

(No Model.)

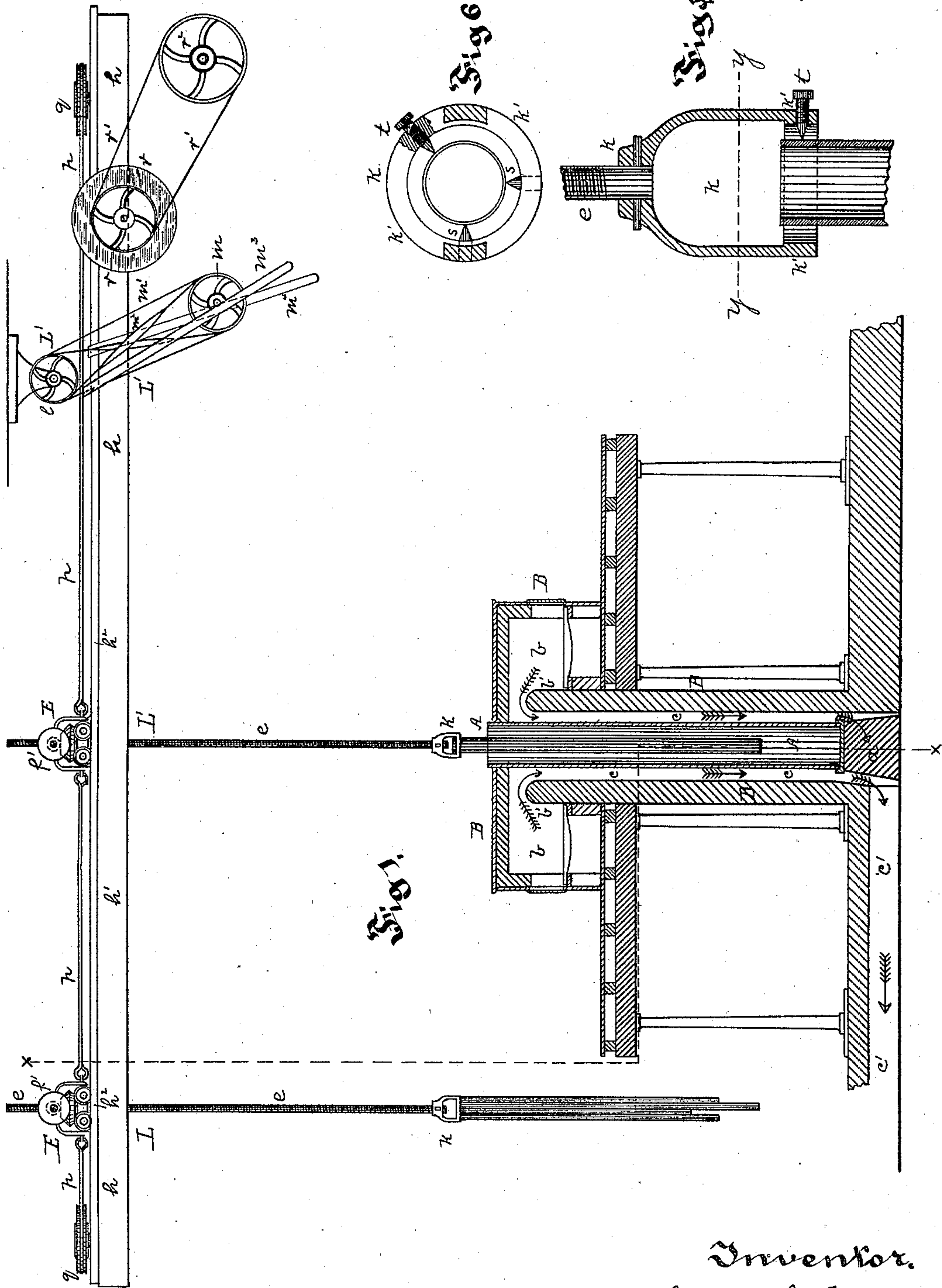
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G. H. EVERSON.

APPARATUS FOR COATING PIPES, BARS, &c.

No. 305,442.

Patented Sept. 23, 1884.



Witnesses.
F. H. May
J. L. Cooke

Inventor.
George H. Everson
by James I. Ray
Attorney

(No Model.)

