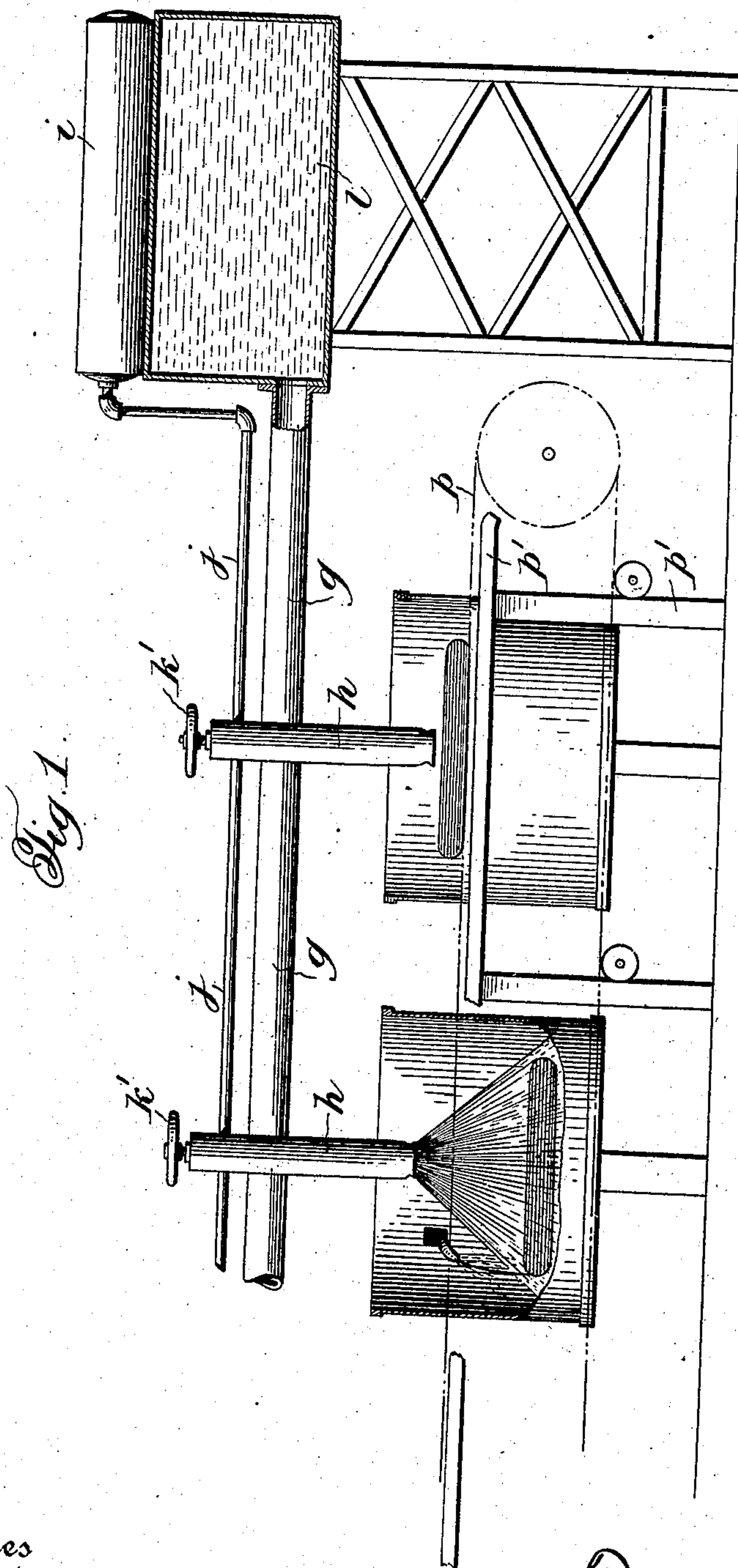


No. 854,808.

PATENTED MAY 28, 1907.

F. H. DANIELS.
TREATMENT OF WIRE RODS.
APPLICATION FILED JUNE 6, 1904.

2 SHEETS—SHEET 1.



Witnesses
Jas. E. Hutchinson.
E. C. Schumann.

