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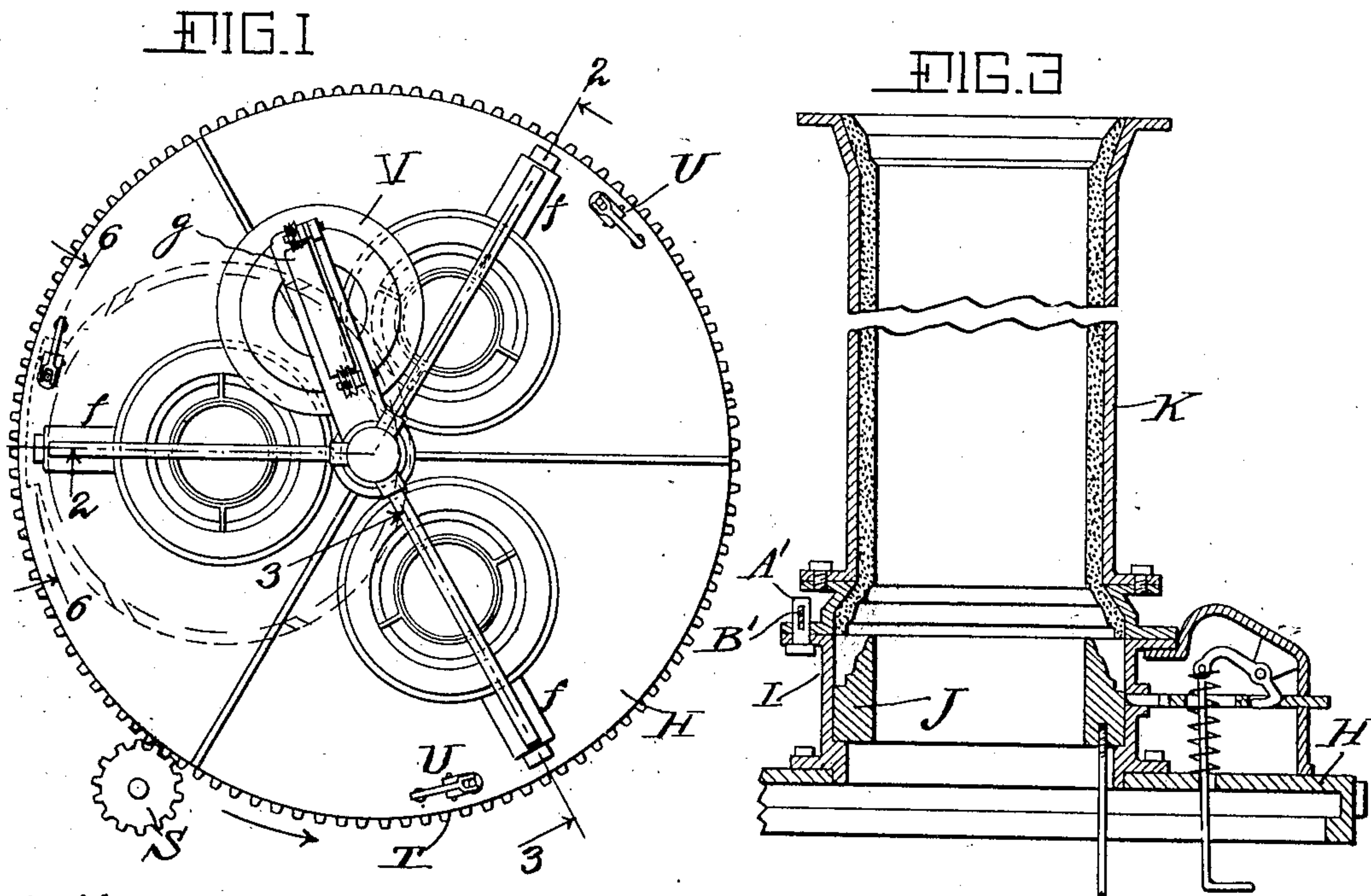
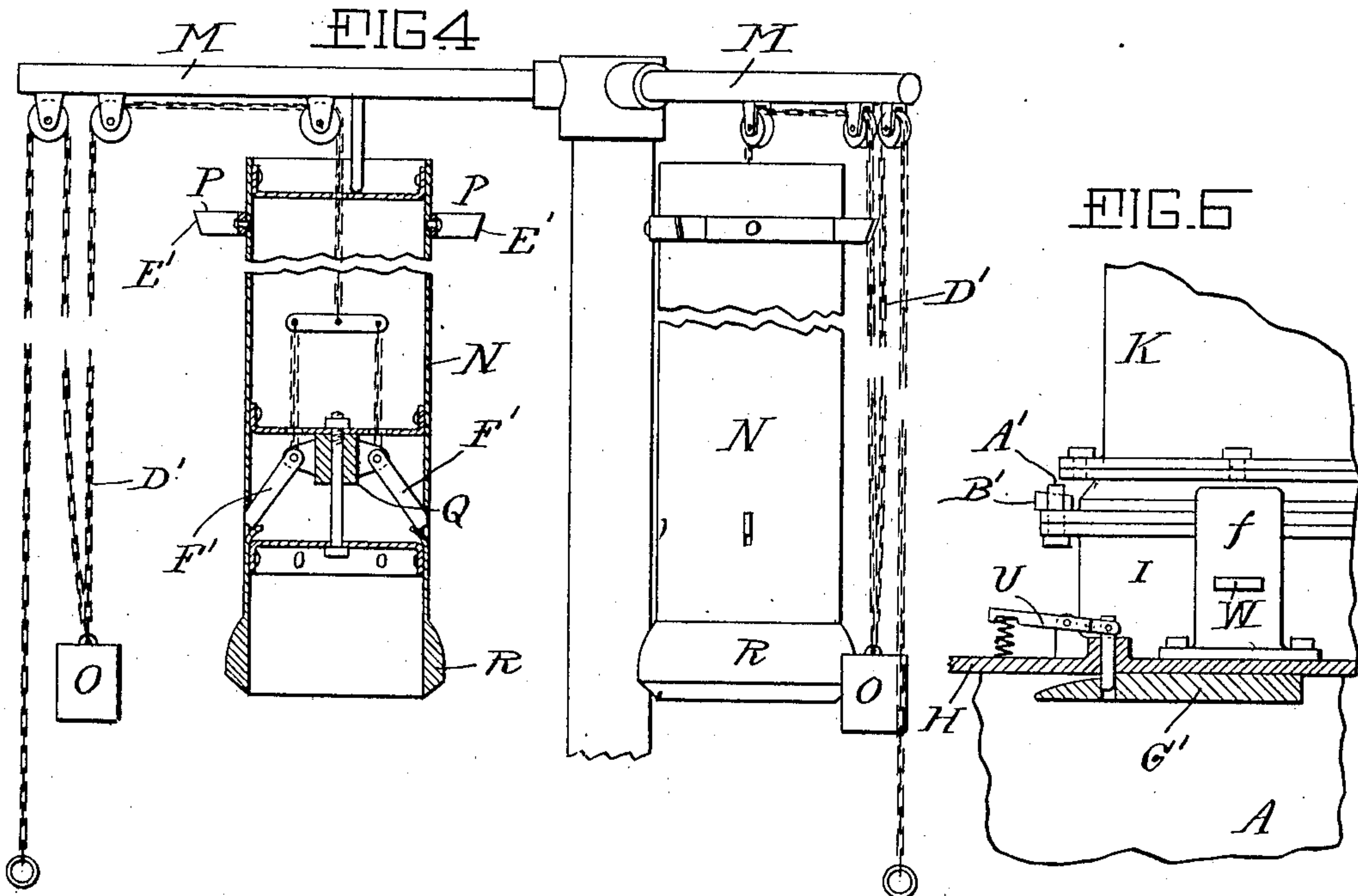
PATENTED FEB. 4, 1908.

