J. L. AND S. A. SMITH.
RETARDER FOR ROD MILLS.
APPLICATION FILED JULY 30, 1918.

1,307,156.

Patented June 17, 1919.
3 SHEETS—SHEET 1.

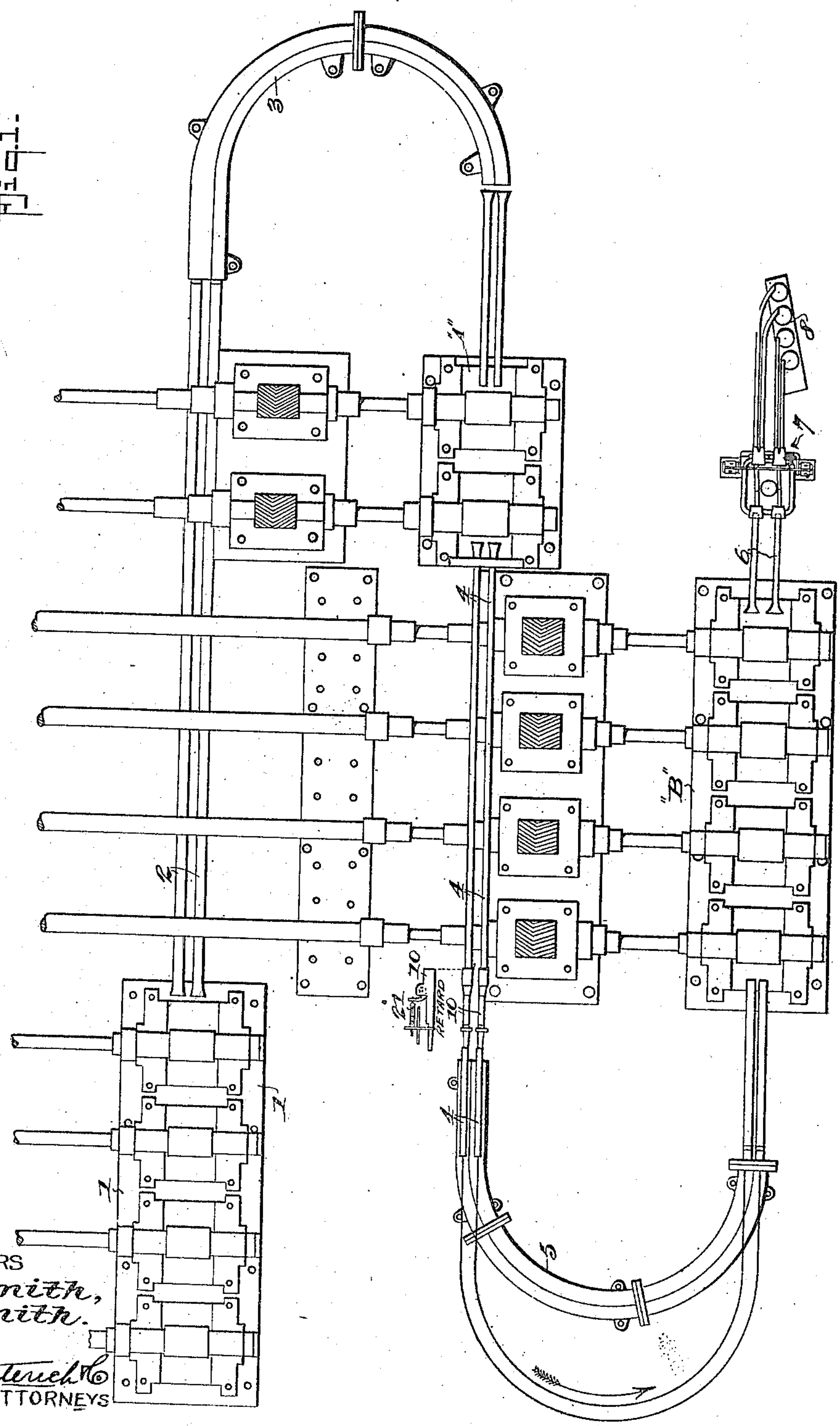


Fig. 1.

INVENTORS
J. L. Smith,
S. A. Smith.
BY
Fred G. Dieterich & Co
ATTORNEYS

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

J. L. AND S. A. SMITH.

RETARDER FOR ROD MILLS.

