

1,022,240.

Patented Apr. 2, 1912.
3 SHEETS-SHEET 1.

Fig. 1.

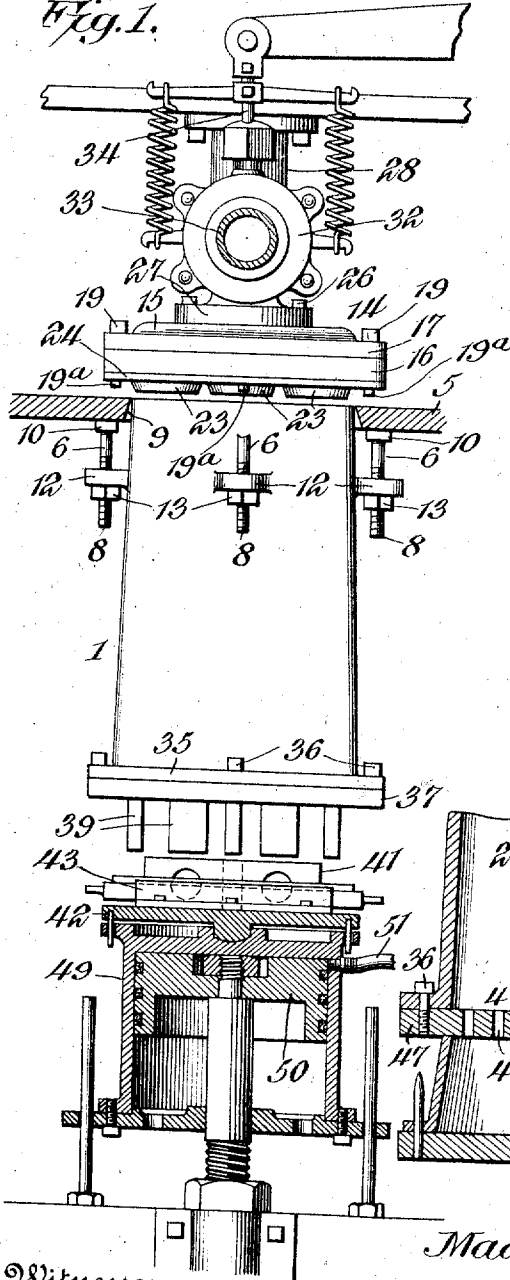


Fig. 6.

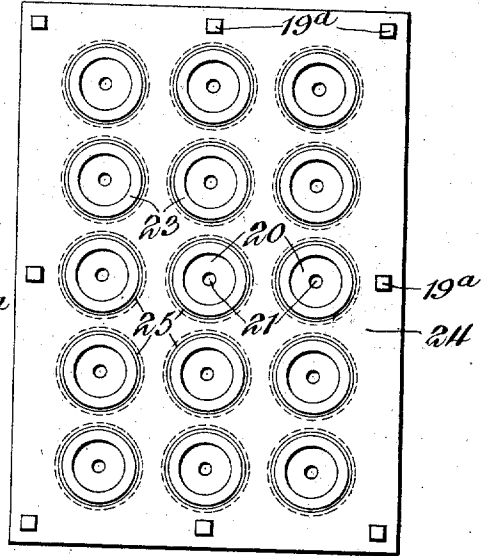
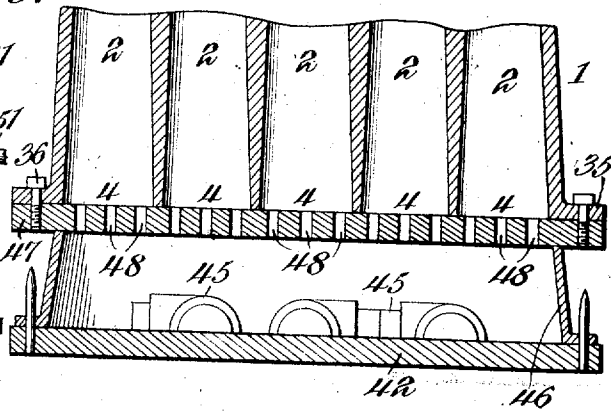


Fig. 7.



