

(No Model.)

3 Sheets—Sheet 1.

T. L. BEAMAN.

ROLLS FOR ROLLING GIRDER RAILS.

No. 347,283.

Patented Aug. 10, 1886.

Fig. 1.

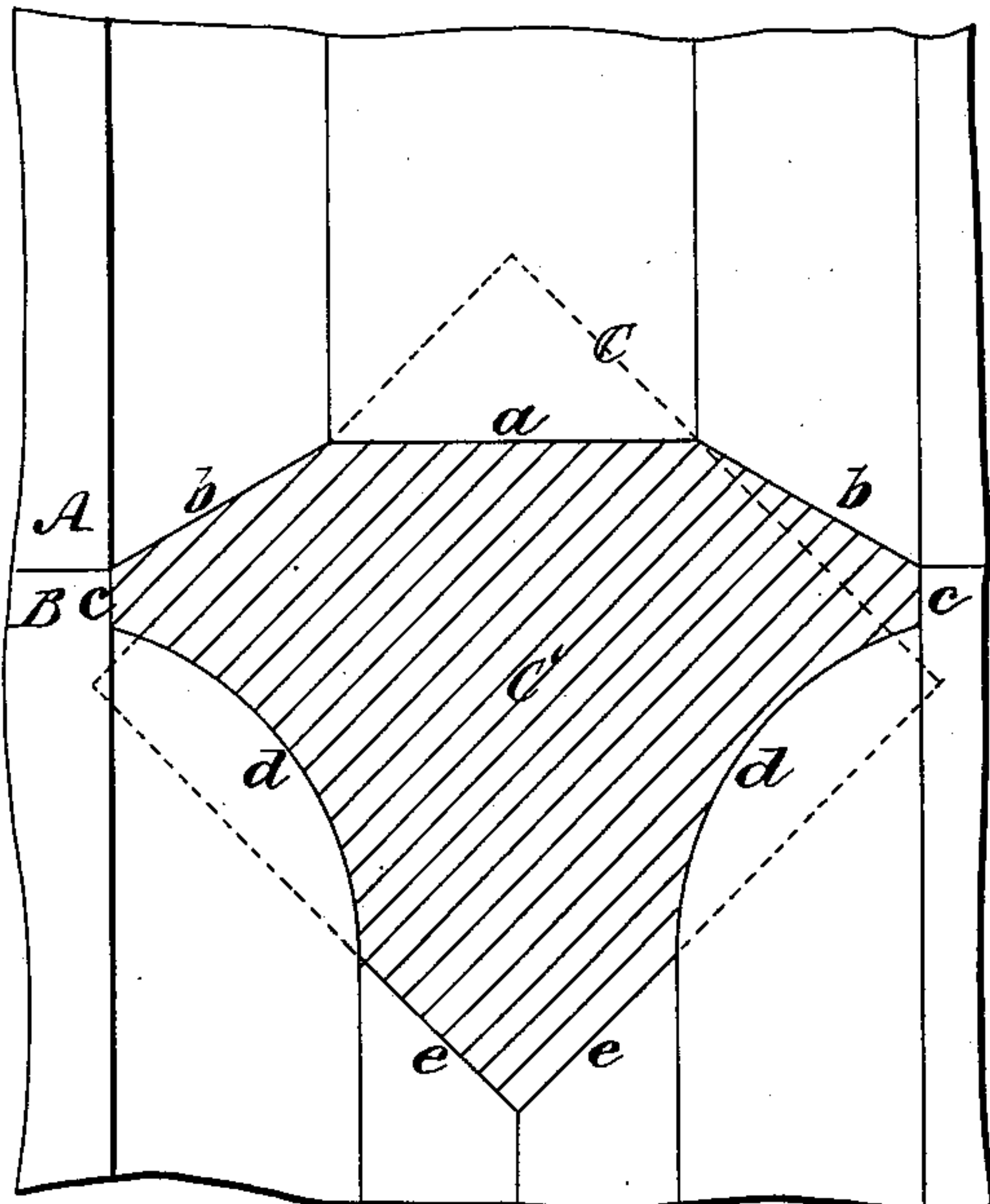


Fig. 2.