APPLICATION FILED JULY 30, 1918.

1,307,156.

Patented June 17, 1919.

3 SHEETS—SHEET 2.

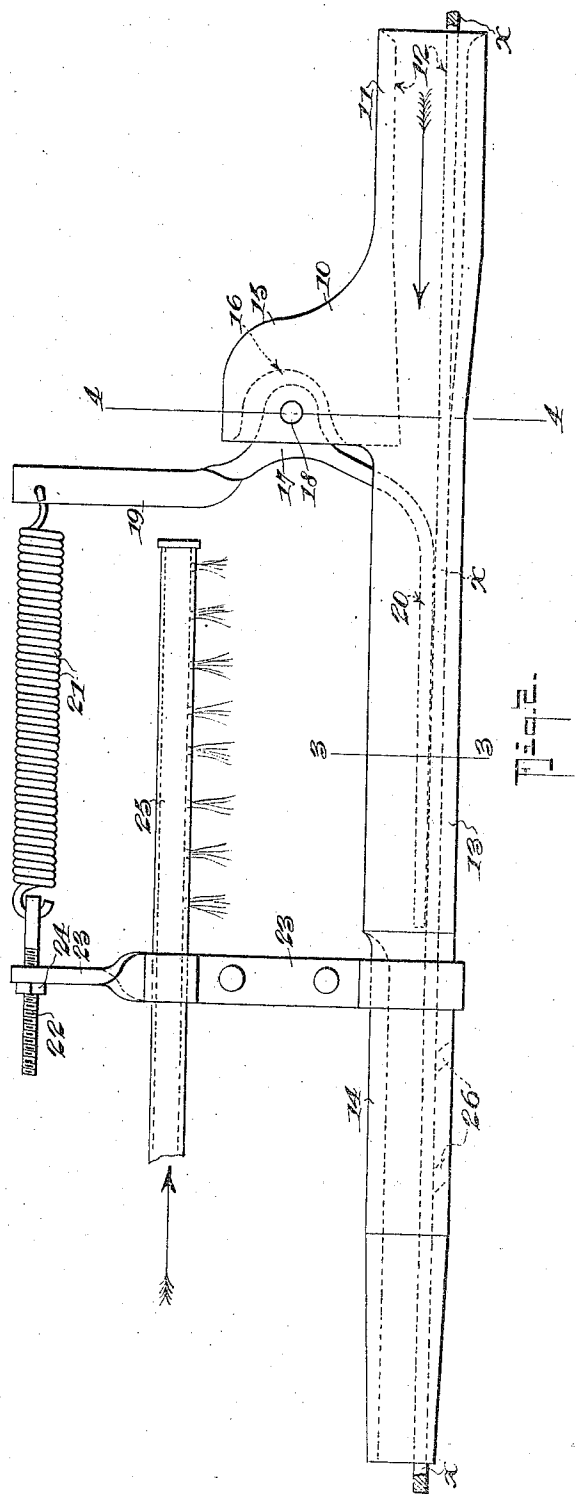


Fig. 2.

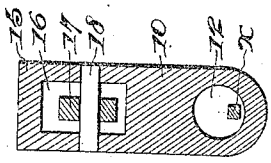


Fig. 4.

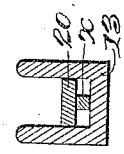


Fig. 5.



Fig. 6.

INVENTOR

J. L. Smith,

S. A. Smith.

BY

Fred J. Dieterich & Co

ATTORNEY

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

J. L. AND S. A. SMITH.

RETARDER FOR ROD MILLS.

APPLICATION FILED JULY 30, 1918.

1,307,156.

Patented June 17, 1919.

