

No. 737,361.

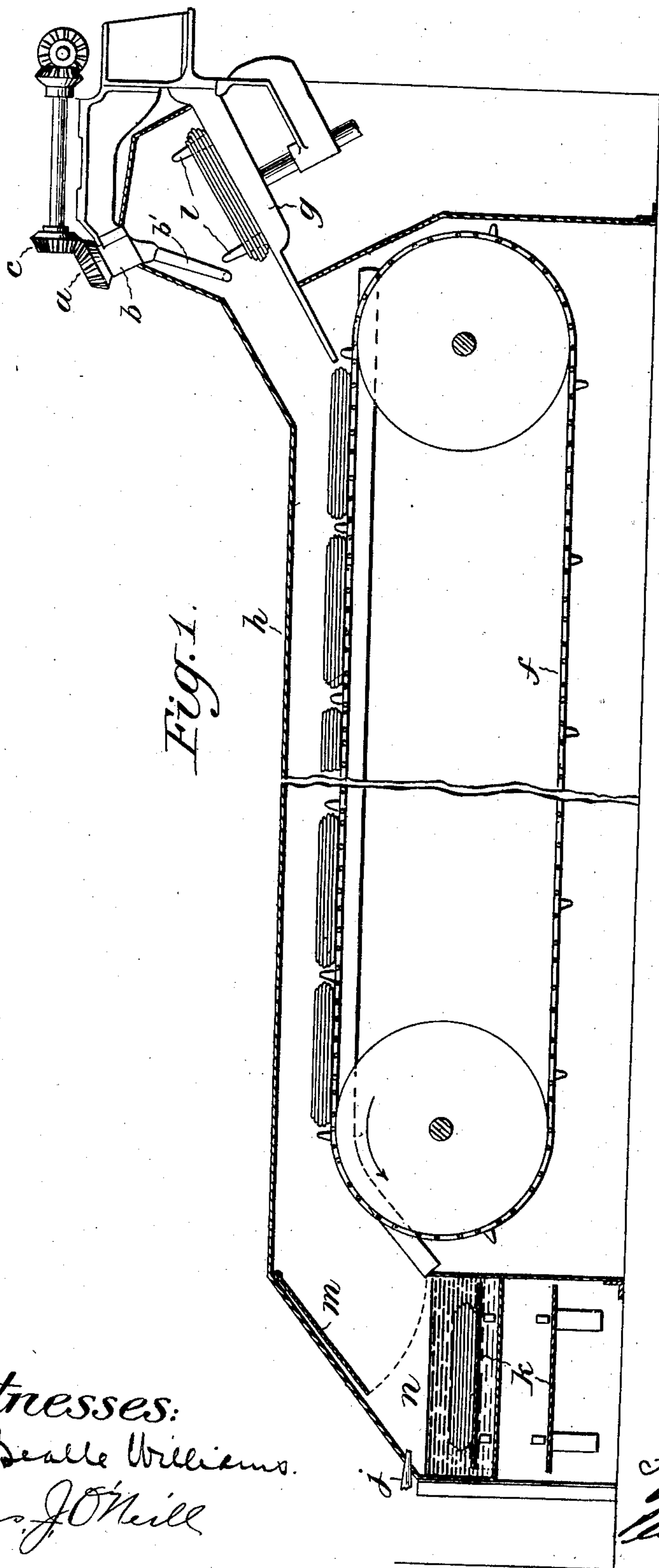
PATENTED AUG. 25, 1903.

F. H. DANIELS.
APPARATUS FOR TREATING WIRE RODS.

APPLICATION FILED JUNE 12, 1903.

NO MODEL.

