

H. BRINKER.
MOLD FOR CLOSED CYLINDERS.
APPLICATION FILED JULY 11, 1908.

911,372.

Patented Feb. 2, 1909.

2 SHEETS—SHEET 1.

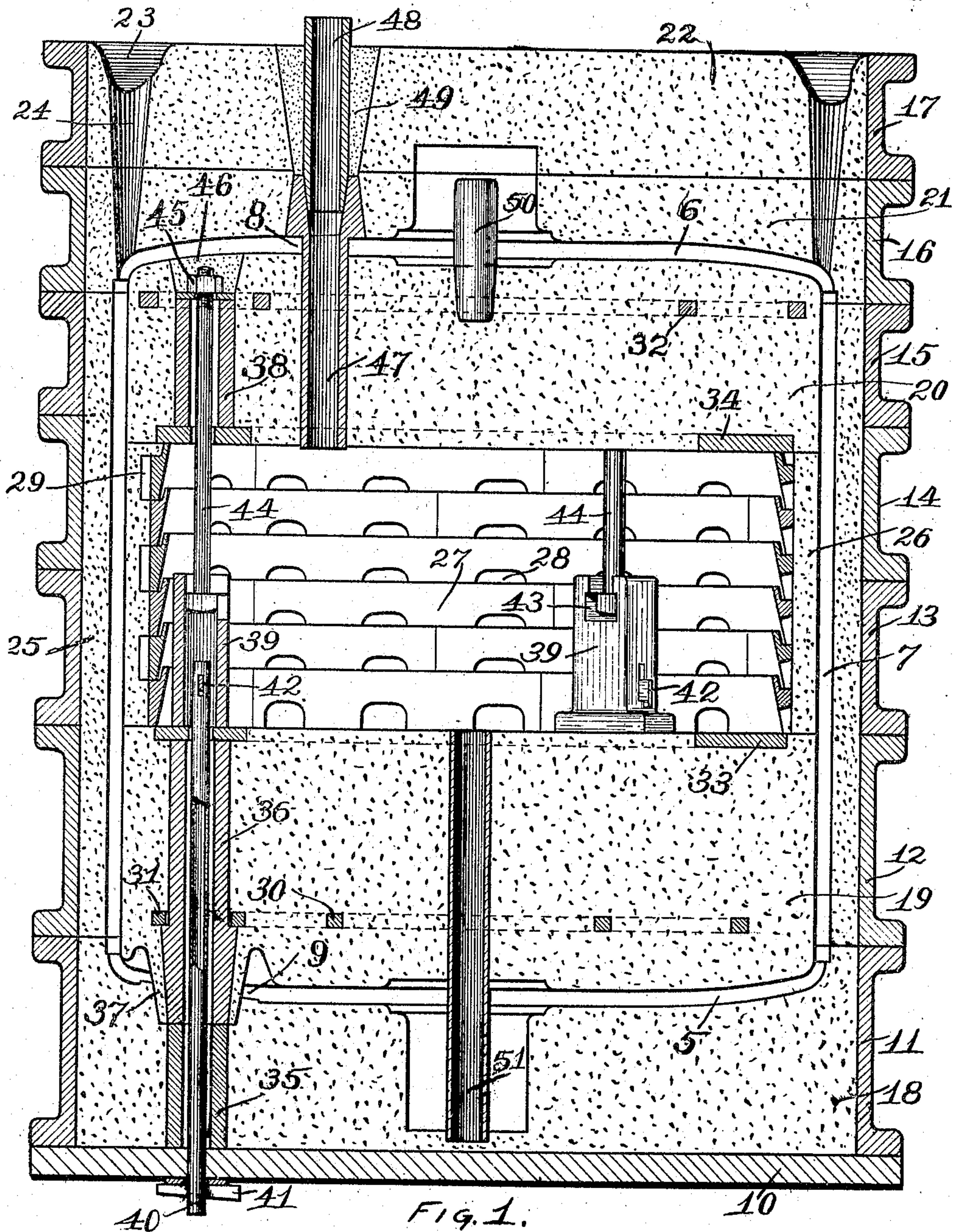


FIG. 1.

Witnesses:
Elmer R. Shipley
M. S. Belden.