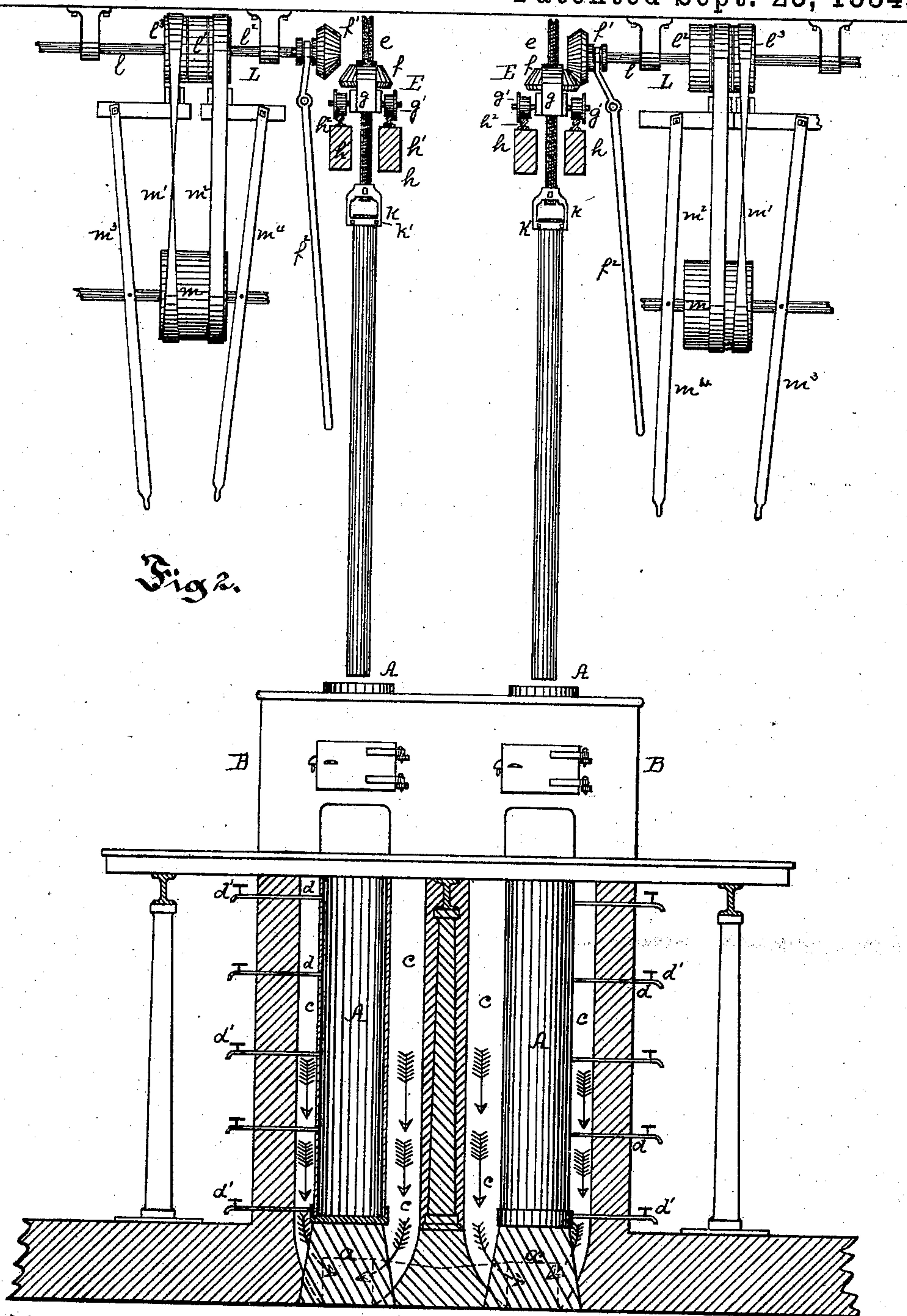
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Witnesses.