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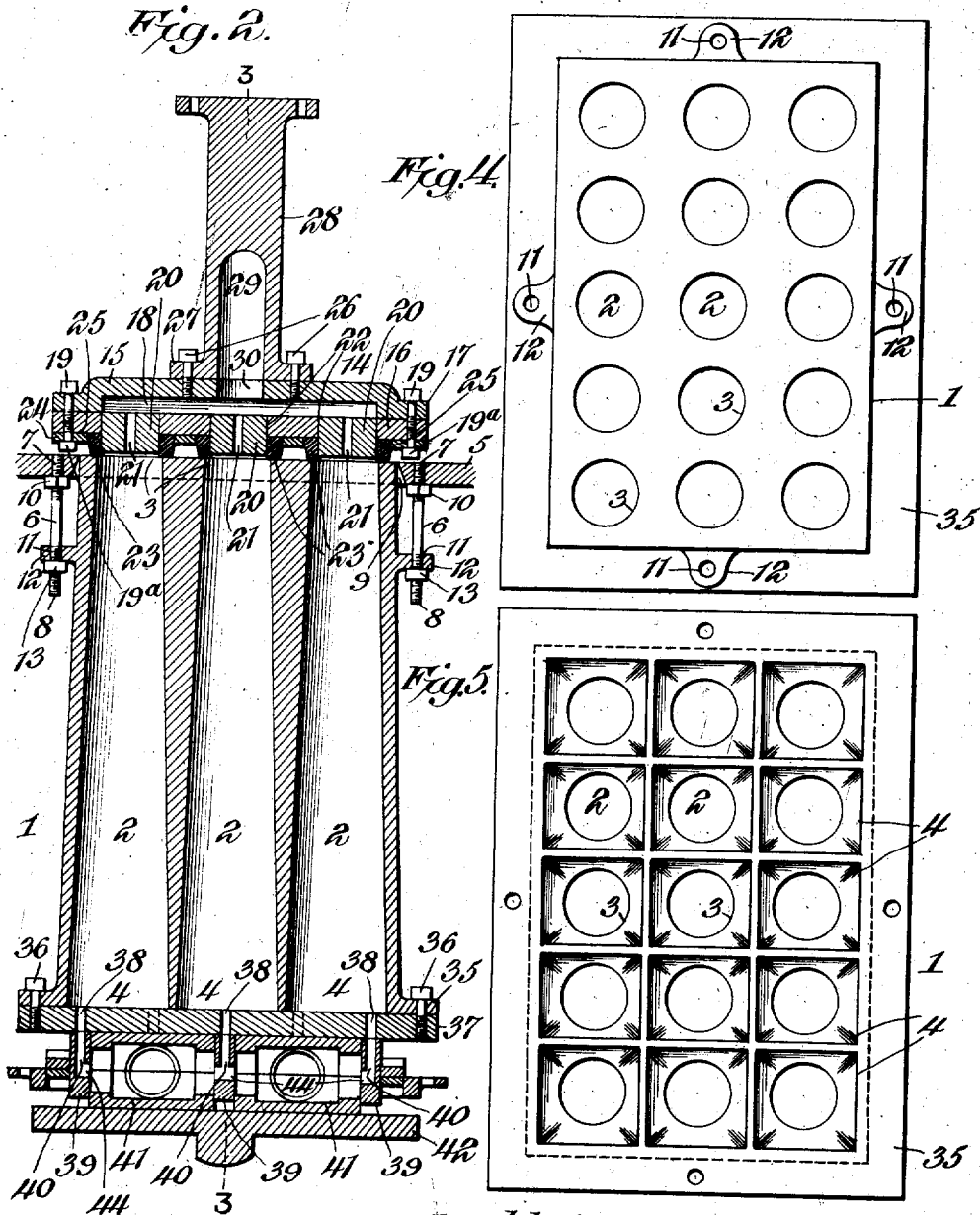
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3 SHEETS-SHEET 2,



