

C. H. PERKINS.
Rolling-Mills.

No. 144,631.

Patented Nov. 18, 1873.

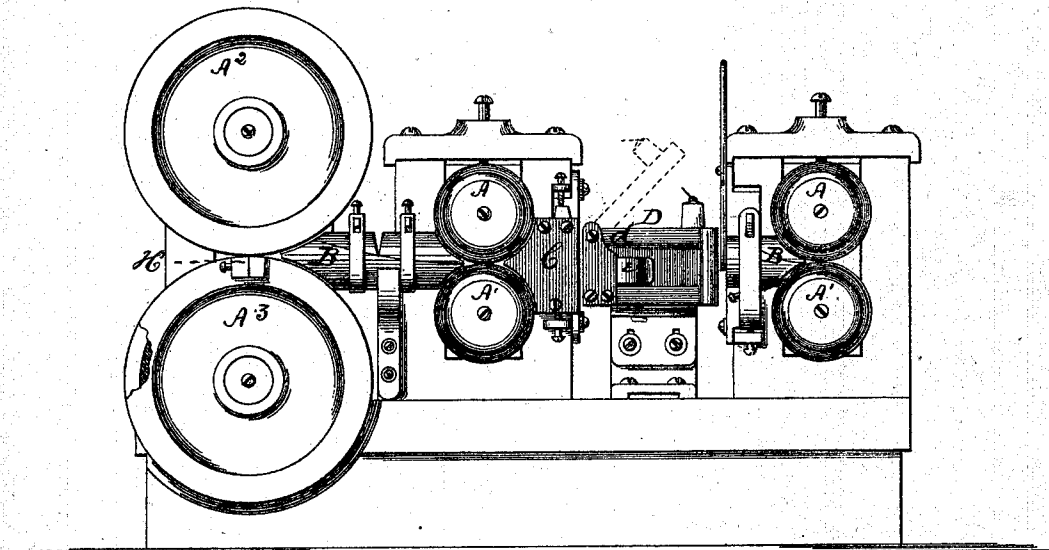


FIG. 1.

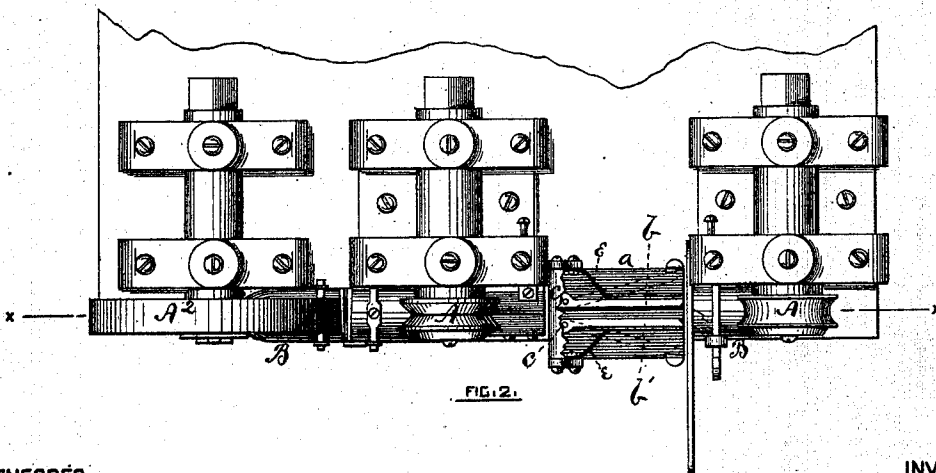


FIG. 2.

WITNESSES.

Samuel Cross
Thomas G. Cooper

INVENTOR.

