(No Model.) 2 Sheets—Sheet 1.

# W. WENSTRÖM.

## ROLLING MILL.

No. 254,745. Patented Mar. 7, 1882.

Fig: 1.

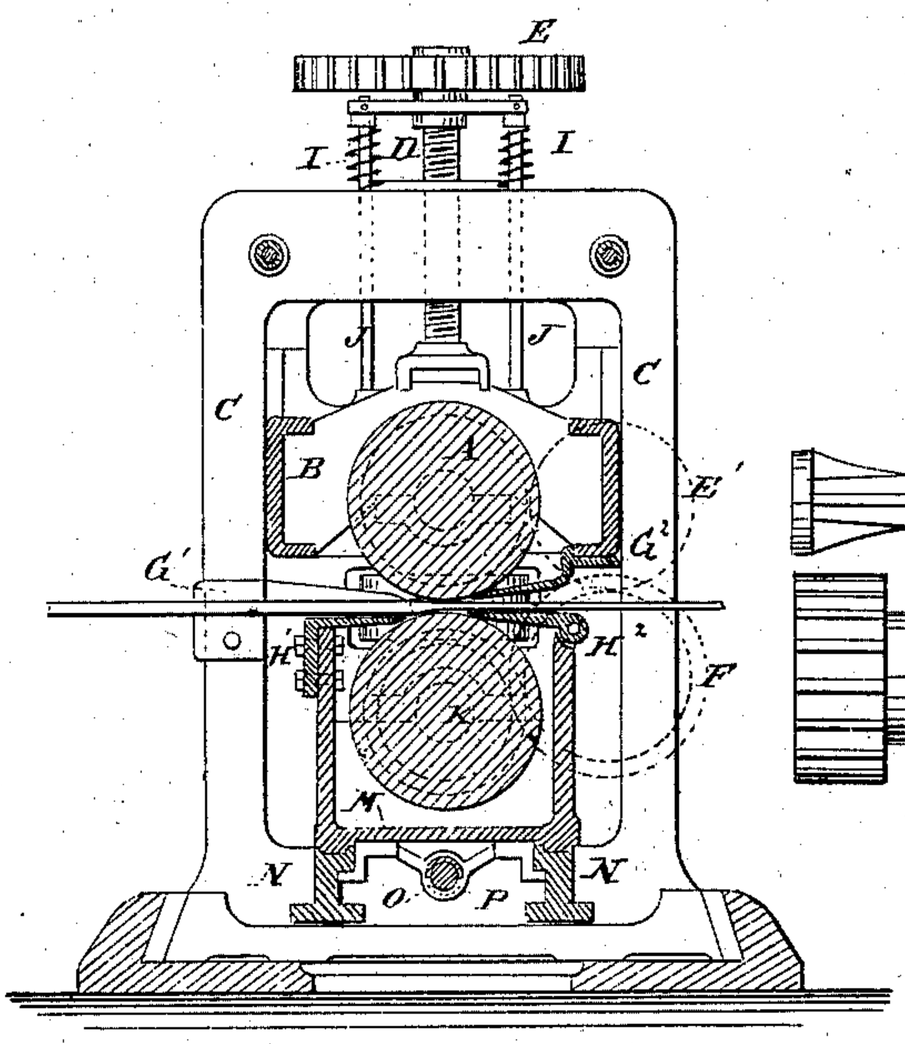



Fig: 2.

