No. 638,984. Patented Dec. 12, 1899.

J. H. PALMER & J. H. SHERIDAN.

CONTINUOUS ROLLING MILL.

(Application file Aug. 14, 1899.)

(No Model.) 3 Sheets—Sheet 1.

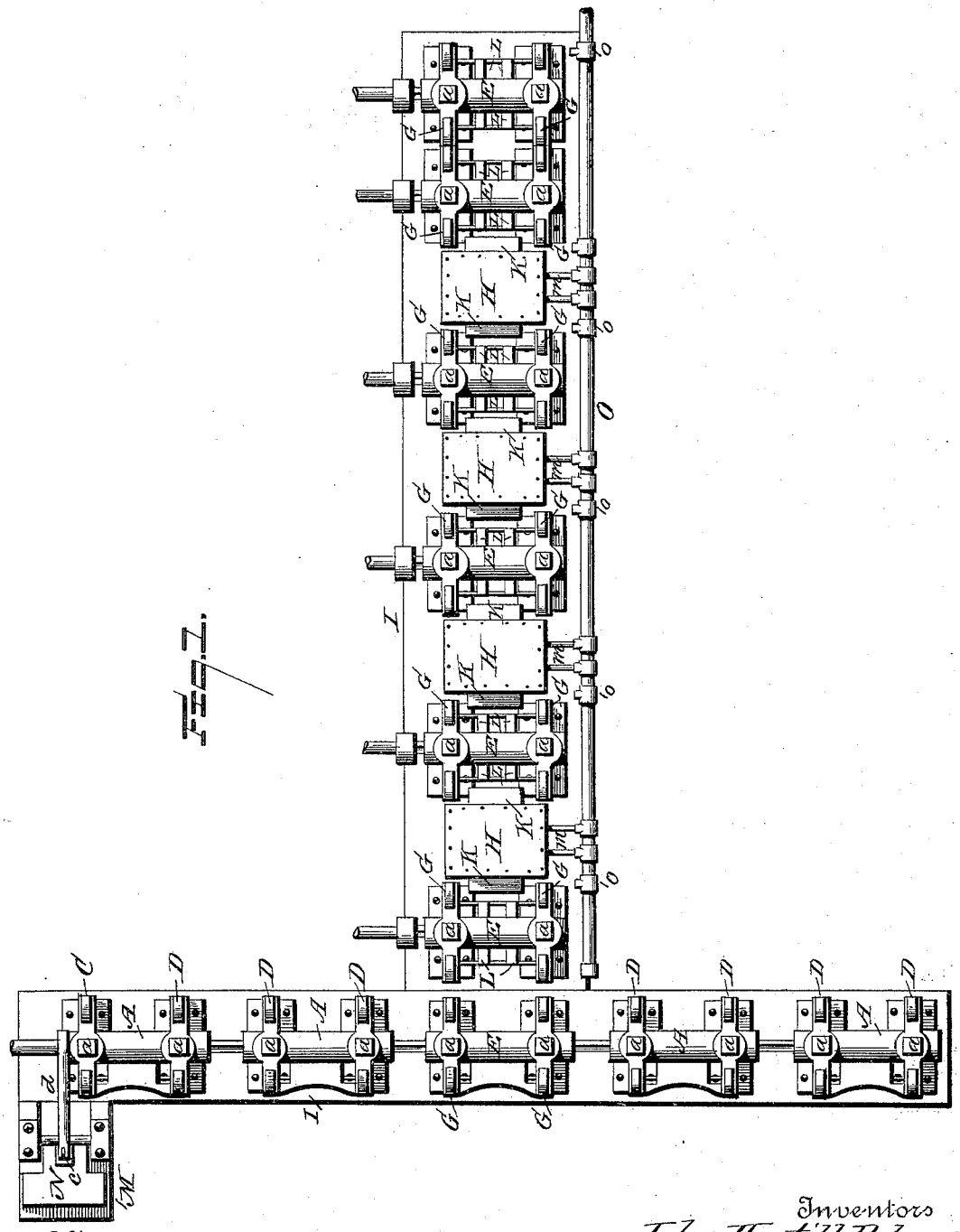


Fig. 1.

