

R. D. SMILLIE.
APPARATUS FOR MAKING STEAM PIPES.

No. 566,629.

Patented Aug. 25, 1896.

FIG. 2.

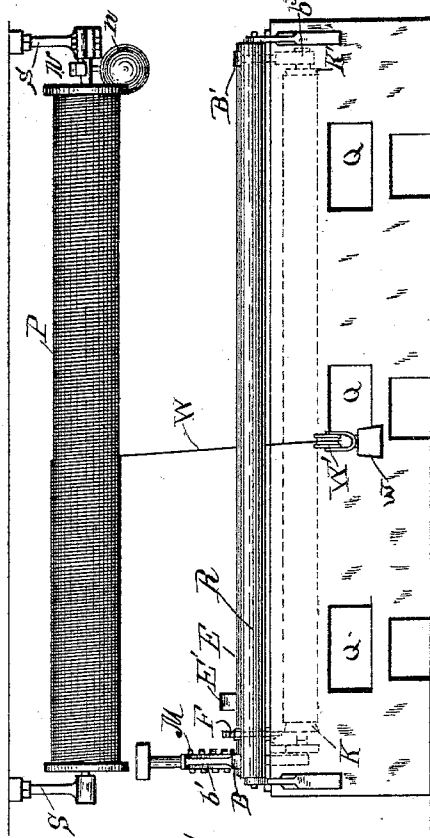
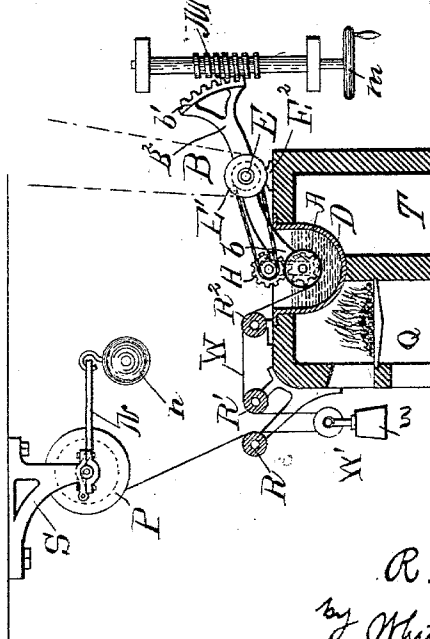


FIG. 1.



Witnesses
J. H. Kohn
J. Wilson

Inventor
R. D. Smillie,
by *Whitman & Wilkinson,*
Attorneys.

(No Model.)

2 Sheets—Sheet 2.

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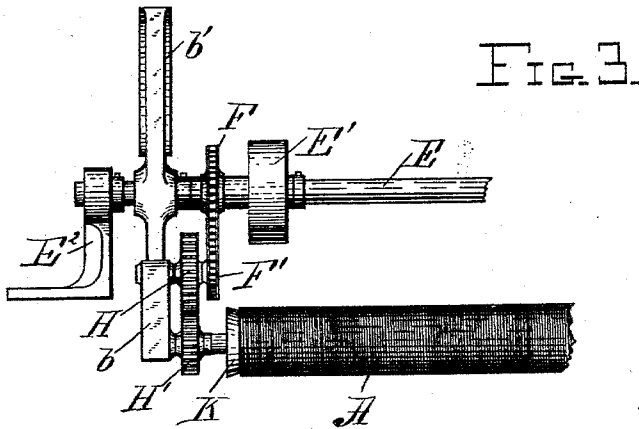


FIG. 4.

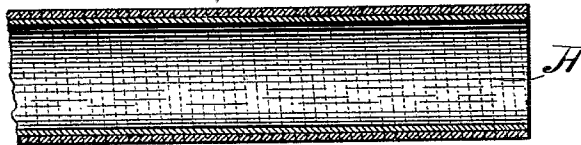


FIG. 5.

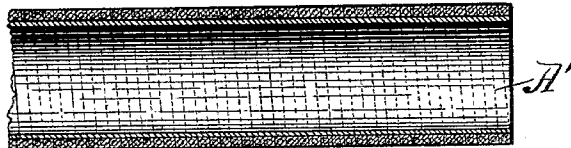
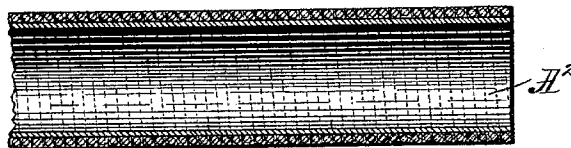


FIG. 6.