3 SHEETS—SHEET 3.

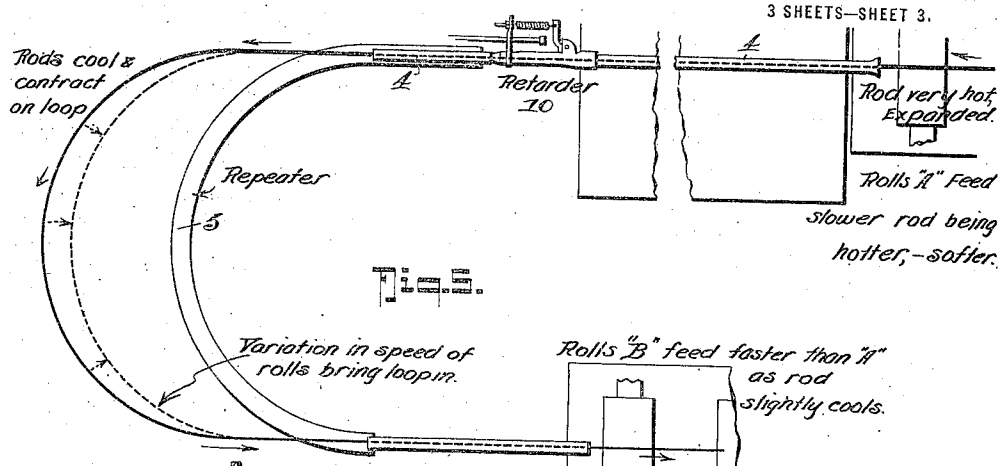


Fig. 3.

Fig. 7.

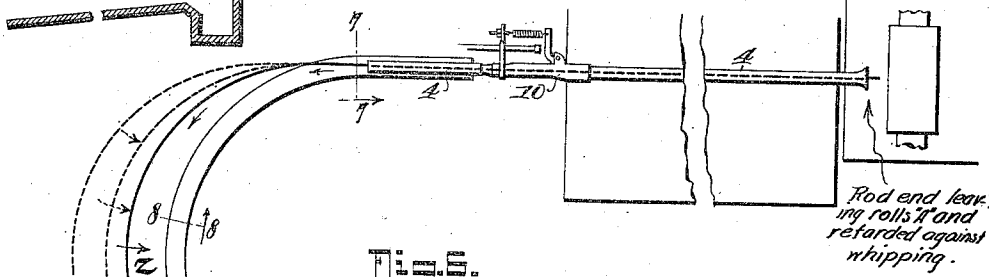


Fig. 6.

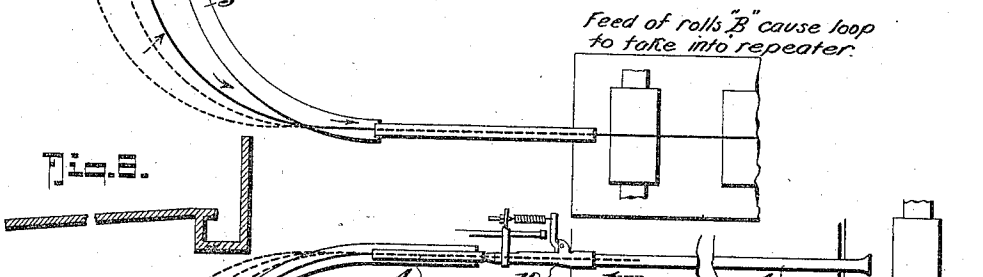


Fig. 8.

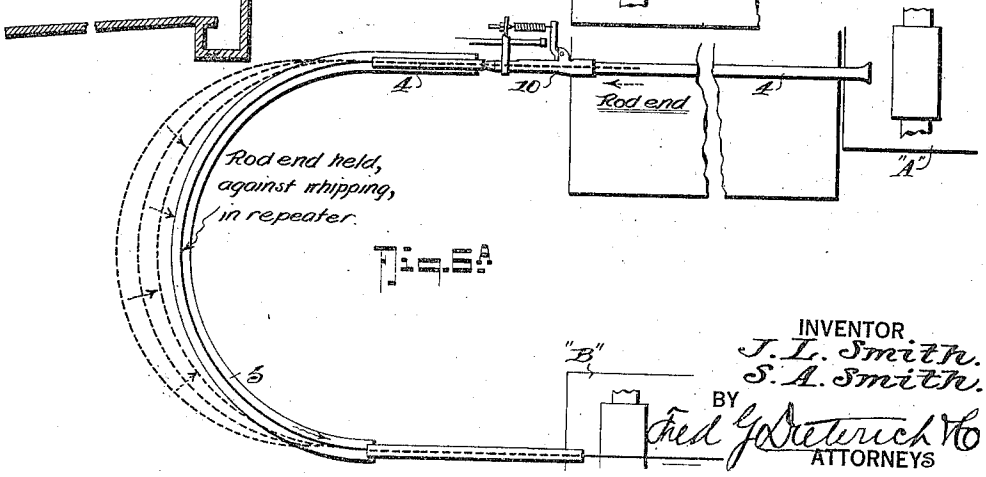


Fig. 5A.

