No. 627,723. Patented June 27, 1899.

V. E. EDWARDS.

APPARATUS FOR HANDLING WIRE RODS.

(Application filed Sept. 11, 1897.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

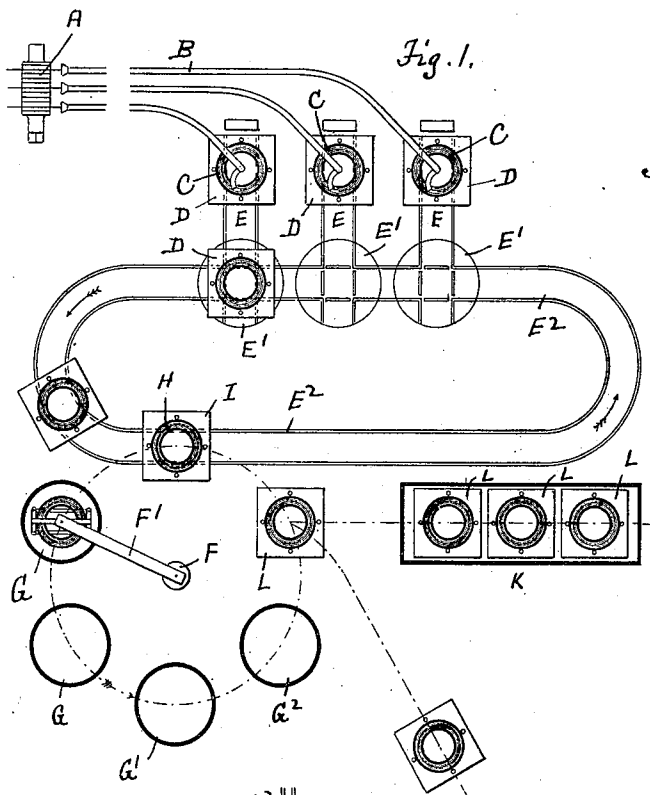
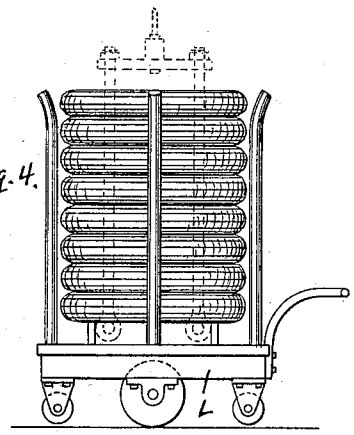


Fig. 4.



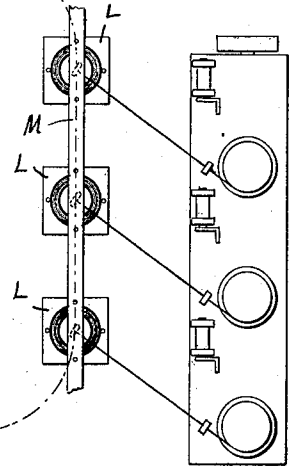


Fig. 2.

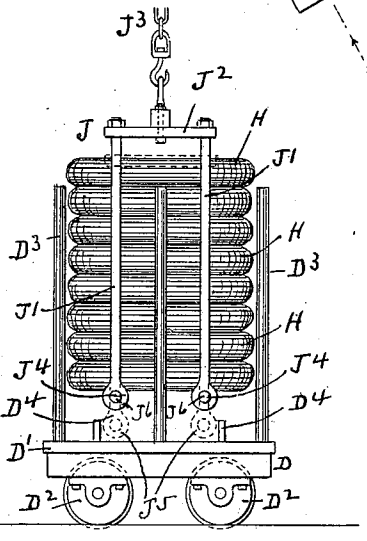
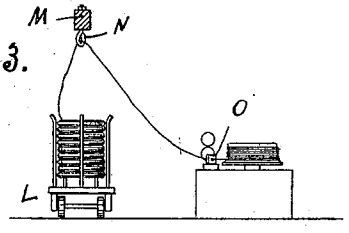


Fig. 3.



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APPARATUS FOR HANDLING WIRE RODS.

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Fig. 7

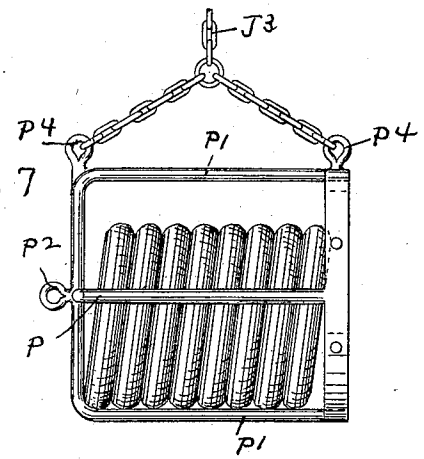


Fig. 10.