Witnesses
J. H. Kott
J. C. Wilson

Inventor
R. D. Smillie,
by *Whitman & Wilkinson,*
Attorneys.

UNITED STATES PATENT OFFICE.

ROBERT DANIEL SMILLIE, OF GLASGOW, SCOTLAND.

APPARATUS FOR MAKING STEAM-PIPES.

SPECIFICATION forming part of Letters Patent No. 566,629, dated August 25, 1896.

Application filed June 13, 1895. Serial No. 552,722. (No model.) Patented in England September 12, 1893, No. 17,101.

To all whom it may concern:

Be it known that I, ROBERT DANIEL SMILLIE, electrical engineer, residing at 80 Mains Street, Glasgow, Scotland, have invented certain new and useful Improvements in Apparatus for the Manufacture of Pipes or Tubes, (for which I have, with another, obtained Letters Patent of Great Britain, No. 17,101, dated September 12, 1893;) 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 pipes or tubes, and has for its object to provide an apparatus for the construction of pipes or tubes capable of withstanding high steam or other fluid or gaseous pressure.

My invention consists in a new and improved apparatus by means of which a metal pipe or shell is provided with a covering or casing consisting of a spirally-wound strip or wire of steel or other metal.

The consolidation of the strip or wire with the internal shell is effected by dipping into a bath of molten tin or other metal or alloy of sufficiently high fusing-point to be unaffected by the temperature of steam or other gas or gases for which the tube is designed, a suitable flux being employed to insure adhesion between the molten metal or alloy and the wire or strip and the shell. This also protects the spirally-wound strips or wires from corrosion.

In the case of iron or steel wire being used it is preferable to have the same cased with copper or other protective metal, so that the steel or iron or other metal core may not be deteriorated in the process of dipping in the molten bath.

My invention will be understood by reference to the accompanying drawings, wherein the same parts are indicated by the same letters throughout the several views.

Figure 1 represents a vertical central section through my apparatus. Fig. 2 represents a front elevation of the same. Fig. 3 represents an enlarged detail view of the mechanism for rotating the tube while being

wound, parts being broken away; and Figs. 4, 5, and 6 represent enlarged longitudinal sections of pipes or tubes provided with different forms of spirally-wound strips or wires.

My apparatus consists of a trough or bath for holding the molten metal into which the pipe is to be submerged while being wound, and this trough is mounted upon a suitable framework of masonry, which constitutes the furnace for treating the bath.

The tube while being wound is held by mandrels in suitable brackets and may be raised from or lowered into the bath by means of suitable means hereinafter to be described.

The tube is rotated by means of suitable gearing, and the wire used for covering the tube is wound off from a coil suspended above the apparatus.

To describe my apparatus more fully, D represents the trough for containing the bath of molten metal. This trough is preferably made semielliptical in cross-section and of sufficient length to receive a whole length of pipe, and is mounted upon a framework of masonry, beneath which are the furnace Q and the return-flue T.

The tube is held by mandrels K and K', carried by brackets B and B'. These brackets are keyed upon a shaft E, pivotally supported in stands E², rigidly mounted upon the framework of the masonry at one side of the trough D.

The inner rod *b* of the bracket B carries a pair of gear-wheels H and H', the gear-wheel H' being keyed upon the same shaft with the mandrel K. A sprocket-wheel F' is keyed upon the same shaft with the gear-wheel H. The sprocket-wheel F' is driven by a sprocket-chain which engages the sprocket-wheel F. The sprocket-wheel F is driven by the pulley E', both said sprocket-wheel and said pulley being loosely mounted upon the shaft E, as shown most clearly in Fig. 3.

The pulley E' is driven by a belt from any suitable source of power, and through the intermediate gearing just described causes the mandrel K to rotate with the tube. Instead of this form of driving mechanism, I may use some other suitable gearing, and I show and

describe this particular form merely for the sake of illustration.

The bracket B', as shown, carries no driving mechanism, but simply the mandrel K', which holds one end of the tube. In an apparatus for winding very long tubes I might have the bracket B' carry gearing to assist in turning the tube. This could be readily accomplished by having the shaft E revolve and by a mere duplication of the driving-gear without affecting the nature of my invention.

