(No Model.) 2 Sheets—Sheet 1.

E. S. LENOX.

OVERFEED RECEIVER FOR WIRE ROD ROLLING MILLS.

No. 351,838. Patented Nov. 2, 1886.

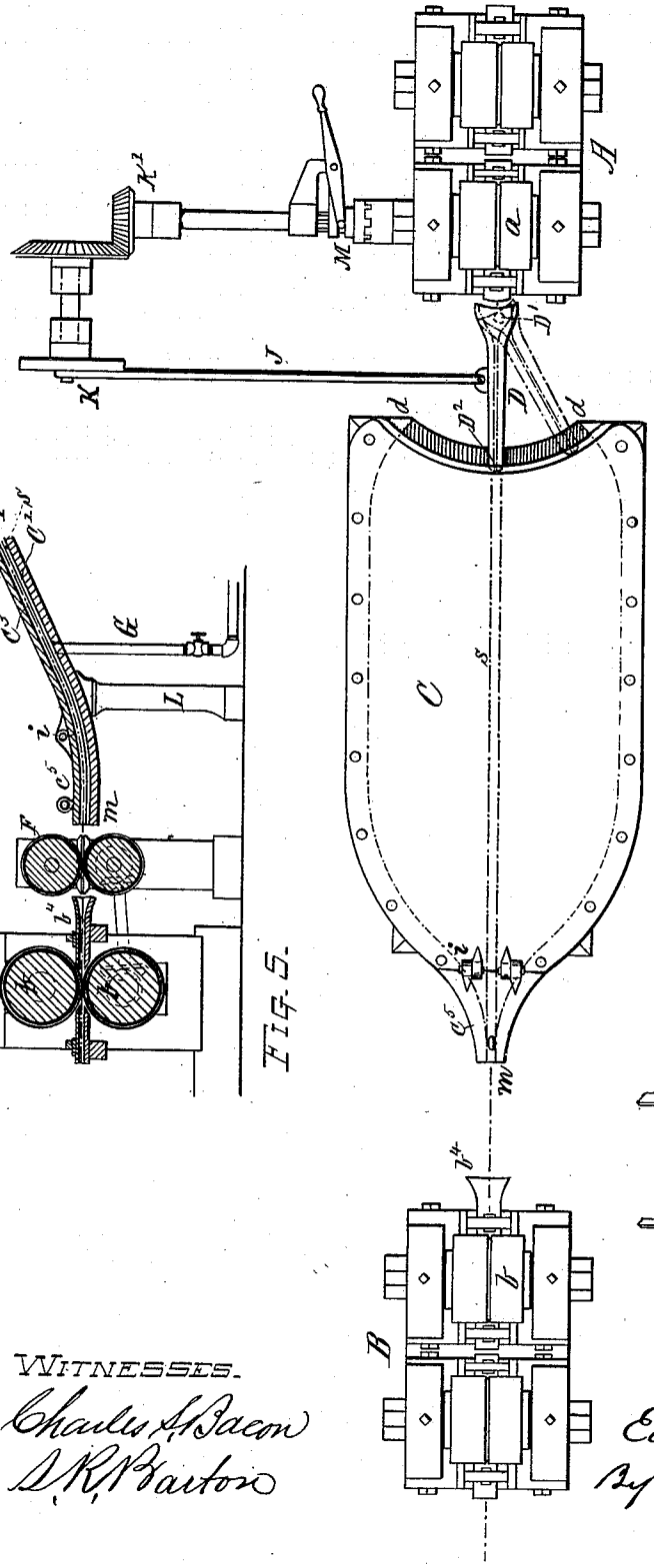


FIG. 1.

FIG. 5.

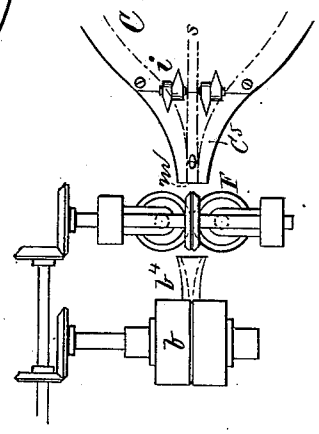


FIG. 4.