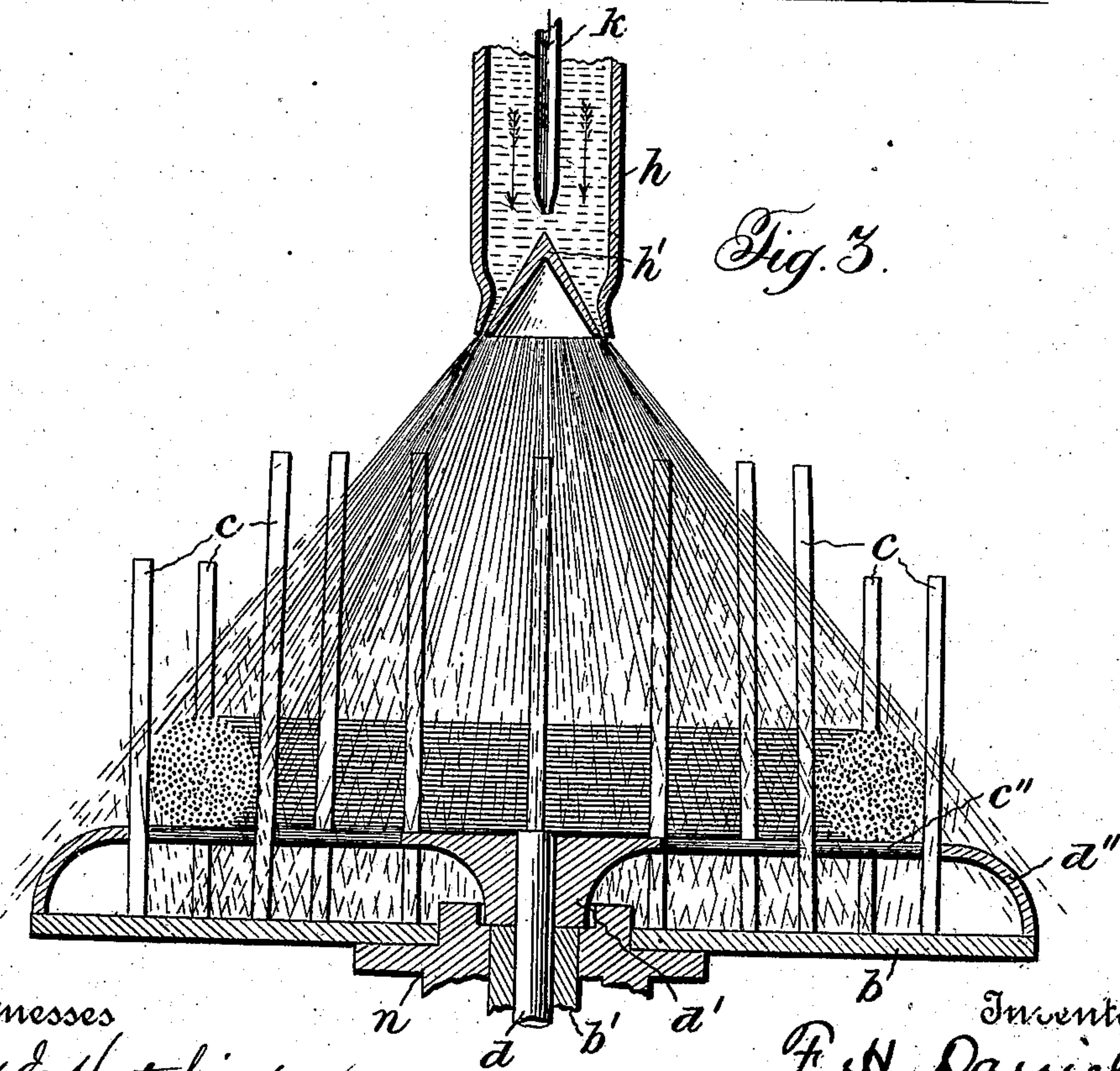
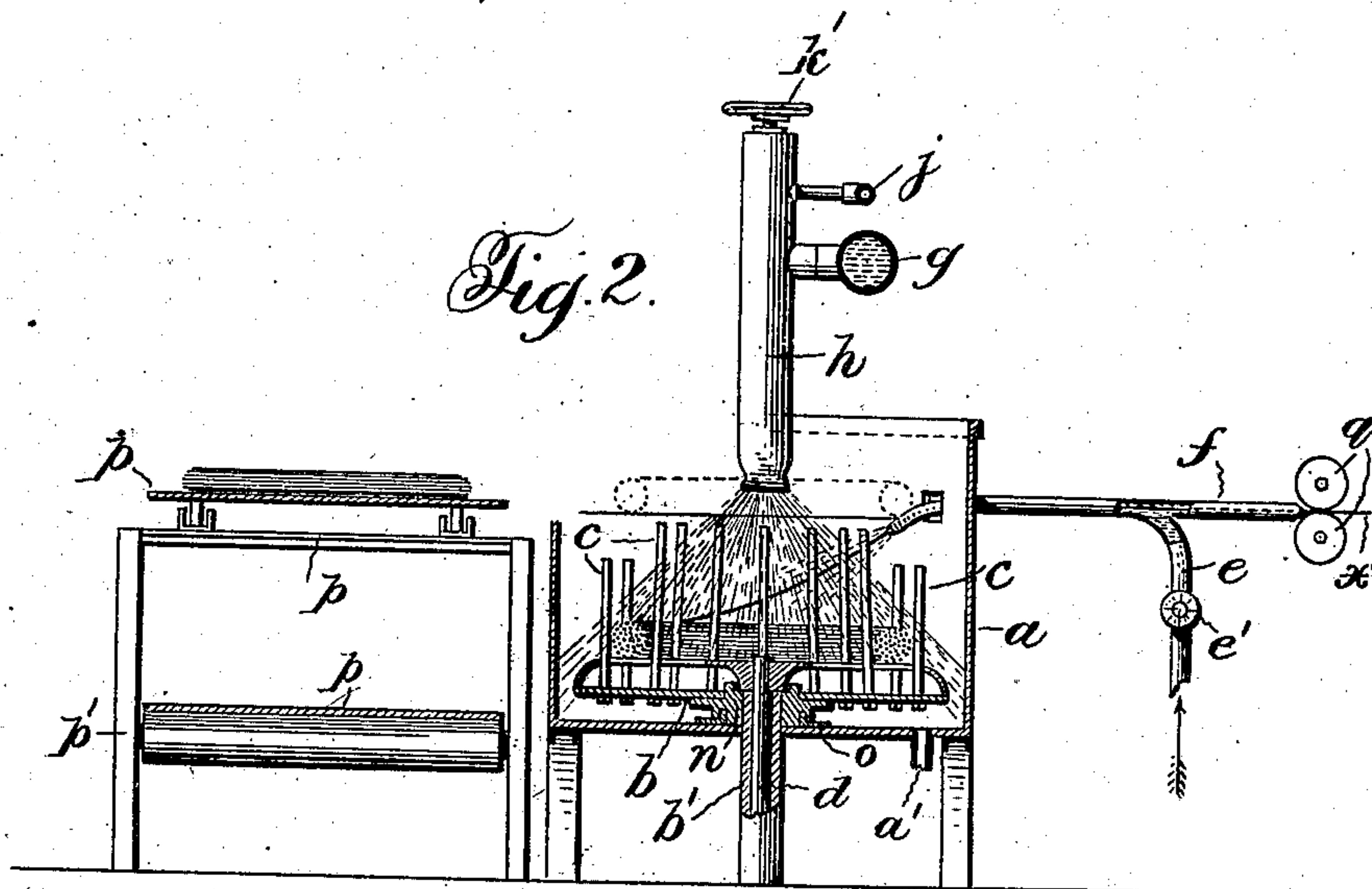
Inventor
F. H. Daniels,
By his attys,
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Witnesses
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UNITED STATES PATENT OFFICE.

