S. P. M. TASKER.

Machine for Casting Metal Tubes.

No. 223,077. Patented Dec. 30, 1879.

FIG. 1.

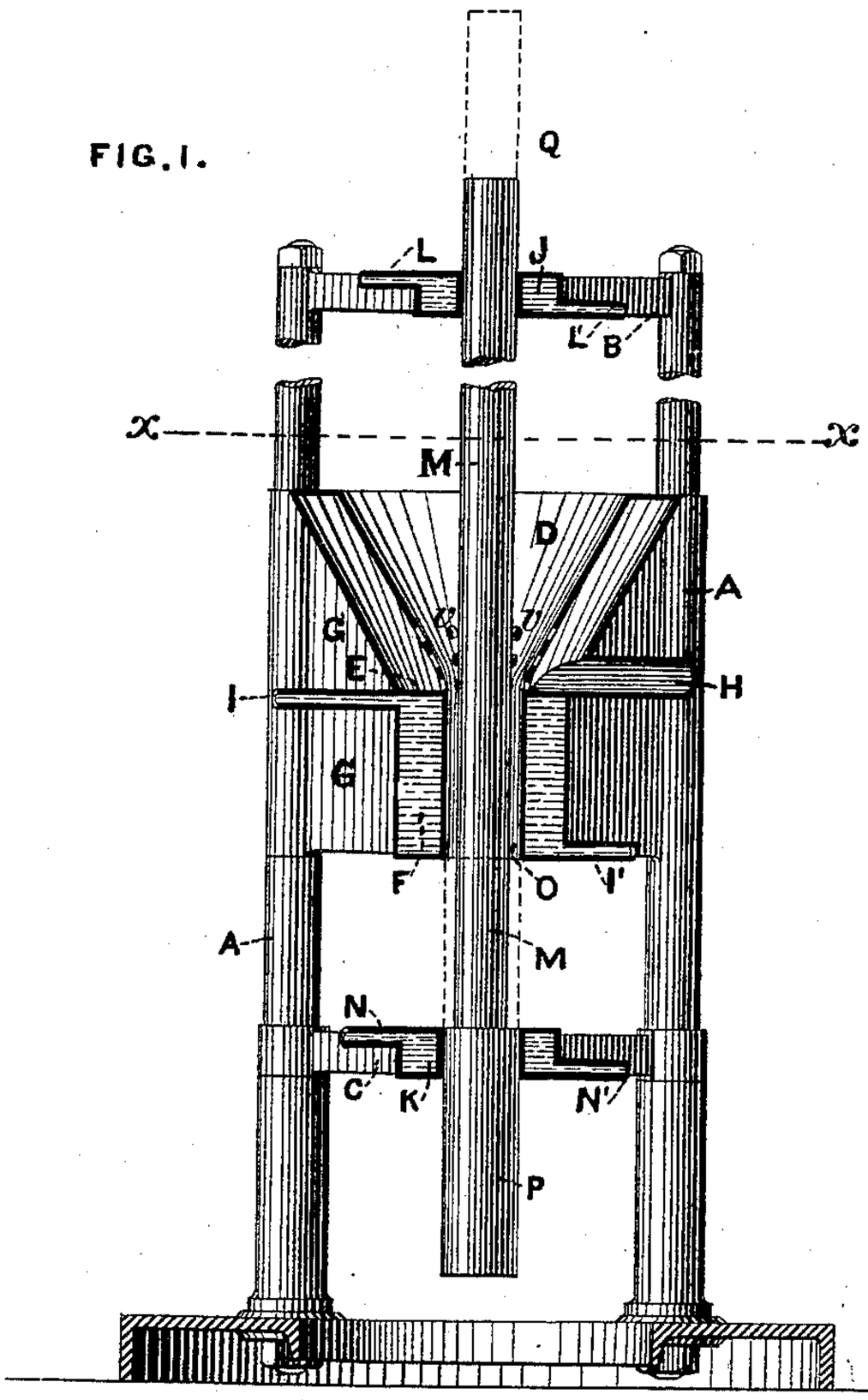
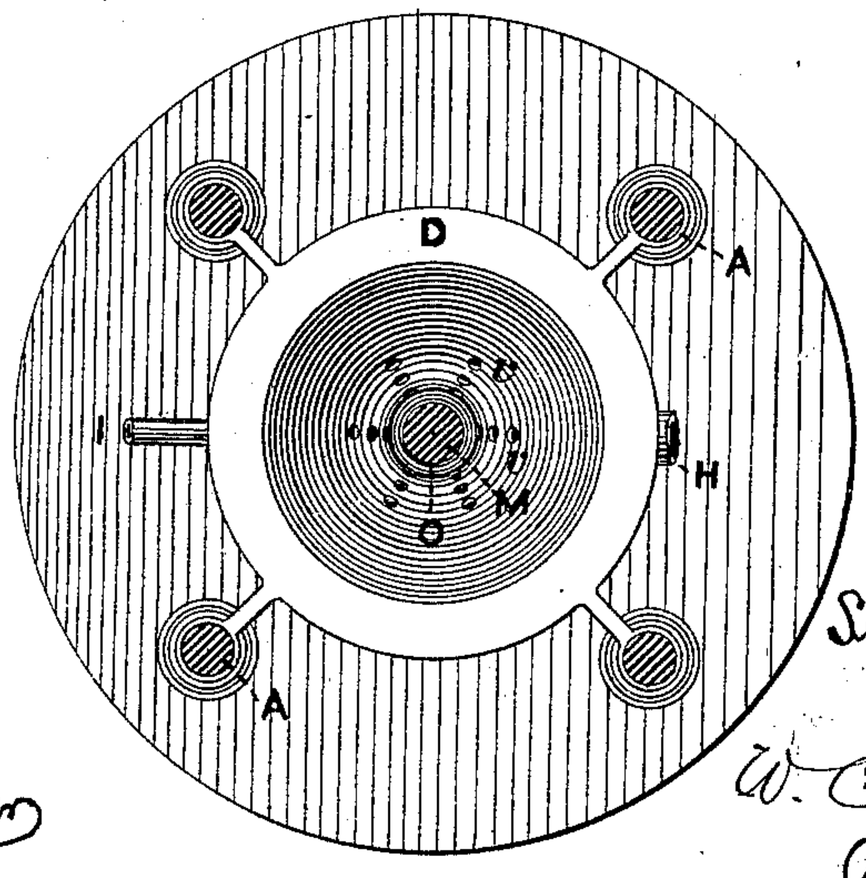


