J. I. WILLIAMS.

Metal-Rolling Mill.

No. 165,290. Patented July 6, 1875.

Fig. 1

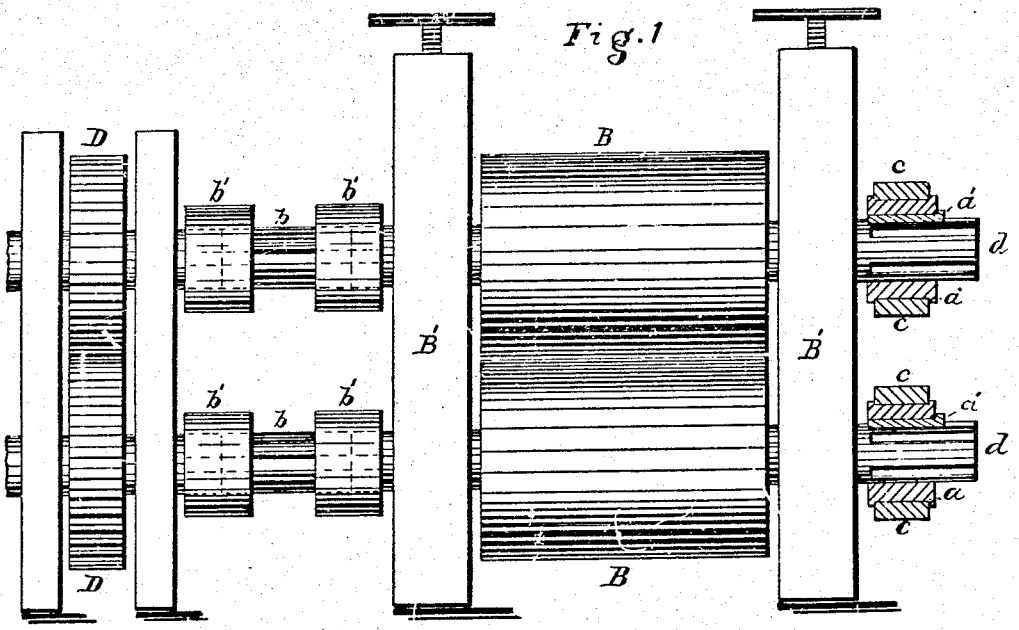
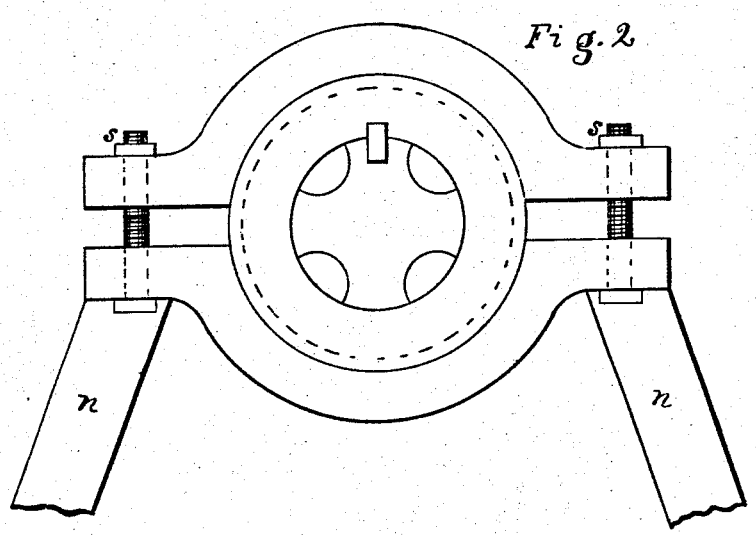


Fig. 2



Witnesses { Charles G. Page
Claudius B. Parker.

Inventor: John I. Williams,
by George N. Christy
his atty.

UNITED STATES PATENT OFFICE.

JOHN I. WILLIAMS, OF MILLVALE BOROUGH, (BENNETT P. O.,) PA.

IMPROVEMENT IN METAL-ROLLING MILLS.

Specification forming part of Letters Patent No. **165,290**, dated July 6, 1875; application filed February 18, 1875.

To all whom it may concern:

Be it known that I, JOHN I. WILLIAMS, of Millvale Borough, (Bennett P. O.,) county of Allegheny, State of Pennsylvania, have invented or discovered a new and useful Improvement in Machines for Rolling Metals; and I do hereby declare the following to be a full, clear, concise, and exact description thereof, reference being had to the accompanying drawing making a part of this specification, in which—like letters indicating like parts—

Figure 1 is a side elevation of a pair of metal rolls, with pinions, couplings, &c., and, by sectional view, illustrating the application of my improvement thereto; and Fig. 2 is an enlarged end view of the coupling end of a roll, with my improvement attached.

