Dec. 4, 1923. 1,476,333

J. R. GEORGE

MANUFACTURE OF WIRE RODS

Filed Feb. 24, 1920 2 Sheets-Sheet 1

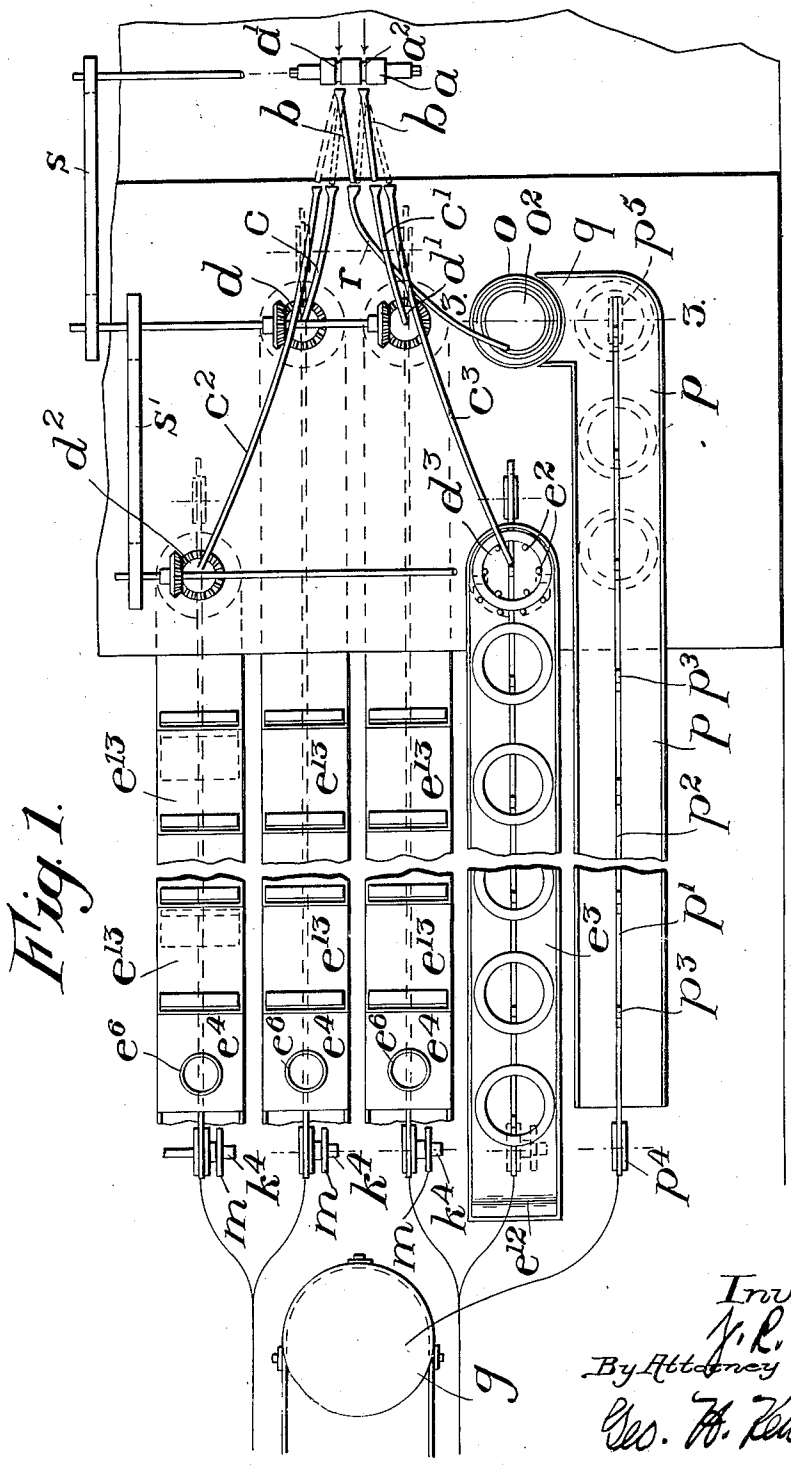

Fig. 1.

Inventor
J. R. George
By Attorney
Geo. H. Kennedy Jr.

