

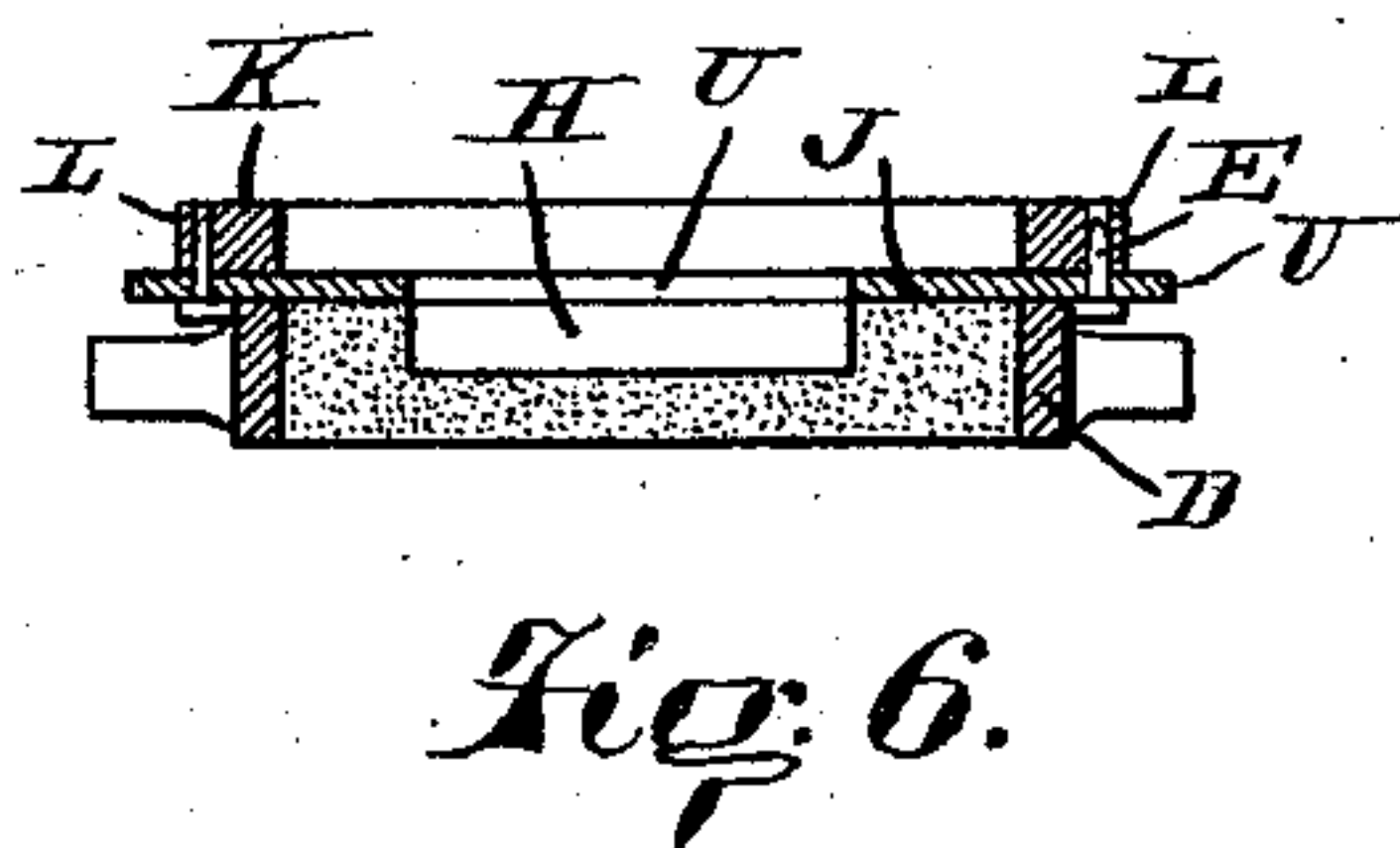
