

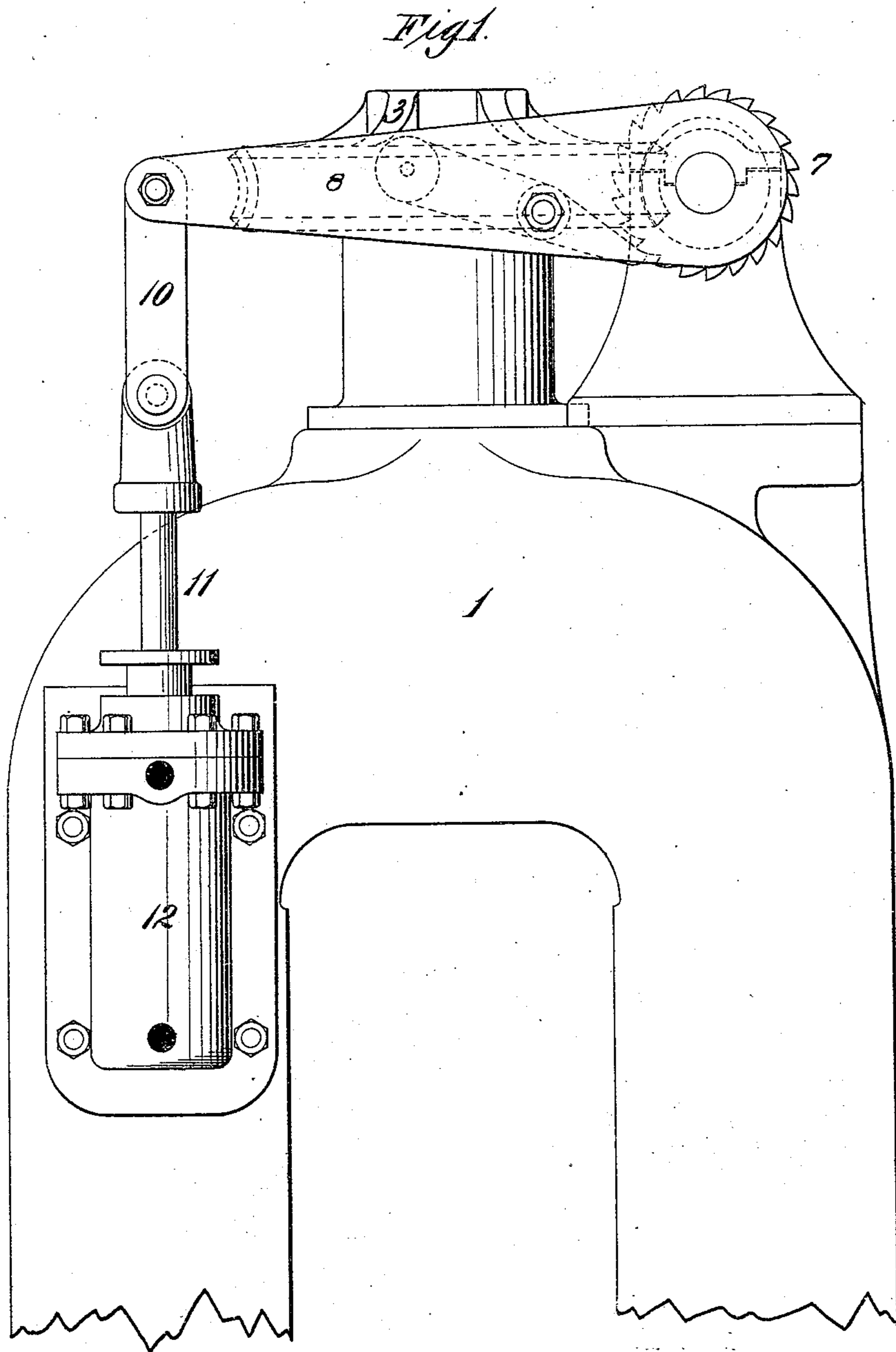
(No Model.)

2 Sheets—Sheet 1.

J. HEMPHILL.
ROLLING MILL.

No. 313,206.

Patented Mar. 3, 1885.



WITNESSES:

Dan S. Wolcott
Chas. M. Clarke

INVENTOR.

James Hemphill
BY George H. Christy
ATTORNEY.

