

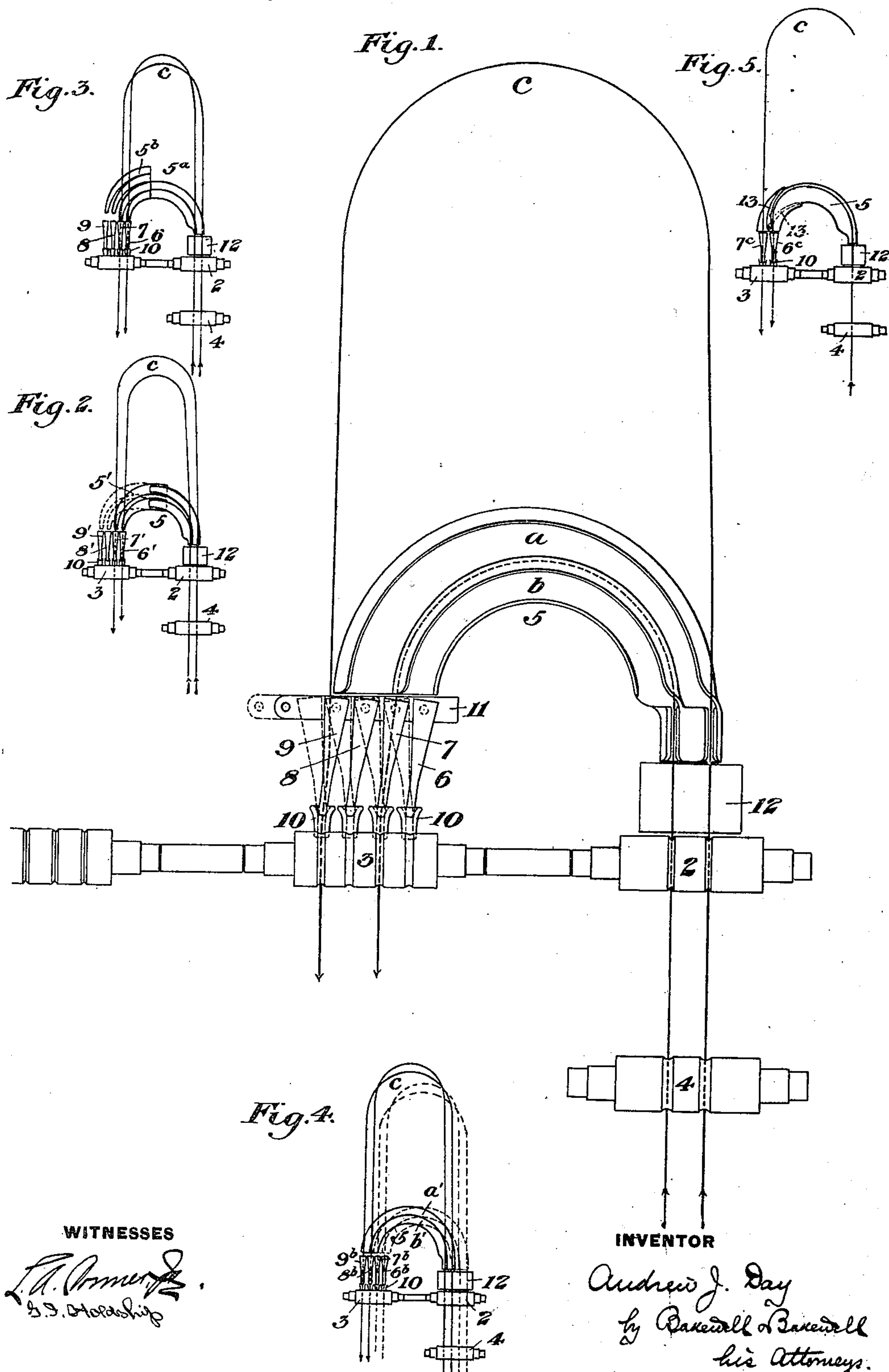
No. 670,271.

Patented Mar. 19, 1901.

A. J. DAY.  
WIRE ROD MILL.

(Application filed July 28, 1900.)

(No Model.)



WITNESSES

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# UNITED STATES PATENT OFFICE.

ANDREW J. DAY, OF PITTSBURG, PENNSYLVANIA.

## WIRE-ROD MILL.

SPECIFICATION forming part of Letters Patent No. 670,271, dated March 19, 1901.

Application filed July 26, 1900. Serial No. 24,958. (No model.)