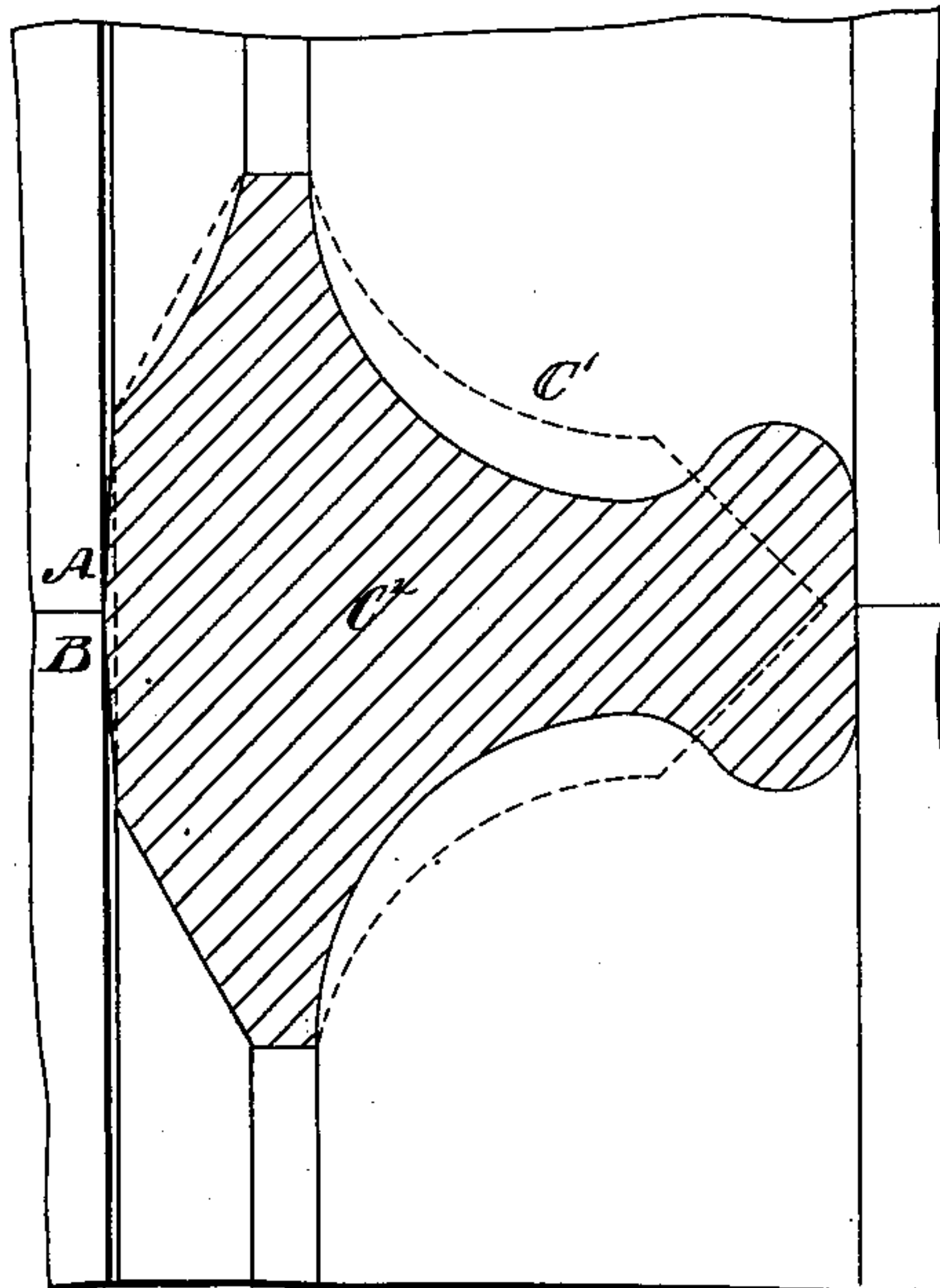


Fig. 3.