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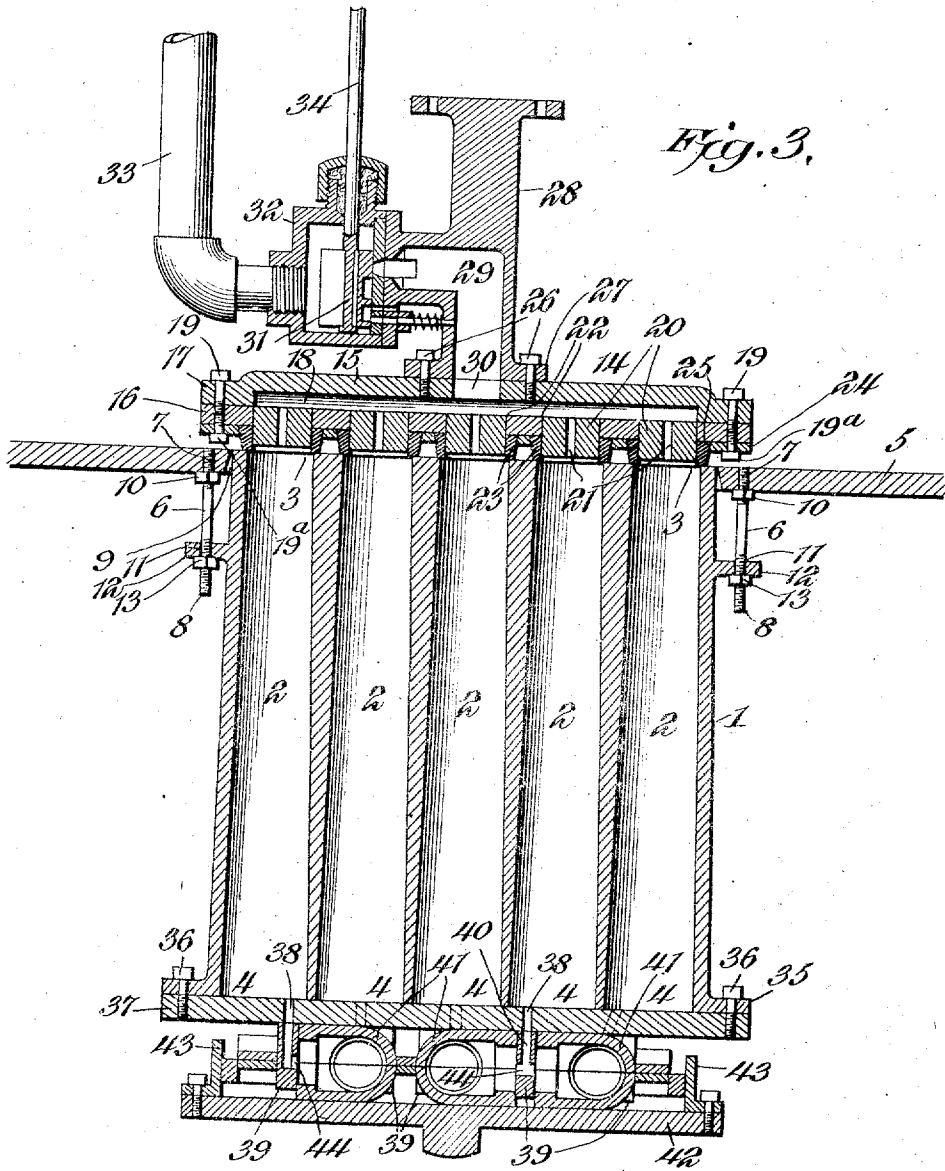
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MOLDING APPARATUS.
APPLICATION FILED JULY 18, 1911.

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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

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MOLDING APPARATUS.

1,022,240.

Specification of Letters Patent.

Patented Apr. 2, 1912.

Application filed July 18, 1911. Serial No. 639,165.

To all whom it may concern:

Be it known that I, MADDRA J. HEWLETT, a citizen of the United States, residing at Kewanee, in the county of Henry and State of Illinois, have invented a new and useful Molding Apparatus, of which the following is a specification.

The invention relates to improvements in apparatus for the molding of sand or analogous material, either for the formation of cores or in the making of molds in which the expansive force of compressed air is employed to carry the sand to and pack it in the mold or molds.

Heretofore when the relatively large sand holding or compression chamber or receptacle has been employed for molding a large number of cores or for making a relatively large mold, it has been found that the compressed air will cut grooves or passages through the body of the sand within the sand holding or compression chamber or receptacle, and that after these grooves or passages are formed the air will travel through them to the core box or flask and fail to carry the sand with it. As a result of this, most of the air will escape and the core box or flask will become filled with air instead of sand, and it will be necessary to clean out the molding apparatus and start over again.

