

UNITED STATES PATENT OFFICE.

SAMUEL JOHNSTON, OF NEW YORK, N. Y.

MANUFACTURE OF MOLD MATERIAL AND MOLDS.

SPECIFICATION forming part of Letters Patent No. 598,633, dated February 8, 1898.

Application filed October 5, 1897. Serial No. 654,200. (No specimens.)

To all whom it may concern:

Be it known that I, SAMUEL JOHNSTON, of the city and State of New York, have invented certain new and useful Improvements in the

5 Manufacture of Mold Material and Molds and in Material for Molds and the Molds Themselves, of which the following is a specification, containing full, clear, and exact instructions in regard to the said improvements.

10 I have discovered that if rock of the hornblende family be thoroughly burned by subjecting it to intense heat and then pulverized it forms an excellent material for use in molds.

15 In an application filed by me June 22, 1897, Serial No. 641,829, I have set forth a new and useful invention based on this discovery. I

have also discovered that fibrous hornblende rock, such as asbestos, when so burned and reduced to a very fine powder by grinding or

20 otherwise, seems to possess slightly-different characteristics from non-fibrous rock of the hornblende family. By burning both these classes of mineral, presumably by driving off water of crystallization or by some chemical

25 change with which I am not familiar, turn pinkish, and if the heat be long continued they become vitreous. The fibrous rock, such as asbestos, after being burned seems to possess greater qualities for binding or holding

30 together than does the material formed by powdering non-fibrous hornblende rock, such as soapstone, whether burned or not. By suitably combining these two burned materials together in a finely-pulverized form and damp-

35 ening to the consistency of molding-sand an improved substitute for molding-sand is produced. I prefer to use the proportions of one-third burned fibrous hornblende rock, such as asbestos, and two-thirds non-fibrous horn-

40 blende rock, such as soapstone. In order to prevent any tendency of this improved molding material sticking to the pattern in forming molds, I prefer to use a facing material which I will presently describe.

45 My new materials are capable of taking the finest definition from a pattern and are of such a nature that steel and even nickel may be cast without trouble from chilling and without the other well-known defects, such as

50 discoloration of the metal, chilling, oxidation, formation of scale, and the like.

After forming the mold material as I have

already described and preferably in the proportions stated, although these proportions may be varied within wide limits, I may then 55 prepare my facing material by taking some of such molding material and making it into small balls, plates, or masses, and then re-burning it by intense heat continued for several hours, after which I pulverize it. I use 60 the finest of powder so formed for the facing of molds and apply it by dusting it onto the pattern to the thickness of about one sixty-fourth of an inch or more in the dry state and preferably through a cloth bag of fine mesh. 65 I then apply the damp molding mixture in the same manner as ordinary molding-sand. I prefer, however, to compress the molding material by a press or other means of applying pressure rather than by ramming in the 70 mold-box. The moisture from the damp molding material seems to strike through and fix or set the facing, so that it comes away from the pattern clean and perfectly defined. I then prefer to bake the mold at a tempera- 75 ture as high as can conveniently be obtained by the use of coal, coke, or gas. After subjecting the mold to heat for preferably a period of two or three hours the mold is ready for use and the material presents an appearance 80 and texture resembling tile or fire-brick, without having lost any of its fineness of definition. It is also capable of withstanding any pressure to which it may be subjected in casting under pressure limited only by that which 85 the containing mold-box or casting can withstand. This feature in itself gives a peculiar value to my new material.

If the article to be molded is of such shape that it can be taken from the mold without 90 tearing the mold, the same mold may be used an indefinite number of times. When this is to be done, I prefer to heat the mold in baking it until the surface becomes partially vitrified. This result may be conveniently ac- 95 complished by subjecting the inner surface of the mold to the heat of a blowpipe. When the mold itself is not to be reused, the mold material may be reused by breaking it up and regrinding it and moistening it with wa- 100 ter, and it may be so reused indefinitely.

It must be understood that the proportions given may be widely varied without differing from the principles of the invention, although

the proportions of two to one are what I find preferable.

In this application I make no broad claim to the molding sand or material distinguished solely by the presence of semifused or semi-sintered asbestos or hornblende, as I claim that in the earlier application above referred to, and by the expression "vitrified at the mold-surface" as used in the following claims I mean to define such state of the mold-surface as is produced by heating the mold-surface until it is at least partially sintered or fused and do not refer to the treatment given the material before it exists as a mold-surface.

I claim and desire to secure by Letters Patent the following:

1. The process of preparing mold material, which consists in subjecting fibrous rock of the hornblende family to intense heat until semifused or sintered, reducing the powder, then incorporating therewith pulverized rock of the hornblende family, and water, substantially as set forth.

2. The process of forming a facing material, which consists in commingling burned semifused or sintered fibrous rock of the hornblende family with non-fibrous rock of the hornblende family and subjecting the mixture to intense heat and then pulverizing it, substantially as set forth.

3. In the manufacture of molds, the proc-

ess of preparing the surface of the mold which consists in forming the lining of pulverized rock of the hornblende family and subjecting the said lining to intense heat until partially or wholly vitrified, substantially as set forth.

4. In the process of forming molds, the sub-process which consists in spreading a thin layer of powder containing burned semifused or sintered fibrous hornblende rock in a dry state, then covering and backing the same with mold material containing water and thereafter, after the said layer has been subjected to the action of the water, subjecting the mold to intense heat, substantially as described.

5. The material for use in molds containing burned semifused or sintered fibrous rock of the hornblende family and non-fibrous rock of the hornblende family, substantially as described.

6. A mold containing rock of the hornblende family in a finely-divided state and vitrified at the mold-surface, substantially as described.

In testimony whereof I have hereunto set my hand this 24th day of September, 1897.

SAMUEL JOHNSTON.

Witnesses:

HAROLD BINNEY,
GEORGE H. SONNEBORN.