

No. 619,036.

Patented Feb. 7, 1899.

P. L. DAY.
WIRE ROD MILL.

(Application filed Feb. 8, 1898.)

(No Model.)

Fig. 3.

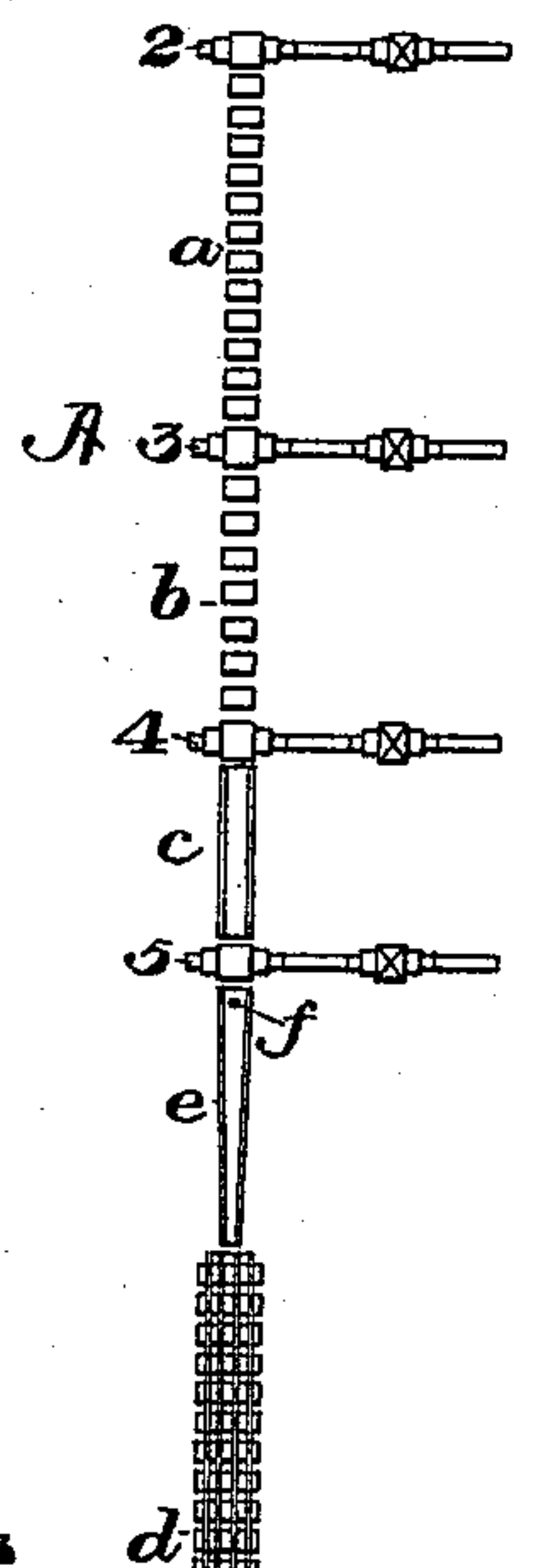
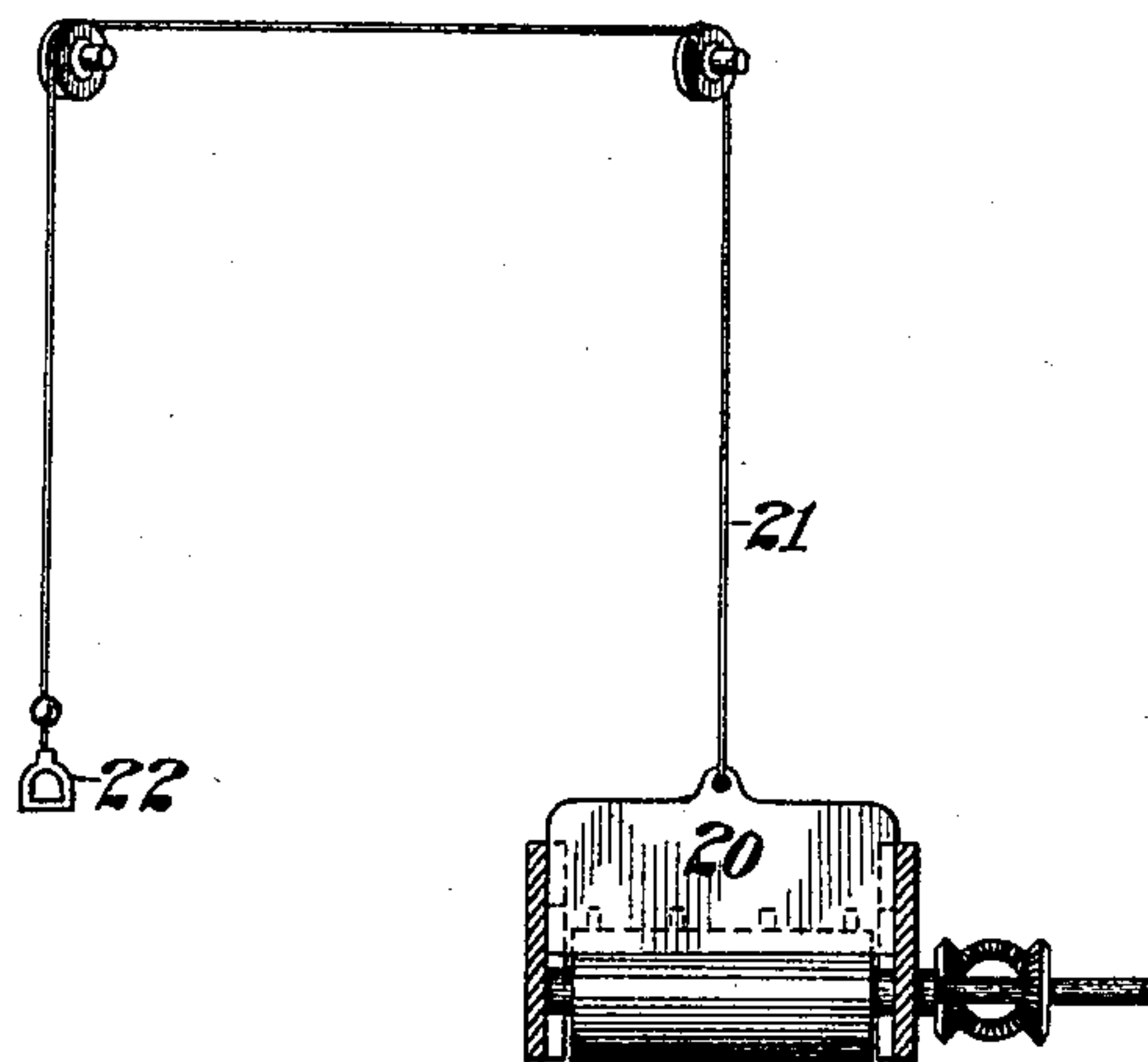


