

J. REMMEN.
WIRE AND ROD COILING AND COOLING DEVICE.
APPLICATION FILED SEPT. 28, 1908.

937,551.

Patented Oct. 19, 1909.

2 SHEETS—SHEET 1.

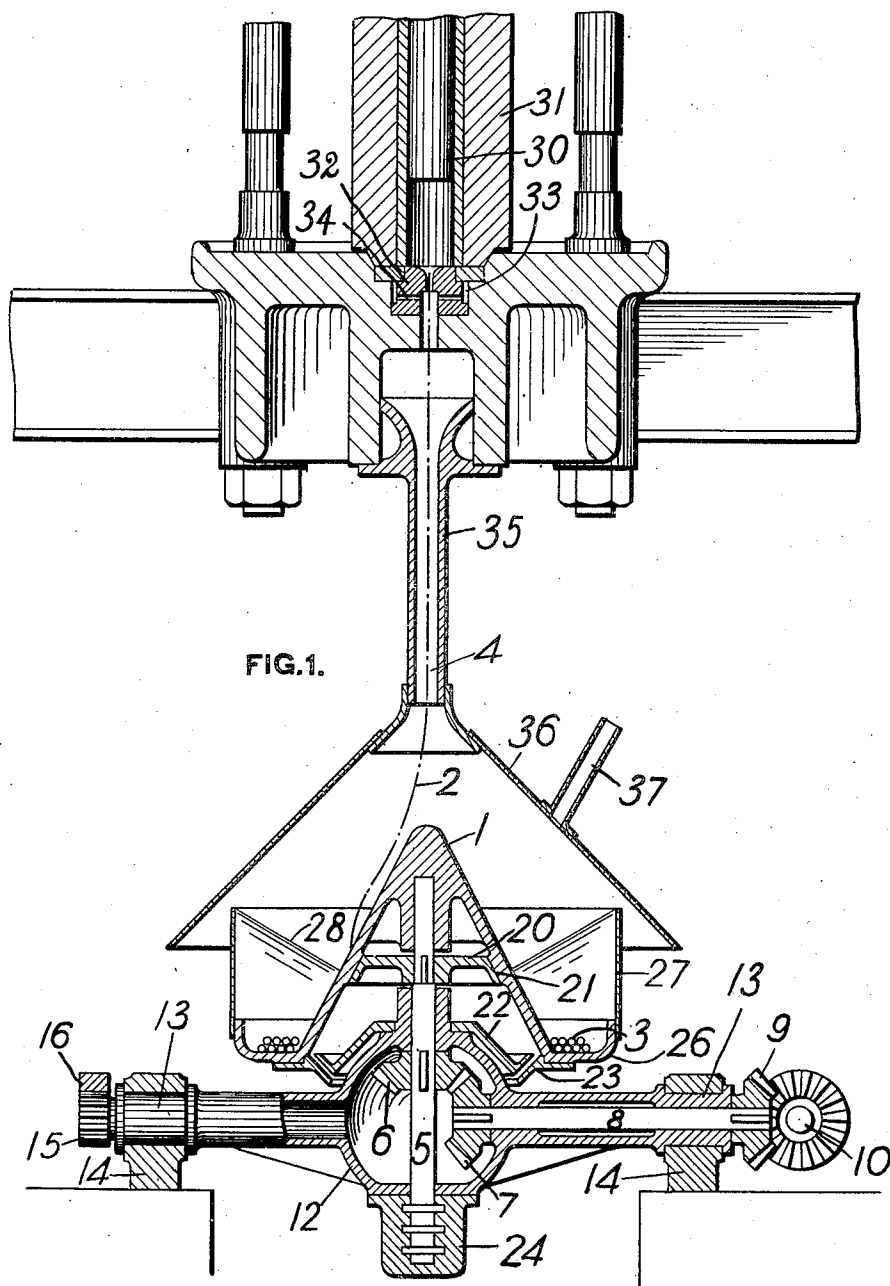


FIG. 1.