FIG. 2.



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UNITED STATES PATENT OFFICE.

STEPHEN P. M. TASKER, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN MACHINES FOR CASTING METAL TUBES.

Specification forming part of Letters Patent No. **223,077**, dated December 30, 1879; application filed October 6, 1879.

To all whom it may concern:

Be it known that I, STEPHEN P. M. TASKER, of Philadelphia, in the State of Pennsylvania, have invented an Improvement on Machines for Making Metal Tubes, of which the following is a full and true description, reference being made to the accompanying drawings, forming part thereof, in which—

Figure 1 is a central sectional elevation of a convenient form of apparatus embodying my invention, illustrating its mechanical construction and the position of the mandrel after a tube of twice the length of the molding-chamber has been formed upon it, the position of the mandrel at the commencement of the operation being shown in dotted lines; and Fig. 2 is a top-plan view, section being supposed on line *x x* of Fig. 1.

Similar letters of reference indicate corresponding parts wherever used.

My invention relates to the class of mechanisms which are designed to produce seamless metal tubes.

It has for its especial object the production of seamless steel tubes of any desired length and cross-section, to which end it consists of the apparatus hereinafter described and claimed.

Referring to the drawings, the following is a description of a convenient form of apparatus embodying my invention.

A is a vertical frame-work of any suitable construction and material, consisting, in the form represented, of four standards erected from a bed-plate, and connected at their upper extremities and near the bed-plate by radial webs B C, concentric with and connected to which are water-containing slide-bearings J K for the mandrel.

D is the receiver, in the form represented, a hollow funnel or inverted frustum of a cone, terminating below in a diaphragm, E.

F is the molding-chamber, a hollow cylinder attached to and extending down from the receiver, but internally separated therefrom by the diaphragm E.

Both receiver and chamber are supported upon radial frame-work webs G, and are both concentric with the bearings of the mandrel.

The receiver is preferably constructed of refractory material, is, as stated, hollow, and is provided with a gas-inlet tube, H, entering, in the form represented, through the outer wall, while the inner wall is perforated with vent-holes *v v*, best located near region of smallest diameter.