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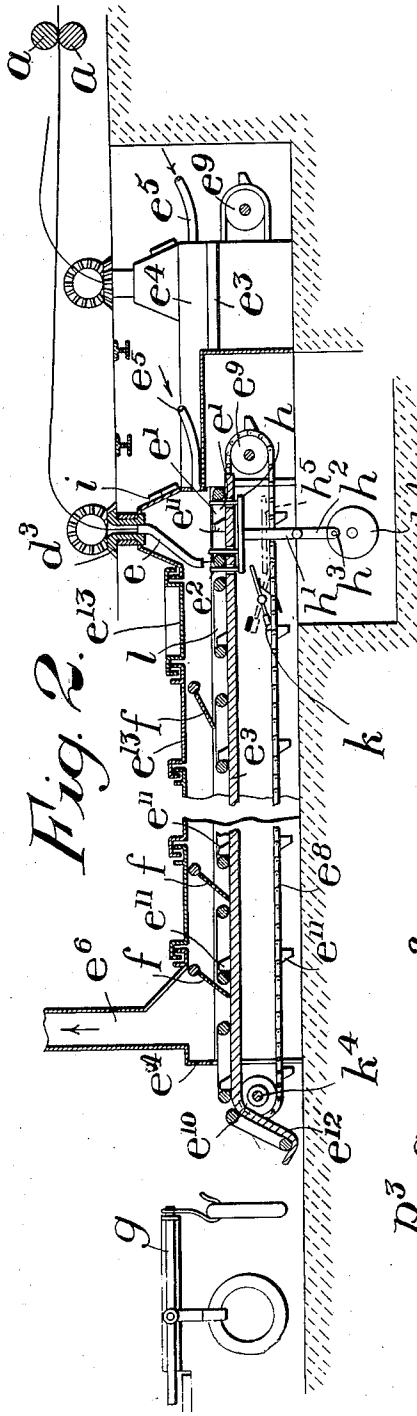

Fig. 2.

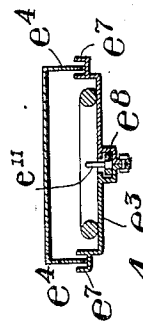

Fig. 4.

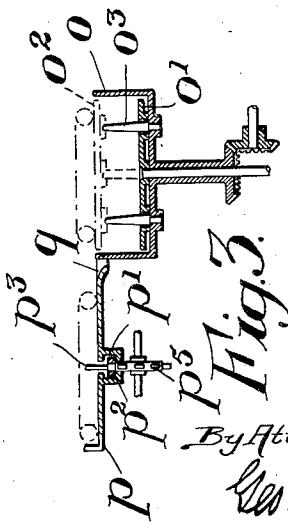

Fig. 3.

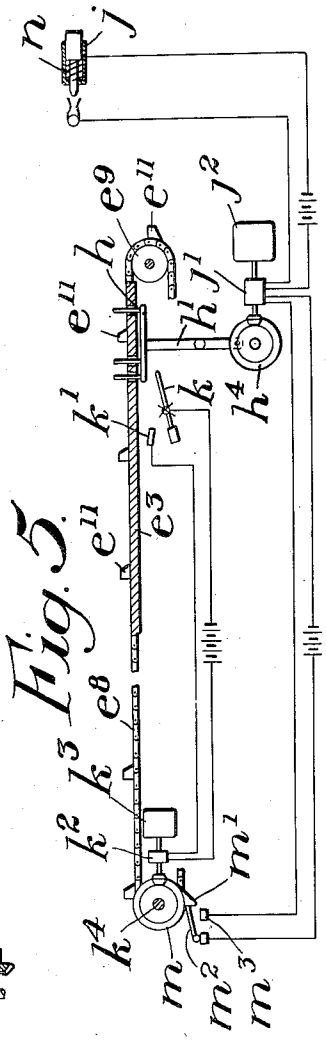

Fig. 5.

Inventor
J. R. George
By Attorney
Geo. W. Kennedy Jr.

Patented Dec. 4, 1923. 1,476,333

UNITED STATES PATENT OFFICE.

JEROME R. GEORGE, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO MORGAN CONSTRUCTION COMPANY, OF WORCESTER, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

MANUFACTURE OF WIRE RODS.

Application filed February 24, 1920. Serial No. 360,634.

To all whom it may concern:

Be it known that I, JEROME R. GEORGE, a citizen of the United States, residing at Worcester, in the county of Worcester and Commonwealth of Massachusetts, have invented a new and useful Improvement in the Manufacture of Wire Rods, of which the following, together with the accompanying drawings, is a specification.