WITNESSES

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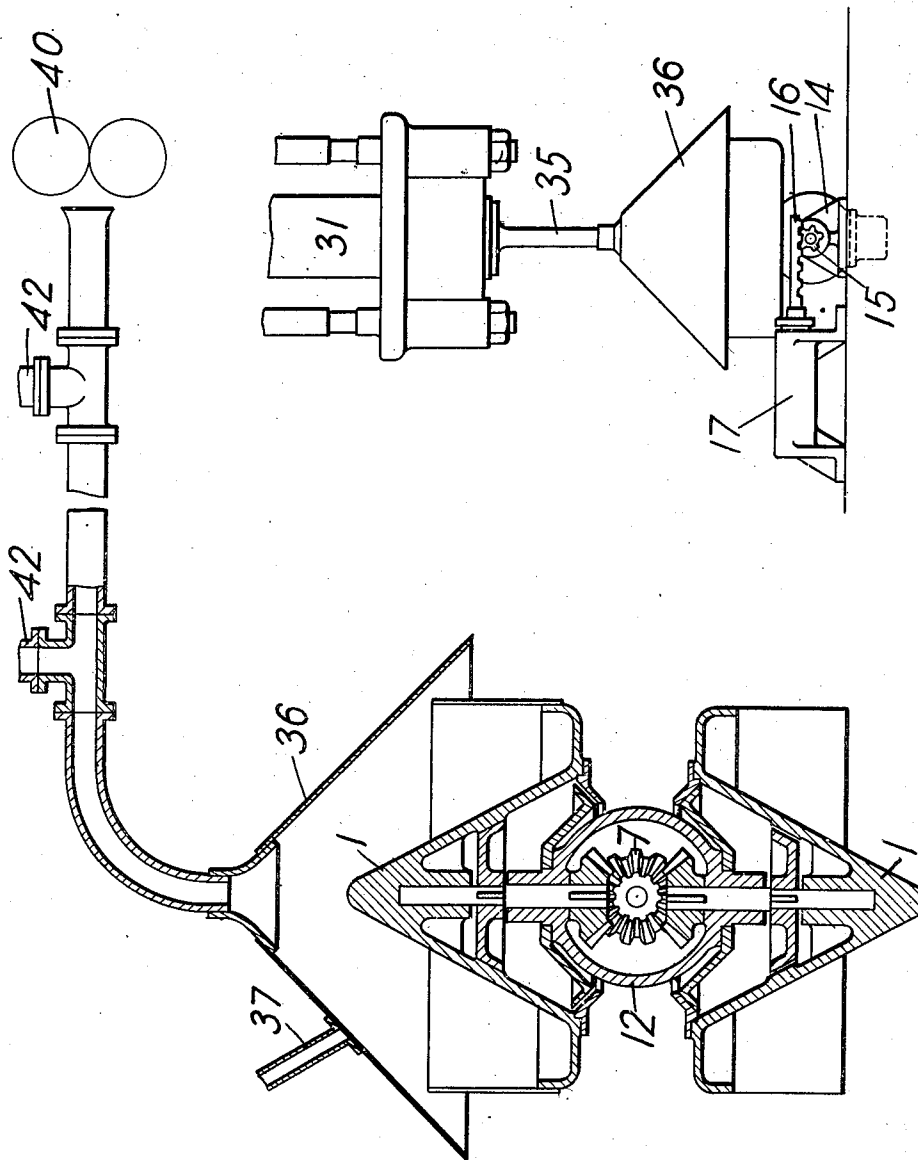


FIG. 2.

FIG. 3.

WITNESSES

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UNITED STATES PATENT OFFICE.

JÖRGEN REMMEN, OF DONORA, PENNSYLVANIA.

WIRE AND ROD COILING AND COOLING DEVICE.

937,551.

Specification of Letters Patent.

Patented Oct. 19, 1909.

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To all whom it may concern:

Be it known that I, JÖRGEN REMMEN, a resident of Donora, in the county of Washington and State of Pennsylvania, have invented a new and useful Improvement in Wire and Rod Coiling and Cooling Devices, of which the following is a specification.

This invention relates to apparatus for coiling and cooling wire, rods for wire, or other small metal rods or bars and similar product.

The object of the invention is to provide a coiling and cooling device whereby the wire, rod or other product is coiled uniformly and with certainty and whereby it is cooled below the point of oxidation, so as to prevent scale formation.

The invention comprises, generally stated, a coiling device of vertical conical form, having the guide for delivering the product to be coiled located vertically above the same, together with means for rotating said conical coiling device.

The invention also comprises a coiling device of the character specified mounted on trunnions so that it can be tilted to discharge the coil.

The invention also comprises a coiling device of the character specified arranged to coil the rod while submerged in water to cool the same.

The invention also comprises certain details of construction and arrangement hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a vertical section through the lower part of a wire rod press and my improved coiling device; Fig. 2 is a side view of the same; and Fig. 3 is a sectional view showing a double coiling device arranged to receive wire rods from a rod mill.