The molding chamber is a tight hollow cylinder, supplied with a water-inlet tube, I, whereby it is filled with water, and with an outlet-tube, I′.

The bearings J K are supplied with water by the pipes L N, and are provided with outlets L′ N′.

M is the mandrel, a vertical shaft, in the form represented, of circular cross-section. It is made of any suitable material, either solid or hollow, to permit of a circulation of water to cool it.

When made of refractory substance, such substance may be either close upon its surface or porous to permit the permeation of the gases.

In diameter the mandrel is sufficiently less than the molding-chamber, with which it is concentric, to leave an annular and (in the form under discussion) cylindrical interspace, O, between.

P is an enlargement of the mandrel, the diameter of which is best that of the molding-chamber F. The upper bearing fits the mandrel proper, the lower its enlargement.

Any suitable mechanism is provided to impart a vertical movement to the mandrel.

Such being the construction of the apparatus represented, its operation is as follows: The mandrel is raised until the upper edge of its enlargement registers with the lower surface of the molding-chamber, and luting is applied around the region of contact to prevent possible escapes of metal at the outstart of the operation. Any suitable gas, hot or cold, is then caused to enter or is forced through the inlet-tube into the gas-space of the receiver, from which it finds escape through the vent-holes into the interior of the receiver and through its molten contents, before the latter descend into the molding-chamber, as hereinafter set forth.

The object, primarily, of forcing gas into the molten metal is to insure that the latter is kept in a molten condition, and I have found that certain gases introduced cold—as, for instance,

hydrogen—will accomplish this result as effectually as heated gases. Incidentally, however, various chemical results ensue from the employment of the blast, which results vary with the character of metals or gases employed. Any desired fusible metal in a molten condition is then run into the receiver, coming in contact with the streams of gas which ascend through it, and falls down into the interspace O in the molding-chamber about the mandrel. As the molten metal cools it is obvious that it forms a cast tube about the mandrel.

Motion being imparted to the mandrel, so as to cause it to move gradually downward, and the supply of molten metal being continued, it is obvious that a cast tube of any desired length is formed about the mandrel.

As the cast tube cools in the molding-chamber by reason of the contained water, it shrinks upon and clings to the mandrel and so is drawn down, new tubing being gradually and continuously formed upon the mandrel, in its downward movement, by the gradual and continuous influx of metal to the molding-chamber.

When a sufficient length of tube has been formed, the mandrel, with the tube upon it, is removed from the apparatus, and the tube afterward drawn from the mandrel by any well-known means.

It is obvious that my apparatus is especially adapted to the production of steel tubing; but it can be used with effect in connection with various fusible metals, either with or without the blast.

Tubes of any desired cross-section can be made by properly shaping the mandrel and molding-chamber and the mandrel-boxes.

I wish it to be understood that I do not limit myself to the exact construction which I have described as convenient; but that I contemplate varieties of mechanical construction while adhering to the substance of my invention. For instance, in some cases the receiver may be represented by the hearth of the furnace, while the gases may be forced down through the molten mass from above through refractory tubes.

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

1. An apparatus for the production of seamless steel or other metal tubes, consisting essentially of a receiver or supply chamber, provided with means for directing a blast into the metal, a cold molding-chamber connected with the receiver, and a vertical mandrel concentric with and adapted to be moved downward through both receiver and chamber, the arrangement being such that molten metal in the receiver encounters the gas as the metal settles about the mandrel into the molding-chamber, in which chamber it is chilled so as to form a continuous seamless tube about and upon the mandrel, substantially as set forth.

2. The enlargement P of the mandrel M, in combination with the molding-chamber, so as to close the interspace at the commencement of the tube-making, substantially as set forth.

3. An apparatus for the production of seamless steel or other metal tubes, which consists essentially of a molding-chamber, provided with a mandrel adapted to move down and through said molding-chamber in such manner that molten metal fed to the molding-chamber follows the mandrel in its downward movement, and is thereby cast about and upon it.

In testimony whereof I have hereunto signed my name this 27th day of September, 1879.

STEPHEN P. M. TASKER.

In presence of—

J. BONSALL TAYLOR,

W. C. STRAWBRIDGE.