No. 744,152. PATENTED NOV. 17, 1903.

J. ANDERSON.

MOLDING MACHINE.

APPLICATION FILED SEPT. 2, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

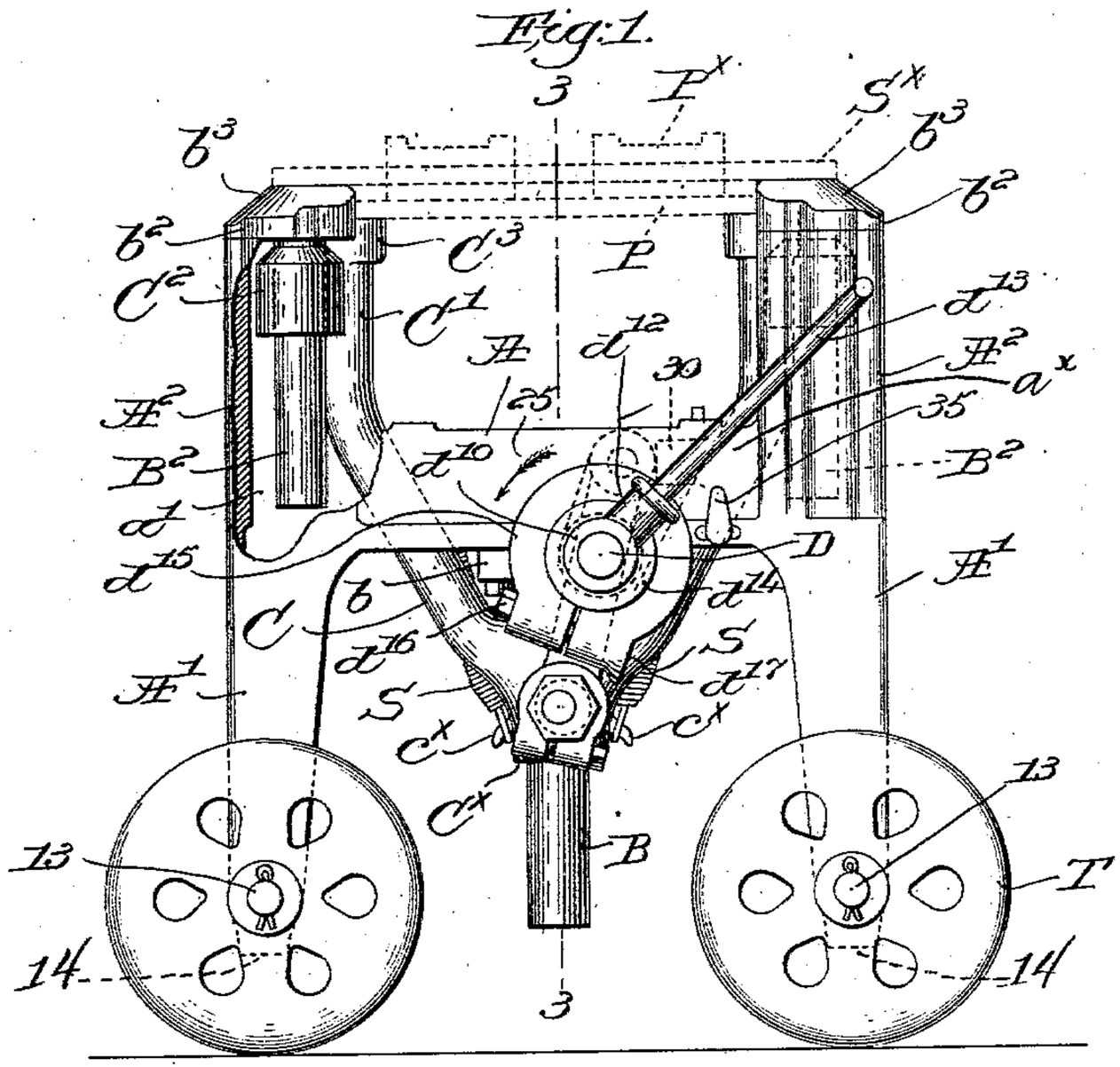
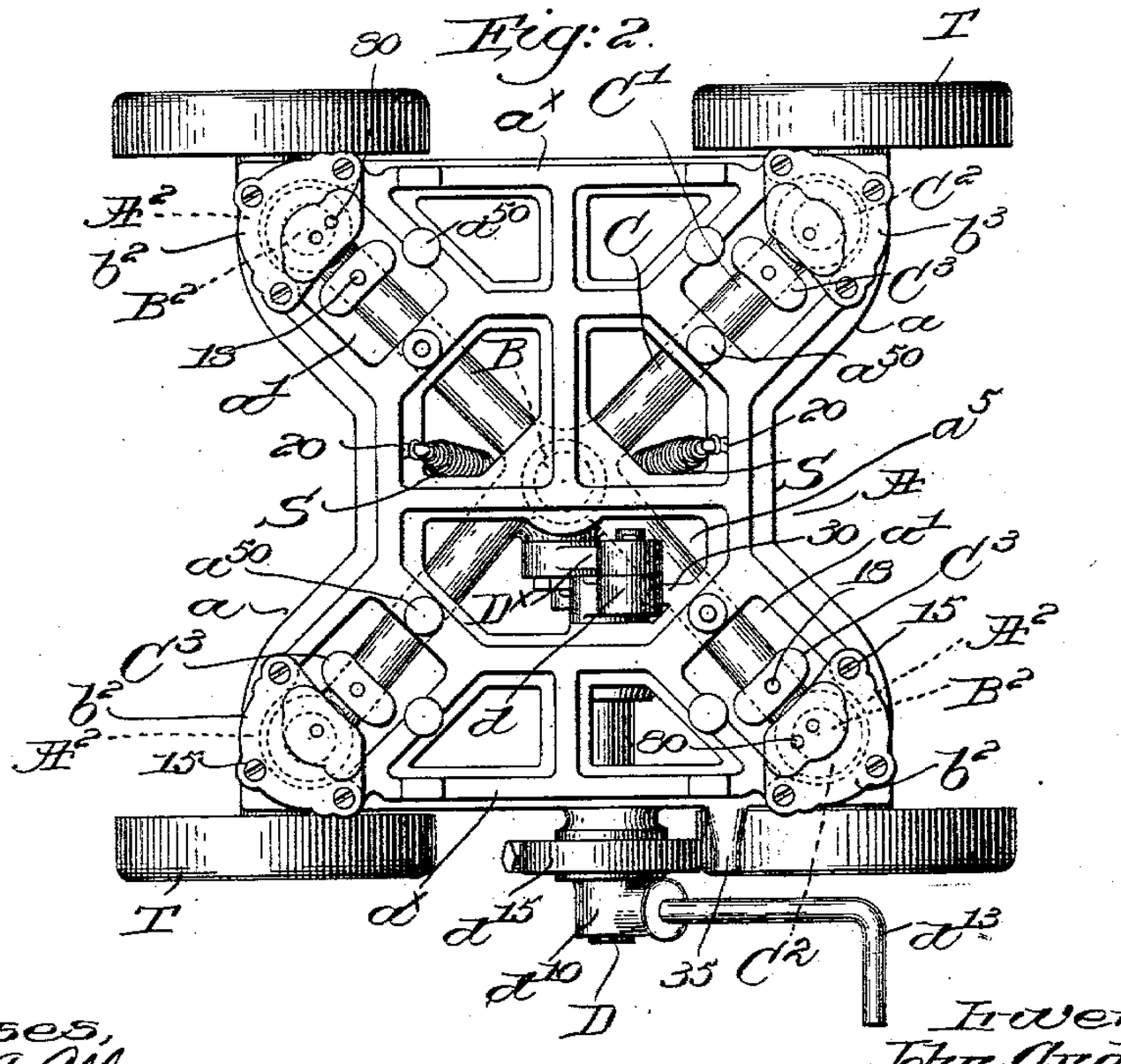


