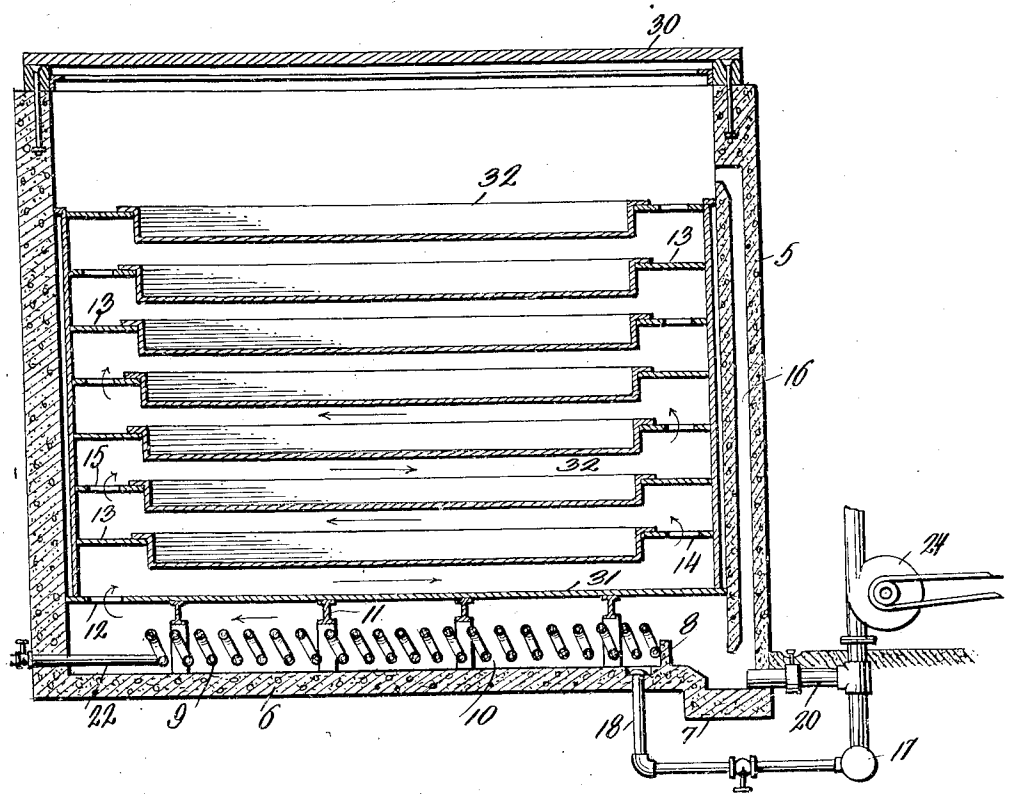
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METHOD OF CURING CONCRETE AND LIKE PLASTIC MATERIALS.

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1,348,775. Patented Aug. 3, 1920.




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## METHOD OF CURING CONCRETE AND LIKE PLASTIC MATERIALS.

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*To all whom it may concern:*

Be it known that I, LEONARD A. BELLONBY, a citizen of the United States, residing at Montpelier, in the county of Washington and State of Vermont, have invented certain new and useful Improvements in Methods of Curing Concrete and like Plastic Materials, of which the following is a specification.

This invention is a divisional part of that disclosed in Patent #1,264,142, granted to me April 30, 1918, and relates to the method of curing concrete and cement products whereby the material is caused to set quickly thereby saving time, space and apparatus with the result of increasing the output of a plant of given size and materially reducing the cost of production besides enabling the product to be marketed in a relatively short space of time.

In carrying out the method I preferably employ the apparatus disclosed in my previous patent herein noted and shown generally in the accompanying drawing, which is a vertical section of a vat showing the parts associated therewith in elevation.

In accordance with the present invention, the material, such as concrete, cement or other similar plastic is subjected to steam, then to a bath of hot water and finally to hot air. The several steps are preferably carried out in a closed chamber, the plastic material being confined in trays or molds in such a manner as to admit of the steam, water and air coming in direct contact therewith.

The method can be best disclosed in connection with the apparatus shown in the accompanying drawing, in which the chamber illustrated comprises inclosing walls 5, a bottom 6 and a cover 30. A portion of the bottom 6 is depressed to form a sump 7. A rib 8 extends across the bottom 6 a short distance from one of the inclosing walls so as to form a shallow basin 10. The rib 8 is disposed adjacent the sump 7. A pipe 20 connects with the sump 7 and is provided in its length with a controlling valve. A pipe 18 connects with the basin 10 and is provided in its length with a controlling valve. The pipes 18 and 20 connect with a main pipe 17 with which a pump 24 cooperates. It is to be understood that a plant may embody any number of chambers although the present drawing illustrates but one. In the event of a number of chambers being employed, the pipe 17 is common to all the chambers and branch pipes 18 and 20 connect each chamber with the main pipe 17. The purpose of the pump 24 which may be of any type is to supply water to the pipe 17 and from thence to the chamber or to draw off the water from the chamber as may be required according to the step in the process necessary to produce the desired effect. It will be observed that the pipes 18 and 20 connect with the lowest portions of the basin and sump respectively so that all the water may be drawn off therefrom when required. One of the inclosing walls of the chamber is provided with a passage 16 which, at its lower end opens into the sump 7 and at its upper end is in communication with the upper portion of the chamber. This passage provides for a circulation and a return of the water from the upper portion of the chamber to the lower portion thereof.

