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METHOD OF ACCELERATING THE HARDENING OF CONCRETE SLABS

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FIG. 1.

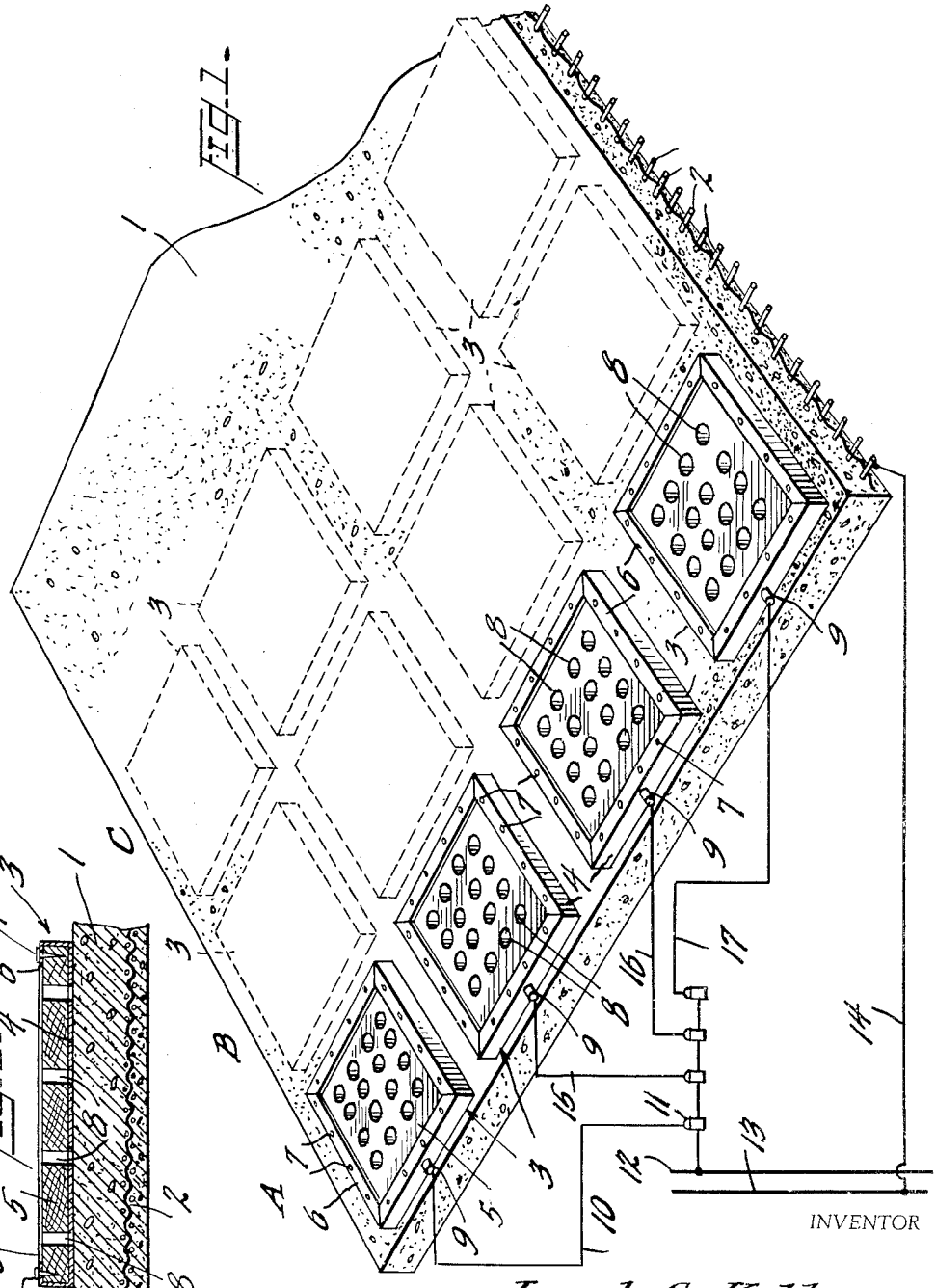


FIG. 2.

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METHOD OF ACCELERATING THE HARDENING OF CONCRETE SLABS

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4 Claims. (Cl. 25—154)

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My invention relates to a new and useful improvement in a method of accelerating the hardening of concrete slabs.