FRED H. DANIELS, OF WORCESTER, MASSACHUSETTS.

TREATMENT OF WIRE RODS.

No. 854,808.

Specification of Letters Patent.

Patented May 28, 1907.

Application filed June 6, 1904. Serial No. 211,307.

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 the Treatment of 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 gradually 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 said 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 said rods by immersing them in water immediately after the coiling operation. It has been found, however, that owing to the highly heated condition of the rods, their immersion at once into a body of water affects them injuriously by chilling and hardening them, and the present invention has been designed with a view to cooling the rods less suddenly, by creating around them as they are coiled, an atmosphere which will be practically non-oxidizing.

In United States Patent No. 737,361, granted to me August 25, 1903, I showed, described and claimed an apparatus for cooling the rods during the coiling operation and thereafter, by inclosing the coils 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 effect the same general purpose, without inclosing the apparatus in a casing, though a casing may be employed therewith if desired.

In a companion application of even date herewith, Serial No. 211,306, I have shown and described an apparatus for accomplishing the same result, in which a revoluble coiler arm is employed to coil the wire, and where the reel and the coil are stationary. A plurality of stationary atomizers are ar-

ranged above the reel to spray a finely divided mist onto the wire as it is coiled, and said coiler arm being constructed to feed a stream of water with the wire, the revolution of the arm throws the fine stream of water violently against the reel, the pins, and all parts of the coiling apparatus adjacent to the place where the coiling is carried on.

