

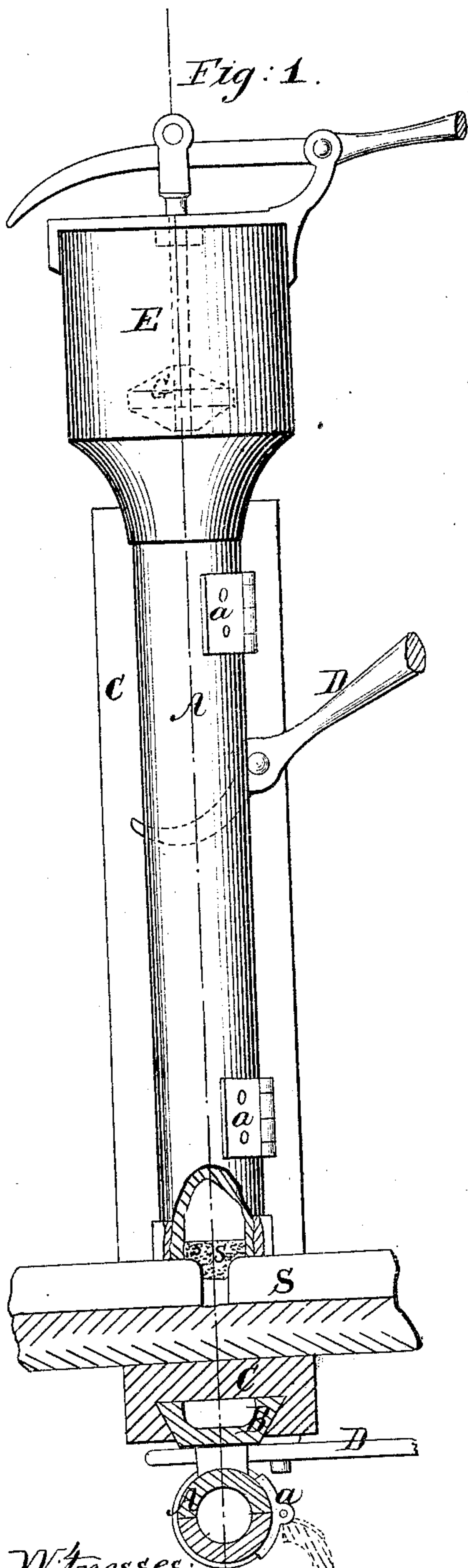
J. J. C. Smith.

Method of Casting Pipes.

N^o 90,201.

