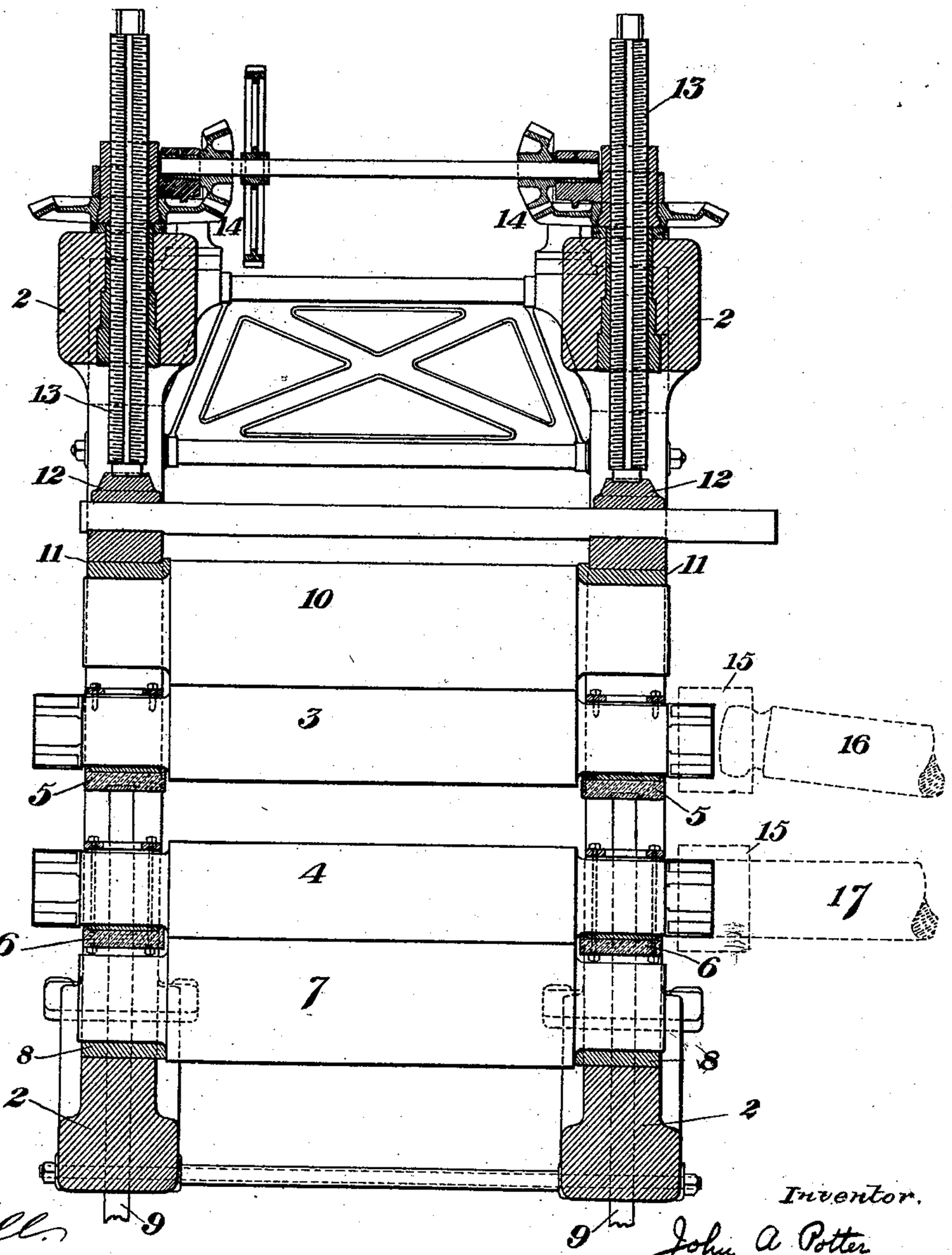
(No Model.) 2 Sheets—Sheet 1.

J. A. POTTER.

ROLLING MILL.

No. 477,821. Patented June 28, 1892.