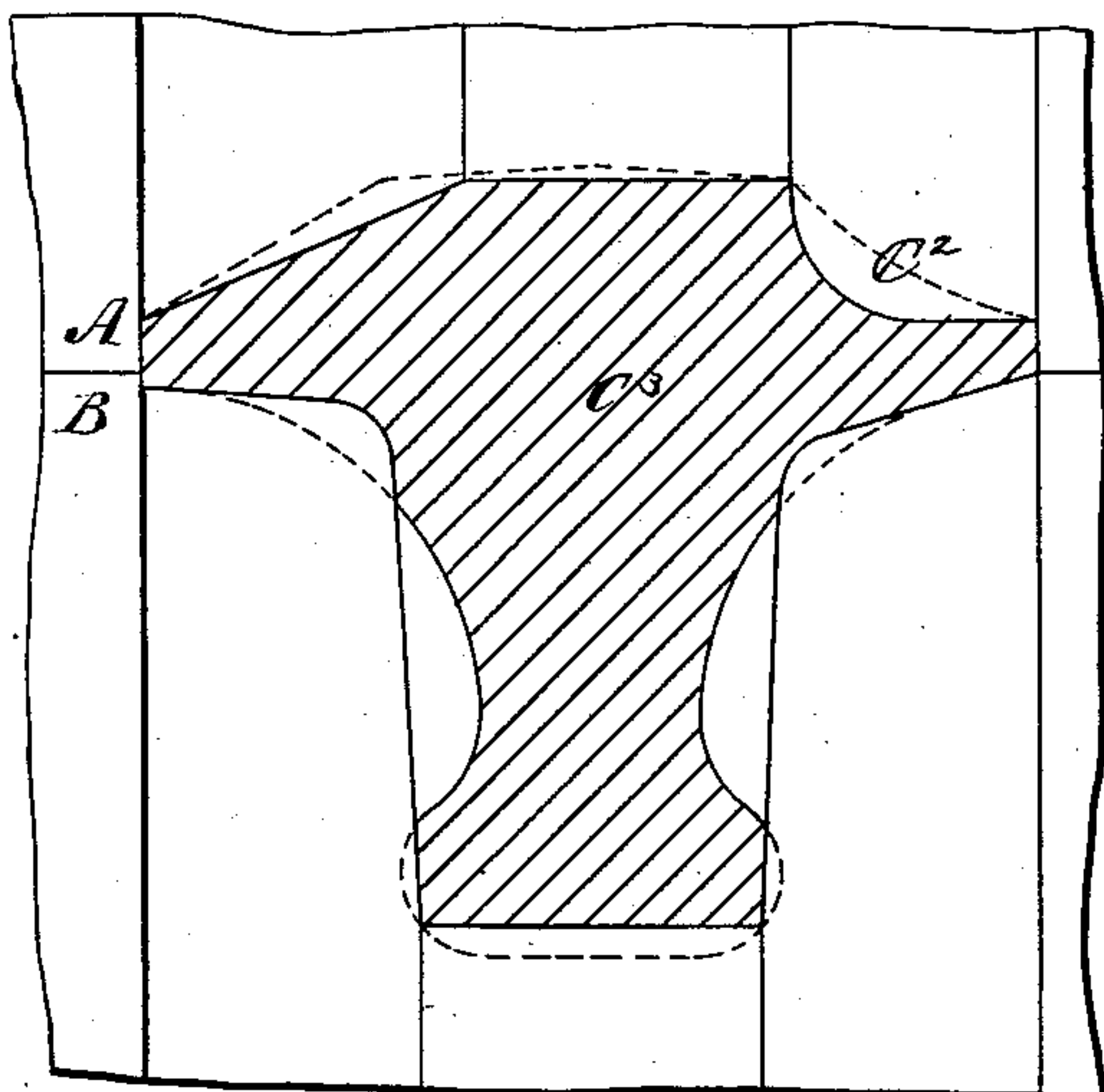
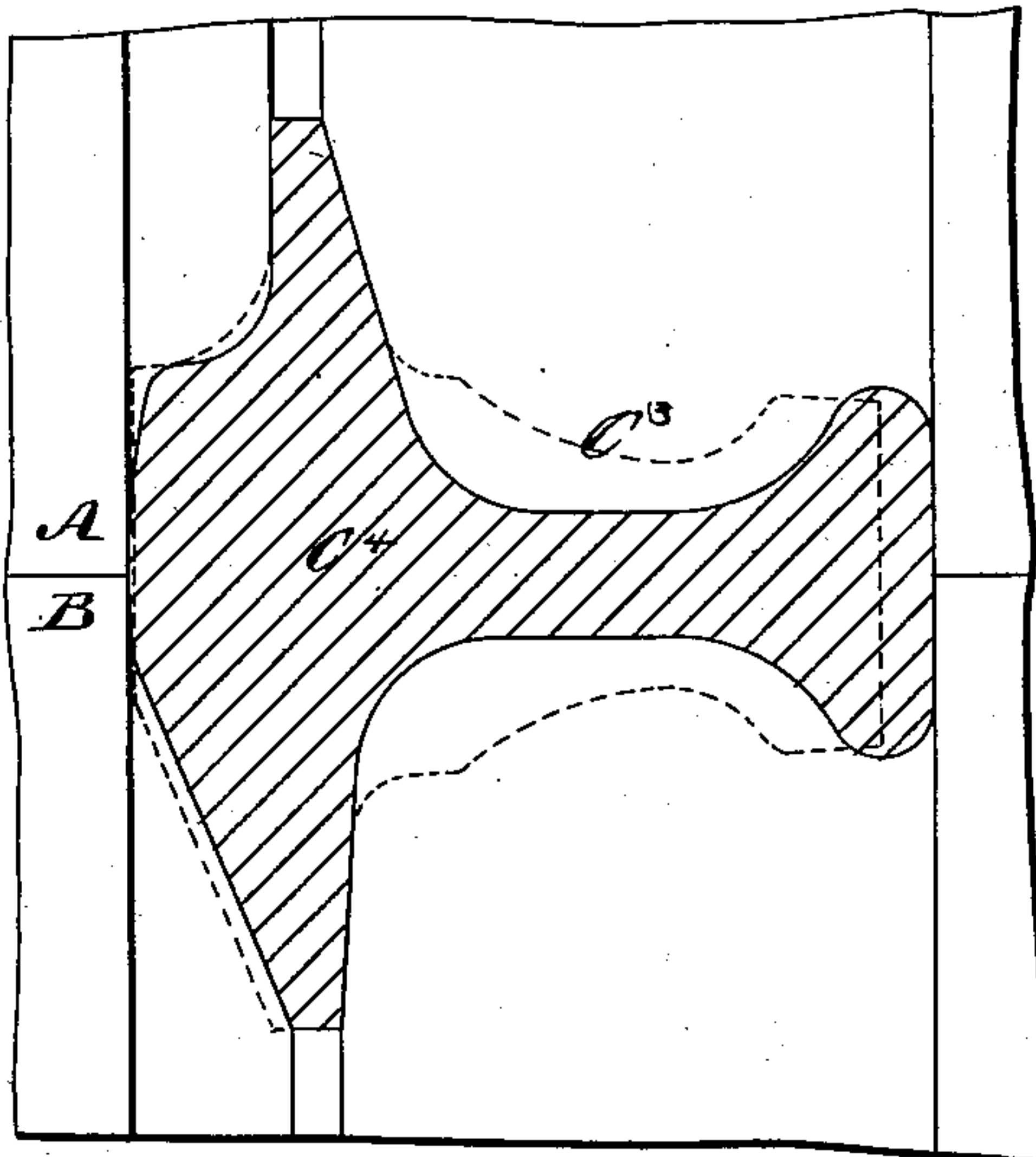


