

(No Model.)

J. GEARING.
Mill for Rolling Hoop Iron.

No. 238,105.

Patented Feb. 22, 1881.

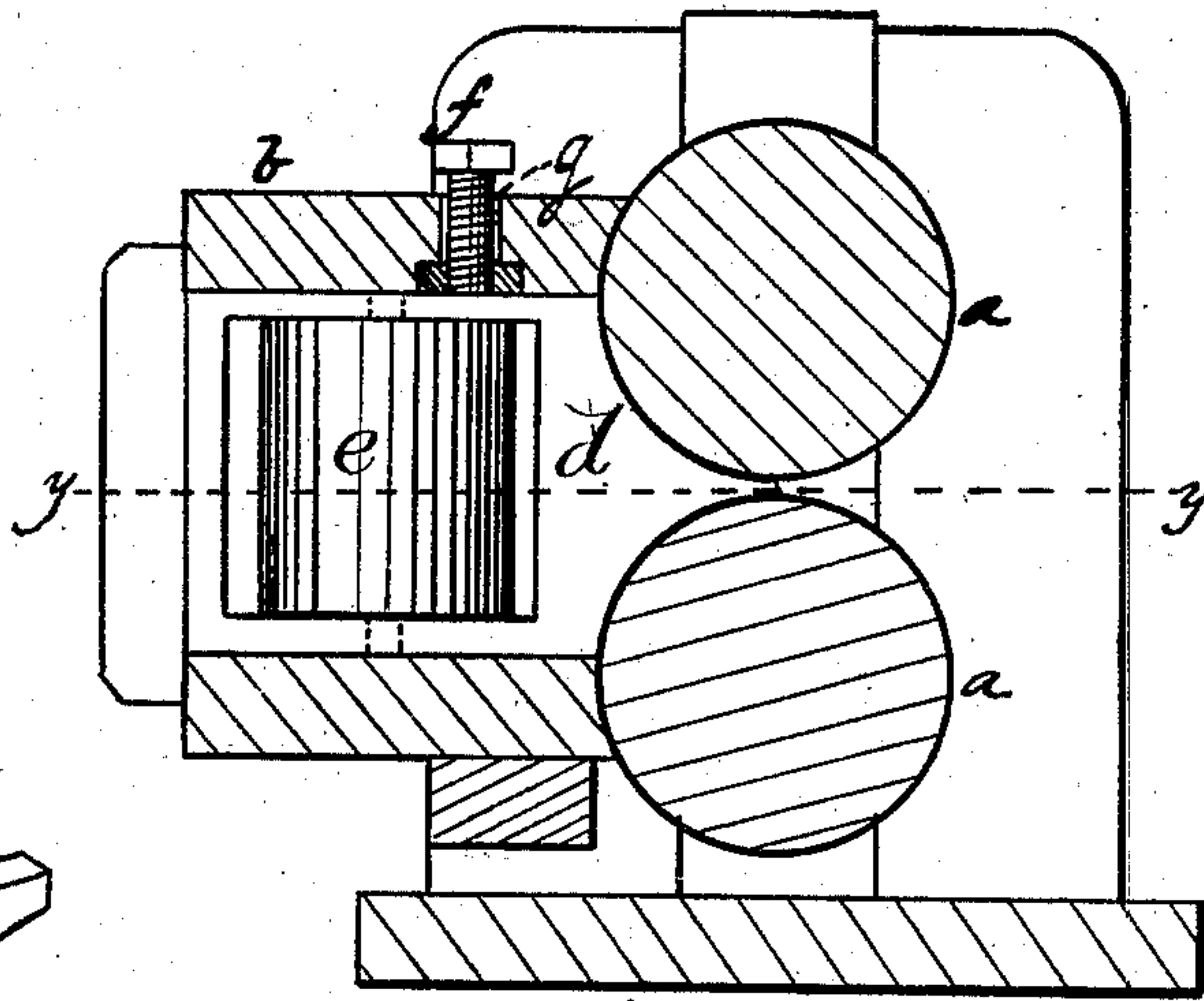


Fig. 1.