Fig. 2.



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NO MODEL. 2 SHEETS—SHEET 2.

Fig: 3.

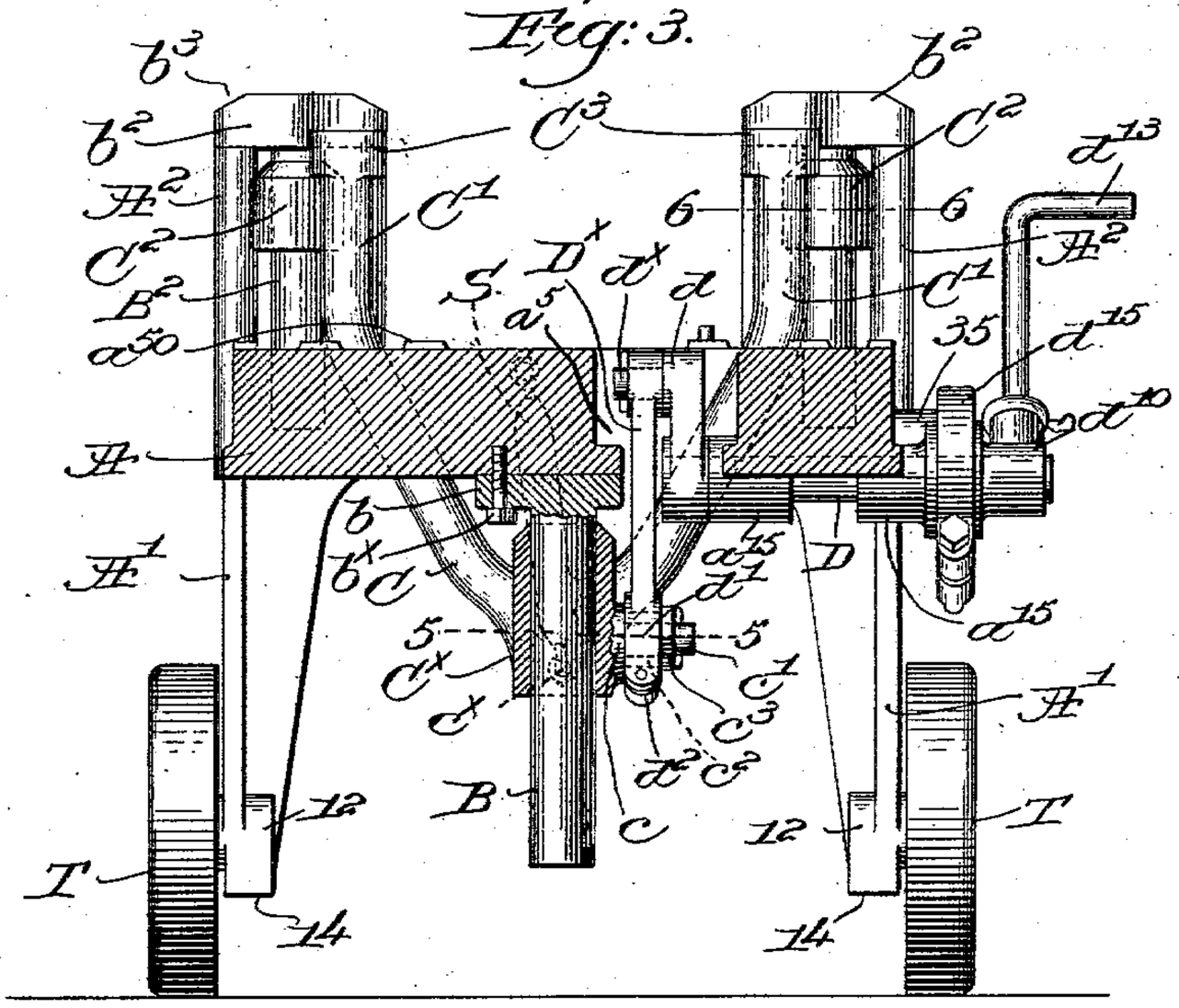


Fig: 4.