Fig. 4.



WITNESSES:

Leo von Rosenberg
Francis P. Kelly

INVENTOR:

T. L. Beaman
BY *P. R. Tompkins*
ATTORNEY

(No Model.)

3 Sheets—Sheet 2.

T. L. BEAMAN.

ROLLS FOR ROLLING GIRDER RAILS.

No. 347,283.

Patented Aug. 10, 1886.

Fig. 5.

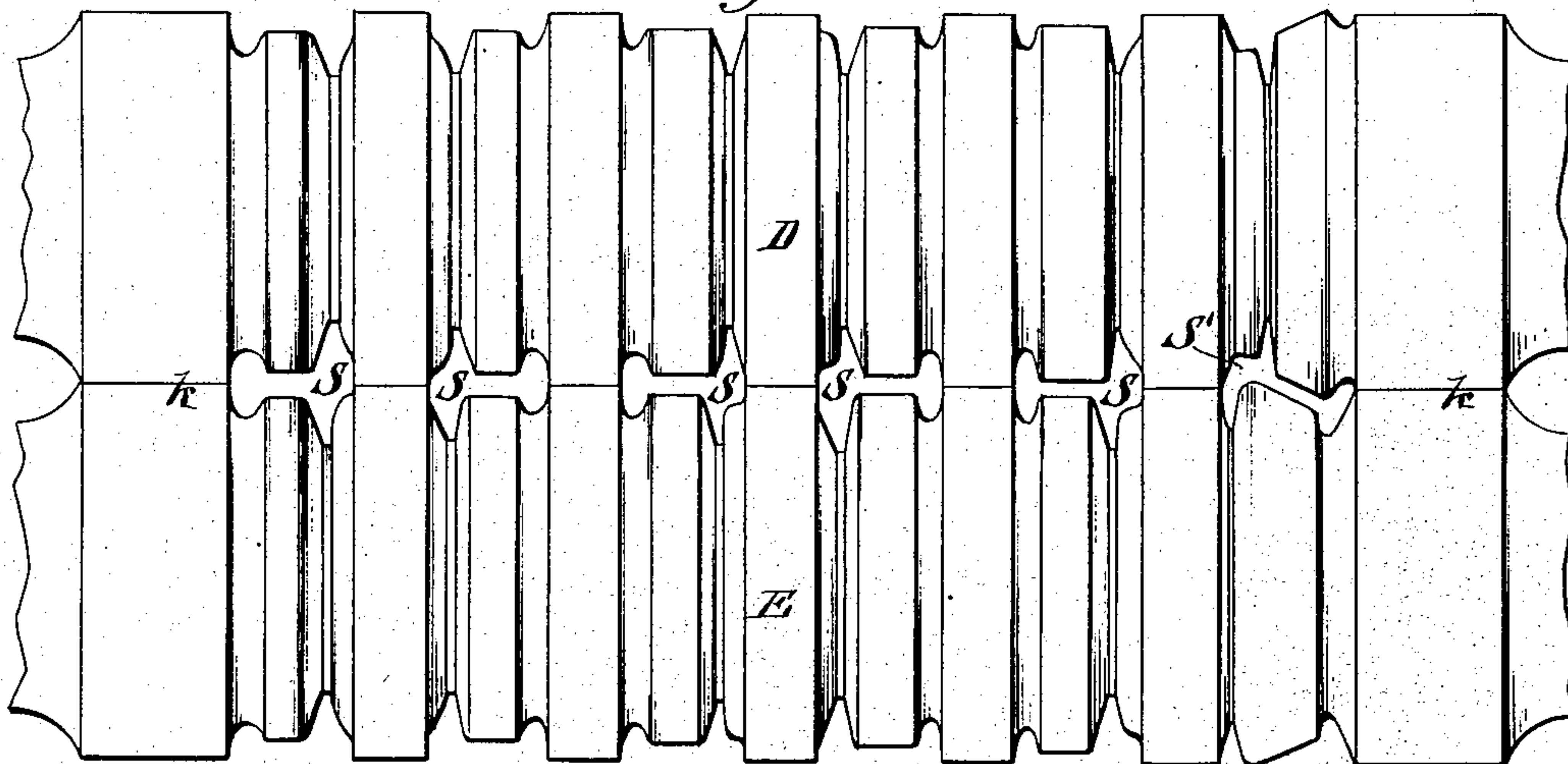