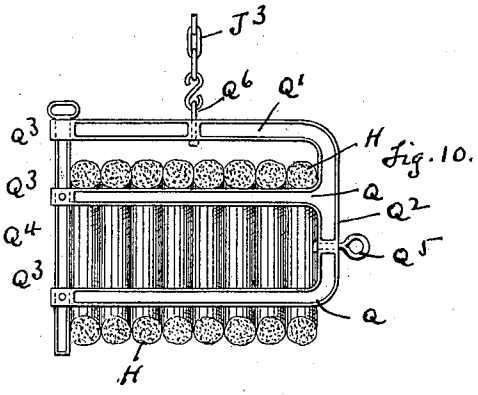


Fig. 6.

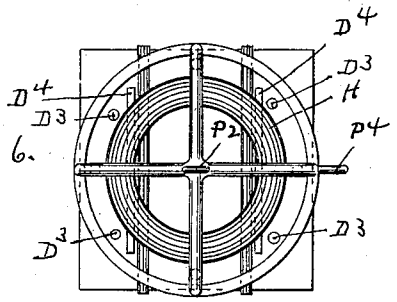


Fig. 9.

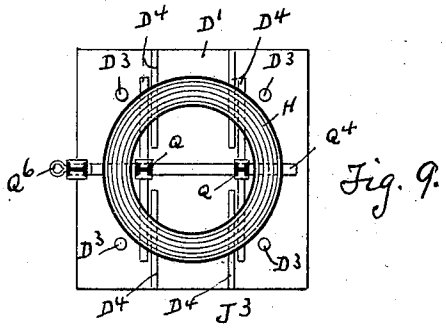


Fig. 5.

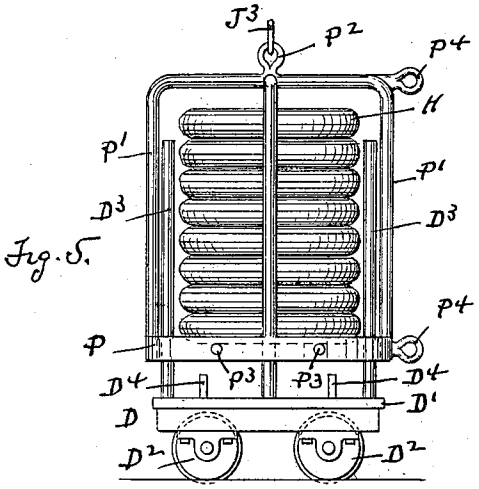
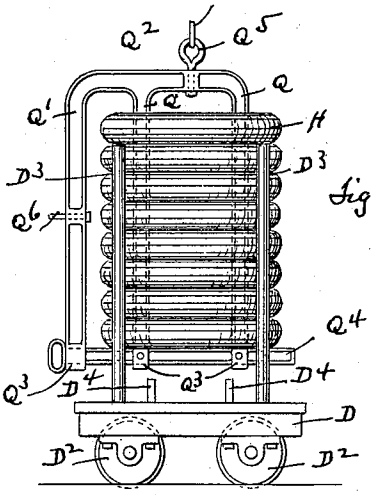


Fig. 8.



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UNITED STATES PATENT OFFICE.

VICTOR E. EDWARDS, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO THE MORGAN CONSTRUCTION COMPANY, OF SAME PLACE.

APPARATUS FOR HANDLING WIRE RODS.

SPECIFICATION forming part of Letters Patent No. 627,723, dated June 27, 1899.

Application filed September 11, 1897. Serial No. 651,396. (No model.)

To all whom it may concern:

Be it known that I, VICTOR E. EDWARDS, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in Apparatus for and Methods of Handling Wire Rods, of which the following is a specification, reference being had to the accompanying drawings, forming a part of the same, in which—

Figure 1 represents in plan view the several mechanisms of a wire-mill plant, illustrating the successive operations between the reducing-rolls and drawing-dies. Fig. 2 represents a side view of a car by which the coils of wire are transferred from the reeling mechanism to the cleaning and coating vats and also showing one of the lifting-cages by which they are lifted from the car. Fig. 3 represents a drawing-die and truck filled with coiled rods, from which a rod is shown as being delivered to the drawing-die. Fig. 4 shows a side view of the hand-truck by which the rods are transferred from the coating-vats to the drawing-dies. Figs. 5 and 6 show, respectively, a side and top view of a modified form of the lifting-cage. Fig. 7 represents the side view of the lifting-cage shown in Figs. 5 and 6 with the coils held therein for immersion in the vats. Figs. 8 and 9 show, respectively, side and top views of the second modification of the lifting-cage; and Fig. 10 represents a side view of the lifting-cage shown in Figs. 8 and 9 with the series of coils suspended therein and shown in sectional view.

