

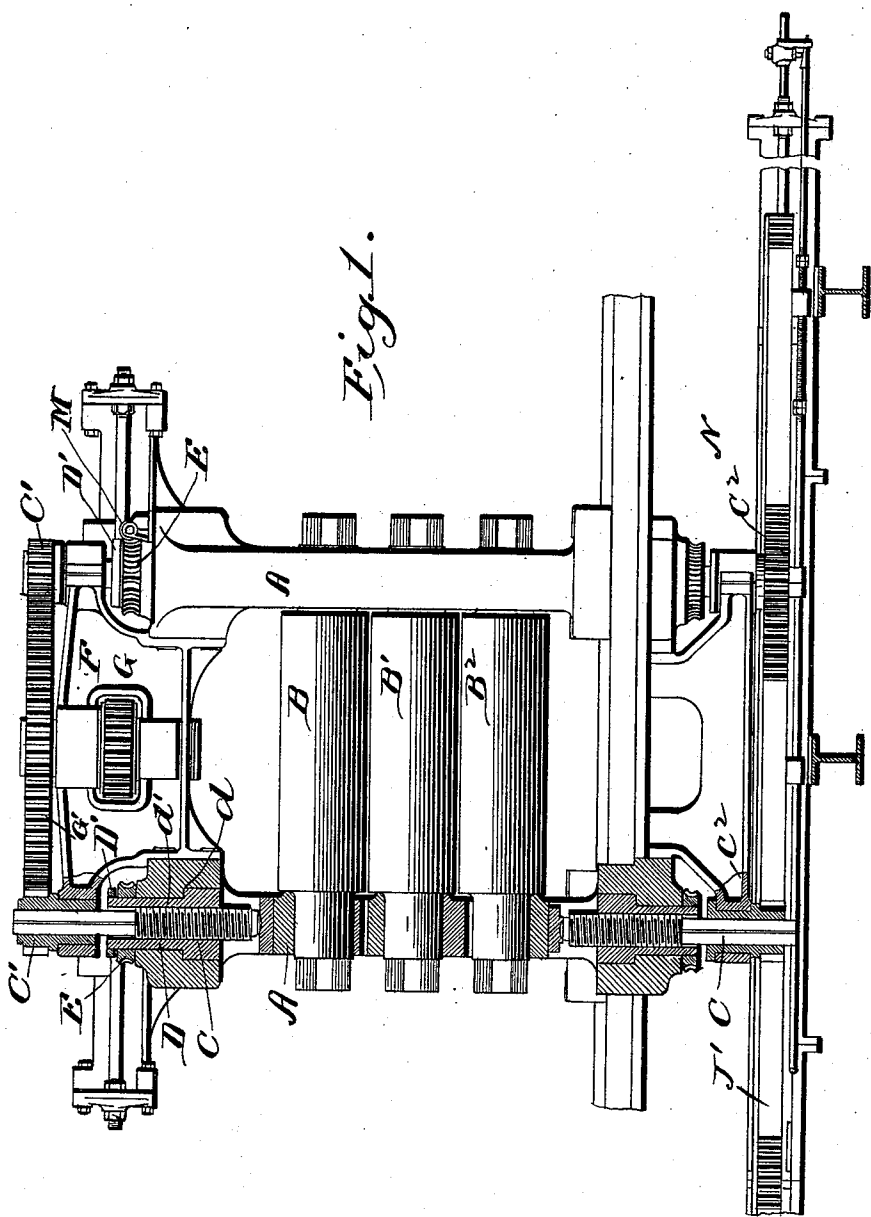
(No Model.)

2 Sheets—Sheet 1.

G. SCHUHMANN.  
ROLLING MILL.

No. 565,512.

Patented Aug. 11, 1896.



Witnesses.

*A. B. Driggs*  
*Edwin Pruse.*

*George Schuhmann* Inventor.

by *J. H. H. H. H.*

Attorney.

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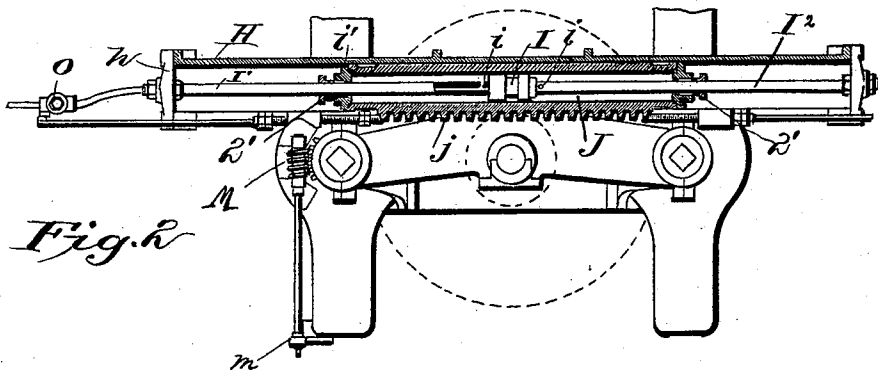


Fig. 2.