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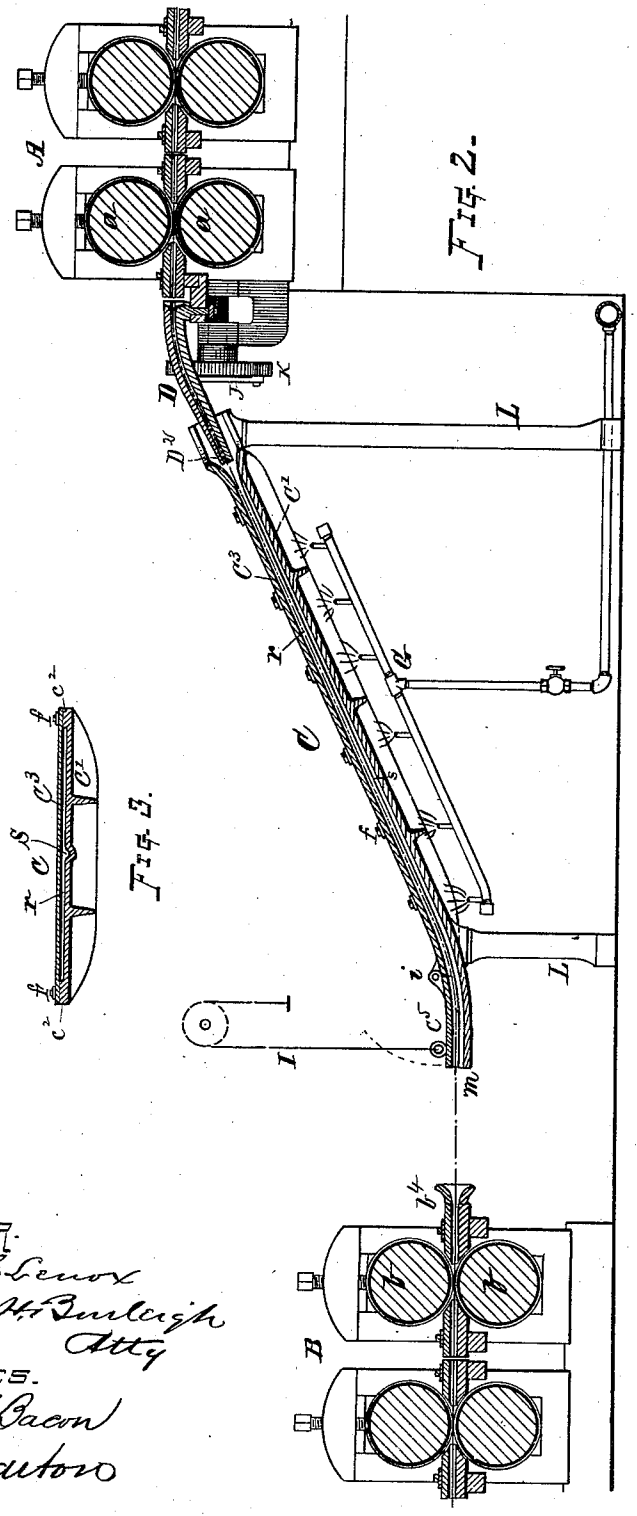
N. PETERS. Photo-Lithographer, Washington, D. C.

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UNITED STATES PATENT OFFICE.

EDWIN S. LENOX, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO THE WASHBURN & MOEN MANUFACTURING COMPANY, OF SAME PLACE.

OVERFEED RECEIVER FOR WIRE-ROD-ROLLING MILLS.

SPECIFICATION forming part of Letters Patent No. 351,838, dated November 2, 1886.

Application filed September 17, 1885. Serial No. 177,326. (No model.)

