

G. ATTERBURY.
 APPARATUS FOR CASTING BLOCKS OR SHAPES OF CEMENTITIOUS, VISCOUS, OR OTHER
 HARDENING MATERIALS.

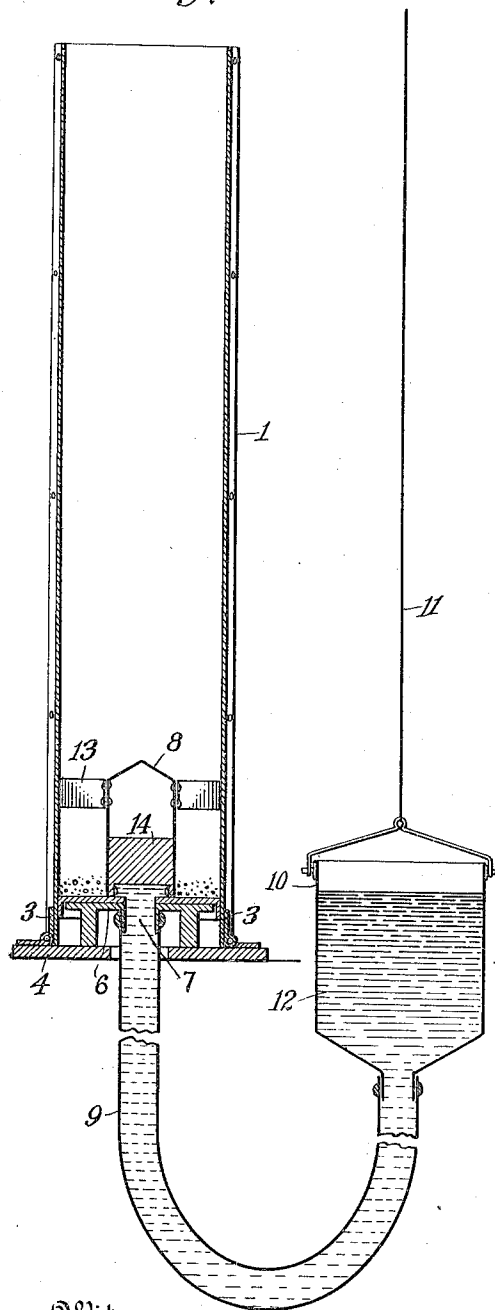
1,123,832.

APPLICATION FILED DEC. 18, 1911.

Patented Jan. 5, 1915.

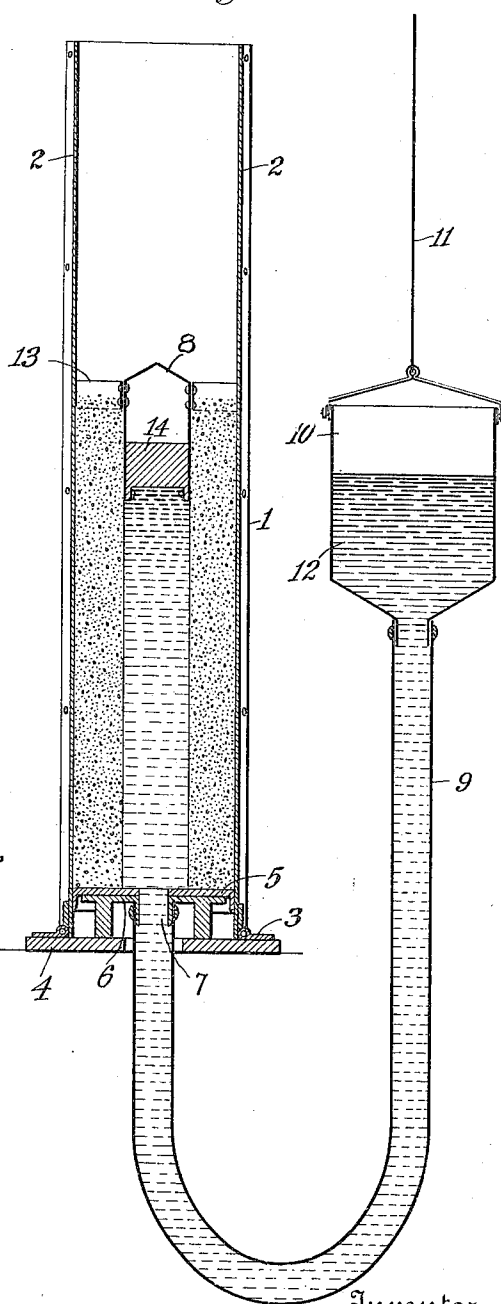
3 SHEETS—SHEET 1.