The subject matter of my present invention comprises an apparatus designed to obtain the same general result, but in this invention the reel itself is rotated and preferably a single stationary atomizer is employed for spraying the coil. As there is the same relative movement between the atomizer, and the water pipe as in the companion invention, the same breaking up and fractional distribution of the water is effected here, but it is believed that the present apparatus produces better and quicker results, owing, among other things, to the fact that the projection of a stationary spray upon a positively moving surface appears to break up or subdivide and distribute the water more thoroughly and effectively than when the spray moves and the parts onto which it is projected are stationary.

The details of this apparatus in its preferred form, its operation and the advantages obtained by its use will all be clearly set forth in the following description and claims taken in connection with the accompanying two sheets of drawings. I would have it understood, however, that certain of my claims herein are designed to cover the apparatus of either and both applications. Some of the claims herein are limited to the apparatus illustrated and described in this application, but other claims are intended to more broadly express the invention so as to cover the apparatus illustrated and described in application, 211,306, as well as the apparatus of this case.

In the accompanying drawings, Figure 1 is a side elevation partly in section, of a reeling plant constructed according to my present invention; Fig. 2 is an end view of the same partly in section and Fig. 3 is a central, vertical section, on a larger scale, of one of the reels and spraying nozzles.

Referring to said figures, *l* represents a tank or reservoir for water and *i* a reservoir for compressed air or other gaseous fluid. A pipe *g* leading from the former communicates with spraying nozzles or atomizers *h*. A

pipe *j* leading from the latter communicates with nozzles *k* axially located in said atomizers. The pressure in said pipes *j* may be controlled, as is the case in my said companion application, by needle valves adapted to be manually controlled, as by the means indicated at *k'*.

The pipes for guiding the wires as they come from the finishing mill are indicated at *f*, and with them communicate branch pipes *e*, provided with cocks *e'*, by which a stream of water can be fed through each of said pipes *f* with the wire, all as described in said application.

As each coiling and cooling mechanism is an exact duplicate of the other, I will describe the construction of one only.

The wire, as it comes from the pipe *f*, is fed to the coiling mechanism, which in this case is the reel, itself, comprising the rotary base *b* attached to and driven by the shaft *b'* and carrying the pins or pegs *c*. To the shaft *b'* is attached the hub *n* of the base plate *b*, and said hub is supported on an annular bearing *o*. The shaft *b'* is hollow and has a rod *d* extending through it, to the upper end of which is attached the hub *d'* carrying the coil supporting plate or grid *d''* which is slotted as at *c''* for the passage of the pins *c*, and which is pushed up in a well known manner to raise the coil above the pins when it has been completed and is ready to be discharged.

The atomizer *h* has an inverted cone *h'* at its open end so that only a narrow adjustable annular aperture is left for the egress of the water, which, owing to the conical shape of the passage leading to said aperture; is sprayed onto the coil in the form of a hollow cone, as will be apparent from an inspection of Fig. 3, and is delivered in the form of a ring or circle approximating that of the coil.

The entire coiling mechanism is contained within a casing *a* provided with an aperture for the pipe *f* and with a drain pipe *a'* for the water.

When the coil is completed, the rod *d* is raised by any suitable means, not shown, and lifts, by means of the plate or grid *d''*, the coil above the upper ends of the pins *c*, and the coil is then removed from said plate onto a conveyer *p*, or other suitable supporting surface, such a conveyer and its support *p'* being diagrammatically represented in Figs. 1 and 2, and which may run in a tank of water for finally cooling the coil, if preferred.

The operation will now be described.

The wire *x* coming from the rolls *q* of the finishing mill, is guided into the pipe *f* and issuing therefrom is engaged by the pins *c* of the revolving reel. As soon as a sufficient number of turns have been made to cause the necessary frictional engagement of the wire with the pins, the cock *e'* is opened and a

stream of water is fed into said pipe along with the wire. This stream strikes the revolving coil and the base and pins of the coiler and also strikes the conical spray coming from the nozzle *h* and mingles therewith, and owing to their impact together and to their striking the revolving base *b* of the coiler and the grid *c''* and pins *c*, and other moving parts adjacent to the coil, the water is delivered onto the hot coil in a finely divided state, the result being the formation of an atmosphere of steam and mist, which gradually cools the coil while preventing the formation of oxid, as described in my said companion application.

So far as I know, I am the first to project water in the form of a finely divided spray onto a moving surface in a wire rod coiling apparatus, whether said moving part be the coil itself or some plate or part of the coiler proper. I do not, therefore, desire or intend to be limited to any particular part as the moving surface, nor to any location or construction of said moving part. Neither do I desire or intend to limit myself to any particular source of the water, nor to any location of the pipe or nozzle whence it issues, nor to any direction for the projected stream or spray.

