

No. 672,466.

R. WAYLAND-SMITH.

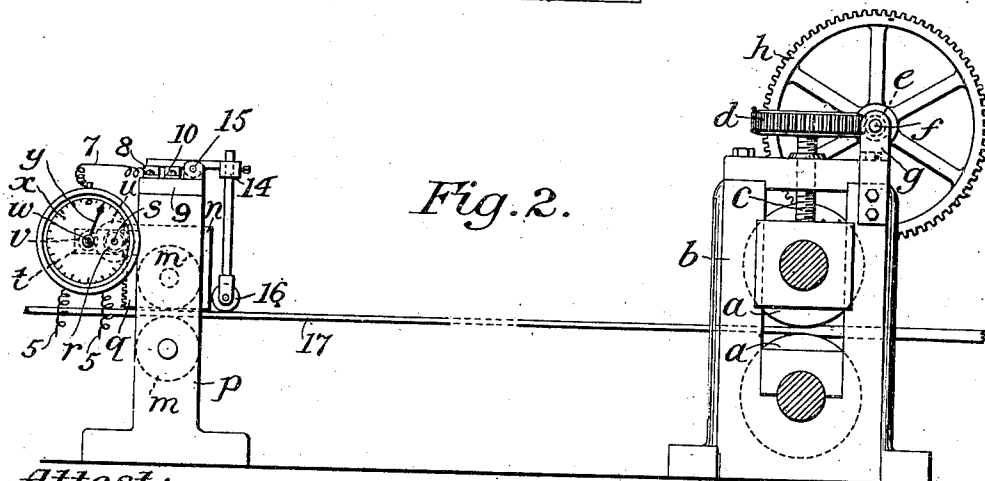
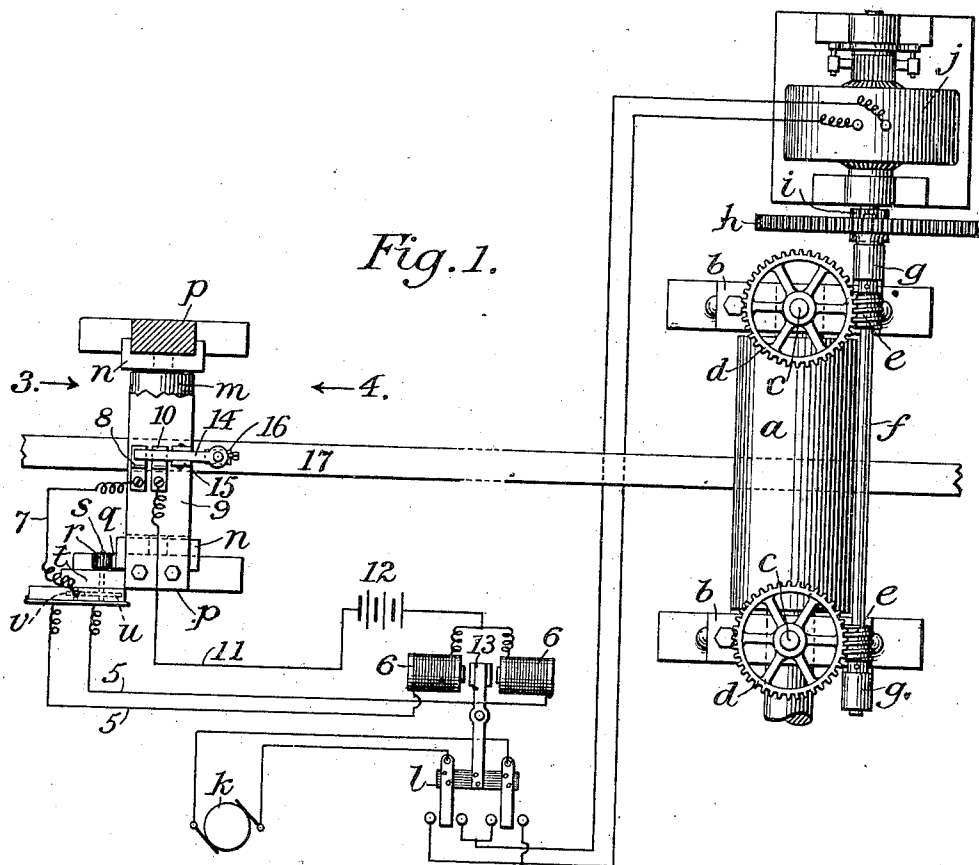
Patented Apr. 23, 1901.

ADJUSTING MECHANISM FOR ROLLING MILLS.