Charles H. Perkins

per J. F. Perkins
att'y

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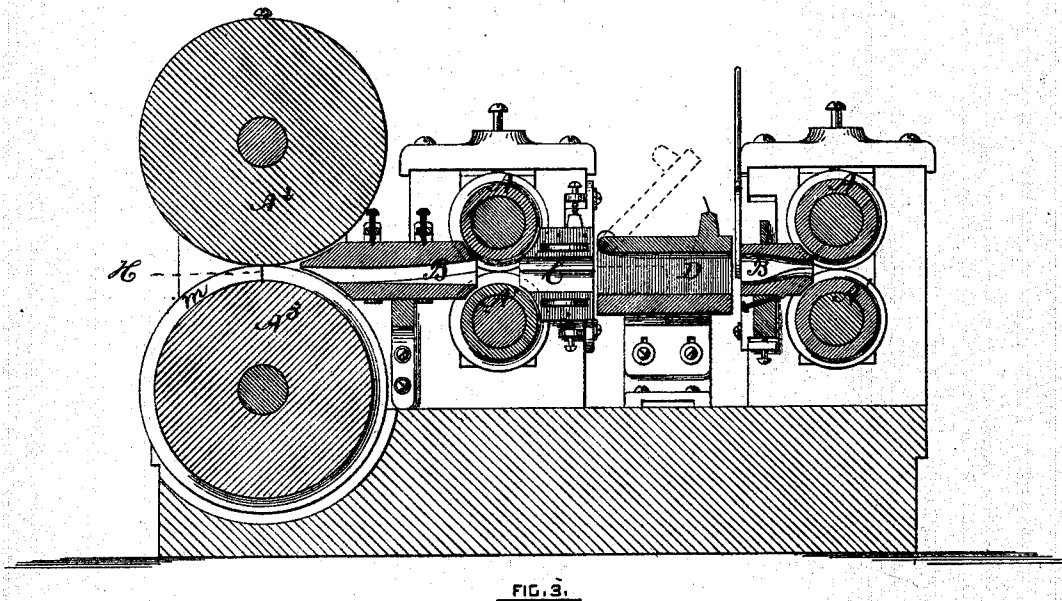


FIG. 3.

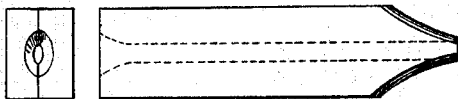


FIG. 4.

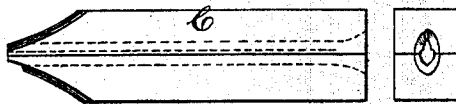


FIG. 6.

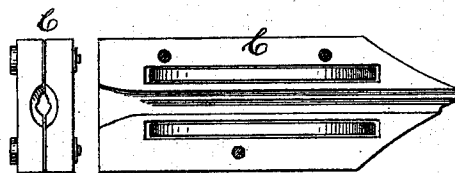


FIG. 5.

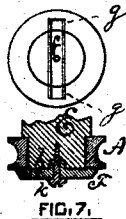


FIG. 7.

WITNESSES.

Samuel Ames
Thomas F. Cropper

INVENTOR.

Charles H. Perkins
per J. F. Thurston
att'y

UNITED STATES PATENT OFFICE.

CHARLES H. PERKINS, OF PROVIDENCE, RHODE ISLAND.

IMPROVEMENT IN ROLLING-MILLS.

Specification forming part of Letters Patent No. **144,631**, dated November 18, 1873; application filed June 24, 1873.

CASE B.

To all whom it may concern:

Be it known that I, CHARLES H. PERKINS, of the city and county of Providence, in the State of Rhode Island, have invented certain new and useful Improvements in Rolling-Mills; and I do hereby declare that the following specification, taken in connection with the drawings making a part of the same, is a full, clear, and exact description thereof.

Figure 1 is a side elevation of my improved machine. Fig. 2 is a top view. Fig. 3 is a vertical section on the line *xx* of Fig. 2. Figs. 4, 5, and 6 relate to an improved box-guide used in the machine, but which is made the subject of a separate application for Letters Patent. Fig. 7 shows the means of securing the rolls to their shafts.

My invention relates to that type of rolling-mills which employ a series of sets of rolls, combined by intermediate twisted guides, to turn the iron partially around its axis while passing from one set of rolls to the next. Examples of such rolling-mills are shown in the Letters Patent granted to me June 25, 1872, and July 9, 1872, respectively.

In rolling-mills of the class above referred to it is intended that each subsequent pair of rolls in the series shall have a greater surface-speed than the preceding pair; and the relative speeds of the rolls ought to be so proportioned that each succeeding pair will enable the increased length of the bar being rolled to be run through them in the same time that its equivalent in weight is passing through the next preceding pair of rolls. From various causes it will unavoidably happen that the iron, after it has passed through one pair of rolls, will not be promptly "taken care of" by the next pair, and consequently there is a liability of an intermediate "piling" of the bar, the effect of which is to cause the metal to jam in the guides. To provide a remedy for this difficulty, in the practical operation of such rolling-mills, is the object of my invention.