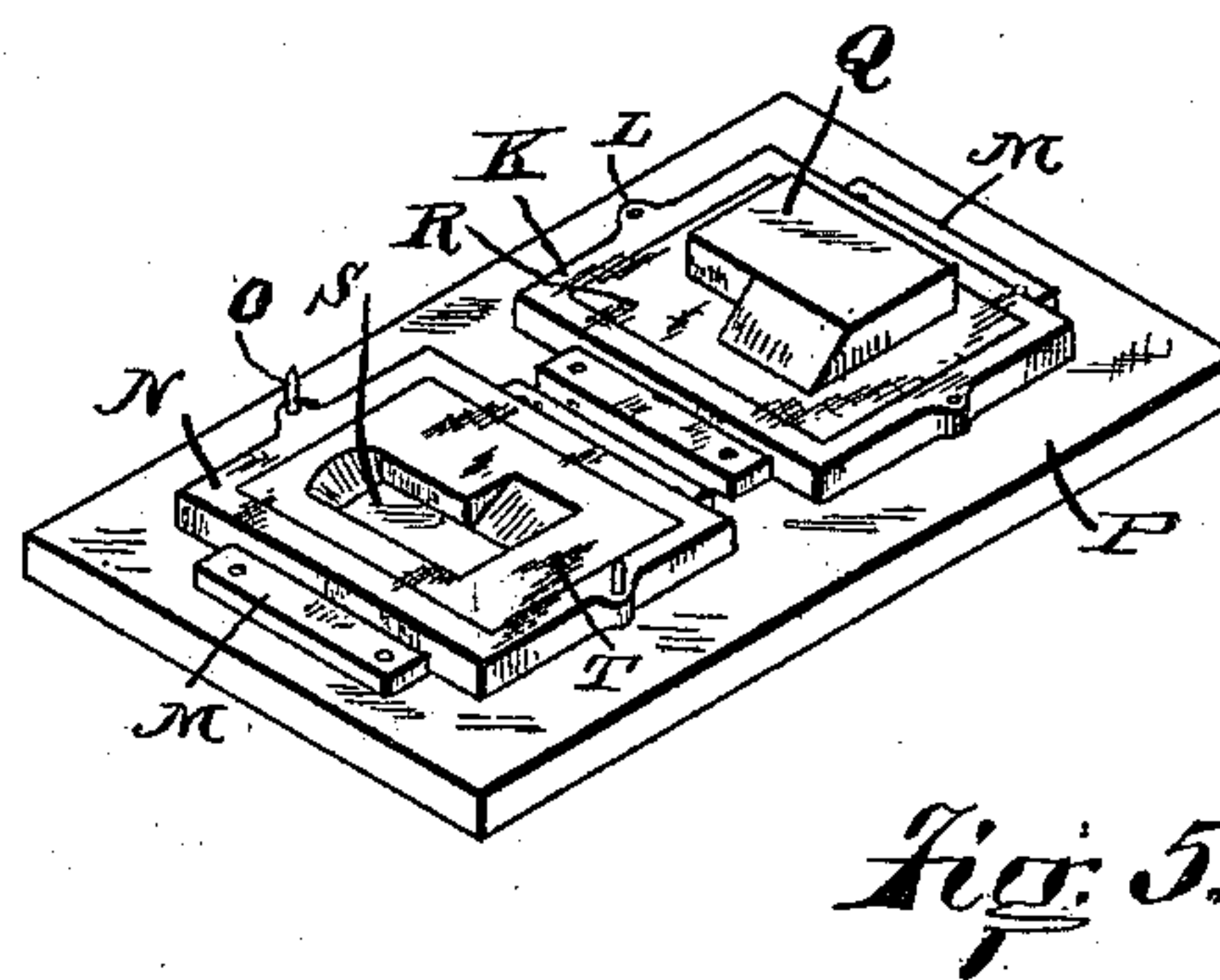
