

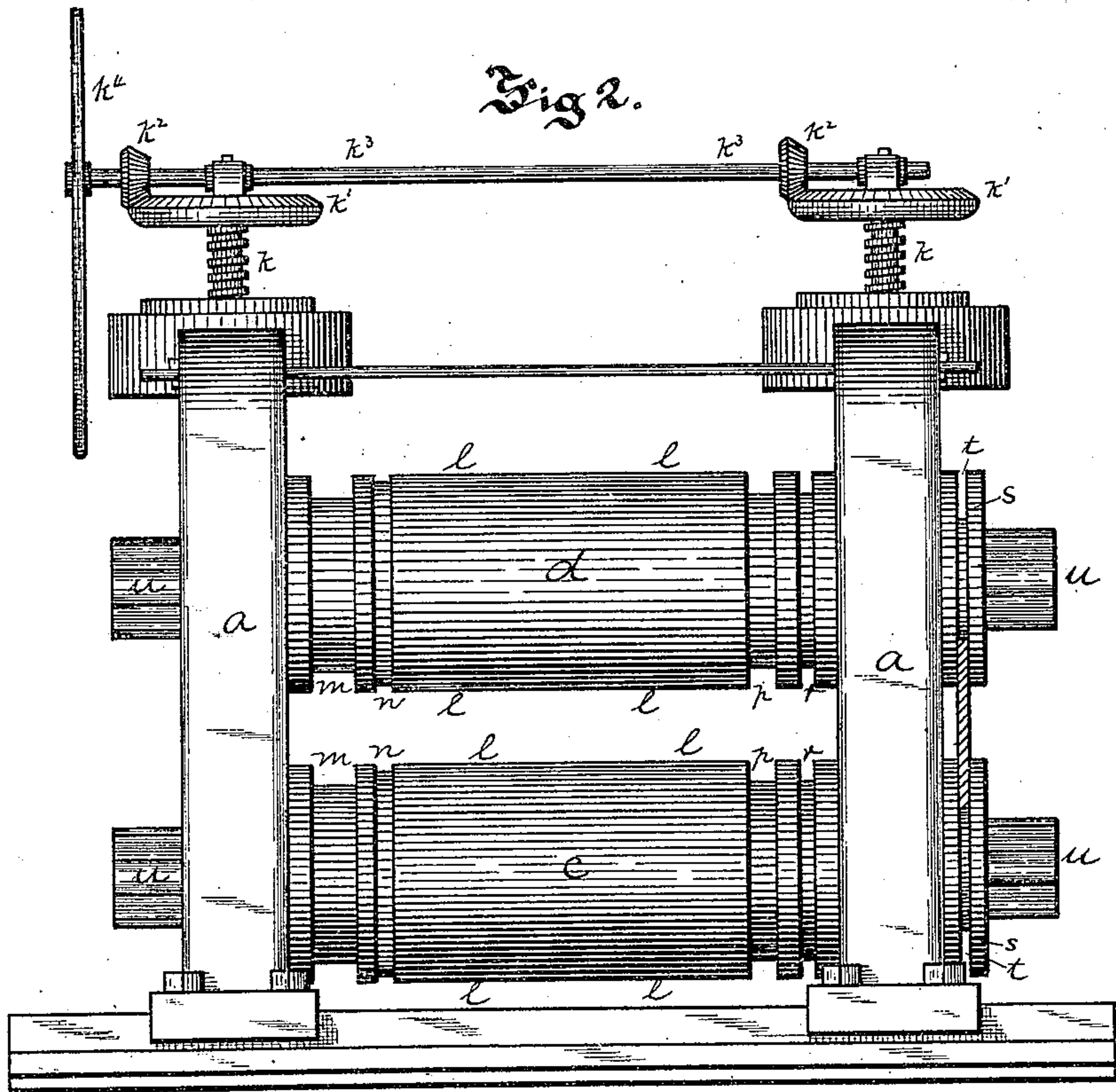