Hermann Brinker
Inventor
by James W. See
Attorney

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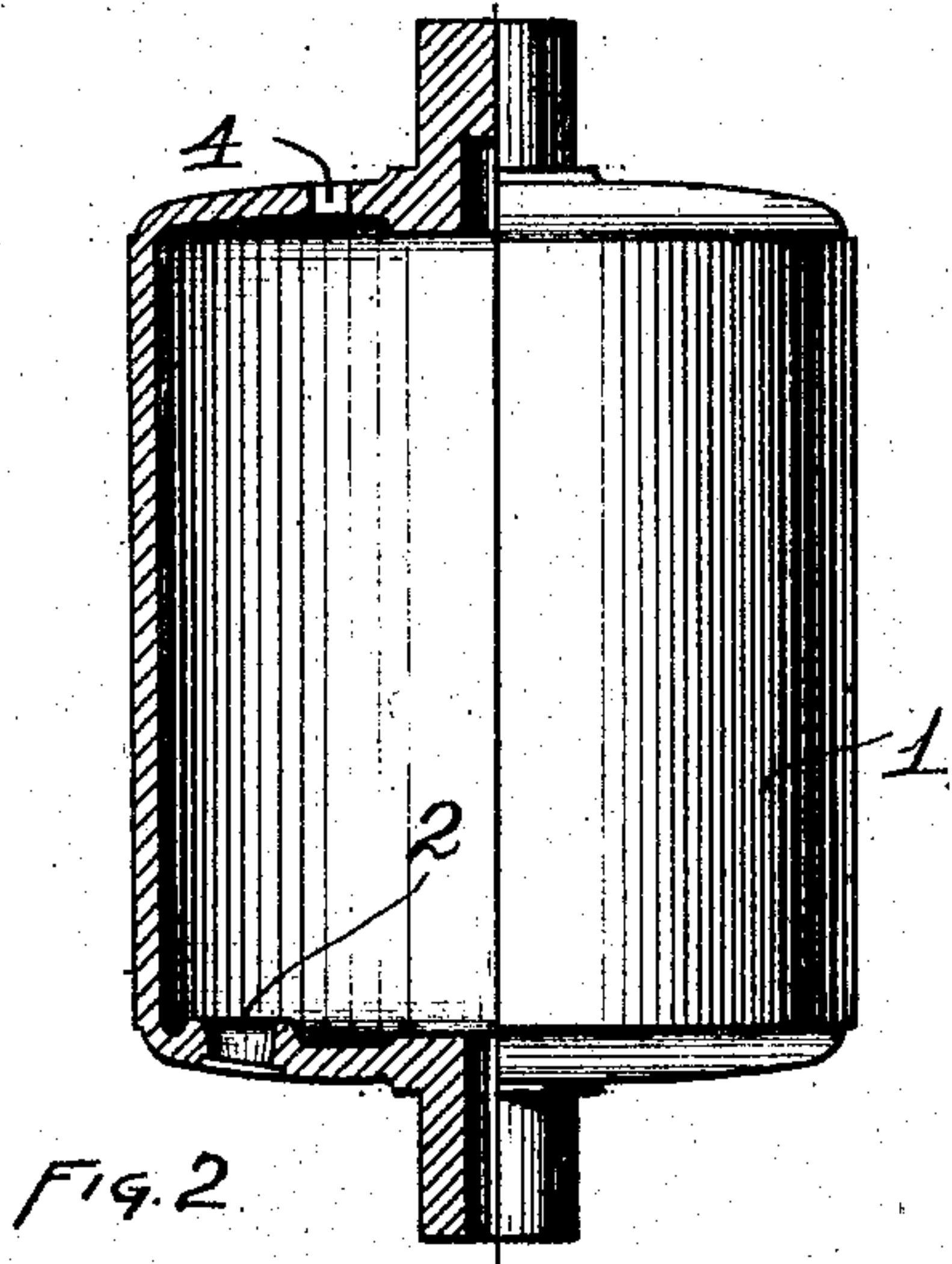


Fig. 2.



Fig. 4.