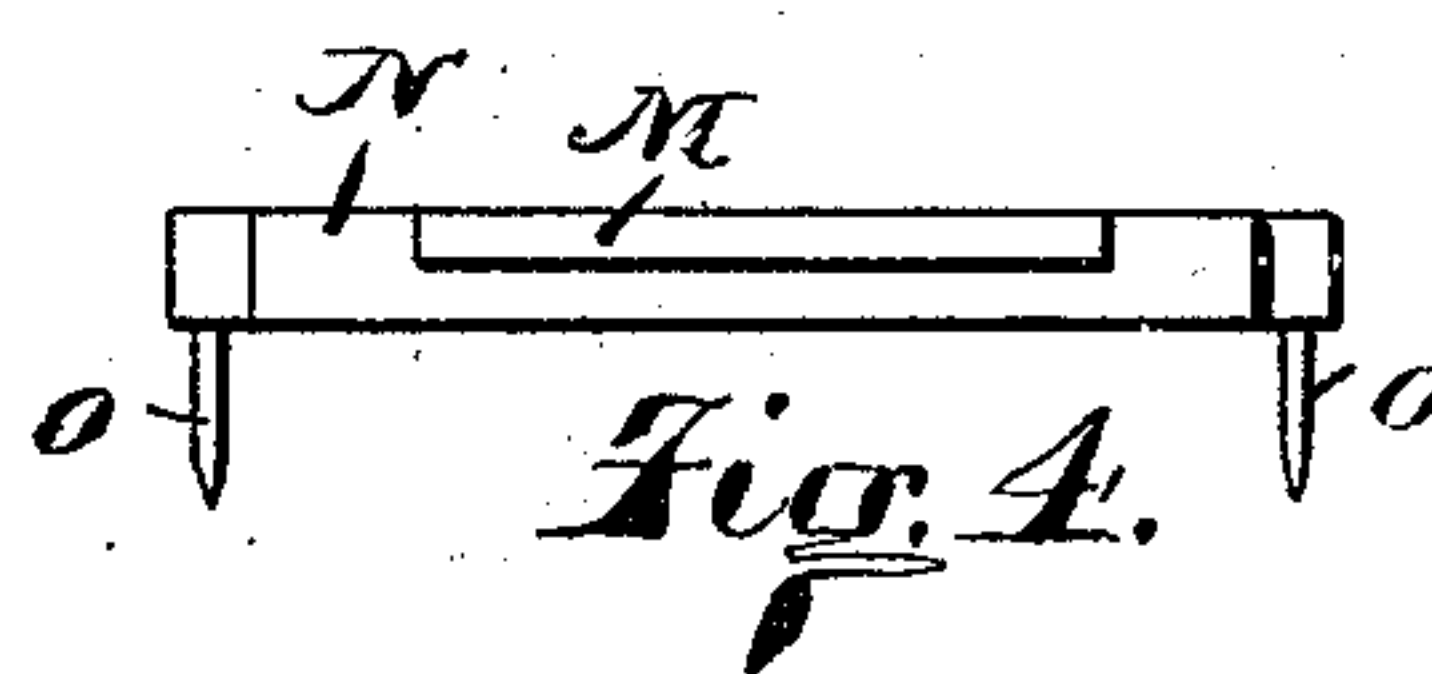
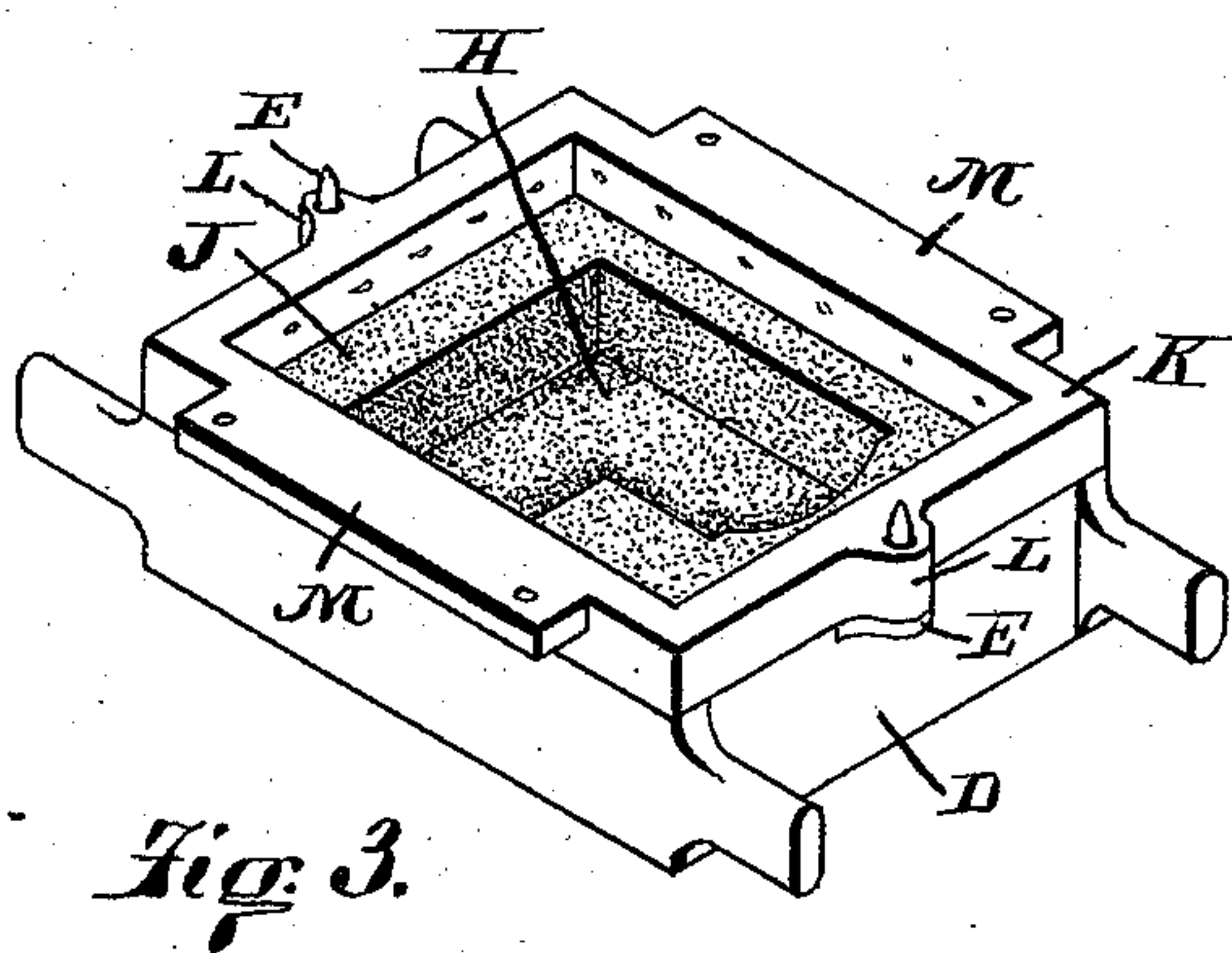