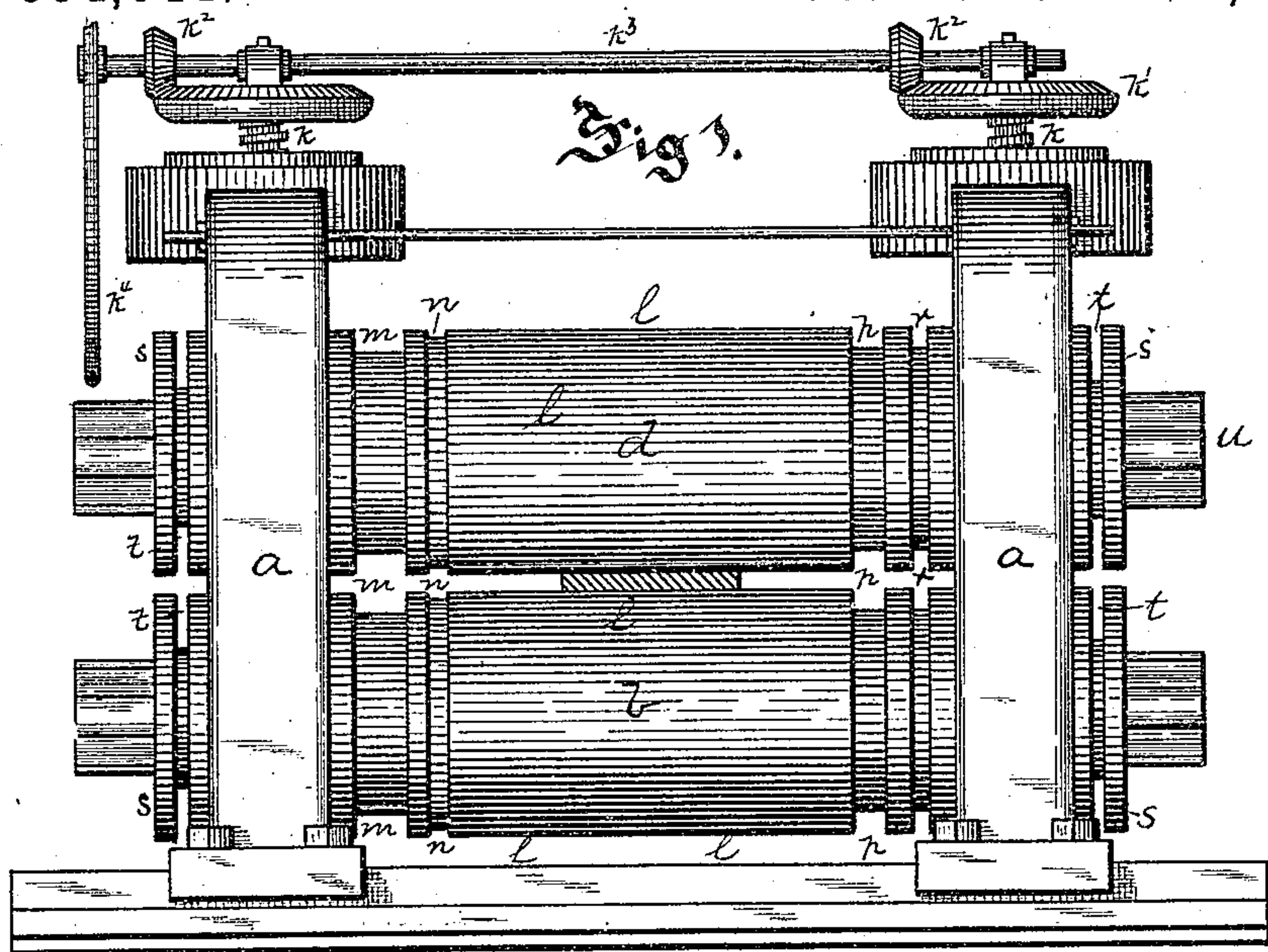
(No Model.)