In the manufacture of wire rods it is customary to conduct the freshly rolled rod to a reeling mechanism from which the coiled rod is transferred and subsequently cooled, but this transference of the coil from the reeling mechanism is liable to disarrange or snarl the coil. When a coiled rod is slowly cooled and exposed to the atmosphere oxidization takes place, producing a scale which is subsequently removed, preparatory to wire drawing, resulting in an additional expense and the loss of stock. To avoid this result it has been proposed to cool the coil in an inclosed chamber containing an inert or nonoxidizing atmosphere, but this method has involved certain difficulties in its practical operation.

My present invention provides a stationary conveyor table long enough to substantially cool the rods as they pass over it, and I coil the rods directly upon the conveyor table, by what is known as a laying reel, thereby avoiding the liability to disarrange or snarl the coils by transferring them from the reel to the conveyor. I also provide means for moving the coil automatically along the conveyor table, with a step-by-step movement by means of an endless chain provided with spurs and I lay the coil around one of the spurs of the chain thereby causing the coil to be engaged by the spur upon the inside of the coil and drawn along the conveyor table instead of being pushed, as is now customary.

My present invention further comprises a multiplicity of reels arranged at different distances longitudinally from the finishing rolls of the mill, thereby rendering each of the reels accessible, and I arrange the conveyor tables side by side with the delivery ends of the tables adjacent to each other, for convenience in disposing of the coils delivered from each of the conveyor tables.

In order to secure greater efficiency in the use of an inert or deoxidizing atmosphere, I inclose each reel and its associated conveyor table with a casing communicating at the reel with a source of inert or deoxidizing atmosphere, such for example, as the exhaust of a billet heating furnace, having a stack at the opposite end for the escape of such atmosphere from the casing. The passage through the casing of the conveyor table is interrupted by a series of baffle plates which check a too rapid movement of the inert atmosphere through the casing.

In the manufacture of wire rods it is essential to maintain a uniform diameter of the rod and also a true cylindrical cross section, and in order to provide means for the occasional testing of rods delivered from the different passes of a rolling mill my present invention provides an open conveyor table with a reeling mechanism preferably of the type known as a pouring reel, to which an individual rod may be diverted as frequently as desired for testing purposes. I further provide means for rendering certain movements of the mechanism embodied in my present invention automatic in their action. These objects among others I accomplish by the arrangement and combination of parts illustrated in the accompanying drawings, in which

Figure 1 is a plan view, with the casing of one of the reels and its conveyor table removed.

Figure 2 is a central vertical sectional view through a laying reel and its associated conveyor.

Figure 3 is a sectional view through the open or pouring reel on the plane of the broken line 3—3, Fig. 1.

Figure 4 is a transverse view of one of the inclosed conveyor tables.

Figure 5 is a diagrammatic sketch illustrating an electrical system by which certain movements of the laying reel and its associated conveyor are rendered automatic.

Similar reference letters refer to similar parts in the different figures.

Referring to Fig. 1 of the drawings, a denotes the final finishing rolls of a rolling mill having, in the present instance, two passes a^1, a^2, from either of which the rolled metal is delivered through pivoted guides b, operated by any suitable switching mechanism, into any one of the curved conducting

troughs c, c^1 c^2, or c^3, by which the rod is conducted to one of the reeling mechanisms d, d^1, d^2, and d^3. These reeling mechanisms are of the type known as laying reels, by which the rod is coiled by a rotating arm e forming a coil e^1 between concentrically arranged pins e^2 in the usual manner of reels of this type, as illustrated in Fig. 2. The coil is supported upon a stationary horizontal conveyor table e^3. The reel and the table are both inclosed within a casing e^4 into one end of which an inert or deoxidizing atmosphere is conducted through a pipe e^5 and delivered from the opposite end of the casing through a stack e^6. Pivotally supported within the casing e^4 are a series of baffle plates f so spaced that one at least of the baffle plates will rest upon the conveyor table e^3 as the spaced coils are moved over the table. The conveyor table e^3, shown in transverse section in Fig. 4, is provided at each edge with troughs e^7 in which the bottom of the casing e^4 is supported and water sealed. The top of the casing is made in sections e^{13} having water sealed joints which allow the top to be removed for access to the interior of the casing. The center of each conveyor table is channelled to receive an endless conveyor chain e^8 carried upon sprocket wheels e^9 and e^{10}, and provided at regularly spaced distances with spurs e^{11} adapted to engage the coils and move them from the reeling mechanism over the conveyor table by a step-by-step movement until they are finally delivered by gravity into a pocket e^{12} from which the coils from each of the tables may be transferred to a common carrying mechanism g or otherwise disposed of.