Fig. 1.

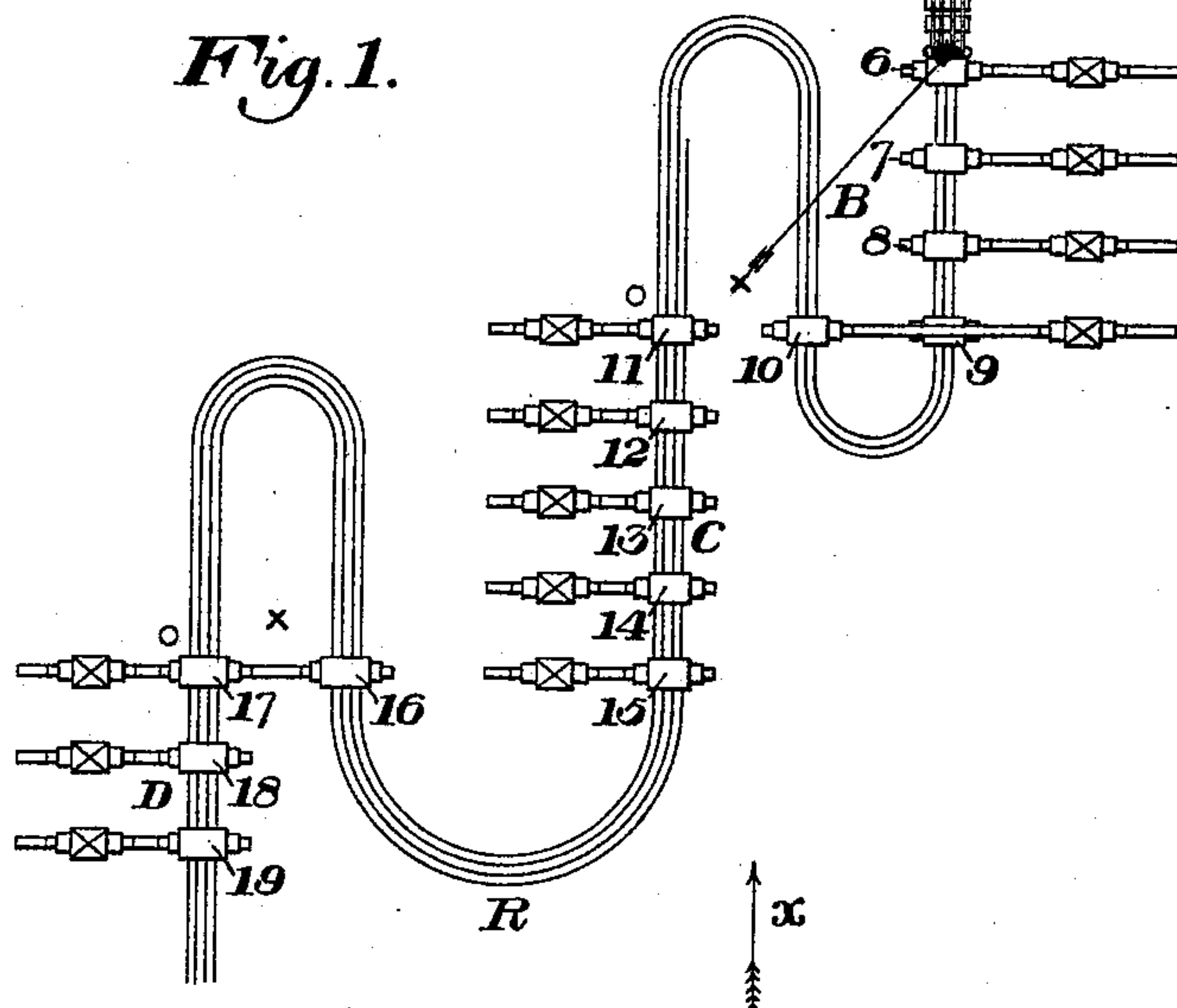
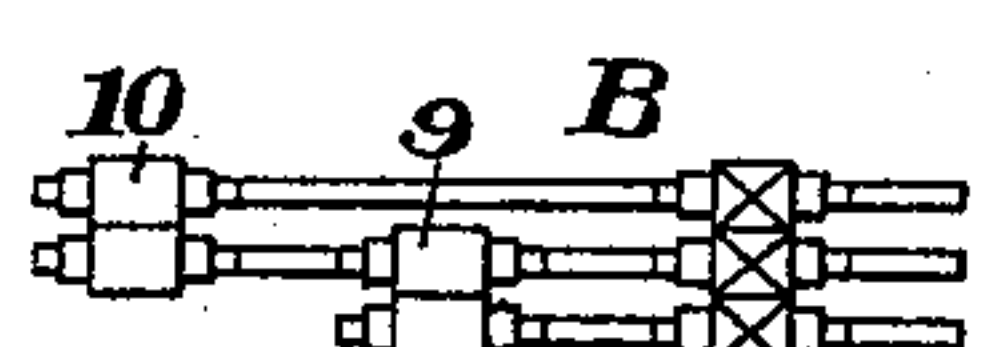
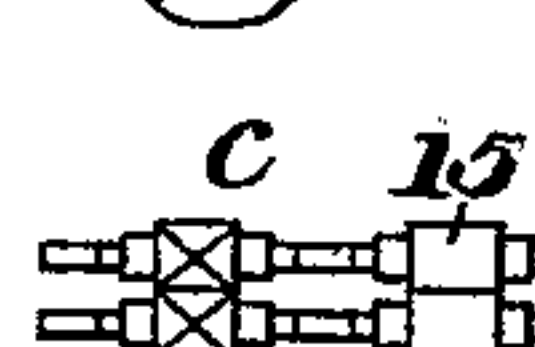
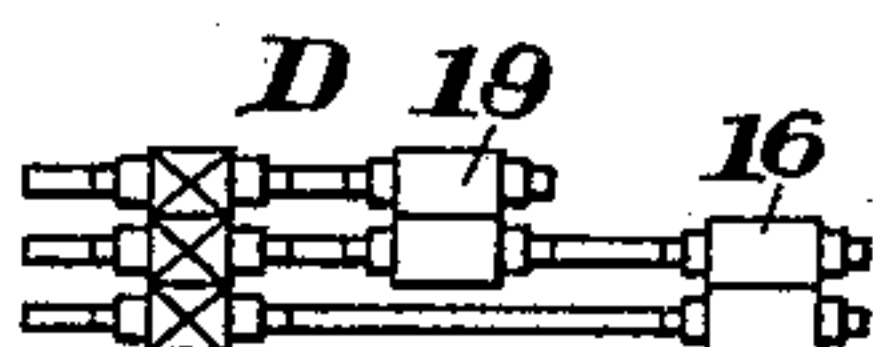


