E. S. PARSONS.

PROCESS OF MOLDING CONCRETE.

APPLICATION FILED JAN. 10, 1916.

1,241,144. Patented Sept. 25, 1917.

Fig. 1.

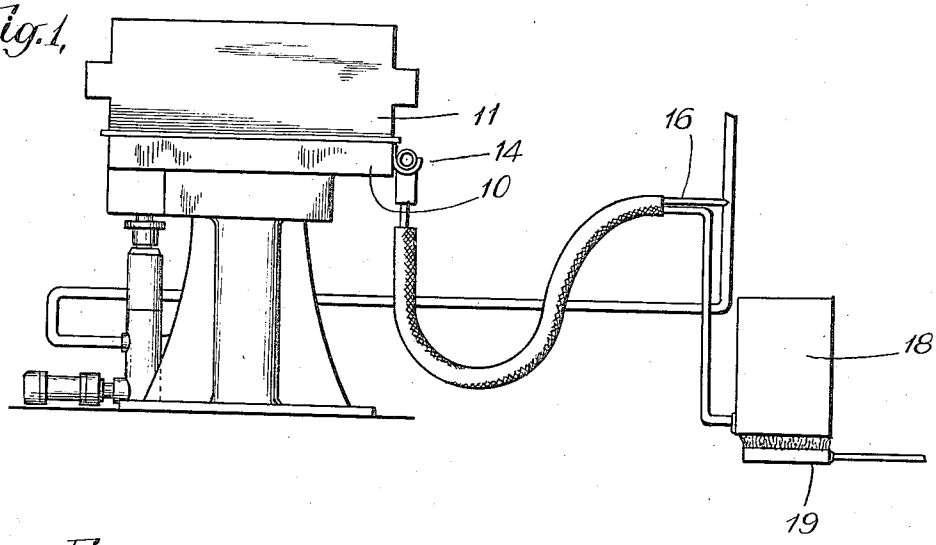


Fig. 2.

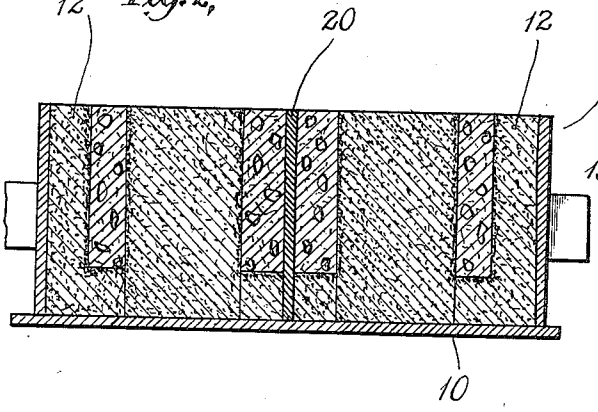


Fig. 3.

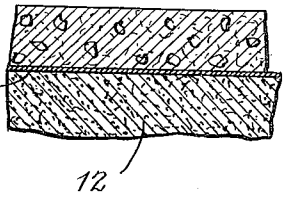
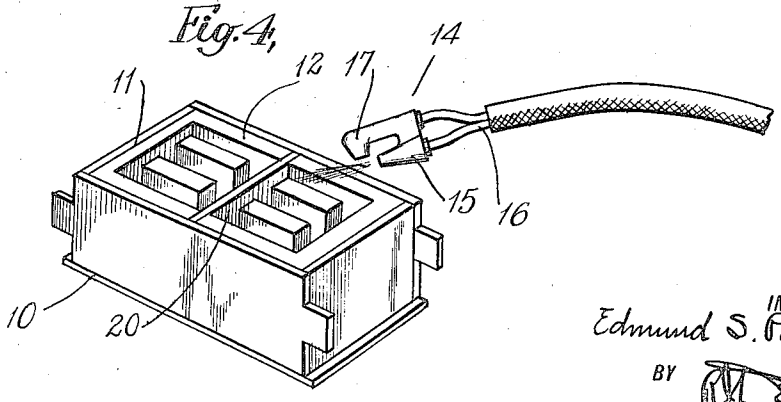


Fig. 4.



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PROCESS OF MOLDING CONCRETE.

1,241,144. Specification of Letters Patent. Patented Sept. 25, 1917.

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To all whom it may concern:

Be it known that I, EDMUND S. PARSONS, a citizen of the United States of America, and a resident of Ilion, Herkimer county, and State of New York, have invented certain new and useful Improvements in Processes of Molding Concrete, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

My invention relates to the art of molding or casting concrete and has special reference to processes of casting hydraulic cement concrete which may contain a greater or less proportion of sand and crushed rock or stone particles.