INVENTOR
J. L. Smith.
S. A. Smith.
BY
Fred G. Dieterich Co
ATTORNEYS

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JOHN L. SMITH AND SHERIDAN A. SMITH, OF HAMILTON, ONTARIO, CANADA.

RETARDER FOR ROD-MILLS.

1,307,156. Specification of Letters Patent. Patented June 17, 1919.

Application filed July 30, 1918. Serial No. 247,397.

To all whom it may concern:

Be it known that we, JOHN L. SMITH, a citizen of the Dominion of Canada, and SHERIDAN A. SMITH, a citizen of the United States, both of whom at present reside at Hamilton, Province of Ontario, Dominion of Canada, have invented a new and useful Retarder for Rod-Mills, of which the following is a specification.

Our invention has particular reference to the application of an improved means, for use in connection with high speed rod mills wherein repeaters are used, for retarding the feed of the bar or rod in its travel toward the last repeater and the final or discharging rolls. As is well known to those skilled in the art of rod making, the billet to be reduced to rod shape is heated in a furnace to a certain degree of temperature and it is practically impossible to maintain the same degree of temperature the whole length thereof.

On high speed mills where repeaters are used, a uniform rod section cannot be made without carrying a loop of steel on the mill floor, which loop varies in length from one to fifteen feet from the last or final repeater.

Again, in the present method of rod making, the loop is carried as soon as the bar enters the last or discharging rolls as the latter are made to travel a little slower than the preceding or delivering rolls from which the bar passes to the last repeater and when a part of the bar is of higher temperature than the remainder passing through the rolls, the percentage of work on the delivering rolls, in advance of the last repeater is lighter and the next following or discharging rolls then take the material faster than the other rolls will deliver, and therefore if a loop is not carried it will cause the bar being rolled to pull and stretch in the repeater and in consequence not make a uniform section.

Among other objects, our invention has for its purpose to provide a means adapted for use in connection with high speed mills where repeaters are used, for carrying the loop of steel away from the repeater in case there would be a hot spot in the bar and prevent the final or discharging rolls from pulling the loop against the repeater.

In rod mills that include repeaters, when the bar is out of the last repeater, the final or discharging roll, traveling at a very high speed, causes the last end of the bar to "whip" and throw itself into a knot that will wedge in the guides to the final rolls, frequently causing the rod end to break off and preventing the bar following from entering the guide to the said last or final roll.

Another object of our invention is to provide a retarding means for the purpose hereinbefore stated that also operates to hold the last end of the bar and bring such end back to engage with the final repeater and thereby prevent the said bar end from whipping or knotting.

In the accompanying drawings, we have illustrated a preferred arrangement of parts that constitute our invention and while the specific mechanical construction and arrangement of the parts shown and to be hereinafter described in detail, illustrate a practical embodiment of our invention, it is to be understood that our said invention is not to be restricted to the aforesaid details of construction, since the parts as illustrated in the drawings may be readily modified or varied, within the scope of the appended claims, to suit the requirements of the particular arrangement of the stand of rolls and the repeater connections with which our invention is to form a coöperative part of a complete rod mill.

In the drawings:

Figure 1 is a substantially diagrammatic plan view of a rod mill that includes our retard mechanism.

Fig. 2 is a side elevation of the bar retarding devices.

Figs. 3 and 4 are cross sectional views, taken respectively on the lines 3—3 and 4—4 of Fig. 2.

Fig. 5 is a diagrammatic plan view of so much of the mill as is necessary to illustrate the manner in which the rod loop compensates for irregular speeds of the primary and secondary stand of rolls hereinafter specifically referred to.

Figs. 6 and 6ª are similar views that illustrate the manner in which the retarder holds back the last end of the bar being worked during the process of bringing the loop back to engage the repeater and guide the said last bar end against whipping or knotting.