In the use of metal rolls for rolling iron, steel, &c., great difficulty has been experienced from loose motion, or "backlash," as it is more commonly termed; and in rolling such masses of material as are produced from the Danks furnace, for example, this difficulty becomes so great as sometimes to result in the breakage of the driving-pinions or other parts of the running machinery, especially in a long train of rolls, or where the roll-couplings are loosely fitted, or have become a little loose by wear. When the mass of iron is fed into the rolls, every part of the driving machinery in the line of communication of power from such rolls back is brought up tight, and the greater the resistance given by the material to be rolled, the tighter will be the working joints and connections. Then, when the material which is being rolled leaves the rolls suddenly, the almost instantaneous cessation of the resistance will leave the rolls free to rebound or fly forward to the extent of the slack motion previously taken up, and the rebound, acting in the opposite direction, and, in some cases, perhaps beyond or forward of the line of ordinary working strain, sometimes results in the breaking of the driving-pinions or other parts of the machinery. As a matter of fact I have found that such running machinery is more liable to be injured on the cessation of the resistance than on its inception; and that driving machinery sufficiently strong to enter, compress, and pass through between the rolls large masses of heated metal will not unfrequently break in taking up the lost motion or backlash after the metal leaves the rolls. To remedy or rather obviate this difficulty, I apply friction at any desired point in the train of rolls at or beyond the driving-pinions, with reference to checking the rebound; but as such rebound most commonly makes itself felt injuriously on the driving-pinions, I usually apply it to the neck or coupling of one of the rolls at any desired point at or beyond such rolls, estimating from the driving power. Where there are two or more sets of rolls in the same train, I prefer to arrange such friction attachment at the extreme end of the train.

In the drawing hereunto annexed, B B represent a pair of metal rolls of ordinary construction, plain or grooved and collared, mounted in any suitable housings B′ B′, and driven by power communicated through the usual pinions D D; or one of the rolls may be driven by frictional contact, and the power be applied directly or otherwise to the other roll. Connection is made from pinion to roll, and from one roll to another in the train by the usual coupling-shaft *b*, coupling-necks, and coupling-boxes *b′*, and, as usual in such machines, the fly-wheel is arranged at or near the point at which the driving power is applied.

To prevent, now, any injurious rebound of the rolls under the circumstances above stated, I apply to some revolving part or connection of either or both of them, at or beyond the driving-pinions, as may be desirable or necessary, a friction band or clutch, *c*, so that the frictional contact of such band or clutch shall, at the moment of rebound, or when the backlash comes into play, offer the needful resistance and check such rebound.

This band or clutch *c* may be arranged in an annular groove made in the outer periphery of the coupling, or on the neck or face of the roll itself; but for most purposes I consider it best to arrange it on the neck of the farthest roll in the train, or, if but a single set of rolls is used, on the neck of one or both such rolls.

As shown in the drawing, a ring, *a*, is by a key, *a′*, or in other suitable way, fastened to the roll coupling or neck *d*, and the clutch *c* is made to bear on the outer periphery of this

ring, it being grooved, as shown, the better to keep it in place. This clutch is prevented from revolving with the revolving machinery by any convenient stop device, or by a connection with some non-revolving part, as by the supports *n n*, or by arms projecting out from the adjacent housings. This device constitutes mechanically a brake, and to regulate its power I prefer to make it open at one or both sides, with an interior periphery or bearing-surface less, or capable of being made less, than the periphery of the surface on which it bears, and I then regulate its frictional power by bolts and nuts *s*, so as to adapt or adjust its resistance to the force of the rebound or backlash movement of the roll or rolls, and thereby, while not giving any serious obstacle to the running of the rolls, prevent the force of the rebound from being so instantaneously and violently communicated to the driving-pinions, or to other parts of the driving machinery.

The form of the brake employed for the purpose set forth, and the manner of applying it, may be varied to the extent that such elements in other mechanical structures are varied without departing from the scope of my invention. As it need not necessarily be in operation while rolling is actually being done, it may be arranged to take little or no hold at such time, and be tightened up or brought into action at the instant resistance ceases or lessens, such variable action being secured either by hand or automatically, as may be preferred.

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

In combination with the rolls of a rolling-mill and their driving mechanism, a brake or brakes arranged in the line of the driving power, at or outside of the driving-pinions, upon the axis or an extension thereof of one or more of the rolls, substantially as and for the purpose specified.

In testimony whereof I have hereunto set my hand.

JOHN I. WILLIAMS.

Witnesses:

JAMES M. CHRISTY,

CHARLES G. PAGE.