

1,412,261.

Patented Apr. 11, 1922.
2 SHEETS—SHEET 1.

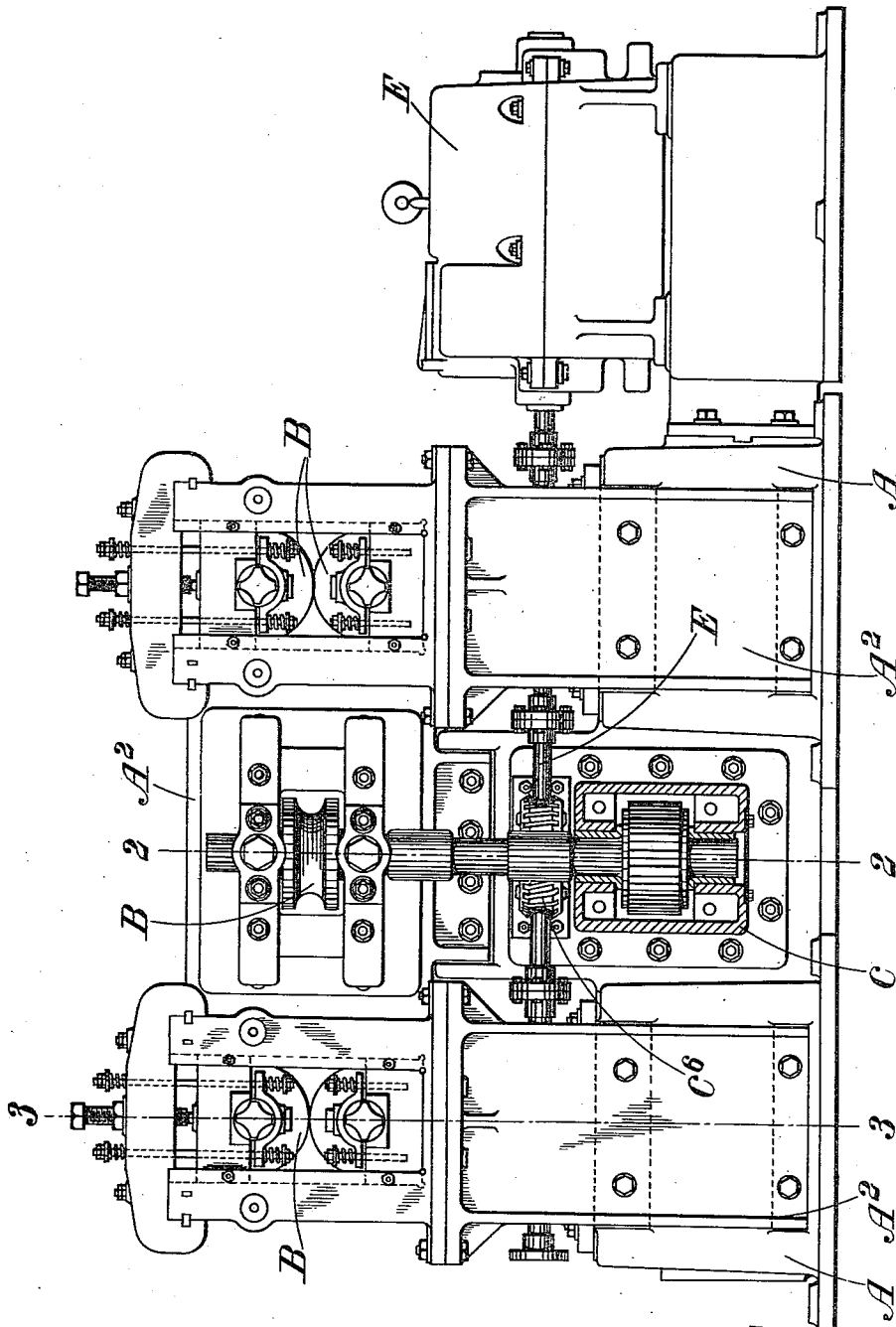


Fig. 1.