Fig. 1



Witnesses:
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Fig. 2



Inventor
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Fig. 3

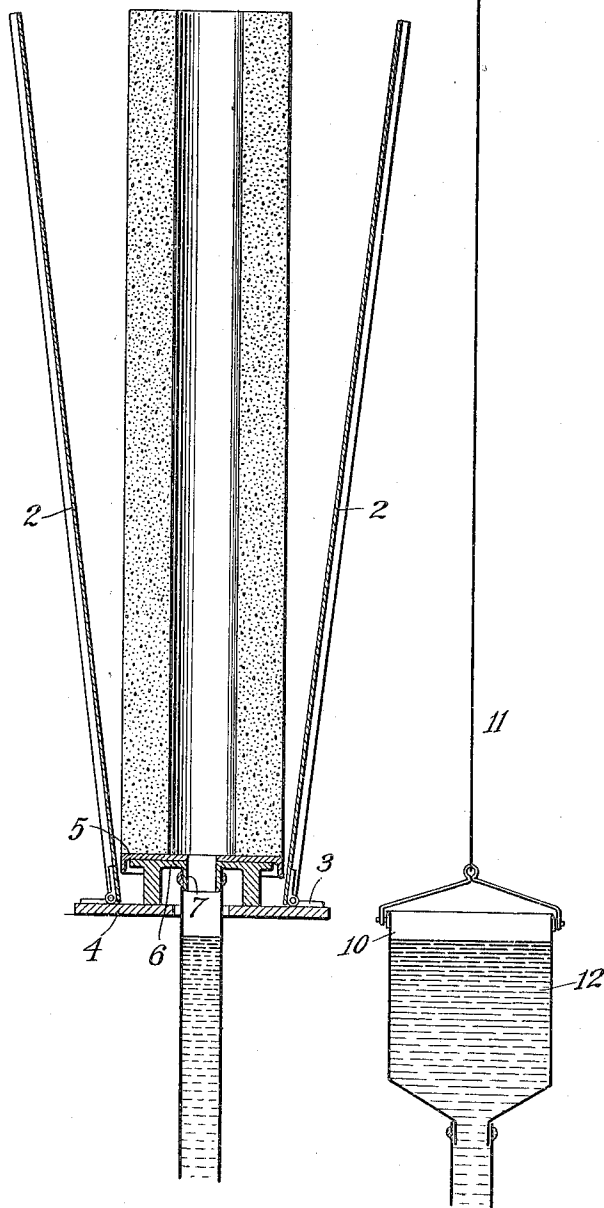
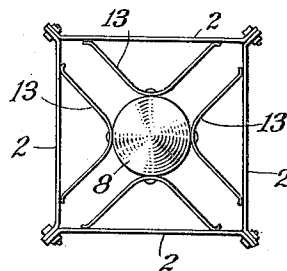


Fig. 4



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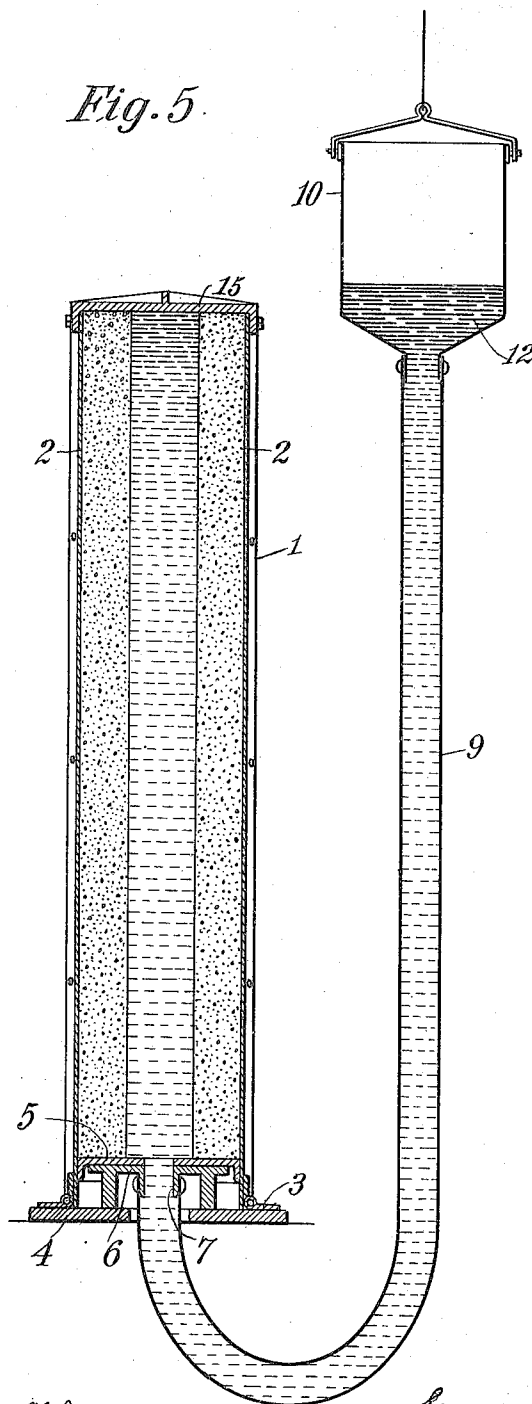
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3 SHEETS-SHEET 3.

