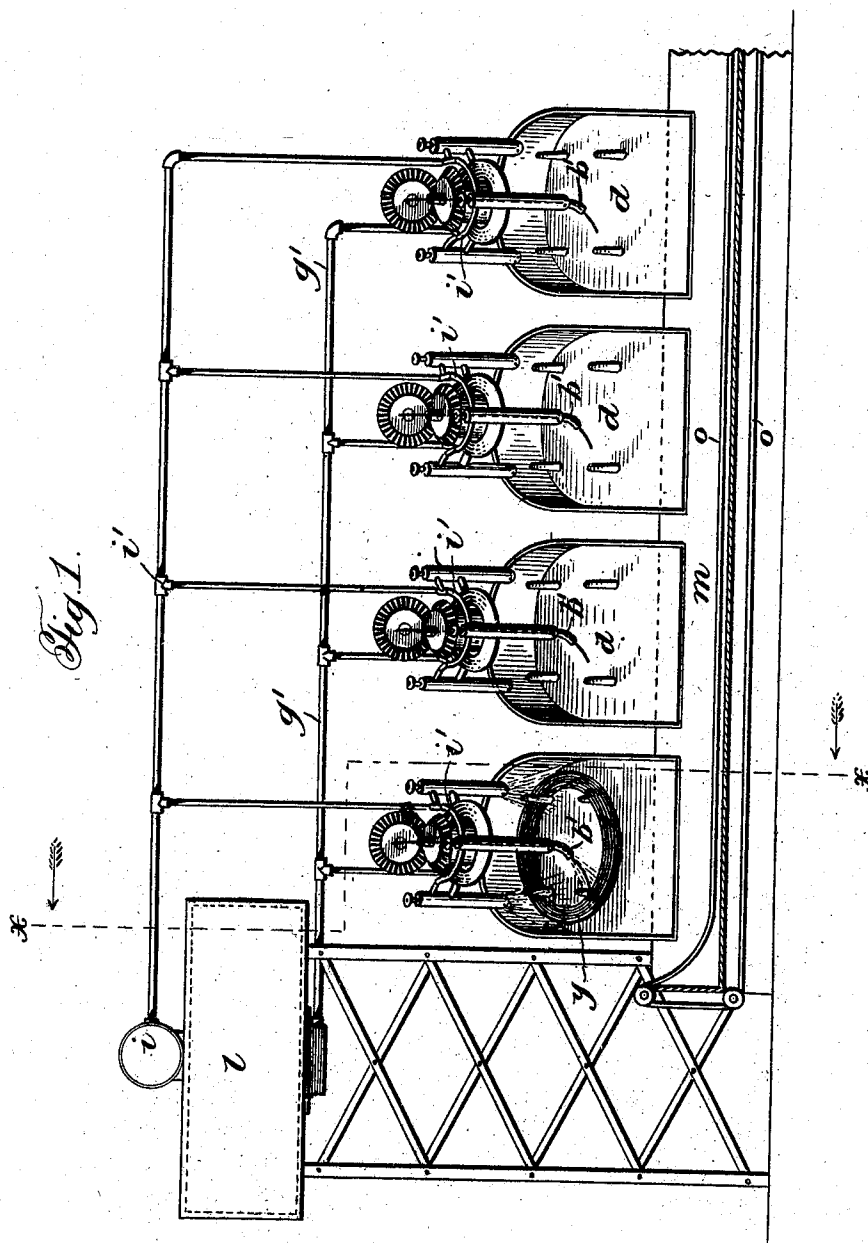


No. 854,807.

PATENTED MAY 28, 1907.