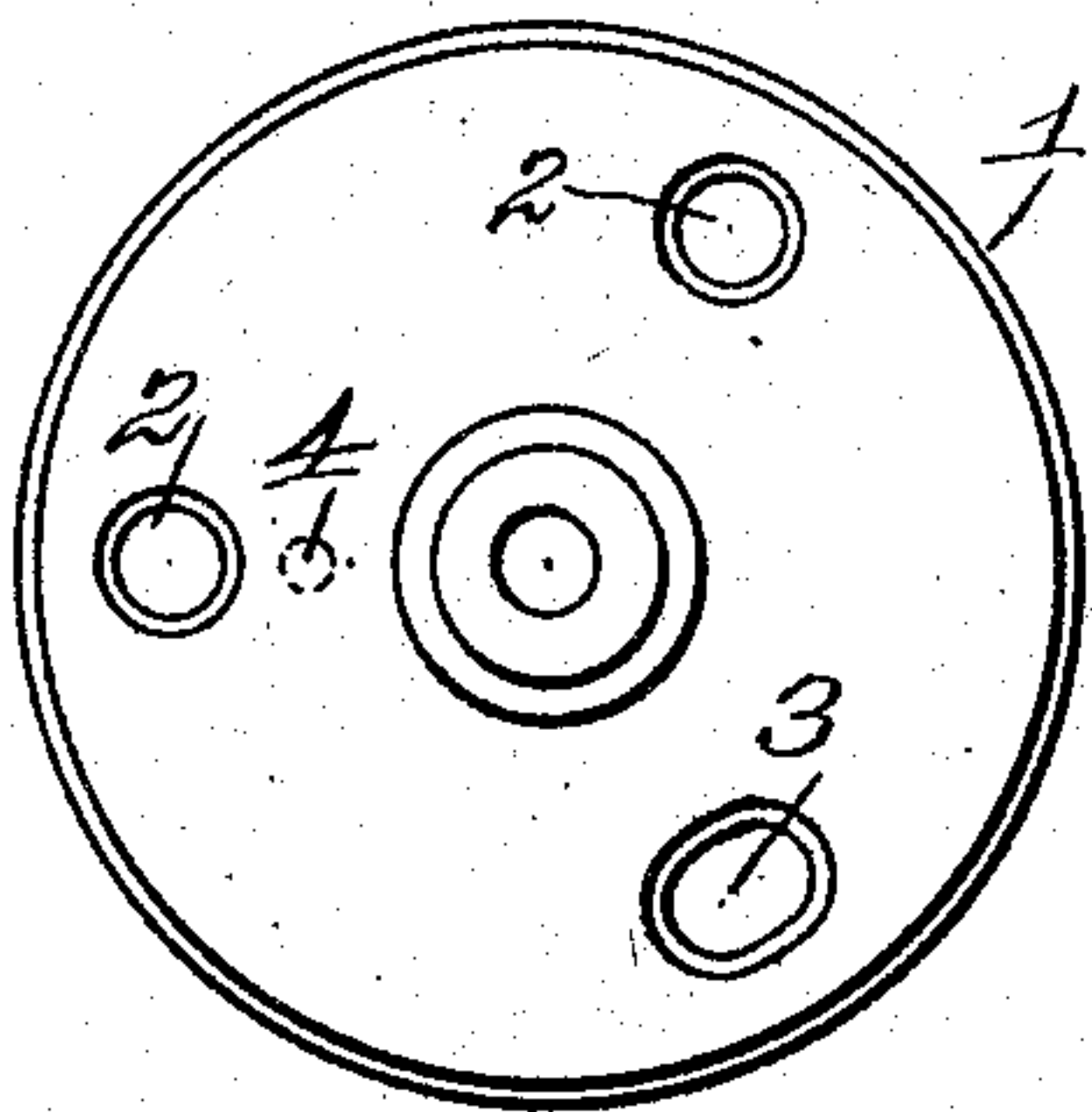


Fig. 3.