J. B. Shaw
McCook

Inventor.
George H. Everson
by James I. Kay
Attorney

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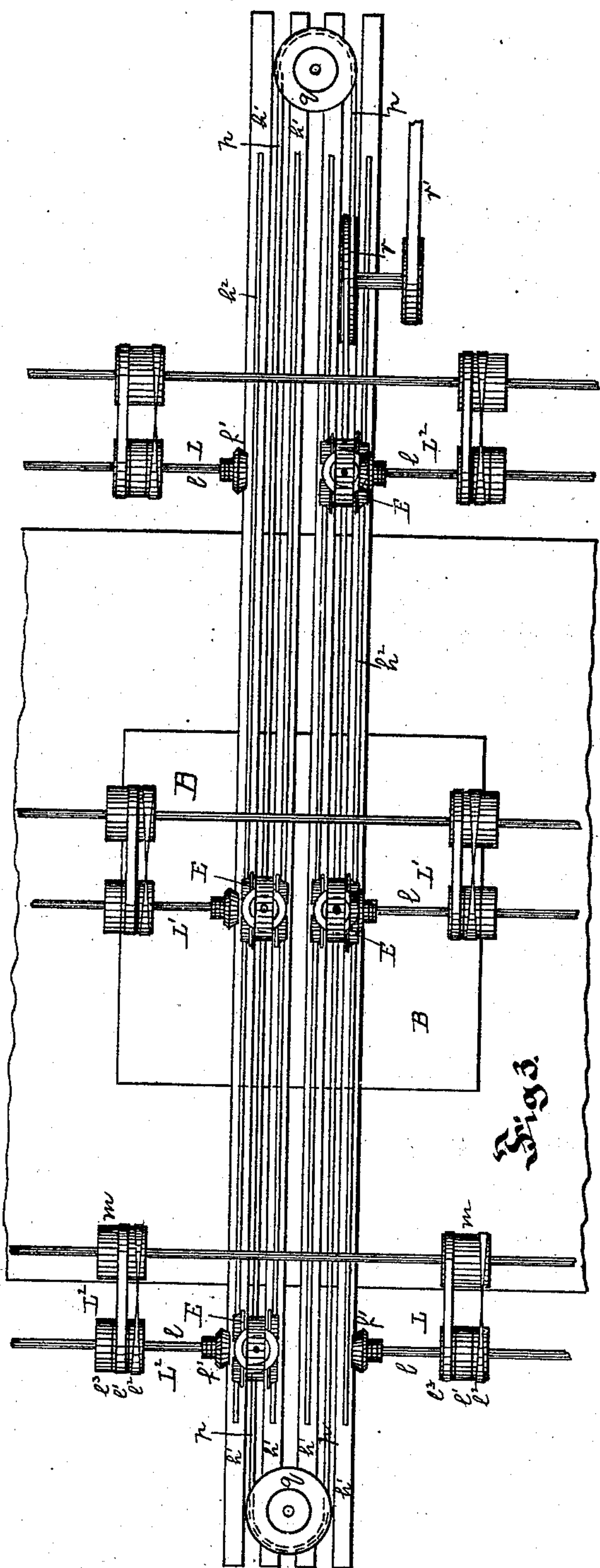