W. C. SWIFT.

SAND MOLD MACHINE.

APPLICATION FILED JAN. 24, 1907.

2 SHEETS—SHEET 1.



Witnesses.
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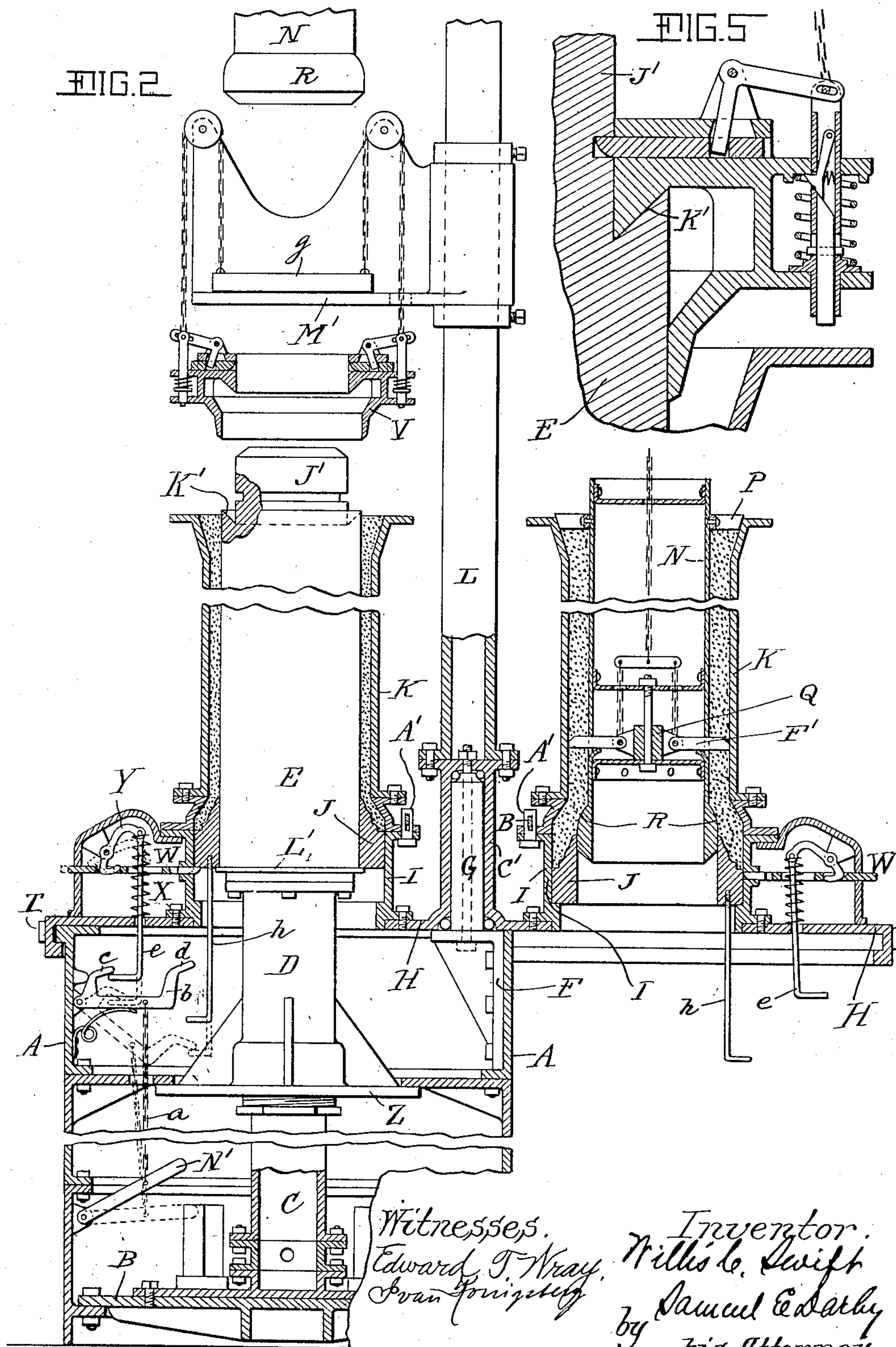
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2 SHEETS—SHEET 2.