Figs. 7 and 8 are detail cross sections of the last repeater taken substantially on the line 7—7 and 8—8 on Fig. 6.

Referring now more particularly to Fig. 1 of the drawings, 1 designates the first or

primary stand of finishing rolls to which the heated billets are fed in the usual manner and from which the bars pass through guides 2—2 to the first repeater 3 that directs the said bars, to what may be termed the "next to the last stand of rolls A" that operate to feed the bars through guides 4—4 that connect with the last repeater 5 that directs the bar ends to the last or bar discharging stand of rolls B, when the said bar ends are held back by our retarding means, in the manner to be hereinafter explained.

6—6 designate guides whose entrant ends receive the bars as they discharge from the rolls B and whose other ends direct the bars or rods fed from the last rolls B to a switch mechanism 7 which, in turn, directs the finished product to the stand of reels 8.

As our present invention is confined to the retarding means, generally designated retard on Fig. 1, further illustration of the other parts of the mill shown in Fig. 1, is deemed unnecessary, since the said other parts (excepting the switch mehanism, which forms the subject matter of our copending application filed August 27, 1918, Serial No. 251,706) are of a well-known arrangement of rod mill.

Our bar retarding means, which forms the subject matter of this application, in its practical application, is located just in advance of the entrant end of the last repeater and constitutes a continuation of the guide through which the bar travels from the rolls A to the last repeater 5.

Referring now to Figs. 2, 3 and 4, which illustrate the details of our bar or rod retarding means, 10 designates a casting that includes a tubular guide member 11 whose passage 12 from the ingoing end merges with a guide trough 13, U-shaped in cross section, which in turn merges with a tubular guide 14 whose outlet alines the end of the corresponding guide 4 that coöperates with the last repeater, it being understood that when a plurality of bars are being passed through the mill, as shown in Fig. 1, a repeater mechanism is provided for each of the bars and since all of the retarders are constructed alike, a detail description of the single retarding means shown in Figs. 2, 3 and 4 is deemed sufficient.

The casting 10 at the end of the guide portion 11 is formed with a vertical bracket 15 whose forward face has a socket 16 in which an apertured lug 17 is rockably mounted, the said lug engaging a pivot pin 18 that takes through the said bracket 15, as shown.

The lug 17 is an integral part of the vertical arm 19 of a presser paddle 20 that is yieldably mounted in and adapted for pressing the passing rod or bar x in frictional engagement with the bottom of the U-shaped guide trough 13, as is best shown in Fig. 3.

The paddle 20, before referred to, extends practically the full length of the guide trough 13 and it is normally held under tension, to press down in the direction of the bottom of the said trough 13 by a tension spring 21, one end of which is attached to the upper end of the vertical arm 19.

An adjusting bolt 22 connects with the other or outer end of the spring 21 and the said bolt passes through an aperture in the upper end of the bracket 23 that is made fast at its lower end to the guide 13.

An adjusting nut 24 engages the bolt 22 and the upper end of the bracket 23 for regulating the tension of the spring 21.

The bracket 23 also serves as a support for one end of a perforated water pipe 25 that is located above and is so disposed that it will deliver the water jets directly onto the paddle 20.

26—26 designate water drain holes in the guide trough 13.

From the foregoing description taken in connection with the accompanying drawings, the complete construction and the advantages resultant in the use of our retarder arranged in operative connection with the rolls A and B and the repeater located between the said rolls, will be readily apparent to those skilled in the art to which our invention relates.

The retarder located at the entrant end of the last repeater acts as a supporting guide and provides for carrying the rod loop away from the repeater. A lift device of any usual construction may be used at the entrance to the repeater to cause the loop to jump out of the repeater but as the same, *per se* and the repeater, *per se*, form no part of the present invention, but may be of the ordinary and usual shape, detailed illustration of the same is thought to be unnecessary.

By placing the retarder as shown in Fig. 1, when a part of the bar passing through the primary rolls A is of a higher temperature than the remaining portion coming through the rolls A, the percentage of work on the rolls A is thereby made lighter and as the rolls feed out the higher heated portion of the bar, the rolls B, will take the material faster than the rolls A deliver the same, and hence if the loop were not carried over the mill floor and disengaged from the repeater the now faster feed of the rolls B will cause the bar to pull and stretch on the repeater and in consequence not produce a uniform section.