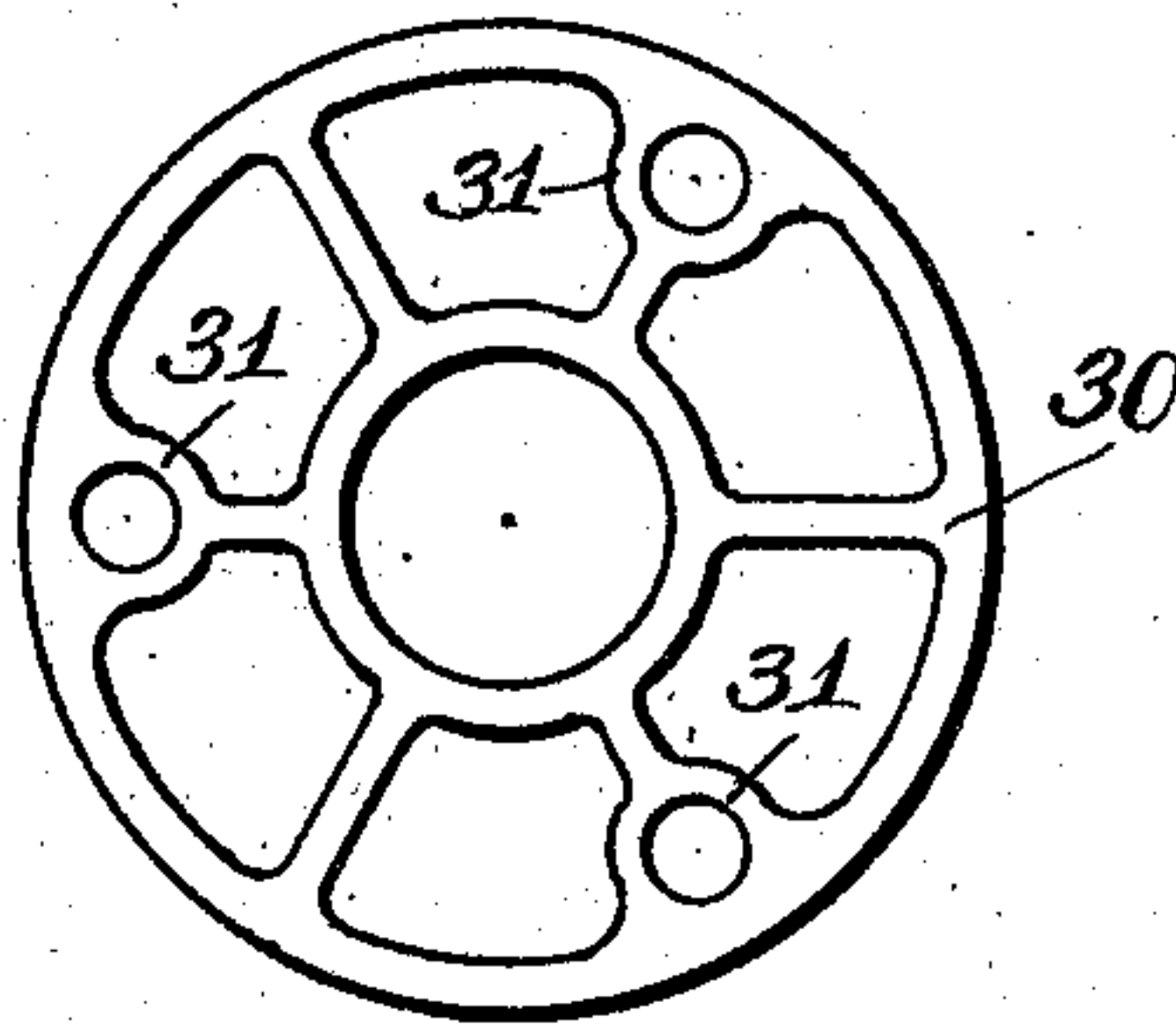


Fig. 5.