(No Model.)

(Application filed Oct. 1, 1900.)

2 Sheets—Sheet 1.



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2 Sheets—Sheet 2.

Fig. 3.

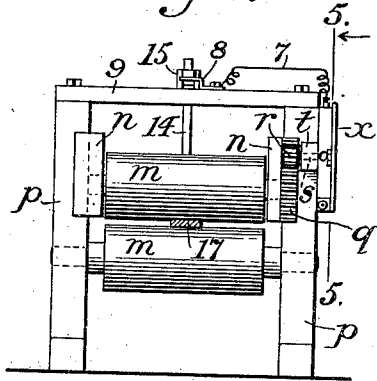


Fig. 4.

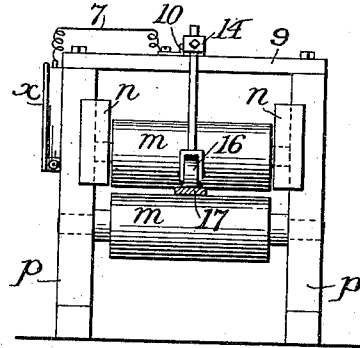


Fig. 5.

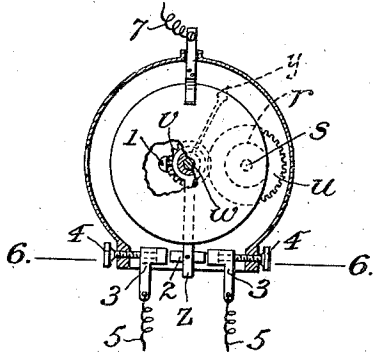
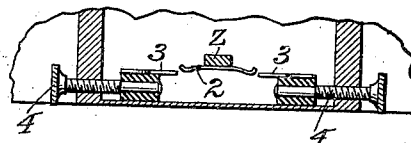


Fig. 6.



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UNITED STATES PATENT OFFICE.

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ADJUSTING MECHANISM FOR ROLLING-MILLS.

SPECIFICATION forming part of Letters Patent No. 672,466, dated April 23, 1901.

Application filed October 1, 1900. Serial No. 31,629. (No model.)

To all whom it may concern:

Be it known that I, RICHARD WAYLAND-SMITH, a citizen of the United States of America, residing in the city of New York, in the State of New York, have invented certain new and useful Improvements in Adjusting Mechanism for Rolling-Mills, of which the following is a specification.

The annexed drawings and the following description set forth in detail one mechanical form embodying the invention, such detailed construction being but one of the various mechanical forms in which the principle of the invention may be used.

In said drawings, Figure 1 is a plan view of a rolling-mill provided with the improved adjusting mechanism. Fig. 2 is a side elevation of the same. Fig. 3 is a rear elevation of the gage-rollers. Fig. 4 represents a front elevation of the same. Fig. 5 is an enlarged detailed view of the gage-register. Fig. 6 represents a detailed sectional view on the line 6 of Fig. 5.

The invention is especially adapted for use in connection with rolling mills or machinery wherein rolls are required to be kept constantly in the same relation to each other, so that the work shall be of a definite size and thickness. The main rolls *a* are journaled in bearings provided on a frame *b* and are adjustable in relation to each other by means of screws *c*, provided at their tops with gears *d*. Said gears mesh with and are actuated by worms *e*, provided upon a shaft *f*, mounted in suitable lugs or standards *g*, formed integral with or secured to the frame. Said shaft is provided in one end with a gear *h*, which meshes with a smaller gear *i*, that is connected to the armature of a motor *j*. Electrical energy is supplied to this motor by a dynamo *k* or other suitable means, and a switch *l* is interposed in the circuit between same for the purpose of controlling the direction of the current through the motor.

Arranged a suitable distance from the main rollers are two gage-rollers *m*, mounted in bearings *n*, provided upon a suitable frame *p*. The bearings of the upper roller are movable lengthwise of the frame, and upon one of said bearings is provided a rack *q*. Said rack engages with a pinion *r*, keyed upon a shaft *s*, journaled in brackets *t* upon the