Fig. 1.



Witnesses
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Inventor.
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(No Model.)

2 Sheets—Sheet 2.

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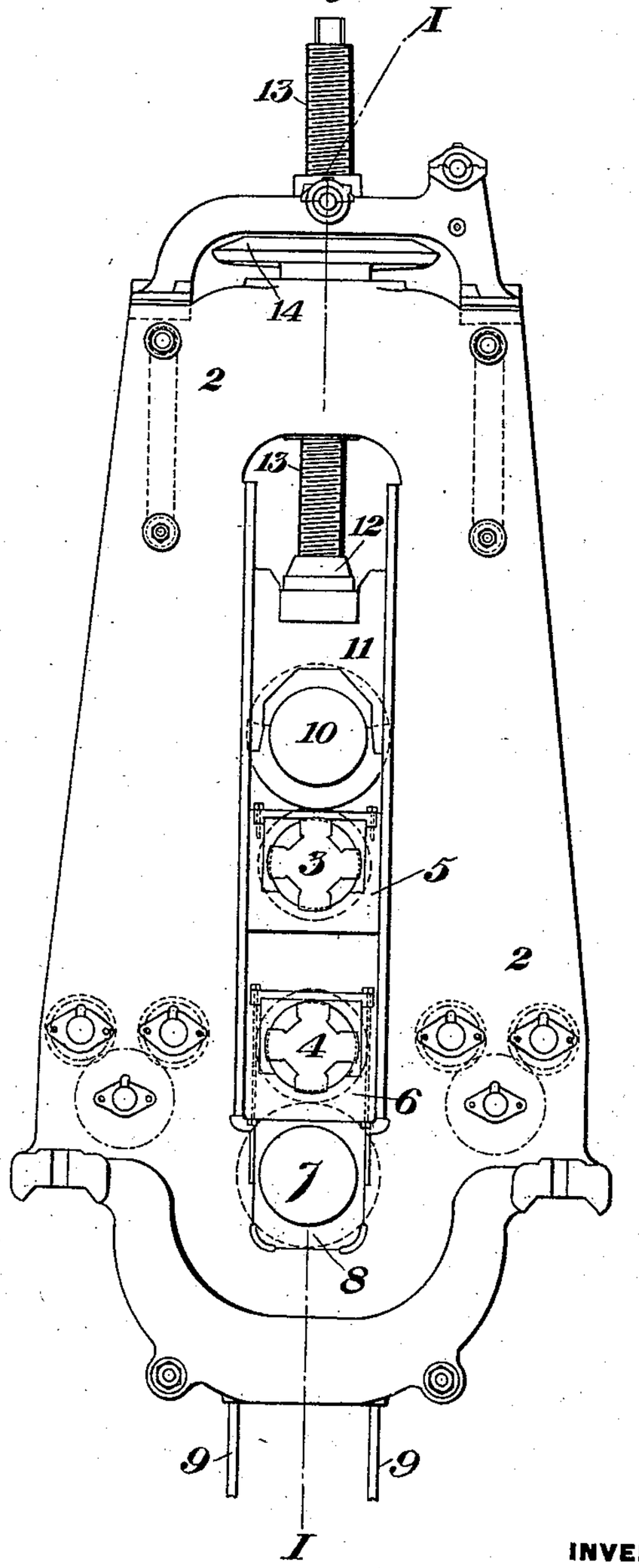
Fig. 2



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UNITED STATES PATENT OFFICE.

JOHN A. POTTER, OF MUNHALL, PENNSYLVANIA.

ROLLING-MILL.

SPECIFICATION forming part of Letters Patent No. 477,821, dated June 28, 1892.

Application filed April 13, 1891. Serial No. 388,704. (No model.)

To all whom it may concern:

Be it known that I, JOHN A. POTTER, of Munhall, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Rolling-Mills, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a front elevation of my improved rolling-mill, the housing being shown in vertical section on the line I I of Fig. 2. Fig. 2 is an end view of the rolling-mill.

Like symbols of reference indicate like parts in each.