A *A*¹ in the several figures represent pairs of rolls for rolling metal, which are mounted in housings in the usual way, and are too well known to require any special description. There may be any preferred number of such

pairs of rolls in the series, and the iron in passing from one pair to the next in the series is conducted through twisted guides *B*, for the purpose of turning the bar partially on its axis, to effect changes in its presentation to the several sets of rolls. *C* represents a box-guide, the details of which are shown at Figs. 5 and 6, and which constitutes the subject of another application for Letters Patent.

For the purpose of remedying the difficulty before mentioned as existing in the use of this class of rolling-mills, I introduce a relief-guide, *D*, between the first and second pairs of rollers, and between any other pair in the series, though, in practice, it will be found that the necessity for this provision occurs mainly between the last two sets of rolls of the series. In this instance the guide is composed of a bottom plate, *a*, two side pieces, *b b'*, hinged at the exit end of the guide, as shown at *e*, and a hinged and weighted lid or cover, *d*. The side pieces *b b'* are furnished with springs *e*, which tend to keep them parallel with each other, but which, in case the bar of metal piles up in the guide, will permit the sides to open outward from each other, as indicated by dotted lines at Fig. 2. If it happens that the bar of metal is delivered from the first pair of rolls, *A A*¹, faster than it is taken away by the second pair of rolls, it will pile up in an irregular coil between the side pieces *b b'* of the relief-guide *D*, which side pieces, in the way shown, or from other equivalent construction, are enabled to yield, to accommodate the mass, until it can be drawn through the next pair of rolls. Thus the device which I have denominated a relief-guide performs the office of a simple guide, to give passage for the bar from the twisted guides *B* to the box-guide *C*, and, in addition, the office of a receptacle for the bar in case, from any cause, its regular passage through the rolling-mill becomes interrupted.

While I prefer to construct the relief-guide *D* with yielding sides *b b* and a hinged lid, *d*, it is apparent that a good effect will result from the employment of a guide whose side walls are not expansible, but which is open at the top, or has a hinged lid, so that the bar of iron will be prevented from jamming. I there-

fore consider this modification as within my invention.

By the employment of the relief-guide above described, rolling-mills employing a system of several sets of rolls can be used with greater advantage than has been possible heretofore.

At Fig. 7 is shown an improved means for securing the rolls to their shafts in place of the ordinary spline and groove. E is the shaft, and A the roll. Transversely across the end of the shaft, and through its center, I cut a parallel-sided groove, *f*, and coincident therewith I cut corresponding recesses *g* in the face of the roll. The end of the shaft and the roll is then covered with a cap, F, which, upon its inner face, has a tongue, *h*, which fits the groove and recesses before mentioned. This cap is secured to the shaft by a bolt and nut, or by a screw, *k*.

Another improvement consists in a means for cutting off the rolled bars to uniform lengths. A² A³ represent two wheels or drums, which may be mounted in a separate frame from that upon which the rolls are mounted, so that wheels of different diameters may, according to the length of bar to be cut, be brought into combination with the rolling-mill. The lower wheel has a groove, *m*, Fig. 3, cut in its face, into which the bar, as it leaves the final pair of rolls of the mill, is to be entered through a guide, B.

A stationary knife, H, is set transversely to the groove, its edge being at the same distance from the center of the axle of the wheel, measured radially, as the periphery of the wheel. The knife consequently forms a partition across the groove. The surface of the periphery of

the upper wheel is that of a plain drum or cylinder, and the office of the wheel is that of a revolving bed. If the circumference of the lower roller, measured on the bottom of the groove, be eighteen feet, it is clear that the iron bars coming from the rolls will be cut into pieces of that length, from the fact that the lower grooved roller, as it is made to revolve, will necessarily cause its knife H to cut through the bar whenever the radius in which the knife stands is at right angles with the longitudinal axis of the bar passing through the machine.

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

1. The relief-guide D, constructed with side walls *b b*, made yielding to internal pressure, substantially in the manner described.

2. In combination with any two consecutive sets of rolls, A A¹, in a rolling-mill, a relief-guide, D, substantially as described.

3. The combination of two consecutive sets of rolls, A A¹, twisting-guides B, relief-guide D, and box-guide C, substantially as described.

4. The means for securing a roll to its shaft, which consists in the combination of the tongued cap K K F with the shaft E and roll A, respectively grooved and recessed, substantially as described.

5. In combination with a rolling-mill, as described, the revolving grooved wheel A³, the knife H, and revolving bed A², substantially as described.

CHARLES H. PERKINS.

Witnesses:

THOMAS S. COSGROVE,
SAMUEL AMES.