

No. 822,880.

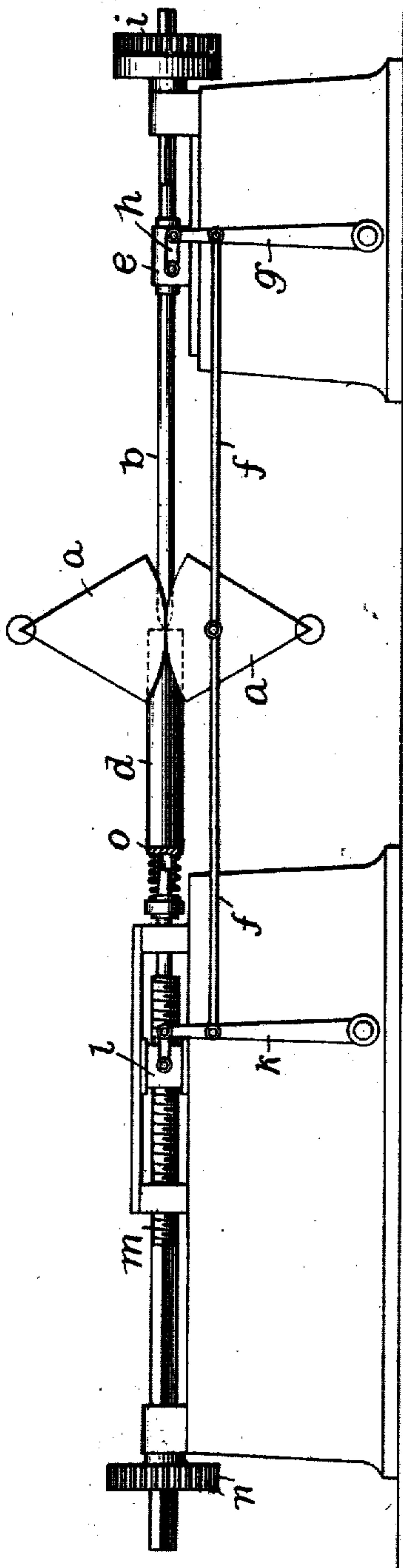
PATENTED JUNE 5, 1906.

O. BRIEDE.

ROLLING MILL FOR ROLLING SEAMLESS METAL TUBES.