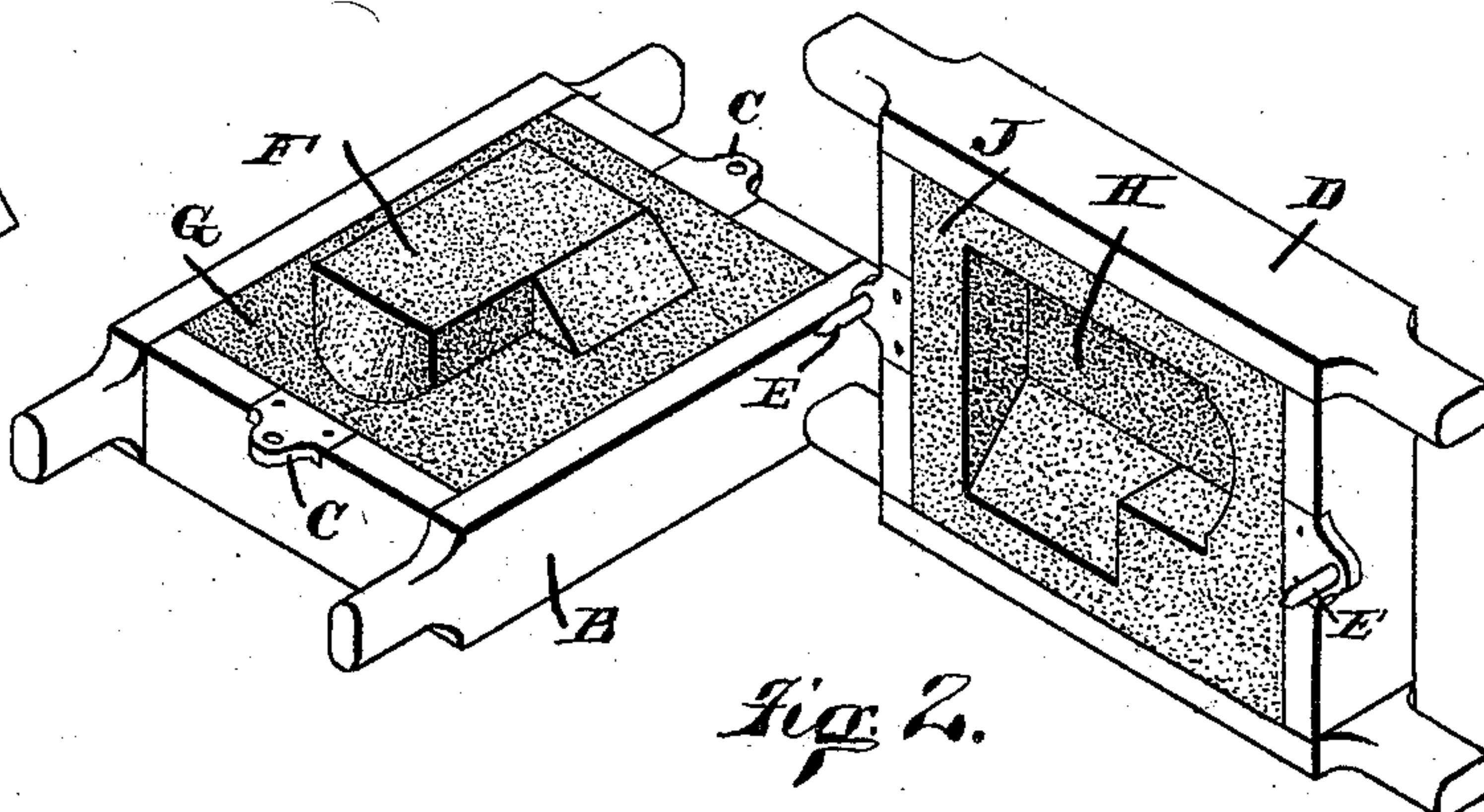