Witnesses:
L. C. Hills.
K. H. Butler.

Inventors
John Hartill Palmer.
James Henry Sheridan.
By Chas. H. Fowler.
Attorney

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 638,984. Patented Dec. 12, 1899.

J. H. PALMER & J. H. SHERIDAN.

CONTINUOUS ROLLING MILL.

(No Model.) (Application filed Aug. 14, 1899.) 3 Sheets—Sheet 2.

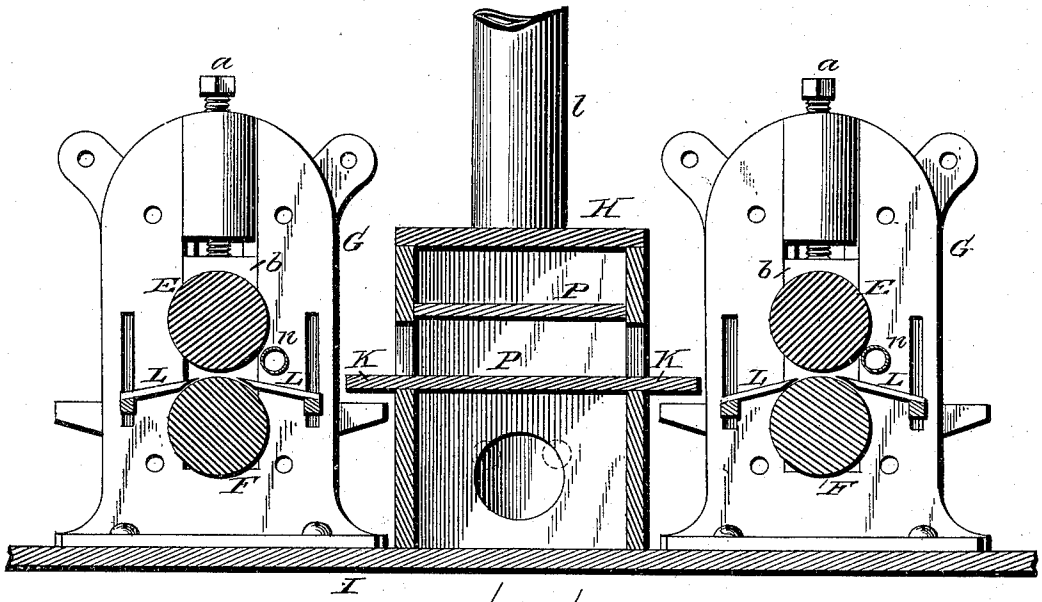


Fig. 2.

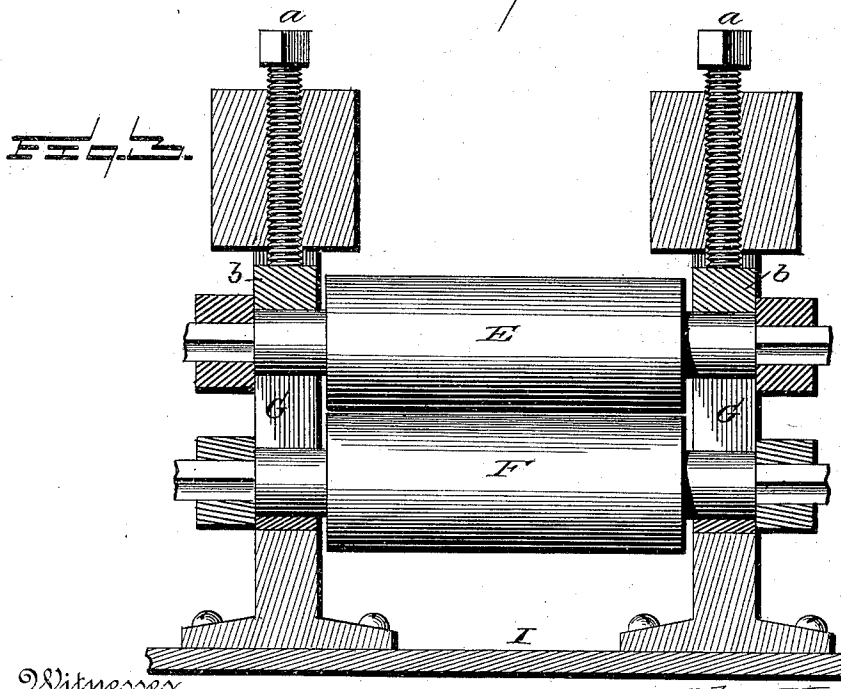


Fig. 3.

