

N. M. CHAFEE.
Molders' Flask:

No. 159,793.

Patented Feb. 16, 1875.

Fig. 1.

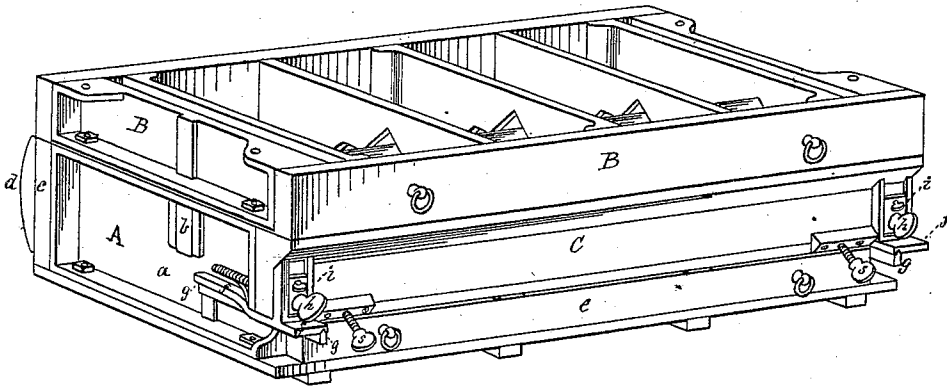


Fig. 2.

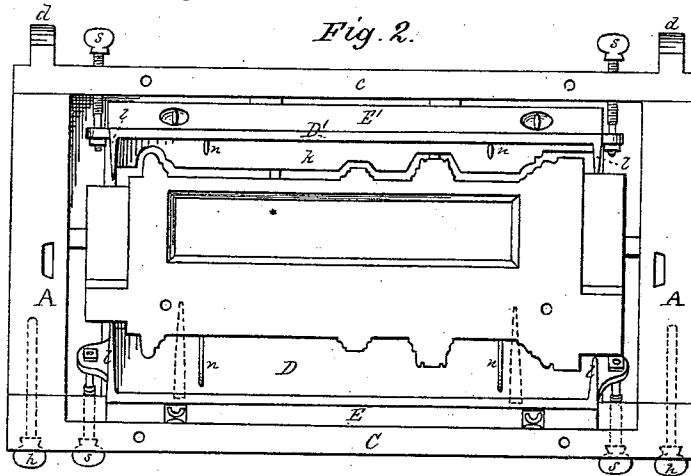
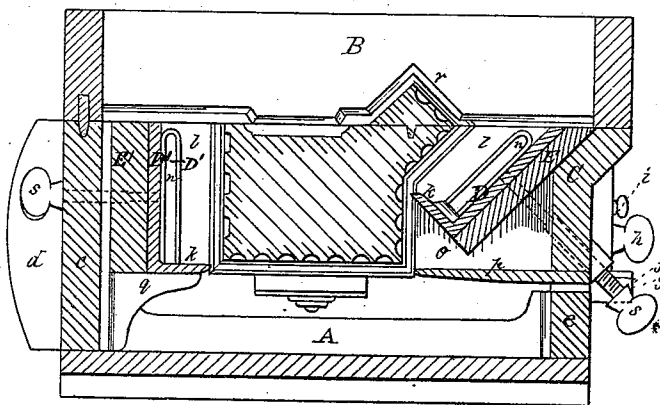


Fig. 3.