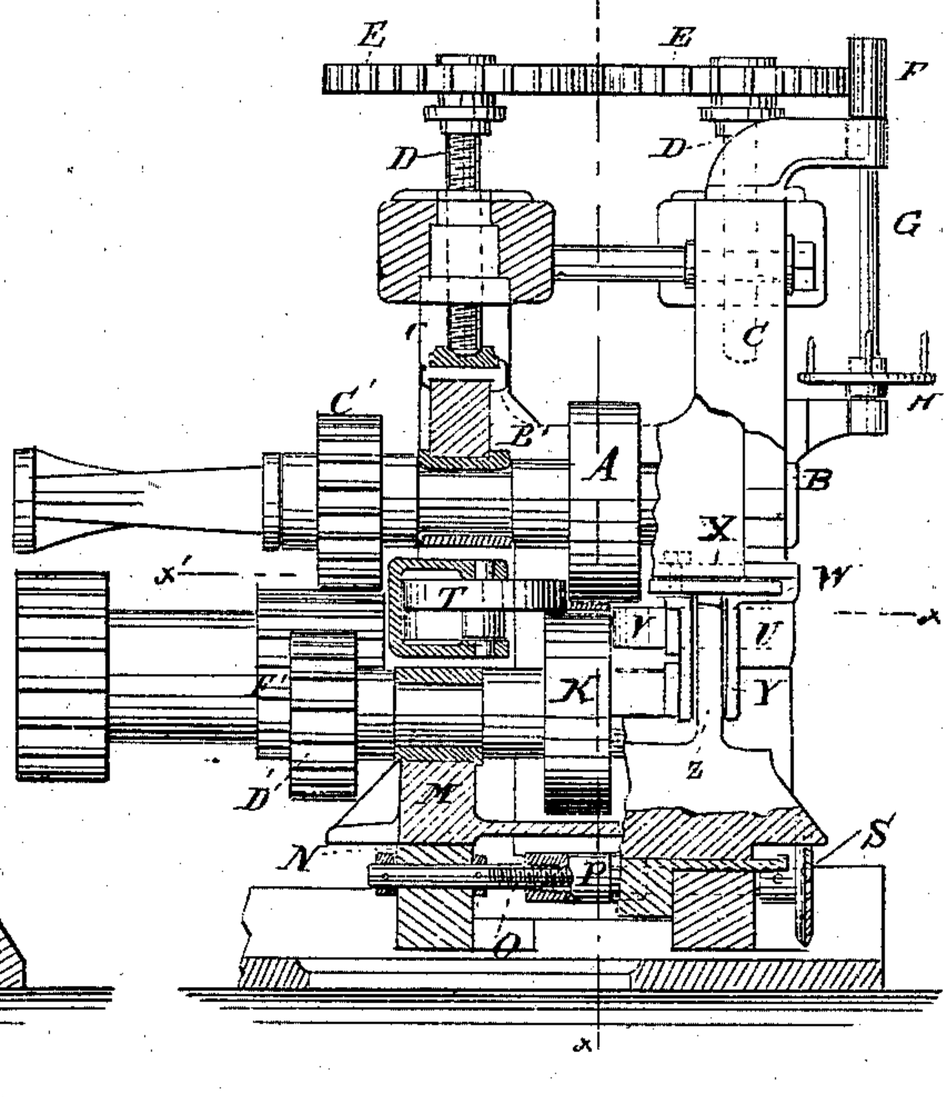



Fig 3.

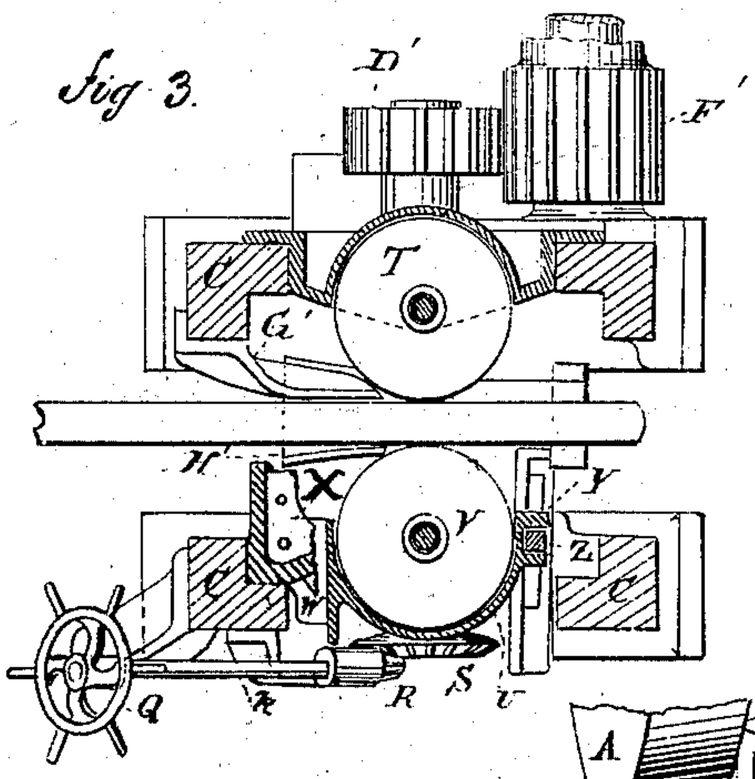
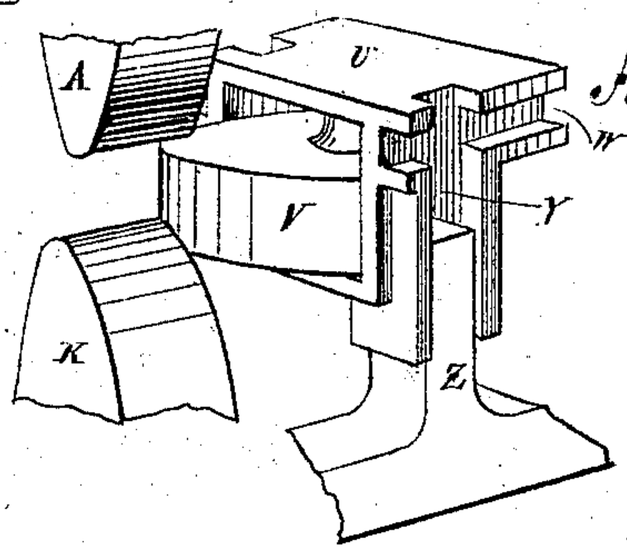