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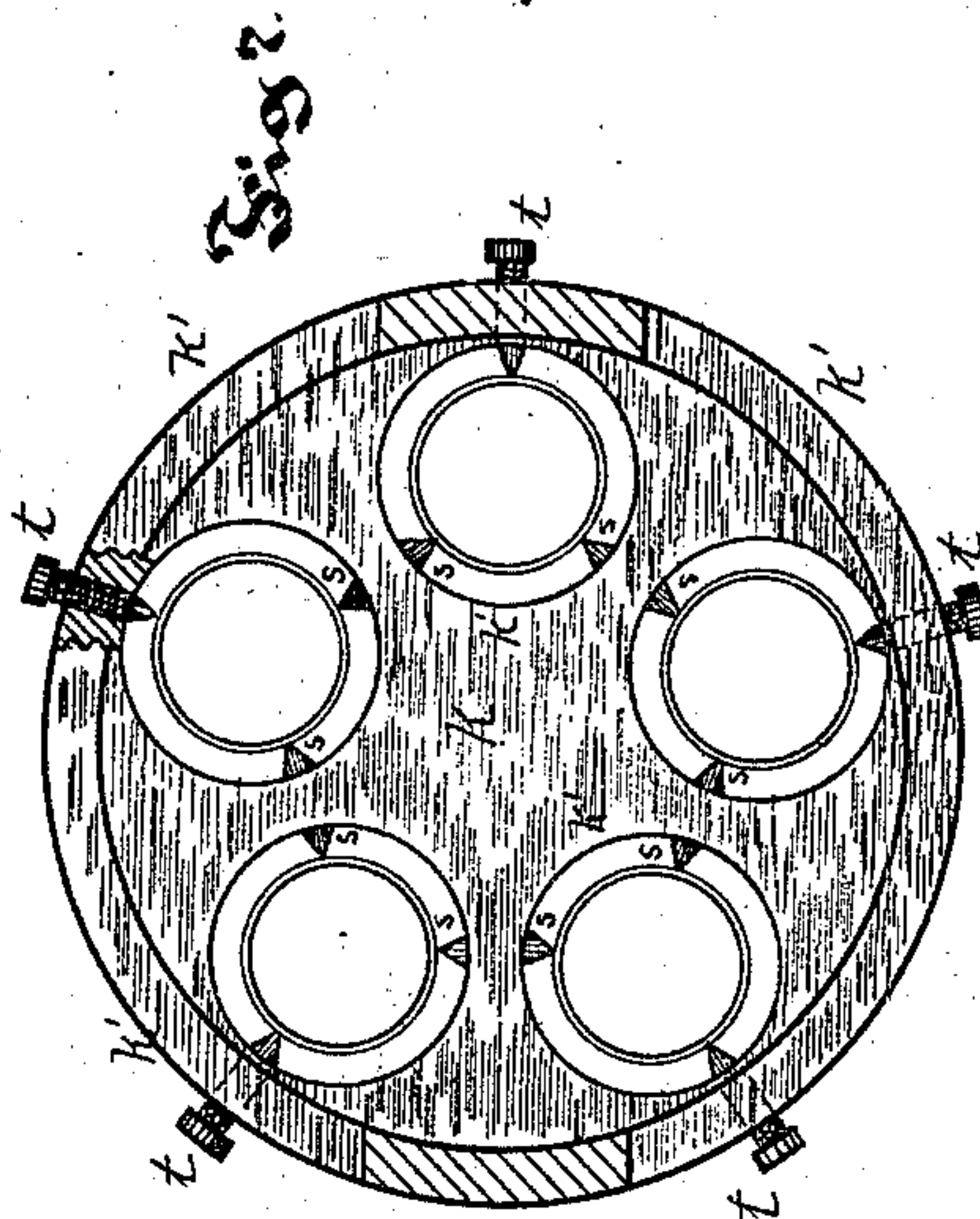
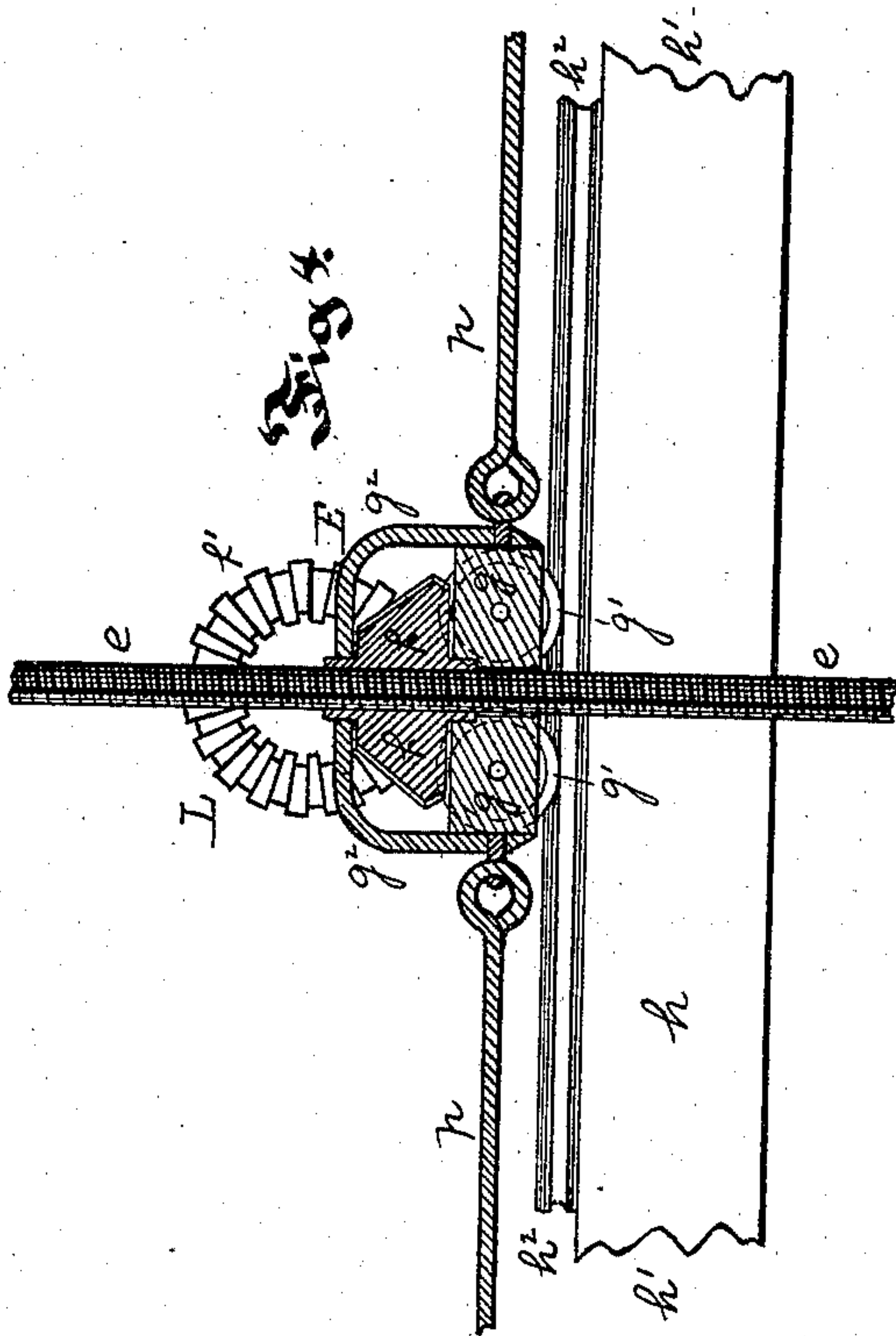
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UNITED STATES PATENT OFFICE.