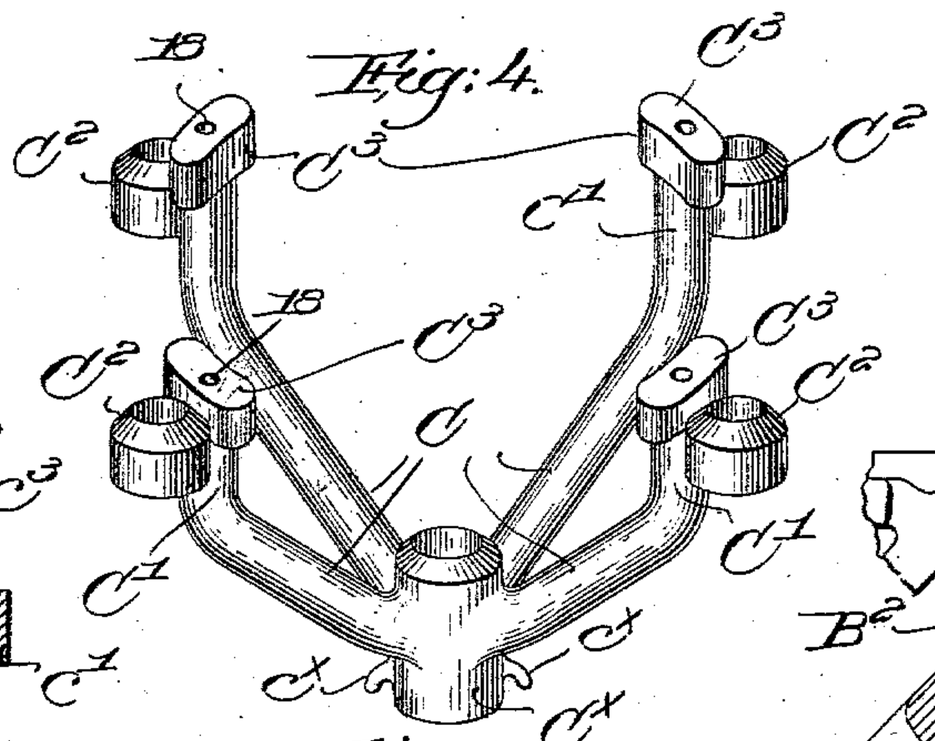


Fig: 5.

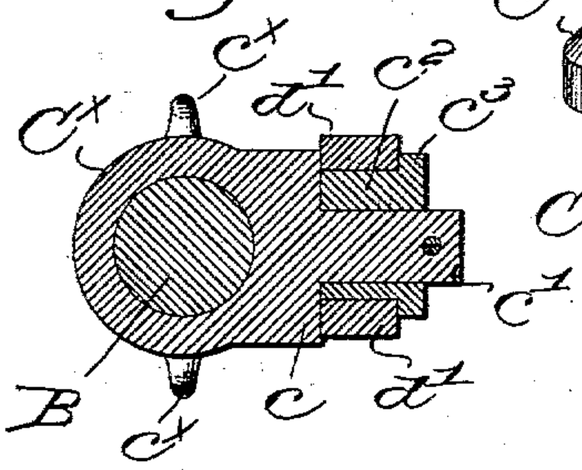


Fig: 6.

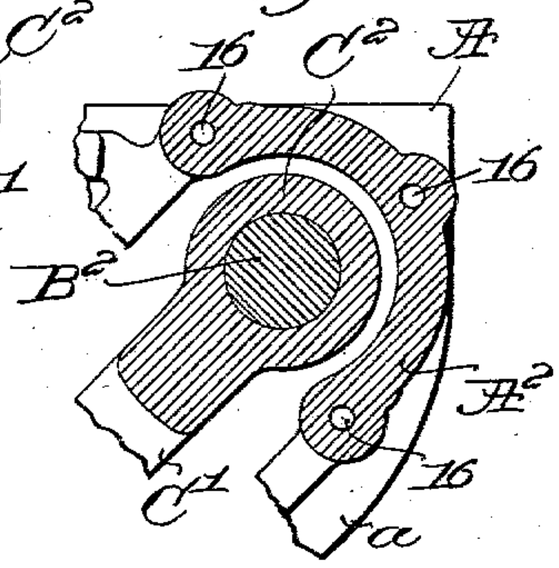
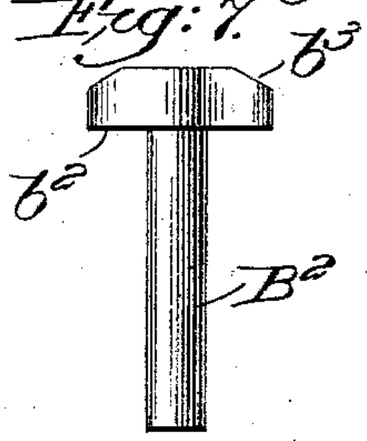


Fig: 7.



Witnesses,
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No. 744,152. Patented November 17, 1903.

UNITED STATES PATENT OFFICE.

JOHN ANDERSON, OF HOPEDALE, MASSACHUSETTS, ASSIGNOR TO DRAPER COMPANY, OF HOPEDALE, MASSACHUSETTS, A CORPORATION OF MAINE.

MOLDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 744,152, dated November 17, 1903.

Application filed September 2, 1903. Serial No. 171,607. (No model.)