F. H. DANIELS.
APPARATUS FOR TREATING WIRE RODS.
APPLICATION FILED JUNE 6, 1904.

3 SHEETS—SHEET 1.



Witnesses
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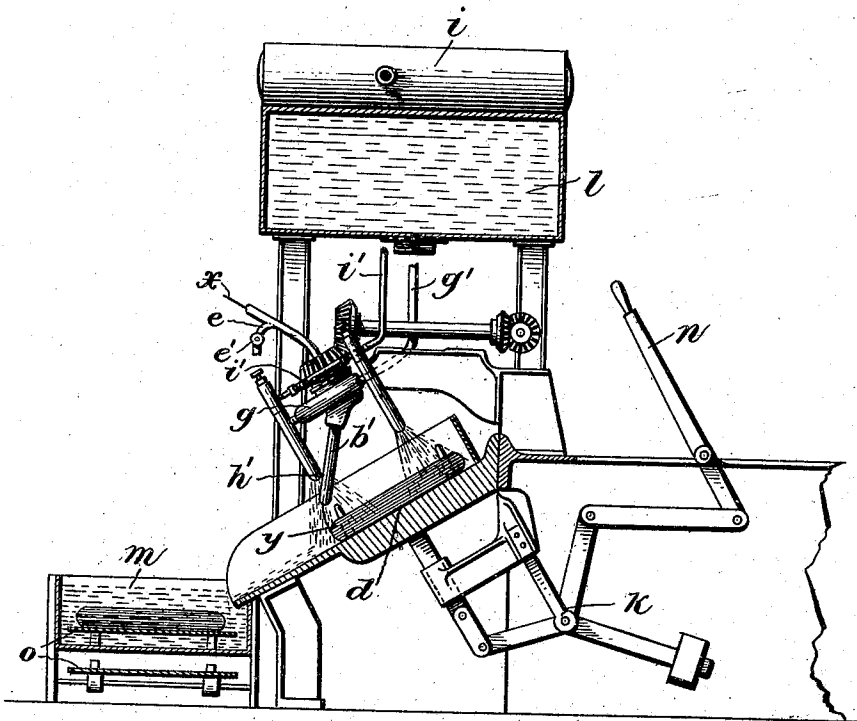
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3 SHEETS—SHEET 2.

Fig. 2.



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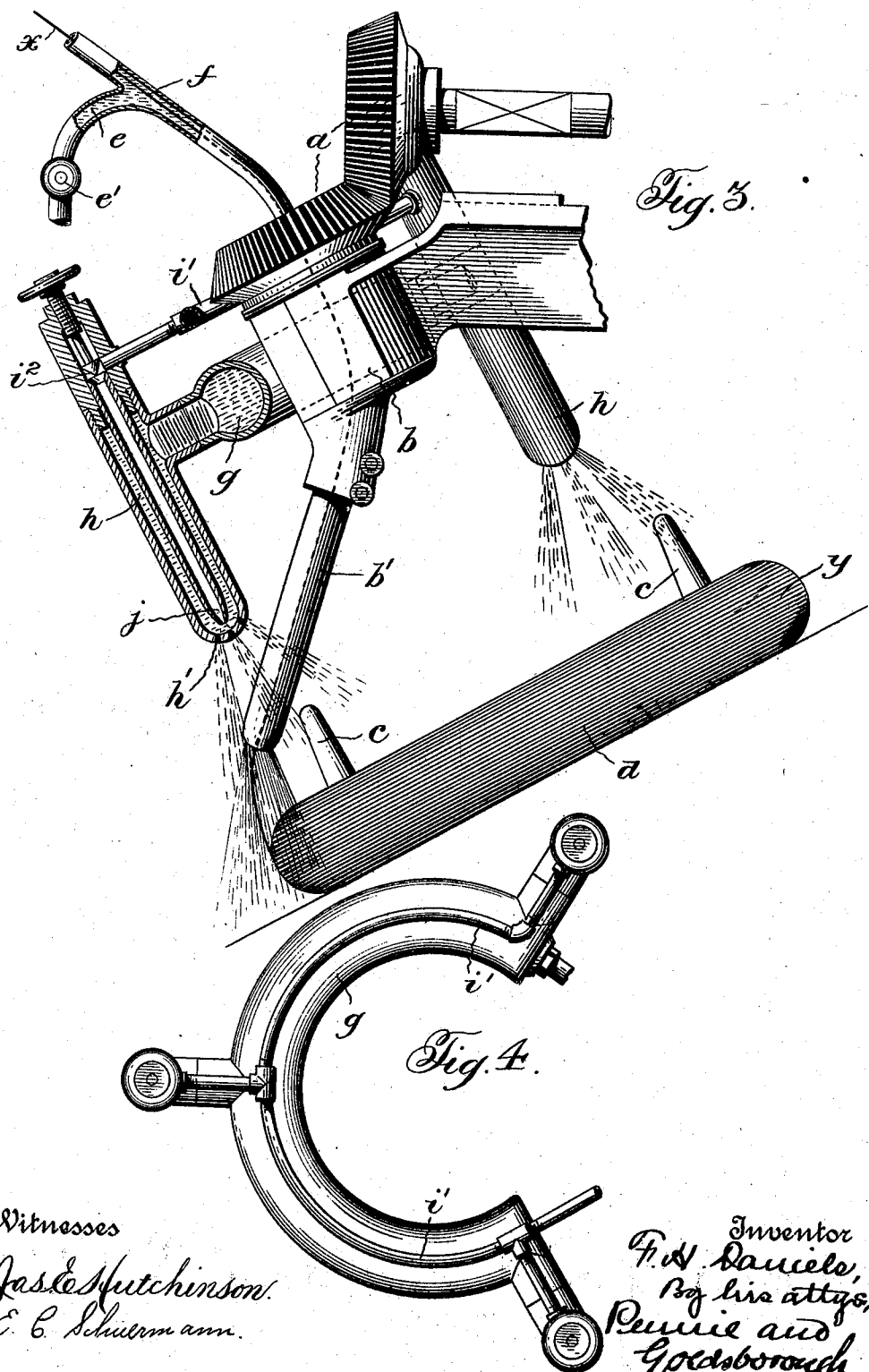
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