Fig: 6




WITNESSES:

Chas. Neal.

C. Sedgwick

INVENTOR:

W. Wenström

BY Munn & Co

ATTORNEYS.

(No Model.) 2 Sheets—Sheet 2.

# W. WENSTRÖM.

## ROLLING MILL.

No. 254,745. Patented Mar. 7, 1882.

Fig. 4.

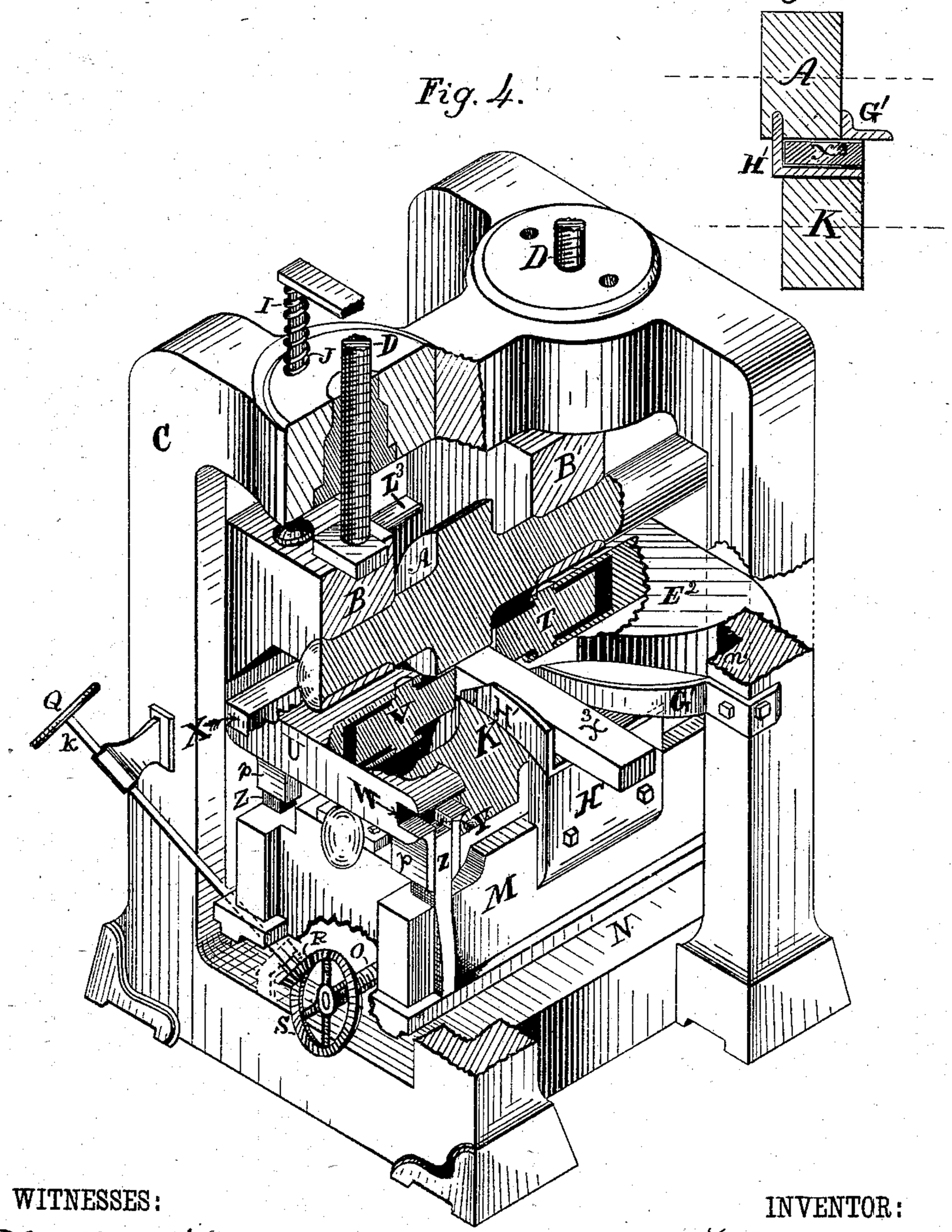



Fig. 5




WITNESSES:

Thos. Houghton.

Charles W Pettit

INVENTOR:

W. Wenström

BY Munn & Co

ATTORNEYS.

# UNITED STATES PATENT OFFICE.

WILHELM WENSTROM, OF OREBRO, SWEDEN.

## ROLLING-MILL.

SPECIFICATION forming part of Letters Patent No. 254,745, dated March 7, 1882.

Application filed October 13, 1880. (No model.) Patented in England July 22, 1880, in France July 22, 1880, in Germany July 27, 1880, in Belgium July 29, 1880, in Sweden July 31, 1880, and in Austria February 28, 1881.

*To all whom it may concern:*

Be it known that I, WILHELM WENSTROM, of Orebro, Sweden, have invented a new and Improved Universal Rolling-Mill, of which the following is a specification.

My invention relates to that class of rolling-mills in which one pair of horizontal and one pair of vertical rolls are adapted to roll metal simultaneously upon four sides, and are made adjustable with relation to each other, whereby they may be adapted to roll bars or plates of different sizes.

The object of my invention is to give the rolls an exact and steady motion under all circumstances, and to realize a compactness of construction and arrangement by which the bearings shall be adapted to withstand the required pressure without straining or displacement.

The invention consists in certain novel features of construction relating to different parts of the mill, as hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a cross vertical section of a rolling-mill embodying my improvements. Fig. 2 is a front elevation, partly in section. Fig. 3 is a horizontal section through the frame and edge rolls T V. Fig. 4 is a perspective view with the principal parts of the mill cut in section, showing their relative positions and general arrangement. Fig. 5 is a vertical section of the main rolls A K and guides H′ and G′. Fig. 6 is a perspective view of journal-box U, rolls V, A, and K, and rib Z of carriage M.