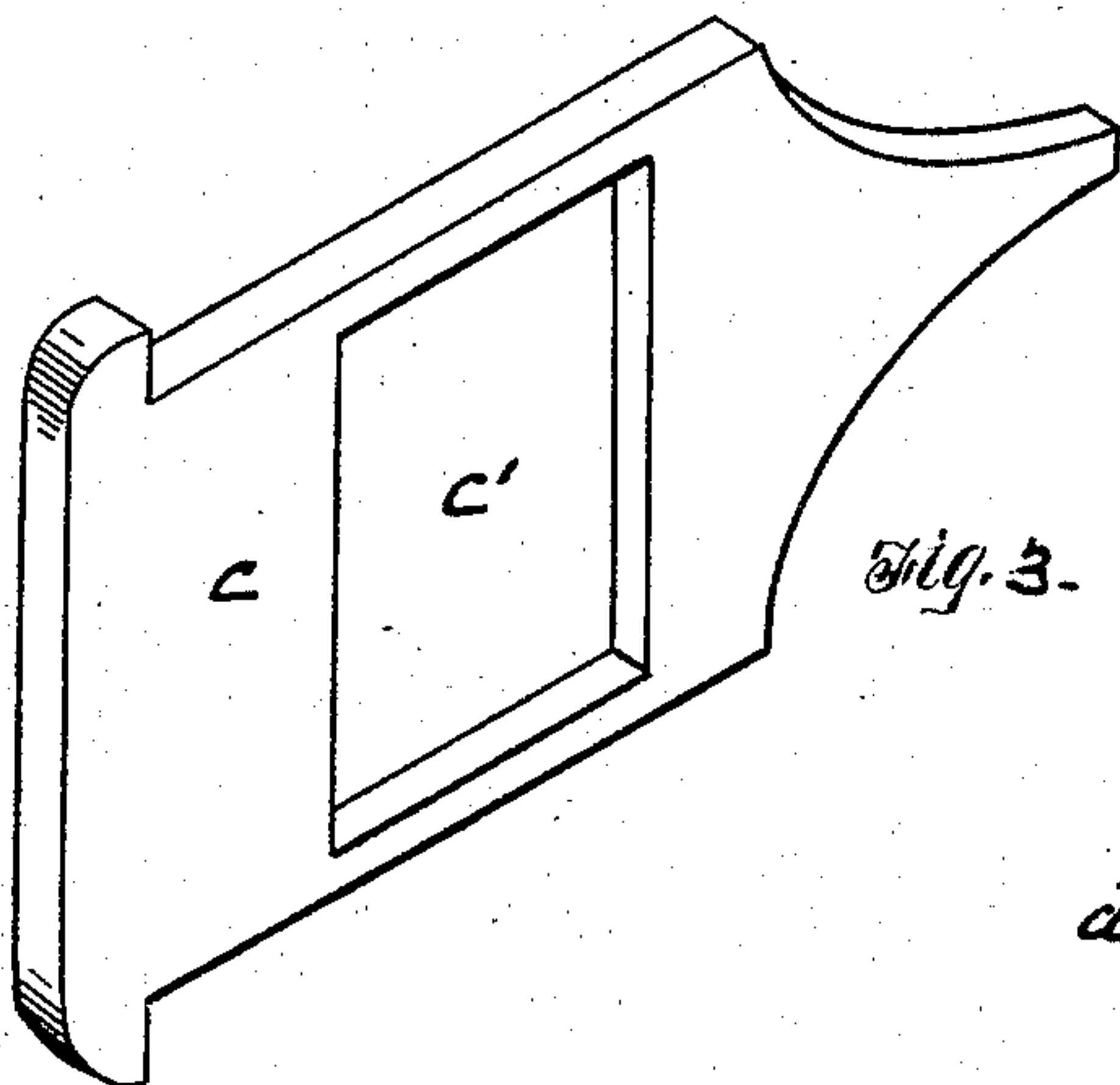


Fig. 3.