Fig. 2.



WITNESSES

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UNITED STATES PATENT OFFICE.

PATRICK L. DAY, OF CLEVELAND, OHIO.

WIRE-ROD MILL.

SPECIFICATION forming part of Letters Patent No. 619,036, dated February 7, 1899.

Application filed February 8, 1898. Serial No. 669,488. (No model.)

To all whom it may concern:

Be it known that I, PATRICK L. DAY, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented a new and useful Improvement in Wire-Rod 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 plan view showing one form of a wire-rod mill constructed in accordance with my invention. Fig. 2 is an end elevation of the same, looking in the direction of the arrow *x* of Fig. 1; and Fig. 3 is a detail view showing the connections for operating the stop upon the feed-table.

By my invention I provide a mill capable of operation with less labor than the Garrett mill, which is the best-known type at present in use, and of producing a greater output and more perfectly formed rods than is possible with mills heretofore known, either of the Garrett type or of the continuous type. I effect this result by dividing the finishing-train into two separate continuous trains and placing one or more loop-rolls between these parts of the finishing-train. By this arrangement I overcome the common difficulties incident to continuous mills—namely, that they cause the finishing of the rod when too hot—and I also overcome the difficulty due to the overfilling of the grooves of the rolls by the last end of the rod, which occurs in continuous mills because of the less stretching and elongating which occurs at the last end of the rod and which unless prevented would produce a finned and bad product. Furthermore, the arrangement of my mill enables me to regulate at any desired point the speed of the finishing-rolls—a thing which is impossible in continuous mills as heretofore constructed. The practical advantages which result from these facts will be appreciated by those skilled in the art of rod-rolling.

In the drawings, A represents a continuous train of rolls 2 3 4 5, which are the roughing-rolls, and between which are arranged a series of conveying-rollers *a b* and a trough *c*. B is a second continuous set of rolls 6 7 8 9, and between the sets B and A is a line of conveying-rollers *d*. The rollers are adapted to convey the metal rod from the rolls 5 to the

rolls 6 and are provided with surface guide-rails, by which the metal may be directed to any one of the several passes of the rolls 6. For directing the metal to the proper one of said guides I employ between the rolls 5 and the ends of the rollers *d* a swinging guide-trough *e*, which may be pivoted at a point *f*.

Succeeding the continuous set of rolls B is a pair of rolls 10, arranged end to end relatively to the rolls 9 and to the rolls 11 of a continuous train of rolls C, and the rod as it comes from the rolls 9 passes through the rolls 10 and 11 in loops, and thence passes through the successive rolls 12 13 14 15 of the continuous train C.