UNITED STATES PATENT OFFICE.

WILLIS C. SWIFT, OF HINSDALE, ILLINOIS, ASSIGNOR TO FRED HERBERT, OF BIRTLEY, ENGLAND.

SAND-MOLD MACHINE.

No. 878,471.

Specification of Letters Patent.

Patented Feb. 4, 1908.

Application filed January 24, 1907. Serial No. 353,878.

To all whom it may concern:

Be it known that I, WILLIS C. SWIFT, citizen of the United States, and resident of Hinsdale, in the county of Dupage, State of Illinois, have made a certain new and useful invention in Sand-Mold Machines, of which the following is a specification.

This invention relates to machines for making sand molds.

10 The object of the invention is to provide a machine for making sand molds which is simple in construction and efficient in operation, and wherein the capacity of the machine in daily output is greatly increased.

15 A further object is to provide means whereby the delay in the mold forming operation incident to supplying the sand or other material is avoided.

20 A further object is to provide an apparatus in which, while a mold is being formed in one flask another flask is receiving the sand or other mold material, so that as rapidly as the mold forming devices complete their work of forming a mold, the flask containing 25 the finished mold may be removed and replaced in working position with reference to the mold forming devices with another, previously charged with the sand, ready for the immediate operation of such mold forming 30 devices, thereby rendering the operation of the machine practically continuous.

Other objects of the invention will appear more fully hereinafter.

35 The invention consists substantially in the construction, combination, location and relative arrangement of parts, all as will be more fully hereinafter set forth, as shown in the accompanying drawings and finally pointed out in the appended claims.

40 Referring to the accompanying drawings, and to the various views and reference signs appearing thereon, Figure 1 is a view in top plan of a machine embodying the principles of my invention. Fig. 2 is a broken view in 45 vertical central section on the line 2, 2, Fig. 1. Fig. 3 is a broken view in central longitudinal section on the line 3, 3, Fig. 1, showing a flask containing a finished mold ready to be removed from the machine. Fig. 4 is a 50 broken view, partly in side elevation and partly in vertical central section of the upper part of a form of apparatus embodying the principles of my invention, showing a construction of and means for supporting the combined measuring or displacing tool and ram-

mer. Fig. 5 is a broken detail view in section showing the manner of applying and locking the spigot pattern to the upper end of the main pattern. Fig. 6 is a broken detail view, partly in side view, and partly in vertical section, showing the means for locking a flask in 60 centered relation with respect to the mold forming devices.

The same part is designated by the same reference sign wherever it occurs throughout 65 the several views.

In the practical operation of machines for making sand or similar molds in which are employed a flask to receive the sand or other composition, a power operated main pattern, 70 a socket pattern and a spigot pattern, the main pattern operating through the socket pattern and the flask to perform the work of ramming the sand and supporting the mold during the operations involved in its 75 forming and shaping, it is the custom to first place and secure the flask in proper alinement and centered relation with respect to the main and auxiliary patterns, then to advance the main pattern far enough into the 80 flask for its ramming end to protrude through the socket pattern, then to arrest the movement of the main pattern, and, while such movement is arrested, to insert a measuring or displacing tool or tube into the flask so as 85 to be received and centered upon the end of the main pattern, then to supply the sand or outer composition to the flask and into the space bounded by the inner wall of the flask, the exterior surface of the measuring tool or 90 tube, the end of the main pattern, the socket pattern and the casing for the latter. Thereafter the main pattern is advanced through the flask, pushing the measuring or displacing tool or tube out of the flask until finally 95 the advancing end of the main pattern emerges and protrudes from the flask, and the measuring tool, having completed its work, is removed from the end of the main pattern and is replaced by a spigot pattern which is 100 detachably secured to the projecting end of the main pattern. During the final movement of the main pattern the socket pattern is engaged and advanced with the main pattern movement to perform its work. After 105 the spigot pattern is secured to the end of the main pattern, the movement of such pattern is reversed and the spigot pattern is carried thereby into position to perform its work, and, when such work is completed, the 110

spigot pattern is released and the main pattern continues its withdrawal movement until it, and the socket pattern are finally entirely withdrawn from the flask, thereby enabling the latter, with the formed and shaped mold contained therein, to be removed and replaced by an empty flask ready for the next operation.

