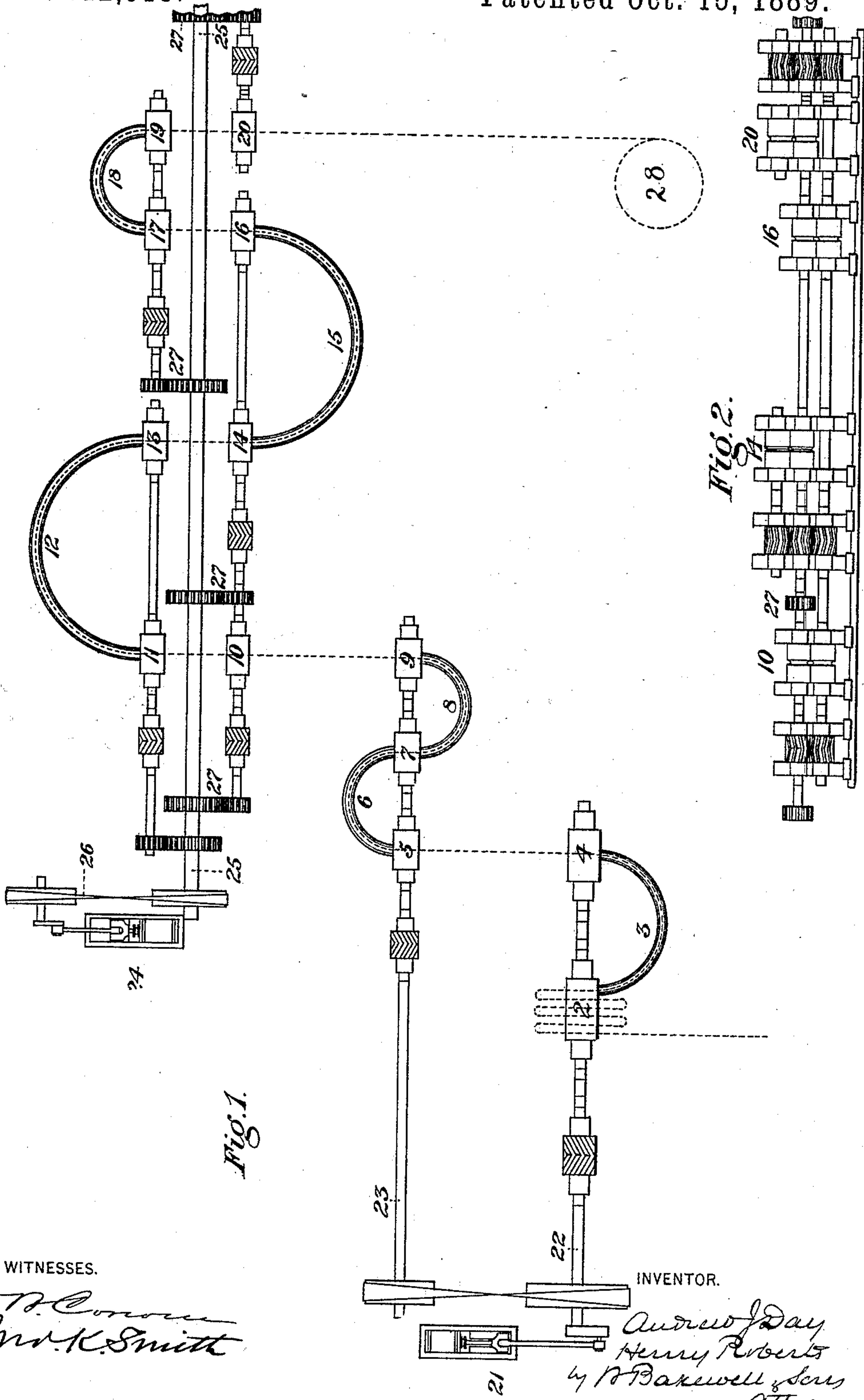


(No Model.)

A. J. DAY & H. ROBERTS.
ROD ROLLING MILL.

No. 412,915.

Patented Oct. 15, 1889.



WITNESSES.

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UNITED STATES PATENT OFFICE.

ANDREW J. DAY AND HENRY ROBERTS, OF PITTSBURG, PENNSYLVANIA.

ROD-ROLLING MILL.

SPECIFICATION forming part of Letters Patent No. 412,915, dated October 15, 1889.

Application filed June 6, 1889. Serial No. 313,270. (No model.)

To all whom it may concern:

Be it known that we, ANDREW J. DAY and HENRY ROBERTS, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have
5 invented a new and useful Improvement in Rod-Rolling Mills, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, in which—

10 Figure 1 is a general plan view of our improved rod-mill. Fig. 2 is a front elevation of part of the mill.

Like symbols of reference indicate like parts in each.

15 In the drawings, 2 represents a set of three-high rolls for roughing the metal billet before it is passed through the rolls, hereinafter described.