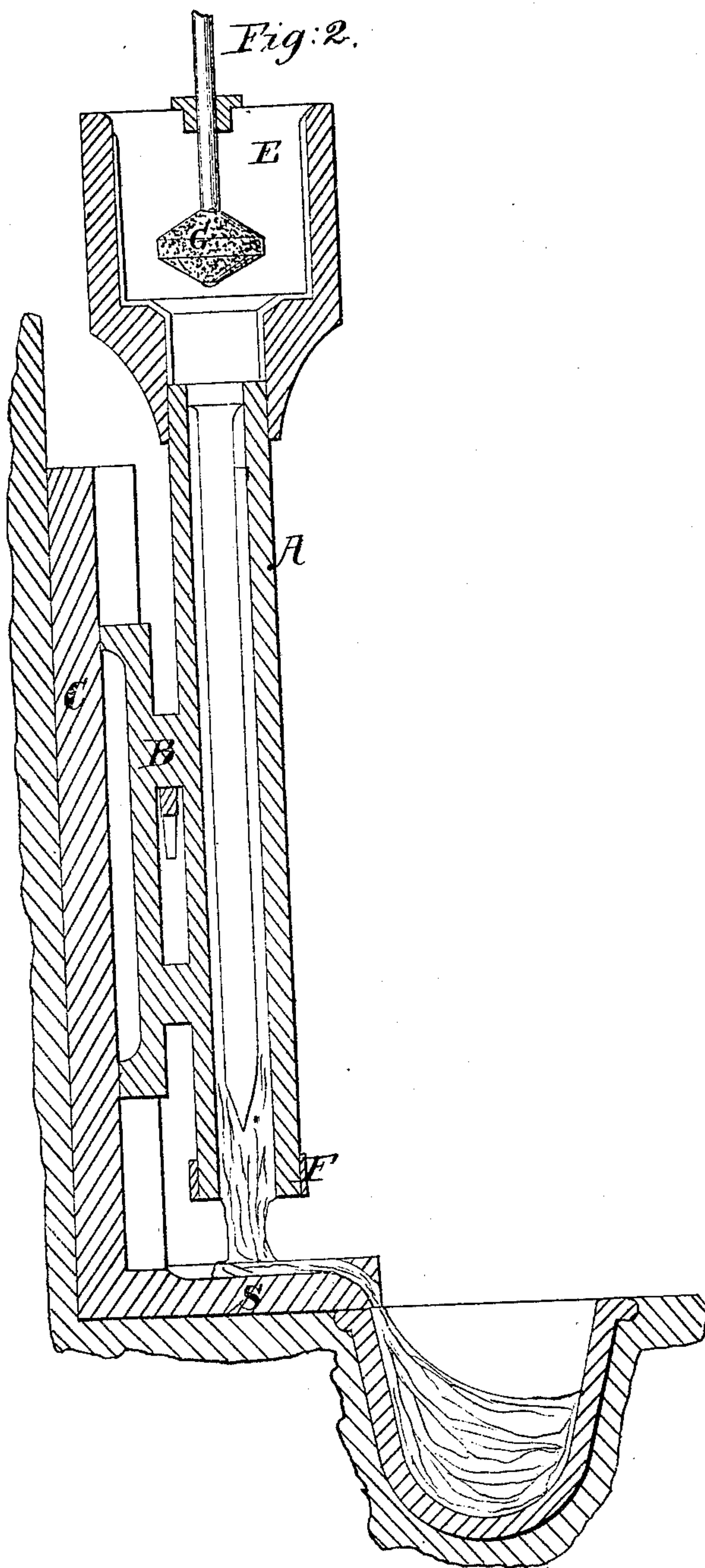
Patented May 18, 1869.

Fig: 1.



Witnesses;
Wm. H. Brewster Jr.
Attorney at Law

Fig: 2.



Inventor;
John. Jos. Chas. Smith

United States Patent Office.

JOHN JOSEPH CHARLES SMITH, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO
"THE METALLIC COMPRESSION CASTING COMPANY," OF BOSTON, MASSACHUSETTS.

Letters Patent No. 90,201, dated May 18, 1869.

IMPROVEMENT IN METHOD OF CASTING METAL PIPES.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, JOHN JOSEPH CHARLES SMITH, of the city and county of Philadelphia, and State of Pennsylvania, have invented a new and improved Process and Apparatus for Casting Tubes and other Hollow Articles of Hard or Refractory Metal; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, which are made a part of this specification.

My invention consists in casting tubes, and some other hollow articles, of iron, steel, or other hard or refractory metal, by running a charge of the metal into a mould of sufficiently free conducting-material, to cause the outer part of the molten metal to set more quickly than the interior, so that, after a sufficient interval to form a shell or tube of the desired thickness, the still liquid interior may be run by elevating the mould, or opening a gate in its lower part.

In order to enable one skilled in the art to which my invention appertains, to carry it into effect, I will proceed to describe an apparatus and mode of operation which I have used with good success in casting iron pipes from three-fourths of an inch to five inches in diameter.

In the drawings—

Figure 1 represents an elevation of the apparatus, with the mould closed, for the reception of the molten metal.

Figure 2 represents a vertical section of the same, with the mould elevated, and the unset metal in the act of running out.

Figure 3 represents a horizontal section of the mould and its accessories.

The mould A is made to open and close by means of hinges *a a*, and is attached to a slide, B, which works in a guide in the standard C, so that the mould may be elevated by a lever, D, or other means.