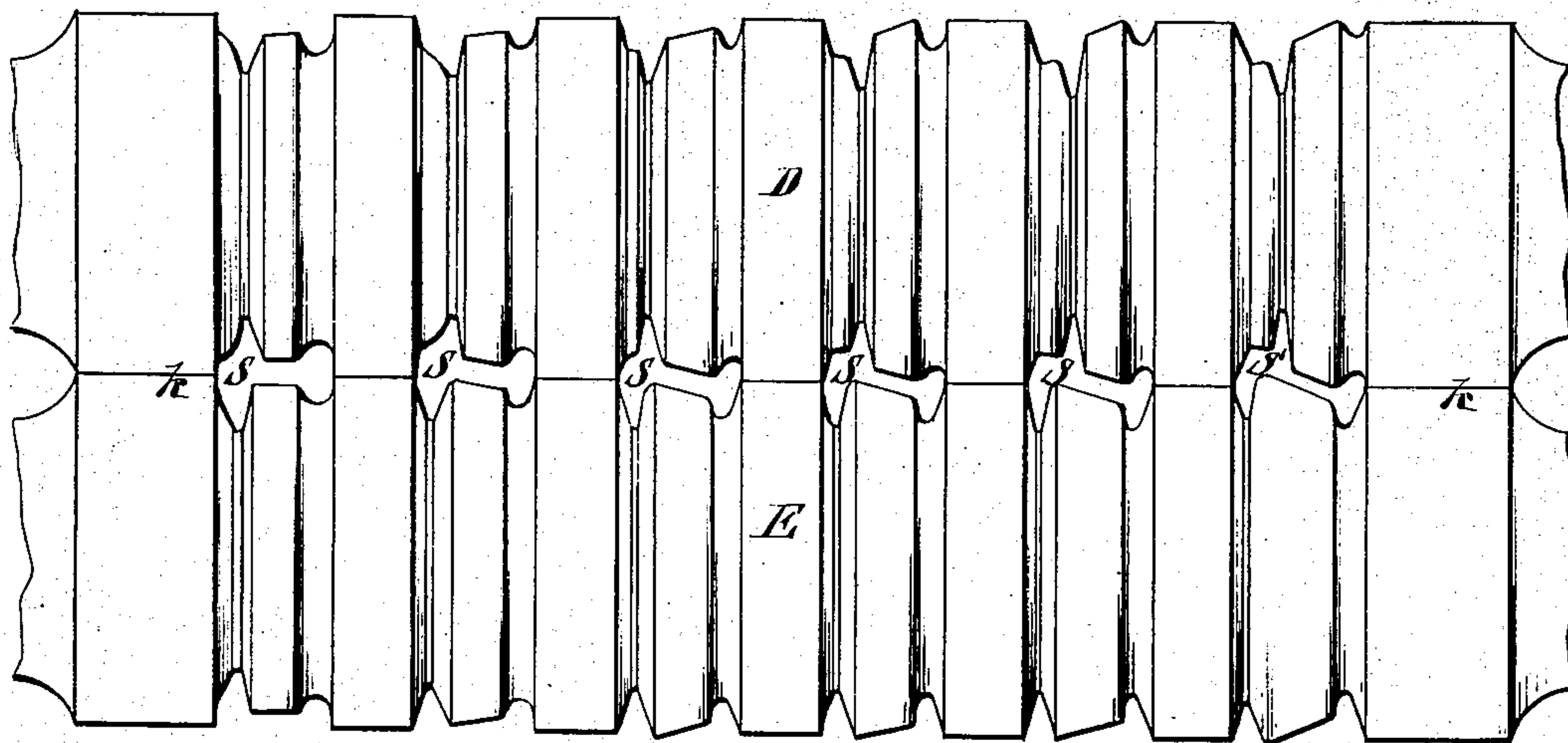


Fig. 6.



WITNESSES:

Leo Van Rosenberg
Francis P. Kelly

INVENTOR:

T. L. Beaman
BY *A. P. Voorhes*

ATTORNEY

(No Model.)

3 Sheets—Sheet 3.

T. L. BEAMAN.

ROLLS FOR ROLLING GIRDER RAILS.

No. 347,283.

Patented Aug. 10, 1886.

Fig. 7.

