J. Revere,

Casting Hollow-Ware.

No. 34,524. Patented Feb. 25, 1862.

Fig. 1.

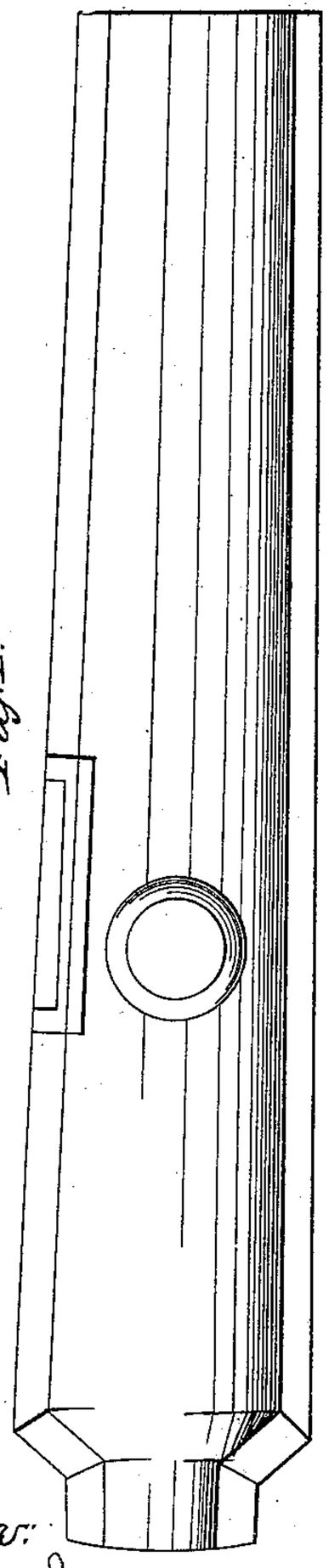
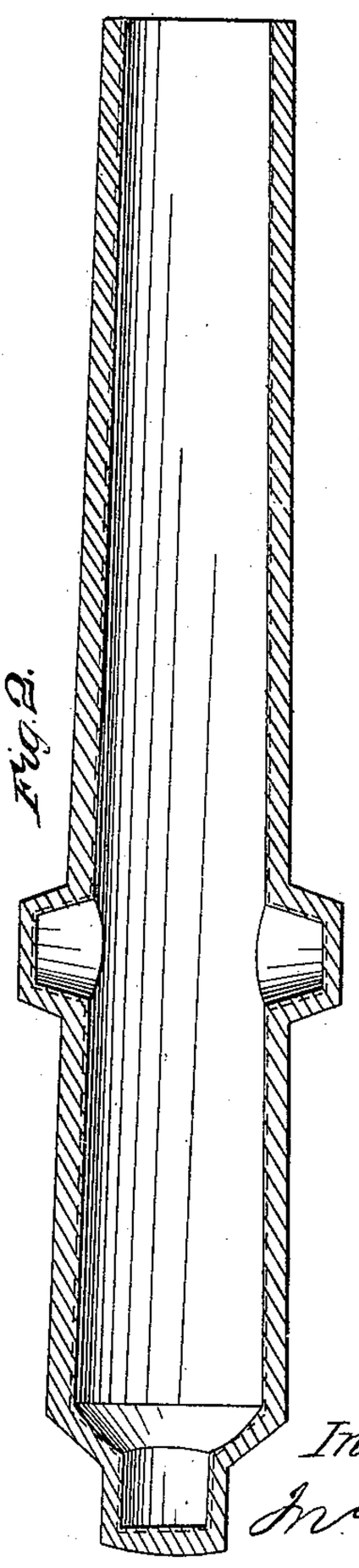


Fig. 2.



Witnesses:
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John J. Treadwell

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UNITED STATES PATENT OFFICE.

JOHN REVERE, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN PREPARING METALLIC MOLDS FOR CASTING METALS.

Specification forming part of Letters Patent No. **34,524**, dated February 25, 1862; antedated November 22, 1861.

To all whom it may concern:

Be it known that I, JOHN REVERE, of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Casting Bronze Ordnance or other Articles; and I do hereby declare the same to be fully described in the following specification.

It is a fact well known to manufacturers of bronze articles, especially those composed of a large amount of metal, that either owing to the repulsion or want of affinity between copper and iron or steel, or for some other cause, it has hitherto been considered impossible to make a good sound casting of bronze in an iron mold, and in consequence thereof all heavy bronze articles are now cast or founded in baked-clay or dry-sand molds. This method is not only very expensive, but is a very slow and tedious one. To find a remedy for these evils has been the object of my invention, and has been the result of a long series of experiments pursued for a considerable length of time.