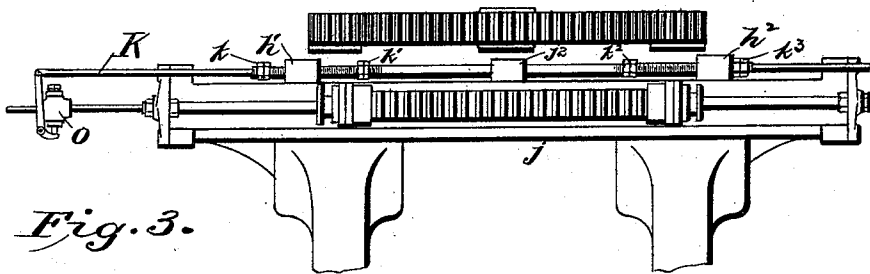


Fig. 3.

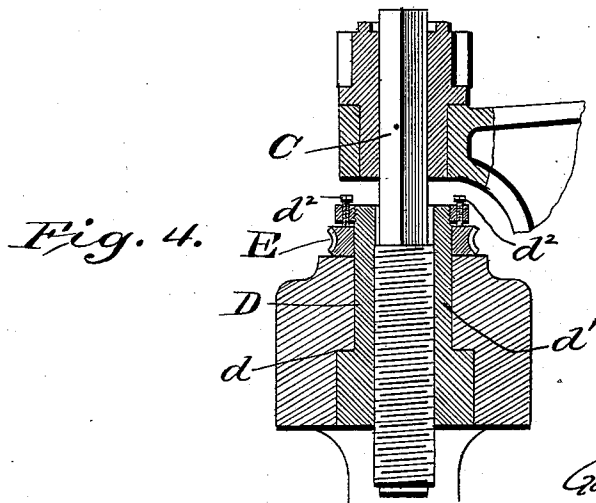


Fig. 4.

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# UNITED STATES PATENT OFFICE.

GEORGE SCHUHMANN, OF READING, PENNSYLVANIA.

## ROLLING-MILL.

SPECIFICATION forming part of Letters Patent No. 565,512, dated August 11, 1896.

Application filed May 9, 1896. Serial No. 590,889. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE SCHUHMANN, a citizen of the United States, residing at Reading, county of Berks, State of Pennsylvania, have invented certain Improvements in Rolling-Mills, of which the following is a specification.

This invention relates particularly to improvements in mechanism for adjusting the rolls of a rolling-mill; and the main objects are to provide for more perfectly and conveniently regulating the relative adjustment of the rolls in the two housings, and at the same time for securing perfectly parallel movement of the rolls, these two adjustments being made independently by means of the improved mechanism hereinafter described in connection with the accompanying drawings.

Figure 1 is a front elevation, partly in section, of a three-high stand of rolls, showing the application thereto of my improved roll-adjusting mechanism both top and bottom. Fig. 2 is a plan view of the same, showing the hydraulic cylinder in cross-section with the screw-operating gears indicated in dotted lines, and showing also the nut-adjusting mechanism. Fig. 3 is a partial rear elevation showing the hydraulic-cylinder stop mechanism. Fig. 4 shows in detail, on an enlarged scale, one of the adjusting screws and nuts with connections thereto.

A A represent the roll-housings, in which are mounted, as shown, rolls B, B', and B<sup>2</sup>, forming a three-high train, the middle one B' of which is in fixed bearings, while the journal-boxes for the upper and lower rolls, respectively, are movable vertically in the housings to permit adjustment relative to the fixed roll, as usual.

C C represent the adjusting-screws for the top journal-boxes, and similar ones are also provided for the lower boxes. These screws pass, as usual, through nuts in the housings and project at the top, so as to enable them to be turned to regulate the lift of the journal-boxes and roll. In my improved construction the nuts D for one or both of these screws are rotatably mounted in the housings, being formed with a circular shoulder d, adapted to seat against an offset in the housing, and with a sleeve d', which projects up-

ward through the latter. Fixed to this projecting sleeve portion of the nut, so as to rotate therewith, is a worm-wheel E, and above said wheel, as shown, is a collar D', provided with set-screws d<sup>2</sup>, to take up any vertical lost motion of the nut in the housing. The screw C extends above the nut and is provided at its upper end with a gear-wheel C'.

