UNITED STATES PATENT OFFICE.

WILLIAM A. SWEET, OF SYRACUSE, NEW YORK.

IMPROVEMENT IN PROCESSES OF CASTING STEEL INGOTS.

Specification forming part of Letters Patent No. **216,117**, dated June 3, 1879; application filed March 19, 1879.

To all whom it may concern:

Be it known that I, WILLIAM A. SWEET, of Syracuse, Onondaga county, State of New York, have invented certain Improvements in the Process of Casting Steel Ingots, &c., of which the following is a specification.

My improvement consists in producing ingots of a more perfect, equal, and homogeneous formation throughout than has been done by any of the methods heretofore in use, by which process the deep central recess called "piping," caused by shrinkage in cooling in the usual way, is avoided, and the cast ingot is materially improved.

The process of melting and the process of pouring into the ordinary ingot-mold are not materially changed; but instead of leaving the steel after it is poured to shrink at the center in cooling, and thereby forming a deep piping, by which a serious defect in the ingot is produced, I obviate it by heaping over the top of the mold a sufficient quantity of highly-heated charcoal or other carbonaceous combustible, or any efficient slag or flux in a liquid and highly-heated state that will keep up the temperature sufficiently high to cause the melted metal covered by or poured in through this highly-heated matter to flow in and fill up the center shrinkage as it cools, so as to make the ingot solid and homogeneous throughout its entire length nearly to the top, thus reducing the loss and equalizing the texture more perfectly than by the old methods, by which I effect a great improvement and saving.

For the best effects I have obtained I have used finely-powdered charcoal intensely heated; but, by practice as well as in accordance with theory, I find that other substances, as above named, may be substituted and produce a good result in a highly-heated state. These are so well known to the metallurgist that they need not here be specified to elucidate my invention, the object of which is to keep the metal in a sufficiently fluid state to fill in the center while consolidating and avoid piping.

It may be sometimes desirable, I have found, to place a small quantity of highly-heated carbonaceous matter in the bottom of the mold before pouring, and then pour the melted metal through it, and it is well, after the carbon is placed upon the fluid steel in the mold, as before stated, to pour a small quantity of melted steel through the carbon into the top of the mold in finishing the pouring, the carbon being at the intensest heat and free from oxygen, and preventing oxidation of the metal.

The highly-heated substance used should be permeable by the gases.

Having thus fully stated my improved process of casting steel ingots, I claim—

The method of preventing piping in ingots, which consists in covering the molten metal while in the mold with a highly-heated substance, substantially as described, capable of protecting the metal from the outer air and permeable by the gases evolved in casting, as set forth.

W. A. SWEET.

Witnesses:
J. J. GREENOUGH,
J. P. MUNRO.

2 Sheets—Sheet 1.

C. TESSIE du MOTAY & E. J. JERZMANOWSKI.

Apparatus for the Production of Gas for Metallurgical and Other Purposes.

No. 216,118. Patented June 3, 1879.

Figure 2.

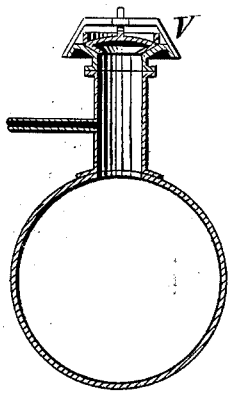
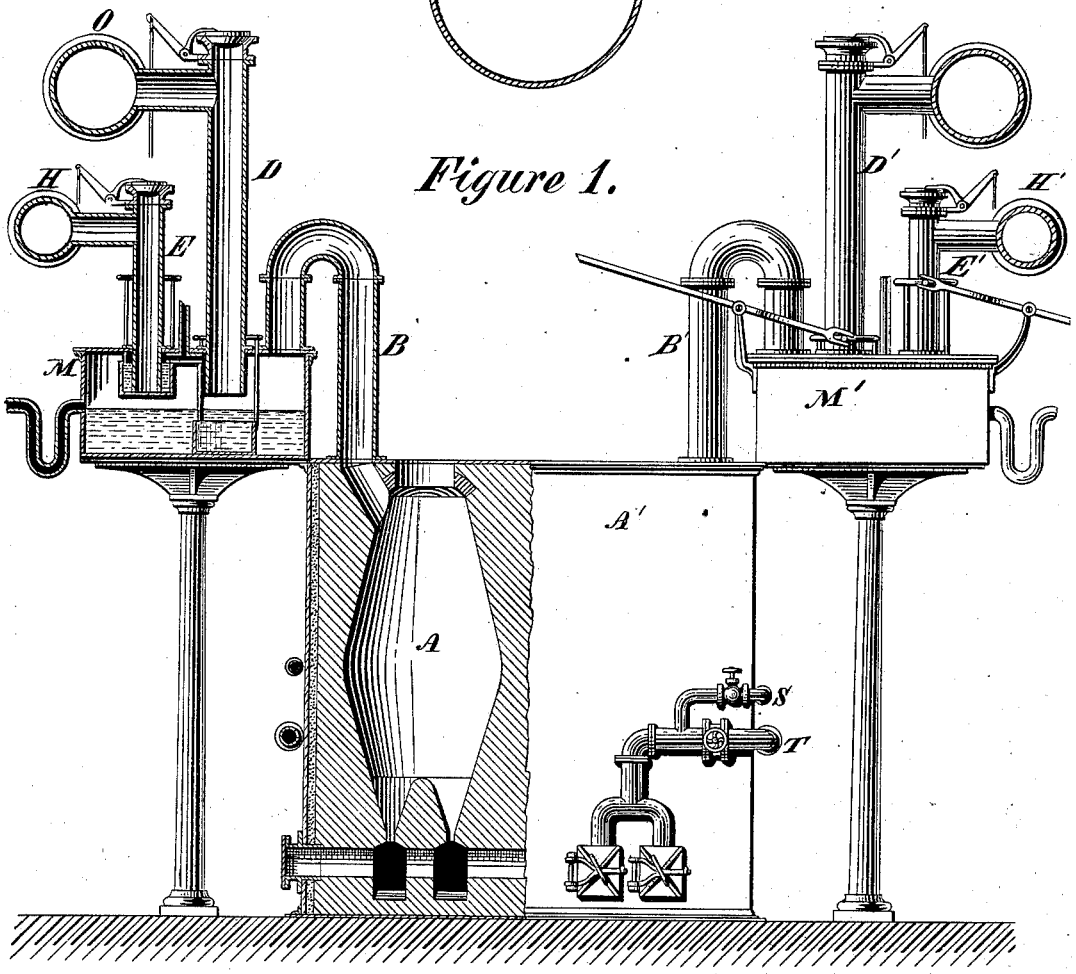