To all whom it may concern:

Be it known that I, EDWIN S. LENOX, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Overfeed Receivers in Wire-Rod-Rolling Mills; and I declare the following to be a description of my said invention sufficiently full, clear, and exact to enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

The object of my present invention is to provide in connection with a rolling mill or machine for working wire rods a convenient and efficient apparatus for temporarily receiving the partially-worked rod at an intermediate stage of its reduction, and for supporting it in the manner hereinafter explained, so as to prevent the tangling of the rod while permitting its free delivery for further treatment; also, to provide facilities for the simultaneous reception and delivery of the rod, and for maintaining or increasing the heat of the rod while within the receiver; to provide a flat receiver, into and through which the rod can be directed from primary rolls, as hereinafter explained, and which, while permitting the spread laterally of the slack or overfeed of the rod, will prevent the loops from overlaying one another, so that the rod can be rapidly withdrawn from the receiver and conducted to the supplemental roll without liability of forming kinks or tangles therein and without subjecting the heated rod to undue strain in the operation. These objects I attain by mechanism, the nature, construction, and operation of which is illustrated in the drawings and explained in the following description, the particular subject-matter claimed being hereinafter definitely specified.

In the drawings, Figure 1 is a plan view of so much of an apparatus for making wire rods as is necessary to illustrate the nature of my invention. Fig. 2 is a central longitudinal section of the same. Fig. 3 is a transverse section of the receiver. Fig. 4 is an outline plan view showing the delivery end of the receiver with a set of feeding-rolls in connection therewith, and Fig. 5 is a vertical section of the same.

In reference to parts, A denotes the primary train or sets of reducing-rolls, by which the metal is reduced from the usual-sized bar to a moderately-sized rod or wire as it is delivered from the last pair of rolls, *a*. Train A may comprise any desired number of pairs or sets of rolls, which may be mounted and operated in any suitable manner; or, as in the ordinary continuous rolling-mills, used for reducing wire rods.

B indicates the supplemental train or sets of rolls, which may also be mounted and operated in any well-known or suitable manner. The small guides between succeeding pairs of rolls may also be of ordinary construction. The construction and arranging of the rolls and pass-guides are not features of my present invention.

C indicates a rod-receiver, into and through which the rod is directed as it issues from the rolls *a* by means of the vibrating or swinging guide D, the delivery end of which moves in a plane coincident with the plane of the receiver-mouth. The receiver C is made of iron or other suitable material, and consists of a broad bed-plate or surface, C′, having a shallow rim, c^2, along its sides, and tapering or converging at the lower or delivery end to form a narrow exit-passage or guideway at *m*. Above this bed-piece, and resting upon the rim c^2, is a cap plate or cover, c^3, the under surface of which substantially corresponds with the form of the top surface of the lower piece, C′, and the two surfaces are arranged substantially parallel with each other and at a distance apart slightly greater than the single diameter of the rod, as formed by the rolls *a*, or, in other words, the dimension of the chamber or receiving-space *r* between the inclosing-surfaces C′ and C^3 is more than once and less than twice the diameter of the rod which it is intended to receive, and, as the two plates or surfaces are parallel, it will be seen that two portions of the rod cannot cross each other within the space *r*. The rim c^2 closes the sides of the receiving-space *r*, as indicated by dotted lines Fig. 1, and the edges of the plate are secured together by bolts *f*, or other suitable fastenings.

The plates may, if desired, be ribbed or flanged on the exterior to give them proper strength and stiffness.

A straight channel or guiding-groove, S, (see dotted lines, Fig. 1,) is formed in the plates, or one of them, preferably the lower plate, for conducting the advance end of the rod through the receiver to the delivery-mouth *m*. This channel may be omitted in some cases, if desired.

The lower extremity, C^3, of the cap-plate c^2 is preferably hinged, as at *i*, so that it can swing upward to permit access to the interior of the receiver in case the mouth becomes accidentally clogged. This hinge may not in all cases be necessary. A suitable cord or chain, I, may be used to facilitate raising the hinged portion of said plate C, as indicated.