Rolling-mills of the class to which my invention belongs have heretofore been constructed with the vertical rolls arranged at the ends of the horizontal rolls, and to accommodate this arrangement it is necessary that the journals of the horizontal rolls shall project beyond each other longitudinally in opposite directions. The horizontal rolls then must be placed near the overlapping ends of their respective journals to bring them in position to operate together; but this causes the strain to be thrown almost entirely upon one of the two bearings of each horizontal roll, and thus the operation of the mill is rendered unsteady, if not altogether ineffectual. In order to secure an evenness and steadiness of operation, I, on the contrary, adopt the following compact construction: The horizontal rolls A and K are secured upon their respective journals about midway between the bearings of said journals, so that the strain will be equally divided between the bearings. The journal-box of the upper roll, A, consists of the single casting B B′, which is adapted to move equally in every part by means of the screws D, rods J, and springs I. The said journal-box of roll A is adapted to slide up and down in corner ways or recesses *n* in columns C of the rectangular frame, for the purpose of adjusting the upper roll to or from the lower roll, K. The bearings of the lower roll, K, are arranged directly under those of the upper roll, and as this roll is also secured upon the central portion of its journal, the pressure upon roll K will be equally distributed between its bearings. The vertical roll T is journaled in rigid bearings secured between the bearings of the horizontal rolls, while the movable vertical roll V is journaled in a box, U, which is supported by the journal-box B B′ and adapted to be adjusted either vertically with roll A or laterally with roll K. Thus the roll V is likewise arranged between the bearings of the upper and lower rolls, and we have a perfectly compact structure.

D D are screws running through the top of the machine, their lower ends pressing upon the top of journal-box B B′, and provided at their upper ends with spur-gears E, which are operated by pinion F, shaft G, and hand-wheel H.