3 SHEETS—SHEET 1.



Witnesses:
W. Beale Williams.
Chas. J. O'Neill

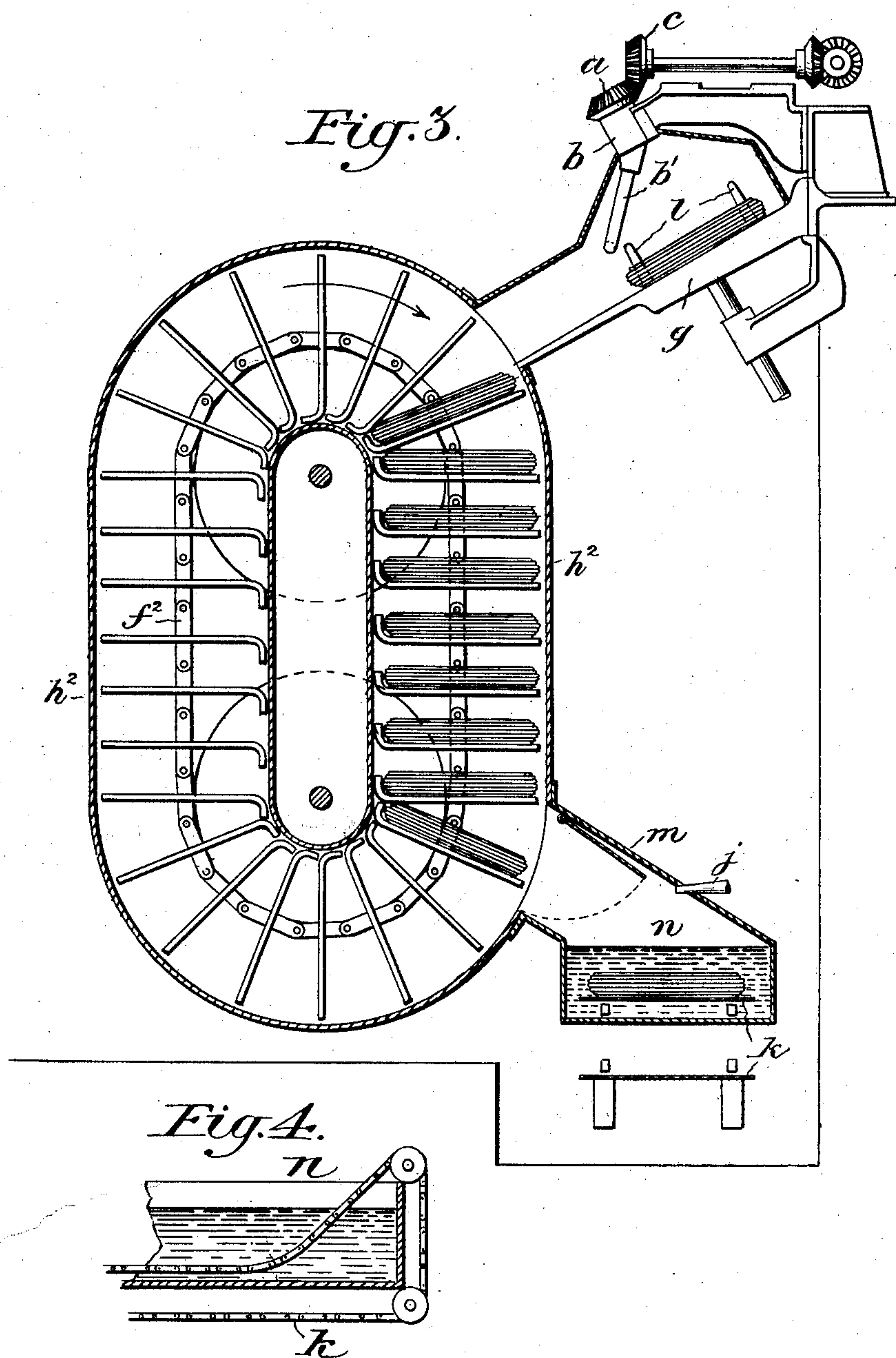
Inventor:
Fred H. Daniels,
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3 SHEETS—SHEET 3.



Witnesses:
 Chas J O'Neill
 W. Deane Williams.