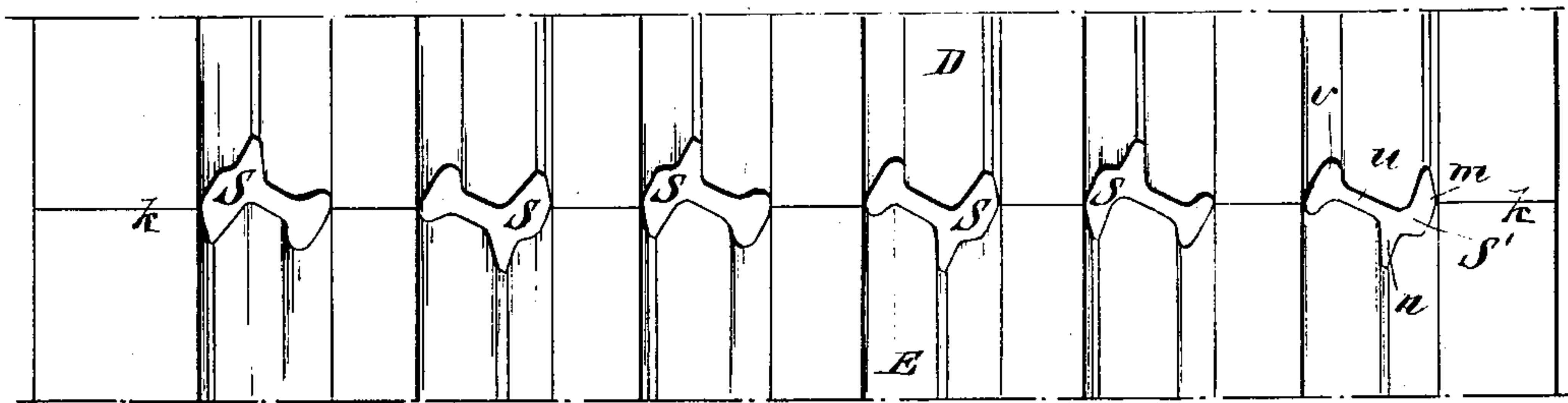
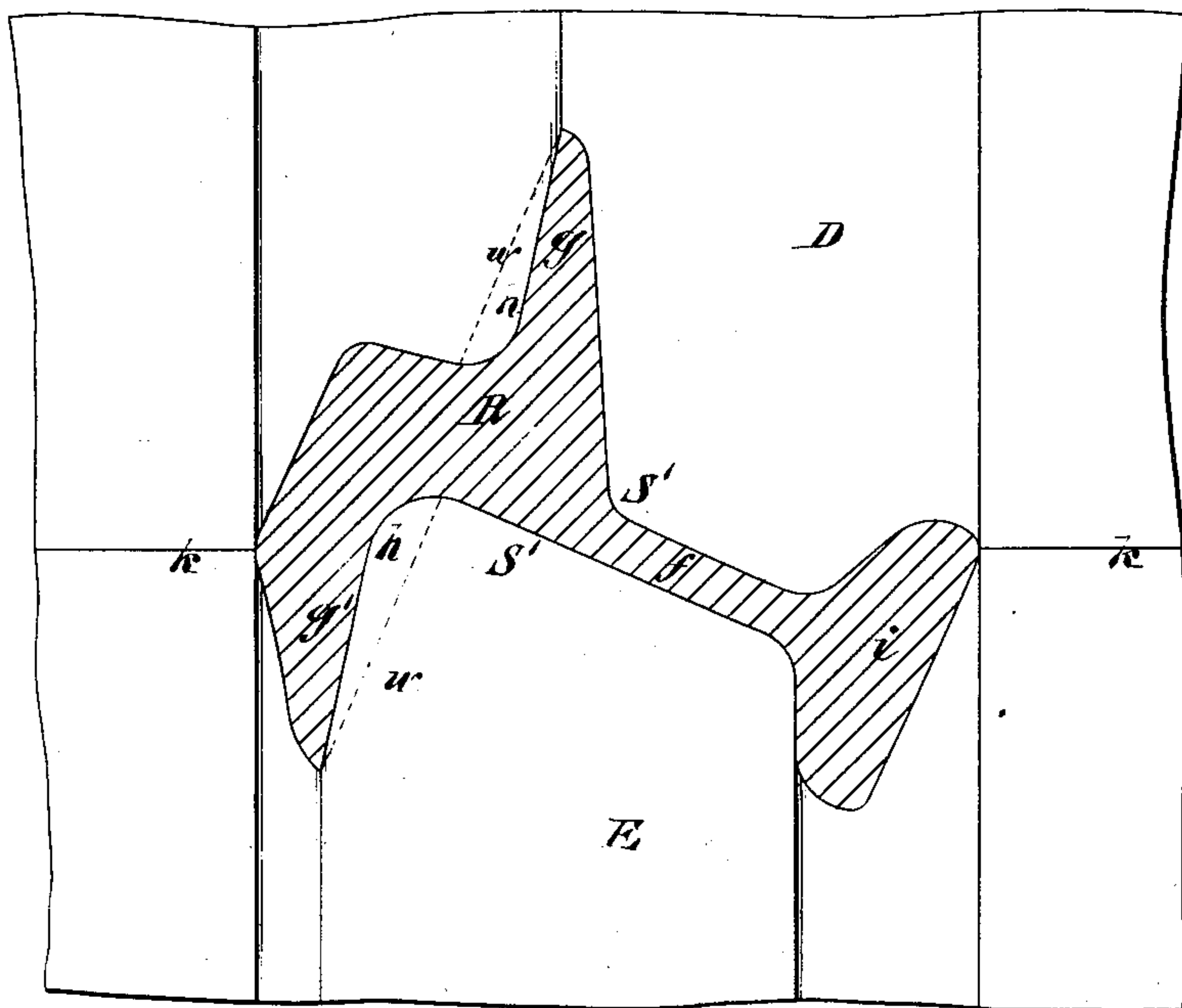


Fig. 8.