E represents a reservoir, attached removably to the top of the mould, and F, a band or ring, by which its lower end may be held together.

Within the funnel is a valve, G, of clay or other infusible and non-conducting material, which is raised or opened, to allow the molten metal to pass instantaneously from the reservoir into the mould, when the casting is to be performed.

The interior of the reservoir is lined with clay or other suitable non-conducting material, to protect the fluid metal from setting.

Operation.

The parts being in the positions shown in fig. 1, and a small quantity of sand placed in the lower part of the mould, as shown at *s*, the reservoir E is supplied with a sufficient charge of molten metal to fill the

mould A. Everything being ready, the valve G is raised, permitting the molten metal to flow instantaneously into the metallic mould A, the contact of which chills the outer part of the molten mass sufficiently to harden it before the internal part.

When the molten metal has been in the mould from two to five seconds, according to the size of the pipe to be produced, and the desired thickness of its walls, the mould A is elevated by the lever D, or other means, permitting the molten metal in the centre of the mould to flow out, as represented in fig. 2, leaving a tubular casting of the form, size, and thickness desired.

The sand *s* prevents the chilling of the metal on the bottom of the mould, and permits the molten part to flow out, without obstruction, when the mould is elevated.

Instead of elevating the mould, it is manifest that the same result can be accomplished by providing a gate, to be opened, at its lower part, in order to permit the escape of the metal.

When the cast tube or other article has remained a sufficient time in the mould, the reservoir E and band F are removed, the mould opened, and the casting discharged.

I am aware that hollow articles have been cast, of Britannia, zinc, and other soft metal, by what is known as the slushing-process; but I am not aware that any practical mode has before been devised by which pipes and other long hollow articles can be cast, of iron, steel, or other refractory metal, by chilling the exterior, and allowing the molten interior part to flow out.

In my process, it is necessary to employ a reservoir, provided with a non-conducting lining, within which the molten metal may be kept in readiness for casting, and that the temporarily-closable opening between such reservoir and the mould shall be as large as the diameter of the mould itself, or of sufficient size to permit the instantaneous passage of the metal from the reservoir into the mould, when the valve is opened.

In practice, it is found to be essential to the most advantageous use of this invention, that the discharge of the molten metal shall be directly downward from the centre of the lower part of the casting. By this means, I am enabled to produce tubes, and other articles with walls, of accurately-uniform thickness; but this uniformity is seriously impaired, if the liquid metal be allowed to flow out slowly over the inner surface of that which is newly set.

It is my intention to apply the invention to the casting of pipes and analogous long articles, such as hollow rails, beams, pillars, &c., for architectural and engineering-purposes, as well as for the conduction of fluids; also, to the casting of spheres and other bodies, when the same are to be made with two orifices, so as

to permit the discharge of the molten metal, in the manner explained.

In the case of iron, the castings may be made malleable, according to the well-known process, and thus provide a cheap and perfectly-efficient substitute for the wrought-iron pipes which are now produced, at great labor and cost, by welding and rolling.

I am aware that the broad principle of casting hollow articles by pouring the molten metal into the mould, and, after allowing a sufficient thickness of shell to congeal or harden, discharging the still molten interior, has been, for a long time, employed for casting small articles of soft metal. I do not, therefore, broadly claim casting by that mode; but

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

1. The apparatus adapted to receive the molten metal at top, and discharge a portion of it at bottom,

substantially as herein described, for the purposes stated.

2. In combination with the mould A, the lined reservoir E and plug G, constructed and arranged as described, to provide for the instantaneous introduction of molten metal into the said mould.

3. The combination of the mould A, the unyielding base or gate S, by which the bottom of the said mould may be opened or closed at pleasure, and a temporary bottom, s, of yielding and non-conducting material, all being constructed and arranged to operate substantially as shown and described, for the purposes set forth.

JOHN JOS. CHAS. SMITH.

Witnesses:

WM. H. BRERETON, Jr.,
OCTAVIUS KNIGHT.