Figure 1.



Witnesses:
Geo. W. Miatt
Wm. J. Sawyer

Inventors:
C. Tessié du Motay
Evraym J. Jerzmanowsky
By their Attorney
C. N. Dickerson Jr.

2 Sheets—Sheet 2.

C. TESSIE du MOTAY & E. J. JERZMANOWSKI.

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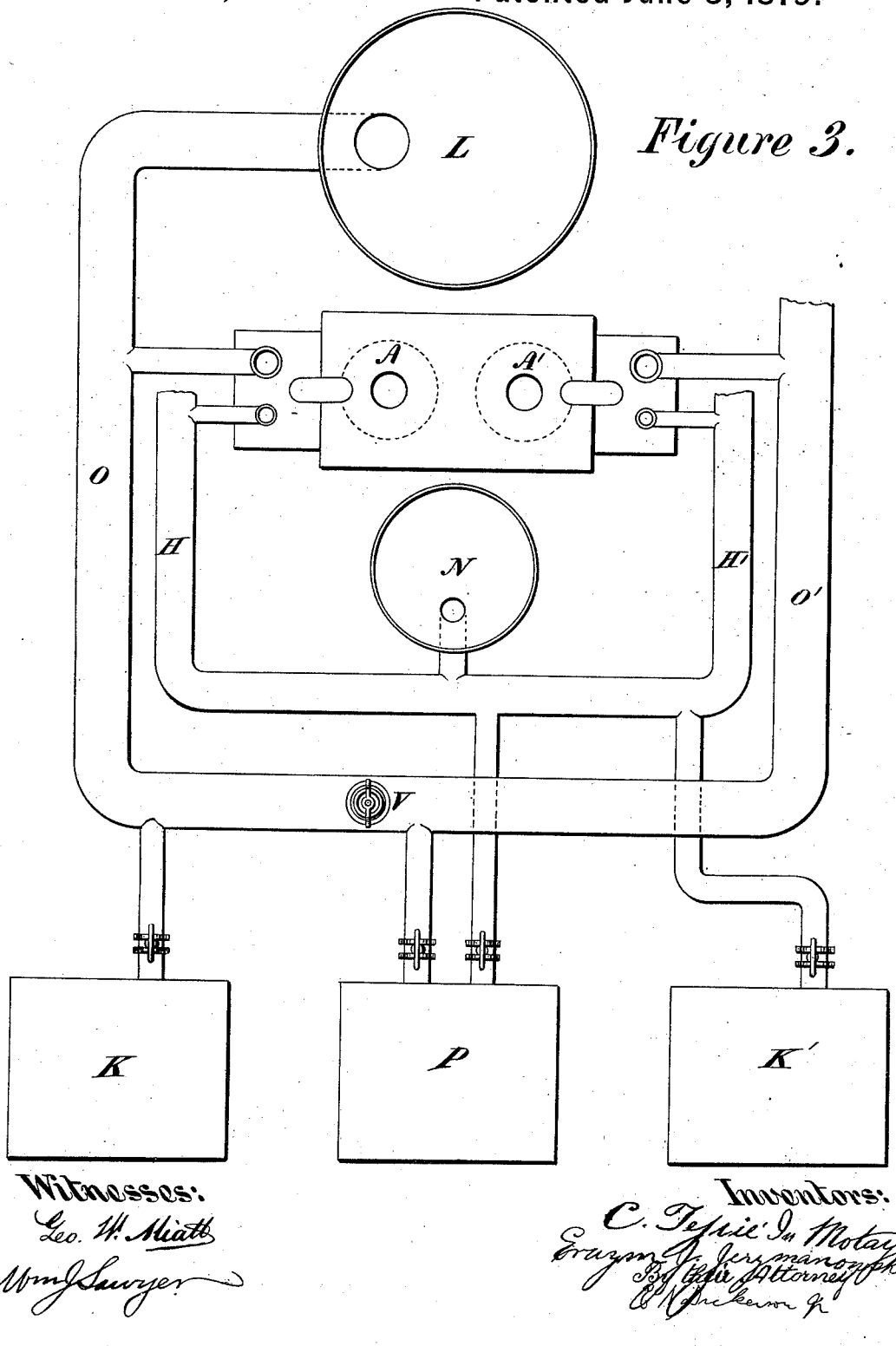
Figure 3.



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Eruzm J. Jerzmanowski
By their Attorneys
C. Dickerson Jr