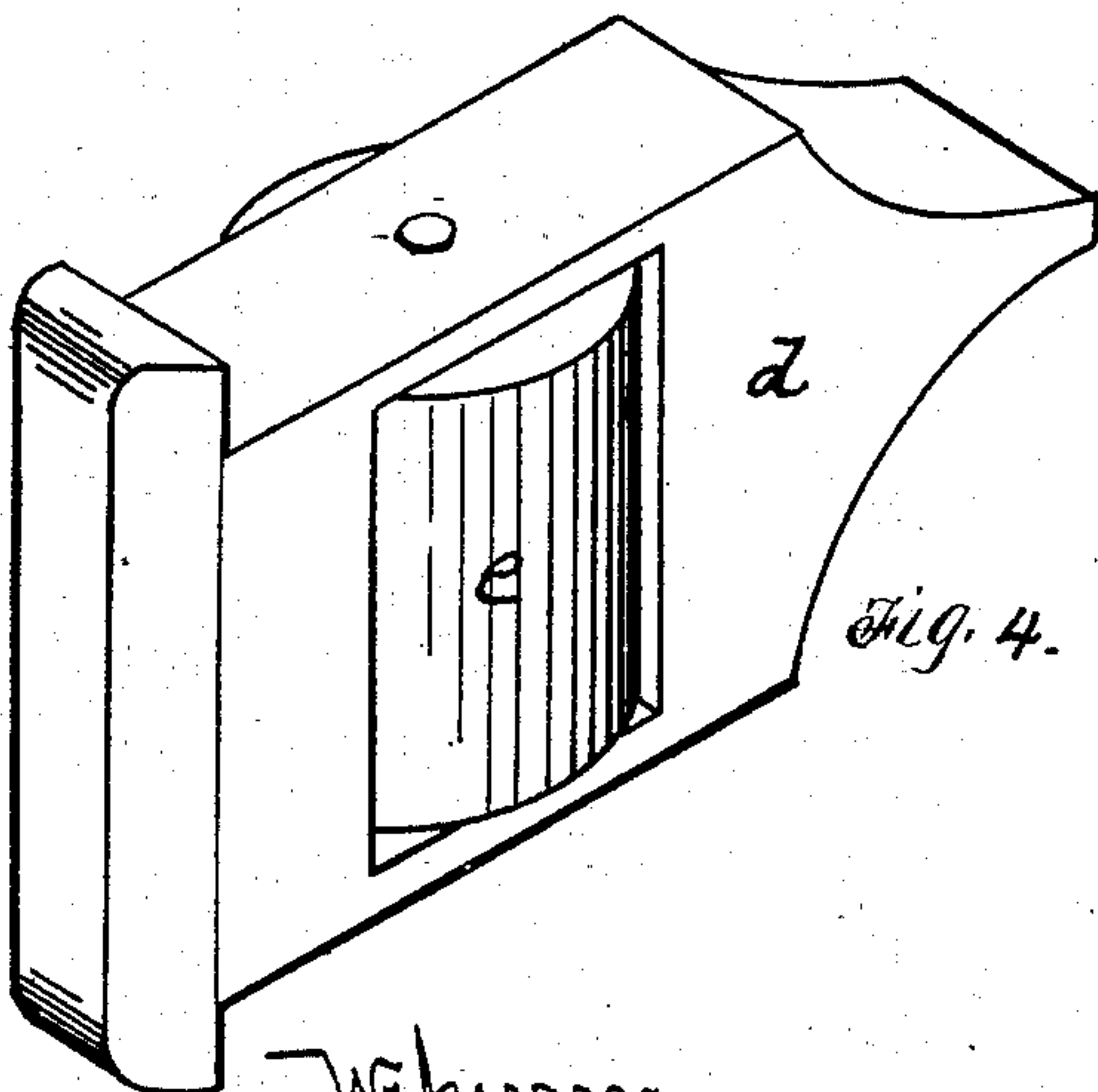


Fig. 4.