The object of the present invention is to improve the construction of molding apparatus of this character, more especially the construction of the sand holding or compression chamber or receptacle and the means for introducing compressed air into the same and for connecting the sand holding or compression chamber or receptacle with the core box or flask, whereby the compressed air will positively carry the sand from a relatively large compression chamber or receptacle and to a core box or flask and firmly pack the sand therein.

A further object of the invention is to provide a molding apparatus equipped with a sub-divided sand holding or compression chamber or receptacle having a plurality of separate pockets or compartments, adapted to be equally supplied with fluid pressure, and capable of causing the same to carry the sand from the compression chamber or receptacle to the core box or flask to be discharged.

With these and other objects in view, the invention consists in the construction and

novel combination of parts hereinafter fully described, illustrated in the accompanying drawings, and pointed out in the claims hereto appended; it being understood that 60 various changes in the form, proportion, size and minor details of construction, within the scope of the claims, may be resorted to without departing from the spirit or sacrificing any of the advantages of the 65 invention.

In the drawings:—Figure 1 is a vertical sectional view of a portion of a molding apparatus provided with a sand holding or compression chamber or receptacle, constructed in accordance with this invention. Fig. 2 is an enlarged vertical sectional view through the sand holding or compression chamber or receptacle. Fig. 3 is a vertical sectional view, on the line 3—3 of Fig. 2. Fig. 4 is a plan view of the sub-divided sand holding compression chamber or receptacle. Fig. 5 is a reverse plan view of the same, the bottom plate being removed. Fig. 6 is a reverse plan view of the compressed air cap. Fig. 7 is a vertical sectional view of the lower portion of the sub-divided sand holding or compression chamber or receptacle, showing the same equipped with a perforated bottom plate for charging 85 a flask.

Like numerals of reference designate corresponding parts in all the figures of the drawings.

In the accompanying drawings in which 90 is illustrated the preferred form of the invention, 1 designates a sub-divided sand holding receptacle, constituting a compression chamber and provided with a plurality of upright pockets or compartments 2, tapered upwardly and gradually increasing in diameter from their upper to their lower ends. Each compartment or unit of the compression chamber or receptacle is circular in cross section at the upper end 3 and 100 is rectangular at the lower end 4. The pockets or compartments gradually increase in area from the top to the bottom, and the walls at the circular upper portions merge into the rectangular lower portion. The 105 increasing area of the pockets or compartments from top to bottom prevents the sand from adhering to the side walls and causes the sand to feed downward regularly and prevents the formation of air holes or passages. The sand holding or compression 110 receptacle is oblong in plan view, as clearly

illustrated in Figs. 4 and 5 of the drawings, but it may be square, or any other preferred configuration and may be of any desired size, the construction being particularly adapted for use in the larger sizes of molding apparatus.

The sub-divided sand holding receptacle is suspended from the table 5 by means of vertical bolts 6, having threaded upper and lower ends 7 and 8. The table 5, which is reciprocable laterally to carry the sand holding receptacle to and from a suitable source of sand supply, is provided with an opening 9 into which the upper end of the sand holding receptacle 1 extends, the upper edges of the sand holding receptacle being normally in flush relation with the upper face of the table 5. The upper threaded ends 7 of the vertical bolts 6 engage threaded openings in the table 5 and are rigidly secured therein by means of jam nuts 10. The lower portions of the bolts 6 extend through perforations 11 of horizontal projecting lugs 12, and receive supporting nuts 13 upon which the lugs 12 rest. The lugs are formed integral with the sub-divided sand holding receptacle 1, and the supporting nuts are adjustable to position the said receptacle 1 properly with relation to the table. The openings or perforations 11 of the lugs 12 are of sufficient size to permit the sand holding receptacle to be moved upward independently of the table by the means hereinafter described to engage the upper end of the said receptacle with a compressed air cap 14 to make an air tight joint or connection prior to simultaneously introducing compressed air into the pockets or compartments of the sand receptacle 1. The compressed air cap 14 comprises upper and lower plates 15 and 16, the upper plate being provided with a depressed marginal portion or flange 17, which spaces the body portion of the upper plate 15 from the lower plate 16 to provide an interior chamber 18. The marginal flange 17 is secured by bolts 19 to the marginal portion of the lower plate 16, which is equipped with a plurality of projecting plugs 20, having air passages or openings 21, which communicate with the pockets or compartments of the sand holding receptacle when the compressed air cap is engaged with the same, as clearly illustrated in Figs. 2 and 3 of the drawings. The plugs 20, which project from the bottom face of the lower plate 16, are round and are suitably secured in circular openings 22 of the said lower plate 16. The plugs may be secured within the openings of the lower plate 16 in any suitable manner, and their projecting portions receive rings 23 of rubber or other yieldable or elastic material, which registers with the circular upper ends of the pockets or compartments of the sub-divided sand holding