The invention is particularly adapted for coiling rods for wire, and it will be described as applied to this use, but it will be understood that it is not limited thereto, but is applicable for coiling and cooling wire or any small rods or bars capable of being coiled while hot.

The coiler comprises a cone shaped receiver or reel 1 arranged with its axis vertical and adapted to have the rod 2, or other product, coiled around the same as shown at 3. The guide 4 for guiding the rod to the

reel is located directly above the cone, so that the forward travel of the rod causes it to automatically coil around the cone. Coiling devices of this general character with stationary cones are old, the rod being coiled automatically by its forward travel. In some cases the rods do not coil themselves uniformly on a stationary coiler of this kind. In order to prevent kinking or reversing of the rod and secure a uniform coiling thereof, I provide such vertical conical reel with means for positively rotating the same on its vertical axis. The driving means shown comprises a vertical shaft 5 carrying a bevel gear 6 meshing with a similar gear 7 on a horizontal shaft 8 which may be driven in any suitable way, such as by bevel gear 9 meshing with a similar gear on driving shaft 10. This imparts positive rotary movement to the cone and effectually overcomes any tendency of the rod to buckle, kink or reverse its direction of coiling around the cone. It is not material at what speed the cone is driven, since if the speed of the cone is greater than the feeding travel of the rod, the latter simply follows around with the cone; whereas if the cone is driven slower than the feeding travel of the rod, the latter automatically coils itself in the same manner as though the cone were stationary. Consequently, this arrangement operates uniformly well, irrespective of the size of the coil or bundle on the cone, or of the rate of feed or travel of the rod.

The cone is mounted to discharge the coil or bundle. To this end the shaft 5 is mounted in a frame 12 provided with horizontal trunnions 13 mounted in suitable bearings 14 and provided with means for tilting the frame. The means shown comprises a pinion 15 on one of the trunnions, engaged by a rack bar 16 which may be actuated by any suitable mechanism, such as a hydraulic or other power cylinder 17. Various other mechanisms for tilting the reel to discharge the coil or bundle may be employed. The shaft 8 extends out through one of the hollow trunnions of the frame, so that the driving means does not interfere with the tilting.

In order to discontinue the rotation of the cone when tilted, I provide driving connections which become disengaged when the cone is tilted. As shown, the shaft 5 is pro-

vided with a disk 20 having a beveled face engaging by friction a corresponding face 21 on the inside of the cone, thereby forming a frictional driving connection which is in engagement when the cone is in upright or vertical position. The cone is loose on the shaft 5 so that when inverted, it slides on said shaft to break contact between the face 21 and disk 20. To prevent the cone from sliding off the shaft 5 and at the same time be free from the rotary action of said shaft, I provide a suitable stop, that shown comprising a disk or arms 22 secured to the frame 12 and having its outer edge arranged to be contacted by an inwardly projecting ring or flange 23 on the base of the cone. The flange is shown as a separate part from the cone, and the flange and disk 22 are provided with correspondingly inclined contacting faces, but these are details which can be varied within wide limits. The shaft 5 is mounted in a step bearing 24 in the frame 12.

In order to cool the rod while coiling, the cone is surrounded by a suitable receptacle or basin. As shown the cone is provided with an outwardly projecting portion or floor 26, to the outer edge of which is connected a ring or annular wall 27, forming in effect a basin surrounding the cone. This basin is water-tight and contains water to such depth that the rod is submerged while being coiled. The centrifugal force due to the rotation of the cone causes the water to assume an inclined position as shown at 28. The excess of water overflows the ring or wall 27. The water may be supplied from any suitable source, and may be either cooling water from the dies or rolls used to form the rod, or supplied through a separate source.

Fig. 1 shows the rod produced by forcing the same by a suitable plunger 30 working in a cylinder 31 whose lower end is closed by die 32 through which the hot metal is forced to form the rod. The die is cooled by having water supplied to a passage 33 therein, which passage has connected thereto ports 34 in such position that the water is projected against the rod as it emerges from the die, thus cooling the rod to some extent at this point. Below the die is a suitable tube or conduit, 35 forming the guide and having connected to its lower end a hood 36 covering the coiling device and confining the water splashing. The water coming through die 32 naturally runs down through the tube or conduit 35 and into the coiler. If this water is not sufficient, additional water may be supplied through pipe 37 projecting through the hood 36. The rod forming apparatus shown in Figs. 1 and 2 is substantially similar to that described and claimed in my application filed Aug. 17, 1908, Serial No. 448,855.

