Oct. 10, 1939. N. V. HYBINETTE 2,175,895

CONCRETE WALL CONSTRUCTION

Filed June 22, 1935

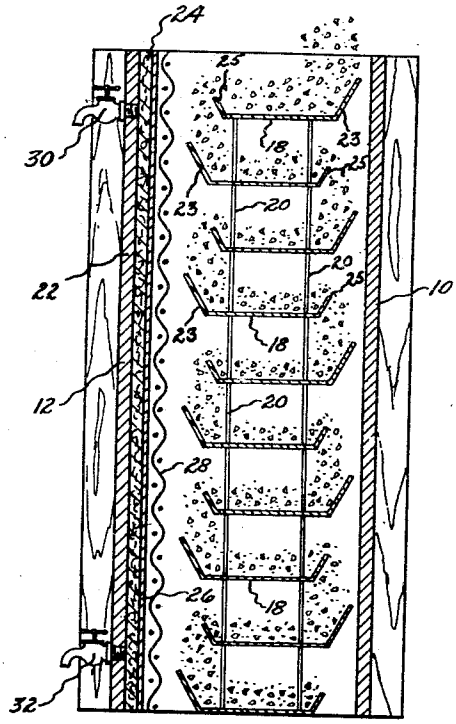


Fig. 1

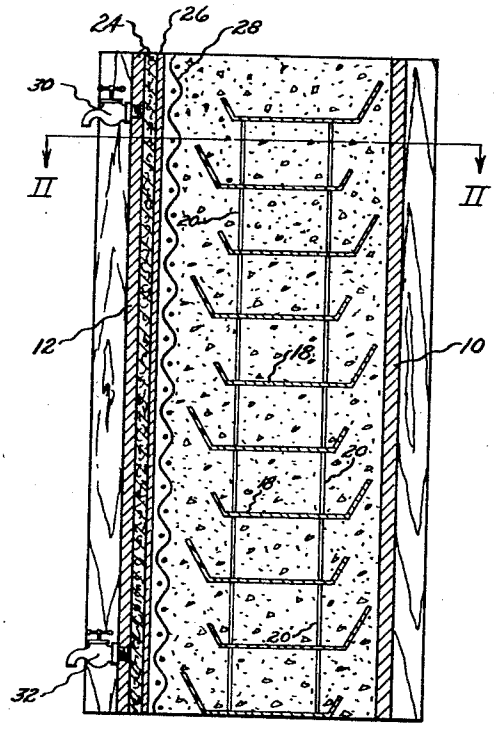


Fig. 3

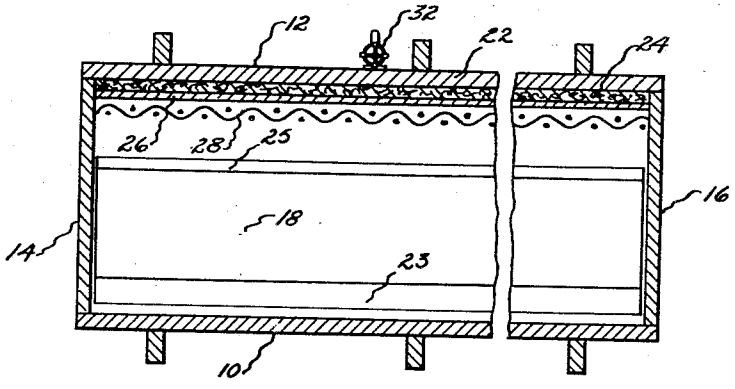


Fig. 2

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CONCRETE WALL CONSTRUCTION

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Application June 22, 1935, Serial No. 27,858

9 Claims. (Cl. 25—131)

The present invention relates to improvements in the use of concrete expanded with a gas evolved in the concrete before setting. More particularly it relates to the use of expanded concrete poured in place for the fabrication of walls and partitions of buildings made up within a form and reinforced by metallic bars, screening, etc.

It is well recognized that the cheapness of expanded concrete and its excellent insulation qualities entitle it to wider use but so far it has only been possible to produce and utilize it in the form of blocks fabricated at a specially equipped factory, and shipped to the building site. Heretofore, it has been tried to pour the concrete in place, but it has been found impossible to obtain sufficient vertical expansion to develop the characteristics of expanded concrete which made it so desirable as a construction material. This inability to obtain sufficient vertical expansion has been especially encountered in the presence of reinforcement which impedes the swelling action and releases the gas evolved resulting in a collapse of the expanded concrete mass.

I have discovered that the special construction of the framework, reinforcement and other apparatus herein described obviates the difficulties above mentioned in connection with the pouring of expanded concrete in place and enables me to produce on inexpensive and satisfactory vertical wall or partition of any reasonable height used in ordinary buildings.