Fig. 5.



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UNITED STATES PATENT OFFICE.

GROSVENOR ATTERBURY, OF NEW YORK, N. Y.

APPARATUS FOR CASTING BLOCKS OR SHAPES OF CEMENTITIOUS, VISCOUS, OR OTHER HARDENING MATERIALS.

1,123,832.

Specification of Letters Patent.

Patented Jan. 5, 1915.

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To all whom it may concern:

Be it known that I, GROSVENOR ATTERBURY, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Apparatus for Casting Blocks or Shapes of Cementitious, Viscous, or other Hardening Materials, of which the following is a full and complete disclosure.

My invention relates to methods and apparatus for casting blocks, columns and shapes having voids therein, and is particularly useful in casting blocks of unusual length such as columns and elongated blocks of all kinds, having a void or voids throughout their length.

In casting concrete blocks, for example, it has heretofore been customary to form the voids by means of mechanical cores, either fixed or collapsible, arranged to be withdrawn after the blocks are formed. In practice such cores work satisfactorily where the blocks are small and the voids short in length. In cases, however, where the blocks are long, trouble arises in the use of mechanical cores either rigid or collapsible, due to the pressure of the material against the sides of the cores, which frequently strains the cores or prevents their easy withdrawal. They are also expensive.

The object of my invention is to obviate the difficulties incident to the use of mechanical cores. I accomplish this by employing a core of liquid, semi-liquid, viscous, or mobile material, forced by pressure into the bottom of the mold beneath a forming head which is forced by the liquid upwardly through the casting material progressively as it is supplied to the mold. The liquid follows up the forming head and fills the void as it is formed, and supports by its pressure the material forming the block.

In the drawing accompanying and forming a part of this specification I have illustrated apparatus embodying my invention and adapted to carry out my improved method.

In these drawings Figure 1 is a vertical section of my apparatus, showing it assem-

bled and ready to receive the material used to form the block. Fig. 2 is a similar view, and shows the block partly completed. Fig. 3 shows the mold open and the completed block in position, ready to be removed from the mold. Fig. 4 is a plan view of the mold as shown in Fig. 1. Fig. 5 is a sectional view of the mold shown in the other views with a cover in position and a newly formed block in the mold under hydraulic pressure.

Referring in detail to these drawings, the numeral 1 designates the mold which comprises side walls 2 hinged at their lower ends by hinges 3 to the floor 4 on which the apparatus is assembled. These side walls are secured in closed position and are opened and closed by any suitable mechanism. Since the opening and closing and securing mechanism form no part of my present invention, and numerous arrangements for such purposes are well known, I do not describe them. The mold also comprises a removable bottom 5, on which the block is formed. This bottom rests on a raised support 6, having an opening at its center, which registers with a similar opening in the removable bottom. A forming head 8, preferably formed of sheet metal, is adapted to rest on and cover the opening in the bottom of the mold.