The object of my invention is to provide a rolling-mill adapted especially to rolling heavy metal plates, such as armor-plates. The work put upon such rolls is of such character that when mills of ordinary construction are employed the rolls must be made of inconvenient size and weight in order to prevent breaking and excessive springing under the heavy strain. In my improved mill I am enabled to use rolls of comparatively small diameter for effecting the work of reduction. Thus I not only simplify and cheapen the cost of construction of the mill, but also improve its working materially. In practical use working rolls of small diameter have a better effect on the metal than larger rolls in that their compressing action extends to a greater degree to the center of the piece, and that the metal is thus more thoroughly wrought. These results I effect by employing, in combination with the two working rolls, outer supporting-rolls and by coupling the driving mechanism to the working rolls, so that the power shall be applied directly to them and not to the supporting-rolls.

I am aware that the use of supporting-rolls for backing the working rolls and driving them by friction is not new, and this I do not claim.

By applying the power to the working rolls the mill performs better work, acts with uniformity, and produces a regular and straight metal plate. This is not so where the supporting-rolls also drive the others frictionally.

Referring now to the drawings, 2 2 represent the roll-housings, made of strong metal castings, as shown.

3 4 are the working rolls, having bearings 5 6 at their necks. The lower roll 4 rests upon a supporting-roll 7, which is journaled in bearings 8, set at the base of the windows of the housings. The bearings 5 of the roll 3 are supported by vertical rods 9, extending from hydraulic cylinders or other suitable counterweighting mechanism, and above said roll and bearing thereon is a roll 10, having bearings 11 on the upper sides of the necks, against which fit the usual blocks 12 at the ends of the adjusting-screws 13, which pass through nuts in the housing-caps, and are actuated by suitable gearing 14. The construction of this gearing is unnecessary to be described, since it does not form a part of my invention. The rolls 7 and 10 are of somewhat larger diameter than are the rolls 3 and 4. The larger rolls I term the "supporting-rolls," because of their functions of backing and supporting the working rolls. The latter rolls are connected by usual coupling-boxes 15 with spindles 16 17, which extend to pinions (not shown) by which the power to rotate the rolls is supplied. The spindle 16 has a wabbler connection with its coupling-box, so that the roll 3 may be driven in any position in which it may be adjusted vertically.

In the operation of the rolls the metal to be reduced is passed back and forth between the rolls 3 and 4, which are reversed at each pass in the manner usual in reversing-mills, and after each pass the distance between the rolls is diminished by means of the adjusting-screws, by which the bearings of the roll 10 may be depressed so as to force down said roll and the roll 3 against the constantly-exerted lifting action of the counterbalancing mechanism. When the metal has been reduced finally to a plate of the required thickness, the adjusting-screws are reversed and permit the counterbalancing mechanism, by action on the journal-bearings 5, to lift the rolls 3 and 10 to their original position in the housings. During the action of the mill the rolls 3 and 4 are perfectly backed and supported along their entire length, and are thus prevented from being broken or strained and are

held to their work, so that they shall not spring or yield under the heavy strain. The actual reduction is performed by the rolls 3 and 4, and as these are the driven rolls of the mill their work is performed uniformly and the metal is rolled into an even and straight product.

Without limiting myself precisely to the described details of construction of the several parts, I claim—

1. In a rolling-mill, the combination of two horizontal working rolls, one of which is vertically adjustable, mechanism by which said rolls are directly rotated, and supporting-rolls of larger diameter situate on the outer sides of the working rolls, bearing frictionally thereon and driven only by such frictional contact, substantially as and for the purposes described.

2. In a rolling-mill, the combination of two working rolls, one of which is vertically adjustable, mechanism for rotating said rolls directly, and supporting-rolls bearing upon the outer sides of the working rolls and driven by frictional contact therewith, substantially as and for the purposes described.

In testimony whereof I have hereunto set my hand this 8th day of April, A. D. 1891.

JOHN A. POTTER.

Witnesses:
W. H. CORBETT,
A. C. DINKEY.