20 4 is a set of rolls arranged, preferably, in line with the rolls 2, and 3 is a curved guide-trough or repeater connecting these rolls.

5 is a set of rolls whose pass is in line with the pass of the rolls 4.

25 7 and 9 are sets of rolls whose axes are preferably in line with the rolls 5, and 6 and 8 are repeaters connecting the rolls 5 and 7 and 7 and 9, respectively.

30 10 and 11 are sets of rolls whose axes are parallel with the axes of the rolls 9, and which are set opposite to each other.

13 and 14 are sets of rolls whose axes are in line with the rolls 11 and 10, respectively.

35 16, 17, 19, and 20 are sets of rolls arranged with their axes parallel to the axes of the rolls 11 and 13 and 10 and 14.

40 12, 15, and 18 are curved repeaters connecting the passes of the rolls 11 and 13, 14 and 16, and 17 and 19, respectively. The rolls 2, 4, 5, 7, and 9 are driven, preferably, from a common engine 21, connected therewith by
45 shafts 22 and 23, as clearly shown in the drawings, and the gearing by which the rolls are driven is arranged so that each of the succeeding sets of rolls 2, 4, 5, 7, and 9 shall re-
50 volve in a contrary direction. The remaining rolls form what we shall designate as the "compound continuous mill," (so called because it comprises several sets of rolls arranged, for example, like the rolls 10 and 11 in the manner of a continuous mill,) and are preferably driven by an engine 24, which is geared

with a counter-shaft 25 by a belt-connection 26.

27 27 are gear-wheels connecting the shaft 25 with the driving-shafts of the rolls of the
55 compound continuous mill. The manner in which these rolls are set in their housings and their connections with the driving-shafts and pinions are clearly shown in the drawings. By means of such arrangement the
60 rolls 10 and 11 and 16 and 17 are caused to rotate in the same direction, and the rolls 13 and 14 and 19 and 20 to rotate in the opposite direction.

The operation of the mill-plant is as follows: The billet after it is taken from the
65 heating-furnace is passed back and forth through the roughing-rolls 2 until it is somewhat elongated, and from these rolls it is delivered through the repeater 3 to the rolls 4,
70 whence it passes in a continuous course through the rolls 5, repeater 6, rolls 7, repeater 8, rolls 9, 10, and 11, repeater 12, rolls 13 and 14, repeater 15, rolls 16 and 17, repeater 18, and rolls 19 and 20 to a reel 28, or
75 other suitable coiling apparatus.

The advantages of our invention will be appreciated by those skilled in the art. By use of our improved plant a metal billet may be rolled into a rod with very little handling
80 of the metal, and as the arrangement of rolls is compact the rod may be subjected to a considerable number of reductions by successive rolls without the use of an unduly large mill. In the rolls of the compound continuous mill, beginning with the rolls 10, the
85 passes are so formed as to change the sections of the metal rod alternately from square to oval shape. Thus the rolls 10, 13, 16, and 19 impart oval section to the rod, and the
90 rolls 11, 14, and 17 a square section. The repeaters 12, 15, and 18 are therefore in such position that the rod passing therethrough shall be of square section, and we are thus enabled by using two lines of rolls to guide
95 the rod in its entire course through them by means of repeaters, whereas, owing to the fact that the rod when in oval section is not sufficiently rigid to be thus guided, repeaters can be used on only one side of the rolls
100 when but a single line is used, as is now the common practice.

As compared with a continuous mill, our improved plant possesses many advantages, principally in that by using the repeaters the introduction of the rod into the passes of the successive rolls is effected with very great certainty, and the overfeed is easier to manage and control.

We claim—

1. In a rod-rolling-mill plant, rolls arranged in two or more adjacent series—such as the series of rolls 10 and 11, 13 and 14, 16 and 17, and 19 and 20—connected by repeaters, the grooves of the delivery-rolls of each series being shaped to impart a substantially square or round section to the rod, and the last pair in order of the rolls forming a finishing pass for the rod, substantially as and for the purposes described.

2. In a rod-rolling-mill plant, rolls arranged in two or more adjacent series—such as the series of rolls 10 and 11, 13 and 14, 16 and 17, and 19 and 20—roughing-rolls, and two or

more intermediate sets of rolls—such as the rolls 4, 5, 7, and 9—substantially as and for the purposes described.

3. In a rod-rolling-mill plant, rolls arranged in two or more adjacent series—such as the series of rolls 10 and 11, 13 and 14, 16 and 17, and 19 and 20—connected by repeaters, the grooves of the delivery-rolls of each series being shaped to impart a substantially square or round section to the rod, and the last pair in order of the rolls forming a finishing pass for the rod, roughing-rolls, and two or more intermediate sets of rolls—such as the rolls 4, 5, 7, and 9—substantially as and for the purposes described.

In witness whereof we have hereunto set our hands this 22d day of May, A. D. 1889.

ANDREW J. DAY.

HENRY ROBERTS.

Witnesses:

W. B. CORWIN,

JNO. K. SMITH.