FRED H. DANIELS, OF WORCESTER, MASSACHUSETTS.

APPARATUS FOR TREATING WIRE RODS.

No. 854,807.

Specification of Letters Patent.

Patented May 28, 1907.

Application filed June 6, 1904. Serial No. 211,306.

To all whom it may concern:

Be it known that I, FRED H. DANIELS, a citizen of the United States, residing at Worcester, county of Worcester, State of Massachusetts, have invented certain new and useful Improvements in Apparatus for Treating Wire Rods; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to the manufacture of wire rods, and more particularly consists in improved means for cooling the same and preventing the formation of scale thereon as they come from the finishing mill. The wire rods, as they come hot from the mill, are coiled or "reeled," and, in order to prevent too heavy scale forming while the coil is cooling in the open air, it has heretofore been the custom, in some cases, to cool them by immersing them in water immediately after the coiling operation. This operation, however, seems too violent for the highly heated rods, and results in chilling and hardening them to an injurious degree, and it is the purpose of this invention to effect the cooling by a milder process that may either be employed as preliminary to the usual immersion, or may be the only cooling to which they are subjected.

In United States Patent No. 737,361, granted to me August 25, 1903, I showed, described and claimed an apparatus for coiling the rods in a practically air-tight casing containing steam or a non-oxidizing gas, and passing the completed coils slowly through a continuation of said casing from which they were finally delivered into a water bath. This apparatus effectively prevents the formation of a coating of oxid of iron upon the rods, and the object of the present invention is to obtain the same general results in substantially the same way, while coiling the rods in the open air and without inclosing the coiler or the wire in the casing, though I would have it understood that the present apparatus may be inclosed if desired.

Generically speaking, the operation performed by the present apparatus consists in creating around the rods, during the operation of coiling, a non-oxidizing atmosphere of steam and finely-divided moisture by spraying the coil with water as it is being formed, the water being divided up into minute particles by the relative rotary move-

ment between the spraying nozzles and parts of the coiler.

The mechanism by which this operation may be carried out, as well as further details of the operation and of the advantages secured by their use will be apparent from the following detailed description, taken in connection with the accompanying three sheets of drawings, in which:

Figure 1 is a front elevation, part being shown in section, of a coiling plant having a capacity of four reels and equipped with my improved cooling and scale preventing means; Fig. 2 is a cross section of Fig. 1, taken on the line $x-x$ thereof; Fig. 3 is a side elevation of the automatic coiler, partly in section, and of the spraying mechanism, also partly in section, and Fig. 4 is a plan view of the spraying mechanism.

Referring particularly first to Fig. 3 of the drawings, the finished wire x is delivered through the pipe f to the rotating tubular arm b' of the automatic coiler b , which may be of usual construction, said arm being rotated by the bevel gears a, a . The rod is thus wound in a coil upon the inclined platform d , through which project pegs or pins e , which are adapted to be retracted by lever mechanism k and handle n , which may be constructed in any usual way and which will be clearly understood from an inspection of Fig. 2.