Thus it becomes an object of the present invention to provide a method of pouring expanded concrete walls or partitions in place which will assure sufficient vertical expansion to provide a wall or partition possessing the desired characteristics.

Another object is to provide a method of pouring a reinforced expanded concrete wall or partition in place in which the reinforcement promotes the expansion of the concrete.

Lastly, it is an object of the present invention to provide improvements in framework or form to be used in pouring of expanded concrete walls and partitions.

In order that the invention may be more fully understood, in the accompanying drawing one form of the invention is illustrated wherein

Fig. 1 is a vertical cross sectional view through a wall form showing my improved reinforcement and filter for expanded concrete in position; the concrete being shown supported in tiers prior to expansion of the same filling the form,

Fig. 2 is a sectional view taken on the line II—II of Fig. 3, and

Fig. 3 is a view similar to Fig. 1 showing the concrete fully expanded completely filling the form.

When broadly considered, the present invention comprises two distinct improvements in the fabrication of an integral expanded concrete vertical wall or other structure having considerable vertical height. One improvement resides in supporting the concrete during expansion in spaced superimposed strata which during the final stages of expansion merge into an integral concrete structure. The other improvement resides in form structure for poured concrete of a character enabling the excess water of the concrete mixture to be drawn off in a manner providing a gradual release of pressure upon the expanding concrete mass. In wall structure of considerate height both of these improvements may be advantageously employed, while in walls of lesser height it may be found that no special provision need be made for withdrawal of water from the form and the excessive water of the mixture upon expansion may merely flow over the top of the form. Also, it is to be understood that the part of the form hereinafter referred to as a filter panel may be advantageously used without supporting the concrete in spaced strata merging upon expansion.

In the drawing the principles of the invention are shown as applied to a rectangular form for the pouring in place of a reinforced concrete wall or partition. The form comprises a pair of spaced side panels 10 and 12 and end panels 14 and 16. Reinforcement structure for the concrete wall as illustrated takes the shape of elongated sheet metal pans 18. The pans are horizontally disposed in vertical spaced relation by being supported by legs 20 or in another suitable manner such as from the panels of the forms. The pans having side portions 23 and 25 of different height and the pans are so arranged that concrete will overflow from one pan into the next adjacent pan. The capacity and spacing of the pans 18 is determined by the expansion of the concrete in the form. This is calculated in such a way that the cubic contents of all the pans is in proportion to the total space of the forms as the volume of the unexpanded concrete is to the expanded. In most cases the latter proportion is determined by the amount of aluminum powder used in the concrete mixture and may be in the order of 1:2 or 1:3. Other materials or methods may be used to

expand the concrete and for this reason I do not wish to limit the invention to the use of aluminum powder. When the concrete is poured into the forms, it will overflow from one pan 18 to another until each pan is level full as shown in Fig. 1. As expansion takes place each pan of concrete will overflow until finally the supported strata of expanded concrete merges to form an integral wall structure filling the entire space within the form as shown in Fig. 3.

In my process of pouring expanded concrete walls, it is necessary that a very thin fluid concrete mixture be used. I use therefore more water than is necessary for the setting of the cement and the water for satisfactory results should be removed as soon as possible. This is accomplished by making one or more of the panels of the form act as a filter. In the illustrated form of the invention the side panel 12 is constructed very much like a panel in an ordinary filter press; for example, the filtering panel may comprise another wooden section 22 having the inner surface thereof provided with riffles to allow a free flow of water along the inner surface. A layer of felt 24 or other suitable material is provided next to the section 22 and then a layer of filter paper 26 and an open mesh wire screening 28 to reinforce the filter paper and felt. The filter paper 26 can be inexpensively replaced and filters out the cement in the water enabling the felt 24 to be repeatedly used. To regulate the flow of water through the filter panel, faucets 30 and 32 may be employed at the top and bottom of the panel.

My improved method of fabricating a poured-in-place expanded concrete wall carried out in conjunction with the foregoing described structure is as follows: A concrete mixture, including aluminum powder, in a decidedly fluid state, resulting from an excessive amount of water, is poured into the wall form and overflows from one of the pans 18 into the other until all the pans 18 are level full. As expansion of the concrete takes place, the concrete in the pans 18 will overflow and after several hours will completely fill the form constituting an integral expanded mass. The expanding action results in a layer of clear water appearing upon the surface of the expanded concrete and such excess water may overflow through the faucet 30 and is drawn off by opening the faucet 32. With the faucet 32 closed, a head of water equal to the height of the faucet 30 will be present in the filter panel. If during the early stage of the expansion the water passing through the filter panel is immediately withdrawn through the faucet, the expansion of the mixture will be materially reduced and the expanded mass is apt to collapse. After drawing off the layer of clear water from upon the surface of the expanded concrete mass, quantities of water are drawn off from time to time through the faucet 32 so that all the water will be removed from the form within eight to twelve hours after pouring. Approximately another twelve hours are allowed before the side and end panels of the wall form are removed.