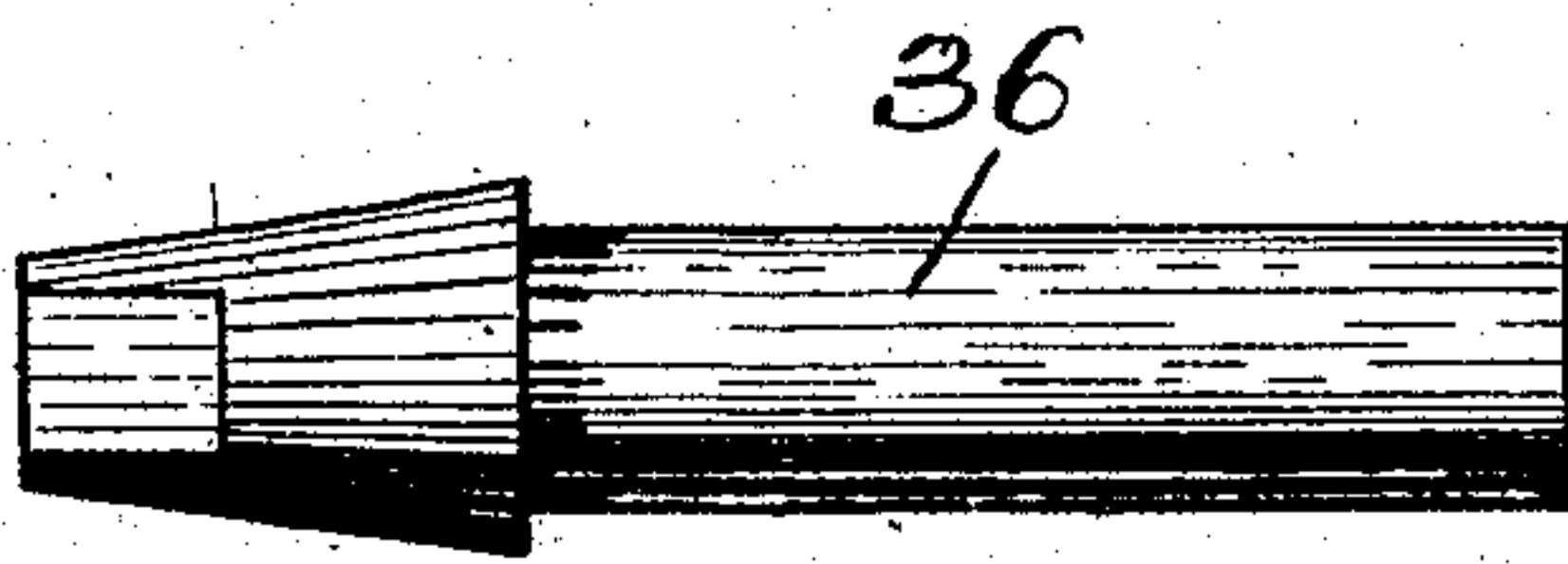


Fig. 6.

Witnesses:
Edmer R. Shipley
M. S. Belden.

Hermann Brinker
Inventor
by James W. S&E
Attorney

UNITED STATES PATENT OFFICE.

HERMANN BRINKER, OF HAMILTON, OHIO.

MOLD FOR CLOSED CYLINDERS.

No. 911,372.

Specification of Letters Patent.

Patented Feb. 2, 1909.

Application filed July 11, 1908. Serial No. 443,155.

To all whom it may concern:

Be it known that I, HERMANN BRINKER, a citizen of the United States, residing at Hamilton, Butler county, Ohio, have invented certain new and useful Improvements in Molds for Closed Cylinders, of which the following is a specification.

There is a class of rotary metallic drying cylinders employed in drying webs, as, for instance, in the driers connected with paper making machines. While many driers of this class are formed with a shell having its heads separably attached, there is a type known as seamless driers in which the entire cylinder, including the shell and its heads, is cast in one piece. The molds for producing these one-piece driers are built up, and the core is supported by feet at its bottom. While the molds usually employed for the production of these one-piece driers have been fairly satisfactory for ordinary lengths of driers there has still been a very serious loss of castings. In the modern developments of the paper making machine art the machines have been very much widened and the drying cylinders have been correspondingly lengthened, driers eight or more feet long not being uncommon. As these driers are subjected to internal pressure an apparently trifling lateral shifting of the core may be serious or even fatal to the utility of the very costly casting, and the core employed in the long driers, as ordinarily produced, is especially liable to transverse shifting at its top.

My present invention is designed to generally improve the molds employed in the production of these seamless driers, and particularly to guard against the usual lateral shifting of the top of the core.

My present invention will be readily understood from the following description taken in connection with the accompanying drawings in which:—

Figure 1 is a vertical longitudinal section of a mold embodying my invention: Fig. 2 an elevation, part vertical longitudinal section, of a typical drier to be produced in the mold: Fig. 3 an end elevation of that end of the drier corresponding with the lower end of the mold: Fig. 4 a plan of one of the segments of the core-barrel: Fig. 5 a plan of one of the core-grids: and Fig. 6 an elevation of one of the core-base tubes. Figs. 2, 3, 4 and 5 are on a smaller scale than the remaining figures.