The object of my present invention is to provide an apparatus for and method of handling the coils of wire rods between the rolls of the rolling-mill and the drawing-dies, whereby the coils can be handled either singly or in groups without disarranging the rods in a coil and enabling each rod to be delivered to the drawing-dies and be regularly uncoiled; and my invention consists in the employment and construction of a retaining-cage by which each coil is protected during the successive operations between the rolls and drawing-dies.

In Fig. 1 of the drawings I have represented in plan view the relative arrangement of the reducing-rolls, cleaning-vats, drying-ovens, and drawing-dies of a wire-mill plant for the purpose of representing the successive operations to which the coils of rods are subjected between the rolling-mill and drawing-dies and illustrating the advantages of my improved apparatus and method of handling the coils of rod.

Referring to the drawings, A represents the last pair of rolls in the series of reducing-rolls, from which the wire rods are delivered to the reeling mechanism, by which they are wound into coils.

B denotes the conductors by which the rods are conducted from the rolls A to the reeling mechanism.

C denotes the reeling mechanism by which the rods are wound into coils upon the platform of a car capable of being raised and lowered, so that successive coils may be placed one upon the other upon the platform of the car.

D denotes the car upon which the coils are deposited by the reeling mechanism, one of said cars being shown in side elevation in Fig. 2. The car D consists of the platform D′, mounted upon flanged wheels D^2, adapted to run upon rails of a railway-track and having posts D^3 projecting upwardly from the platform in a circular row, between which the coils are deposited upon the ribs D^4, on the upper surface of the platform D′, whereby the coils are raised above the surface of the platform to allow the bars of a lifting-frame to be inserted beneath the coils, as hereinafter described.

Each rod as it is delivered from the rolls A is wound into a coil by the reeling mechanism C, of the usual form and construction, and deposited upon the car D between the upright posts D^3, the car being successively lowered the proper distance as each succeeding coil is wound. When the car is filled with coils, it is lowered into alinement with the stationary horizontal track E, which communicates by means of a turn-table E′ with an endless track E^2.

Adjacent to the track E^2 and upon the side opposite the turn-table E′ is a crane comprising a vertical post F and a radial swinging arm F′, with its outer end arranged to swing over the track E^2.

G, G′, and G^2 denote a series of vats arranged concentrically with the post F and beneath the circular path of the outer end of the swinging arm F′. The arm F′ is provided with the usual lifting apparatus commonly employed with swinging cranes for the purpose of raising and lowering the coils. The vats G contain an acid solution for cleaning the rods, G′ clear water for washing the rods, and the vat G^2 contains the coating solution.

A car, such as represented in Fig. 2, is filled with coils and transferred by the turn-table E′ from the track E to the track E^2, upon which it is moved into the path of the swinging arm F′, as represented at I, Fig. 1. A lifting-cage J, comprising the vertical rods J′, united at the top by the yoke J^2, is suspended from the swinging arm F′ by a chain J^3 and is lowered over the coils H upon the car I, as represented in Fig. 2. The rods J′ are provided at their lower ends with eyes J^4, through which bars J^6 J^6 are inserted when the rods are in their lowest position, and the lifting-cage is then raised, lifting the coils H from the car and allowing them to be swung around and lowered successively into the acid-vats G, cleaning-vat G′, and coating-vat G^2. The coils H are maintained in the lifting-cage during these operations and until they are ready to be transferred to the drying-ovens K, when they are deposited upon the truck L. (Represented in side view in Fig. 4.) The lifting-frame is then removed by withdrawing the bars J^6. A truck L, loaded with coils, is moved to a position beneath an overhead beam M, having a suspended eye N, through which the rod is conducted to a drawing-die O. The last end of the rod, as it is wound in the coil, is presented to the drawing-die, and in the operation of drawing the rod is unwound from the coil as it is supported upon the truck L. The successive layers of rod are taken from the coil in the reverse order from that in which they are deposited in the coil, and the different layers of rod in each coil are maintained during the successive operations of cleaning, washing, coating, and drying in substantially the same position in which they are deposited by the reeling mechanism, so that the kinking of the rods or their disarrangement in the coil is entirely obviated.

In the cage represented in Fig. 2 the vertical rods J′ are arranged upon the outside of the coils, so that as the coils are supported upon the bars J^6 they may be held from lateral movement. I do not, however, confine myself to the precise construction of the cage shown in Fig. 2, as other forms of retaining-cages may be employed, such as that represented in Figs. 5 to 7 or like that shown in Figs. 8 to 10. When the form of cage shown in Fig. 2 is employed, the coils rest one upon the other as they are immersed in the cleaning and coating vats, with the lowermost coil supported upon the bars J^6, causing the weight of the coils to hold the layers of rods in close contact and to some extent prevent the contact of the cleaning and coating solutions with the surface of the rods. I therefore prefer to employ that form shown in Figs. 5 to 7 or that shown in Figs. 8 to 10.