GEORGE H. EVERSON, OF SCOTSDALE, PENNSYLVANIA.

APPARATUS FOR COATING PIPES, BARS, &c.

SPECIFICATION forming part of Letters Patent No. 305,442, dated September 23, 1884.

Application filed July 2, 1883. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. EVERSON, of Scottdale, in the county of Westmoreland and State of Pennsylvania, have invented a new and useful Improvement in Coating Pipes, Bars, and Articles of Long Section; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to the coating of pipes or tubing, rods, bars, and other articles of long section, with zinc or other metals or alloys, or with asphalt or other materials or compositions, to preserve them from rusting or corroding, to improve their appearance, or for other purposes. It has special reference to the "calamining" of pipes and bars by the alloy and process described and covered in two several Letters Patent granted to John B. Jones, November 16, 1880.

The usual method heretofore employed in coating pipes and bars has been to dip them horizontally in a long shallow trough or pot, the pot being heated in a suitable manner when coating with metals. This is not found so objectionable in coating with asphalt and like compositions where the coating materials are not raised to a high heat and are not liable to chill on the article coated when withdrawn from the bath; but in coating with spelter, the calamining alloy or other metals, which require to be melted before applied, as the articles were withdrawn horizontally the coating metal would "chill" before it could drain or run off the articles, and for this reason the coating material would set unevenly over the surface of the pipes or bars, and a thicker coating than desired be formed thereon. In coating pipes in this manner with the calamining alloy it is found that the coating varies from one sixty-fourth to one-eighth of an inch in thickness, whereas a very thin coating, the thickness of which can scarcely be estimated, is all that is necessary. It is therefore evident that a large waste of the coating material is caused by this method of dipping or subjecting the materials to be coated to the bath, and as all these coating materials, whether metals or compositions, are comparatively expensive, the cost of coating is therefore unnecessarily increased. It was also found very laborious to handle heavy pipes and bars on dipping

them horizontally, especially where the coating metal was heavier than the article to be coated, and required it to be held beneath the metal by bars, as is the case in galvanizing or calamining. It was also extremely difficult to heat the coating metal evenly on account of the length of the pot and surface of the metal exposed, and the chilling or cooling of the metal when the articles to be coated were introduced, and for this reason the spelter employed in galvanizing was liable to "dross." On account of the large surface of metal exposed in calamining, large loss was caused by oxidation, the size of the articles coated preventing the successful employment of a "coating" or "cover" to protect the metal.