A coil 9 is disposed in the lower portion of the chamber in such a manner so that its lowest portion is arranged within the basin 10 and its upper portion clears said basin. A pipe 22 connects with the coil 9 and is in communication with a source of supply of steam. When the basin 10 is supplied with water, the lower portion of the coil 9 is immersed therein whereas the upper portion of the coil is clear of the water contained in the basin. Steam being supplied to the coil, heats the water in the basin to such an extent as to cause vapor or steam to be created. This vapor or steam rising from the water contained in the basin 10 comes in contact with the upper portion of the coil and is superheated or made comparatively dry. This dry steam is utilized in the first step in the method of treating the concrete, cement or other plastic material.

A bottom 31 is located within the lower portion of the chamber a short distance above the coil 9 and is supported upon beams 11. An opening 12 is formed in the bottom 31 near one end thereof. A plurality of ledges 13 are located upon the inner walls of the chamber and are spaced a proper distance one above the other. The ledges 13 constitute rests for trays 32 which are adapted to receive the material to be treated. The rest next above the bottom

31 is provided with an opening 14 diametrically opposite the opening 12 of the bottom 31 and the rest second above the bottom 31 has an opening 15 above the opening 12. The rests 13 in order have openings in opposite ends as clearly indicated, the purpose being to cause the medium circulating through the chamber to take a tortuous or zig zag course, thereby insuring that each tray or container be subjected alike to the medium coursing through the chamber. The trays 32 when in position engage the rests and in conjunction therewith close the space between the walls 5 of the chamber, so that the medium in its circulation through the chamber is compelled to pass through the opening provided in the rest 13 for its passage. This will be plain on reference to the drawing.

In carrying out the method the concrete or other analogous self setting plastic is placed in a tray 32 or other form of container or mold according to the desired shape to be imparted thereto. The trays illustrate one form of mold for slabs or building units but such trays are representative of any type of mold or container. The material thus confined in the tray or mold is placed in the chamber in layers in the manner set forth. It is to be understood that the chamber may contain any number of trays or molds holding the material to be treated, the same being arranged so that the medium will come in direct contact with the material and hasten the setting thereof, which is essential in order to increase the output of a plant of given capacity. After the material has been placed in the chamber the cover 30 is arranged so as to close the top of the chamber and is secured in place in any manner. Water is now supplied to the basin 10 and the coil 9 is heated by passing steam therethrough. As the steam circulates through the coil 9 the water in the basin 10 is heated and steam or vapor rises therefrom, and coming in contact with the upper portion of the coil above the basin is superheated or rendered comparatively dry. This dry steam circulates through the chamber in a tortuous path and comes in contact with the material contained in each of the trays or molds 32. Any water of condensation accumulating in the upper portion of the chamber above the topmost rest 13 and tray 32 is returned to the lower portion of the chamber into the sump 7 by way of the passage 16. The material is subjected to the vapor or steam bath for a period approximating thirty minutes after which the chamber is flooded with water which is supplied thereto through the pipes 18 and 20. The water is supplied to the chamber so as to cover the topmost tray or mold and its contents. The steam is continued through the coil 9 thereby heating the water in the chamber to the boiling point, such water circulating between the rests and trays in a manner set forth so as to heat the material uniformly. The water in the chamber is kept at the boiling point for approximately three hours and this step further hastens the setting of the material which was preliminarily effected by the vapor bath, the water preventing the too rapid drying of the material. The water is now drawn off from the chamber through the pipes 18 and 20 and the coil 9 is maintained in its heated condition by the circulating of steam therethrough. After the water has been completely drawn off the air contained in the chamber is heated by means of the coil 9, and this hot air circulating through the chamber completes the process of curing the material. The material in its final step is subjected to the hot air for a period of about thirty minutes. After the material has been subjected to the final step the cover 30 is removed from the chamber and the material is removed and will be found set sufficiently hard to admit of it being handled and placed upon the market. It will be understood that the method saves considerable time and enables the output of a plant to be more than doubled and obviates the necessity for providing a great number of trays or molds since the same may be more frequently used than is possible by the process generally in vogue. During the process the material is subjected to a pressure of twenty to sixty pounds while confined in the valve or chamber. Cured thus under pressure the product possesses considerable strength and is extremely hard.

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

1. The method of curing concrete and analogous self setting plastic material, the same consisting of subjecting the same to a heated vapor bath, then to a bath of hot water and finally subjecting the same to hot air.

2. The method of curing concrete and analogous self setting plastic material which consists in subjecting the same to dry steam, then to a bath of hot water and finally subjecting the same to hot air.

3. The method substantially as herein described of curing cement and analogous self setting plastic material which consists in confining the same in a closed chamber and while so confined subjecting the same to vapor in a heated state, boiling water and hot air in succession.

4. The herein described method of treating concrete and like plastic material which consists in subjecting the same to hot vapor, then treating the same to a bath of boiling water, and finally drawing off the water and subjecting the material to hot air.

5. The herein described method of treating concrete which consists in placing the same in a mold and while so confined subjecting it in succession to hot vapor, boiling water and hot air.

6. The herein described method of treating concrete and analogous plastic material which consists in confining the same in a mold, then inclosing the same in a chamber and while so inclosed subjecting it in successive order to dry steam, boiling water and hot air.

7. The herein described process of treating concrete and analogous self setting plastic material which consists in confining the same in a mold, then inclosing it in a chamber and while so inclosed subjecting the material to dry or superheated steam for a period approximating thirty minutes, then to a bath of boiling water for a period of about three hours and finally to a bath of hot air for a period approximating thirty minutes.

In testimony whereof I affix my signature in presence of two witnesses.

LEONARD A. BELLONBY.

Witnesses:
B. GROUT,
FRANCIS T. SHERIDAN.