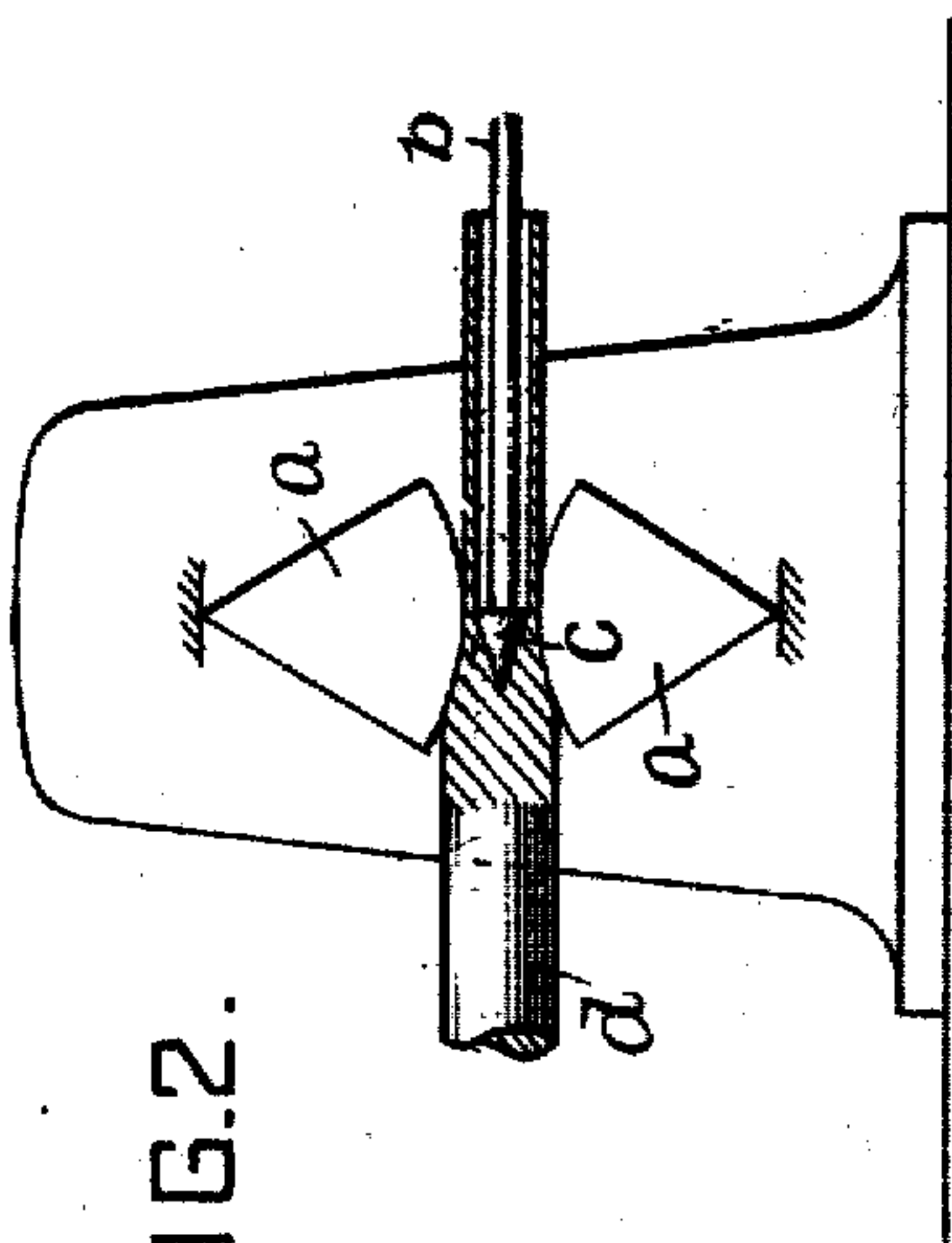
APPLICATION FILED MAY 4, 1903.

FIG.1.



WITNESSES:  
*Herbert Bradley.*  
*Charles Barnito.*

FIG.2.



INVENTOR  
*Otto Briede*  
*by Christy and Christy, Att'y's.*



# UNITED STATES PATENT OFFICE.

OTTO BRIEDE, OF BENRATH, NEAR DUSSELDORF, GERMANY.

## ROLLING-MILL FOR ROLLING SEAMLESS METAL TUBES.

No. 822,880.

Specification of Letters Patent.

Patented June 5, 1906.

Application filed May 4, 1903. Serial No. 155,600.

*To all whom it may concern:*

Be it known that I, OTTO BRIEDE, a subject of the King of Prussia, German Emperor, and a resident of Benrath, near Dusseldorf, in the Province of the Rhine, German Empire, have invented certain new and useful Improvements in Rolling-Mills for Rolling Seamless Metal Tubes, of which the following is an exact specification.

The invention described herein relates to certain improvements in forging-machines, and has for its object a construction and combination of parts whereby a solid or imperforate ingot or billet may be reduced or worked down to a seamless tube.

Heretofore seamless tubes have been made from solid ingots or billets by means of rolls arranged with their axes at an angle to the axis of the billet to be reduced. These rolls caused the outer portions of the billet to flow over a stationary mandrel, which serves to hold back or retard the forward movement of the inner portion of the ingot. This method injures the metal by reason of the combined spiral and forward movement given to the metal.

The object of the invention described herein is to provide for the forward movement of portions of the ingot or billet in straight or approximately straight lines—i. e., without any spiral movement or twisting of the metal—over a relatively stationary mandrel, thereby avoiding any injurious punishment of the metal.