*To all whom it may concern:*

Be it known that I, ANDREW J. DAY, of  
Pittsburg, in the county of Allegheny and  
State of Pennsylvania, have invented a new  
5 and useful Improvement in Wire-Rod Mills,  
of which the following is a full, clear, and ex-  
act description, reference being had to the  
accompanying drawings, forming part of this  
specification, in which—

10 Figure 1 shows in plan view repeater mech-  
anism and rolls constructed in accordance  
with my invention. Figs. 2, 3, 4, and 5 show  
in diagram modifications thereof.

My invention is designed to enable large  
15 billets of steel to be rolled into rods without  
incurring the difficulty which would arise  
from the excessive length of the loops into  
which the rod is formed, causing the rod to  
become chilled and preventing the successful  
20 continuance of the rolling operation. To this  
end I provide in connection with two of the  
sets of the rolls through which the rod passes  
repeater mechanism adapted to conduct the  
rod from one set of rolls to the next and ar-  
25 range the delivery end of the repeater mech-  
anism, or a bell-mouth thereof, so that it shall  
be movable and adapted to transfer the cut  
end of a traveling rod and to cause it to en-  
ter a pass of the receiving-rolls different from  
30 that through which the rod passes previously  
to being cut. By these means I am enabled  
to cut the rod at a middle portion at one of  
the loops, and by mechanically transferring  
the cut end—that is, the front end of the rear  
35 section of the rod-loop—into another pass of  
the receiving-rolls of the loop. By thus di-  
viding the rod into sections, which travel si-  
multaneously through different passes of the  
rolls, I am enabled to roll a billet of very  
40 large size without forming loops of excessive  
length, and I thus avoid the difficulty of  
chilling the metal, which would otherwise in-  
terfere with the operation. It is important  
that in thus effecting the transfer of the front  
45 end of the rear section to another pass of the  
rolls the transfer be effected by moving the  
repeater mechanism at the delivery portion,  
since by so doing I am enabled to perform  
this operation without causing the front end  
50 of the rear section of the rod to be deflected  
as it enters the repeater from the delivery-  
rolls. The deflection of the rod in my inven-

tion is caused only at the receiving-rolls, and  
this does no harm; but if the rod be mate-  
rially deflected at the delivery-rolls on its 55  
entrance into the repeater it will prevent the  
successful operation of the device, because it  
will either cause the rod to buckle or kink in  
the repeater or it may prevent it from trav-  
eling around through the repeater at all. 60  
These difficulties do not occur in apparatus  
constructed in accordance with my invention.

Referring now to the drawings, 2 3 repre-  
sent two rolls of a wire-rod mill between  
which a loop is formed, 2 being the primary 65  
or delivery rolls and 3 the receiving-rolls.

4 represents a set of rolls through which  
the rod travels to the rolls 2 and which may  
be set in any suitable position relatively to  
the rolls 2. 70

The repeater mechanism comprises a curved  
trough 5, which may have two or more grooves  
a b and is adapted to receive the rods from  
the passes of the primary rolls 2. The re-  
peater mechanism is movable at its delivery 75  
end. As shown in Fig. 1, I effect this by em-  
ploying a series of bell-mouth pieces 6, 7, 8,  
and 9, the ends of which are set in the guides  
10 in front of the rolls 3 and the rear ends of  
which are connected with a movable slide 11, 80  
which can be moved back and forth across  
the ends of the grooves of the repeater, with-  
out, however, disconnecting the front ends of  
the bell-mouth sections from the guides in  
which they fit. Between the receiving end 85  
of the repeater and the rolls 2 is a chopping-  
block 12, at which the workman may cut the  
rod in two with a hatchet, or any suitable  
shear mechanism may be situated at this  
place for the same purpose. 90

In the operation of the device shown in Fig.  
1 the front end of the rod leading to the rolls  
2 passes around the curved trough 5, through  
the groove a thereof, and is guided by said  
groove through the bell-mouth 9 and guide 95  
10 to the pass of the rolls 3, with which the  
guide registers. The rod thus forms a loop  
which passing out of the repeater in the usual  
way extends over the floor of the mill, as  
shown at c. At a suitable point in the length 100  
of the rod the workman standing at the rolls  
2 cuts the rod in two, having previously  
moved the slide 11 to the left into the posi-  
tion shown by dotted lines. This motion of