frame. A larger gear *u* is keyed upon this shaft, which meshes with a gear *v* upon a spindle *w*, likewise journaled in said brackets. Said spindle projects through a graduated register or dial-face *x* and is provided at its outer end with a dial finger or pointer *y*. Mounted upon the spindle in the rear of the dial-face is a switch-arm *z*, that is adjustably secured by means of a set-screw 1. The outer end of said arm is provided with a U-shaped switch 2, adapted to engage either of contacts 3, that are insulated from the frame and are adjustable thereon by means of screws 4. Each contact is connected by means of a suitable conductor 5 with one of the two oppositely-arranged magnets 6. The switch-arm is connected by means of a suitable conductor 7 with a contact 8, secured to and suitably insulated from the cross-piece 9 of the frame. A corresponding contact 10 is arranged adjacent thereto, that is connected by a suitable conductor 11 with batteries 12, that are connected with both magnets. An armature 13 is arranged between said magnets and is operatively connected with the switch interposed in the circuit between the motor and the dynamo. A bell-crank lever 14 is pivoted to a lug 15 on the cross-piece of the frame and is provided at the end of its vertical arm with a guide-roller 16, arranged in the line of the work 17. The horizontal arm of said lever extends between said contacts and is adapted to engage both of them, thereby connecting same electrically when the guide-roller upon the end of the vertical arm of the bell-crank lever engages the work and the horizontal arm of the lever is depressed.

The main rolls are first adjusted the desired distance apart, and the switch 2 is adjusted so that same will be between and out of engagement with either of the contacts 3 when the gage-rollers are arranged the same distance apart as the main rolls. This adjustment is easily effected, as the upper gage-roller is raised until the pointer indicates the desired height or distance apart upon the dial-face, and the switch-arm is then fixed in its proper position by the set-screw 1. So long as no work passes through the gage-rollers the device remains inoperative, as the horizontal arm of the bell-crank lever is held

by gravity out of engagement with the contacts 8 and 10, thus breaking the circuit. When work is passing through or between the gage-rollers, however, the bell-crank lever is actuated, thus depressing its horizontal arm and establishing connection between said contacts. If the work varies in thickness, the upper gage-roller is moved, which movement is communicated to the switch-arm by the train of gear, and in case the variation is sufficient the switch 2 is brought into engagement with one of the contacts, thus establishing the circuit through one of the magnets, and thereby energizing same. The armature is therefore immediately attracted by said magnet and operates the switch in the main circuit between the dynamo and the motor, which is constructed in any well-known manner, so that the current can be sent in either direction through the motor. The motor actuates the worm which meshes with the gears provided upon the adjusting-screws on the main rolls, and thereby automatically raises or lowers said rolls, according to the direction of the current. By this construction it is possible to automatically regulate the adjustment of rolling-mills and of other mechanism wherein parallel rolls are required to be kept at a determined distance apart. Heretofore it has been customary to adjust such mechanism by hand in order to obtain the necessary precision of adjustment. Since the wear and strain upon the rolls is very great, frequent adjustment is required in order to keep the work at a standard gage. By this construction the adjustment is instantly and automatically performed, and the slightest variation in the gage of the work is immediately detected and remedied. Although an electric motor has been shown in the drawings, it is obvious that other kinds of motors or any suitable motive means that can be operatively secured to adjusting mechanism of the main rolls and automatically controlled by the gage-rolls may be used.

I claim as my invention—

1. The combination with the main rolls and

gage-rolls, of means operatively connected with the gage-rolls for automatically adjusting the main rolls when the gage-rolls are actuated.

2. The combination with the main rolls and means for adjusting said rolls, of a gage-roll journaled in movable bearings, and means operatively connected with said gage-roll for actuating said adjustment mechanism, substantially as described.

3. The combination with the main rolls and means for adjusting said rolls, of a gage-roll journaled in movable bearings, a rack upon said bearings, an arm actuated by said rack, and means operatively connected with said arm for actuating said adjusting mechanism, substantially as described.

4. The combination with the main rolls, means for adjusting said rolls, a motor operatively connected with said adjusting mechanism, and a switch for supplying electrical energy to said motor, of gage-rolls, one of said gage-rolls being journaled in movable bearings, and means for automatically operating said switch when the gage-rolls are separated a predetermined distance, substantially as described.

5. The combination with main rolls provided with adjusting-screws, a shaft operatively connected therewith, a motor for actuating said shaft, and a switch for supplying electrical energy to said motor, of a gage-roll journaled in movable bearings, a switch-arm actuated by said bearings, a magnet connected with the terminals of said switch-arm and having its armature operatively connected with said motor-switch, and means for electrically connecting the switch-arm with said magnet when the gage-roll is raised a predetermined distance, substantially as described.

This specification signed and witnessed this 28th day of September, A. D. 1900.

RICHARD WAYLAND-SMITH.

In presence of—

F. H. WADSWORTH,
A. N. JESBERA.