The object of my invention is to improve the method of and apparatus for coating these pipes and articles of long section, so as to form a more even perfect coating on the pipes or bars, employ less coating material, prevent the drossing, wasting, or chilling of the coating metal, do away to a large extent with manual labor, and otherwise improve the coating operation.

It consists, essentially, in improved means for coating these pipes, bars, and articles of long section by immersing them in and withdrawing them from the coating material in the direction of their length.

It also consists in a coating-pot, formed of a long perpendicular tank, into which the pipes or bars are dipped, and from which they are withdrawn in the direction of their length, and in means of heating this coating-pot where metals are employed in coating.

It also consists in improved means for dipping and withdrawing the pipes and bars.

It also consists in certain details of construction hereinafter set forth.

To enable others skilled in the art to carry out my invention, I will describe the same more fully, referring for that purpose to the accompanying drawings, in which—

Figure 1 is a longitudinal central section of the coating-pot, and side view, partly broken away, of the dipping apparatus. Fig. 2 is a cross-section of the line *xx*, Fig. 1. Fig. 3 is a top view of the apparatus. Fig. 4 is a longitudinal section of the buggy employed for carrying the pipe to be dipped. Fig. 5 is a

longitudinal section of the head carrying the tubing; and Figs. 6 and 7 are top views of different forms of the heads, the swivel-arms being cut off, as on the line *y y*, Fig. 5.

5 Like letters of reference indicate like parts in each.

My invention is illustrated in connection with the coating of pipes with the calaminizing alloy above referred to, and will be specially described in connection with the calaminizing of these pipes, the changes necessary in the treatment and the apparatus, according to the coating used or the shape of the article to be treated, being within the knowledge of the skilled mechanic.

10 The coating-pot A is formed of a long cylindrical or other shaped tank, closed at the base, and supported on a suitable foundation, *a*, this tank being generally about twenty-three feet long and three feet in diameter when employed in coating the ordinary wrought-metal tubing. Where a metal or alloy coating material is used the pot is built within a furnace, B, of suitable construction—that illustrated in the drawings being found best adapted for heating these long perpendicular pots. It is provided with one or more fire-chambers, *b*, at the top of the furnace on either side of the pot, the heat and products of combustion passing over the bridge-walls *b'* and through the heating-chamber *c* around the pot to the flue *c'*, which leads to the stack by means of which the necessary draft to operate the furnace is obtained. As the fire-chambers are located at the top of the coating-pot, the metal in the upper part of the pot is retained at the highest heat, so that it is not liable to be chilled on account of its surface being exposed, or by the introduction of the cold pipes or bars into it.

40 As the pipes or bars pass down into the pot they are heated by the coating metal in the upper part of the pot, so that they have no tendency to chill the coating metal in the lower part of the pot, and it can be maintained at the proper heat by the heat and products of combustion passing down around the pot to the stack. As the coating metal is heavy, the specific gravity of the calaminizing alloy being about ten and one-half, it is evident that the weight of the metal contained in the long pot would be too great to allow of its being kept under control in tapping at the base of the pot. For this reason I have provided the pot with a series of tapping-pipes, *d*, communicating with the pot at different heights, and provided with suitable stop-cocks, *d'*, by means of which the coating material can be gradually withdrawn from the pot.

55 The pipes or bars to be coated may be fed to and withdrawn from the coating-pot by any suitable dipping apparatus, E, such as by means of a screw-rod, rack and pinion, block and tackle, or by means of power apparatus operated directly by gas, air, steam, or hydraulic power.