To all whom it may concern:

Be it known that I, JOHN ANDERSON, a citizen of the United States, residing at Hopedale, county of Worcester, State of Massachusetts, have invented an Improvement in Molding-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to machines for facilitating the construction of sand molds for metal-founding of the type wherein a stripper-plate is firmly supported on a suitable frame and provided with apertures through which the different parts of the pattern project, the stripper-plate providing for the parting-face of the mold, while the pattern is mounted on a carrier movable toward and away from the stripper-plate. In operation a flask is placed on the latter, the pattern then projecting above its upper face, and the molder fills the flask with sand and rams it, after which the carrier is moved away from the stripper-plate to "draw" the pattern from the mold. Molding-machines of this type must provide a firm and rigid support for the stripper-plate and the pattern must be accurately movable smoothly and evenly toward and from the stripper-plate in a direction exactly at right angles thereto.

My present invention has for its object the production of a molding-machine of the type specified and which shall possess the requisite characteristics and which will be capable of a very wide range of work, the construction being such that the stripper and pattern plates may, if desired, be extended beyond the sides or ends, or both, of the frame of the machine for large molds or for molds the pattern for which is of peculiar shape. At the same time the machine embodying my invention is equally well adapted for small work and for use with round, rectangular, or other shaped flasks.

It is now common practice in foundries to use different sets of molding-machines, one for small work and the other for large work; but by my invention only one set of machines need be employed by reason of the wide range of work for which they are adapted.

The various novel features of my invention will be fully described in the subjoined specification, and particularly pointed out in the following claims.

Figure 1 is a right-hand end elevation, partly broken out, of a molding-machine embodying one form of my present invention, showing the stripper and pattern plates in dotted lines, the machine being in readiness for the construction of a mold. Fig. 2 is a top or plan view thereof, the stripper-plate and pattern-plate being omitted. Fig. 3 is a vertical section on the line 3 3, Fig. 1, looking to the right toward the rear side of the machine. Fig. 4 is a perspective view of the pattern-carrier detached. Fig. 5 is an enlarged sectional detail on the line 5 5, Fig. 3, taken through the center guide and coöperating hub of the pattern-carrier. Fig. 6 is a similar view on the line 6 6, Fig. 3, taken through one of the corner standards and guides and also through the hub of the carrier coöperating with such guide; and Fig. 7 is a separate view of one of the corner-guides and its heads whereby the guide is secured in position on a standard.

It will be understood by those skilled in the art that the mold is made in two parts, technically termed the "drag" and the "cope," and both may be constructed on machines such as herein shown and described, or the drag may be constructed on such machine and the cope on a "flat back"—that is, a flat plate with such portions of a pattern rigidly secured thereto as can be readily drawn from the mold.

I have herein shown the frame as comprising a strong rigid head A, having integral depending legs A′ at the corners thereof and an upright columnar standard A^2 at each corner of said body, all made as a single casting. Referring to Fig. 2, the heavy and rigid head A of the frame is shown as substantially cruciform, having four outwardly-extended radial arms *a*, from the ends of which the legs depend, while the four isolated upright standards A^2 rise from the arms above the legs. Between the pairs of arms at the ends the metal forms strengthening-ribs $a^\times$, and, as shown in Fig. 2, each arm has an opening a'

therein at the foot of the standard thereon for a purpose to be described. The standards are shown as columnar, being substantially semicylindrical, as clearly shown by dotted lines, Fig. 2, and in cross-section, Fig. 6, to provide strength and rigidity with relatively light weight, this construction also serving, as will be described, to shield or guard the corner-guides of the pattern-carrier from sand during the molding operation.

The legs A′ are provided with suitable bosses 12, Fig. 3, for lateral pins or studs 13, on which are mounted suitable truck-wheels T, whereby the machine may be readily moved from place to place, as necessary. Referring to Fig. 1, it will be seen that each boss has an extension 14 at its lower end, and when the frame is to be trued the first operation is to accurately plane or mill the lower faces of these extensions, so that all will lie in the same plane. Thereafter the tops of the standards A^2 are planed so that they will all lie in a plane parallel to the bottom faces of the extensions 14, both planes being substantially in parallelism with the head A of the frame.

A center guide, shown as a strong cylindrical bar B, having a laterally-enlarged head b, is rigidly secured to and depends from the head A, at the center thereof, suitable screw-bolts $b^\times$, one of which is shown in Fig. 3, passing through the head b and holding the guide in place, the guide being accurately trued up and centered.