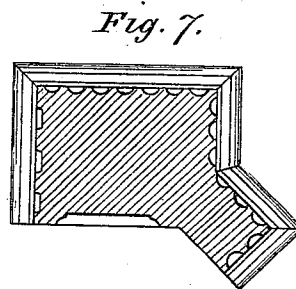
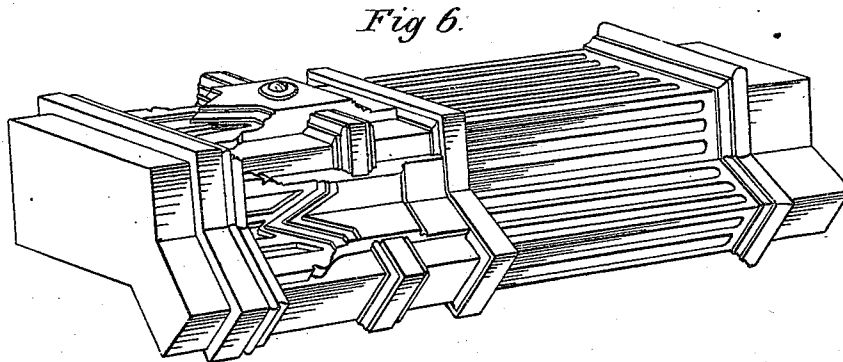
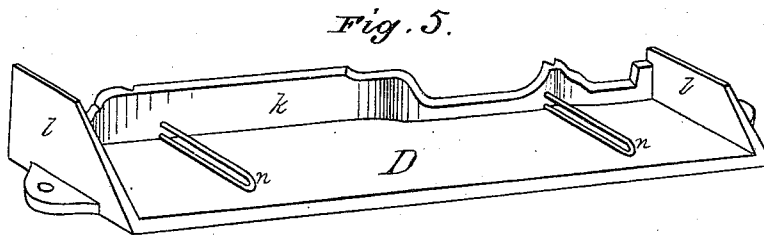
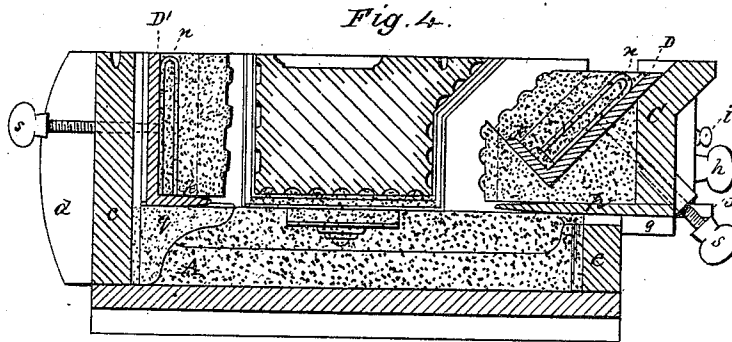
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UNITED STATES PATENT OFFICE.

NATHAN M. CHAFEE, OF PROVIDENCE, RHODE ISLAND.

IMPROVEMENT IN MOLDERS' FLASKS.

Specification forming part of Letters Patent No. **159,793**, dated February 16, 1875; application filed January 25, 1875.

To all whom it may concern:

Be it known that I, NATHAN M. CHAFEE, of the city and county of Providence, in the State of Rhode Island, have invented certain new and useful Improvements in Molders' Flasks; and I do hereby declare that the following specification, taken in connection with the drawings furnished and forming a part of the same, is a clear, full, and accurate description of a flask embodying my invention.

The end sought by me and practically attained by reason of my invention is the production of iron columns cast in one piece regardless of their peculiar sectional outline and the extent or character of the ornamentation thereon, provided, of course, that said ornamentation be designed in accordance with the well-known requirements of the art of casting metals.

Although it has been proposed, in the employment of certain means hereafter particularly described, to cast in one piece columns of this general character, it has never to my knowledge been practically accomplished prior to my invention.

With my improved flask I can produce practically perfect hollow iron columns, each cast in one piece, and having, say, seven or even a greater number of sides, all of which are ornamented, more or less, by sunken molded panels, fluting, and floral, or other similar designs.

My invention consists partially in the combination, with a nowel, of a movable exterior cheek mounted on said nowel, and a movable interior cheek mounted on said exterior cheek, and also in the novel combination, with the nowel or the cope, of an interior cheek, which is mounted on supporting-guides, whereby said interior cheek, with a portion of the sand-mold thereon, may be truly and safely moved bodily away from the pattern; also, in the combination, with said cope or nowel and an interior cheek, of a movable back board, whereby said cheek may be held in proper position to receive the sand and to take the portion of the mold assigned to it, and also, whereby on the removal of said back board, said cheek may be bodily removed from the pattern, and afford a space, when said cheek is again advanced into position, into which

sand may be packed for securely backing up said cheek during the operation of casting.

My invention further consists in the combination, with the nowel or cope, of an exterior cheek, which is mounted on supporting-guides, whereby it, with the portion of the mold assigned to it, may be truly and safely moved bodily away from the pattern; also, in the combination, with the nowel or cope, of an exterior cheek mounted on supporting-guides and an interior cheek carried by the exterior cheek on supporting-guides, whereby said interior cheek may first be withdrawn bodily from one face of the pattern, and then the exterior cheek in like manner withdrawn from another face of the pattern.