The bracket B has an outwardly-extending arm B², which terminates in a toothed quadrant b', which engages a worm M. This worm M is rotated by means of the hand-wheel m, and the bracket B is thereby given a rocking motion to lower the tube into the bath or raise it from the same and hold it in the desired position.

P represents the drum from which the wire W is wound upon the tube. This drum is suspended from suitable hangers S, and a friction-lever N, carrying a weight n, is provided upon the shaft of this drum for giving tension to the wire being unwound.

Rollers R, R', and R², over which the wire runs, are revolvably mounted in stands upon the masonry, and a pulley W', carrying a weight w, is suspended from a loop in the wire between the rollers R and R' to give additional tension to the wire and to take up the slack should the tube be lifted from the bath during the operation of winding.

The pipe A (shown in Fig. 4) is represented as wound with a metallic strip, rectangular in cross-section. The pipe A' (shown in Fig. 5) is represented as wound with small steel wire incased in copper or other protective metal, and the pipe A², Fig. 5, is represented as wound with larger wire and not inclosed in a casing of copper.

In some cases it may be advisable, after dipping in the molten bath, to deposit by electricity a metal or alloy to protect the consolidated tube from corrosion.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In an apparatus of the character described, the combination with a furnace, and a trough for containing molten metal mounted above said furnace; means for holding the tube in said molten bath while being wound; means for rotating said tube in said bath; a drum provided with a friction device from which the wire is fed to said tube while being wound; tension devices for holding said wire taut; and means for raising and lowering said tube into said bath, substantially as and for the purposes described.

2. In an apparatus of the character described, the combination with a furnace, and a trough for containing molten metal mounted above said furnace; a pair of pivoted

brackets each carrying at one end a mandrel for holding the tube, an arm on one of said brackets terminating in a toothed quadrant; a worm adapted to engage said toothed quadrant for imparting a rocking motion to said brackets and thus raising or lowering the tube carried by said mandrels; means for rotating said tube; a drum provided with a friction device from which the wire is fed to said tube while being wound and tension devices for holding said wire taut, substantially as and for the purposes described.

3. In an apparatus of the character described, the combination with a furnace, and a trough for containing molten metal mounted above said furnace; a pair of brackets pivoted upon suitable stands mounted above said furnace; a mandrel carried by one end of each of said brackets; means for rotating one of said mandrels; an arm on one of said brackets terminating in a toothed quadrant; a worm adapted to engage said toothed quadrant; means for turning said worm and imparting a rocking motion to said brackets; and a drum from which the wire is fed to the tube being wound, substantially as described.

4. In an apparatus of the character described, the combination with a furnace, and a trough for containing molten metal mounted above said furnace; a pair of brackets pivoted upon suitable stands mounted above said furnace, a mandrel carried by one end of each of said brackets; an arm on one of said brackets terminating in a toothed quadrant; a worm adapted to engage said toothed quadrant, a hand-wheel for turning said worm and imparting a rocking motion to said brackets; a pulley having its axis in line with the axis of said pivoted brackets, and adapted to be driven from any suitable source of power; driving-gear between said pulley and one of said mandrels, for rotating the same; and a drum from which the wire is fed to the tube being wound, substantially as described.

5. In an apparatus of the character described, the combination of a furnace, and a trough for containing molten metal mounted above said furnace; a pair of pivoted brackets carrying mandrels for holding the tube; an arm on one of said brackets terminating in a toothed quadrant; a worm adapted to engage said toothed quadrant, for imparting a rocking motion to said brackets, and thus raising or lowering the tube carried by said mandrels; a pair of toothed gear-wheels carried by one of said brackets and adapted to rotate one of said mandrels; a pulley mounted upon a shaft in line with the axis of said brackets and adapted to be driven from any suitable source of power; driving-gear between said pulley and said gear-wheels; a drum from which the wire is fed to said tube while being wound; and tension devices for holding said wire taut, substantially as described.

6. In an apparatus of the character described, the combination of a furnace, and a trough for containing molten metal mounted above said furnace; means for holding the
5 tube in said molten bath while being wound; means for rotating said tube; means for raising said tube from and lowering said tube into said bath; and devices for feeding the

wire to said tube under tension while being wound, substantially as described. 10

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

ROBERT DANIEL SMILLIE.

Witnesses:

JNO. B. LEES,

JAS. A. THOMSON.