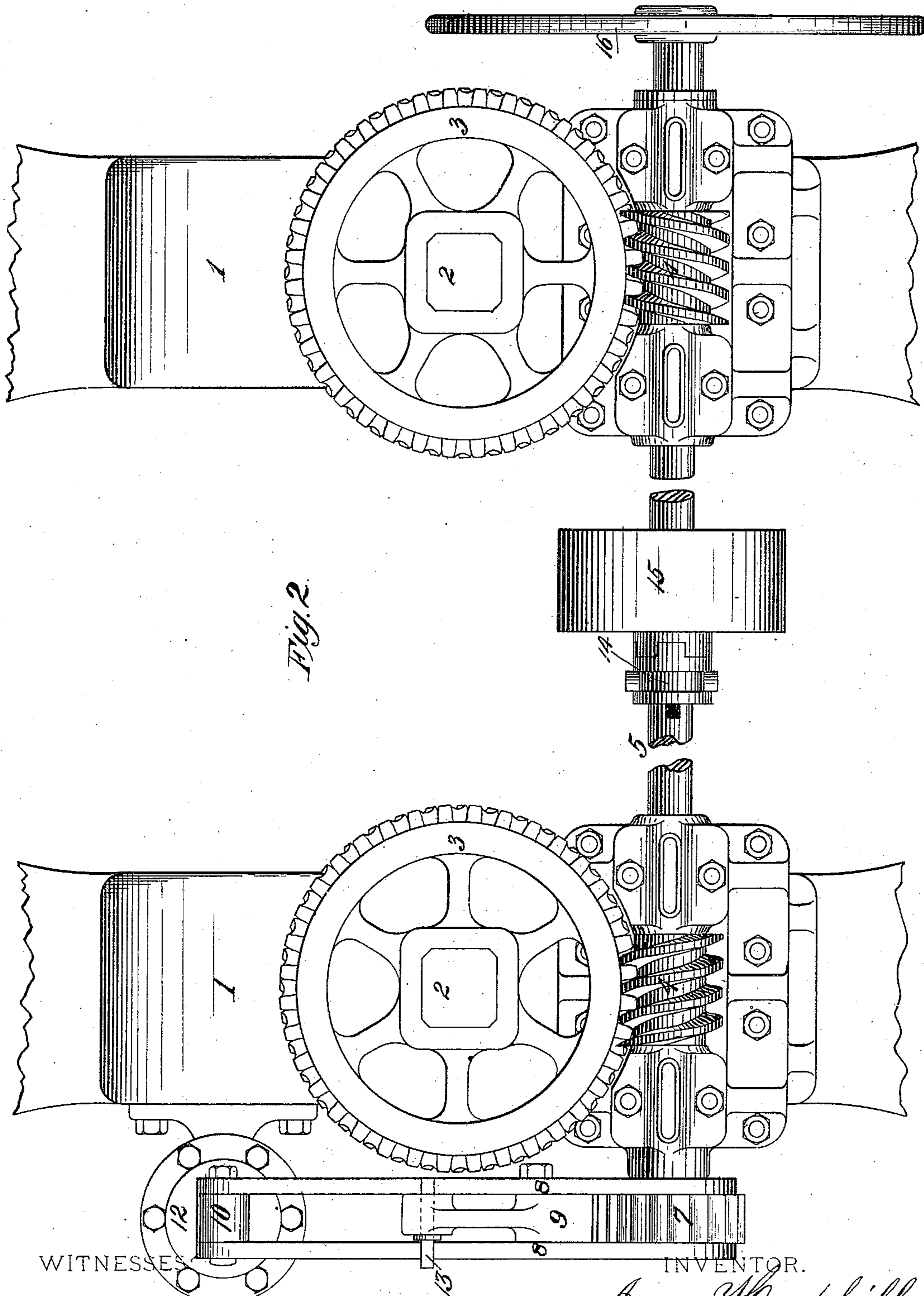
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UNITED STATES PATENT OFFICE.

JAMES HEMPHILL, OF PITTSBURG, PENNSYLVANIA.

ROLLING-MILL.

SPECIFICATION forming part of Letters Patent No. 313,206, dated March 3, 1885.

Application filed August 29, 1884. (No model.)

To all whom it may concern:

Be it known that I, JAMES HEMPHILL, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented or discovered certain new and useful Improvements in Mechanism for Operating the Housing-Screws of Rolling-Mills, of which improvements the following is a specification.

10 In the accompanying drawings, which make part of this specification, Figure 1 is a view in end elevation of the housings of a rolling-mill, showing my improved mechanism for adjusting the housing-screw. Fig. 2 is a plan view
15 of a pair of housings, showing the mechanism for operating the housing-screw mounted on one of said housings and connected to the other housing by a horizontal shaft.

It frequently happens in the ordinary operation of rolling that during the passage of plates, blooms, bars, or other articles through between the rolls some part of the mill or its operating mechanism breaks, thus stopping the mill while the article being rolled is still in the bite of the
25 rolls, and unless such article, which is at a high heat, is speedily removed from between the rolls that portion of the latter in contact with the heated iron will become highly heated, thereby causing a distortion of the rolls or a
30 burning of that portion of the metal in contact with the heated article, either of which effects will destroy the further utility of the rolls.

The object of my invention is to provide means, independent of the ordinary adjusting
35 mechanism, whereby the upper roll may be quickly raised to permit the withdrawal of the article caught between the rolls as above stated; and to this end my invention consists in the construction and combination of parts, all as
40 more fully hereinafter described and claimed.