receptacle 1 and seal the same while the compressed air is being introduced into the said pockets or compartments. The sealing rings are tapered or beveled at their outer faces, and they are held in place by means of a retaining plate 24, secured to the bottom face of the lower plate 16 by bolts 19 and provided with circular openings 25, which are interiorly beveled to fit the taper of the sealing rings. The compressed air cap is secured by bolts or screws 26 to a lower attaching flange 27 of a stem or standard 28, which is provided with a passage 29, communicating with the chamber 18 of the compressed air cap through an opening 30 in the upper plate thereof. The means for supplying compressed air to the compartments or pockets of the sand holding receptacle consists of suitable valve mechanism connected with the passage 29 and preferably comprising a slide valve 31 and a valve casing 32, mounted on the stem or standard and connected by a pipe 33 with a suitable source of compressed air supply. The slide valve 31 is connected with a valve rod 34 and is designed to be automatically actuated in the operation of the molding apparatus, suitable feed and exhaust ports or passages being provided. As the valve mechanism for controlling the supply and exhaust of compressed air does not constitute a portion of the present invention, and as any suitable means may be employed for this purpose, further description thereof is deemed unnecessary. The sub-divided sand holding chamber is provided at its bottom with an outwardly extending horizontal attaching flange 35 to which is secured by bolts or screws 36 a bottom plate 37, adapted to support the sand within the pockets or compartments of the receptacle 1, and provided with outlets 38 for the discharge of the sand-laden compressed air. The bottom plate 37 is equipped at its lower face with a plurality of nozzles or connecting blocks 39, having blow openings or passages 40, extending from the outlets 38 of the bottom plate and designed to communicate with the interior of core molds 41 for charging the latter with sand. The core molds are arranged upon a suitable support 42, and the bottom plate 37 is detachable to enable various bottom plates to be applied to the sub-divided sand holding receptacle, so that the said receptacle may be readily equipped with a bottom plate having nozzle or connecting blocks corresponding with the openings of the core molds to be charged. The support 42 is provided with upwardly projecting walls 43 for retaining the core molds or plates in position upon the support, and the nozzle or connecting blocks depend vertically from the lower face of the bottom plate 37, and the passages 40, which extend downwardly from the outlets 38, have lat

eral discharge orifices 44, communicating with the core molds. The blocks or plugs 39 have flat vertical side faces, and they are adapted to form practically air tight closures for the openings of the core molds, as clearly illustrated in Figs. 2 and 3 of the drawings.

When the apparatus is employed for the making of sand molds, the patterns 45 are placed within a flask 46, and the sub-divided sand holding receptacle 1 is equipped with a bottom plate 47, having a plurality of perforations 48 at the lower end of each of the pockets 2. The compressed air carries the sand from the pockets into the flask 46 and packs it around the pattern 45. The bolts or screws 36 engage suitable threaded perforations in the bottom plate 47, and the latter may be readily attached to and removed from the lower end of the sand holding receptacle.

The support 42 with the core molds and the flask 46 with the patterns are in the operation of the apparatus carried by a vertically movable cylinder 49, co-acting with a relatively fixed piston 50 and operated by compressed air or other fluid pressure, which is introduced into the cylinder between the upper end or head thereof and the piston 50 through a pipe 51, suitable valve mechanism (not shown) being employed for controlling the feed and exhaust of such fluid pressure. The upward movement of the cylinder 49 lifts the support 42 and carries the core molds into contact with the bottom plate 37 and brings the passages 40 of the plugs or blocks 39 into communication with the core molds, and a continued upward movement of the cylinder lifts the sand holding receptacle and carries the top thereof into contact with the rubber rings of the compressed air cap, thereby sealing the upper ends of the pockets or compartments of the sub-divided receptacle 1. After proper contact has been made at the top and bottom of the sand holding receptacle, the slide valve 31 is automatically operated to introduce compressed air into the pockets or compartments 2. The combined area of the openings or passages 21 of the plugs 20 of the compressed air cap is less than the area of the supply or feed port of the slide valve, so that each of the pockets or compartments of the receptacle 1 will receive a full supply of compressed air, and one pocket or compartment will thereby be prevented from robbing another and a complete discharge of sand will be effected. Also the fluid pressure within the cylinder is greater than the air pressure within the sand holding receptacle, so that proper contact between the various parts is maintained while the sand is being operated on by compressed air. The slide valve 31 is then reversed to exhaust the compressed air within the sand