By providing means for keeping the loop away from the repeater, as stated and shown, the rolls B can take the material and still not pull it against the repeater, as the loop, in practice, is very large and the difference in the speed of the bar feeding out from the rolls A and the speed of the rolls B pulling the bar in, is compensated for by the

loop resting on the floor away from the repeater.

Furthermore since the retarder includes a clamp device or presser foot that constantly presses the traveling bar against the bottom of the guide trough 13, it follows that when the bar is out of the repeater, and the rolls B traveling fast, by retarding the forward feed or movement of the said last end of the bar and holding the said end back, any tendency of the said bar end to whip or knot is overcome by reason of the loop being now pulled in the direction of the arrow Z, as shown in Fig. 6, and back into the repeater to cause the free end of the bar to travel within the trough passage of the repeater, see Fig. 6a.

The means for water cooling the presser paddle, is provided to keep cool the said paddle and keep it from getting red hot, by reason of its continuous contact with the passing bar, it being obvious that unless constantly cooled, the paddle would bend and thereby lose its usefulness.

Thus, with our improved device applied to a rolling mill of the general character stated, a simple, inexpensive and efficient means is provided and so arranged that a loop of steel can be readily carried away from the repeater, when a hot spot in the bar is being worked by the rolls A under a speed relatively slower than the speed of the outfeeding or pulling rolls B, thereby producing a better rod and overcoming all tendency of the last end of the bar to whip and knot.

What we claim is:—

1. In a rolling mill wherein is provided first and second sets of rolls and a repeater located between said sets of rolls with provisions for allowing the bar to be lifted out of the repeater, a retarder for holding back the following end of the bar when it leaves the first set of rolls.

2. In a rolling mill wherein is provided first and second sets of rolls and a repeater located between said sets of rolls with provisions for allowing the bar to be lifted out of the repeater; a retarder for holding back the following end of the bar when it leaves the first set of rolls, said retarder comprising a guide through which the bar passes and a presser foot engaging the bar in the guide and serving to hold the following end of the bar until it is pulled through the guide.

3. In a rolling mill wherein is provided first and second sets of rolls and a repeater located between said sets of rolls with provisions for allowing the bar to be lifted out of the repeater; a retarder for holding back the following end of the bar when it leaves the first set of rolls, said retarder comprising a guide through which the bar passes, a clamp device for restraining the following end of the bar when it leaves the first set of rolls and holding it until the loop has been drawn into the repeater and the bar end pulled out of the guide by the second set of rolls.

4. In a rolling mill wherein is provided first and second sets of rolls and a repeater located between said sets of rolls with provisions for allowing the bar to be lifted out of the repeater; a retarder for holding back the following end of the bar when it leaves the first set of rolls, said retarder comprising a guide through which the bar passes and a presser foot engaging the bar in the guide and serving to hold the following end of the bar until it is pulled through the guide, and a spring tension device for said presser foot.

5. In a rolling mill wherein is provided first and second sets of rolls and a repeater located between said sets of rolls with provisions for allowing the bar to be lifted out of the repeater; a retarder for holding back the following end of the bar when it leaves the first set of rolls, said retarder comprising a guide through which the bar passes and a presser foot engaging the bar in the guide and serving to hold the following end of the bar until it is pulled through the guide, a spring tension device for said presser foot, and means for cooling said presser foot.

6. In a rolling mill wherein is provided first and second sets of rolls and a repeater located between said sets of rolls with provisions for allowing the bar to be lifted out of the repeater; a retarder for holding back the following end of the bar when it leaves the first set of rolls, said retarder comprising a guide through which the bar passes, a clamp device for restraining the following end of the bar when it leaves the first set of rolls and holding it until the loop has been drawn into the repeater and the bar end pulled out of the guide by the second set of rolls, and means for directing a jet of water against said clamp device to cool the same.

7. In a rolling mill, the combination with the first and second sets of feed rolls, and the repeater between said rolls, of a retarder located adjacent to the entrance of the repeater, said retarder including mechanism for holding the following end of the rod after it leaves the first set of rolls until the loop has been drawn back into the repeater by the second set of rolls.

JOHN L. SMITH.
SHERIDAN A. SMITH.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."