My invention still further consists in an exterior cheek of novel and peculiar construction, hereafter more fully described.

To more particularly describe my invention, for the purpose of enabling persons skilled in the art to apply the same to practical uses, I will refer to the drawings, in which—

Figure 1, Sheet 1, represents, in perspective, one of my flasks. Fig. 2 represents the nowel in top view, the cope being removed and a portion of the pattern in position. Fig. 3 represents the flask in lateral section with pattern and cheeks in proper position. Fig. 4, Sheet 2, represents the nowel in lateral section with main portion of pattern in position, and cheeks with sand-molds thereon withdrawn from the pattern. Fig. 5 represents an interior cheek detached from the flask. Figs. 6 and 7 represent, in perspective and in section, the pattern of a seven-sided ornamented column.

A represents the nowel. For heavy work it is advisable that the ends *a* be composed of cast-iron, and provided with mortises to receive tenons *b* on the top cope, B, for guiding said cope to and from the nowel. Within the nowel at each end are suitable bearings for sustaining the pattern and also the core in proper position. In the flask shown one side of the nowel, as at *c*, is stationary, being firmly secured by bolts to the ends of the flask. Convex cleats, as at *d*, are provided on the side *c*, on which the flask may be turned during the process of molding. In the flask shown its two ends are braced by

the narrow side piece *e*, which, with the side *c*, constitute, in this instance, immovable sides of the flask. *C* denotes an exterior cheek, the same being, in fact, a movable side of the flask, which is provided with a sand-shelf. It is also provided with long iron shoes at each end, as at *f*, which have a foundation upon wrought-iron guides, as at *g*, secured to the outer heads of the nowel. I prefer that the under side of the shoe be provided with a V-shaped groove, which is fitted to a corresponding edge of the guide *g*. Any other form of connection of the shoes with the guides may be employed, provided the shoes are thereby only permitted to move longitudinally on the guides. The peculiar angular edges of the guides are of value, however, because sand or dirt has little opportunity to lodge thereon.

The exterior cheek at each end is provided with a draft-screw, as at *h*, which is fitted to a tap or tapped hole at the end flange of the nowel, as shown. By means of these draft-screws the exterior cheek, while resting on the guides *g*, may be evenly moved laterally from the nowel. Adjacent to each screw, on the outer side of the cheek, I sometimes place a collar-plate, as at *i*, which at its lower end occupies an annular groove cut in the neck of the screw, and partially embraces it. This collar-plate is attached to the cheek by means of a thumb-screw. In removing the cheek by means of the screws these collar-plates are firmly held in position until the cheek portion of the mold is clear from the pattern. The collar-plates are then loosened, and the screws are then, by turning them, withdrawn to the required distance without carrying the cheek with them, after which the cheek may be more rapidly moved outward by hand. The collar-plates, therefore, serve to unite the screws and the cheek, and afford a ready means for disconnection on occasion. Instead of such plates the screws may be permanently attached by stationary collars, although I prefer an arrangement similar to that shown, as it is more convenient in practice to have the screws capable of being withdrawn when desired, independently of the cheek.

D and *D'* denote interior cheeks. The interior cheeks are preferably composed of cast-iron. At the lower edge of each a shelf, as at *k*, projects at right angles from the back of the cheek toward the pattern. This shelf has an edge outline, which approximately corresponds to the outline of the pattern at the point which said shelf would come into contact with the pattern if advanced to it. At each end of these cheeks is an end piece, as at *l*, which in practice should be in contact with the end of the core, as at *m*, when in position for casting. The interior cheek *D* is adjusted in this instance at an angle corresponding to one of the faces of the pattern. The interior cheek *D'* is vertical in position parallel with the opposite paneled side of the pattern. Both interior cheeks are provided with hooks or loops, as at *n*, whereby they may be lifted from

the flask on occasion. Both interior cheeks are mounted on supporting-guides. The guides for interior cheek *D* are shown at *o*, which project upward from the sand-shelf *p* of the exterior cheek *C*. These guides *o* have V-shaped bearing-edges, and the interior cheek *D* has grooves of a corresponding character, which engage therewith. The longitudinal surface-lines of these guides (being transverse in the flask) are inclined so as to be at right angles to the inclined face of the pattern, the point of which the interior cheek *D* is to bear. The interior cheek *D'* has supporting-guides, as at *q*, which are in the form of brackets, projecting inward from the side of the nowel, which in this instance is stationary. Like the other supporting-guides, I prefer that their edges be V-shaped, and that the lateral grooves in the lower side of the cheek also correspond therewith. Both interior cheeks are controllable by means of screws, as at *s*, which are attached thereto at each end by swiveled connections, and fitted to nuts which are attached to the side of the nowel as with cheek *D'*, and to the exterior cheek *C* as with cheek *D*. These screws are employed for adjusting the cheeks in proper position with relation to the pattern, and also for withdrawing the same from the pattern when each is laden with its portion of the mold.