In the operation of such machine, as above briefly outlined, it is necessary to remove each flask in which a mold has been completed, and replace the same with one which is empty, and to properly center and secure each flask in the required relation and alignment, and it is necessary to fill the empty flask with the sand or other composition, after such flask has been placed and secured in proper position and alinement and while the mold forming operation is arrested. It is among the special purposes of my invention to provide means whereby the daily capacity of the machine in finished molds produced thereon may be very largely increased by making the molding operations substantially continuous.

In carrying out my invention I propose to provide means which are simple and efficient whereby the flasks are preliminarily filled with the sand or other composition before being placed, centered or secured in proper position and alinement with reference to the mold forming and shaping patterns, whereby the operation of filling one flask with sand or composition is being carried on while another, previously filled flask is in molding position and the molding operations being carried on therein, I also propose to provide means for removing the flask, in which the molding operation has been completed and replacing the same with the preliminarily sand-filled flasks, thereby interrupting the molding operation only a small fraction of the time heretofore required, and enabling such operation, when once started, to be carried on, the completion of one mold to be followed by the completion of another mold, without any material interruption.

My invention contemplates the accomplishment of various other special purposes and objects which will appear more fully hereinafter.

The operation of removing and replacing the flasks may be accomplished in many specifically different ways, and the idea involved in my invention may be carried out in connection with many specifically different constructions and types of mold forming mechanisms, while, therefore, I have shown and will now describe one type and construction of mold forming mechanism, and one form of replacing and removing mechanism, I do not desire to be limited or restricted in these respects.

Referring to the accompanying drawing, reference sign A, designates a main casing.

Suitably supported in any convenient manner within the casing, as, for instance, upon a plate or platform B, is a stationary hollow cylinder C, adapted to receive a power medium, such as water, steam, compressed air, or the like, from any suitable or convenient source. Over the cylinder is sleeved a plunger D, the cylinder C, forming a guide therefor. Upon plunger D, is mounted the main pattern E. Within casing A, adjacent its top edge, is secured a bracket F, carrying a stud G, arranged to form a pivotal axis around which a table H, turns. This table carries a series of supplementary casings I, spaced at equal radial distances from the axis about which table H, revolves, and in each of which is mounted a socket pattern J. A flask K, is adapted to be removably received and supported upon the upper edge of each supplementary casing I, and held in any suitable or convenient manner in centered relation with reference thereto. In the particular form shown, to which, however, my invention is not to be limited or restricted, the flasks are removably secured in centered relation by means of slotted bolts A', passing through flanges of the casing and flask, and held by wedges B' inserted through the slots in said bolts. In this manner the flasks may be very quickly adjusted in centered position and held and secured therein, or detached for removal.

Suitably secured to and arranged in axial alinement with the pivot hub C', of the platform or table H, is a standard L, carrying at its upper end the horizontally extending arms M, which are respectively arranged to extend over the casings I. Upon each of these arms is supported a measuring tool N, in such relative arrangement with the casings I, and the flask K, secured and centered thereon, that when the measuring tool is lowered from its raised position it will be received within the flask, and will rest and be centered at its lower end within the upper end of the socket pattern, the latter being in the form of a ring, as shown, and the lower end surface of the measuring tool being tapered to facilitate the centering of such end in the socket pattern. The measuring tools may be normally maintained in their raised positions in any suitable or convenient manner. I have shown a simple arrangement for accomplishing this result wherein each measuring tool is held in its raised position by a counterbalance weight O, suitably connected thereto, as, for instance, by means of the hand chain, D', suitably arranged, whereby a pull exerted by an attendant upon the hand chain will raise the counterbalance, thereby permitting the measuring tool to be lowered.

One of the objects and purposes of the measuring tool is to form between the exterior surface thereof and the interior sur-

face of the flask, a pocket or chamber to receive the loose sand or other composition to form the mold, thereby regulating or controlling the thickness and the amount of sand required or desired to form the mold. Another function of the measuring tool is to form a retaining support for the loose column of sand when the latter is delivered into the flask. Another, and a most important function of the measuring tool, contemplated by my invention, is the ramming of the sand thereby when the flask containing the sand and measuring tool is placed in the proper position for the operation of the main pattern, as will appear more fully hereinafter. In the accomplishment of this function I provide the lower end of the measuring tool with an enlarged tapering portion R, which, when the measuring tool is forced through the flask by the main pattern, rams and compresses the sand.