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 Fred H Daniels,
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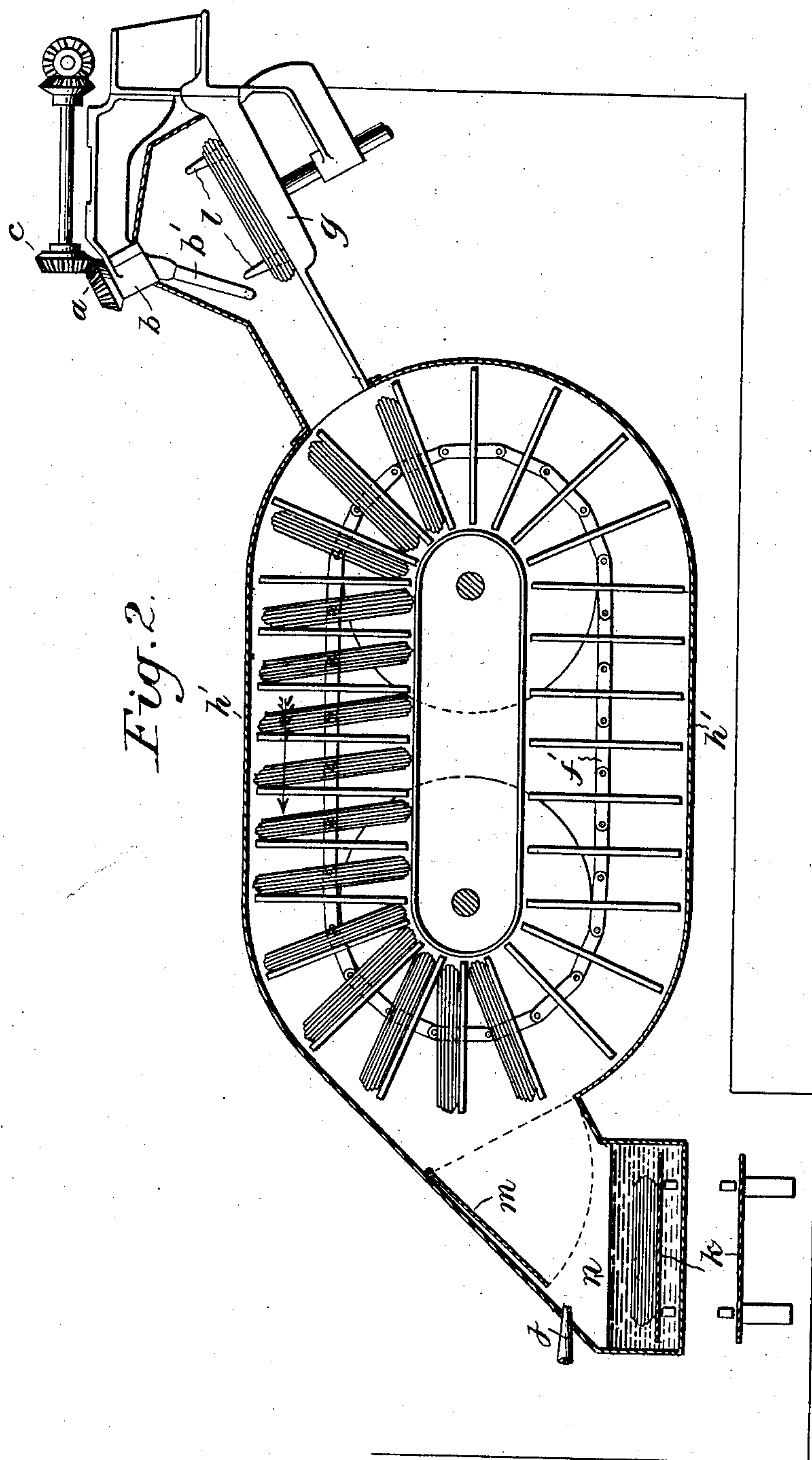
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3 SHEETS—SHEET 2.



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Chas. J. O'Neill

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UNITED STATES PATENT OFFICE.