When the coil or bundle y is completed, the pins e are withdrawn and the bundle y slides by gravity off said platform onto a suitable supporting surface, which may, as shown, be a conveyer o , running in a tank or water bath m for finally cooling the rod so that it can be handled, after having been, by means of the spraying process described above, cooled to a temperature below the critical point at which the metal may be hardened or tempered. This final cooling may or may not be used, and the coil may be delivered to a conveyer or stationary platform without the addition of a water tank.

From a suitably located reservoir l or other source I extend a system of piping g which communicates with hollow supply heads g , one of said supply heads being located adjacent to, and partially encircling each coiler b . To each of said heads are secured a plurality of atomizer nozzles h , three being shown in the drawing, which are located so as to direct the sprays issuing from them upon the rods as they are wound, by

the coiler *b*, around the pins *c* on the platform *d*.

The ends of the atomizers *h* are provided with small apertures *h'* and the water is caused to issue therefrom with considerable force in a fine spray by means of air, steam or other gaseous fluid under pressure delivered from a reservoir *i*, through pipes *i'* to a nozzle *j*, axially located within each atomizer *h*. A needle valve *i²*, at the upper end of each nozzle *j* controls the pressure in each atomizer. The pipes *f* through which the rod *x* is fed to the coiler and the coiler arm *b'* may also be utilized as a water passage. I have shown a branch pipe *e*, provided with a cock *e'*, and leading into the pipe *f* for this purpose. I do not confine myself to a nozzle constructed according to the above description; any suitable spraying nozzle may be used.

The operation will now be described. The wire as it comes from the rolls is guided by the pipe *f* into the coiler and by the latter is laid around the pins *c*. The water issuing in fine sprays from the atomizers *h* is still more finely divided by the impact of the revolving arm *b'* and the wire issuing therefrom. As soon as a sufficient number of turns of wire have been coiled around the pins *c*, the cock *e'* is opened admitting water to the pipe *f* and revolving arm *b'*, and as said water issues from the end of said arm, it mingles with the sprays from the atomizers *h*, the result being to spray or atomize still further the water coming from both sources. As the water, in this finely-divided condition, strikes the hot wire in the coil, steam is formed, which, coupled with the fine mist pervading the entire platform *d*, effectually prevents the oxidation of the wire while at the same time cooling the same sufficiently gradually to prevent a chilling or hardening action. When the coil is completed, the pins *c* are withdrawn and the coil slides off the platform *d* preferably into the bath *m* and onto the conveyer *o*.

It is to be noted that the water issuing from the revolving arm *b'* strikes the coil and the platform on which it is being formed with considerable force, and is broken up into minute particles similar to those issu-

ing from the spray nozzles or atomizers *h*. This action is greatly facilitated by the rotation of the arm *b'*, causing the jets to strike the pins *c*, the coil itself, and other parts of the apparatus, which, though actually stationary, are relatively movable with respect to the water which is thus projected upon them, and cause the fine stream of water to rebound and be further broken up so as to be the more easily converted into steam by the heat of the coil.

What I claim is:—

1. An apparatus for treating wire rods, comprising a stationary reel, a spraying mechanism arranged to create an atmosphere of finely divided water spray in proximity to the reel, and a revolving coiler arranged to pass the wire through the spray on its way to the reel.

2. An apparatus for treating wire rods, comprising a hollow revolving coiler arranged to receive the wire as it comes from the finishing mill, a relatively stationary reel, atomizers to deliver a finely-divided spray upon said reel, and a pipe to force water through said coiler along with the wire.

3. An apparatus for treating wire rods, comprising a hollow, revolving coiler arm arranged to receive the wire as it comes from the finishing mill, and a pipe to force water under pressure through said coiler arm, whereby a stream of water will be caused to issue from said arm with the wire.

4. An apparatus for treating wire rods, comprising a hollow, revolving coiler arm arranged to receive the wire as it comes from the finishing mill, means arranged to convey water into and through said coiler arm, and atomizers to project a finely divided spray or mist onto said wire during the coiling process, said atomizers being located at intervals in a circle approximating that described by the coiler.

In testimony whereof I affix my signature, in presence of two witnesses.

FRED H. DANIELS.

Witnesses:

EUGENE VAN DE MARK,
IDOFF EKLUND.