In the drawings, referring for the present only to Figs. 2 and 3:—1, indicates a seamless drier, with its shell, heads, and journals cast in one piece: 2, a pair of hand-holes in one head of the drier: 3, a third hand-hole in the same head of the drier: and 4, a hole in the head opposite the one containing the hand-holes. That head of the drier provided with hand-holes 2 and 3 is the one to be downward when the drier is cast, and there are to be not less than three of the hand-holes in this lower end. My preference is to employ a plurality of circular hand-holes in conjunction with one elliptical hand-hole. Circular hand-holes and hand-hole plates are preferable to elliptical ones but circular hand-holes have the disadvantage of not being able to admit their own plates. In the preferable example referred to the plates for the circular hand-holes may be passed through the elliptical hand-holes, and the elliptical hand-hole will permit its own plate to enter. The hole 4 in that head of the drier opposite the one provided with hand-holes is for production purposes only and is to be plugged, preferably flush, before the drier is put into use. I will now describe my improved mold in the production of these driers.

Proceeding with the drawings, and particularly Fig. 1:—5, indicates the mold-space for the lower head of the drier: 6, the mold-space for the upper head: 7, the mold-space for the shell: 8, the location in the mold-space for the upper head corresponding with that of the hole 4 in the upper head of the drier: 9, the location in the mold-space of the lower head corresponding with one of the hand-holes in the lower head of the drier: 10, the bottom-board of the mold: 11 to 17, inclusive, the vertical series of flasks resting upon the bottom-board, this series of flasks to vary in number and total height according to the height of drier to be produced, and the individual flasks to be firmly clamped together as usual: 18, the lowermost mold section, or drag: 19, the lowermost core section: 20, the top core section: 21, the top mold section: 22, the basin section, sections 18 to 22 inclusive being preferably of core sand and baked: 23, the pouring basin in the top of the basin section: 24, the gates leading from the basin section to the mold space: 25, the drier shell mold sand between mold sections 18 and 21, this sand being, preferably, rammed up on a shell draw-pattern: and 26, the drier shell core sand between sections

19 and 20, this sand being also preferably rammed up in the draw-pattern for the shell.

All of the parts thus far described are, or may be, substantially as usual and produced in the usual manner in the making of seamless driers.

Proceeding with the drawings:—27, indicates core-barrel segments joining into the circles arranged in vertical series, the lower-
 10 most one resting on core-section 19, the upper edges of the segments being rabbeted to receive the lower edges of the superposed segments: 28, ports in the lower edges of the segments, the walls of these ports flaring
 15 outwardly in such manner that the sand which enters them in the course of ramming core portion 26 will choke within them instead of passing freely and wastefully into the interior of the core-barrel: 29, vertical
 20 dovetail ribs on the exterior of the core-barrel segments: 30, a horizontal skeleton grid incorporated within core-section 19 and serving to strengthen that core section to facilitate its being handled: 31, eyes formed
 25 in grid 30, one eye corresponding with the position of each of the hand-holes to be formed in the lower head of the drier: 32, a skeleton grid, similar to grid 30, and incorporated in top core section 20: 33, segments
 30 forming a ring embedded in the upper surface of core-base 19, these segments being provided with holes in line with each of the eyes in grid 30: 34, similar segments forming a ring embedded in the lower face of the
 35 core-section 20: 35, vertical tubes embedded in core-base 18 and resting on bottom-board 20, there being one of these tubes under each of the eyes 31 in grid 30, corresponding with the position of the hand-holes in the lower
 40 head of the drier: 36, tubes embedded in core-base 19, their lower ends resting on tubes 35 and their upper ends being engaged by segments 33, these tubes being provided with upwardly projecting shoulders,
 45 the portions of the tubes above the shoulders engaging the eyes 31 of grid 30, which grid rests downwardly upon the shoulders of the tubes; 37, core-bosses surrounding the lower ends of tubes 36 and projecting into drag-
 50 section 18 and forming the cores for the hand-holes in the lower head of the drier: 38, vertical tubes embedded in core-section 20, and extending from segments 34 up to near the top of that core section, there being one
 55 of these tubes in line with each of the tubes 36; 39, vertical couplings disposed within the core-barrel and resting on segments 33, one coupling over each of the tubes 36: 40, a bolt, preferably tubular, extending from
 60 below the bottom-board up through tubes 35 and 36 and into its appropriate coupling: 41, a tapering key in the lower end of each of the bolts 40 below the bottom-board: 42, a separable key uniting each bolt 40 with its
 65 appropriate coupling 39: 43, tee-slots in the

