

(No Model.)

C. Q. GOODWIN.

APPARATUS FOR APPLYING SHEATHS TO ELECTRICAL CONDUCTORS.

No. 410,410.

Patented Sept. 3, 1889.

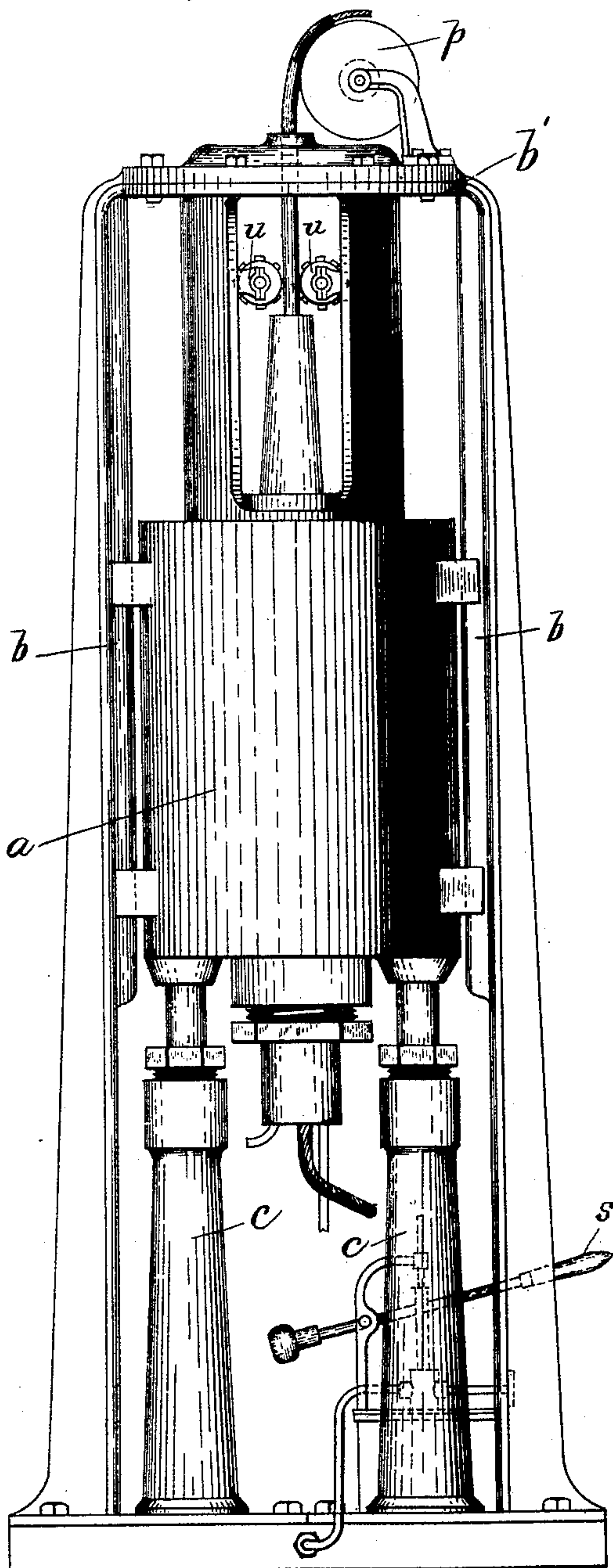


FIG. 1.