One object of my invention is to provide a simple and inexpensive process for the aforesaid purpose that shall compare favorably with the well known methods of casting metal and at the same time shall be adapted to produce high-grade concrete blocks of any desired shape.

Another object is to provide a process that shall make possible the casting of a wet concrete mixture in sand molds by avoiding the disadvantages of both absorbent and non-absorbent molds.

It is now well recognized that high-grade, hydraulic cement concrete can only be produced by casting a wet mixture into the molds or forms because the water is essential to the proper crystallization of the cement particles. The use of a water-tight mold will cause bubbles or pockets of water to remain in the concrete mass and when the water in the concrete is evaporated the concrete will be porous and weak. It is therefore very important to overcome this disadvantage.

On the other hand, the results are even less desirable if the water is taken away too rapidly as is the case if an absorbent mold is utilized. Furthermore, if a sand mold is utilized and wet concrete thoroughly mixed is poured in, in some such way as molten iron is poured into a sand mold, the concrete mixture will wash and destroy the shape of the mold to a large extent. No satisfactory results can be secured by casting concrete blocks in sand molds as usually formed, the results being particularly poor if intricate-shaped blocks are attempted. There is another disadvantage of using a sand mold of ordinary form for casting concrete, viz., that the sand will adhere to the concrete and the casting will be very difficult to clean properly.

According to my invention, I provide a process which involves the use of a sand mold which, when formed, differs from the usual sand mold for cast iron, in that the sand is made as wet as it can be molded. After the mold is formed I treat its inner surfaces by spraying thereon by an air brush or some other suitable means, a thin coating of glue or some similar substance. I thus form a film or diaphragm which is not intended to make a water-tight mold and differs materially from the formation of a water-tight mold, by means of plaster of Paris, or the like. It is, however, of sufficient strength to prevent disruption while the wet concrete mixture is being poured into the mold. At the same time the excess water in the concrete which is so essential to act initially as a lubricant, to allow and assist the particles or aggregates in the concrete to slip over each other and settle down into their natural positions, is held in the mold only temporarily. In accordance with my invention this action is further promoted by preferably jarring or vibrating the molding during the pouring process. The water soon dissolves the thin coating of glue and thus permits the excess water in the concrete to be taken up by the sand which is already as wet as can be molded. The sand at this stage becomes thoroughly saturated with water and obviously remains in a very wet condition while the concrete is setting; in fact, as the concrete sets additional water is required and this water is then drawn from the saturated sand.

Thus it will be seen that the mold is treated to make it temporarily water-tight; the concrete in a thoroughly mixed wet condition is poured into the mold; the mold is vibrated to settle the aggregates and solidify the mass; the coating is disrupted permitting excess water to pass into the sand, and finally, the water is drawn back from the sand as the concrete sets.

Although my process may obviously be practised by the use of diversity of apparatus, I have illustrated one set of suitable apparatus in order to make the steps of the process perfectly clear.

Referring to the drawings:

Figure 1 is an elevation of a molding table

of well-known form, which is adapted to be vibrated or jarred, and a glue container from which material is drawn to coat the mold.

Fig. 2 is a sectional view showing a mold as provided with a plurality of mold cavities and adapted to cast a plurality of concrete blocks at one time.

Fig. 3 shows a sectional detail of the mold and indicates the coating on its inner surface.

Fig. 4 is a perspective view showing an air brush or suitable spray nozzle by which the coating is sprayed onto the inner surface of the mold.

In Fig. 1, 10 is the table or molding board of the machine upon which is mounted a flask 11. A pattern having the shape of the desired concrete block is placed on the molding board inside of the flask. The space around the pattern is filled with comparatively wet molding sand which is tamped down hard and struck off clean on the top in the usual manner.

The pattern is then withdrawn from the sand and leaves a space in the sand mold similar to the desired concrete shape. The pattern is made of suitable size to allow for shrinkage and settlement of the concrete.

The sand which is used is not only moist but is saturated with water to the full extent possible while permitting of its being used as above indicated.

After the pattern has been withdrawn the walls and surfaces of the sand mold 12, a portion of which is indicated in Fig. 3, are sprayed with a solution of glue or some other suitable substance by means of a pneumatic brush, sprayer or atomizer to form a coating 13. The brush or atomizer may be constructed in any suitable manner such as, for example, that designated 14 in Fig. 4 which comprises an air nozzle 15 supplied from any suitable source of compressed fluid such as air, gas, steam or the like, through a pipe 16, and a branch nozzle 17 which delivers the coating liquid such as glue in front of the spray nozzle 15.