The housings 1 are of the ordinary construction, and are provided with the usual upper-roll-adjusting screw, 2, having its upper end squared, as shown in Fig. 2. On these squared
45 ends are placed the worm-wheels 3, which mesh with the worms 4, formed on the horizontal shaft 5, journaled in bearings 6, said bearings being mounted on the top of the housings at one side of the center thereof. The worms 4
50 are made right and left handed, the worm-

wheels being correspondingly shaped as respects peripheral teeth, as clearly shown in Fig. 2. The purpose of this construction will be fully stated hereinafter.

On one end of the shaft 5, which projects beyond the sides of the housings, is secured the
55 ratchet-wheel 7, and on this projecting end are journaled the side bars, 8, between which is pivoted the pawl 9 in such relation to the ratchet-wheel 7 that the forward end of said pawl
60 will catch into the teeth on the under side of the ratchet-wheel, the outer end of the pawl being weighted, so as to keep the operative end thereof in contact with the periphery of the ratchet-wheel. The outer ends of the bars
65 8 are connected by the link 10 to the piston-rod 11 of the steam or hydraulic cylinder 12. This cylinder may be either secured to the side of one of the housings, as shown in Fig. 1, or may be mounted in any desired way in convenient
70 proximity to one of the housings.

In order to keep the pawl 9 out of connection with the ratchet-wheel 7 during the ordinary operation of the rolling-mill, a hole is formed through the weighted end of said pawl,
75 and through this hole is passed a pin or bolt, 13, the projecting end of which rests upon the upper edges of the side bars, 8, thereby holding the pawl from engagement with the ratchet-wheel.
80

Midway on the shaft 5 is mounted the clutch 14, adapted to move longitudinally of the shaft and to rotate therewith. On each side of this clutch mechanism are mounted the loosely and
85 oppositely revolving pulleys 15, (only one of these pulleys being shown, as they pertain to the ordinary construction of the rolling-mill, and form no part of the invention herein.) By sliding the clutch mechanism either to the right or left one or the other of these pulleys is
90 brought into engagement with the clutch, and the shaft is rotated either to the right or to the left, as will be clearly understood. If desired, a hand-wheel, 16, may be secured on the end of the shaft opposite the ratchet-wheel.
95

In case of the breakage of any part of the mill or the driving mechanism while heated bar, plate, or bloom is passing through the rolls of the mill, it is only necessary for an attendant to release the pawl by removing the pin 100

13, and to admit steam or water to the cylinder 12, thereby causing the piston of said cylinder to traverse up and down, and through the medium of the side bars, 8, pawl 9, and ratchet 7 the reciprocating movement of the piston causes an intermittent rotary movement of the shaft 5, worms 4, and gears 3. This rotation of the gears imparts such a rotation to the screws 2 that the upper roll will be raised sufficiently to allow of the removal of the article being rolled. The cylinder 12 may be made of such a length, and the worms and gears may be made of such a relative size, that one stroke of the piston will be sufficient to cause such a movement of the upper roll that the article may be released. By making the worms 4 right and left handed, said screws will operate against each other, thereby relieving their journals of all lateral thrusts, as will be clearly understood.

Any other suitable mechanism for connecting the cylinder and the shaft 5 may be substituted for the mechanism—as, for example, the piston 11 may be provided with a rack, and the cylinder 12 so arranged that the rack will mesh with a gear on shaft 5, the gear being substituted for the ratchet-wheel; or the piston may be connected directly to a crank-pin secured to a disk mounted on the shaft 5. These and other like means of connecting the piston and shaft I consider within the scope of my invention.

I claim herein as my invention—

1. In a rolling-mill, the housing-screws 2, in

combination with worm-wheels secured thereto, a horizontal shaft provided with worms meshing with the worm-wheels, and mechanism, independent of the usual shaft-rotating mechanism, for rotating the horizontal shaft, substantially as set forth.

2. In a rolling-mill, the horizontal screws 2, in combination with worm-wheels secured thereto, a horizontal shaft provided with worms meshing with the worm-wheels, and an operating-cylinder having its piston connected with said shaft, and adapted to rotate the same, substantially as set forth.

3. In a rolling-mill, the housing-screws 2, in combination with the worm-wheels secured to said screw, a horizontal shaft provided with worms having oppositely-arranged threads and meshing with the worm-wheels, and a cylinder having its piston connected to the shaft, and adapted to rotate the same, substantially as set forth.

4. In a rolling-mill, the housing-screws 2, in combination with worm-wheels secured thereto, a horizontal shaft provided with worms meshing with worm-wheels, and a cylinder having its piston detachably connected to said shaft, and adapted to rotate the same, substantially as set forth.

In testimony whereof I have hereunto set my hand.

JAMES HEMPHILL.

Witnesses:

JNO. D. McKENNAN,
DARWIN S. WOLCOTT.