holding receptacle, and the fluid pressure within the cylinder 49 is also exhausted to permit the cylinder to descend to the position illustrated in Fig. 1 of the drawings, so that the empty sand holding receptacle 70 may be shifted laterally to carry it to the sand supply, and to simultaneously bring a filled sand holding receptacle in position over the cylinder. As the construction of the cylinder and the operating mechanism 75 does not constitute a portion of the present invention, further description and illustration thereof are deemed unnecessary.

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

1. A sand molding apparatus comprising a sand holding receptacle having a plurality of separate sand receiving pockets or compartments, each having a separate sand outlet, and means for supplying compressed air to the sand holding receptacle for simultaneous delivery to the said pockets or compartments.

2. A sand molding apparatus comprising a sand holding receptacle provided with a plurality of separate sand receiving pockets or compartments and provided at the bottom of each of the pockets or compartments with a sand outlet, and means located at the top of the said receptacle for supplying compressed air to the same for simultaneous delivery to the pockets or compartments, said means including separate openings or passages for each of the pockets or compartments.

3. A sand molding apparatus comprising a sand holding receptacle having a plurality of upright sand holding pockets or compartments gradually increasing in area from the top to the bottom and provided at the latter with sand outlets, and means for supplying compressed air to the pockets or compartments of the said receptacle.

4. A sand molding apparatus comprising a sub-divided sand holding receptacle having a plurality of separate sand receiving pockets or compartments tapered upwardly and gradually increasing in diameter from top to bottom, the upper portions of the pockets or compartments being circular and the lower portions being rectangular, the walls of the upper portion gradually merging into the walls of the lower portion, said receptacle being provided at the bottom of the pockets with sand outlets, and means located at the upper ends of the pockets or compartments for supplying the same with compressed air.

5. A sand molding apparatus comprising a sub-divided sand holding receptacle having a plurality of sand receiving pockets or compartments and provided at the lower end thereof with sand outlets, and a compressed air cap arranged at the top of the said re-

ceptacle and extending over the upper ends of all the pockets or compartments and having separate air passages or openings communicating with the upper ends of each of the pockets or compartments for simultaneous delivery of compressed air to the same.

6. A sand molding apparatus comprising a sub-divided sand holding receptacle having a plurality of sand receiving pockets or compartments and provided at the lower end thereof with sand outlets, and a compressed air cap having an interior chamber and provided at the bottom thereof with separate passages or openings communicating with each of the pockets or compartments for simultaneous delivery of compressed air to the same.

7. A sand molding apparatus comprising a sub-divided sand holding receptacle having a plurality of sand receiving pockets or compartments and provided at the lower end thereof with sand outlets, and a compressed air cap arranged at the top of the said receptacle and having projecting portions registering with the upper ends of the pockets or compartments and provided with openings or passages communicating with the same for simultaneous delivery of compressed air to the said pockets or compartments.

8. A sand molding apparatus comprising a sub-divided sand holding receptacle having a plurality of sand receiving pockets or compartments and provided at the lower end thereof with sand outlets, a compressed air cap arranged at the top of the said receptacle and extending over the upper ends of all of the pockets or compartments and having projecting portions registering with the upper ends of the pockets or compartments and provided with openings or passages communicating with the same for simultaneous delivery of compressed air thereto, and yieldable means surrounding the projecting portions of the compressed air cap and arranged to form a seal for the upper ends of the pockets or compartments.

9. A sand molding apparatus comprising a sub-divided sand holding receptacle having a plurality of sand receiving pockets or compartments and provided at the lower end thereof with sand outlets, a compressed air cap arranged at the top of the sand receptacle and having projecting portions registering with the upper ends of the pockets or compartments and provided with openings or passages communicating with the same for simultaneous delivery of compressed air thereto, and elastic sealing rings arranged on the projecting portions of the compressed air cap and adapted to be compressed between the latter and the receptacle to seal the upper ends of the pockets or compartments.