Witnesses
L. C. Hills.
K. H. Butler.

Inventors
John Hartill Palmer.
James Henry Sheridan.
By Chas. H. Fowler, Attorney

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 638,984. Patented Dec. 12, 1899.

J. H. PALMER & J. H. SHERIDAN.

CONTINUOUS ROLLING MILL.

(Application filed Aug. 14, 1899.)

(No Model.) 3 Sheets—Sheet 3.

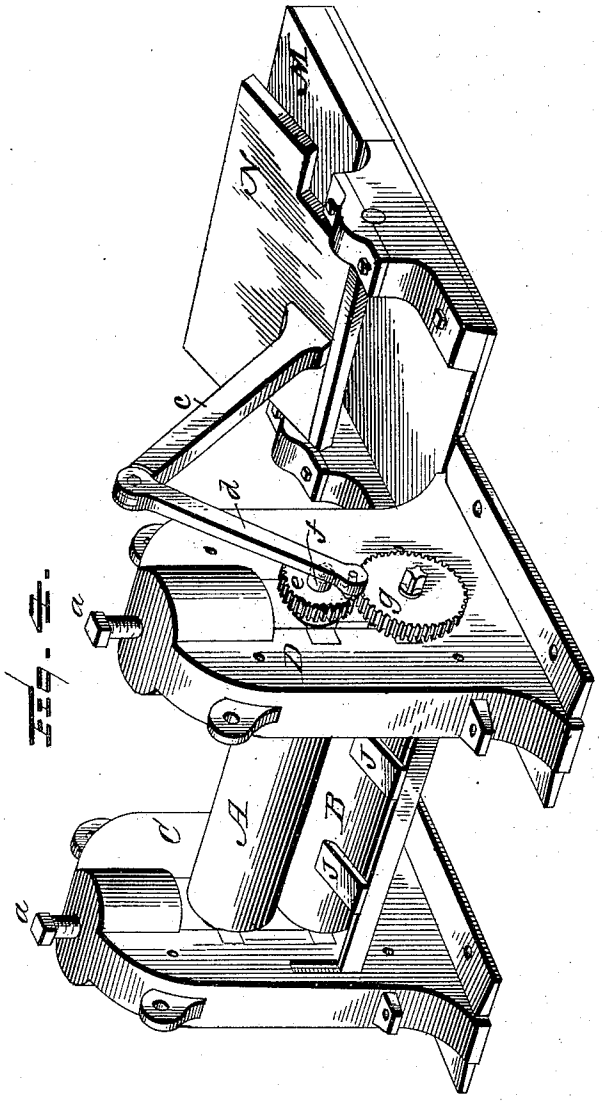


Fig. 4.

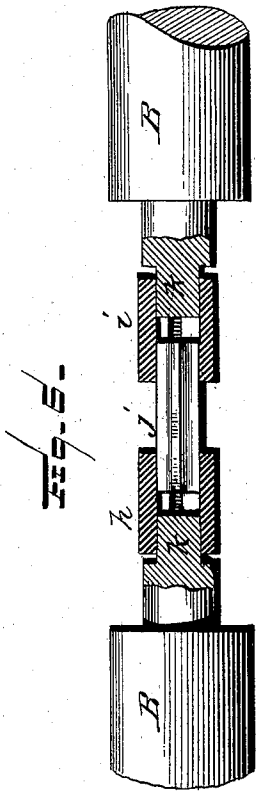


Fig. 5.

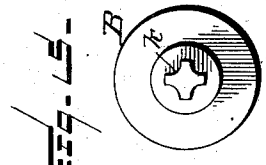


Fig. 6.

Witnesses
L. C. Hills
K. H. Butler.