As indicated in Fig. 1, I prefer to utilize hot glue which may be kept in a cooker or container 18, where it is kept hot by a gas burner 19 or some other suitable means.

Several concrete blocks or units may be made at one time in one large mold by using several patterns separated by suitable plates 20 (see Fig. 2), the ends of which are embedded in the sand mold. These plates are preferably made of iron. When the patterns are drawn, the iron plates form a part of the mold and their surfaces are sprayed to provide a coating of glue the same as the exposed surfaces of the sand. By coating the iron with glue the concrete is prevented from sticking and in fact the glue on the sand surfaces acts in addition to its primary function, to prevent the sand from sticking to the concrete and so avoids a large part of the usual cleaning process.

Ordinary hot glue has the advantage that it can be readily sprayed onto the mold, it is inexpensive, and it will harden quickly, when sprayed onto the cold, wet surface of the mold, to a sufficient extent to serve its intended purposes. Nevertheless, my invention is by no means limited to the use of glue as some other suitable gum or coating substance, capable of acting in the same way may be employed.

Attention is particularly directed to the fact that the extreme wetness of the sand mold tends to maintain a constant temperature while the concrete is being set and a constant degree of moisture thereby giving a substantially constant and uniform condition for the hardening and crystallizing process of the cement particles. By this means a superior concrete block is inexpensively produced, particularly since the investment in the molds is so slight that the castings can economically stand until the blocks are fully set and hardened.

What I claim is:

1. The process of casting concrete that consists in forming a mold in absorbent material, coating the walls of the mold cavity with a dissoluble film and filling the mold with a wet mixture of concrete.

2. The process of casting concrete that consists in forming a mold in wet sand, coating the walls of the mold cavity with a dissoluble film and pouring the mixture of concrete into the mold.

3. The process of casting concrete that consists in forming a mold in wet sand, spraying the walls of the mold cavity with a dissoluble substance adapted to form a thin film and pouring a wet mixture of concrete into the wet mold.

4. The process of casting concrete that consists in forming a mold in wet sand, spraying the walls of the mold cavity with a mixture of glue and hot water to form a thin dissoluble film, and pouring a thin mixture of concrete into the mold.

5. The process of casting concrete that consists in forming a mold in wet sand, spraying the walls of the mold cavity with a mixture of glue and hot water to form a thin dissoluble film, pouring a thin mixture of concrete into the mold, and vibrating the mold while the concrete is being introduced.

6. The process of casting concrete that consists in forming a mold in wet sand, coating the walls of the mold cavity with a dissoluble film, pouring the mixture of concrete into the mold, and vibrating the mold while the concrete is being introduced.

7. The process of casting concrete that consists in forming a mold in wet sand, spraying the walls of the mold cavity with

a dissoluble substance adapted to form a thin film, pouring the wet mixture of concrete into a wet mold, and vibrating the mold while the concrete is being introduced.

8. The process of casting concrete that consists in forming a mold in wet sand, spraying the walls of the mold cavity with a mixture of glue and hot water to form a thin dissoluble film, pouring a thin mixture of concrete into the mold, and vibrating the mold while the concrete is being introduced.

9. The process of casting concrete that consists in forming a mold to comprise at least a portion of wet sand, coating the walls of the mold cavity with a dissoluble substance adapted to form a thin film, and pouring a wet mixture of concrete into the mold.

10. The process of casting concrete that consists in forming a mold of wet absorbent material, coating the walls of the mold cavity with a dissoluble film adapted to prevent disruption of the mold while the concrete is being poured into the mold, pouring into the mold a mixture of concrete containing an excess of water to lubricate and permit the aggregates in the concrete to slip over each other and to settle down into a compact mass, and vibrating the mold during the pouring process.

11. The process of casting concrete that consists in forming a mold of wet absorbent material, coating the walls of the mold cavity with a dissoluble film adapted to prevent disruption of the mold while the concrete is being poured into the mold, pouring into the mold a mixture of concrete containing an excess of water to lubricate and permit the aggregates in the concrete to slip over each other and to settle down into a compact mass, and vibrating the mold during the pouring process, said film being further adapted to be dissolved by the excess water to permit the same to be first absorbed by the wet sand and then given up to the concrete during the crystallization thereof.

12. The process of casting concrete that consists in forming a mold of wet sand, coating the walls of the mold cavity with a film of glue adapted to prevent disruption of the mold while the concrete is being poured into the mold, pouring into the mold a mixture of concrete containing an excess of water to lubricate and permit the aggregates in the concrete to slip over each other and to settle down into a compact mass, and vibrating the mold during the pouring process.

In witness whereof, I have hereunto set my hand this 3rd day of January, 1916.

EDMUND S. PARSONS.