WITNESSES:

Leo V. Rosenberg
Francis P. Keilly

INVENTOR:

T. L. Beaman
BY *P. V. Voorhees*
ATTORNEY

UNITED STATES PATENT OFFICE.

TIMOTHY L. BEAMAN, OF KNOXVILLE, TENNESSEE.

ROLLS FOR ROLLING GIRDER-RAILS.

SPECIFICATION forming part of Letters Patent No. 347,263, dated August 10, 1886.

Application filed November 20, 1885. Serial No. 183,398. (No model.)

To all whom it may concern:

Be it known that I, TIMOTHY L. BEAMAN, of Knoxville, in the county of Knox and State of Tennessee, have invented certain new and useful Improvements in Rolls for Rolling Girder-Rails, which invention is fully set forth and illustrated in the following specification and accompanying drawings.

This invention has for its object the rolling of girder-rails; and it consists in a novel construction of the rolls and their passes, or certain of them, whereby the flanges of the rail on opposite sides of its web may be hollowed, substantially as hereinafter described.

The invention also consists in a special configuration of a primary roughing-pass, whereby a less number of subsequent roughing-passes to prepare the bloom or ingot for the finishing-rolls will suffice.

The invention is applicable to girder-rails made of either steel or iron, and it is not restricted to any particular form of foot or to a rail provided with a foot.

A conspicuous feature of the invention is that in the finishing pass or passes it provides for the web of the rail passing at an oblique angle between the rolls relatively to the axes of the rolls and the flanged head or portion of the rail oblique to a plane intersecting the axes of the rolls at right angles.

In the accompanying drawings, Figures 1, 2, 3, and 4 represent side views of different portions or sections of a set of roughing-rolls, showing a series of consecutive passes for breaking down the bloom or ingot into a shape ready for the finishing-rolls. Figs. 5 and 6 are side views of different forms or modifications of the passes in the finishing-rolls, and Fig. 7 a further modification of the same. Fig. 8 is a side view, upon a larger scale, of a portion of the finishing-rolls, showing the final pass and shape of a flanged girder-rail capable of being produced by it.

In said figures the respective parts are indicated by letters as follows:

A B indicate a portion of a pair of roughing-rolls, showing four different passes, as seen in Figs. 1, 2, 3, and 4; but the invention is not restricted to any number of passes, either in said roughing or subsequent finishing rolls, and, so far as the roughing-rolls are concerned, the main or only novelty consists in the shape

of the primary pass (shown in Fig. 1) to break down a bloom or ingot of rectangular form in transverse section introduced diagonally between the rolls, as shown by dotted lines in Fig. 1; but no claim is made to the diagonal introduction of the bloom irrespective of the shape of the primary pass, which is here represented as having a contour formed by a straight line, *a*, parallel with the axes of the rolls, the opposite reverse-sloping side portions, *b b*, straight portions *c c*, transverse to the axes of the rolls, concave portions *d d*, and wedge-shaped portions *e e*. This configuration of the primary roughing-pass shapes the diagonally-introduced square ingot C, Fig. 1, into a bloom, C', of the shape shown in said figure, corresponding to the shape of the primary pass. This shape advances the condition of the bloom or ingot to an extent that it would take several passes to do in the roughing-rolls heretofore used, and by means of this primary pass the number of subsequent roughing-passes may be greatly reduced. Thus the rolled bloom C', as it emerges from the pass shown in Fig. 1, is inserted in the second pass, Fig. 2, and rolled into the form as indicated for it by C². It is then inserted in the third pass, Fig. 3, and its shape made to assume the form shown by C³, after which it is entered in the fourth pass, Fig. 4, and its shape further changed, as marked C⁴. In each of these figures the parts shown by full lines in cross-section show the product as it emerges from the several passes, respectively, consecutively, and the dotted lines the product in the shapes the same is introduced to the passes. The partly-formed rail is then transferred to the finishing-rolls D E, to form the finished girder-rail R, (shown in Fig. 8,) which conforms to the shape of the final pass S' in Figs. 5, 6, and 8, and also under a reversed position in Fig. 7, and in which the web *f* of the rail has side flanges, *g g'*, Fig. 8, the one *g* of which is made to present a hollow, *h*, on its upper side, and the other flange a corresponding hollow space, *h*, on its under side, regardless of the shape of the foot *i* of the rail, which foot might either be of oval or other shape, or be altogether dispensed with by extending the web downward. To make the flange or flanges of the rail thus hollow, instead of presenting straight lines, as shown by dotted lines *w w* in Fig. 8, whereby

metal is saved without sacrificing strength, it is necessary that the finishing-rolls should be constructed differently from the finishing-rolls in ordinary use for making flanged girder-rails. Such difference consists in providing said rolls with passes, and in particular with a final pass, as S' , more or less varied to shape the rail to the form of its flanged head, as may be desired, but so turned in said rolls.