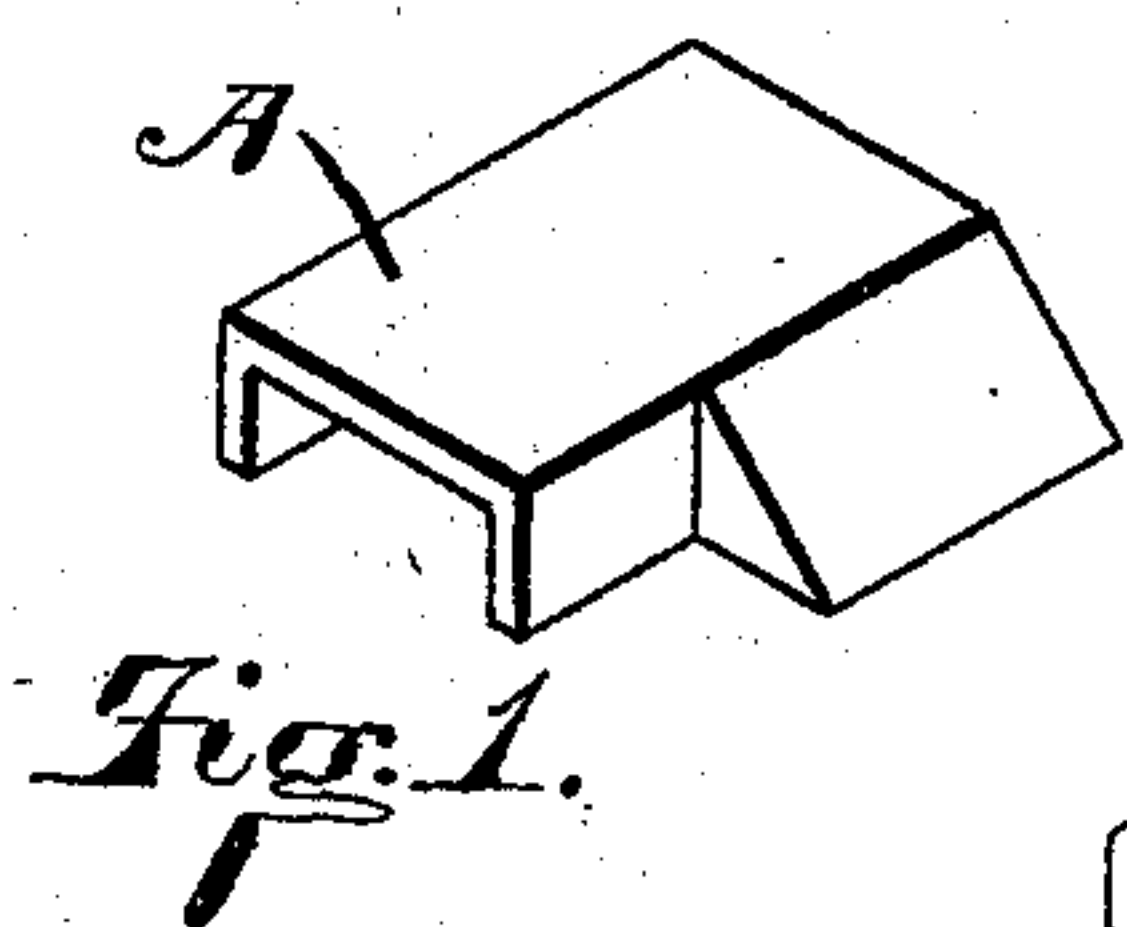
(No Model.)