Fig. 3 shows the application of the inven-

tion to an ordinary rod mill whose finishing pair of rolls is shown at 40. From this leads a suitable tubular guide 41 for conducting the rod to the coiler, said guide at its outer end curving downwardly and connecting with the top of dome 36 so as to deliver the rod to the coiler in a downward direction. The cooling water in this case can be supplied either through the pipe 37 in hood 36, or through additional pipes 42 connected to the conduit or guide 41. Fig. 3 also shows a double coiling device; that is, having two oppositely arranged cones on the same vertical shaft 5 so that when the frame is tilted to discharge the bundle from one of the cones, the other cone is brought into upright position to receive a fresh rod. This double coiler is particularly adapted for rod mills where rods are produced in rapid succession through the same pass.

In the use of the apparatus described, the rod is formed either between the rolls shown in Fig. 3, or by pressing through a die as shown in Fig. 1. In either case the hot rod travels at a comparatively high speed. It is guided to the cone at a point directly above the latter, so that said rod tends to coil itself automatically around the cone, due to the travel imparted thereto by its production. By driving the cone positively, however, the rod is prevented from snarling, kinking or reversing its travel around the cone. The driving of the cone does not interfere with the proper automatic coiling of the rod. With a high speed of rotation the rod travels around with the cone, whereas with a slow speed of rotation, the rod automatically coils itself partially in the same manner as though the cone were standing still. Even a moderate speed of rotation of the cone prevents all danger of reversing, snarling or kinking, and by having a cone shaped coiler with the delivery guide located above the same, no particular attention need be paid to the speed of travel of the rod or the speed of rotation of the coiler, as it operates equally as well when the coil is being formed around the large part of the cone as when being formed around a smaller diameter. When the coiling of a bundle is completed the frame 12 is tilted on its trunnions to automatically discharge the bundle. When inverted the cone slides downwardly on the shaft 5 until arrested by contact of flange 23 with disk 22. This breaks the driving connection between the cone and friction disk 20, so that in inverted position the cone is held by the non-rotary part 22. The coiler when in working position is full of water, so that the rod is coiled while being submerged. The water supply overflows the edge of the basin 27, so that the water is kept cold in order to effectually cool the rod and prevent oxidation. This is of importance when forming small rods, such as

for wire, in which even a thin layer of oxid constitutes a very perceptible percentage of the entire tonnage.

What I claim is:—

5 1. Apparatus for coiling wire, rods and similar product, comprising in combination, a cone-shaped receiver or reel arranged with its axis vertical, mechanism for rotating said receiver or reel, a guide for the product
10 located above and in line with the axis of said cone-shaped receiver or reel, and mechanism for feeding the product through said guide and to the receiver or reel.

15 2. Apparatus for coiling wire rods and similar products, comprising in combination a frame, horizontal trunnions on which said frame is tiltable, a vertical shaft carried by said frame, driving connections to said shaft, a reel slidable and rotatable on said
20 shaft, and connections between the shaft and reel arranged to rotate the reel with the shaft when in upright position and to permit the reel to slide on the shaft and out of driving engagement therewith when in-
25 verted.

30 3. Apparatus for coiling wire rods and similar product, comprising in combination, a frame mounted to tilt, a vertical shaft mounted in said frame, driving connections to said shaft, a reel slidable and rotatable on said shaft, connections between the shaft and reel arranged to rotate the reel with the shaft when in upright position and to permit the reel to slide on the shaft and out of

driving engagement therewith when in- 35
verted, and a non-rotatable member arranged to be contacted by the reel when inverted.

4. Apparatus for coiling wire rods and similar product, comprising in combination, 40
a basin shaped coiling device, rod forming mechanism, a conduit extending from said mechanism to the coiling device, and means for supplying water to the rod as it emerges from the forming mechanism, whence the 45
same can flow into the conduit and into the coiling device.

5. Apparatus for coiling wire rod and similar product, comprising in combination, a basin shaped coiling device, a forming die, 50
means for forcing the metal through said die, a conduit extending from said die to the coiling device, and means for supplying water to the product as it emerges from the die, whence the same can flow through the 55
conduit into the coiling device.

6. Apparatus for coiling wire, rods and similar product, comprising an upright water tight basin shaped coiling receptacle, mechanism for rotating the same, a hood covering 60
said coiling receptacle, a water supply, and a guide for the product arranged in the hood.

In testimony whereof, I have hereunto set my hand.

JÖRGEN REMMEN.

Witnesses:

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CLYDE T. LEWIS.