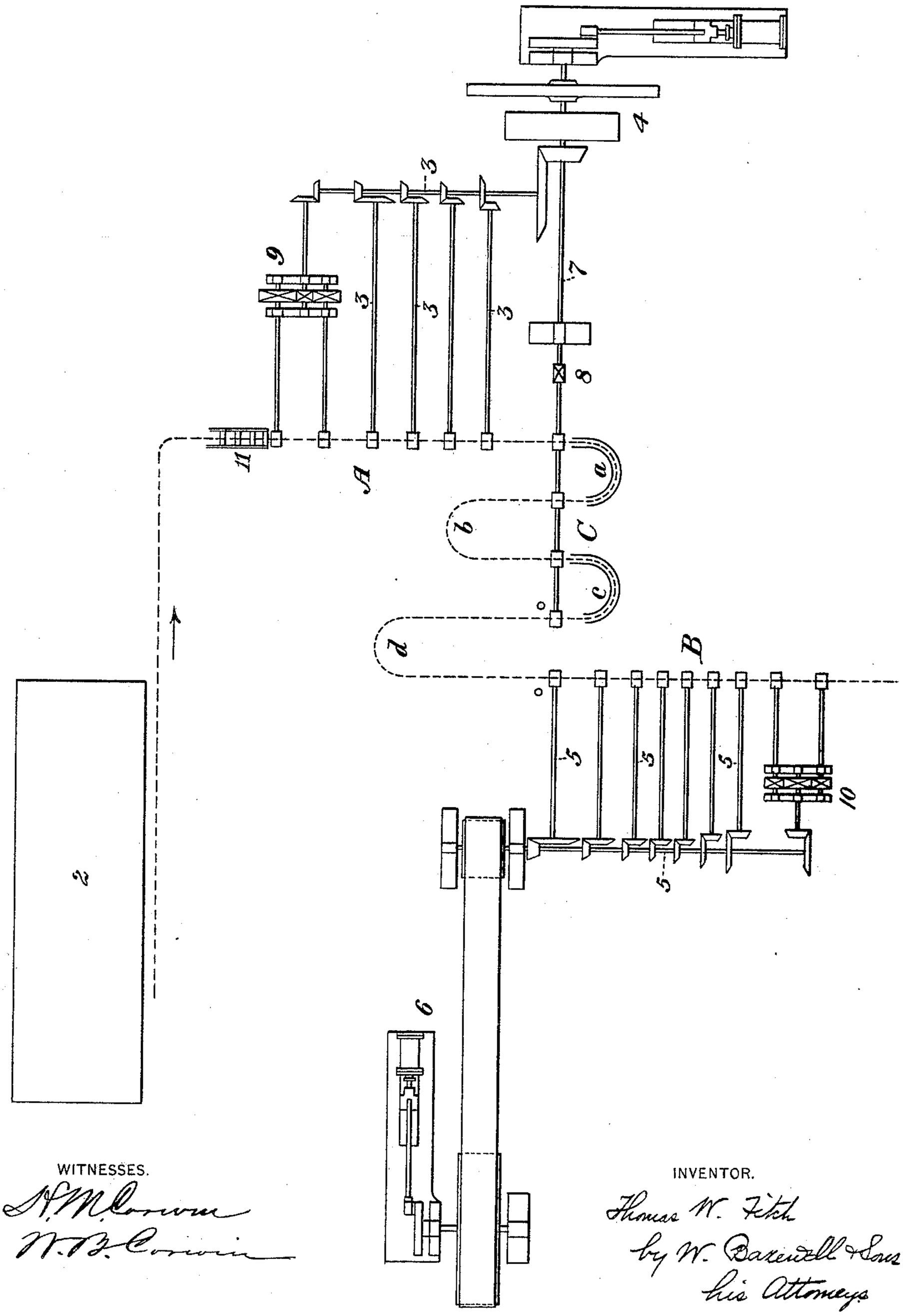
(No Model.)

T. W. FITCH.

CONTINUOUS WIRE ROD MILL.

No. 435,815. Patented Sept. 2, 1890.



WITNESSES.

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THOMAS W. FITCH, OF EDGEWOODVILLE, PENNSYLVANIA.

CONTINUOUS WIRE-ROD MILL.

SPECIFICATION forming part of Letters Patent No. 435,815, dated September 2, 1890.

Application filed July 17, 1890. Serial No. 359,040. (No model.)