Each standard supports a depending, preferably cylindrical, corner-guide, as B^2, and herein each of such guides is provided with an enlarged head b^2, adapted to be secured to the top of the standard and to extend inwardly therefrom, the heads thus overhanging suspending the guides B^2 within but separated from the concaved inner sides of the standards. The clearance between a guide and its supporting-standard is clearly shown in Figs. 1, 2, and 6. The guide-heads are provided with holes to receive screw-bolts 15, (see Fig. 2,) which enter threaded holes 16, Fig. 6, in the upper ends of the standards, and preferably the holes 16 are not made until the several guide-heads are fitted, so that the corner-guides may be brought into exact parallelism with each other and with the center guide B. As shown in Fig. 1, the corner-guides extend down into the openings a' of the frame-head, and it will be observed that the standards are entirely unconnected or isolated with relation to each other above the main frame, so that the ends and sides of the frame above its head are open and unobstructed. By such arrangement the pattern-plate can be extended beyond the frame at its front and rear sides or at either end, so that the machine is greatly enlarged in its scope and can handle patterns of peculiar shape and which are much longer than the frame.

In Fig. 1 I have shown in dotted lines a pattern-plate P in operative position, with the pattern $P^\times$ thereon projecting above the stripper-plate $S^\times$, also shown in dotted lines. The tops of the heads b^2 are planed flat to support the stripper-plate, which is held in place in any suitable manner, as by dowels on the plate adapted to enter suitable holes 80 in the heads. The sides of the heads b^2 slope or are inclined away from their flat tops, as at b^3, to shed or deflect any sand outward, while the standards A^2 partly surround their adjacent guides B^2 and with the heads effectually guard them and the portions of the pattern-carrier in sliding engagement therewith from injury by sand falling or being thrown thereupon.

The pattern-carrier is herein shown as comprising an elongated central hub $C^\times$, having connected with it a series of radiating branches C, four in number, upturned at their outer ends C′ and each branch having on its upturned end an outwardly-extended hub C^2, the pattern-carrier being shown separately in Fig. 4. The central hub is bored to embrace and slide easily upon the depending center guide B, and the hubs C^2 embrace and slide vertically on the several corner-guides B^2, the said hubs moving in the clearance-space between each guide and its adjacent standard A^2. As shown, the upturned ends of the branches enter the openings a' in the frame-head A, so that the carrier has a free vertical movement to carry the pattern-plate toward and from the stripper-plate $S^\times$, Fig. 1. In practice the carrier is positioned on the center guide B, and then the corner-guides are inserted in their hubs C^2 and the overhanging heads b^2 are then positioned on the standards, after which the threaded holes 16 are formed and the heads b^2 secured in place. Such procedure facilitates setting up the machine and provides a ready and efficient mode for getting the parts trued up. The upturned arm of each branch of the carrier is surmounted by a pattern-plate seat C^3, shown as a segmental enlargement above the adjacent hub C^2 and set in therefrom to properly clear the overhanging head of the standard at that corner. Any suitable mode of attachment may be adopted to secure the pattern-plate on the seats, the tops of which are planed, and herein I have shown holes 18 in the seats to receive fastening-screws. The pattern-plate may be of such a size as to move up and down wholly within the corner-guides B^2, or said plate may be extended beyond such guides in any direction between the standards as may be necessary or desirable to accommodate the pattern. In order to aid in raising the pattern-carrier, I have provided strong springs S, secured at their upper ends to hooked lugs 20 on the frame-head (see Fig. 2) and at their lower ends attached to downturned lugs $c^\times$ on the central hub $C^\times$ of the carrier, the springs being stiff enough

to substantially balance the weight of the carrier and parts mounted thereon.