INVENTOR:

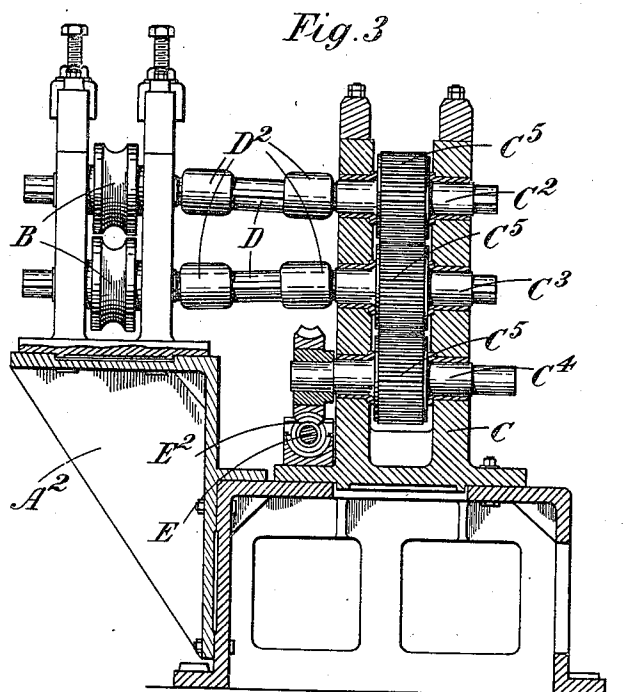
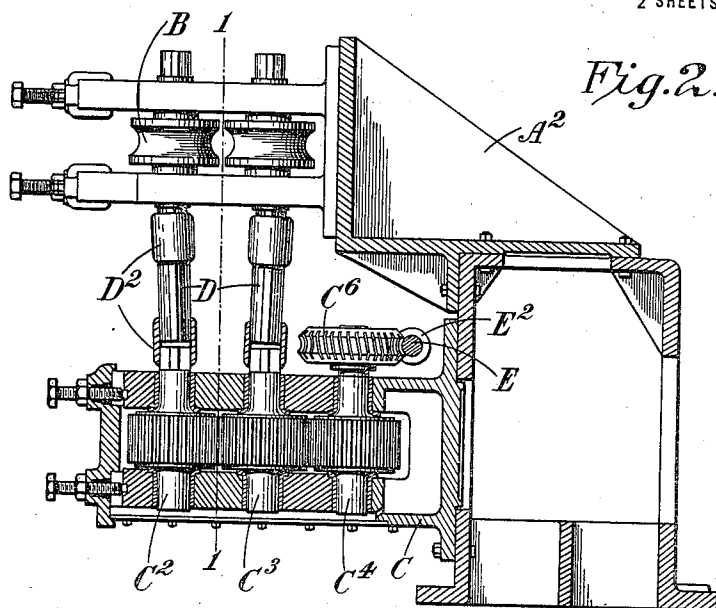
Jacques Reimann.

By
Spear, Middleton, Donaldson & Hall
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

JACQUES REIMANN, OF BIRMINGHAM, ENGLAND, ASSIGNOR TO TUBES LIMITED, OF BIRMINGHAM, ENGLAND.

ROLLING MILL.

1,412,261.

Specification of Letters Patent. Patented Apr. 11, 1922.

Application filed June 2, 1920. Serial No. 386,088.

To all whom it may concern:

Be it known that I, JACQUES REIMANN, a subject of the King of England, residing at Birmingham, in the county of Warwick, England, have invented certain new and useful Improvements in Rolling Mills, (for which I have filed an application in England, No. 135,261, Nov. 15, 1918,) of which the following is a specification.

This invention is for improvements in or relating to rolling-mills for reducing, sizing, finishing or like operations, and has particular reference to the type of rolling mills in which a plurality of rolls are employed in alignment with one another so that the operation of rolling is continuous (i. e., the article to be rolled is passed continuously in one direction through each succeeding roll pass.)