upper ends of the couplings 39: 44, bolts extending down through the tubes 38 and having their heads hooked into the tee-slots of the couplings: 45, nuts on the upper ends of the bolts 44, these nuts being disposed in
 70 recesses in the upper surface of core-section 20: 46, sand filling these recesses over these nuts: 47, a vertical tube embedded in core-section 20 and having a converging upper
 75 end engaging a converging socket formed in the base of mold-section 21, this tube being in the position corresponding with hole 4 in the upper end of the drier, which position is, however, rather immaterial in view of the
 80 fact that the hole is to be finally abandoned when plugged: 48, a vertical tube projecting freely through basin section 22 and having its lower end engaging the upper end of tube 47: 49, sand tightly packed in the opening of basin section 22 around tube 48: 50,
 85 journal-core for the upper journal of the drier, such core to be employed only in case it is desired to lighten or to have a hole entirely through the upper journal: and 51, the core for the lower journal, this core being
 90 preferably tubular and extending through the lower journal-space of the mold and through core-base 19 and into the interior of the core.

As the uniformity of the thickness of the
 95 shell of the core depends not only on the accuracy of the formation of the mold-parts but also upon the accuracy of their positioning with reference to each other, it is desirable that the upper face of the bottom-
 100 board and both ends of tubes 35, and at least the lower ends of tubes 36 should be accurately machined. The forming of basin section 22 separate from the upper mold-section 21 is desirable but not essential. The
 105 mold-base 18, the core-base 19, the core top 20, the upper mold section 21, and the basin section 22, are to be produced in the usual manner ready for use with their metal parts embedded in them.

Owing to the small quantity of sand in the
 110 core-bosses 37 surrounding the lower ends of tubes 36, the accurate positioning of these tubes is a matter of very considerable importance in forming the core-base. The
 115 eyes 31 carried by grid 30 serve in accurately positioning these tubes. If the grid, in being placed in the sand while the core is being formed, is allowed to tip out of parallelism with the face of the core then the eyes and
 120 tubes become malpositioned, the tubes being at wrong distances from the center of the core and becoming tipped at angles to the axis of the core. The resting of the eyes of the grid upon the shoulders of the tube insures accu-
 125 racy in all respects.

Flask 11 with its contained mold-base 18 when completed is to be set upon the bottom-board. Core-board 19 is then to be set in place with the bases of its tubes resting on
 130

tubes 35. Couplings 39 are then to be placed and bolts 40 connected with them and keyed up whereby the core-base becomes accurately positioned with reference to the mold-base and rigidly locked to it. The core-barrel may then be built up to some extent and, in connection with the usual draw pattern, the sand around the core-barrel may be rammed, and also the exterior sand for the shell, flask sections being added, and the core-barrel built up to such extent as is called for by the desired length of the drier. Core-top 20 is then placed in position and the bolts 40 applied in an obvious manner and tightened, thus completing the core and binding it firmly to the bottom-board, after which the sand 46 is filled in over the nuts on the rods. Mold-top 21 is then to be placed in position, the upper end of tube 47 serving to position and substantially stay the core with reference to the general mold, it being understood that the flask sections are clamped together in the usual manner. Basin section 22 is then placed, after which tube 48 is placed in position and sand 49 rammed around it and serving to lock tube 47 firmly and solidly to the mold even if the upper end of tube 47 does not snugly fit the recess in mold-top 21. It will be observed that the upper end of the core is firmly held so that when the metal is poured it is not liable to shift laterally.