65 In coating with metals—such as in calamin-

ing—as the coating metal is heavier than the pipe to be coated—that of iron being about seven and one half—it is necessary to provide apparatus to force the pipe into the metal as well as withdraw it therefrom. The dipping apparatus I have found best adapted for the purpose is shown in the drawings, the screw-rod *e* working through an internally-threaded bevel-pinion, *f*, supported in a buggy, *g*, on a suitable track, *h*, above the pot, and the pipe or bar to be coated being secured within the clamping-head *k* at the base of the screw-rod. The track *h* is formed of two beams or girders, *h'*, each provided with a rail, *h''*, and the wheels *g'* of the buggy travel on this track, the screw-rod *e* being suspended between the girders. The buggy *g* is provided with a yoke, *g''*, secured at each end thereof and extending over it, this yoke forming the upper journal for the pinion *f*, which is journaled at its base in the body of the buggy. The screw-rod is prevented from turning by a key in the body of the buggy, and when the pinion *f* is rotated the pinion screws the rod through it up or down, and thus raises or lowers the pipe or bar carried by it. The bevel-pinion *f* is rotated by means of suitable power apparatus L, that shown being formed of the bevel-pinion *f'* on the end of the horizontal shaft *l*, and suitable power-connections to rotate the shaft. The pinion *f'* slides on the shaft *l* by means of a feather or key, the pinion *f'* being thrown into and out of gear with the pinion *f* by the lever *f''*. The shaft *l* is provided with the fixed pulley *l'* and idle pulleys *l''* *l'''*, and power is communicated thereto from the driving pulley *m* through the belts *m'* *m''*, one belt being crossed to reverse the motion, and the belts being shifted onto the fixed pulley *l'*, according to the direction in which the shaft is to be turned by the shifting-levers *m''* *m'''*. As too much time would be consumed if but one of these buggies were employed, I have provided two buggies for each pot, so that while one pipe is cooking in the coating-pot, the coated pipe may be removed from the clamping head of the other dipping apparatus and another one secured thereto. The coated pipe and pipe to be coated can then be raised and the buggies drawn along the track until the uncoated pipe is over the pot and both pipes lowered, the coated pipe being removed and another one secured in its place, and the operation repeated. In order to accomplish this, I provide a set of this power apparatus L, for raising and lowering the pipe over the pot, and one on each side thereof at the points to which the buggies are drawn to remove the coated pipe and secure another to the clamping-head, the power apparatus being marked L *L'* *L''*, respectively. As I have shown a furnace having two coating-pots I have also shown six sets of this power apparatus L—three for each pot.

The buggies *g* are drawn along the track *h* by means of a wire-rope, *p*, passing around

drums q at each end of the track, and around a grooved wheel, r , rotated by a belt, r' , from a driving-wheel, R^2 , or in other suitable way.

Where but one buggy is used, the ends of the rope are secured thereto; but where two or more buggies are used they are connected by lengths of rope, so as to hold them in proper position on the track with relation to the power apparatus by means of which the rods e are raised and lowered.

The pipes or bars are preferably secured to the clamping-heads k at the base of the screw-rods by means of two stationary pointed lugs, s , extending out from the interior of the annular ring, k' , forming the base of the clamping-head and pointed set-screw t , passing through said ring, the pipe extending up within the head k , and being suspended therein by these lugs s and the set-screw t , the points of which bite upon the pipe. By this means, the entire pipe is coated, except where the points of the lugs and set-screw impinge upon the pipe. In dipping smaller pipes and bars a clamping-head having the desired number of these clamping-rings may be employed, as shown in Fig. 7. In this clamping-head the rings are arranged around the center of the head, and the set-screws t extend through from the periphery of the clamping-head into each ring, the lugs s being on the inner sides of the rings.

In coating pipe in accordance with my invention, the coating-bath is brought to the proper heat, and the furnace B is regulated so as to retain it at that heat. The operators then insert a length of pipe within the ring k' of the clamping-head, and tighten up the set-screw t , thus securing the pipe to the dipping apparatus, this being done, for example, at the station L . An operator then meshes the pinion f' into the pinion f on the buggy g , and shifts the belts of the power apparatus, causing the rod e to screw up through the pinion f , until the pipe to be coated is raised higher than the coating-pot. He then unmeshes the pinions f and f' , and by means of the grooved wheel r causes the rope p to draw the buggy g over the coating-pot at the station L' , the rope at the same time drawing the other buggy g to the station L^2 . By means of the power apparatus the screw-rods e are then screwed down through the buggies, and the one carrying the pipe dips it into the coating-pot, the pipe being forced down into the coating-metal by means of the screw on the rod, so that it enters, even though the metal is heavier than the pipe. As only the edge of the pipe is presented to the metal in entering, the force necessary to press it down into the metal is greatly reduced. The pipe is then lowered down until it is entirely immersed in the coating material, the clamping-head of the rod being also immersed. As the pipe is lowered into the coating material the screw-rod at the station L^2 is also lowered, and while the pipe in the pot is cooking another pipe is secured to the clamping-head