It is the principal object of the present invention to provide a form of rolling mill in which the transmission and reduction gear for both the vertical and the horizontal rolls are alike and are of exceedingly simple form, and to arrange them so that the power unit can be self contained with the mill, thereby to form a compact plant which can be located in any desired position independently of any existing power distributing means, or adjacent machinery.

A further object is so to construct the supports and transmission mechanism of the several rolls that they form units, or groups of units, corresponding parts of which are exactly similar whether for horizontally or vertically disposed rolls thereby to reduce the cost of manufacture and of maintenance. Such a construction, furthermore, permits of readily employing any number of pairs of rolls in alignment, by extending sufficiently the length of the bed, and also permits of placing rolls on both sides of the bed, so that two complete rolling machines may be combined in one having a single main driving shaft common to both with comparatively little extra cost of manufacture or floor space involved.

According to this invention, the bed of the rolling machine is so formed that roll-carrying brackets and gearing housings of similar form can be attached as required on the side or sides, and the top of the said bed, such brackets and housings respectively being of similar construction for each pair of rolls. Thus a machine may be built up with

any required number of rolls disposed either horizontally or vertically, and two machines may be formed with one bed by putting the rolls on each side thereof.

Such a construction provides a compact form of rolling mill, and the arrangement and reduplication of parts is particularly favourable to economy of manufacture and maintenance.

In the accompanying drawings,

Figure 1 is a side elevation of a rolling mill with a part in section on the line 1—1 of Figure 2.

Figure 2 is a transverse section upon the line 2—2 of Figure 1, and

Figure 3 is a transverse section on the line 3—3 of Figure 1.

Like letters indicate like parts throughout the drawings.

The bed A of the rolling mill is of rectangular cross section and supports by means of brackets A² the rolls B. In the construction shown, three pairs of the latter are employed, two with their axes horizontal, and the third situated between them, with their axes vertical, the medial line of the roll apertures being to one side of the bed A. Similar brackets A² are employed in each case, those for the horizontal rolls being secured to the side of the bed A, and that for the vertical rolls to the upper face of the bed. As will be seen by comparison of Figures 2 and 3, the dimensions of the section of the bed A are altered where the vertical rolls are carried, to provide for their alignment with the others, and to carry the transmission gear for them, as will hereinafter be apparent.

The transmission gear for each of the rolls is of unitary form, and comprises a housing C with three shafts C², C³, C⁴ connected to one another by similar spur gears C⁵. The shafts are so disposed that when the housing C is secured to the upper face of the bed A (see Figure 3) the shafts C², C³, can be connected to the horizontal roll-shafts by means of relatively short shafts D provided with universal couplings D² to permit the rolls to be separated or approach each other in the known manner.

For use with the vertical rolls, the housing C has its base bolted to the side of the bed A (see Figure 2) so that it extends horizontally therefrom and its shafts C², C³ occupy the same relative position to the ver-

tical rolls as those in the other housings to the horizontal rolls, and can be similarly connected with them by shafts D with universal couplings D².

5 The shaft C¹ nearest the base of the housing C carries a worm wheel C⁶, which is engaged by a worm E² carried upon a main driving shaft E extending along the bed lengthwise, that is, in a direction parallel to
10 the travel of the articles rolled, and has its axis equally distant from horizontal and vertical planes which meet one another along the medial line through the roll apertures. The housing C, cross sections of the
15 bed A, and the position of the main shaft E, are such that the worm wheels C⁶ occupy the same position relative to the shaft centre, whether the housing C is carried upon the top or side of the bed. Thus it will be seen
20 that construction of the rolling mill is very considerably simplified, inasmuch as each set of rolls, the bracket which supports it, and the transmission gear, are respectively all of identical form, whether the rolls are
25 set horizontally or vertically.

The employment of universal couplings D² which can be slid endwise on the shafts D provides simple means for disconnecting the latter to change the rolls.