H. TABOR.

ART OF MAKING METAL FOUNDERS' PATTERNS.

No. 408,677.

Patented Aug. 6, 1889.



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ART OF MAKING METAL-FOUNDERS' PATTERNS.

SPECIFICATION forming part of Letters Patent No. 408,677, dated August 6, 1889.

Application filed September 22, 1888. Serial No. 286,108. (No model.)

To all whom it may concern:

Be it known that I, HARRIS TABOR, of New York, New York county, New York, have invented certain new and useful Improvements in the Art of Making Metal-Founders' Patterns, of which the following is a specification.

This invention pertains to improvements in the art of making patterns for the use of the metal-founder. In ordinary procedure a pattern of the desired form is made in wood or other material, which can be properly worked to the shape desired, and the product represents the pattern used by the metal-founder in producing the molds for metal castings of the form of the pattern. Often these original patterns are too fragile for continued use, and often they are wanted in multiple. In such case it is usual to smooth up castings made from the original patterns, and these castings become in turn the patterns for actual use. The metal castings thus used for patterns have the disadvantage of being smaller than the original wooden patterns by reason of the shrinkage of the metal, and, furthermore, the proper dressing of the metal surface to fit them for use as patterns is very laborious and expensive. Especially is this the case in stove-patterns, if the labor be carried far enough to secure in the metal patterns that peculiar sharpness of detail present in the original wooden pattern, but lost in the process of casting. In stove-work the patterns as ordinarily made involve also the production, generally by carving process, of the follow-board. The use of these patterns, often with the most closely-fitted follow-board, requires extraordinary skill on the part of the molder in forming his mold-joints so as to produce fine work. In all patterns of wood or of metal, and regardless of how their surfaces may have been treated for smoothness, there is often found great difficulty in getting the pattern to leave the sand nicely in the absence often of such an amount of draft as might not for other reasons be desirable. In the later developments of molding by molding-machines or molding-presses a reproduction of the patterns in a modified

form suited for application to the machines is generally called for, and the expense of this duplication of patterns, already satisfactory for hand-molding, has constituted a serious obstacle to the introduction of molding-machines.

By means of my improvements I am able to duplicate the original wood patterns or metal patterns at comparatively trifling cost, and to produce patterns without additional cost, having the property of drawing with peculiar freedom and cleanness from the sand, and, if desired, specially adapted for use in connection with molding-machines, and, if desired, avoiding the necessity for any separate follow-boards, and also, if desired, patterns capable of serving in the molding-machine for both half-flasks, which make up the complete mold.

My improvements in the art will be readily understood from the following description, taken in connection with the accompanying drawings, in which—

Figure 1 is a perspective view of an example casting to be produced, and also the usual form of pattern corresponding precisely with the casting; Fig. 2, a perspective view of the two parts of the mold or flask in which this pattern has been molded; Fig. 3, a perspective view of one of these half-molds with a pattern-margin placed thereon; Fig. 4, a side elevation of a pattern-margin for the other one of the half-flasks; Fig. 5, a perspective view, on a somewhat reduced scale, of the two parts of the complete pattern with their margins shown as mounted upon a bed or platen for a molding-machine; and Fig. 6, a vertical longitudinal section, upon a somewhat reduced scale, of the half-flask and pattern-margin shown in Fig. 3, illustrated in conjunction with a stripper-plate.