The concentric pins e^2 project upwardly through holes in the conveyor table e^3 and are supported by a plate h carried upon a vertically sliding spindle h^1 connected by a link h^2 with a crank pin h^3 carried upon a disk h^4, which is rotated at each of its movements through half a revolution by an electric motor.

The laying reels d, d^1, d^2, and d^3, are placed in pairs upon the opposite side of and at different distances from the line of movement of the rod as it leaves the roll passes a^1, a^2, as illustrated in Fig. 1, that is, the reel d is nearer the rolls a than the reel d^2, and also nearer the line of movement of the rod as it is delivered from the rolls. This arrangement of the reels renders each reeling mechanism accessible by means of doors, in the casing of the reel, such as are shown at i, Fig. 2. The sprocket wheels at the delivery ends of each conveyor table are driven by electric motors conveniently located, and when the coiling of a rod has been completed the plate h is depressed, as shown by the broken lines h^5, Fig. 2, by the rotation of the disk h^4 one half of a revolution. Subsequent movements of the table h and the step-by-step movement of the conveyor chain e^8 are rendered automatic by a system of electrical wiring diagrammatically illustrated in Fig. 5, operating as follows:—

When a rod has been coiled the operator by means of a push button j completes an electrical circuit to energize a magnet j^1 which, actuating a clutching mechanism, connects the motor j^2 with the crank disk h^4 to rotate the latter one half a revolution to depress the plate h. The clutching mechanism between the motor j^2 and the disk h^4 is of any known type, like that, for example, known as the Horton clutch, which will become automatically thrown out of action when the motor has revolved the disk h^4 one half a revolution. The depression of the plate h rocks a lever k against a contact point k^1 which, completing another circuit, energizes a magnet k^2 to actuate a clutching mechanism connecting the motor k^3 with a sprocket wheel shaft k^4, to rotate the latter through a sufficient angular movement to move the conveyor chain a sufficient distance to move a coil from the reeling mechanism along the conveyor table e^3 one step, moving the coil from its position at the reel to the position shown at 1, Fig. 2. The clutching mechanism between the motor k^3 and the shaft k^4 of the sprocket wheel is of the same type as that employed between the motor j^2 and the disk h^4, or one which will automatically disengage itself when the conveyor chain has moved the requisite distance to transfer the coils on the conveyor table one step. When this movement of the sprocket wheel shaft k^4 has been accomplished, the magnet j^1 is again energized by the rotation of a disk m, carried on the sprocket wheel shaft k^4, and having cam projections m^1 which pass entirely across and clear a spring m^2 depressing it against a contact point m^3, thereby completing an electrical circuit which includes the magnet j^1, causing the clutching mechanism to again connect the motor j^2 and disk h^4 to rotate the latter one half a revolution and elevate the plate h to its normal position ready for the coiling of another rod.

The upward movement of the plate h and the step-by-step movement of the conveyor chain are thus rendered automatic, the depression of the plate h alone requiring to be manually operated. The electrical circuits at the push button j and the spring m^2 remain normally open as soon as the circuits have been completed, the push button j being reversed by a spring n and the spring m^2 rising by its own resilience as soon as the cam projection m^1 has passed over it.

At one side of the reeling mechanism d d^1, d^2 and d^3, and their associated conveyor

tables, I place an open reeling mechanism o, Fig. 1, represented in section in Fig. 3, preferably of the type known as a pouring reel, in which the coil is laid upon a platform o^1 which is provided with means for elevating the coil as shown by broken lines o^2, Fig. 3, forming a stripping plate for raising the coil above the pins o^3. At the level of the elevated coil I provide an open conveyor table p having a central channel p^1 for an endless conveyor chain p^2, provided with spurs p^3, carried upon sprocket wheels p^4 and p^5. A platform q connects one end of the conveyor table with the reel allowing the coils to be moved over the platform q from the platform at o^2 upon the conveyor table p, and over the sprocket wheel p^5 in position to carry a spur p^3 of the chain p^2 into the inside of a coil resting on the table p at the next movement of the chain p^2, when the coil after being tested is moved over the table p. The conducting trough r leading to the reeling mechanism o, is located between the troughs c, c^2, and the troughs c^1 and c^3 to enable a rod from either of the roll passes a^1, a^2 to be diverted to the open reel o for the purpose of being tested as to its diameter or the shape of its cross section. The reels d, d^1, d^2 and d^3 may be driven by belt connections s, s^1, thereby controlling their speed to correspond with the delivery of rods from the finishing rolls a. The open reel o and the conveyor chain p^2 are actuated by any suitable motor which may be manually controlled.