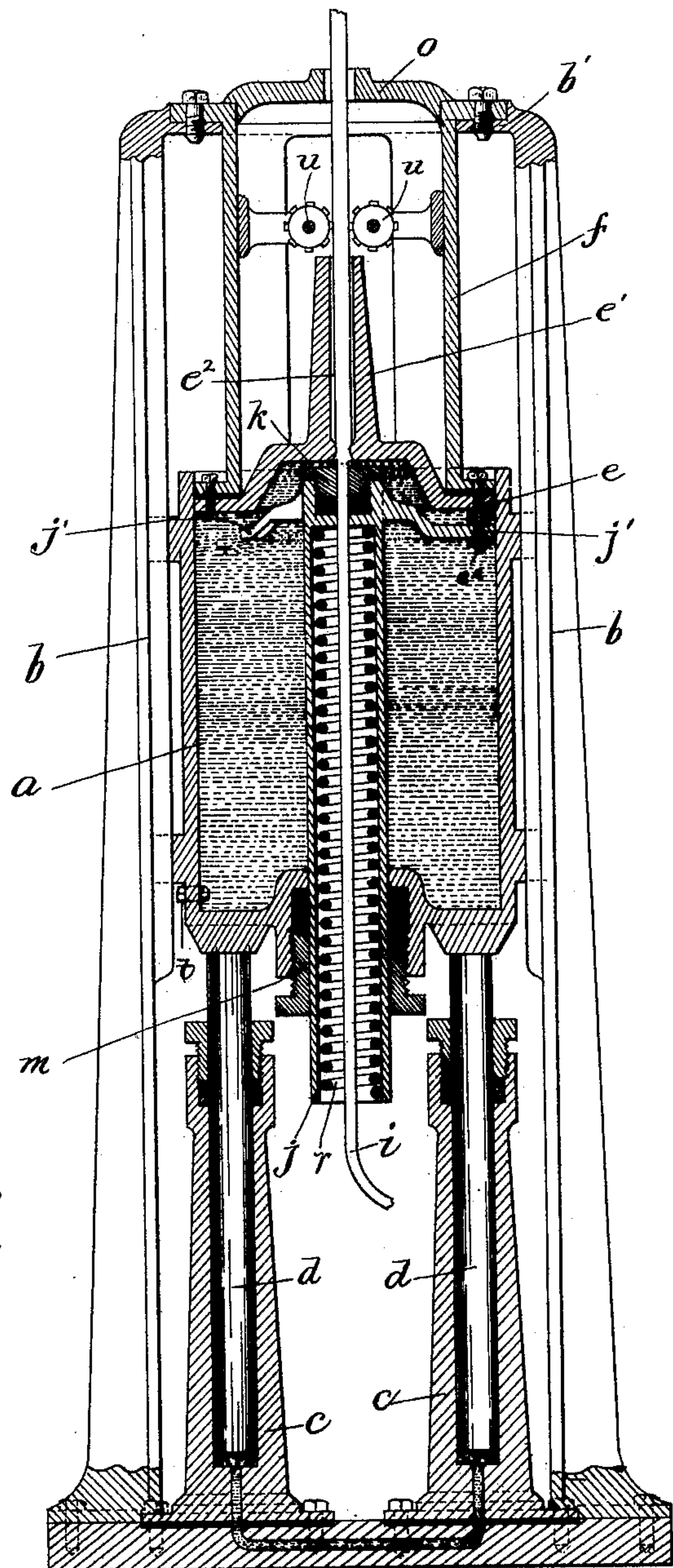


FIG. 2.

WITNESSES.
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APPARATUS FOR APPLYING SHEATHS TO ELECTRICAL CONDUCTORS.

SPECIFICATION forming part of Letters Patent No. 410,410, dated September 3, 1889.

Application filed March 30, 1889. Serial No. 305,403. (No model.)

To all whom it may concern:

Be it known that I, CHARLES Q. GOODWIN, of Malden, in the county of Middlesex and State of Massachusetts, have invented certain
5 new and useful Improvements in Apparatus for Applying Seamless Sheaths to Electrical Conductors, of which the following is a specification.

This invention has for its object to provide
10 a simple and effective apparatus for forming a seamless envelope or sheath of lead or other suitable material upon an electrical conductor or wire having an insulating-covering; and it consists in the improvements which I will now
15 proceed to describe.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a side elevation of an apparatus embodying my improvements. Fig. 2 represents a vertical
20 section of the same.

The same letters of reference indicate the same parts in both figures.

In the drawings, *a* represents a vertically-movable receptacle or reservoir adapted to
25 contain melted lead. Said reservoir is fitted to slide between vertical guides or ways *b b*, and is provided with any suitable means whereby it may be forcibly raised or moved upwardly on said guides. I have here shown
30 as the upward-propelling means two hydraulic presses, each composed of a cylinder *c* and a ram or plunger *d*, fitted in said cylinder, the cylinders being provided with connections with a source of water supplied under pressure, whereby water may be admitted to and
35 discharged from the lower ends of the cylinders.

e represents a fixed head, which fits in the interior of the reservoir *a*, the latter being
40 preferably cylindrical. The fit of the head *e* in the cylinder is like that of a piston in its cylinder, the contact between the head and the reservoir being sufficiently close to prevent the escape of the fluid or semi-fluid contents of the reservoir between its walls and
45 the head, the walls of the reservoir being in sliding contact with the head *e*. Said head is rigidly secured to the supporting-frame on which the guides *b b* are formed by any suitable means, the means here shown being a
50 cylinder *f* with flanged ends, the upper one

of which is connected to a circular seat *b'*, formed on the said upright, while the lower flange is connected to the head *e*. In the center of the head *e* is a tubular mold *e'*, which
55 is affixed to the head and has a bore or cavity *e''*, which is of the diameter of the lead sheath to be applied to the conductor.

i represents the wire or conductor to be coated, the same being of the usual kind,
60 and preferably provided with a fibrous woven covering saturated with paraffine or other insulating material. The said conductor is passed upwardly through a tube *j*, affixed to the head *e* by means hereinafter described,
65 and having a stuffing-box *k* at its upper end, which closely fits the wire and prevents the passage of lead downwardly around the wire. Said tube is fitted to slide in an orifice on the bottom of the reservoir *a*, said orifice being
70 provided with another stuffing-box *m*, which prevents the escape of lead around the tube *j* through the bottom of the reservoir. The conductor *i* passes through the tubular mold *e'* and through a guide *o* at the top of the
75 supporting-frame.