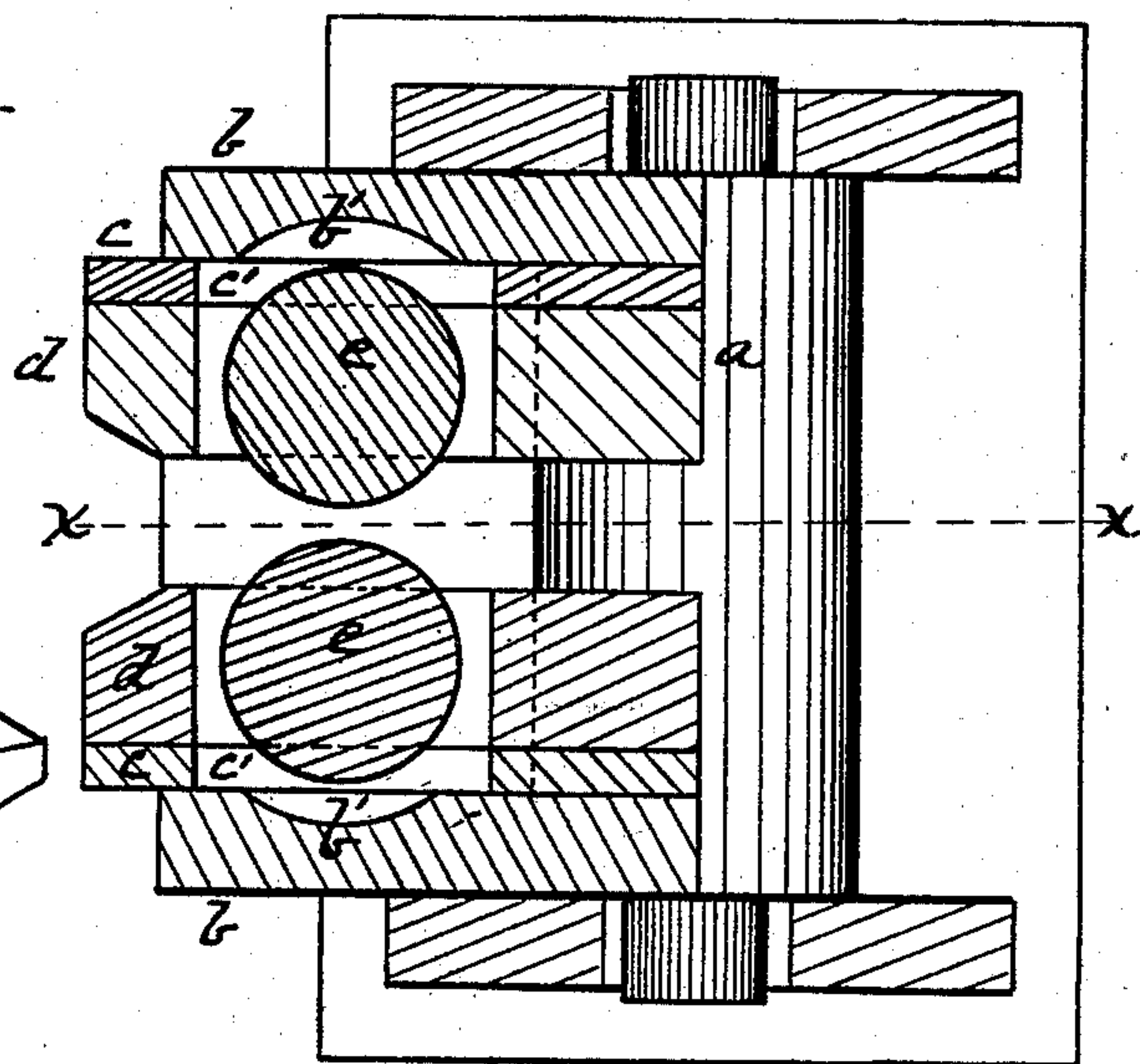


Fig. 2.