My process and structure may be modified in several ways. For example, for a twelve foot wall I may have a faucet vertically spaced every foot along the outer surface of the filter panel. Each time a faucet is opened commencing from the top of the panel, the pressure is reduced upon the filter an amount equal to one foot of water. If successive faucets are opened every forty-five minutes, within a period of eight hours all the faucets will be opened.

By regulating the withdrawal of the water from the form as disclosed in the foregoing paragraph and thus gradually releasing the pressure of the water upon the filter panel, maximum expansion of the concrete mixture is obtained and collapse of the expanded mass prior to setting of the concrete is obviated. With reference to the pans 18 and their function, the same may be inexpensively manufactured from sheet metal and of a design providing adequate reinforcement for the concrete. As each station of expanded concrete is supported by a pan 18, it should be obvious that the degree of expansion will be materially greater than would be in the case of an unsupported mass of considerable vertical extent especially in the presence of reinforcements.

As previously stated, I do not wish to limit the invention to the expansion of the concrete by the use of aluminum powder. Moreover, I consider the use of a filter which is capable of releasing the pressure gradually upon the expanding concrete mass the major essence of this invention and intend to include within the scope of the annexed claims all such changes and modifications of the filter panel herein disclosed as will occur to those skilled in the art in the light of my disclosure.

Having described my invention, what I claim as new and desire to protect by Letters Patent is:

1. A method of expanding concrete and the like comprising the steps of supporting expansible concrete in vertically spaced strata and permitting the same to expand and to merge said strata of concrete into an integral mass.

2. As a step in a method of fabricating expanded concrete and the like comprising supporting expansible concrete prior to setting in different strata, and permitting the concrete to expand and to merge in the vertically spaced strata to form an integral mass.

3. A method of fabricating expanded concrete product and the like comprising supporting quantities of expansible concrete prior to complete expansion in tiers, and permitting the concrete to completely expand and to merge to form an integral mass.

4. A method of fabricating reinforced expanded concrete products and the like comprising the step of supporting quantities of expansible concrete upon spaced associated reinforcement surfaces, and permitting said quantities of supported concrete to expand into an integral mass.

5. A method of fabricating expanded concrete products and the like comprising the steps of pouring a fluid mixture of expansible concrete into a form, supporting a quantity of said concrete in spaced vertical relation while permitting the same to expand into an integral mass, and regulating the withdrawal of excess water of said mixture from said form.

6. A method of fabricating expanded concrete products and the like comprising the step of pouring a fluid expansible concrete mixture into a form and regulating the withdrawal of excess water from said form during the expansion and setting of said concrete.

7. An apparatus for the fabricating of expanded concrete products and the like comprising a form into which the concrete is poured for expansion and setting, said form including a filter at one side, and means including a plurality of valves disposed at different levels for draw-

ing off in a plurality of steps the excess water draining through said filter from said form.

8. An apparatus for the fabricating of expanded concrete products and the like comprising a form into which the concrete is poured for expansion and setting, said form having a portion comprising a rigid wall, an inner layer of water pervious porous material, a layer of filtering membrane on the inner side of said porous material, and a plurality of controllable excess water outlets at different levels communicating with said porous material for drawing off in a plurality of steps the excess water filtering through said membrane.

9. An apparatus for the pouring of expanded concrete vertical walls in position comprising a form in which expansible concrete is poured for the expansion and setting of the same, said form being constructed at the top to enable the concrete to freely expand in a vertical direction, a vertical side of said form comprising a water pervious filter made up of juxtapositioned strata of water pervious substances, one stratum of said filter being in direct contact with the poured concrete for uniform horizontal drainage throughout the entire vertical side, and another stratum adjacent said first stratum for vertically draining the entire area of said first stratum.

NOAK VICTOR HYBINETTE.

CERTIFICATE OF CORRECTION.

Patent No. 2,175,895. October 10, 1939.

NOAK VICTOR HYBINETTE.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, second column, lines 39 and 40, claim 2, for the word "different" read vertically spaced; line 41, same claim, for "vertically spaced" read different; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 5th day of December, A. D. 1939.

(Seal)

Henry Van Arsdale,
Acting Commissioner of Patents.