2 Sheets—Sheet 1.

J. PEDDER.
ROLLING MILL.

No. 334,044.

Patented Jan. 12, 1886.



Witnesses.
Julius
John Cobbett

Inventor.
John Pedder
By James S. Ray
Attorney

(No Model.)

2 Sheets—Sheet 2.

J. PEDDER.
ROLLING MILL.

No. 334,044.

Patented Jan. 12, 1886.

Fig 3.

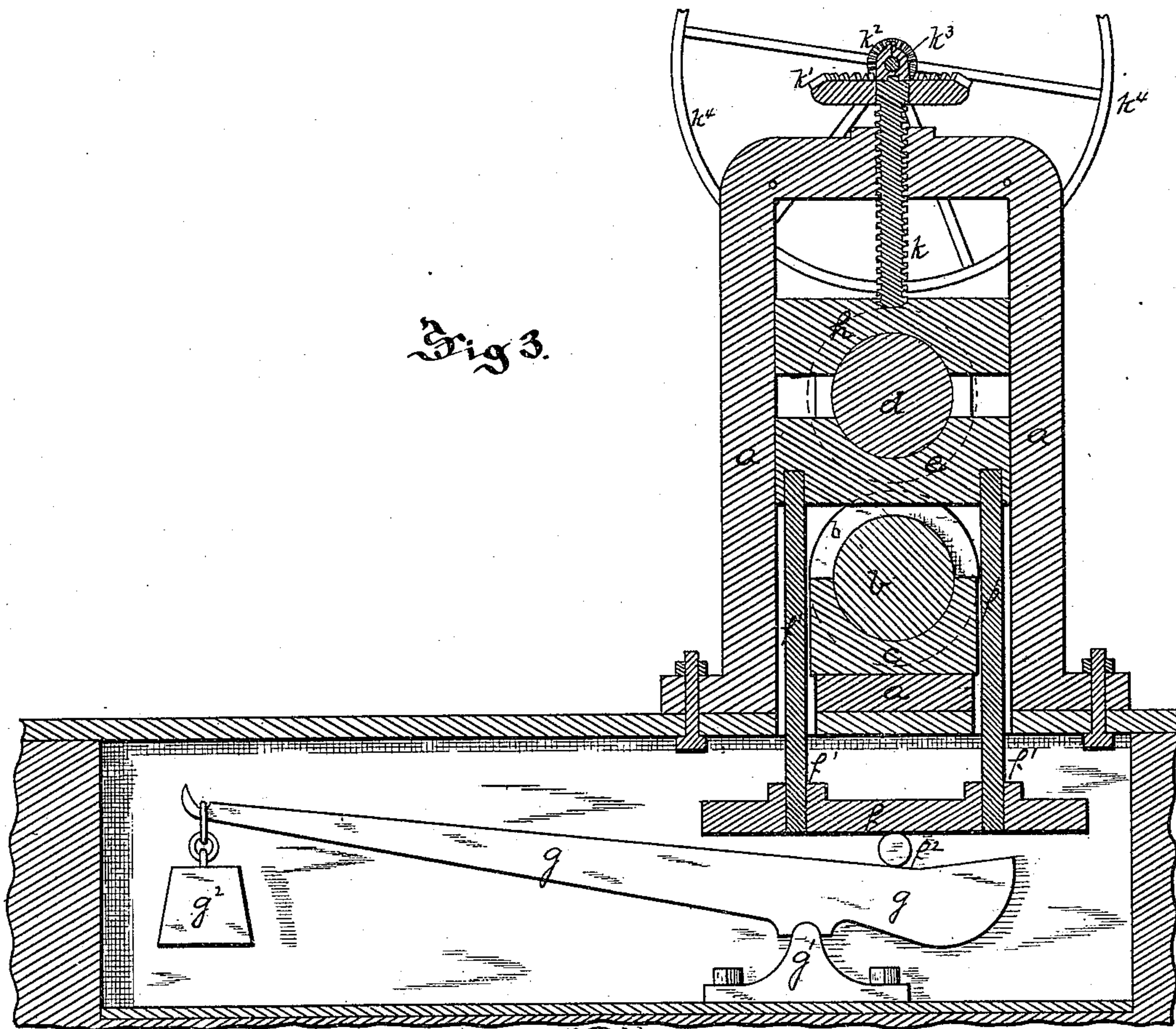
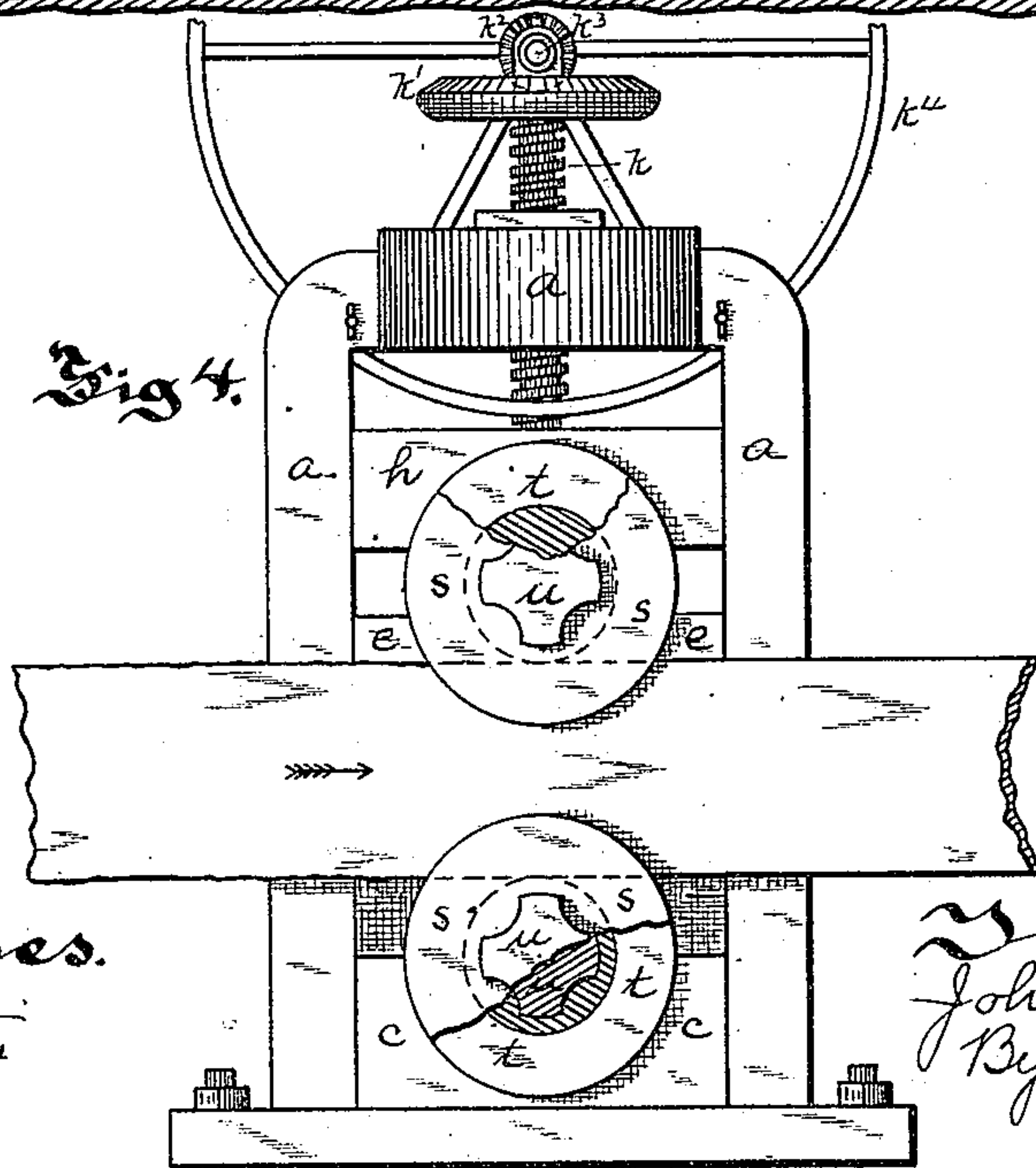