The cage represented in side elevation in Fig. 5 consists of a ring P, forming the base of the cage, with vertical rods P′ extending upwardly from the ring P and united at the top and provided with an eye P^2 to receive the suspension-chain J^3. The ring P is lowered over the coils H as they rest upon the ribs D^4 of one of the cars, and bars P^3 are inserted through the ring P and beneath the lower coil, similar to the bars J^6. The cage is provided upon one side with eyes P^4, and when the coils have been lifted out of the posts D^3 the suspension of the cage is shifted from the eye P^2 to the eyes P^4, causing the cage to be suspended in the position shown in Fig. 7, with the coils supported by their edges against the rods P′ for immersion in the cleaning and coating vats.

The cage represented in Figs. 8 to 10 I deem a preferable form, and it consists of a framework having vertical members Q Q, adapted to pass down inside the coils, and the vertical member Q′, extending downward upon the outside of the coils, and all united at the top by a cross-bar Q^2. The vertical members Q Q′ are provided with eyes Q^3 to receive a bar Q^4, upon which the coils are supported as they are raised from the car D. The cage is provided with an eye Q^5 to receive the suspension-chain by which the coils are lifted from the car and an eye Q^6, by which the cage is suspended for the purpose of immersing the coils in the cleaning and coating solutions. When the cage is suspended in the position shown in Fig. 10, each coil of wire becomes suspended upon the bars of the cage, allowing the layers of rods to hang loosely and allow the free admission of the cleaning and coating solutions.

The successive operations of cleaning, coating, drying, and drawing are the same as now practiced; but it has been the custom hitherto to coil the rods by means of a reeling mechanism, remove each individual coil from the reel by means of hooks, and deposit the coils promiscuously in a heap, from which they are afterward taken to the cleaning-vats, causing the rods to become bent and entangled with each other, thereby causing a waste of material and increasing the friction and power required at the drawing-dies. My improved method comprises the winding of the coil in a receptacle which is transferred from the reeling mechanism without removing the coil therefrom and then protecting the coil by means of a lifting-cage, which prevents the kinking or entangling of the layers of rods of the coil during the operation of cleaning and coating and afterward depositing the coil in the second receptacle, in which the coil is supported in precisely the same position as it was deposited by the reeling mech-

anism, so that the end of the rod last coiled may be first taken from the coil to the drawing-die and the coil unwound in the reverse order of its winding.

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

1. In an apparatus for handling wire rods, the combination of a platform-car, a series of posts projecting upwardly therefrom, ribs for supporting the coils of wire rods and providing a space for the removable bars of a lifting-cage, a lifting-cage comprising a series of vertical rods united at the top by a yoke and provided at their lower ends with eyes to receive removable bars and removable bars adapted to be held in said eyes and project beneath a coil of wire rods, substantially as described.

2. The combination with a pair of reducing-rolls of a rod-conductor, a reeling mechanism, a car, a track leading from said reeling mechanism, a turn-table between said track and an endless track, an endless track, a swinging arm extending over said track, a lifting-cage suspended from said swinging arm and a series of cleaning-vats arranged in a circle concentric with the axis of said swinging arm, substantially as described.

3. A lifting-cage for handling a series of coils, consisting of a frame comprising bars parallel with the axis of the coils, by which the coils are held concentrically with each other, with one of said bars outside the coils, a yoke connecting said bars at one end of the frame, eyes in the opposite ends of said bars, a removable bar held in said eyes at right angles to the axis of said coils, by which said coils are supported, means for attaching a lifting mechanism to said yoke, whereby said frame is suspended from its end with the coils resting upon each other and means for attaching a lifting mechanism to said outer bar of the frame, whereby said frame is suspended from its side with the coils supported upon their edges, substantially as described.

4. A lifting-cage for handling coils consisting of bars parallel with the axis of the coils, by which the coils are held concentrically with each other, a yoke connecting the upper ends of said parallel bars, means for attaching a lifting mechanism to said yoke, eyes formed in the opposite ends of said parallel bars, a removable bar inserted in said eyes at right angles with the axis of the coils, with its ends extending beyond the sides of a coil resting thereon and forming the coil-support when the cage is suspended by its yoke, substantially as described.

Dated this 23d day of August, 1897.

VICTOR E. EDWARDS.

Witnesses:
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M. C. PRICE.