making one (or both) of the rolls adjustable relatively to the other, so that the space between the faces of the rolls between which the metal to be rolled is passed may be increased or diminished at pleasure during the operation of rolling, by means of mechanism under the control of the operative and independent of the motive power which drives the rolls, as will be presently more fully described.

To enable those skilled in the art to make and use my invention, I will proceed to describe the construction and operation of my improved mill for rolling tapers, referring by letters to the accompanying drawings, in which—

Figure 1 is a side elevation, and Fig. 2 a front elevation, of one of my improved machines.

A is a suitable frame-work, made in about the usual manner, in which are mounted in suitable boxes two rolls, C and D, which may be made after any of the known forms to suit the kind of work to be done. The lower one of these rolls, D, has its boxes (in which its journals run) permanently arranged in the frame A. The other roll, C, has its boxes *b b* arranged so as to be capable of a vertical movement in said frame, and has them supported (over the boxes of the lower roll) by means of strong spiral or other springs, P, which, as seen at Fig. 1, are located between the tops of the boxes of roll D and the lower surfaces of boxes *b b*. In the upper portion of each of these last-named boxes is hung an anti-friction roll, *m*, on top of which works a cam, *u*, fast on a shaft, B, which is hung in suitable bearings formed in stationary boxes, *a l*, arranged in the frame A. One end of this shaft A is provided with a sector-gear, F, (the hub E of which is keyed fast to said shaft,) by which said shaft is partially rotated when desired, as will be presently explained. The two rolls C and D are driven in the usual manner by coupling-shafts connecting their journal ends *c d* with the driving machinery. On one end of roll D or its journal is secured a pinion, J, which drives a gear, I, the shaft or stud M of which projects from the main frame A, and fast to said gear I, and concentric with it, is a pinion, H, which meshes into and drives another pinion, G. This latter is hung loosely on a stud, *r*, in one end of a bar, K, which is hung near its center in the stud M, and which is provided at its other end with a pin or stud, *t*, on which is pivoted or hung one end of the shipper-lever *e*. The other end of said lever is formed, as seen at Fig. 1, with an oblique groove or slot, *p*, through it, which slot works around a pin, *q*, which is fast in the block or stand L. Just beyond the inclined slot is attached to shipper *e* a spring, *f*, by which the forward end of said shipper is lifted when released by the operator.

The operation of the machine shown and described in detail is as follows, viz: When it is desired to produce a tapering strip or piece, the rolls C and D have power applied to them in the usual way to rotate them, and the end of the heated piece of metal to be rolled out being inserted between the rolls C and D the operator puts his foot on the twisted end of shipper-bar *e*, and depresses it into the position seen at Fig. 1. This causes the arm K to be vibrated or turned on its center stud, M, until the pinion G comes in mesh with sector F. With this condition of all the parts the rotation of the roll D through the medium of the pinion J causes the gear I to rotate, which carries with it the pinion H, and this latter drives the pinion G, which induces motion in the sector F. This sector being fast on shaft B, the latter is turned in its bearings, and thereby the cams *u* are brought to bear against the rolls *m*, and operate to force the boxes *b b* (in which are hung the journals of roll C)

downward against the tendency of the springs P to keep them always up, and thus the roll C is made to approach nearer to the roll D with a uniform motion, while the two rolls are rotating at uniform and given velocities in their respective boxes or bearings. When the roll C has been depressed to its extent of motion, or after the piece being rolled has passed between the rolls, the treadle *e* is relieved, when the spring *f* lifts its forward end, thereby turning the arm K into such a position as to throw the pinion G out of gear with the sector F, when the latter will swing back into the position from which it was turned, carrying with it the shaft B, with its cams *u*, and thus allowing the boxes *b b* to be lifted by the springs P, and the roll C restored to its former elevated position. The vibration or descent of the sector F, by its own gravity, is checked by the pin *g*, which projects from the frame A, and around which the sector works, being formed with a slot, *o*, through it, for that purpose. While the shipper-bar *e* is in its normal position the rolls C and D will rotate at uniform velocities, and at a given and fixed distance apart, and the operation of straight-rolling is performed by them in the usual and well-known manner.

It is only when it is desired to roll a tapering piece out that the operator depresses the forward end of bar *e* simultaneously with introducing the heated bar between the rolls C and D, and causes the cam-shaft to effect the depression of the upper roll, and thus cause the metal being rolled to be uniformly decreased in thickness as it passes through the rolls. It will be understood that by either varying the cam or shifting the gears I and J the extent of taper to the piece rolled will be affected. By changing the gears the rolls will be allowed to make a greater or less number of revolutions, as desired, while the upper roll descends a given distance, thus varying the taper produced.

It will be seen that with a machine constructed as shown I am enabled to perform, with equal facility, both tapering and plain rolling, which is a great desideratum in many kinds of manufactures of rolled metal.

It will be understood that there are other ways than that shown by which the cams may be brought into and thrown out of action at the will of the operator, and I do not therefore wish to limit myself to the precise mechanism shown.

I am aware that it has been suggested to roll tapering pieces of metal by means of adjusting one roll relatively to the other while the two were rotating, by means of a former passed between the adjustable roll and an upper stationary roll; but I do not wish my invention to be confounded with any such impracticable plan.

I am also aware that it has been suggested to roll a taper by means of a cam-like roll; but in such a plan the surface of the cam-shaped roll would have a different velocity at each point in its rolling-surface, while the cylindrical roll with which it co-operated would have a uniform velocity throughout its surface, and no such result as that attained by my improved machine could be arrived at by such machinery.

I am aware that machines for rolling tapering pieces of metal have been employed in which a device was embraced for varying the distance between the faces of rotary rolls, having concentric journals, during their rotation; but in all such machines with which I am familiar the mode of operation is different from that in my improved machine.

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

In combination with rolls so arranged as to admit of the distance between their faces being varied, a mechanism, substantially such as described, for operating upon the roll in the manner and for the purpose described.

ANDREW B. CLEMONS.

Witnesses:

ASAEL DREW,

THADDEUS G. BIRDSEYE.