The operation of the described apparatus is as follows: Upward motion is imparted to the reservoir by means of the hydraulic devices described, and at the same time an upward movement at a faster rate is imparted to
80 to the conductor *i* by any suitable means, as by wheels or by rolls driven by any suitable means, one of said rolls *p* being shown in Fig. 1. The upward movement of the reservoir causes
85 the lead in the upper portion thereof to exude through the annular space between the conductor *i* and the throat or forming portion of the mold *e'*, thus depositing a seamless sheath of lead upon the conductor *i* at
90 this point. The upward movement of the conductor, which, as above stated, is at a more rapid rate than that of the reservoir, carries the said sheath away from the forming portion of the mold as fast as the sheath
95 is formed. It will be seen, therefore, that so long as the supply of lead lasts and the described movements of the reservoir and conductor are continued, the formation of the seamless sheath on the conductor will go on.
100 In this way an electrical conductor of any desired length may be provided with a seam-

less sheath very rapidly and economically. The metal deposited on the conductor solidifies directly after its passage through the mold or core. I prefer to have the metal
 5 within the mold at a temperature somewhat reduced, so that it will not flow as freely as when it is raised fully to the melting-point, said metal being preferably in a semi-fluid state or plastic condition, so that it is securely
 10 fixed at the time of its formation on the conductor. The portion of the conductor within the tube *j* is protected from the heat of the lead in the reservoir by a coil *r* of pipe placed in the tube, adapted to receive
 15 water and conduct it along the tube from the lower end to the upper end and from the upper end back to the lower end. The tube *j* is secured in any suitable way to the head *e*, so that the reservoir *a* moves on said tube, a
 20 suitable space or opening being formed between the head *e* and the upper end of the tube for the passage of lead from the reservoir to the mold *e'*. I prefer to provide the upper end of the tube *j* with radiating arms
 25 *j'*, which constitute the means for connecting the tube with the head *e* and prevent the stuffing-box *k* from pressing against the base of the mold *e'*, said arms *j'* being secured to the head *e* in this instance by bolts *e''*.
 30 The lead is preferably melted outside the reservoir, and transferred in a fluid or semi-fluid state to the reservoir; but, if desired, means may be employed for melting the lead in the reservoir or for keeping it in a melted
 35 condition therein.

I have shown in Fig. 1 a force-pump, of which *s* is the handle or lever, said pump being adapted to supply the requisite water-pressure in one or both of the cylinders *c*.

40 The reservoir *a* should have an outlet *t* at its lower portion for the escape of residuum of the charge of lead, said outlet having a suitable plug.

u u represent rolls having indenting-dies
 45 on their peripheries arranged to act on opposite sides of the lead sheath or envelope after the latter emerges from the mold *e'*. Said dies may be formed to imprint any desired letters, figures, or other characters on the
 50 sheath—for example, the name or trademark of the manufacturer or other information. If preferred, only one of the rolls *u* may be provided with the dies or printing-characters, the other having a smooth surface to
 55 support the sheath against the pressure exerted on it by said dies.

The mold *e'* is preferably connected de-

tachably to the head *e*, so that molds of different sizes may be used interchangeably.

I do not limit myself to lead as the material used with the above-described apparatus, as any other suitable fusible metal or alloy may be used, and, if desired, a non-metallic material or compound—such as wax or resin—may be applied to the wire in the manner and
 60 by the apparatus described, as an insulating coating.

I claim—

1. The combination of the movable reservoir, fixed guides therefor, a motor whereby
 70 the reservoir may be moved upon said guides, a fixed head having a mold communicating with the interior of the reservoir, a guide for an electrical conductor below said mold, and rigid lateral supports connecting the upper
 75 end of said guide with the fixed head, whereby the upper end of the guide and an electrical conductor therein are kept at the center of said mold, as set forth.

2. The combination of the fixed supporting-
 80 frame having vertical guides *b b*, the reservoir *a*, fitted to slide on said guides, means for elevating said reservoir, the fixed head *e*, fitted in said reservoir and having the mold *e'*, and the tube *j*, having the guide *j'* within the res-
 85 ervoir, said guide being formed and arranged to keep a conductor passing therethrough at the center of the forming-throat of the mold, as set forth.

3. The combination of the fixed supporting-
 90 frame having vertical guides *b b*, the reservoir *a*, fitted to slide on said guides, a stuffing-box in the bottom of said reservoir, means for elevating said reservoir, the fixed head *e*, fitted in said reservoir and having the mold *e'*, and
 95 the tube *j*, having the guide *j'* within the reservoir and passing through the stuffing-box in the bottom of the reservoir, said guide being formed and arranged to keep a conductor passing therethrough at the center of the
 100 forming-throat of the mold, as set forth.

4. The combination of the movable reservoir, the fixed head having the mold *e'*, the tube *j*, having the guide *j'* within the reservoir, and means for circulating water in said
 105 tube, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 27th day of March, A. D. 1889.

CHAS. Q. GOODWIN.

Witnesses:

C. F. BROWN,
 P. B. WILEY.