As shown herein, the surface onto which the spray is thrown is formed partly of the coil and partly of the bottom plate *b* and the coil raising grid *c''*, and it is to be noted that, (as indicated by the lines in Fig. 3,) part of the spray is projected directly onto some parts of the coil, and part is deflected or rebounds from the base *b* onto other parts of the coil, this arrangement serving in a high degree to effect such complete breaking up of the fine streams or spray, that the formation of an atmosphere of steam around the coil and the entire apparatus is effectually quickened and easily maintained.

Any moving plate or part, whether a necessary part of the coiling apparatus, or a special part provided for the purpose, would be within the scope of the invention, as I believe myself entitled to cover broadly any apparatus involving any arrangement for providing a moving baffle plate or surface onto or against which the spray is projected and from which it is deflected or rebounds so as to be further broken up.

What I claim is:—

1. An apparatus for treating wire rods, comprising a reel, means for coiling the wire thereon, and an atomizer to forcibly project a finely divided spray of water on the revolving coil.

2. An apparatus for treating wire rods, comprising a reel, means for coiling the wire thereon, and an atomizer to forcibly project a finely divided water spray against a moving surface adjacent to the coil.

3. An apparatus for treating wire rods,

comprising a revolving reel, a guide pipe for the wire, and means for forcing water through the pipe along with the wire and projecting it onto and against the moving reel.

4. An apparatus for treating wire rods, comprising a revolving reel, means for coiling the wire thereon, an atomizer, and means to forcibly project the water from said atomizer under sufficient pressure to deliver it in a finely divided state onto the coil and reel.

5. An apparatus for treating wire rods, comprising a revolving reel, an atomizer arranged axially above the reel to spray water thereon during the operation of coiling the wire, said atomizer having an annular aperture for the passage of the water constructed to cause the spray to be thrown out in the form of a circle approximating that of the coil.

6. An apparatus for treating wire rods, comprising a reel, means for coiling the wire thereon, an atomizer located axially above the reel to spray water on the coil during its formation, and a pipe for simultaneously delivering a stream of water onto the coil, said pipe being arranged to cause an impact of the stream from the pipe with the spray from the atomizer.

7. An apparatus for treating wire rods, comprising a revolving reel, an atomizer arranged centrally above the reel to spray water thereon during the operation of coiling the wire, said atomizer having an annular aperture for the passage of the water constructed to cause the spray to be thrown out in the form of a circle, and a pipe axially located within said atomizer to cause a gaseous fluid under pressure to issue with the water.

8. An apparatus for treating wire rods, comprising a revolving reel, an atomizer arranged centrally above the reel to spray water thereon during the operation of coiling the wire, the wall of said atomizer being constructed adjacent to its mouth and then inclined outwardly and said atomizer having an axially located inverted cone at its mouth whereby a narrow annular conical passage is formed, and a pipe axially located within said atomizer and terminating adjacent to the apex of said inverted cone, and means to force a gaseous fluid through said pipe, whereby the water will be caused to issue

from said atomizer in the form of a circle and in a finely divided condition.

9. An apparatus for treating wire rods, comprising a reel, a casing surrounding the same, a pipe to convey the wire from the finishing mill to the reel, means to force a stream of water through said pipe, and an atomizer axially located above said reel to spray water thereon, whereby the water by the impact of the stream and spray together and against the revolving reel, will be delivered onto the hot coil in a finely divided state.

10. An apparatus for treating wire rods, comprising a reel, means for coiling the wire thereon, a revolving plate, and means for projecting a spray or stream of water onto the plate whereby it is broken up and caused to rebound onto the hot coil in a finely divided state.

11. An apparatus for treating wire rods, comprising a reel, means for coiling the wire thereon, and means for delivering a stream or spray of water onto said coil in an atomized or finely divided state, said means including a revolving surface onto which the water is projected under pressure and from which it is deflected and rebounds onto the coil.

12. An apparatus for treating wire rods, comprising a coiler, a revolving plate, and means for projecting a stream or spray of water against the plate and causing it to rebound in an atomized or finely divided state onto the coil.

13. An apparatus for treating wire rods, comprising a reel, means for coiling the wire thereon, and means for creating a non-oxidizing mist or atmosphere of finely divided water spray and projecting it upon the wire while it is being coiled.

14. In an apparatus for treating wire rods, the combination of finishing rolls, a reel upon which the wire is coiled, a closed conduit for protecting the wire in its passage from the rolls to the reel, and means for projecting a finely divided spray of water onto the wire as it issues from the conduit.

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

FRED H. DANIELS.

Witnesses:

EUGENE VAN DE MARK,
IDOFF EKLUND.