On the under side of the head A of the frame bearings a^{15} are provided, preferably integral therewith, to support a horizontal operating-shaft D, extended from near the center of the frame outward and projecting beyond one end thereof, having at its inner end a crank d, provided with a crank-pin $d^{\times}$, on which is pivotally mounted the upper end of a link $D^{\times}$. The lower end of the latter is adjustably connected with the center hub $C^{\times}$ of the carrier, as will be described, said link moving in a vertical plane, the head A being apertured at a^{5} (see Figs. 2 and 3) to receive the crank and upper end of the link when the shaft D is operated. As best shown in Figs. 1 and 5, the hub $C^{\times}$ is provided on one side with a lateral flat-ended boss c, having a stud c' projecting therefrom at right angles to the bore of the hub and parallel to the crank-pin $d^{\times}$. A sleeve c^{2} is eccentrically mounted on said stud and has an annular flange c^{3} at one end, the periphery of the sleeve between its head and the flat end of the boss c being embraced by the split end d' of the link, the split end being tightly clamped on the sleeve by a clamping-bolt d^{2}. By loosening the split end of the link and turning the sleeve in one direction or the other wear in the crank-pin or its opening in the link can be taken up, so that the extreme upward position of the carrier will be exactly correct for the proper and accurate coöperation of the pattern-plate with the stripper-plate. Rotation of the operating-shaft D in the direction of arrow 25, Fig. 1, will swing the link $D^{\times}$ to the left and downward, effecting the downstroke of the carrier from the position shown, and when the machine is in use the pattern will thereby be drawn from the mold. The opposite rotation of the shaft D is limited by a stop 30, shown as a lug, on the head A in the path of and to engage the upper end of the crank when it is swung up and past dead-center.

A hub d^{10}, having a radial socket d^{12} for the operating handle or bar d^{13}, Fig. 1, is rigidly secured to the projecting end of the shaft D, and an annular enlargement d^{14} of said hub is surrounded by a split collar d^{15}, adapted to be clamped thereon by a clamp-bolt d^{16}, all substantially as in United States Patent No. 714,285, one end of the clamp being shouldered at d^{17} to engage a fixed stop 35 on the frame. When the mold is completed, the molder grasps the handle d^{13} and pulls it toward the front of the frame, thereby rotating the operating or actuating shaft D in the direction of arrow 25, Fig. 1, lowering the carrier, as described, and drawing the pattern from the mold. Such downward movement of the carrier is stopped when the shoulder d^{17} of the clamp-collar d^{15} engages the stop 35. By slackening the clamp-collar and turning it in one or the other direction the drawing movement of the carrier is varied, the collar being clamped again when its shoulder d^{17} is in the desired position.

The frame-head A is provided with upturned lugs a^{50}, which form supports for a stool-plate, if one be necessary, and such stool-plate may obviously project beyond the ends or sides of the frame. Should the stool-plate and corresponding stripper and pattern plates project beyond the end of the frame at which the actuating-handle d^{13} is located, said handle is removed and a bent bar used to clear the projecting ends of the plates. The actuating force is transmitted from the operating-shaft D to the pattern-carrier through the link $D^{\times}$, the lower end of the latter being connected with the carrier as near its center as possible to provide for central draft of the carrier and apply the power uniformly to different portions thereof.

The molding-machine may be used in connection with a mechanical "squeezer" or ramming apparatus, being rolled up to the same beneath the rammer, with the planed lower ends of the extensions 14 resting on the platform or support common in such ramming apparatus, whereby the pressure is resisted longitudinally by the legs of the frame and not laterally by the studs on which the truck-wheels are mounted.

My invention is not restricted to the precise construction and arrangement of one practical embodiment thereof herein shown and described, as the same may be modified or rearranged in various particulars without departing from the spirit and scope of my invention.

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

1. In a molding-machine, a frame having rigid, upright standards at its corners, to support a stripper-plate at their upper, unconnected ends, a rigid, vertical guide depending from the upper end of each standard, a pattern-carrier comprising a plurality of upturned branches connected at their lower ends and each having a pattern-plate seat, and a hub to embrace and move vertically upon a guide, and means to actuate the carrier.

2. In a molding-machine, a frame having rigid, upright standards at its corners, to support a stripper-plate at their upper, unconnected ends, a rigid, vertical guide depending from the upper end of each standard, and a central guide depending from the center of the frame, a pattern-carrier comprising a plurality of upturned branches having a central hub at their lower connected ends, to embrace and move upon the central guide, each branch having a pattern-plate seat, and a hub at its upper end to embrace and move vertically upon a guide on a standard, and means to actuate the carrier.

3. In a molding-machine, a frame having rigid, upright standards at its corners, to sup-

port a stripper-plate at their upper, unconnected ends, a rigid, vertical guide depending from the upper end of each standard, the head of the frame having openings into which the lower ends of the corner-guides extend, a pattern-carrier comprising a central hub and a series of divergent branches rigidly connected with the hub and upturned at their free ends, the hub embracing and moving upon the center guide, a pattern-plate seat and a hub on the upturned end of each branch, said hubs embracing and moving vertically upon the corner-guides, the upper ends of the arms passing through the openings in the frame-head, and means to actuate the carrier.