Fig 4.



Witnesses.
J. Cooke
John Cobbett

Inventor.
John Pedder
By James D. Ray
Attorney

UNITED STATES PATENT OFFICE.

JOHN PEDDER, OF PITTSBURG, PENNSYLVANIA.

ROLLING-MILL.

SPECIFICATION forming part of Letters Patent No. 334 044, dated January 12, 1886.

Application filed January 2, 1885. Serial No. 151,747. (No model.)

To all whom it may concern:

Be it known that I, JOHN PEDDER, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Rolls for Rolling Plate Metal; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to rolls for rolling plate metal—such as boiler-plate, nail-plate, skelp-plate, iron-center or iron-back steel, and like plate metal—its object being to provide means for edge-rolling the plates during their reduction, so as to form even edges thereon. The ordinary plate-rolls are plain-faced rolls, one of them being adjustable vertically, so that the pass between them may be varied in reducing the ingot or pile to the required thickness of plate and to widen it as desired, being fed to the rolls in the direction of their length and width, according to the size of the plate.

The means generally employed for adjusting the movable roll are illustrated in Fig. 3, and will hereinafter be described.

Heretofore where it was desired to edge-roll the plate during reduction it was necessary to employ a separate mill at a cost of about two thousand dollars, or to employ a universal mill having vertical edging-rolls, the latter being still more costly, and where a separate mill was employed it required great labor to take the plate thereto to edge-roll it during its reduction, and the plate could not be so rapidly reduced, while on the universal mill it was necessary to employ an ingot or pile the full width to be rolled, as it could not be fed sidewise thereto, and as the edges were rolled by plain-faced rolls, and were not confined on the sides, they were liable to open and be imperfect. For these reasons these plates have generally been reduced without edge-rolling, the edges being left rough and uneven, and the rough edges subsequently sheared off, causing large loss of metal. By my invention I am enabled to edge-roll this plate metal to any width desired in the plate-rolls in which it is reduced to the required thickness, the combined plate and edging rolls being made at but a slight cost over the ordinary plate-rolls. This I accomplish by providing the adjusta-

ble plate-rolls with edging-grooves at one or both sides of the flat face employed for reducing the ingot, bloom, or pile to the required width and thickness, so that the rolls may be parted to arrange the pass in the edging-grooves according to the desired width, and the ingot pile or plate edge-rolled in the same rolls, thus overcoming the necessity of taking it to another set of rolls, and enabling the roller to reduce it much more rapidly, and at the same time enabling him to hold it to the proper shape during rolling, while all the metal heretofore sheared from the side edges is saved, and the finished plate has true and even edges. I have also provided the rolls with collars outside of their housings, in which these edging-grooves are formed, and am thus enabled to form deep edging-grooves capable of edge-rolling wide sheets without weakening the body of the rolls, where they are subject to heavy strain in reducing the plate, and without requiring great vertical adjustment of the rolls.

My invention is fully illustrated in the drawings, in which Figure 1 is a side view of a two-high mill, illustrating the flat-rolling of the plate to reduce it in thickness and bring it to the required width. Fig. 2 is a like view illustrating the edge-rolling of the plate. Fig. 3 is a vertical section through one housing, and Fig. 4 is an end view further illustrating the outside edging-grooves.

Like letters of reference indicate like parts in each.

The mill illustrated is a two-high mill, this being the simplest form, though my invention may also be employed in a three-high mill. The housings *a* are of the usual construction for an adjustable plate-mill, the lower roll, *b*, being supported on boxes *c*, resting within the housing, and the upper roll, *d*, being supported on vertically-adjustable boxes *e*, which fit in guides within the housings, the means of adjusting the upper roll illustrated being as follows: Below the boxes *c* are the blocks *f*, which are secured to the boxes *e* by bolts *f'*, and extending under the blocks *f* are the steel-yards or levers *g*, which rest on fulcrums *g'*, and are provided with weights *g''*, the steel-yards and weights being located in pits under

the working-floor. Anti-friction rollers f^2 are placed between the blocks f and the steel-yards. Above the necks of the upper rolls, mounted in guides within the housings, are the boxes h , and extending through the tops of the housings are the adjusting-screws k , having the bevel-gears k' at the upper end thereof gearing with the bevel-pinions k^2 on the rod k^3 , journaled in bearings loosely mounted on top of the screws k , and turned by the hand-wheel k^4 , the hand-wheel being turned, and thus raising and lowering the screws k , and allowing the upper roll to be raised by the weights g^2 through the steelyards g and frame carrying the boxes e . The rolls have the flat or plain faces l , forming the greater part of the working-faces of the rolls, the ordinary plate-rolls having working-faces about four feet in length, and the flat working-faces of my improved rolls being from thirty-five to forty-four inches in length, according to the number of edging-grooves employed. In the rolls shown there are four edging-grooves within the boxes of the rolls, the grooves m being employed for edging ingots, blooms, and piles, and being about four inches in width, and the grooves n being shallow—for example, one-half inch deep—for edging narrow plates, while the grooves p and r are about one and one-half inch deep, and of different widths for edging plates of different thicknesses. The number and sizes of the grooves employed will of course vary according to the work to be done on the mill, and grooves of different depths are employed to prevent the necessity of too great vertical adjustment of the rolls to arrange them for edging. These grooves cannot, however, be made deep, as they would weaken the rolls, which are subjected to exceedingly severe strain in reducing the plates in flat-rolling to their required thickness, and rolling them to the desired width, any such deep grooves in the portion subjected to such strain rendering the rolls only as strong as the bodies of the rolls at the base of the grooves.