In order to enable the measuring tool to properly perform its various functions it is desirable that said tool be accurately centered within the flask. It will be seen that the lower end of the measuring tool is received within the upper end of the socket pattern, thereby insuring a proper centered relation of the measuring tool at that end. At its upper end the measuring tool is provided with radially projecting arms P, beveled upon the under surfaces of the outer ends thereof, as indicated at E', to conform to the taper of the flare of the flask at its upper end. From this it will be seen that when the measuring tool is lowered into the flask the arms P, will eventually be received in and rest upon the inner surface of the flared upper end of the flask, thereby not only supporting the measuring tool but also centering the same at its upper end. If desired, and in order to facilitate the accurate and rapid centering of the measuring tool within the flask, the weight Q, arranged within the tool for limited vertical movement may be provided with pivoted arms F' adapted to be projected through slots or openings in the shell of the measuring tool. The weight Q, is suspended from one end of connection D' and so long as the weight O, is effective, the weight Q, is held in raised position, thereby withdrawing the centering arms F' within the shell of the measuring tool, as shown in Fig. 4, but when the influence of weight O, is removed, as for instance, by an attendant pulling down on the connections D', until the measuring tool is lowered and its weight is taken off the connection D', then the weight Q, is free to descend thereby causing the centering arms to be projected radially through the shell of the measuring tool and to engage the inner wall of the flask and hence insuring the proper and rapid centering of the measuring tool as shown in Fig. 2. When the tool is

once centered, the counterbalance weight O, may again be permitted to become effective to raise weight Q, thereby withdrawing the centering arms F', into the measuring tool, and hence avoiding interference thereof with the upward movement of the tool in the mold forming operation.

When the measuring tool has been properly inserted and centered in the flask, as above described the sand or other mold forming composition is introduced, as shown on the right hand side of Fig. 2, and the sand-filled flask with its associated casing I, socket pattern J, and measuring tool, is then ready to be conveyed or transported into proper centered relation with respect to the main pattern and the mold forming and shaping devices, and in order that there shall be no interruption of the mold forming operations, the centering of a flask upon its supplementary casing I, and socket pattern J, and the centering of the measuring tool within the flask, and the delivering of the sand into the flask, may all take place at a point removed from the mold forming devices and while such devices are performing their work upon a previously filled flask.

As above indicated, the transfer of the sand-filled flask into position for the mold forming devices to perform their work, may be effected in many specifically different ways within the broad scope and contemplation of my invention, and, similarly, the flask containing the finished and formed mold may be removed from the position occupied thereby during the forming operations, in many different ways. In the particular form shown, to which my invention is not to be limited or restricted, the platform or table H, upon which the auxiliary or supplementary casings I, are mounted, is made to revolve upon the stud G, as above described, so as to bring said auxiliary or supplemental casings I, successively into proper alinement and operative relation with respect to the main casing A, and the main pattern E, and by providing the table or platform H, with a plurality of such auxiliary or supplemental casings I, each adapted to receive a flask as above explained, it will be readily seen that when said table or platform is revolved, a flask in which a mold has just been completed will be carried out of the line of the mold forming devices and into position for the flask containing the completed mold to be removed, while at the same time a freshly filled flask is brought into position for the next operation of the mold forming devices. At the same time an empty flask may be applied to an auxiliary casing I, and a measuring tool lowered into it and the whole brought into position to receive the sand or composition for the next operation. The table or platform H, may be revolved in any suitable or convenient

manner. In the particular form shown, to which however my invention is not limited, said table is revolved by means of a pinion S, meshing with the gear teeth T, as clearly shown.

In order to insure a proper centering of the various auxiliary or supplementary casings with their socket patterns, sand filled flasks, and measuring tools, as they are successively brought into proper position with reference to the mold forming devices, I provide the spring stops U, adapted and arranged to engage in a fixed flange G', see Fig. 6, when the casings I, are brought into the required position for the operation of the mold forming devices. When a sand filled flask is thus brought into and centered and secured in position, the mold forming devices are started up by supplying operating medium to the stationary guide cylinder C, thereby causing the plunger sleeve D to be raised and hence advancing the main pattern E into and through the flask. As the main pattern E, advances into and through the auxiliary casing I, and socket pattern J, the upper end thereof is eventually brought into bearing relation with the lower end of the measuring tool. To facilitate the seating and centering of the measuring tool upon the upper end of the main pattern, said upper end is somewhat reduced in diameter, as at J', thereby forming a shoulder K', the upper surface of which is beveled or inclined to receive the beveled or inclined lower end surface of the measuring tool. In this manner the measuring tool becomes seated and centered upon the upper end of the main pattern, and, thereafter, the advancing movement of the main pattern through the flask also forces the measuring tool through and out of the upper end of the flask, such movement causing the tapered end or portion R, of the measuring tool to effect a ramming or compression of the sand in the flask, while the exterior surface of the main pattern, operating as a follower for the ramming portion of the measuring tool, serves to iron or smooth the surface of the bore of the mold and to support and maintain the mold within the flask. As the main pattern approaches the upper limit of its movement, a flange or projection L', thereon engages underneath the socket pattern J, and raises the same from the position shown at the right in Fig. 2, to its working position shown at the left of said figure thereby compressing, shaping and forming the socket end of the mold. The socket pattern is engaged, when in its fully advanced position by the spring pressed detent W, whereby it is maintained in raised position during the return or withdrawal movement of the main pattern, thereby protecting the socket end of the mold against danger of injury during such withdrawing movement.