Inventors
John Hartill Palmer.
James Henry Sheridan.
By Chas. H. Fowler,
Attorney

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JOHN HARTILL PALMER AND JAMES HENRY SHERIDAN, OF WHEELING, WEST VIRGINIA.

CONTINUOUS ROLLING-MILL.

SPECIFICATION forming part of Letters Patent No. 638,984, dated December 12, 1899.

Application filed August 14, 1899. Serial No. 727,153. (No model.)

To all whom it may concern:

Be it known that we, JOHN HARTILL PALMER and JAMES HENRY SHERIDAN, citizens of the United States, residing at Wheeling, in the county of Ohio and State of West Virginia, have invented certain new and useful Improvements in Rolling-Mills; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters of reference marked thereon.

The present invention has relation to that class of rolling-mills in which is employed a series of rolls arranged in pairs or sets in a common line of feed, whereby the metal is reduced by passing between the successive sets of rolls.

It is the purpose of the invention to provide a mill whereby the reduction of the metal is materially facilitated in its progress from between one set of rolls to the other set, thereby materially reducing the cost of manufacture and improving the quality of the finished product.

The invention therefore consists in a metal-rolling mill constructed substantially as shown in the drawings and hereinafter described and claimed.

Figure 1 of the drawings represents a top plan view to show the system or arrangement of roughing-rolls and the finishing-rolls with the furnaces located between the finishing-rolls and their pipe connections; Fig. 2, a longitudinal vertical section, on an enlarged scale, showing the two sets of finishing-rolls and furnace located between the same; Fig. 3, a side elevation, partly in section, showing one pair or set of finishing-rolls with their housings; Fig. 4, a perspective view of one of the sets of roughing-rolls, showing the doubling device connected thereto; Fig. 5, an end view of one of the rolls; Fig. 6, a detail perspective view showing the coupling ends of two of the rolls in section and the coupling boxes and spindle, showing them in the position they will assume when the two rolls are coupled together.

In the accompanying drawings, A B represent the two roughing-rolls, suitably mounted in the housings C D, which may be of any preferred construction, the upper roller A being rendered adjustable in any well-known manner found best adapted to the purpose. We have shown, however, suitable screws *a*, connected to riders *b*, which bear down upon the journal of the rollers as one of many means for adjusting the upper roller to the lower one, the same means of adjustment being applied to the finishing-rollers E F, which rollers are mounted in the housings G. The several housings may be secured to a suitable base I of any preferred construction, or any other desirable means may be provided to form a support for the housings.

The rollers A B are provided with vertically-adjustable guides J for guiding the metal between the rolls, said guides being of any suitable form and construction and may be either adjustable or stationary, as circumstances require. The finishing-rolls E F have similar guides L, and between these rolls are located suitable furnaces H, provided with suitable horizontal guides K, which extend out from the sides of the furnace a sufficient distance to guide the metal between the succeeding pair or set of rolls.

We do not wish to be understood as confining our invention to any special construction of rolls, the means of adjusting the same, or the housings and their connections, as these features of the rolling-mill may be variously modified or changed without departing from the principle or the essential elements of the invention, which will be hereinafter described in detail.

The roughing-rolls A B, which constitute a pair or set, are duplicated, a series of sets or pairs being used and arranged as shown in Fig. 1 of the drawings. Four sets or pairs of these rolls are shown, and upon the outer one of this train of rolls is a doubling device for doubling the sheet of metal after passing through the roughing-rolls. This doubling device consists of the stationary bed-plate M and the presser-plate N, suitably pivoted thereto, said presser-plate having an upwardly-extending arm *c*, to which is pivoted one end of a lever *d*. This lever *d* is eccentrically pivoted to a pinion *e* upon the outer end of the shaft *f* of the roll A, as shown in Fig. 4 of the drawings, said pinion engaging

the teeth of a similar but larger pinion *g* of the lower roll B. The lower roughing-rolls B of the series are disposed on line with each other and are coupled together by the coupling-boxes *h i* and the central spindle *j*. The opening through the boxes is in form to correspond with the form of the short shaft *k* of the roll, as shown in Figs. 5 and 6 of the drawings, the boxes fitting thereon and on the ends of the spindle *j*.