By removing keys 41 all of the exterior mold-parts can be removed and the drier casting shaken out. The downwardly projecting ends of tubes 36 are flattened, as seen in Fig. 6, thus permitting the application of a wrench to the outer ends of these tubes, whereby they may be twisted loose in the core-base and withdrawn through the hand-holes through which they project. The core-base and its grid 30 may then be broken up by means of suitable tools employed through the hand-holes and the core-base and grid fragments and segments 33 removed through the hand-holes. The coupling may then be readily disengaged from the heads of bolts 44 and withdrawn through the hand-holes, after which the segments of the core-barrel may be separated and withdrawn. Core-top 20 and its grid 32 may then be broken up and withdrawn, along with segments 30 and bolts 44 and tubes 38. Tube 47 is then to be removed outwardly, and to facilitate this it should be well supplied with core wash or black lead or a suitable wrapping as of asbestos paper. The casting has now been cleaned up without and within and the hole left by tube 47 should be tapped and plugged.

I claim:—

1. A mold comprising a cylindrical core-barrel formed of segments provided on their outer surfaces with vertical dovetail ribs and on their lower edges with ports and having their upper edges rabbeted to receive the

lower edges of the superposed segments, substantially as set forth.

2. A mold comprising a cylindrical core-barrel formed of segments provided on their outer surfaces with vertical dovetail ribs and on their lower edges with ports having outwardly diverging walls and having their upper edges rabbeted to receive the lower edges of the superposed segments, substantially as set forth.

3. A mold comprising, a mold-base, a core bolted downwardly upon the core-base, a shell mold-portion resting upon the mold-base and surrounding the core, a mold-top section above the core, and a vertical metallic tube embedded in the top of the core to one side of the axis of the core and having a converging upper end engaging a recess in the mold-top section and serving to prevent the core from shifting laterally in the mold, combined substantially as set forth.

4. A mold comprising, a mold-base, a core bolted downwardly upon the core-base, a shell mold-portion resting upon the mold-base and surrounding the core, a mold-top section above the core, a first vertical doweling element embedded in the top of the core and projecting up into the upper part of the mold, a second doweling element projecting downwardly through the upper part of the mold and into the upper end of the first doweling element, and a packing of sand around the second doweling element between it and the opening through which it passes in the upper portion, combined substantially as set forth.

5. A mold comprising, a mold-base, a core bolted downwardly upon the core-base, a shell mold-portion resting upon the mold-base and surrounding the core, a mold-top section above the core, a first vertical doweling tube embedded in the top of the core and projecting up into the upper part of the mold, a second doweling tube projecting downwardly through the upper part of the mold and into the upper end of the first doweling tube, and a packing of sand around the second doweling tube between it and the opening through which it passes in the upper portion, combined substantially as set forth.

6. A mold comprising a core-base, a series of upwardly shouldered tubes disposed therein parallel with the axis of the core, and a grid embedded in the sand of the core-base and having eyes engaging the bodies of said tubes above their shoulders and engaging downwardly upon said shoulders, combined substantially as set forth.

7. A mold comprising, a bottom-board, a vertical mold resting thereon, a core supported by the base of the mold, lower bolts extending through the bottom-board and mold-base and into the core, upper bolts extending downwardly through the top of the core, and detachable couplings uniting the

inner ends of the upper and lower bolts, combined substantially as set forth.

8. A mold comprising, a bottom-board, a vertical mold resting thereon, a core supported by the base of the mold, lower bolts extending through the bottom-board and mold-base and into the core, upper bolts extending downwardly through the top of the core, coupling blocks disposed within the core and having each a tee-slot, a key uniting each lower bolt with a coupling block, and a head on the lower end of each upper bolt engaging the tee-slot of a coupling-block, combined substantially as set forth.

9. A mold comprising, a bottom-board, a mold-base thereon, vertical tubes embedded in the mold-base and resting on the bottom-board, a hollow core disposed over the mold-base and supported on said tubes, coupling

blocks disposed within the core over each of said tubes, lower bolts passing upwardly through the bottom-board and mold-base and core-base and into the coupling blocks, keys separably uniting the upper ends of the lower bolts with the coupling blocks, keys in the lower ends of the lower bolts for drawing those bolts downwardly, upper bolts extending upwardly from the couplings into the top of the core, heads on the lower ends of the upper bolts detachably engaging the coupling-blocks, and nuts on the upper ends of the upper bolts for drawing the top of the core downwardly, combined substantially as set forth.

HERMANN BRINKER.

Witnesses:

LUTIE HALE,
M. S. BELDEN.