30 The use of a worm drive provides a convenient and compact form of reduction gear, and the employment of a longitudinally disposed main shaft E enables the latter to be conveniently connected to, and operated by
35 an electro-motor F, or other high speed prime motor, carried at, or upon the end part of the bed A, thus making the rolling machine entirely self-contained.

The unitary construction of the rolls and
40 their driving gear permits, with a sufficient extension of the bed for the purpose, the employment of as many additional rolls as may be required to carry out, at one "pass" of the material through them, such operations, or
45 combination of operations, as reducing, sizing, tapering, tagging and finishing, whether in solid or hollow material.

It further enables the rolls or groups of rolls to be duplicated upon the other side of
50 the driving shaft so that two sets of rolls thus constituted side by side take up but little more lateral space than the single set, an arrangement which adds relatively little to the original cost of manufacture and installation
55 of a single set.

What I claim as my invention and desire to secure by Letters Patent of the United States is:—

1. In a continuous rolling mill, a bed, rolls
60 and roll-driving gears carried in housings secured to the side and to the upper surface of said bed to constitute respectively horizontal and vertical rolls arranged with their several roll-apertures in alignment with one
65 another; and a main driving shaft carrying

gears operatively engaging the driving gears of the several rolls, substantially as set forth.

2. In a continuous rolling mill, a bed, rolls carried in housings and supported by
70 angle brackets secured to the side and to the upper surfaces of said bed to constitute respectively horizontal and vertical rolls arranged with their several roll-apertures in alignment with one another, roll-driving
75 gearing operatively connected to said rolls and mounted in housings also secured to the side and to the upper surface of said bed; and a main driving shaft carrying gears operatively engaging the driving gears of the
80 several rolls, substantially as set forth.

3. In a continuous rolling mill, a bed with seating faces formed on its side and upper
85 surface, angle-brackets secured against said seating-faces, rolls in housings secured on said brackets with their roll-apertures in alignment with one another, gearing-housings carrying shafts geared together and operatively connected to the axles of said rolls,
90 said housings being for this purpose secured to seatings formed on the side and upper face of said bed; and a main driving shaft carrying gears engaging operatively gears actuating the shafts carried in the gearing-housings aforesaid, substantially as set
95 forth.

4. In a continuous rolling mill, a bed with seating-faces formed on its side and upper
100 surface, angle-brackets secured against said seating-faces, rolls in housings secured on said brackets with their roll-apertures in alignment with one another, gearing housings carrying three parallelly arranged shafts geared to one another, two of said shafts in each housing aligned with and operatively
105 connected to a pair of rolls, the third shaft carrying a driving gear, seatings for said gearing housings on the side and upper face of the bed aforesaid, a main driving shaft extending lengthwise of the bed and
110 equally distant from horizontal and vertical planes meeting in the centre line of the roll apertures, and gears carried upon said driving shaft engaging the driving gears carried on the third shaft in the gear hous-
115 ing aforesaid, substantially as set forth.

5. In a continuous rolling mill, a bed with seating faces formed alternately on its side and upper faces, angle brackets of like form and size secured against said seating sur-
120 faces, rolls in housings of like form and size secured on said brackets, thereby constituting horizontally and vertically arranged rolls, the aforesaid parts so arranged that the several roll-apertures are in accurate
125 alignment with one another, gearing-housings of like form and size carrying three parallelly arranged shafts geared to one another by similar sized gear wheels, two of said shafts coupled by intermediate shafts
130

carrying universal joints to a pair of rolls, the third shaft carrying a worm wheel, seatings formed on the side and upper face of the bed aforesaid to receive the gearing
5 housings, a main driving shaft extending lengthwise of the bed and located in a position equally distant from a horizontal and from a vertical plane meeting on the centre line of the roll-apertures; and worms of like
10 form and size carried upon said shaft, each

worm engaging a worm wheel on the third shaft of each gearing housing aforesaid, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of 15 two subscribing witnesses.

JACQUES REIMANN.

Witnesses:

M. JOHNSON,
THOS. E. KERSHAW.