The guide D is arranged to swing freely on a pivot located near its entrance end, so that its exit end D^2 can traverse along the entrance-mouth of the receiver at *d d*, from one side to the other, (see dotted lines, Fig. 1,) for distributing the rod back and forth within the receiver-space *r* in serpentine order. The swinging or traverse motion is imparted to the guide D by means of a connecting-rod, J, attached to the side of the guide, and operated by a crank, cam, or other mechanical devices, K, worked by suitable driving-gearing, K′, actuated from the driving-shaft or primary train of rolls A; or motion may be imparted to said guide by other suitable means.

The receiver C is supported on a suitable frame or standards, L L, preferably in an inclined position, with the delivery-mouth *m* at a lower position than the entrance *d d* and with the space *r* laterally horizontal, although I do not desire to confine my invention to the particular position shown; neither do I desire to confine the invention to any particular size or proportion of width to length, since it may be desirable in some cases to have the receiver long and comparatively narrow, while in other cases it may be desirable to make it wide and comparatively short, and, also, the side may be straight or more or less curved in its outline from the entrance-opening to the delivery-mouth, the space *r*, however, in either case being, as above stated, sufficient to receive one course of the rod, but not great enough to permit the crossing of the rod one portion over another within the receiver.

G indicates a gas-pipe having a series of burners arranged in suitable manner for heating the receiver, and thus maintaining or augmenting the heat of the rod while it is passing through the receiver.

The gas may be applied either to the exterior or to the interior of the receiver. If to the interior, a sufficient amount of air should also be injected to insure combustion within the space *r*.

The receiver may be jacketed or inclosed in a body of fine clay or other refractory material, if desired, to prevent loss of heat by radiation.

The operation of this invention is as follows: The heated billet or bar is fed to the primary train in the usual manner. As the end of the rod issues from the rolls *a*, it passes through the guide D, which guide is then at a stationary position in line with the channel S. The end of the rod shoots through the guide D and travels in the channel S to the delivery-mouth *m*, where it is seized by an attendant and entered to the pass of the rolls *b* through the bell-mouthed guide b^4, or if the mouth of the bell-shaped guide b^4 is arranged sufficiently close to the delivery *m* the rod can pass direct to the secondary rolls without the assistance of an attendant. After the end of the rod has reached and entered the leading pair of rolls of the secondary train the clutch M is thrown in and the guide D set vibrating from side to side by its driving mechanism, so that as the overfeed of the rod is laid into the receiver it is arranged in alternate right and left loops disposed in serpentine order, the loops being laid in at the upper part of the receiver C, while the rod is being drawn out from the lower part of said receiver, the size of the space *r* confining each loop to its own respective position in relation to the other loops, and thus preventing the tangling of the several loops one with another. For automatically passing the end of the rod from the mouth *m* of the receiver to the leading-rolls *b* of the supplemental set or train B, a set of feed-rolls, F, preferably of four rolls, or three rolls in a set, is arranged at the mouth of the receiver substantially as illustrated in Figs. 4 and 5, which rolls may be operated by gearing from the supplemental train or in other suitable manner at a speed to correspond with the speed of rolls *b*, and by means of which the end of the rod as it comes from the mouth of the receiver is carried forward through the leading-guide into the pass of the rolls *b*.

For taking care of the rod at the end of the secondary train, an automatic reel may be employed, the construction and arrangement of which may be substantially such as those ordinarily employed with continuous rolling-mills.

In case it is desired to use two or more secondary trains for finishing the rods that are partially reduced in a single primary train there may be arranged two or more receivers, C, one placed above the other, or in other convenient relation, so as to alternately receive the rods from said primary rolls, the guide D in this case being made to switch from one to the other. Said receivers might be made so that the covering-plate of one receiving-chamber, *r*, would form the bottom of another receiving-chamber, if desired, thus economizing heat in the process of transferring the rods from the primary to the secondary sets of rolls.