the slide transfers the receiving end of the bell-mouth section 8, so as to bring it opposite to the groove *a*, but leaves the bell-mouth 9 in register with the guide 10, so that the travel of the front section of the rod is not interfered with. The front end of the rear section when cut passes on through the groove *a* and is guided thereby so as to enter the bell-mouth 8, which is then in register with the groove *a*, and is deflected by the bell-mouth into the second of the guides 10, entering thereby a pass of the rolls different from that through which the first section of the rod has traveled. Thenceforward the two sections of the rod travel through the mill without interference and through different roll-passes and the operation is proceeded with just as when two distinct rods are being rolled side by side or in succession. It will be noticed that the front end of the rear section of the rod is not deflected on its entrance into the groove *a*, but passes thereinto in a straight line, so that there is no tendency of the rod to buckle or to jump out of the trough without entering the bell-mouth section.

In the form of my device shown in Fig. 2 instead of using movable bell-mouth sections, as described above, I make the bell-mouth sections 6' 7' 8' 9' stationary and divide the trough 5 into telescopically-fitted parts, so that their delivery ends can be moved laterally to bring them from register with the bell-mouths 6' 7' into register with the adjacent bell-mouths. In the operation of this device prior to the severing of the rod the parts 5' of the curved trough are moved laterally, so as to cause the front end of the rear section of the rod to enter an adjacent bell-mouth section different from that through which the advanced portion of the rod is traveling, and in this case, as in the apparatus of Fig. 1, the front end of the rear section of the rod is not deflected at the delivery-rolls.

In the device shown in Fig. 3 the principle is the same as in Fig. 2, except that the curved trough is divided into sections 5<sup>a</sup> 5<sup>b</sup>, the receiving-section 5<sup>a</sup> being stationary and the section 5<sup>b</sup>, which has four troughs adapted to register, respectively, with the bell-mouths, being movable transversely to the section 5<sup>a</sup>. Previously to cutting the rod the section 5<sup>b</sup> is moved so as to bring a new groove opposite to the groove *a*, through which the said front end of the rear portion of the loop passes, and said front end is thereby directed into a bell-mouth and guide adjacent to and different from that through which the advance portion of the rod is traveling.

In the mechanism shown in Fig. 4 I connect the curved trough 5 with the bell-mouths 6<sup>b</sup> 7<sup>b</sup> 8<sup>b</sup> 9<sup>b</sup> and provide it with four grooves registering, respectively, with the four bell-

mouths. Before cutting the rod the entire repeater-section 5, with the bell-mouths, is shifted laterally. This brings a new trough *a'* or *b'* opposite to the pass of the rolls through which the front end of the rear severed section of the rod is coming and at the same time brings the bell-mouth with which said trough registers opposite to a pass of the rolls different from that through which the advanced section of the rod is traveling. In this case, as in the others, the front end of the rear section of the rod is not deflected on its entrance to the trough 5.

In Fig. 5 I show the trough 5 formed with a single groove, in which is placed a switch 13, arranged to deflect the front end of the rear portion of the loop to the bell-mouth adjacent to the one through which the advanced portion of the loop is passing. In this figure I show only two bell-mouths 6<sup>c</sup> 7<sup>c</sup> and a single groove in the rolls 2 and 4 and two grooves in roll 3.

In Figs. 1 to 4 I show the rolls 3 arranged with four passes and four guides and four bell-mouth sections, enabling two main rods to be passed through the rolls simultaneously and each divided into two sections; but it will be noticed that by duplication of the apparatus it may be arranged to control a greater number of the rods.

The advantages of my invention will be appreciated by those skilled in the art. The mechanism is simple in construction and it will accomplish the purpose for which it is designed, enabling large billets to be rolled and a very large output obtained from a mill.

I claim—

1. In a rod-mill, the combination with sets of rolls arranged to revolve in opposite directions, of repeater mechanism arranged to deliver the rod from one set of rolls to a succeeding set, and having a plurality of delivery end portions arranged to direct the cut end of a traveling rod to a different pass from that of the preceding section; substantially as described.

2. In a rod-mill, the combination with the rolls, of repeater mechanism arranged to deliver the rods from one set of rolls to a succeeding set revolving in the opposite direction, and having a plurality of delivery portions, said repeater mechanism being movable at its delivery portion and arranged to transfer the cut end of the traveling rod to a different pass from that through which the preceding section of the rod is traveling; substantially as described.

In testimony whereof I have hereunto set my hand.

ANDREW J. DAY.

Witnesses:

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G. I. HOLDSHIP.