Witnesses.
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UNITED STATES PATENT OFFICE.

JOHN GEARING, OF PITTSBURG, ASSIGNOR TO HIMSELF AND WILLIAM E. BRANDON, OF ALLEGHENY CITY, PENNSYLVANIA.

MILL FOR ROLLING HOOP-IRON.

SPECIFICATION forming part of Letters Patent No. 238,105, dated February 22, 1881.

Application filed July 14, 1880. (No model.)

To all whom it may concern:

Be it known that I, JOHN GEARING, of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Mills for Rolling Hoop-Iron; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a vertical section of a pair of hoop-finishing rolls on line *xx* of Fig. 2. Fig. 2 is a horizontal section on line *yy* of Fig. 1, and Figs. 3 and 4 are perspective views of the liner and guide.

Like letters of reference indicate like parts in each.

Heretofore rolls for rolling iron, and especially sheet, band, and hoop iron, have been provided with guides on the feed side for guiding the iron properly into the finishing-rolls. These guides have been set in suitable boxes, and in the manufacture of hoop-iron, nail-plate, and other similar forms the effect of the reduction of the iron by the pass has been to produce a lateral spread and cause it to crack and fray at the sides, producing ragged edges, which subsequently had to be trimmed off in some instances, and in others, such as in the manufacture of hoop-iron of the finer gages, it has been impossible to remedy it, and the result is a total loss. Especially is this the case where there is cinder or scale in the iron, as the cinder or scale, being rolled into the body of the hoop, presses out the edges and makes them uneven and the hoop of varying width. The guides consisted of a series of frames or plates set vertically in a suitable box at the front of the roll, and they were removable and interchangeable, so as to make the proper width of guide for the iron that was being rolled. In the drawings, Fig. 3 shows a liner which is similar to the guides just described, except that it is cut out centrally. Another purpose in making these guides movable is, that in plain rolls it is desirable to change the part of the roll which constitutes the working-face—that is to say, the guides are so set that the rolls are used at one end first and then, when that portion becomes worn

by shifting the position of the guides, the rolling is done on another and smoother part of the rolls.

My invention consists in forming the adjustable guides with vertical friction-rolls at each side of the pass, so that when a piece of metal is rolled the edges shall be slightly reduced and squared up, and all cracking, raggedness, and lateral spread prevented, the vertical rolls operating in this respect similarly to the vertical rolls of the universal mill.

In all cases prior to my invention the vertical or edging rolls of a mill have been operated by power communicated to them by suitable gearing. Such structures are enormously expensive, both in construction and in operation.

By my invention I retain the advantage of the vertical rolls for squaring up the edges with but little or no increase of cost from the old form of stationary guides. My vertical rolls constitute a rolling or moving guide.

In the drawings, *a a* indicate a pair of finishing-rolls such as are used for the finishing-pass of the hoop-mill. *b* is a guide-box of the ordinary construction, placed upon the feeding side of said rolls; and *cc* are liners, similar in shape to the ordinary guides heretofore used, but cut out centrally, as at *c'*, for the purpose of permitting the vertical rolls to turn. The ends *b'* of the guide-box *b* are cut out for the same reason. Guides *d* are similar in form to the liner *c*, and are provided with vertical friction-rolls *e*, preferably made of steel or chilled iron, which are so journaled in the guides *d* that their working-faces or peripheries shall extend slightly beyond the inner sides of said guides, so as to have a rolling contact with the piece of metal as it passes to the rolls *a*. The guides *d* are provided with set-screws *f*, working through a slot, *g*, in the guide-box *b*, by means of which they can be secured in any desired position in front of the rolls *a*. These devices may be varied in form without departing from the spirit of my invention, which consists in the use of rotating frictional vertical guide-rolls for squaring up the edges of the piece.