The invention is hereinafter more fully described and claimed.

In the accompanying drawings, forming a part of this specification, Figure 1 is a side elevation of my improved forging-machine, and Fig. 2 is in the nature of a diagrammatic view illustrating the operation of the forging-machine.

In the practice of my invention the dies or swages *a* are provided with conically-shaped grooves and are oscillated back and forth by any suitable form or construction of driving mechanism. On the delivery side of these dies or swages I arrange a holding-bar *b*, provided with a round or conical point or end *c*, which serves as an abutment to prevent the direct forward movement of the inner portions of the ingot or billet. The ingot or billet is fed to the swages step by step by any suitable form or construction of feed mechanism—such, for example, as that shown and described in application Serial No. 155,599, filed

May 4, 1903. This feed mechanism consists of a sliding block *b*, connected to a lever *k*, which is oscillated by the swages through the medium of a rod *f'*. A threaded bar *m* passes through the sliding block and is provided at its inner end with a yielding head *o*, adapted to bear against the end of a billet being operated on. The billet can be supported while being fed to the swages in any manner known in the art. The bar *m* is rotated to move it forward through the sliding block and to rotate the billet by a driven gear-wheel *n*, mounted in a bearing *g* on bed-plate. The bar *m* passes through the gear-wheel and is so locked thereto that the bar will be rotated by the wheel, but is free to move therethrough. As the billet or ingot follows the back-and-forth movements of the dies or swages provision is made in the feed mechanism for permitting or causing such oscillation of the ingot or billet without interfering with the necessary onward feed of the ingot or billet. As a back-and-forward movement of the ingot or billet while the holding-bar is stationary would subject the latter to severe and injurious strains, it is preferred that provision should be made for a back-and-forth movement of the holding-bar synchronous with and equal to the movement of the swaging-dies *a*. This reciprocation of the holding-bar can be effected conveniently by securing it to a sliding block *e*, which is moved back and forth by one of the dies or swages connected by a rod *f* to the lever *g*, said lever being connected to the sliding block by a link *h*. As a rotation of the conical or round head *c* is in some cases desirable, provision is made for the rotation of the holding-bar by so mounting the bar in the sliding block that it can turn therein, but will move back and forth therewith. The holding-bar is rotated by a power-driven wheel *i*, mounted in a bearing on the bed of the slide, and the holding-bar passes through the hub of the wheel and is so connected thereto, as by a spline and groove, that the bar will rotate with the wheel and be free to move back and forth longitudinally therein.

It is characteristic of my improvement that the metal of the ingot or billet is forced forward in straight or approximately straight lines over the head or cone *c*, and although the billet or ingot is rotated to bring all portions under the action of the dies or swages the turning occurs when the billet or ingot is released from the bite of the dies, or practically



so, and hence there will not be any twisting or distortion of the metal.

I claim herein as my invention—

1. In a forging-machine the combination  
5 of oscillatory dies or swages an abutment arranged between the dies or swages in line with the axis of the bars and means for imparting a reciprocatory movement to the  
10 abutment equal to the peripheral movement of the dies or swages and synchronous therewith.

2. In a forging-machine the combination  
of oscillatory dies or swages, mechanism for feeding the billet step by step between the  
15 dies and swages, an abutment arranged between the dies or swages in line with the axis of the bars, and means for imparting a reciprocatory movement to the abutment equal

to the peripheral movement of the dies or swages and synchronous therewith. 20

3. In a forging-machine, the combination of oscillatory dies or swages, a feed mechanism, means for reciprocating the feed mechanism, a holding-bar arranged on the delivery side of the dies or swages and provided with a  
25 shaping-head arranged between the dies or swages, and means for reciprocating the holding-bar synchronously with the dies or swages, substantially as set forth.

In testimony whereof I have signed my  
name to this specification in the presence of  
two subscribing witnesses. 30

OTTO BRIEDE.

Witnesses:

MAX WESCHAR,

WILLIAM ESSENWEIN.