FRED H. DANIELS, OF WORCESTER, MASSACHUSETTS.

APPARATUS FOR TREATING WIRE RODS.

SPECIFICATION forming part of Letters Patent No. 737,361, dated August 25, 1903.

Application filed June 12, 1903. Serial No. 161,163. (No model.)

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.

The object is to provide an apparatus in which the rods may be slowly and effectively cooled under conditions most favorable for the prevention of the formation of scale or oxid on the hot metal.

In the manufacture of such wire rods it is customary to lead the rod from the finishing-mill to an automatic coiler or reel, which forms it while still hot into a bundle, which is afterward cooled. During this operation of cooling the action of the air upon the hot metal forms a considerable coating of oxid or scale upon the outer surfaces, and this must be thoroughly cleaned off before the metal can be satisfactorily drawn into wire. This cleaning operation is usually accomplished by immersing the coil in a dilute solution of sulfuric or hydrochloric acid, preferably the former, and therefore involves considerable care, labor, and expense.

The particular purpose of the improvement being to perform all operations, including the coiling and cooling of the rod after it leaves the finishing-roll, in a non-oxidizing atmosphere, the invention contemplates the employment of an automatic coiler or reel which delivers in a chamber containing an atmosphere of steam or non-oxidizing gases, which chamber also contains a suitable conveyer for receiving the finished coils and slowly advancing the same through said chamber until the coils are sufficiently cool and may, if desired, open into a second chamber or receptacle containing a quenching-bath of water or other suitable liquid to finally cool the coils.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a longitudinal section through one form of my apparatus, which comprises

an automatic coiler and reel inclosed within an elongated horizontal chamber, within which operates a horizontal conveyer for receiving the coils, said conveyer being adapted to discharge the coils when cool to a sufficient degree upon a second conveyer operating in a tank of water or other quenching fluid. Figs. 2 and 3 are modified forms of my apparatus, which differ from Fig. 1 only in the specific arrangement of the primary conveyer. Fig. 4 is a fragmentary detail of the quenching-tank and its conveyer.

Referring to Fig. 1 of the drawings, the finished rod is delivered through a pipe to a point *a* on the automatic coiler *b*, which may be of any well-known type, preferably with a rotating tubular arm *b'*. This arm is rotated at a proper speed by means of gearing *c*, driven from a suitable power-shaft, and the wire is thus laid up in a coil upon a platform *g*, upon which is mounted upstanding pegs or pins *l*, in accordance with the well-known wire-mill practice. The automatic coiling mechanism, including the platform *g*, is inclined at a suitable angle, so that when a coil is finished and the pegs or pins *l* are withdrawn by appropriate mechanism the coil will slide down the platform *g* and be discharged therefrom upon a conveyer *f*. The coiler arm and reel, as described, are inclosed within a suitable casing *h*, which is to all intents and purposes gas and air tight and is adapted to form a cooling-chamber for the finished coils. In order to prevent oxidation and scaling of the hot coils during their passage through said cooling-chamber, I propose to fill the latter entirely with an atmosphere of non-oxidizing gas or steam delivered by a jet or burner *j*. The chamber *h* opens into a second chamber *n*, having a conveyer *k* operating therein, preferably at right angles to conveyer *f*, and serves to deliver the coils at a convenient place for loading or storage. The conveyer *k* is immersed in a bath of water or other suitable fluid for the purpose of finally cooling or quenching the coils after they have been preliminarily cooled in chamber *h*. It will be seen that by this method the formation of oxid or scale on the rods is prevented.

Of course it is to be understood that each reel and conveyer may be provided with a separate inclosing chamber *h*, and each of

said chambers may connect with a common chamber *n*, containing the water-bath, and conveyer *k*, so that the products of the several coilers are ultimately delivered to a single conveyer in manner following the common practice.

In order that necessary repairs may be made upon any coiler without interrupting the service of the others, a damper *m* may be provided for separating each reel-chamber *h* from the common chamber *n*.