ready to be raised and lowered into the coating material. The operation is then repeated, the coated pipe being withdrawn from the bath, and, by means of the rope p , the buggy carrying it drawn back to the station L , and afterward lowered so that it may be removed from the clamping-head and another secured thereto ready for coating, the pipe secured to the other buggy at the station L^2 being at the same time raised, carried over the pot, and lowered into it. As it is necessary that the pipe remain in the coating material long enough to be raised to approximately the heat of the coating metal in order to properly coat it, there is sufficient time to remove the coated pipe and secure an uncoated pipe to the clamping-head while it is cooking in the pot. As the pipe is introduced endwise into the pot, it is evident that only the upper part of the metal is chilled thereby, the pipe becoming heated as it descends; and as the furnace is located at the top of the pot, the metal in the upper part of the pot can easily be maintained at the desired heat. As the greatest heat is thus applied at the part of the pot, most liable to be chilled, a more even and perfect heat may be maintained. As there is but a small portion of the metal exposed to the atmosphere, the loss by oxidation is reduced to a minimum. As the pipes are withdrawn from the coating-bath vertically or in the direction of their length the coating material will run or drain rapidly off the pipe before it can chill thereon, only the thin coating necessary to give the desired surface or protection to the article remaining thereon, and a large saving in coating material being thus obtained. This saving is also increased in articles of wrought metal because the article is withdrawn in the direction of the grain of the metal, and the coating material can therefore run or drain off more easily. For the same reasons the coating material is spread more evenly over the surface of the article and a smoother and more perfect surface is therefore obtained. The only manual labor necessary is to secure the uncoated article to the clamping-head and remove it after coating, the balance being accomplished by the power apparatus through the working of the levers, so that the labor required is reduced and the operation can be accomplished in less time.

In coating small pipe or bars a clamping-head—such as is shown in Fig. 7—having as many clamping-rings as desired may be employed, and a number of these articles raised and dipped together.

The apparatus above described may, of course, be changed in many particulars without departing from my invention, it being necessary to alter the apparatus according to the weight of the article to be coated, to the coating material employed, or for other reason.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In apparatus for coating pipes, bars, and

like articles of long section, the combination of a long perpendicular coating-pot, a suitable furnace for heating the same, and dipping apparatus having means for supporting the article to be coated, raising it, carrying it over, and forcing it vertically into the pot, and finally withdrawing and delivering it, substantially as and for the purposes set forth.

2. A long perpendicular coating-pot, in combination with a furnace provided with one or more fire-chambers at the upper part of the pot, substantially as and for the purpose set forth.

3. A long perpendicular coating-pot, in combination with a furnace provided with one or more fire-chambers at the upper part of the pot, and a heating-chamber around the pot leading to a flue at the base thereof, substantially as and for the purposes set forth.

4. In combination with a suitable heating-furnace, a long perpendicular coating-pot provided with two or more tapping-pipes communicating therewith at different heights, and suitable apparatus for raising and lowering the articles to be coated, substantially as and for the purposes set forth.

5. In combination with a long coating-tank, a track above said tank, provided with a traveling buggy, having a vertically-moving rod to which the article to be coated is suspended, and apparatus for raising and lowering said rod, substantially as and for the purposes set forth.

6. In apparatus for coating metals, a traveling buggy having an internally-threaded pinion journaled therein, and a screw-rod working through said pinion, in combination with apparatus for rotating said pinion, substantially as and for the purposes set forth.

7. In apparatus for coating metals, a track extending above the coating-tank, and a buggy traveling thereon, and provided with a vertically-moving dipping-rod, in combination with two sets of power-apparatus for raising and lowering said rod in said traveling buggy, one located above the tank and one at the side thereof, substantially as and for the purposes set forth.

8. In apparatus for coating metals, the combination, with a long cylindrical coating-pot, of a vertically-moving dipping-rod provided at the base with a clamping-head, or like means for securing the article to be coated thereto.

9. In apparatus for coating pipes, bars, and articles of long section, the dipping-rod provided at the base with the clamping-head *k*, having the lugs *s* and set-screw *t*, for suspending the article to be coated to the rod, substantially as and for the purposes set forth.

In testimony whereof, I, the said George H. Everson, have hereunto set my hand.

GEORGE H. EVERSON.

Witnesses:

R. G. LEEPER,
E. A. McCONN.