To provide for edge-rolling very wide plates in plate-rolls of the ordinary diameter, I have formed at one end of the rolls beyond the necks the collars s , thus forming one or more edging-passes outside the housings between the necks and the coupling-wabblers u . As it is not necessary to have a greater diameter of metal beyond the necks than that in the wabblers, it is evident that deep grooves may be formed in these collars, and therefore in rolls of ordinary diameter—say eight inches—the grooves t can generally be cut four inches deep. Consequently, when, as usual, the top roll is capable of ten inches vertical adjustment, the grooves t are capable of edge-rolling a plate eighteen inches wide.

The collars s may either be cast with the

rolls or be formed separate and fitted over the coupling-wabblers u , as shown in Fig. 4. 65

My improved rolls may be employed for rolling any width and thickness of plate, the ingot or pile being fed to it either lengthwise or sidewise, and gradually reduced between the flat or working faces l , forming the principal portion of the rolls, to the proper thickness, and, if desired, widened out by the side rolling, the rolls being adjusted to give the proper width of pass for reducing it. 70

When it is desired to edge-roll either the ingot, bloom, or pile, to impart to it even edges, the rolls are drawn apart until the pass m is the proper width and the ingot, bloom, or pile fed edgewise through said pass, and when it is desired to edge-roll the plate while it is sufficiently thick the rolls are properly adjusted and the plate fed edgewise to the proper pass, either n , p , r , or t , according to the width and thickness of the plate, and, if necessary, it is further reduced and planished between the flat faces of the rolls. As the ingot or pile is reduced to plate at the one set of rolls, it can be much more rapidly reduced than where it is necessary to carry it to another set of rolls for edging it, and for this reason, in many cases, the necessity of a second heating of the plate is overcome, as well as a large amount of heavy labor. I also obtain even and true edges on the finished plate, avoiding the necessity of shearing to remove the rough portion formed on sheets rolled in the ordinary manner, and a loss of from five to fifteen per cent. As the edges are rolled in grooves, the liability of the edges splitting and opening, as in universal mills, is overcome, and I have thus formed wide plate having even, true, and firmly-compacted edges in one mill—a result never before accomplished, the mill having been practically tested and in operation for a considerable period. Plates of any width and thickness may be rolled, the rolls being adjusted accordingly, and by the employment of the deep grooves outside the housings I provide means for edge-rolling plates of unusual width without weakening the bodies of the rolls. The deep grooves t outside the housings also enable me to edge-roll plates eight inches in width and upward without so great adjustment of the rolls. 100 105 110

I am aware that previous to my invention fixed rolls have been provided with special passes, according to the work to be done, these passes being horizontal and vertical; but these rolls could not be employed in any manner to obtain the results obtained by my improved plate-rolls, for the reason that the rolls were not adjustable to the different widths or passes necessary to gradually reduce the ingot, bloom, or pile to plate of the different widths and thicknesses necessary in rolling plate metal, nor of edge-rolling a plate of any width so 115 120 125

rolled, and consequently were limited to the rolling of special shape, width, and thickness of plate. These rolls were not provided with the edging-pass outside of the housing herein
5 shown and described.

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

The improved rolling-mill herein described, comprehending in its construction the rolls
10 having plain surfaces for flat and cross rolling

and grooves within the housings, and with other grooves exterior to the housings for edge-rolling, and mechanism for adjusting, as usual, the rolls toward and from each other.

In testimony whereof I, the said JOHN PED- 15
DER, have hereunto set my hand.

JOHN PEDDER.

Witnesses:

JAMES I. KAY,
J. N. COOKE.