4. In a molding-machine, a frame having upright, isolated standards at its corners provided with inturned, overhanging heads to support a stripper-plate, a rigidly-attached guide depending vertically from each head, and a center guide depending vertically from the frame-head, a pattern-carrier comprising a central hub and branches radiating therefrom and upturned in parallelism at their free ends, each upturned branch having an outwardly-extended hub to embrace and move vertically upon a corner-guide, the central hub of the carrier embracing and sliding upon the depending center guide, and means to actuate the carrier.

5. In a molding-machine, a frame having vertical guides rigidly supported above it and at its corners, a center guide mounted on and depending vertically from the frame, the head of the latter having openings adjacent the corner-guides, a pattern-carrier having a central hub to embrace and slide upon the center guide below the frame-head and provided with branches upturned to pass through the said openings, said branches having external hubs to slidably embrace the corner-guides above the frame-head, and means to actuate the pattern-carrier.

6. In a molding-machine, a frame having upright, isolated standards at its corners, an inturned, overhanging head detachably secured to the upper end of each standard to support a stripper-plate, a rigidly-attached guide depending vertically from each head clear of the adjacent standard, a pattern-carrier having a series of divergent branches upturned at their free ends and each having an outwardly-extended hub to embrace and slide upon a corner-guide, a pattern-plate seat on each branch, projecting above the adjacent hub, and means to effect vertical movement of the carrier.

7. In a molding-machine, a frame having at its corners upright isolated standards longitudinally concave on their inner faces, an inturned, overhanging head on each standard provided with a depending, vertical guide set in away from the concave face of its standard, the heads being adapted to support a stripper-plate, a pattern-carrier comprising a plurality of divergent branches upturned at their free ends and each having an outwardly-projecting hub to embrace and move vertically on a corner-guide, the standards and their heads serving to shield and deflect sand from said guides and hubs movable thereon, a depending vertical center guide for the carrier mounted on the frame, seats at the upper ends of the branches for a pattern-plate, and means to actuate the carrier.

8. In a molding-machine, a frame having rigid, upright standards at its corners, to support a stripper-plate at their upper, unconnected ends, a rigid, vertical guide depending from the upper end of each standard, a pattern-carrier comprising a plurality of divergent branches upturned in parallelism at their free ends, each branch having an outwardly-projecting hub to embrace and move vertically upon a guide, a segmental pattern-plate seat on each branch extended above the adjacent hub, means to effect vertical movement of the pattern-carrier, and a central guide therefor mounted on and depending vertically below the head of the frame.

9. In a molding-machine, a frame having upright, isolated standards rigidly mounted on its corners and each provided with a flat-topped, inturned and overhanging head to support a stripper-plate, a vertical guide depending from each head clear of the adjacent standard, a center guide depending below the head of the frame and equidistant from the corner-guides, the frame-head having openings at the bases of the standards, a pattern-carrier comprising a central hub, attached and divergent branches upturned at their free ends in parallelism and extended through the said openings, an upturned pattern-plate seat on each branch at its upper end, and an outwardly-projecting hub to embrace and move vertically upon a corner-guide, the central hub of the carrier embracing the depending center guide, and means operatively connected with said central hub to move the carrier vertically.

10. In a molding-machine, a frame comprising an apertured head, having integral depending legs at its corners, and integral, upright columnar standards, also located at its corners, depending vertical guides mounted on said standards at their upper ends and set in from their inner concave sides, a center guide rigidly secured to and depending from the frame-head at its center, a pattern-carrier having hubs to embrace and slide upon said center and corner guides, and means to raise and lower the pattern-carrier.

11. In a molding-machine, a frame having at its corners upright columnar standards unconnected at their upper ends, overhanging heads secured to the tops of the standards and inwardly extended therefrom, vertical guides depending from the heads within the inner, concave faces of the standards, a pat-

tern-carrier having radial branches provided with outwardly-extended hubs to embrace and slide upon said guides, the standards and their overhanging heads guarding the guides and the coöperating carrier-hubs from sand, and means to actuate the carrier.

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

JOHN ANDERSON.

Witnesses:
GEORGE OTIS DRAPER,
ERNEST W. WOOD.