H. McPHEE.

MAKING MASTER PLATES.

APPLICATION FILED JUNE 15, 1910.

976,897.

Patented Nov. 29, 1910.

2 SHEETS—SHEET 1.

Fig. 1

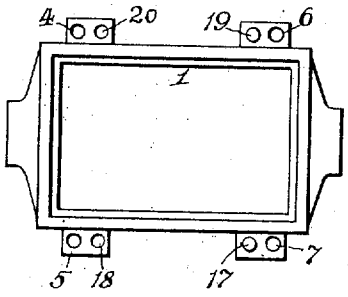


Fig. 2

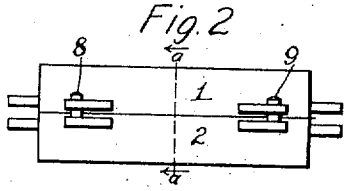


Fig. 3

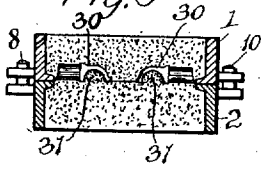


Fig. 4

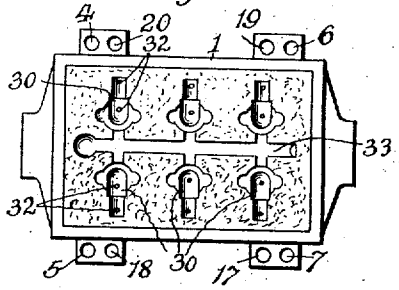


Fig. 5

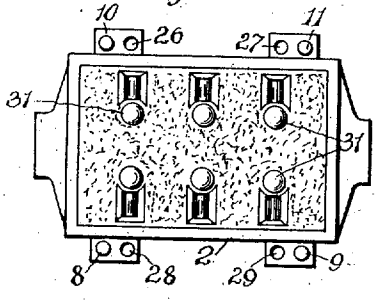


Fig. 6

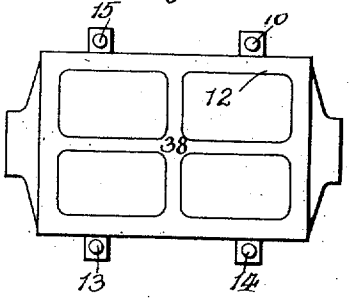
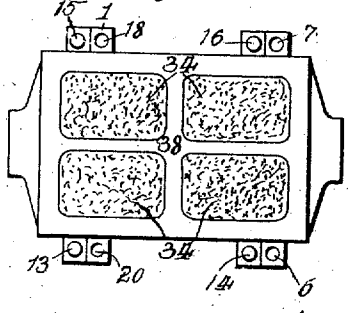


Fig. 7



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2 SHEETS—SHEET 2.

