

No. 709,958.

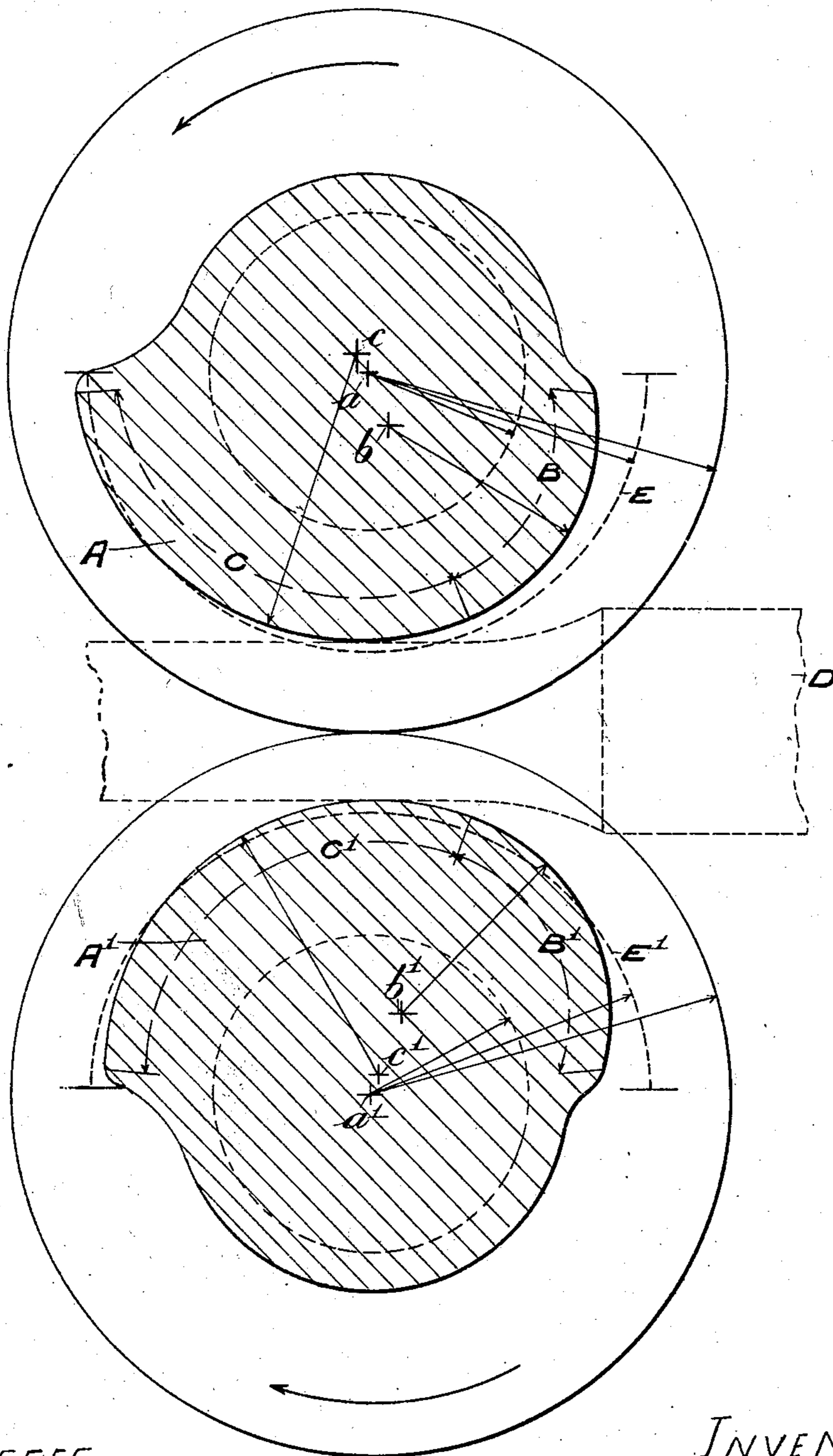
Patented Sept. 30, 1902.

A. E. BECK.

ROLLING METAL TUBES OR OTHER HOLLOW OR SOLID BODIES.

(Application filed Feb. 3, 1902.)

