UNITED STATES PATENT OFFICE.

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ART OF MOLDING.

SPECIFICATION forming part of Letters Patent No. 482,901, dated September 20, 1892.

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To all whom it may concern:

Be it known that I, FRED E. GORDON, a resident of Allegheny, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in the Art of Molding; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

In the art of making castings the particular process employed determines largely the material which must be used in molding. Certain sorts of casting require the use of special molding material and do not permit the use of others.

My present invention relates to the art of green-sand molding, of molds for stove-plates, and light floor and bench work—a class of the art recognized as quite distinct from that of dry-sand molding, loam-molding, the use of metal molds, chills, and cores—and as requiring special material and special manipulation. My invention is also distinct from the molding of "heavy machinery," a term broadly covering a large line of heavy castings, for which is required in green-sand molding a rather coarse open sand possessing sufficient bond or cohesive quality to retain the conformation of the pattern and yet not cut, scab, blow, or wash when poured. Castings of another sort, also excluded from my invention, are known as "light machinery" castings, and require similar but finer sand. In making another kind of castings known as "stove-plate" molding-sand of a finer grade is used. Stove-plate molds are made from ordinary heap-sand, (a technical name for ordinary molding-sand used day after day,) and it is common practice after the mold has been made and the cope lifted to withdraw the pattern, and by a bag a heavy blacking (plumbago or its equivalent) is dusted over the drag, and on top of it is dusted from another bag charcoal or its equivalent to prevent the first dust from sticking to the pattern. The pattern is then quickly returned to its exact former position in the mold, tapped down, and then quickly withdrawn to set the facing-dust on the molding-sand and to restore the fine lines obscured by the dust. The necessity for rapid work arises from the fact that the bag-facing, being dry and having an affinity for moisture, would absorb moisture from the molding-sand and stick to the pattern, unless the printing were done quickly. The above process serves for but one side of the casting, and if both sides are to be treated the same process of bag-facing must be repeated on the cope or other half of the mold. This sort of casting requires the use of hot metal, for if the metal be not poured hot enough the casting will be cold-shut or misrun and therefore worthless. If the metal is poured too hot, the casting will not "peel" from the sand, the cost of cleaning is largely increased, and the casting is rendered less salable. Furthermore, this work of reprinting the pattern is one which requires a high degree of skill and is therefore expensive, adding materially to the cost of the castings. The next class of light castings is very large and embraces what is known as "light floor and bench work" and a large variety of gated work made in snap-flasks. The same class of molding-sand is used for this as for stove-plate, excepting the bench-work, for which somewhat finer molding-sand can sometimes be used to advantage. In each of these last two classes of castings the molding-sand in its natural condition is a fine material without grit containing considerable loam and should be capable of doing effective work without admixture of other ingredients. Quartz-sand, river-sand, mortar-sand, bank-sand, or sharp sand do not meet these requirements, because having no bond or cohesive properties they cut or wash and flow with the metal. Hence they are not included within the meaning of the word "molding-sand" as used by me in this specification and as commonly understood in the art.

A large part of the castings of the class last mentioned is made without bag-facing and printing the molds, because of the expense of this operation, and to remove the sand tumbling-barrels are used, resulting in the breaking and mutilation of many fine and frail castings.

My invention relates to the last-named two classes of green-sand molding—viz., stove-plate molding and light floor and bench work—and to the molding with green sand of similar light castings, and is designed to place within

reach of the founder means for producing castings which shall be of as smooth surface and as free from sand as if made by use of the process of bag-facing, but without the inordinate expense and without the necessity for the high degree of skill required in the latter. It is in respect of smoothness of finish of the castings, ease of cleaning them of sand, saving of breakage by dispensing with the necessity for use of the tumbling-barrel, and cheapness of cost of molding that the advantages of my invention principally consist.

In the practice of my invention I use as a facing for the mold a thoroughly-intermingled mixture of finely-pulverized rosin and molding-sand, the latter term being used according to the well-understood meaning attributed to it in the art, and as explained above, excluding such material as river-sand, quartz-sand, &c. In making this facing the rosin is first pulverized finely in any convenient manner, and then, to remove any remaining lumps, is bolted or riddled. The molding-sand employed is of the ordinary variety, being of quality adapted when used alone to produce efficient molds; but I prefer that it should be somewhat drier than when tempered for ordinary molding, because in such drier state it can be more thoroughly intermingled with the rosin. The molding-sand, having been riddled to remove lumps and foreign matter, the pulverized rosin is added to it, preferably in the proportion of one volume of rosin to eight volumes of sand, and the two are thoroughly intermingled by riddling or otherwise. This mixture may be kept in this condition for any desired length of time, and such parts of it as are required for use may be tempered daily in the usual manner with water or other liquid. It may be used to advantage in a moister condition than ordinary molding-sand, but, preferably, should be riddled thoroughly after tempering.

While I prefer the proportions of one volume of rosin to eight volumes of molding-sand to constitute the facing as being adapted to a wide range of light castings, these proportions may be varied within certain limits (from one part of rosin and four of molding-sand to one part of rosin and forty of molding-sand) without sacrificing all the benefits of the invention.

In practicing my invention after placing the pattern on the match part or follow-board and putting the drag or bottom half of the flask in position, I dust on the pattern lycopodium or equivalent fine-powdered material, (not parting sand,) and I then apply by riddling or otherwise (preferably by riddling) enough of the facing material above described to form a thin layer on all parts of the pattern from which it is desired to produce a clean-faced casting. Then I fill the flask with heap-sand as a backing for the facing and ram it in the usual way. The drag is then turned over, the match part or follow-board removed, and the cope or top half of the flask put on. Then I dust the parting of the mold with parting sand in the usual way, blowing off carefully what falls on the pattern. Then if this side of the casting is to be treated according to my invention the pattern is dusted with lycopodium, the facing is riddled on, backed with heap-sand and rammed, the cope being then lifted, the pattern removed, and gates trimmed in the usual way. By use of the mold thus formed I am enabled to pour the metal as hot as desired and yet produce a clean smooth casting from which the sand can be removed with an ordinary shoe-brush, the wire brush ordinarily used in foundries not being required. Better results are obtained than with the bag-facing and without the objections of the latter process above explained.

The manipulations of the process are the same as those used in making castings without facings, except that instead of using all molding-sand the pattern is first dusted with lycopodium and a thin layer of my improved facing then applied. The use of the lycopodium is not indispensable, but it is desirable, especially when patterns are used that are hard to draw or cope properly.

I claim—

1. As a new composition of matter, facing material for green-sand molds, consisting, essentially, of molding-sand containing a binding material, such as loam and finely-pulverized rosin thoroughly intermingled, substantially in the proportions specified.

2. In the art of green-sand molding, the improvement which consists in facing the mold by applying to the pattern a layer of thoroughly-intermingled molding-sand and rosin and then filling the flask with heap-sand, which forms a backing for the facing, substantially as and for the purposes described.

3. In the art of green-sand molding, the improvement which consists in dusting the pattern with lycopodium and then forming the mold, substantially as and for the purposes described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

FRED E. GORDON.

Witnesses:
S. G. HOPKINS,
ARCH. M. CATLIN.