When the upper end of the main pattern finally emerges from and rises above the upper end of the flask, the measuring tool is removed or raised out of the way by its counterbalance O, or otherwise. The spigot forming pattern, indicated at V, is then applied and detachably secured to the upper end of the main pattern, in any suitable or convenient manner. In the particular form shown, to which, however, my invention is not to be limited or restricted, the spigot pattern is suspended from an arm or bracket M', sleeved upon the standard L, whereby the same may be readily swung into or out of proper position with reference to the line of movement of the main pattern or the measuring tool. The spigot pattern may be counterbalanced by a weight g, and any suitable automatic or other form of attaching and detaching devices may be employed for securing the spigot pattern to the main pattern and detaching the same therefrom.

I have shown a simple arrangement for accomplishing the desired object wherein a locking slide 12, is carried by the spigot pattern V, and operated by a bell crank lever 13, to be projected into or withdrawn from engaging relation with respect to a peripheral groove 14, formed on the end of the main pattern. The bell crank lever 13, is operated to withdraw the slide from locking engagement with the main pattern whenever the weight of the spigot pattern is taken by its suspending connections 15, and also whenever the spigot pattern has been carried down by the withdrawing movement of the main pattern, until a sleeve 16, carried by the spigot pattern engages the flange 17, on the upper end of the flask, whereby such sleeve is projected endwise, said sleeve being connected to one arm of the bell crank lever. A spring 18, acting on this sleeve normally exerts its tension in a direction to rock the bell crank lever 13, to project the slide 12, into locking engagement with the main pattern. A locking pawl 19, which is engaged and released automatically by the movement of the sleeve serves to lock the slide in locking position.

When the spigot pattern is secured to the end of the main pattern, the said main pattern is caused to begin its withdrawal movement, thereby carrying the spigot pattern down to form and shape the spigot end of the mold, upon the completion of which work the spigot pattern is released and returned to its raised position and swung out of the way, while the main pattern continues its withdrawal movement. As it approaches its retracted or initial position, a flange Z, on the plunger D, engages and rocks a lever N', connected by a chain or other suitable connection a, with a pivoted lever b, which is provided with two hooks, or fingers c, d, the former of which, when

said lever *b* is rocked, engages a toe on the end of a spring pressed rod *e*, thereby rocking a cam lever *Y*, arranged to engage and withdraw the detent *W*, from supporting relation with respect to the socket pattern *J*. The continued downward rocking movement of lever *b*, causes the finger or hook *d*, thereon to engage and exert a downward pull on the toe of a rod *h*, which is connected to the socket pattern thereby insuring a positive withdrawal of the socket pattern from its raised to its retracted or initial position. The main pattern is by this time fully withdrawn to a point below the table or platform *H*, and the flask containing the completed mold is ready to be removed and replaced by another sand filled flask preparatory to another operation. The casing *A*, is suitably slotted as indicated at *R'* to permit the depending rods *e*, and *h*, to pass through the same when the table or platform *H* is rotated.

It is believed that the operation of the machine will be fully understood from the foregoing description, taken in connection with the accompanying drawings.

I desire it to be understood that while I have shown and described one form of construction and arrangement embodying the principles of my invention I am not to be limited or restricted thereto as many variations therefrom and changes in the details thereof might readily occur to persons skilled in the art and still fall within the spirit and scope of my invention. But,

What I do claim as new and useful and of my own invention and desire to secure by Letters Patent is:

1. In a molding machine, the combination with a main pattern, and actuating mechanism therefor, of a flask, means for supporting a column of mold forming material within said flask, and means for transferring the flask containing the column of mold forming material, into and out of the line of movement of the main pattern.

2. In a molding machine, the combination with a main casing, a main pattern mounted therein to operate, and means for operating said pattern, of a flask, an auxiliary casing for supporting said flask, means for supporting a column of sand within said flask, and means for transferring said auxiliary casing and flask containing the column of sand into and out of the line of movement of the main pattern.

3. In a molding machine, the combination with a main casing, a main pattern, and power mechanism for operating the same, of a series of auxiliary supports, flasks adapted to be secured to said supports, and to receive columns of mold material therein, and means for successively moving said auxiliary supports with said flasks into and

out of the line of movement of the main pattern.

4. In a molding machine, the combination with a main pattern and shaping devices, and means for operating the same, of a flask, means for supporting the same, means arranged within said flask for supporting a column of mold material therein, means for moving the filled flask into the line of movement of the main pattern, and means for removing the flask with the completed mold from such relation.

5. In a molding machine, the combination with a main casing, a main pattern arranged to operate therein, and means for operating said pattern, of a series of auxiliary casings, flasks, means for centering and securing a flask upon each of said auxiliary casings, means for supporting a column of sand within each flask and auxiliary casing, and means for successively moving said auxiliary casings and flasks into and out of the line of the main pattern.

6. In a molding machine, a main casing, a main pattern operating therein, a carrier operating past said main casing, a series of auxiliary casings mounted on said carrier, each adapted to receive a flask in centered relation with respect thereto, means for supporting a column of sand within said flasks and the supporting casings, and means for operating said carrier.

7. In a molding machine, a main pattern and means for operating the same, a carrier operating past said pattern, casings mounted on said carrier, each adapted to receive a flask in centered relation with respect thereto, means for supporting a column of sand within said flasks and casings, and means for moving said carrier to bring said casings successively into alinement with said pattern.