By placing the liners *c* at one side of the guides *d* the guides *d* may be adjusted so as to bring the pass at one end of the rolls *a*, the

end of the box *b* being cut out, as at *b'*, to permit the rolls *e* of the guide-box *b* to rotate without interference when placed at the extreme end. Then, when the rolls *a* are worn in that place, the guides *d* may be moved toward the center by taking out one or more of the liners *c* opposite the center of the rolls and placing it at that end where the rolls have been worn, thus shifting the position of guides *d*, and the rolling may be continued at the new place on the rolls *a*.

The operation of my machine is the same as that with the ordinary stationary guides; but the effect upon the iron is, that the vertical rolls *e* square up or roll in the ragged edges or prevent their formation to any injurious extent by the rolls. They also prevent the iron from being rolled of uneven width.

If desired, the guide-rolls *e* may be placed upon the delivery side of the rolls *a*, or upon both sides, so as to have the effect of the vertical rolls both on the feed and the delivery side.

I have been describing my improvement with reference to plain rolls. It may also be used in connection with grooved rolls, and its chief utility in such use consists in the fact that by moving the guides nearer together iron of different gages or widths may be rolled in the reducing-rolls in the same groove—that is to say, that iron of a smaller size than the groove may, by the use of the vertical rolls, be put through the final or finishing pass with as good an effect as has heretofore been accomplished with the stationary guide-box and grooves of the size of the iron. This enables me to obviate the necessity of changing the rolls as frequently as is now done, it being necessary to change the rolls for every size of iron that is rolled.

The cost of the guides *d*, provided with the vertical rolls *e*, is but comparatively little greater than the cost of the ordinary stationary guides heretofore used, while the saving effected by preventing or curing the formation of ragged edges upon the iron is very great.

Universal and similar mills, where the vertical or edging rolls are driven by power, are only adapted to heavy work, such as slabs, I-beams, &c., and the effect of the side rolls is to exert a drawing action. This is also the case where four rolls are arranged around a

common center, although the vertical rolls may not be power-driven. In power-driven universal mills the vertical rolls cannot be adjusted with relation to the horizontal rolls, so as to steady the iron between the two sets of rolls, and such support is essential in rolling hoop or band iron. Neither can the vertical rolls be advantageously adjusted across the horizontal rolls so as to utilize the entire working-faces of the rolls. In my devices the guides can be adjusted to support the metal between the rolls. The action of the friction-driven rolls is to knead or work in the ragged edges of the hoop, and is not a reducing or drawing action. Finishing-rolls are often changed, and require to be frequently dressed down. This reduces the diameter, and as the same couplings are used the speed is correspondingly reduced. Friction-driven rolls will permit this change, whereas if the rolls were driven by power it would be impossible to dress down the rolls and reduce the gearing correspondingly.

I can roll all kinds or forms of metals which can be rolled in plain or grooved rolls. The edges are perfectly smooth and the iron of unvarying width.

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

1. The combination, with a pair of horizontal rolls, of the guide-box *b*, having its ends cut away, as at *b'*, and the adjustable slotted guides *d*, having the vertical friction-rolls *e*, substantially as and for the purpose specified.

2. The combination, with a pair of horizontal rolls, of the guide-box *b*, the adjustable slotted guides *d*, having the vertical friction-rolls *e*, and the removable slotted liners *c*, substantially as and for the purpose specified.

3. The combination, with a pair of horizontal work-rolls, of a pair of friction-driven guide and edging rolls capable of a lateral adjustment along the horizontal rolls, to change the place of the pass, substantially as and for the purposes described.

In testimony whereof I have hereunto set my hand.

JOHN GEARING.

Witnesses:

WM. E. BRANDON,
T. B. KERR.