These screws may be variously attached to the cheek; and in some instances I propose to employ a fork or collar, which, by engaging with an annular groove in the screw, will admit of their ready connection and disconnection. I also propose on occasion to use divided nuts for engaging with the screws, whereby they may be withdrawn, as will sometimes be desirable, without the necessity of revolving them.

An interior cheek, having a back, a sand-shelf, as at *k*, and end pieces, as at *l*, constitutes, so far as my knowledge extends, a novelty in this connection. Such a cheek has peculiar value, in that its portion of the mold is not only always kept separate and distinct from the other portions, but the end pieces serve to protect the mold as the core is being lowered into position; and for the purpose of rendering such cheeks adjustable the end pieces will be, on occasion, provided with a slotted plate and bolts, whereby the edges of said end pieces for contact with the core, may be advanced or withdrawn, as may be desired.

When employed with the back boards, hereafter referred to, the cheek-shelf *k* may also be constructed separately from the back of the cheek, and transversely slotted, whereby it may be secured to the back by means of bolts, and admit of its being advanced or withdrawn to any desired degree.

E and *E'* denote two back boards. The back board, *E*, operates in connection with the interior cheek, *D*, and the other at *E'* operates with cheek *D'*. They are both composed of wood, and have hooks or loops, by which they may be lifted from position. Their

function is to back up the cheeks when in proper position to receive the sand and during the making of that cheek portion of the mold, and by their withdrawal they afford spaces into which the cheeks may be withdrawn for the removal of the pattern, and these same spaces, when the cheeks are finally advanced into position for completing the mold, may then be packed with sand for the more complete protection of the flask, and the backing up of the cheeks during the casting operation. The back board, E, in this instance also serves as a "striker" for leveling the sand with the upper edges of the supporting-guides *o*. The back board, E', at its lower edge, serves to fill the space between the cheek D' and the side of the flask, and admits of the ramming of the sand which is first introduced to form the mold.

The top cope, B, may be of the usual construction. It is in this instance, however, shown to be adapted for receiving and retaining a longitudinal doweled section of the pattern, as at *r*, having thereon one ornamented face and the one plain face of the column.

For convenience in casting columns of this general style, this section *r* of the pattern will be temporarily secured, so that when the top cope is removed this portion of the pattern will be at the same time detached from the main portion.

I am well aware that in some instances it will be advantageous to have movable cheeks, of the general character herein described, combined with the cope. In such cases, however, the guides will be fitted to grooves, which, while permitting the cheeks to move longitudinally thereon, will not permit them to be displaced therefrom while the cope is being lifted off. The bottom boards and molding-boards employed with this flask are of the usual character.

For preparing a mold for casting such columns as are shown I proceed as follows: The flask when in position, as shown in Fig. 1, is right-side up. Let it be supposed that the cope is removed and a molding-board secured to the top of the nowel. The nowel, with the pattern thus inclosed and held in position, is turned over, bottom up. Sand is then applied so as to form the bottom of the mold, and well rammed. The bottom board is then secured to the nowel, after which the latter is turned right-side up. The joints between the lower corners of the pattern and the front edges of the shelves of the inner cheek, D', and shelf *p* of the exterior cheek, C, are then carefully made up and parting sand applied. To obtain free access for the performance of this portion of the work the interior cheeks and back boards will be removed. The interior cheek, D', and its back board are then placed in position, and sand applied and rammed between said cheek and the coincident face of the pattern. The exterior cheek, C, is then supplied with sand to the height of the upper edges of the guides *o*, the back board, E, serv-