(No Model.)



WITNESSES

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UNITED STATES PATENT OFFICE.

ARTHUR EDWARD BECK, OF EARLSWOOD, ENGLAND, ASSIGNOR TO
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COMPANY.

ROLLING METAL TUBES OR OTHER HOLLOW OR SOLID BODIES.

SPECIFICATION forming part of Letters Patent No. 709,958, dated September 30, 1902.

Application filed February 3, 1902. Serial No. 92,376. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR EDWARD BECK, a subject of the King of Great Britain and Ireland, and a resident of Earlswood House, Earlswood, in the county of Warwick, England, have invented certain new and useful Improvements Relating to the Rolling of Metal Tubes or other Hollow or Solid Bodies, (for which I have filed an application in Great Britain, No. 23,455, bearing date November 19, 1901,) of which the following is a specification.

This invention relates to the rolling of metal tubes and other hollow or solid bodies by the well-known step-by-step process with gapped or pilger rolls, my object being to so construct such rolls as to provide in a simple and convenient manner for the production of tubes or other articles of a uniform cross-section throughout.

My invention comprises the arrangement of a pair of gapped or pilger rolls having their projecting or working parts provided with grooves of an eccentric form throughout in such a manner as to effect the stretching of the metal and to finish the tube or other article to the required uniform cross-section. In carrying my invention into effect I make the gapped or pilger rolls in the usual manner and of the ordinary general shape; but within the projecting or working periphery of the rolls I cut grooves of an eccentric form. The respective grooves are so shaped that when they face each other (during the rotation of the rolls) they first form a gradually-reducing caliber; but during the latter part of the working period they form a uniform caliber. The intermittent feeding of the work through the rolls and its return and partial rotation after the successive backward movements are effected in any ordinary manner.

The illustration on the accompanying sheet represents in sectional elevation a pair of gapped, pilger, or back-action rolls constructed in accordance with my invention.

The centers of the rolls or the centers of rotation are at a and a' , respectively. The working or projecting parts A and A' of the rolls are provided with grooves of an eccentric form throughout. The peripheral por-

tions $B B'$ of the grooves have their centers at $b b'$, respectively, while the peripheral portions $C C'$ have their respective centers at $c c'$. The peripheral portions $B B'$ are of equal curvature; but the portions $C C'$ have varying or differential curvatures with respect to each other. The maximum eccentricity or the maximum radius of the one roll—the under roll in the figure—is at the beginning of the portion C' (or where it adjoins the portion B) of the grooves, whereas the maximum eccentricity or the maximum radius of the top roll is at the end of the corresponding portion C . The two maximum eccentricities never fall together; but during the period of rotation when the portions $C C'$ run together the eccentricity or radii of such portions respectively increase and decrease, and thus as the groove of one roll then moves slightly faster in contact with the work than the groove of the other roll the faster-moving portion has a rubbing or planishing effect upon the work, which improves its finish. The rubbing or planishing effect is due to the fact that the groove in the one roll at a certain period moves slightly faster in contact with the work than the groove of the other roll. Distortion would undoubtedly occur if the work went straight through the rolls, as in ordinary rolling; but the feeding of the work through the rolls is intermittent, and after each backward movement the work is partially rotated. Thus the action of the faster-moving portion is not confined to one side of the work, and in practice a substantially uniform and planished tube or piece of work is obtained.

The work (such as a tube or other article) D is represented by dotted lines. The circular dotted lines $E E'$, which are struck from the respective centers of rotation $a a'$, indicate the eccentricities of the respective working portions of the rolls.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A pair of gapped, pilger, or back-action rolls having eccentrically-grooved projecting or working portions, the eccentricity of one roll being different from that of the companion roll, substantially as set forth.

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2. A pair of gapped, pilger, or back-action
rolls having eccentrically-grooved projecting
or working portions, corresponding portions
of the respective grooves in the two rolls be-
5 ing of the same curvatures and other corre-
sponding portions of different curvatures, sub-
stantially as described.

In witness whereof I have hereunto set my
hand in presence of two witnesses.

ARTHUR EDWARD BECK.

Witnesses:

HERBERT BOWKETT,
AGNES E. LELAND.