On one end of journal-box B B′, and projecting inwardly, are ribs X, from which the journal-box U of side roll, V, is suspended, and upon which it slides horizontally. Journal-box U of side roll, V, is shown in perspective and partially in section in Fig. 4. It is constructed with two grooves, W, fitted to slide upon ribs X of journal-box B B′, and is provided with pendent flanges *p*, forming vertical ways Y, which receive ribs Z of sliding carriage M, as shown in Fig. 4.

M is a sliding carriage, adapted to move horizontally on suitable ways in the usual and well-known manner shown in metal-planing

machines. The shaft of lower roll, K, is journaled in suitable boxes on carriage M.

Near one end of carriage M are upwardly-projecting ribs Z, adapted to slide freely within ways or recesses Y, as shown in Figs. 4 and 6.

Attached to the under side of the bed of carriage M is a long nut or sleeve, P, through which the screw O passes. Screw O is prevented from moving lengthwise in stationary journal-boxes in the usual manner, and is provided on one end with a bevel-wheel, S, which is revolved by pinion R on rod *k* by turning hand-wheel Q.

Gear-wheels C′ D′ may be mounted on the shafts of rolls A and K, respectively, and two spur-wheels, E′ and F′, engaging with each other, and also with the spur-wheels C′ and D′, respectively, are arranged as shown in Fig. 1, thus permitting the rolls to separate, while their gear-wheels C′ and D′ remain in gearing with wheels E′ and F′. Gear-wheel F′ is made broad on its face, so as to remain in contact with wheel D′ during the sliding of carriage M.

The bar of metal, $x^3$, to be rolled is guided to and from the rolls A K V T by guide-plates G′, H′, H², and G², by the former two on entering and the latter two on leaving the machine. Guide-plate H′ forms a bottom and one side support for the entering bar of metal, and is constructed as shown in Fig. 4, and is firmly attached to carriage M. Guide G′ is an edge-guide, and is secured to the main frame, as shown in same figure. Guides H² and G² are arranged on the back of the machine. The top of guide H² is level with the top of roll K, and is attached to and moves laterally with carriage M. Guide G² is rigidly attached to side L³ of upper frame or journal-box B B′, so as to move up and down with roll A.

It will be seen from the above that rolls A and V are moved together up or down, as required, by turning hand-wheel H.

Journal-box E² of roll T is rigidly attached to one end of the main frame, the lower edge of roll T just clearing the top of roll K, so that roll K may be moved under it. It is also evident that by the arrangement of the guide-plates H′ and H², which are attached to carriage M, and consequently move horizontally with roll K, and guide G′ being attached to the main frame, thereby remaining always in position with fixed roll T, and guide G² being attached to journal-box B B′ of upper roll, A, moving with it whenever raised or lowered, the said guides H′ G² are automatic in their adjustment and mode of operation. By suspending the upper roll, A, by rods I and springs J the rolls A and K are held at any distance required from each other, the screws D adjusting such distance as herein shown.

The operation of my invention is as follows: The thickness and width of bar required being determined, I first raise the upper roll, A, by turning hand-wheel H until the horizontal rolls are adapted to roll the thickness of metal required. Then I turn hand-wheel Q, which gives a horizontal motion to carriage M and moves rolls K and V until the vertical rolls are adapted to roll the required breadth of bar. At the same time that the rolls are adjusted the guides H′, H², and G² are also automatically adjusted to suit the size of bar to be made.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a rolling-mill, the combination, with the rolls A K T V, of four short flat guides, one edge guide, G′, fixed at the standard, a second a flanged guide, H′, that follows the sliding frame M in all its movements, a third, H², leading from the lower roll underneath the bar or plate, and a flat guide, G², moving with the top roll, as shown and described.

2. In a rolling-mill, the combination of the horizontal rolls A and K, secured upon their journals midway between the bearings thereof, and the vertical rolls T and V, arranged between the bearings of rolls A and K on opposite sides of said rolls, whereby strain upon the upper and lower rolls shall be equally distributed between their respective bearings, substantially as shown and described.

3. In a rolling-mill, the combination, with the gear-wheels C′ D′, movable to and from each other, of the broad gear-wheel F′, made broad to accommodate the lateral adjustment of wheel D′, and the gear-wheel E′, adapted for accommodating the vertical adjustment of wheel C′, substantially as shown and described.

WILHELM WENSTROM.

Witnesses:
JOHN ERICSON,
ALEXIS BRAMBECK.