The intermediate feed-rolls, F, may, if desired, be fitted with passes or grooves, shaped to reduce the overstocked or finned ends of the rods before they enter the secondary train.

In a previous application I have described and claimed a system of circular revolving receivers for use in connection with rod-reduc-

ing rolls in a wire-rod-making plant. The present application, therefore, contemplates only a system of flat receivers wherein the rod is confined in a manner to prevent its loops from crossing each other within the receiver, this being another valuable improvement in this class of mechanism.

What I claim as of my invention, and desire to secure by Letters Patent, is—

1. A receiver for containing the overfeed of the rod, having a broad shallow interior space inclosed above and below by plates disposed at such distance apart that the depth of the space is greater than once and less than twice the diameter of the rod to be entered therein, substantially as hereinbefore set forth.

2. A receiver for containing the overfeed of the rod, having a broad shallow interior space, as *r*, inclosed by plates disposed substantially parallel to each other, and between which a rod can be distributed in single loops, and having an entrance-opening, as *d d*, and a narrow exit-opening, as *m*, substantially as and for the purpose set forth.

3. The combination, in a mechanism for working hot-wire rods, of a receiver for containing the overfeed of the rod, having a broad shallow interior space inclosed above and below by plates disposed at a distance apart slightly greater than the diameter of the rod, and a swinging or vibrating guide moving in a plane coincident with the plane of the receiver-space for delivering the rod into said receiver in a series of loops, substantially as set forth.

4. The combination, substantially as hereinbefore described, of a primary set of rolls, a swinging guide, a receiver having a broad shallow receiving-space, as *r*, adapted for permitting lateral spread of the rod in loops while preventing the crossing of the rod, one part above another therein, and a narrow delivery-mouth from which the rod can be withdrawn while it is being fed into said receiving-space, as set forth.

5. The combination, substantially as hereinbefore described, of a primary set of rolls, a swinging guide, a receiver having a broad shallow receiving-space with an exit-passage, and a guide-channel, as S, formed in the bottom plate, for directing the advance end of the rod to said exit-passage, for the purpose set forth.

6. The combination, substantially as hereinbefore described, of a primary set of reducing-rolls, a supplemental set of reducing-rolls, an intermediate receiver having its inclosing-plates disposed at such distance apart as will accommodate the rod only in single-laid coils or loops, and a vibrating guide for delivering the rod to the space between said plates, for the purpose set forth.

7. The combination, substantially as hereinbefore described, of a stationary receiver having a broad shallow interior space, as *r*, a narrow delivery-opening, as *m*, and a set of feed-rolls, as F, located adjacent to said delivery-openings in position to seize the end of a rod as it issues therefrom, for the purpose set forth.

8. The combination, substantially as hereinbefore described, of a receiver having a broad shallow interior space, as *r*, tapering to a narrow delivery-passage, as *m*, a set of feed-rolls adjacent thereto, with the pass of said feed-rolls in line with said exit-passage, and a supplemental set of reducing-rolls, for the purpose set forth.

9. The combination, substantially as hereinbefore described, of a primary set of reducing-rolls, a broad and closed receiver having a shallow interior space, as *r*, tapering to a narrow exit-passage, as *m*, a tubular pivoted guide, one end of which is located to receive the rod as it issues from the primary rolls, and the other adapted to traverse the entrance-space of said receiver, a set of intermediate feed-rolls, and a supplemental set of reducing-rolls, for the purpose set forth.

10. The combination of the receiver C, having a broad shallow interior space, as *r*, adapted for containing a wire rod in the manner set forth, and a gas supply pipe, G, for the purpose set forth.

11. The combination, with the receiver C, having the broad shallow interior space, *r*, tapering to the exit-passage *m*, of the hinged cap-plate above said passage, substantially as and for the purpose set forth.

Witness my hand this 14th day of September, A. D. 1885.

EDWIN S. LENOX.

Witnesses:

CHAS. H. BURLEIGH,

JAMES N. HEALD.