8. In a molding machine, and in combination with a main casing and mold forming devices, an auxiliary casing, a flask, means for supporting and centering said flask upon said auxiliary casing, a socket pattern arranged within said auxiliary casing, a measuring tool arranged within said flask, the space between said flask, auxiliary casing, pattern and measuring tool adapted to receive mold forming material, and means for moving said auxiliary casing, flask, pattern and tool containing the mold material into centered relation with respect to the mold forming devices.

9. In a molding machine, the combination with a main casing, mold forming devices, and means for operating said devices, of an auxiliary casing, a socket pattern movably mounted therein, a flask, means for centering said flask upon said casing, a measuring tool, means for centering said tool within said flask, said flask, casing, pattern and tool adapted to support a column of sand, and

means for transporting said casing and associated parts containing the column of sand into centered relation with respect to the mold forming devices.

5 10. In a molding machine, the combination with a main casing, and mold forming devices, of an auxiliary casing, a socket pattern arranged therein, a flask, means for securing the same upon said casing in centered
10 relation with respect to said pattern, a measuring tool, means for supporting the same within said flask and in centered relation with respect to said pattern, and means for moving said casing with its associated parts
15 into and out of centered relation with respect to said mold forming devices.

11. In a molding machine, the combination with a main pattern and means for operating the same, of a revolving table, a series of auxiliary casings carried thereby, and adapted to be successively brought into
20 alinement with the main pattern when said table is revolved, and flasks adapted to be removably secured in centered relation with
25 respect to said casings.

12. In a molding machine, the combination with a main pattern and means for operating the same, of a revolving table, a series of casings carried thereby, a flask adapted
30 to be detachably secured in centered relation upon said casings, whereby said casings and flasks are successively brought into alinement with said main pattern when said
35 table is revolved, and means for locking said table to hold said casings in centered relation with the main pattern.

13. In a molding machine, the combination with a plunger, a pattern carried thereby, a flask, a measuring tool, means carried
40 by said tool and arranged to engage said flask whereby said tool is supported within the flask, to form a chamber to receive the mold material, and means for conveying the flask into alinement with the pattern.

45 14. In a molding machine, a flask, a support therefor, a measuring tool arranged and supported within said flask, and forming therewith a chamber to receive the mold composition, a plunger, a pattern carried
50 thereby and independent of the measuring tool, means for moving the flask carrying the measuring tool and mold composition into and out of the line of movement of said plunger and pattern, and means for advancing
55 said plunger into the flask to engage the measuring tool and force the same out of the flask.

15. In a molding machine, a flask, a support therefor, a measuring tool having a ramming portion, said tool supported within said
60 flask and forming therewith a chamber to receive the mold composition, a main pattern, means for moving the flask carrying the measuring tool and mold composition into
65 and out of the line of movement of the main

pattern, and means for advancing said main pattern into the flask to engage said tool and force the same out of said flask whereby the mold composition is rammed and shaped.

16. In a molding machine, a flask, a support therefor, a socket pattern, means for supporting the same within the flask, a measuring tool, means for supporting said tool within said flask, said flask, pattern and tool together forming a chamber to receive
70 the mold composition, a main pattern, means for moving said flask with the socket pattern and measuring tool supported therein into and out of the line of movement of the main pattern, means for advancing said main pattern into the flask to engage the tool and
80 force the same out of the flask, and means whereby the advancing movement of the main pattern is imparted to the socket pattern.

17. In a molding machine, a main pattern and means for moving the same longitudinally, in combination with a flask, a casing supporting the same, a socket pattern arranged within the casing, a measuring tool
90 arranged and supported within the flask, and means for conveying the casing into the line of movement of the main pattern moving means.

18. In a molding machine, a main pattern and means for moving the same longitudinally, in combination with a flask, a casing supporting the same, a socket pattern arranged within the casing, a measuring tool
95 arranged and supported within the flask, and provided with a ramming portion, and means for moving the casing into and out of the line of movement of the main pattern moving means.

19. In a molding machine, a pattern and means for moving the same longitudinally, in combination with a flask, a measuring tool independent of the pattern and having arms arranged to be received and to rest on the
105 end of said flask whereby said tool is supported and centered within said flask, said tool and flask forming a chamber to receive the mold composition, the pattern while being advanced into the flask, adapted to engage the measuring tool and force the same out of
110 the flask and means for moving said flask and tool and composition carried thereby into and out of the line of movement of the pattern.

20. In a molding machine, a flask, a casing supporting the same, and a measuring tool arranged and supported within said flask, said flask, casing and tool together forming a
120 chamber or space into which the mold composition is delivered, and means for moving the flask casing and tool together.

21. In a molding machine, a main pattern and means for moving the same longitudinally, in combination with a flask, a support therefor, a socket pattern means for support-
130

ing the same within said flask, a measuring tool also arranged and supported with said flask, one end of said tool being centered by said socket pattern, means for centering the other end of said tool with reference to the flask; said flask, tool and socket pattern together forming a chamber to receive and support the mold composition, and means for moving the flask carrying the tool socket pattern and composition into and out of the line of movement of the main pattern.