Succeeding the continuous train C is a pair of rolls 16, to which the rod passes in a loop from the rolls 15, and succeeding the rolls 16 is a set of continuous rolls D, comprising rolls 17 18 19, to which the rod passes in a loop from the rolls 16. From the rolls 19 the rods pass to the reels, which may be located in any convenient position.

R is a repeater arranged to take care of a square loop between the continuous train C and the rolls 16, it being understood that the rod is converted alternately from oval or diamond section to a square section in the ordinary manner.

The various pairs of rolls may be driven by any suitable connection with driving mechanisms or motors.

Whenever it is desired in the operation of the mill, the rod after it has passed the set of rolls A may be stopped on the line of rollers *d* for the desired length of time by dropping the stop or gate 20, which is connected by a wire or chain 21 to a handle 22, located at the point where the sticker-in stands near the rolls 10, and in this way cobbles and scrap may be prevented from forming in cases where the advance rolls of the mill are not ready to receive the rod. The alternation of the loop arrangement of rolls with the continuous trains of rolls is a great advantage, because it reduces and takes out the surplus amount of stock from the rear end of the rod occasioned inevitably in the continuous trains and prevents, in great part at least, the finning of the rod and the consequent waste which would result from such finning.

By separating the train of billet-rolls A

from the succeeding train of rolls B by the intermediate conveying-rollers I am enabled to carry on the work of the roughing-train with a less number of grooves in the rough-
 5 ing-rolls than in the succeeding train of rolls, and in like manner by the interposition of loop-forming rolls between the several continuous trains the successive trains of rolls can be provided with a successively greater
 10 number of grooves instead of, as in ordinary continuous mills, making all the parts of the mill of rolls having the same number of grooves.

By reason of the arrangement of the finishing-train of rolls D the sticker-in, who
 15 stands in front of the rolls 17, if he sees that the end of the rod fails to enter properly either of the rolls 18 and 19 or the reels may cut off the rod and introduce the severed end
 20 into another groove. In this way frequent source of waste by scrap is prevented.

I have indicated on the drawings by an X the position where a man may stand to reflex the oval rods to form the loops and by circles O
 25 places where shears may be put to shear off the end of the rod.

In cases where the billet is supplied to the mill of sufficiently small cross-section the train of rolls A may be dispensed with, or
 30 where the larger size of billet than a four-inch billet is supplied to the mill additional rolls may be added to the train A in order to provide for such greater section.

It will be seen that instead of using one
 35 continuous train for the finishing-train, such as shown in the United States Patent to T. W. Fitch, No. 435,815, dated September 2, 1890, I have divided this finishing-train into two separate continuous trains and placed a loop-
 40 train between these parts of the finishing-train. I thus avoid the trouble which has always occurred by reason of the rod not properly entering one or more of the latter

passes of the continuous finishing-train, since by my improved arrangement the rod is in- 45
 serted by hand into the first pass of the mill D, and the trouble thus avoided. The loop-train between these parts of the continuous finishing-train reduces the speed of the rod to a point where it may be seized and inserted 50
 in the first set of rolls of the train D.

Many variations in the arrangement of the rolls and their driving mechanism may be made without departing from my invention, since 55

What I claim is—

1. A rod-mill having a continuous train, a finishing-train divided into separate continuous trains, and loop-rolls both before the first part of the finishing-train and between the 60
 parts of the finishing-train; substantially as described.

2. A rod-mill having a continuous roughing-train, an intermediate continuous train, and a finishing-train divided into separate 65
 continuous trains, and loop-rolls between the intermediate train and the first part of the continuous train, and between the parts of the finishing-train; substantially as described.

3. A rod-mill having two continuous trains 70
 of rolls arranged in line with intermediate positively-driven feed mechanism between them, said feed mechanism having a stop under the control of the operator, a finishing-train divided into two continuous trains, and 75
 loop-rolls between the second continuous train and the first part of the finishing-train and between the two parts of the finishing-train; substantially as described.

In testimony whereof I have hereunto set 80
 my hand.

PATRICK L. DAY.

Witnesses:

THOS. E. PIGOTT,
 H. A. WILLIAMS.