Fig. 8

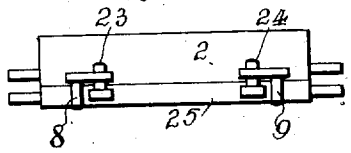


Fig. 9

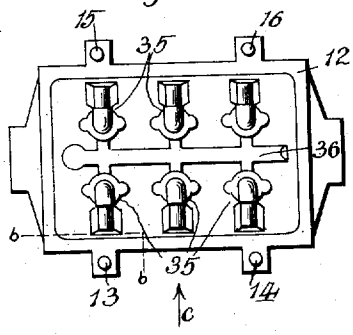


Fig. 10

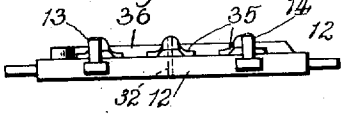


Fig. 11

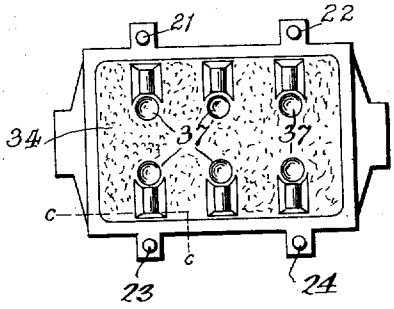


Fig. 12

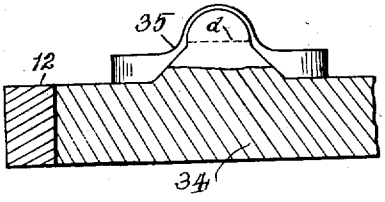


Fig. 13

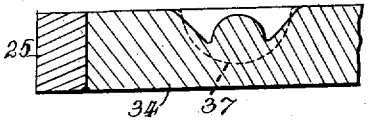


Fig. 14

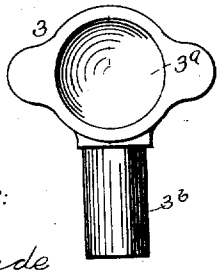


Fig. 15

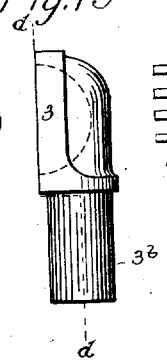
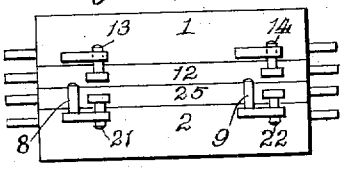


Fig. 16



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HUGH McPHEE, OF TARRYTOWN, NEW YORK.

MAKING MASTER-PLATES.

976,897. Specification of Letters Patent. Patented Nov. 29, 1910.

Application filed June 15, 1910. Serial No. 566,904.

To all whom it may concern:

Be it known that I, HUGH McPHEE, citizen of the United States, residing at Tarrytown, in the county of Westchester and State of New York, have invented certain new and useful Improvements in the Method of Making Master-Plates; 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 appertains to make and use the same.

My invention relates to an improvement in the process or method of making permanent master plates to be used in connection with the cope and nowel of a two-part flask. My method of making master plates is particularly adapted for a multiple of small patterns that, from their peculiar shape, it is practically impossible to locate on ordinary cast iron master plates. I employ first a master pattern of wood or other suitable material and form impressions or molds in a two-part flask, and then pour pattern metal into each separate individual mold so as to insure a uniform shrinkage in each mold of the cope and nowel. After the metal has cooled, a skeleton master plate is placed on the cope and nowel and filled with a non-shrinkable material to which the metal patterns will adhere when the said material hardens. The master plates thus formed are used to mold from and will last indefinitely.

Referring to the drawings: Figure 1 represents an upper plan view of a flask set up for forming molds from the master patterns; Fig. 2 is a side elevation of the flask; Fig. 3 is a sectional view of the flask on line *a a* of Fig. 1, showing the molds formed by the master patterns; Fig. 4 is an upper detail plan view of one-half of the flask showing the depressions or molds in the sand formed by the master patterns; Fig. 5 is a similar view of the other half of the flask; Fig. 6 is a detail plan view of one of the skeleton master plates; Fig. 7 represents one of the master plates overlying one part of the flask and filled with non-shrinkable material; Fig. 8 represents the position of one of the master plates and one part of the flask when molds are made in the flask by the working patterns on the master plate; Fig. 9 is a detail inside plan view of one of the master plates with the working patterns secured thereto; Fig. 10 is a detail side elevation of one of the master plates looking in the direction of arrow *c* of Fig. 9; Fig. 11 is a detail inner plan view of the other finished master plate; Fig. 12 is an enlarged broken sectional view of the master plate on line *b b* of Fig. 9; Fig. 13 is an enlarged broken sectional view of the master plate on line *c c* of Fig. 11; Fig. 14 is an enlarged detail view of the master pattern; Fig. 15 is an enlarged detail side elevation of the master pattern; and Fig. 16 is a side elevation showing the cope and nowel of the flask and the interposed master plates.

Like figures of reference indicate like parts throughout the several views.

In forming master plates from my improved method, it is essential that the cope 1 and nowel 2 of the flask should accurately register with each other, and one master plate should register with the cope and the other master plate with the nowel, or each master plate can be made to register, if desired, with either the cope or nowel. The cope 1 has the holes 4, 5, 6 and 7 to admit the pins 8, 9, 10 and 11 of the nowel 2 when the cope and nowel are put together. When the master plate 12, Fig. 9, is laid on the cope 1, the pins 13, 14, 15 and 16 will enter the holes 17, 18, 19 and 20 of the cope. In like manner the pins 21, 22, 23 and 24 of the master plate 25, Fig. 11, will enter the holes 26, 27, 28 and 29 of the nowel shown at Fig. 5.