10. A sand molding apparatus comprising a sub-divided sand holding receptacle having

a plurality of sand receiving pockets or compartments and provided at the lower end thereof with sand outlets, a compressed air cap arranged at the top of the sand receptacle and having projecting portions registering with the upper ends of the pockets or compartments and provided with openings or passages communicating with the same, elastic sealing rings arranged on the projecting portions of the compressed air cap and adapted to be compressed between the latter and the receptacle to seal the upper ends of the pockets or compartments, and a retaining plate secured to the compressed air cap and having openings through which the sealing rings project.

11. A sand molding apparatus comprising a sub-divided sand holding receptacle having a plurality of sand receiving pockets or compartments and provided at the lower end thereof with sand outlets, a compressed air cap having an interior chamber and provided at the bottom thereof with openings, plugs secured in the said openings and projecting from the bottom of the compressed air cap and registering with the pockets or compartments of the said receptacle and having openings or passages to communicate with the same, sealing rings arranged on the projecting portions of the plugs and adapted to be pressed between the receptacle and the compressed air cap, and means for retaining the sealing rings on the plugs.

12. A sand molding apparatus comprising a sub-divided sand holding receptacle having a plurality of sand receiving pockets or compartments and provided at the lower end thereof with sand outlets, a compressed air cap having an interior chamber and provided at the bottom thereof with openings, plugs secured in the said openings and projecting from the bottom of the compressed air cap and registering with the pockets or compartments of the said receptacle and having openings or passages to communicate with the same, exteriorly tapered sealing rings arranged on the projecting portions of the plugs, and a retaining plate secured to the bottom of the compressed air cap and having interiorly beveled openings fitting the sealing rings and through which the latter project.

13. A sand molding apparatus comprising a sub-divided sand holding receptacle having a plurality of sand receiving pockets or compartments and provided at the bottom thereof with outlets, a compressed air cap arranged at the top of the receptacle and composed of top and bottom plates secured together and forming an interior chamber, the bottom plate being provided with openings or passages communicating with the pockets or compartments of the said receptacle.

14. A sand molding apparatus comprising

a sub-divided sand holding receptacle having a plurality of sand receiving pockets or compartments and provided at the bottom thereof with outlets, a compressed air cap arranged at the top of the receptacle and composed of top and bottom plates secured together and forming an interior chamber, the bottom plate being provided with openings, plugs secured in the openings of the bottom plate and projecting therefrom and having passages to communicate with the said pockets or compartments, and sealing means carried by the projecting portions of the plugs and arranged to be compressed between the receptacle and the said compressed air cap to form an air tight joint or connection.

15. A sand molding apparatus comprising a sub-divided sand holding receptacle having a plurality of sand receiving pockets or compartments, means common to all the pockets or compartments and located at the top of the receptacle for simultaneously supplying the pockets or compartments with compressed air, and a plate secured to the receptacle at the bottom of the pockets or compartments and having separate outlets for the same.

16. A sand molding apparatus comprising a sub-divided sand holding receptacle having a plurality of sand receiving pockets or compartments, means located at the top of the receptacle for supplying the pockets or compartments with compressed air, a plate secured to the receptacle at the bottom of the pockets or compartments and having separate outlets for the same, and blocks or plugs depending from the said

plate and having passages communicating with the said outlets and adapted to connect the latter with core molds.

17. A sand molding apparatus comprising a sub-divided sand holding receptacle having a plurality of sand receiving pockets or compartments, means located at the top of the receptacle for supplying the pockets or compartments with compressed air, a plate secured to the receptacle at the bottom of the pockets or compartments and having separate outlets for the same, and blocks or plugs depending from the said plate and provided with passages communicating with the said outlets, said blocks or plugs having vertical side faces adapted to form closures for core molds.

18. A sand molding apparatus comprising a sub-divided sand holding receptacle having a plurality of sand receiving pockets or compartments, means located at the top of the receptacle for supplying the pockets or compartments with compressed air, a plate secured to the receptacle at the bottom of the pockets or compartments and having separate outlets for the same, and blocks or plugs depending from the said plate and forming closures for core molds and provided with passages communicating with the said outlets and having lateral discharge orifices.

In testimony, that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

MADDRA J. HEWLETT.

Witnesses:

W. E. GOULD,
JOHN FISHER.