While the accompanying drawings are diagrammatic for the most part, they set forth the essential features of my present invention, and the detailed construction of the several operating parts will be understood by those familiar with rolling mills.

I claim,

1. In apparatus of the class described, a plurality of coil conveyors extending parallel with the line of delivery of the wire, and an independent coiling device associated with each conveyor, said coiling devices being at different distances longitudinally from the common supply point of said wire.

2. In apparatus of the class described, a plurality of coil conveyors extending parallel with the line of delivery of the wire, and an independent coiling device associated with each conveyor, said coiling devices receiving wire from a common supply and being at different distances transversely, from the line of said delivery.

3. In apparatus of the class described, a row of closed conveyors for the movement of coils, all extending parallel with the line of delivery of the wire, and an independent coiling device associated with each conveyor, said coiling devices receiving wire from a common source of supply and being arranged, across the row of conveyors, at different distances longitudinally from said source of supply.

4. The combination with the rolls of a rolling mill, of a stationary table, means for moving a coiled rod over said table by a step-by-step movement, and means for coiling a rod on said table and around said coil moving means as it is delivered from said rolls.

5. The combination with the rolls of a rolling mill, of a stationary table having a channel in its upper surface, an endless chain held in said channel provided with spurs for engaging a coiled rod, and means for coiling a rod around one of said spurs as it is delivered from said rolls.

6. The combination with the rolls of a rolling mill, of a stationary table, means for coiling a rod as it is delivered from said rolls on said table, an endless chain provided with spurs for engaging said coiled rod, and means for moving said chain to bring one of its spurs within the circle of a coiled rod.

7. The combination with the rolls of a rolling mill, of a stationary table, means for coiling a rod delivered from said rolls, on one end of said table, a casing inclosing said coiling means and said table, and a series of spaced baffle plates inclosed in said casing.

8. The combination with the rolls of a rolling mill, of a stationary table, means for coiling a rod delivered from said rolls on one end of said table, a casing inclosing said coiling means and said table, and a series of spaced baffle plates pivotally supported in said casing.

9. The combination with the rolls of a rolling mill, of a stationary table, means for coiling a rod delivered from said rolls on one end of said table, a water sealed casing supported on said table and inclosing said table and said coiling means.

10. The combination with the rolls of a rolling mill, of a stationary table, means for coiling a rod delivered from said rolls on one end of said table, a casing inclosing said table and said coiling means, and a removable cover for said casing made in water sealed sections.

11. The combination with the rolls of a rolling mill, of an inclosed coiling mechanism, means for conducting a rod from said rolls to said inclosed coiling mechanism, a second open coiling mechanism, and means for conducting a rod from said rolls to said open coiling mechanism.

12. The combination with the rolls of a rolling mill, of a stationary table, means for coiling a rod delivered from said rolls on one end of said table, means for moving the coiled rod across said table, a casing inclosing said coiling means and said table, a second open table, means for coiling a rod delivered from said rolls adjacent to one end of said open table.

13. The combination with the rolls of a rolling mill, of a stationary table, means for coiling a rod delivered from said rolls on said table around concentrically arranged pins projecting above the upper surface of said table, means for withdrawing said pins below the upper surface of said table to release the coil, means automatically controlled by the withdrawal of said pins for moving the coil from its coiling position, and means automatically controlled by said coil moving means for restoring said pins to their normal position above the upper surface of said table.

14. The combination with the rolls of a rolling mill, of a stationary table, means for coiling a rod delivered from said rolls around concentrically arranged pins normally projecting above the upper surface of said table, means for withdrawing said pins below the upper surface of said table to release the coil, means for moving the coil from its coiling position along said table, an electric motor for actuating said coil moving means, means for automatically completing the electric circuit including said motor by the withdrawal of said pins, a second electric motor for restoring said pins to their normal position, and means automatically controlled by said coil moving means for completing an electric circuit including said second motor.

Dated this 20th day of February, 1920.

JEROME R. GEORGE.

Witnesses:
RUFUS B. FOWLER,
NELLIE WHALEN.