To all whom it may concern:

Be it known that I, THOMAS W. FITCH, of Edgewoodville, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Continuous Wire-Rod Mills, of which the following is a full, clear, and exact description.

The class of wire-rod mills to which my invention relates is the continuous mill in which the metal billet in the course of its reduction to rod form is passed in direct or continuous passes through a line or series of rolls of progressively-increasing surface velocity. A difficulty incident to the use of such mills is that if the rolls be driven at sufficient surface speed to effect the reduction of the billet to a rod at one heat it is hard to control the overfeed loops between the rolls, and if the rolls be geared so as to prevent entirely the overfeed their speed becomes inconveniently great. Another difficulty arises from the fact that in rolling from a large billet it is generally impracticable to drive the whole series with a single driving-engine, and if two driving-engines be employed for the same series it is practically impossible to cause them to run together at a uniform speed, so that the rod is apt either to be drawn with too great tension or to overfeed unduly between the rolls.

My invention is designed to obviate these difficulties and to provide a mill compact and convenient in arrangement capable of operation with a minimum of manual labor.

It consists in combining with two series of continuously-arranged rolls an intermediate series of rolls through which the rod travels back and forth in loops. The loops are controlled without difficulty in the same manner as in the ordinary Belgian mill, and, as they constitute a loose flexible portion of the rod between the two continuous trains, they enable the latter to be driven by different engines and with the proper difference in speed without danger of injuring, breaking, or buckling the rod.

In the drawing, 2 represents the usual heating furnace or furnaces.

A is the first continuous series of rolls constituting the billet-train. These are arranged in line with their axes substantially parallel and are driven by shafting 3 from a suitable driving-engine 4.

B is the second continuous series of rolls, arranged in advance of and preferably parallel with the series A and driven through shafts 5 by an engine 6.

The intermediate roll series C consists of rolls set with their axes in line with or parallel with each other, the first set being preferably situate directly opposite the last pass of the series A, and the last set may be in line with the first pass of the series B. The rolls of the intermediate series are preferably driven through shafting 7 and pinions 8 by the engine 4, with which they are geared, so as to run at a rate of speed greater than that of the series A. The first two passes of the series A may be caused by pinions 9 to rotate at a considerably lower rate than the other rolls of the series, and the speed of the last passes of the series B may be accelerated in like manner by pinions 10. The progressive increase in speed of the other rolls of each series may be effected by increasing their diameters in the manner commonly practiced in rod-mills.

The operation is as follows: The heated billet is taken from the furnace 2 and conveyed to the feed-table 11 of the billet-train, from which it passes in continuous course through the rolls of this train. From the last pass of the billet-train the elongated rod enters the first pass of the train C, and through the rolls of this train to the first pass of the series B it passes back and forth in loops *a b c d*, of which the loops *a* and *c* are of square or round cross-section and may be guided by curved repeaters, while the loops *b d* are of oval section, and in forming these loops the emerging end of the rod should be seized by the tongs of the workman, sheared, and introduced into the next roll-pass. The rod travels in continuous course through the rolls of the series B, from the last pass of which it may be conducted to a suitable reeling or coiling apparatus. (Not shown.) The continuous-roll series should be provided with suitable conductors and guides to direct the rod from each pass to the next; but as these

may be of the common and well-known construction I have not deemed it necessary to illustrate them in the drawing.

The advantages of my invention will be appreciated by those skilled in the art.

The mill may be varied in arrangement without departing from the principles of my invention, which, broadly considered, consists in a mill in which a series of loop-rolls is interposed between two continuous series of rolls.

I claim—

1. In a wire-rod mill, the combination of two continuous series of rolls and an intermediate loop-train through which the rod passes in loops in its course from the first series to the second, substantially as and for the purposes described.

2. In a wire-rod mill, the combination of two continuous series of rolls and an intermediate loop-train through which the rod passes in loops in its course from the first series to the second, and a separate driving-engine for each of the continuous series, substantially as and for the purposes described.

3. In a wire-rod mill, the combination of two continuous series of rolls and an intermediate loop-train through which the rod passes in loops in its course from the first series to the second, the first pass of the loop series being directly in advance of the last pass of the first continuous series, substantially as and for the purposes described.

In testimony whereof I have hereunto set my hand this 10th day of July, A. D. 1890.

THOMAS W. FITCH.

Witnesses:
W. B. CORWIN,
H. M. CORWIN.