In the drawings, A indicates an ordinary wood or metal pattern having the form and dimension of the casting to be produced from it, except of course as to the usual allowance for shrinkage, and thus may therefore be taken as indicating also the casting to be produced, the delineation answering for both the pattern and the casting; B, one of the

half-flasks—say the drag; C, female dowel elements attached, as usual, to the drag; D, the other half-flask—the cope; E, male dowel elements attached, as usual, to the cope and adapted to properly engage the dowel elements of the drag; F, that portion of the sand standing in the drag and left by the interior of the pattern when the pattern is withdrawn; G, the flat joint-surface of the drag-mold around the standing pattern; H, the mold-cavity in the cope formed by the exterior of the pattern when withdrawn; J, the joint-surface of the cope-sand around this cavity; K, a pattern-margin in the form of a frame, preferably of metal corresponding with the cope and forming practically a shallow continuation of the depth of the same; L, female dowel elements on this pattern-margin adapted to engage the dowel-pins of the cope; M, flanges upon the pattern-margin, adapted to serve in securing the same to a board or plate, as the bed or platen of a molding-machine; N, another similar pattern-margin for the drag; O, male dowel elements on this pattern-margin adapted to engage the dowel elements of the drag; P, the bed or platen of the molding-machine; Q, that portion of my improved pattern corresponding to the exterior of the pattern A and fitting the mold-cavity H of the cope; R, the flat joint-surface of this cope portion of the pattern fitting the joint-surface J of the cope-mold; S, that portion of my improved pattern corresponding with the interior of the pattern A and fitting the standing-sand F of the drag; T, the flat joint-surface of this drag portion of the improved pattern, and U the usual stripper-plate.

In executing my improvement in the art the process is as follows: The pattern A, be it wood or metal, is molded up as usual and the flask opened and the pattern withdrawn, leaving the mold as it appears in Fig. 2. It is desirable that the mold-surface be as smooth and true as possible. If the character of the pattern will permit it, the mold is to be dusted, as usual, with facing and the pattern returned. If the character of the work will not permit the return of the pattern, then in forming the mold the mold-surface directly in contact with the pattern may be formed of special fine sand mixed with facing or of suitable facing alone. The cope is then laid upon its back, as in Fig. 3, and the pattern-margin K is placed upon it, the dowel elements intermembering and the pattern-margin fitting neatly down upon the edges of the flask. It is highly desirable, where my improvements are introduced systematically into a foundry, to have an interchangeable system of flasks, so that any cope of a given size will properly dowel with any drag of corresponding size, and the pattern-margins will therefore of course properly intermember with these flask parts. The pattern-margin K is to be preferably of cast-iron, with accurately-fitted dowel elements, and the interior surface of the pattern-margin should be roughened or otherwise pro-

vided to hold the pattern material into firm union with the pattern-margin. The parts being properly arranged, as in Fig. 3, the material of which the pattern is to be made is poured into the cope-mold and pattern-frame until even with the top of the latter, when it may be struck off level. Any suitable material may be employed for the pattern. It should be capable of flowing freely and filling the mold accurately, and of forming, when solid, a properly smooth pattern-surface, and it should be free from objectionable shrinkage. I prefer Portland cement as the material to be employed. Mix the cement so it will flow freely, and handle it rapidly and pour quickly. When this material is used, I recommend graphite as a facing material. Let the parts remain until properly set and hard—say twenty-four hours or more. The pattern-margin may then be lifted from the cope, and the cement pattern will be found joined up integral with it. The cope-mold will be no longer required. Brush the sand from the pattern-surface and let the pattern harden, say, for some days. The pattern may be further smoothed, but this will seldom be necessary.

The pattern part thus produced will obviously exactly fit the mold-cavity H and the joint surface J of the drag. If this pattern part be secured by the margin-flanges to the bed or platen of a molding-press, it is obvious that when the cope is properly engaged with the pattern-margin and sand compacted in the cope and the pattern withdrawn a cope-mold will have been produced which is the identical counterpart of the cope in which the pattern was made; and it is further obvious that this pattern part may then be used to produce any number of identical cope-molds, and it is further obvious that by the process indicated more of these identical pattern parts may be produced, so that more extensive molding operations upon one character of castings may be carried on.

A pattern part for the drag-mold is produced in precisely the same manner as has been indicated for the cope part. This gives two pattern parts, one of which may be used in forming copes and the other of which may be used in forming drags, and these copes and drags will properly intermember and produce perfect and complete mold-cavities, each pattern part being used separately in the molding process; but I carry my improvements farther and arrange so that each effective impulse of the molding-machine shall produce a complete mold—that is to say, the cope and the drag. I secure the two pattern parts with their backs against the bed or platen of a molding-machine, as indicated in Fig. 5. The bed or platen of the machine therefore presents pattern features adapted for operation upon the drag and cope at once, whereby each effective impulse of the machine produces a cope and a drag, which, when closed, form the complete mold.