10 The portion of the final pass which receives the web f of the rail shall be at an angle of twenty-five degrees (more or less) to the axes of the rolls, of which k indicates the parting-line, and so that the portion of the pass

15 which receives the flanged portions $g g'$ of the head of the rail shall be at a corresponding angle, or thereabout, to a plane intersecting the axes of the rolls at right angles. This oblique construction of the final pass will

20 cause much more than one-half—say two-thirds—of the rail to lie in the one roll, instead of being equally divided between the two rolls, as in the ordinary construction of rolls for making girder-rails, in which the web portion

25 of the pass is horizontal or parallel with the axes of the rolls, and the portion which receives the flanged head in a plane at right angles to the axes of the rolls. This oblique construction of the final pass, and consequent

30 unequal distribution of metal in the two rolls, facilitates the drawing out of the foot and head flanges of the rail, and by the inclination thus given to the rail a perfectly adequate clearance is secured for the upper side

35 of the flange g , and the under side of the flange g' made to present hollows or recesses $h h$, as shown, instead of being filled in, as indicated by the lines $w w$, Fig. 8, which straight surfaces, in rolls of the ordinary construction,

40 said flanges could only be given. The hollow shown at h in the flange g may sometimes be dispensed with to advantage, as custom in many cases prescribes a flat or straight flange for this portion of the rail.

45 Three different modifications of the finishing-rolls D E are shown in Figs. 5, 6, and 7, and these may either be used separately or collectively; but the final pass S' in each is the same, and of the peculiar construction, as

50 regards inclination, hereinbefore described, and for the purpose or purposes before set forth.

In the set of finishing-rolls shown in Fig. 5 the several preparatory or reducing passes S , from left to right, are all arranged to successively act upon the roughed-out bloom or partly-formed rail on the horizontal—that is,

55 with the web of the rail parallel with the rolls—the rail being reversed or turned half around for each succeeding preparatory pass. This resembles the ordinary mode of proceeding in making girder-rails on a two-high rolling-mill, except that the design of the passes

60

is different. As the rail emerges from the last of these horizontal passes, it is nearly of the shape shown in Fig. 8, but with the flanges $g g'$ filled in, as indicated by the lines $w w$. Upon turning the rail, however, once more half around and passing it through the oblique pass S' it assumes the finished construction shown for it by full and cross lines in Fig. 8.

In Fig. 6 the finishing-rolls D E are only shown with one horizontal or first preparatory pass S to the left, and the other passes S intervening between it and the final pass S' , made gradually and successively inclining to prepare the rail for the final pass S' , of maximum obliquity. In these rolls the respective positions of the rail are not changed in the passes—that is, the rail is not reversed.

In Fig. 7 the finishing-rolls D E have their several preparatory or reducing passes S all set at the same inclination as the final pass S' , and the rail is reversed for each succeeding pass.

The drawings illustrate two-high rolls. These may, if desired, be three-high, as will be quite obvious to those skilled in the art, in which case all reversing or turning over of the rail will be obviated.

The particular construction here shown for the several finishing-passes includes, as indicated for the final pass in Fig. 7, a deep opposite-stepped flange-head portion, $m n$, a web portion, u , and a foot portion, v ; but, as hereinbefore observed, the foot portion may be changed or dispensed with.

Having thus fully described my said improvements, as of my invention I claim—

1. A set of finishing-rolls for rolling girder-rails, provided with a final pass constructed to receive the web of the rail obliquely to the axes of the rolls, and the flanged head of the rail obliquely to a plane intersecting the axes of the rolls at right angles, while subjecting the whole surface of the rail to draft or elongation, substantially as and for the purposes set forth.

2. A set of roughing-rolls, as A B, provided with a primary pass substantially of the conformation shown in Fig. 1, substantially as and for the purposes set forth.

3. A set of rolls for rolling girder-rails, provided with one or more passes constructed to form opposite-stepped flange-head portions $m n$, and a web portion, u , in oblique relation to the axes of the rolls and to planes intersecting the said axes, while subjecting the whole contour of the rail to the draft of the rolls, substantially as and for the purposes set forth.

TIMOTHY L. BEAMAN.

Witnesses:

J. Y. JOHNSTON,
D. E. LOWRY.

It is hereby certified that Letters Patent No. 347,283, granted August 10, 1886, upon the application of Timothy L. Beaman, of Knoxville, Tennessee, was erroneously issued to said Beaman; that said Letters Patent should have been issued to the *Johnson Steel Street Rail Company, of Louisville, Kentucky*, as assignee; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 31st day of August, A. D. 1886.

[SEAL.]

H. L. MULBROW,
Acting Secretary of the Interior.

Countersigned:

R. B. VANCE,
Acting Commissioner of Patents.