The mechanism by means of which I adjust the two screws C C simultaneously and equally, so as to provide for parallel movement of the roll B, is shown in Figs. 1, 2, and 3 and includes a transversely-reciprocating cylinder J, which carries a gear-rack j, by means of which rotary motion is given to the screws C C through the gear-wheels C' C'. This cylinder travels in a guideway H, secured to the tops of the housings. The centrally-located fixed piston I is carried by hollow piston-rods I' I<sup>2</sup>, which pass through stuffing-boxes in the cylinder-heads 2' and are secured to the guide heads or brackets h. Beyond these guide-heads each piston-rod is provided with a check-valve O, which is operated by a valve-rod K to permit the passage of water through the hollow piston-rod to or from the interior of the cylinder J, with which each piston-rod communicates through openings i. This valve-rod is operated so as to automatically open and close the check-valves and at the same time form a positive stop to the travel of the cylinder by means of a lug j<sup>2</sup> on the cylinder, which slides upon the valve-rod and engages one or other of the adjustable stops k' k<sup>2</sup> on the rod, so as to move the latter until said stops or others k and k<sup>3</sup>, provided on the rod on the opposite side of the rod-supporting lugs h' h<sup>2</sup> on the guideway, come in contact with one or other of said supporting-lugs. This contact forms a positive stop to the movement of the cylinder, the motive power of which is also cut off automatically before it is thus positively stopped by the movement of the valve-rod K, operating upon the check-valves O so as to shut off the inflow of water.

The movement of the hydraulic cylinder J at the top of the housings is conveyed to the screws C C through a gear-shaft mounted vertically in a bracket F, extending between the housings, said shaft having secured thereto a pinion G, with which the cylinder-rack j en-

gages, and also a spur-gear G', which meshes with and drives the screw-gears C' C'. This arrangement is modified for effecting the adjustment of the lower roll B<sup>2</sup>, the cylinder-rack J' being in this case extended so as to engage directly with the screw-gears C<sup>2</sup> C<sup>2</sup> and dispensing with the intermediate gears G G', which cannot be so conveniently placed in the pit N below the housings. Otherwise, however, the cylinder and valve mechanisms may be substantially the same as those above.

Referring again to the nut D, the construction of which has already been described, it will be seen that I have provided for turning it within the housing by means of the worm-wheel E and a worm M, mounted on the top of the housing and operated through a shaft or socket-wrench *m*. This turning of the nut is entirely independent of the operation of the adjusting-screws C C already described, and may be effected without interfering in the least with the equal simultaneous adjustment of the two screws before described. Indeed such adjustment may be in progress at the same time that the nut D is being positively rotated by means of the worm-gear. Yet this latter movement is also effective in adjusting the screw C, which passes through it vertically in the housing, said screw being prevented from turning with the nut by being geared, in common with the other screw C, with the operating-cylinder J. I am thus enabled, therefore, to adjust the height of one screw relative to the other with the greatest nicety and ease, thereby correcting perfectly the slightest inequality in the parallelism of the rolls without interfering with or delaying the usual simultaneous adjustment of the screws.

What I claim is—

1. In a rolling-mill the combination with the housing and adjusting-screw, of a nut in said housing for the screw, and separate mechanisms for turning the screw and the nut independently substantially as set forth.

2. In a rolling-mill the combination with adjusting-screws for each end of the rolls, and nuts therefor, of mechanism for simultaneously adjusting said screws, and separate mechanism for turning one of said nuts to in-

dependently adjust the screw working therein substantially as set forth.

3. In a rolling-mill the combination with an adjusting-screw for each end of a roll, of a reciprocating hydraulic cylinder arranged to simultaneously operate said screws, and a fixed piston with hollow rods mounted upon the housings substantially as set forth.

4. The combination with the adjusting-screws, the reciprocating hydraulic cylinder in gear therewith, and the fixed piston with hollow rods, of valves in said piston-rods, a shifting-rod connecting said valves, and stops for said shifting-rod, whereby the motive force is automatically shut off from said cylinder and a positive stop provided for the same substantially as set forth.

5. The combination with the adjusting-screws of an operating mechanism therefor, comprising a guide-frame on the housings, a fixed piston having hollow rods fixed to said guide-frame and provided with valves, a reciprocating hydraulic cylinder in gear with said screws, a valve-operating rod mounted in said guide-frame and adapted to be moved by the cylinder, and adjustable stops on said rod whereby said valves are automatically opened and closed at proper times and the movement of the cylinder positively stopped substantially as set forth.

6. In a rolling-mill the combination with the housing and adjusting-screw, of a rotatable nut for said screw shouldered within the housing and having an extension projecting through the same and provided with means for turning it substantially as set forth.

7. In a rolling-mill the combination with the housing and adjusting-screw, of a rotatable nut for said screw shouldered within the housing and having an extension projecting through the same and provided with means for turning it and a collar to adjustably support the nut in the housing substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE SCHUHMANN.

Witnesses:

GEO. W. DELANY,

T. O. YARINGTON, Jr.