One or more of the furnaces H may have a smoke-stack *l*, as shown in Fig. 2 of the drawings, or any suitable means may be provided for conducting off the smoke from the furnaces.

The furnaces are heated by coal or other fuel, oil, natural or artificial gas, in which latter case a supply-pipe O extends along the line of furnaces and communicates with the source of supply. This supply-pipe O is provided with a series of feed-pipes *m*, which enter the furnaces.

It is necessary to heat the several roughing and finishing rolls just previous to starting the mill, and for this purpose suitable branch pipes *n* may connect with couplings *o* and extend to a position with relation to the rolls as shown in Fig. 2 of the drawings.

The same arrangement of supply-pipe O and branch pipes *n* may be used to heat the roughing-rolls A B, although not shown in the drawings.

The finishing-rolls E F constitute a pair or set, and there may be any number of these sets or pairs arranged in a common line of feed, as shown in Fig. 1 of the drawings, there being no furnace located between the last two sets or pairs of rolls, as the sheet of metal passes from these rolls in a finished condition.

There is an attendant for each pair or set of rolls A B, who takes the metal bars from the pair-furnace and passes them through these roughing-rolls until the required length is obtained for doubling, after which the sheets or plates are removed from the rolls, placed between the bed-plate M and presser-plate N of the doubling device, and then replaced in the finishing-furnace. After the sheets or plates are sufficiently heated they are then taken from the furnace and successively fed to the finishing-rolls E F until the sheets or plates pass from the last set or pair of rolls in a finished condition.

The series of furnaces H, which are located between the sets of rolls E F, are considered of material importance in overcoming the difficulty usually experienced in the process of reducing the metal to a finished product.

The sheet-metal plate after passing from between one set of finishing-rolls passes into and through the furnace H in front thereof and then to the next succeeding pair or set of finishing rolls and to the furnace in front thereof, and so on throughout the train of finishing rolls and furnaces. As the sheet-metal plate passes from between the finishing-rolls and immediately enters the furnace, the sheet is thus prevented from losing its heat until finished, thereby facilitating the reduction of the metal, reducing the cost of manufacture, and improving the quality of the finished product. The guide K is constructed of a sheet-metal plate, which may be of any desirable width and extends through the furnace and beyond the sides thereof to provide the guides for the support of the metal sheet or plates passing from the finishing-rolls into the furnace. This plate, which we will designate as P, forms together a heating plate and guides, thus performing this double function and materially facilitating the passage of the rolled sheets from one set of finishing-rolls to the furnace and from said furnace to the next set or pair of finishing-rolls.

The several pairs or sets of both the roughing and finishing rolls are operated in the usual manner, the pinions *e g* upon the shafts of the roughing-rolls A B of the outer set or pair operating the lever *d* and in turn giving to the presser-plate a continuous rocking motion to double the metal plate or sheet placed under the same.

The employment of the heating-plates P gives a uniform heat to the metal sheet as it passes through the furnace, thereby enabling the sheet to retain the same degree of heat during its passage through the several sets or pairs of finishing-rolls.

Having now fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a rolling-mill, suitable gearing connected to the shafts of the rollers, and a doubling device consisting of a stationary bed-plate, a pivoted presser-plate having an upwardly-extending arm, and a lever pivotally connected to the arm and to the gearing, whereby said doubling device may be operated by the same power that operates the rollers, substantially as and for the purpose set forth.

2. A rolling-mill, comprising a series of roughing-rolls and a series of finishing-rolls arranged in pairs or sets, furnaces located between the sets of finishing-rolls, and a doubling device consisting of a stationary bed-plate and a presser-plate pivoted thereto, said plate having an upwardly-extending arm and a lever pivoted thereto and connecting with the gearing of the roughing-rolls, whereby a rocking motion is imparted to the presser-plate, substantially as and for the purpose described.

In testimony that we claim the above we have hereunto subscribed our names in the presence of two witnesses.

JOHN HARTILL PALMER.
JAMES HENRY SHERIDAN.

Witnesses:
WM. H. DE LACY,
FINIS D. MORRIS.