Gates and sprue-holes will be provided, of course, in the mold, as usual, and in the usual process, or they may be provided for in the form of the pattern, or by the means usually employed in machine-molding. Fig. 5 therefore represents a complete pattern fitted for peculiarly-accurate molding and avoiding the necessity for expensive follow-boards and adapted for peculiarly-rapid work in the molding-machine, and the patterns are of a very inexpensive character, the entire cost of producing these complete patterns by the improved process being far less than the cost of reproduction by any of the earlier processes and in many cases less than the cost of follow-boards alone, and less than the cost of even dressing ordinary duplicate patterns.

Where the patterns are not intended to be used in molding-machines, and where the pattern-margin is not required, provision may be made by which the molder can draw his pattern parts in the usual manner by means of spikes and draw-irons. To make this provision it is only necessary, when pouring the cement or other material, to lay proper blocks of wood in the upper surface of the material before it hardens, these blocks forming wooden spots in the back of the pattern parts, into which the draw tools may be readily driven without injury to the pattern part.

My improvements have in view principally the employment of molding-machines in which the pattern is withdrawn from the sand by the operation of the machine, as is common in machine-molding. Some characters of patterns call for the employment of stripper-plates, and in such cases these plates are fitted and used in the usual manner, the pattern part being of course correspondingly deepened. Thus, in Fig. 6, the pattern-margin K, instead of resting directly upon the edges of the cope, has the stripper-plate U interposed. The projection of the pattern part from the joint part of the pattern will therefore have an increased depth due to the thickness of the stripper-plate. The stripper-plate having the precise contour of the mold-cavity, it is obvious that the pattern material poured into the mold-cavity and stripper-plate fits the stripper-plate with absolute accuracy.

There are pattern-producing processes which yield the fundamental pattern; others which produce a match-board with the fundamental pattern attached thereto, and therefore not pattern-duplicating processes; others which produce a parting-plate with a pattern-face on each side of it; others which involve the making of intermediate waste-molds of plaster or the like, thus involving a mold-shrinkage as well as a pattern-shrinkage. I disclaim such processes. My process utilizes

an ordinary pattern and an ordinary sand mold made thereon, and produces any desired number of working-patterns direct from such sand mold. My process yields working-patterns, in any desired number, in true correspondence to the fundamental pattern, unmodified by mold-shrinkage.

I claim as my invention—

1. That improvement in the art of making metal-founders' patterns which consists in, first, producing a pattern having the form of the casting desired; second, producing a doweled two-part sand mold therefrom; third, laying the two mold parts upon their backs; fourth, fitting dowel elements to the dowel elements of said separate mold parts, and, fifth, pouring a suitable pattern-forming material into said separate mold parts and into connection with said fitted dowel elements, whereby are produced two pattern parts each fitting the mold portion and dowel elements of its respective mold part.

2. That improvement in the art of making metal-founders' patterns which consists in, first, producing a pattern having the form of the casting desired; second, producing a doweled two-part sand mold therefrom; third, laying the two mold parts upon their backs; fourth, fitting the dowel elements to the dowel elements of said separate mold parts; fifth, pouring a suitable pattern-forming material into said separate mold parts and into connection with said fitted dowel elements, and, sixth, securing the two pattern parts thus produced side by side with their backs against a bed or platen, whereby is produced a pattern adapted, by one impression in one direction, to produce two half-molds which will join and form a perfect mold.

3. That improvement in the art of making metal-founders' patterns which consists in, first, producing a pattern having the form of the casting desired; second, producing a doweled two part sand mold therefrom; third, laying the two mold parts upon their backs; fourth, laying a proper stripping-plate upon the mold-faces in dowel engagement with the dowel elements of the mold parts; fifth, fitting dowel elements to the dowel elements of said separate mold parts, and, sixth, pouring a suitable pattern-forming material into said separate mold parts and said stripping-plates and into connection with said fitted dowel elements, whereby are produced two pattern parts each fitting the mold portion and dowel elements of its respective mold part and stripper-plate.

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