A. MECHWART.
Rolling-Mill.

No. 216,750. Patented June 24, 1879.

Fig. 1

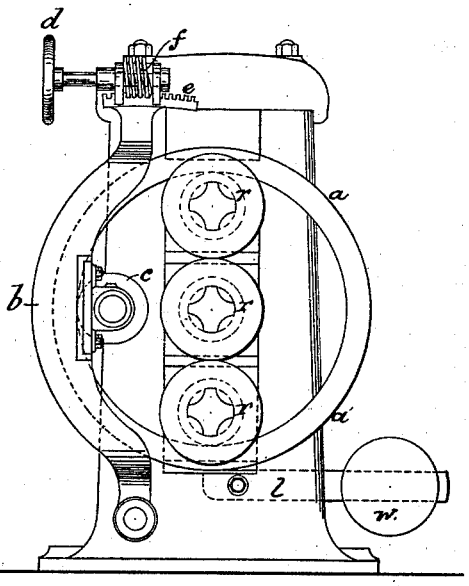
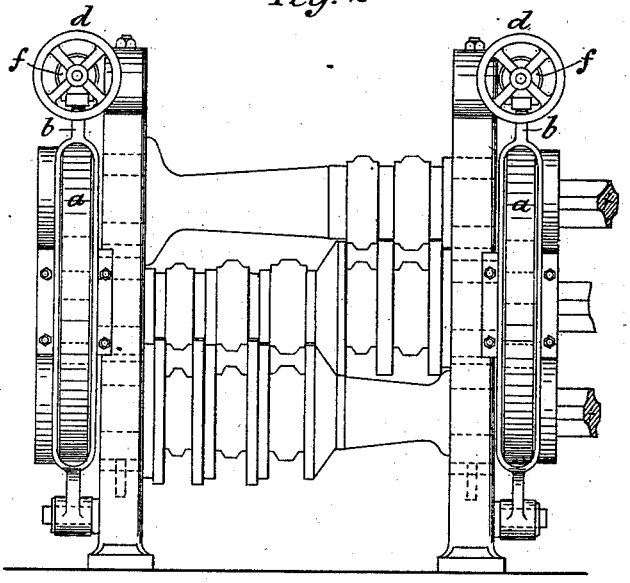


Fig. 2



Witnesses:
Chas. P. Henry
J. R. White

Inventor:
Andreas Mechwart,
by Franklin Scott, Atty.

UNITED STATES PATENT OFFICE.

ANDREAS MECHWART, OF BUDA-PESTH, HUNGARY.

IMPROVEMENT IN ROLLING-MILLS.

Specification forming part of Letters Patent No. **216,750**, dated June 24, 1879; application filed January 11, 1879.

To all whom it may concern:

Be it known that I, ANDREAS MECHWART, (of the firm of Messrs. Ganz & Co., engineers,) of Buda-Pesth, in the Kingdom of Hungary, have invented Improvements in Rolling-Mills, which improvements are applicable also to mills or machinery used for breaking, pulverizing, stretching, flattening, polishing, or other analogous purposes, of which the following is a specification.

This invention relates to special means for controlling and regulating the pressure applied to rolls used for pulverizing, laminating, or other analogous purposes, and for reducing the friction in or upon the journals and bearings of such rolls resulting from such pressure when at work.

My apparatus for accomplishing these results is fully illustrated in the accompanying drawings, which constitute a part of this specification, wherein Figure 1 shows an end elevation of a frame or train of rolls (three-high) with my devices for controlling pressure shown attached thereto. Fig. 2 exhibits a front elevation of the same.

In the drawings I have shown a column of grooved rolls similar to those used for rolling bars of iron, or sometimes known as "laminating-rolls." These rolls are provided with journals of the usual kind at each end, which journals are mounted and revolved in journal boxes or bearings placed between two vertical jambs at either end of the rolls, one above another, but not so that such journal-boxes shall rest upon each other, the journal-boxes of the two outside rolls—*i. e.*, the top and bottom ones—being free to move vertically or toward or from the middle roll, as they may be influenced by the pressure-regulating mechanism hereinafter described. The axles or shafts of the two outside rolls extend on each side beyond the journal-boxes, and are provided with friction-rolls *r r r r*, which are flanged at either end, to receive the large anti-friction revolving rings *a a*. The friction-rolls *r r r r* are designed to revolve with the roll to the shaft of which they are applied.