ing as a striker or screed. The portion of the mold carried by this cheek extends from the lower right-hand corner of the pattern upward to the point where that face of the column terminates. Parting sand is then applied, and the interior cheek, D, and back board, E, placed in position, as shown. Sand is then rammed between it and the angular face of the pattern, and parting sand applied to the upper surface. The cope is then placed on the nowel, with the section *r* of the pattern in position, and the sand rammed therein, after which the cope is lifted off, and the section of the pattern removed from its sand. Both back boards are then removed from the nowel. Both interior cheeks are then withdrawn from the pattern, followed by the withdrawal of the exterior cheek, after which the pattern may be freely lifted from the nowel. The exterior cheek is then advanced into proper position, and the joint at the lower right-hand corner made up; then I advance the interior cheek, D, and make up the joint at the junction of the two angular faces; then the interior cheek, D', is advanced, and the joint at the lower left-hand corner made up, after all of which the mold is ready to receive the core, which is lowered into position and prevented from touching any portion of the mold, by reason of the contact of the ends of the core with the edges of the end pieces of the several cheeks. The spaces back of the two interior cheeks are then filled up with sand, the back boards being withdrawn. The cope is then attached to the nowel and the mold is ready to receive the metal, which is entered at both ends adjacent to the core. The latter will preferably be more or less tubular, and perforated to receive the gases, which are conducted to the open air by suitable vents located at each end.

It will be seen that the transverse guides on which the cheeks are supported are of great importance in effecting their removal from the pattern without endangering the portions of the mold borne by them. From the fact that the cheeks are grooved so as to fit upon the edges of these guides, it is practically impossible for them to be moved away from the pattern in any irregular manner which would endanger the mold. It will be obvious that any desired number of interior cheeks, of substantially the same character as those described, may be employed within a nowel, and that they may also be employed in connection with the cope, as already referred to.

Although I have described my invention in connection with a flask adapted to cast columns of a peculiar sectional outline, I desire it to be distinctly understood that I do not limit myself to the particular arrangement of the cheeks with relation to the nowel which is shown in the drawings, for I am well aware that their form and relative arrangement will, of necessity, be varied to meet special requirements. I have, however, shown a practically suitable arrangement thereof, for successfully

casting a hollow seven-sided column in one piece, and persons skilled in the art need have no difficulty in extensively modifying said arrangement, so as, in accordance with my invention, to practically accomplish the making of molds for casting any known or desirable style of builders' column, or any other object of irregular form possessing similar characteristics.

I am aware that sectional molds and movable cheeks have heretofore been proposed and employed. I am also aware that it has been heretofore proposed to prepare molds in which to cast hollow iron columns, by means of a flask, the nowel of which was provided with movable cheeks, hinged at their lower edges to the nowel, so that when the sand was packed on said cheeks they could be turned outward and downward, carrying with them the sides of a pattern. I therefore make no claim, broadly, to movable cheeks.

The advantages gained by the interior and exterior cheeks moving bodily on transverse supporting-guides, as herein described, will be obvious. Among these, I will mention that the pattern of a four-sided paneled column, for instance, may be constructed with the four sides connected, instead of in sections, while with the hinged-cheek flask referred to, the four sides of the pattern must be made detachable, and employed with a central-block pattern. Moreover, in molding for columns having angular faces, like that herein shown, a single hinged cheek could not be employed, as it would be difficult for it to be swung clear of the angular face, even if the pattern were made in sections, and the cheek should carry with it one or more of said sections.

That portion of my invention which, as herein stated, consists of the combination of two cheeks, one mounted on the other, and

both movable independently of the nowel, renders it practicable to cast in one piece columns with two angular faces on one side; and by increasing the number of cheeks, one above the other, I will be enabled to cast in sand, for instance, an octagonal column, which would require three cheeks on a side, in which case the top one would be moved bodily backward and upward, the middle one backward horizontally, and the lower one backward and downward.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination, in a molder's flask, of a movable exterior cheek, and a movable interior cheek mounted on said exterior cheek, substantially as and for the purposes specified.
2. In combination with a molder's flask, an interior cheek which is mounted on supporting-guides, substantially as described.
3. The combination, in a flask, of the interior cheek and a movable back board, substantially as described.
4. The combination, with the flask, of an exterior cheek mounted on supporting-guides, substantially as described.
5. The combination, with the flask, of an exterior cheek, mounted on the nowel by means of supporting-guides, and an interior cheek, mounted on the exterior cheek by means of supporting-guides, substantially as described.
6. The combination, with the flask and a movable cheek mounted on supporting-guides, of the draft-screws, substantially as described, for the purposes specified.

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