The first step in forming the master plates is to ram up the master pattern 3 in the cope 1 and nowel 2 in the usual manner to form the molds 30 in the cope, as shown at Fig. 3 and 4. As this particular master pattern has the depressions 3^a, Fig. 14, there will also be formed the corresponding circular elevations 31, Figs. 3 and 5, in the nowel. The parting line is represented by the dotted line *d*, as shown at Figs. 12 and 15, so that an impression of the entire head portion of the pattern and one-half of the stem 3^b will be in the cope.

When the cope is removed, as shown at Fig. 4, the anchorage pins 32 are inserted in the molds or impressions 30 and allowed to stand above the surface of the cope so as to project well into the master plate when assembled to the cope. Previous, however, to the placing of the master plate on the cope, each of the depressions or molds 30 are filled with pattern metal, pouring the molten metal into each mold separately and flush with the parting line, then the gate 33 is

formed in the sand in the usual manner. The master plate 12, which is now a skeleton as shown at Fig. 6, is placed on the cope as shown at Fig. 7 and filled with the non-shrinkable material 34 which is poured into said palte in a semi-liquid state. When this material has hardened sufficiently, the master plate is removed and with it also the raised metal working patterns 35, Fig. 9, firmly anchored to the binding material by the before mentioned pins 32, as shown at Figs. 9, 10 and 12. After the binding material is poured into the skeleton master plates it should be allowed to set for a few moments before removing the plates from the flask. As soon as the material is set, the plates are removed and the sand washed off and they are placed in a temperature where they will dry out thoroughly.

The principal feature of my improved method is to form the working patterns of metal and the filler for the master plate of a baser material for the reason that if the master plate was filled with the same metal, or, in other words, if instead of first pouring the pattern metal into each mold separately as before described, the molds in the cope and the openings in the master plate were filled at the same time and with the same pattern metal, the shrinkage in such a body of metal would be so unequal that the castings made from the separate master plates in the cope and nowel would overlap and not match, and thus make an imperfect casting. This would be particularly the case with those castings located or formed from the central group of working patterns, as these patterns would be the last to cool. But when each mold is poured separately, each working pattern will naturally shrink evenly toward its own center and will not be influenced by the shrinkage of the rest. The depression 33, Fig. 4, made in the sand of the cope, as before mentioned, will result in forming the ridge 36, Fig. 10, which ridge will form a gate in the sand of the cope when the master plate with its working patterns is located thereon to obtain castings therefrom.

With this particular master pattern shown, there will be nothing to project above the match face of the master plate 25, as the elevations in the nowel 2, Figs. 3 and 5, will form the depressions 37, Figs. 11 and 13, so that when this master plate is placed on the nowel the sand will be forced therein and act as a core, so that, in this particular case, this master plate will simply be filled with the same material as before described for the master plate 12. When, however, a master pattern is so constructed as to form molds in both cope and nowel, then the molds in both cope and nowel will be separately filled with the molten pattern metal as before described for the master plate 12.

The integral cross bars 38 of the master plates not only add strength to the skeleton plates, but they also serve as an additional anchorage for the filling material 34, which when hardened forms practically a solid plate. The master plates thus formed are equally adapted for bench or machine molding.

Having thus described my invention, what I claim is:—

1. The herein described method of making master plates which consists in first forming a mold from a master pattern in a two-part flask comprising a cope and nowel, then pouring pattern metal into each separate and individual mold thus formed and flush with the parting line to form, when cooled, working patterns, then place a skeleton master plate over the cope and nowel and fill said plates with a non-shrinkable material and allow it to set, then remove the master plates with the working patterns firmly secured to the said material and allow said material to become thoroughly hardened.

2. The herein described method of making master pattern plates which consists in first forming a mold from a master pattern in a two-part flask and insert anchorage pins in the mold, then pouring pattern metal into each separate and individual mold thus formed and flush with the parting line to form, when cooled, working patterns, then place a skeleton master plate over one-half of the separated flask and fill said skeleton plate with a non-shrinkable material with the anchorage pins embedded therein, allow the material to set, then remove the pattern plate with the working patterns firmly anchored thereto and allow said material to become thoroughly hardened before using the master plate.

In testimony whereof I affix my signature in presence of two witnesses.

HUGH McPHEE.

Witnesses:

FRED'K H. BECKWITH,

E. MOSS JACKSON.