The apparatus illustrated in Figs. 2 and 3 differs from that hereinbefore described only in the particular arrangement of the cooling-chambers *h'* and *h''* and the inclosed conveyers *f'* and *f''*. In Fig. 2 the coils are delivered edgewise to the conveyer and are carried in an upright position through the cooling-chamber and finally discharged upon the common conveyer *k*. In Fig. 3 the chamber *h''* and conveyer *f''* are arranged vertically and differ in no other essential particular from the arrangement shown in Fig. 2.

The operation of the apparatus is substantially as follows: the rod passes directly from the finishing-roll through a suitable pipe (not shown) to the head of the coiler *b*; thence through the rotating tubular arm *b'*, by which it is coiled up upon the platform *g* about the pegs or pins *l*. When the coil is finished, the pegs or pins *l* are lowered or withdrawn by any appropriate means, and said coil slides down to platform *g* upon the conveyer *f*, *f'*, or *f''*, by which it is carried through the cooling-chamber, from which the air is excluded by the introduction of steam, products of combustion, or other non-oxidizing gases by way of jet *j*. From the cooling-chamber the coil is delivered to conveyer *k* in chamber *n*, which is provided with a water seal in order to prevent the non-oxidizing gases from escaping. By means of conveyer *k* the partially-cooled coil is passed through the bath and completely cooled or quenched, after which it is delivered at some appropriate point.

The forms and mode of operation of my improved apparatus being as hereinbefore described, it is to be particularly noted that the purpose and object of the preliminary-cooling chambers *h*, *h'*, or *h''* is to reduce the temperature of the hot metal, which contains a percentage of carbon, to such a point that the stock will not be injuriously affected by the subsequent quenching of the liquid-bath of chamber *n*.

Although, as herein shown, a jet or burner *j* is employed for the introduction from the outside of steam or other non-oxidizing gas, the invention is not to be understood as limited to the employment of such jet, for the reason that a non-oxidizing atmosphere of steam may be generated within the chamber

by means of the hot coils falling into the water-bath at *n*. When the coils reach this point, although they have cooled down considerably, they are still hot enough to generate sufficient steam for this purpose.

Having thus described my invention, what I claim is—

1. An apparatus for treating wire rods, comprising a reel receiving the rods from the finishing-rolls, a casing forming a housing for said reel and a cooling-chamber for said rods, means for excluding air from said casing, and means for passing the coils from said reel through the cooling-chamber.

2. An apparatus for treating wire rods, comprising a reel receiving the rods from the finishing-rolls, a casing forming a housing for said reel and a cooling-chamber for said rods, means for introducing a non-oxidizing atmosphere into said housing, and a conveyer receiving the coils from the reel and passing them through the cooling-chamber.

3. An apparatus for treating wire rods, comprising a reel receiving the rods from the finishing-rolls, a casing forming a housing for said reel and a cooling-chamber for said rods, means for introducing a non-oxidizing atmosphere into said housing, a conveyer receiving the coils from the reel and passing them through the cooling-chamber, and a second chamber containing a liquid-bath, into which the coils are discharged from the cooling-chamber.

4. An apparatus for treating wire rods, comprising a reel receiving the rods from the finishing-rolls, a casing forming a housing for said reel and a cooling-chamber for said rods, means for introducing a non-oxidizing atmosphere into said housing, a conveyer receiving the coils from the reel and passing them through the cooling-chamber, a second chamber containing a liquid-bath, into which said cooling-chamber discharges, and a conveyer in said second chamber for passing the coils through said bath.

5. An apparatus for treating wire rods, comprising a coiler receiving the rods from the finishing-rolls, a reel upon which the rods are wound by the coiler, a casing forming a housing for said reel and a cooling-chamber for said rods, means for introducing a non-oxidizing atmosphere into said housing, and means for receiving the coils from the reel and passing them through the cooling-chamber.

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

FRED H. DANIELS.

Witnesses:

A. F. BACKLIN,
W. D. THOMPSON.