In carrying out my invention I construct the mold or material in which the article is to be cast of iron, and I prefer to make the same in two or more parts, which are to be confined together by means of iron clamps or other suitable devices.

The mold after being formed of the required shape is to be thoroughly annealed, so that its inside surface shall have the appearance of burnt iron. Such inner surface is next to be washed with a hydrated solution of pulverized clay and wood-ashes until the pores of the iron are completely filled, and such a coating formed upon it as to entirely prevent any contact of the metallic surface with the melted bronze during the process of founding. Over such coating, and while the mold is in a warm state, a coating of lamp-black dissolved in spirits of turpentine or alcohol is next to be applied; or instead thereof a liquid resinous substance—such as tar—may be used.

In casting a piece of ordnance or other article I pour the molten bronze into a long tunnel extending down some distance into the mold, so that the liquid mass shall fall directly into or upon the center of the bottom of the mold, and continue pouring in until the mold is completely filled, care being taken that none of the molten bronze shall come in contact with the resinous coating on the unfiled portion of the mold until it shall impinge against the same as it (the molten mass) rises upward in the process of filling the mold.

By my improved mode of annealing the iron mold and applying to the inner surface the coatings as above described I have been able to cast cannons and other articles whose outer surfaces were almost, if not entirely, free of air-holes or "honey-comb," as they are technically termed, which it is utterly impossible to do by using an iron mold without applying such coatings.

By my improvement the cost of casting a cannon or other article of bronze is lessened fully one-half in comparison with the ordinary method, as all the expense attending the making of the clay molds, the molding material, the flasks, the baking of the molds, and the ovens for baking the same is avoided.

Another important advantage attained by my improvement is the rapid and almost instantaneous cooling of the melted bronze, whereby a separation of the tin from the alloy is prevented—an evil familiar to all manufacturers of bronze articles by the old method.

I am aware that molds have been made of metal, and had their inner surfaces coated with red ocher and white of eggs, the said coating being not only to prevent the casting, when made in the mold, from adhering to it, but to give to such casting a smooth surface.

I am also aware that a metallic chill constituting part of a mold has been thinly coated with a mixture of black-lead and clay, the object of such coating being to prepare the iron chill for resisting the abrading or corrosive action of the molten cast-iron while the latter may be flowing rapidly in a current around and within the mold. I therefore claim no such means of preparing the inner surface of a mold; nor do I claim covering the inner surface of a mold with a coating.

In carrying out my invention I do more than merely coat the mold with any such means, as I first anneal the iron mold and burn or oxidate its inner surface, whereby I prepare it for the reception of its first coating, to which, after having been properly laid on, I apply a

second and different cooating—viz., a resinous wash, as described.

The object of annealing the mold and oxidizing its inner surface by heat, as described, is not only to prevent the mold from suddenly cracking or breaking while it may be receiving hot metal or may contain the same, but to destroy the metallic character of the inner surface of the mold, in order that a bronze casting, when within the mold, may harden or set without having what founders term a "honeycomb surface," such as it will have when cast against pure or unoxidized metal.

The object of employing the hydrated solution of clay and ashes is to obtain an impalpable-powder coating, which will set, adhere strongly to the mold, and fill its pores to advantage.

During the use of the bronze or fluid metal in the mold the resinous wash or second coating will gradually liquefy and burn, and thus will prevent the metal from setting or hardening against the surface of the mold until the mold may have received its proper quantity of metal. By this means the metal, while fluid in the mold, will be preserved in a homogeneous state, whereby the oxides and extraneous matter which so readily form or collect in fluid bronze will freely flow to the upper part or head of the casting without adhering to the sides of the mold. By preventing the metal from setting or adhering to the sides of the mold until the oxides and extraneous matter have had time to rise into the head of the casting the metal is enabled to become properly and evenly compacted preparatory to and while passing from a fluid to a solid state.

What I claim as my invention or improvement in preparing a metallic mold for casting ordnance or articles of bronze consists not only in heating the mold, so as to anneal it and burn and oxidize its inner surface, but in afterward applying to the said surface the earthy wash and to the latter a resinous coating, substantially as hereinbefore specified.

JNO. REVERE.

Witnesses:
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