A flexible conduit or hose 9 is secured at one end to the lower side of the support 6 and opens into the bottom of the mold through opening 7. This flexible conduit is connected at the other end with a reservoir 10 adjustably supported by a cable 11, secured to a suitable hoist, not shown, and this reservoir is filled with a fluid for semi-fluid substance 12. This substance should be sufficiently fluid to flow through the conduit 9 and into the void formed in the block, and should have a specific gravity as near that of the concrete used in the mold as it is commercially possible to obtain. It should not be too free-flowing since, if it were, there would be a tendency for it to flow into the body of the concrete and force its way to the surface of the material in the mold without raising the forming head. Notwithstanding these requirements, there are nu-

merous fluids and mixtures, or semi-fluid mixtures, which can be used. I have found that water containing paper pulp and unburned cement mixed into a viscous liquid gives good results. The pulp serves to make the liquid viscous and supports the cement thereby maintaining the mixture uniform and preventing the heavier matter from settling. The pulp also tends to prevent the liquid from flowing into the concrete. I have also found a mixture of oil and unburned cement to give good results. Also heavy oils loaded with powdered material of various kinds may be used. Water, alone, may be used, but not with the best results, since it tends to force its way through the concrete and to damage the structure of the block.

The forming head 8 in size and cross-section should conform with the size and shape of the void to be formed in the block, and near its upper end is provided with guides 13 which at their outer ends bear against the side walls of the mold and keep the forming head in correct alinement and position. These guides are preferably formed of flat strips of metal disposed edgewise so as not to interfere with the filling of the mold. Where the liquid used in the mold has a specific gravity less than that of the concrete, the forming head is preferably weighted as shown at 14, so that by raising the reservoir 10 a suitable distance above the mold, the hydraulic pressure of the liquid forming the core will assist in supporting the side walls of the block.

In Fig. 5 the mold is shown provided with a cover 15, which may be used to close the mold after the block has been formed, in order that the block may be subjected to hydraulic pressure from the liquid in the reservoir 10. I have discovered that when the blocks are subjected to hydraulic pressure during the time they are setting by means of the reservoir 10 and the liquid core, harder and better blocks are obtained.

The following is my preferred method for forming blocks using the apparatus above described: The mold is assembled and adjusted as shown in Fig. 1, with the forming head resting on the bottom over the opening 7. Concrete or cementitious material is then fed into the mold until it extends up and around, but not covering the forming head 8. The tank 10 is then put in motion and gradually raised so that the fluid in it will flow in the mold beneath the forming head and gradually raise the same. The raising of the tank 10 and the feeding of the concrete to the mold are simultaneous and at substantially the same rate so that the forming head will maintain substantially the same relative position shown in

Fig. 2. When the mold is full and the block completed, the forming head is removed by the attendant and the cover 15 is closed and the block subjected to hydraulic pressure while setting. After the block has been subjected to hydraulic pressure and has sufficiently hardened, the tank 10 is lowered until all of the liquid used as a core has flowed back in the tank. The block is then removed and the above operation repeated.

The liquid in the tank 10 may be used over and over again, and will be kept in a homogeneous state by the agitation incident to transferring it from the tank to the mold and vice versa.

While I have described only one embodiment of my apparatus and one way for practising my improved method, I am aware that both may be varied by those skilled in the art without departing from the scope of my claims.

What I claim is:

1. A mold, a forming head therein, and means for forcing a liquid beneath said forming-head and thereby forcing it upward progressively as the block is formed, substantially as described, said liquid contacting with said block.

2. A mold, a forming head therein, and means for forcing a viscous liquid beneath said forming-head and thereby forcing it upward progressively as the block is formed, said liquid contacting with said block substantially as described.

3. A mold, a forming-head therein, and means for forcing a viscous liquid of high specific gravity beneath said forming-head and thereby forcing it upward progressively as the block is formed, and supporting the walls of the block by contact of the liquid therewith, substantially as described.

4. A mold for casting forms of cementitious material, a weighted forming-head therein, and means for forcing a liquid having a specific gravity substantially the same as the cementitious material, beneath said forming-head and thereby forcing it upward progressively as the block is formed, and supporting the walls of the block by contact of the liquid therewith, substantially as described.

5. A mold, a forming head therein, means for forcing a liquid behind said forming head and thereby forcing it forward progressively as the block is formed, substantially as described, said liquid contacting with said block.

6. A mold, a forming-head therein, a fluid reservoir adjustable vertically, a conduit leading from said reservoir into the bottom of said mold, and a fluid in said reservoir adapted to flow into the mold and to force the forming-head upwardly and support the

sidewalls of the block by contact of the liquid therewith during the casting operation, substantially as described.

reservoir is raised and to force the forming-head upwardly and support the side-walls 10 of the block during the casting operation, substantially as described.

7. A mold, a forming-head therein, a fluid reservoir adjustable vertically, a conduit leading from said reservoir into the bottom of said mold, and a fluid in said reservoir adapted to flow into the mold when said

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Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."