22. In a molding machine, a flask, a socket pattern arranged adjacent the lower end of the flask, a measuring tool arranged and supported within said flask, means for centering said tool with reference to said pattern, a main pattern, means for operating the same, and means for conveying the flask, socket pattern and measuring tool together into the line of operation of the main pattern.

23. In a molding machine, a flask, a measuring tool arranged therein and forming therewith a chamber to receive the mold composition, in combination with a plunger, and means for moving the flask and tool into register with the line of movement of the plunger, whereby the plunger may move through the flask and force the tool out of the same.

24. In a molding machine, a main casing, a longitudinally moving pattern arranged therein, and means for moving the same, in combination with a revolving table, a series of auxiliary casings carried thereby, flasks, means for detachably securing said flasks to said auxiliary casings, a movable socket pattern arranged in each auxiliary casing, measuring tools, means for centering said tools within said flasks, thereby forming with said flasks, auxiliary casings and socket patterns, chambers or spaces to receive the sand or other mold composition, said auxiliary casings adapted to be successively brought into alinement with said longitudinally moving pattern, when said table is revolved.

25. In a molding machine, a main casing, a pattern arranged therein, and means for moving the same longitudinally in combination with a revolving table, a standard carried thereby, and provided with an arm, an auxiliary casing carried by said table, a flask adapted to be detachably secured to said auxiliary casing, and a counterbalanced measuring tool suspended from said arm, and over said flask.

26. In a molding machine, the combination with mold forming devices, and means for operating the same, of a flask, a socket pattern associated therewith, a measuring tool arranged and supported within said flask and in centered relation with respect to said pattern, said flask, pattern and tool forming a chamber to receive a column of sand, and means for moving said flask and associated parts containing the column of sand into

centered relation with respect to said mold forming devices.

27. In a molding machine, the combination with a main pattern and means for operating the same of a revolving table, a series of flasks supported upon said table and adapted to be successively brought into alinement with the main pattern when said table is revolved and a socket pattern supported in each flask.

28. In a mold forming machine the combination with mold forming devices, of a series of flasks, and means for successively bringing said flasks into alinement with said mold forming devices, a standard a swinging support thereon, and a spigot pattern carried by said swinging support and adapted to be brought into and out of alinement with the mold forming devices and over the flasks.

29. In a mold forming machine the combination with mold forming devices of a swinging support, and a spigot pattern carried by said support, whereby said pattern may be swung into and out of alinement with said mold forming devices said pattern being movably suspended from said support.

30. In a mold forming machine, the combination with a flask, a main pattern, and means for advancing said pattern through the flask, of a spigot pattern, and a swinging support therefor, whereby said spigot pattern may be swung into and out of alinement with said main pattern said spigot pattern being movably suspended from said support.

31. In a molding machine, the combination with a flask, a main pattern and means for moving said main pattern longitudinally through the flask, of a spigot pattern, a swinging arm, said spigot pattern being movably suspended from said arm, and means for counterbalancing said spigot pattern upon said swinging arm.

32. In a molding machine, the combination with a main pattern, a revolving table, flasks carried thereby and adapted to be successively brought into alinement with said main pattern when the table is revolved, of a swinging arm, a spigot pattern carried thereby, and means for automatically attaching and detaching said spigot pattern with reference to the main pattern.

33. In a molding machine, the combination with mold forming devices, of a carrier, flasks removably mounted thereon, a socket pattern associated with each flask, whereby when the carrier is actuated a flask and a socket pattern is presented in alinement with the mold forming devices, means actuated by the mold forming devices for advancing the socket pattern to its work, a rod connected to the socket pattern and provided with a hooked end, a lever arranged adjacent the mold forming devices into cooperative relation with which the hooked end of said rod is brought when the socket pattern is brought

into alinement with the mold forming devices, and means actuated by the withdrawal movement of the mold forming devices for rocking said lever.

5. 34. In a molding machine, a main pattern, a carrier, a socket pattern and flask mounted on said carrier, whereby when said carrier is operated said socket pattern and flask are brought into alinement with said main pattern means for moving said main pattern into and withdrawing the same from said flask, a hook rod connected to the socket pattern, means for advancing said socket pattern to its work, a lever mounted adjacent the line of movement of the main pattern and into coöperative relation with which the hook rod is brought when the socket pattern is moved into alinement with the main pattern, and means operated by the withdrawal movement of the main pattern for rocking said lever.

35. In a molding machine a main casing, a main pattern mounted therein, means for moving said pattern, a revolving table, an auxiliary casing mounted on said table, a flask carried by said auxiliary casing, a

socket pattern arranged within said auxiliary casing and having a hook rod, a lever mounted in said main casing to rock or swing in the path of movement of said hook rod, and means operated by the movement of said main pattern for rocking said lever.

36. In a molding machine, a main casing, a main pattern mounted therein, means for moving said pattern, a revolving table, an auxiliary casing mounted thereon, a flask and a socket pattern carried by said auxiliary casing, means operated by the main pattern moving means for advancing the socket pattern to its work, means for automatically locking said socket pattern in its advanced position, and means for automatically releasing said locking mechanism.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 16th day of January A. D., 1907.

WILLIS C. SWIFT.

Witnesses:

JOSEPH KLEIN,
S. E. DARBY.