Each pair of friction-rolls *r r*, on each side of the frame of rolls, is spanned or embraced by an anti-friction revolving ring, *a*, which is adapted to rotate in conjunction with the friction-rolls *r r*. On either side of the frame of rolls is pivoted a segment-lever, *b*, which carries the friction-wheel *c*. This friction-wheel *c* is pivoted within the periphery of ring *a*, and is so disposed that it bears or impinges against the inner surface of ring *a* as the same revolves, and is capable of being adjusted radially with reference to the middle roll, and the degree of pressure exerted on the principal rolls is determined by the extent of such radial adjustment. The upper end of lever *b* is provided with a toothed sector, *e*, which engages with and is actuated by worm *f* and hand-wheel *d*. The weight of the lower roll in the set, and any weight superincumbent thereon, is counterbalanced by the weight *w*, attached to the long arm of lever *l*, upon the short arm of which rests the journal-box of the lower roll. This or some analogous provision becomes necessary in order to relieve the revolving rings *a a* of an undue strain which would devolve upon them in the absence of some such provision in equalizing the pressure between the several rolls, as well as to neutralize such friction as would be produced in the journal-boxes by and directly chargeable to the weight of such rolls resting and revolving therein.

When the several parts are in adjustment, as shown in the drawings, the amount of pressure to be effected or established between the several rollers composing the train is adjusted and determined as follows: By turning worm *f* in one direction by means of the hand-wheel, the toothed segment-lever *b* is thrust away from the principal rolls, the friction-wheel *c* at the same time carrying with it the anti-friction pressure-ring *a*. This movement has a tendency to bring closer together the tangential points of contact between the friction-rolls *r r* and the adjacent interior surface of ring *a*, thus forcing the principal rolls into closer contact. An opposite movement of worm *f* produces the contrary result by permitting the ring *a* to recede from its work, so that its greatest diameter shall more nearly coincide with a line connecting the tangential points of contact between the friction-rolls *r r* and the ring *a*.

By the use of this system of devices the friction induced by the thrust or pressure of the roller-journals upon the journal-bearings, as in ordinary constructions, is transferred to the sev-

eral points of contact between the anti-friction rings and the several friction-rolls upon and with which they revolve, and is thus reduced to a minimum.

I am aware that rings for clasping or embracing shafts or rolls between which pressure is exerted have heretofore been used, and therefore I do not claim such rings *per se;* but

What I do claim is—

1. In mills adapted for laminating, pulverizing, granulating, flattening, polishing, or other analogous purposes, by passing the material to be acted upon between rolls coacting under pressure, the combination, with the outside rolls, (when in a set or series,) of the described friction-rolls attached to or constructed upon the outer ends of such pressure-rolls, and spanned or embraced by revolving anti-friction rings, such rings being rendered adjustable in the plane of their rotation by means of internal radially-adjustable friction-wheels, all constructed and arranged substantially as described, and for the purposes set forth.

2. In rolling-mills of the character described, the means shown for controlling the adjustment of the anti-friction revolving rings *a a*, consisting of the friction-wheel *c*, attached to segment-lever *b*, toothed sector *e*, and worm *f*, conjointly operating substantially in the manner described and set forth.

3. In rolling-mills of the character described, the provisions shown for conjointly reducing friction and regulating pressure between the rolls, consisting of weighted levers *l l*, pivoted and operating as shown, in combination with friction-rolls *r r r r*, revolving anti-friction rings *a a*, and friction-wheels *c c*, attached to the adjustable segment-levers *b b*, all arranged to operate substantially in the manner described, and for the purposes set forth.

4. The means shown for regulating pressure between rolls in rolling-mills, consisting of a revolving hoop or ring of an internal diameter sufficient to span or clasp said rolls, their shafts or circumferential grooves or ways constructed thereon to receive said ring, and adapted to be laterally adjusted in the plane of its revolution, for the purpose of increasing or diminishing such pressure by means of an adjustable friction-wheel revolving within and against its internal surface, substantially as described, and for the purposes set forth.

ANDREAS MECHWART.

Witnesses:

PAUL ENGEL,

WILLIAM HUMING.