As is well known to those skilled in the art, when laying floors or concrete slabs of the monolith type, the hardening of the concrete is relatively slow, and especially if the concrete is poured in the spring or fall when the temperature is around forty or fifty degrees (40° or 50°).

It often happens that after the concrete is poured, as for instance in the afternoon, the temperature will fall say to forty degrees (40°) and the concrete will have to dry or harden a number of hours before the workmen can trowel or smooth the surface. This necessitates a needless waste of time.

One of the objects of the present invention, therefore, is to provide a method wherein even if the temperature is just slightly above freezing, the concrete may be poured; and by providing a number of relatively large electrodes, say from twenty to thirty inches square (20" to 30"), and positioned in a row, and connecting the reinforcing metal in the concrete slab to form the other electrode, and then passing electric current therethrough, I can hasten the hardening of the concrete so that in from twelve to thirteen minutes, the workmen can walk or kneel on the strip so hardened and trowel or surface the same while the next strip is being hardened.

Still another object of the invention is to provide a number of copper electrodes, each of which consists of a sheet of copper nailed or secured to a back of relatively stiff material, such as compo-board, or plaster board, or any other form of board, to provide sufficient rigidity for the plate; and then to drill a number of holes therein, or in other words, perforate the electrode, that is, the back and the copper sheet so that as the excess moisture arises from the concrete that is being heated, the steam may pass through the electrode and thus hasten the time of the hardening.

Still another object of the invention is to provide a method wherein a number of these electrodes can be placed in a row to thus heat the concrete, a strip or row at a time, until the entire slab has been so heated.

With these and other objects in view, which will be described as the application proceeds, reference is now made to the drawings, showing how my method is employed to accelerate the hardening of the concrete.

Fig. 1 is a perspective, showing a monolith floor with a plurality of electrodes in place, the electric circuit being diagrammatically shown, and

Fig. 2 is a fragmentary, sectional view, showing a portion of the slab, one of the portable electrodes and the metal reinforcement.

At the outset it might be mentioned that the method primarily consists in passing an alternating current through the plastic mass, wherein the metal reinforcing rods or wire mesh form

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the one electrode, and a plurality of copper plates also connected to the alternating current are placed in position on the concrete to form the other electrode, so that as the current passes through the mass, it will cause the temperature to rise to approximately one hundred ninety or two hundred degrees (190° or 200°) and thus accelerate the hardening of the concrete and drive out the moisture and steam which may escape through the perforations in the upper copper electrodes.

Referring now to Fig. 1, there is shown, in perspective, a monolith slab of concrete 1. I have not shown any confining walls or molds as they may be of any conventional type, as it will be understood that the concrete may be used to form floors in houses, basements, garages, or any other concrete surface.

Still referring to Fig. 1, there is shown the ends 2 of the metal reinforcements, which are also of the conventional type used in the laying of concrete slabs. Where the slab is four inches or under, only one set of concrete reinforcing rods or mesh is used; but, if the slab is over four inches, the conventional method is to use another set, at a level spaced from the first set.

The present method is adapted to accelerate the hardening of concrete slabs that are up to three or four hundred feet square (300 or 400 sq. ft.).

Referring now to Figs. 1 and 2 for the moment, there is shown a plurality of copper portable electrodes 3, and as they are all similar, a description of one is a description of the others.

This electrode 3 consists of a relatively thin copper plate 4 which is nailed to a board 5 to form a rigid plate; and as may be seen in Fig. 2, the copper plate 4 extends up and over the upper edges of the board 5 as at 6, around the four sides, and is held in place by the nails 7.

As heretofore mentioned, the back 5 may be of wood or composition board or plaster board, and after the copper sheet 4 is well nailed in place, a plurality of holes 8 are drilled through the entire electrode 3 so that the excess moisture may escape from the concrete as the current is passed back and forth through the mass.

At one side of the electrode 3 there may be an electric socket 9 for the sake of convenience; and as shown in Fig. 1, this socket 9 will be electrically connected by the wire 10 to the socket 11, which in turn is fastened to one of the inlet leads 12. The other conductor or the supply of current is carried by the wire 13 which at its far end 14 is connected to the aforementioned reinforcing rods 2 which are imbedded in the plastic mass.

The other electrodes are similarly connected by the conductors 15, 16 and 17, all of which are in parallel. Thus, any of the conductors to the sockets in the electrodes may be quickly connected or disconnected.

The electrodes 3 are relatively light in weight

and it will be understood that the workmen can easily move them from one position to another.

The electrodes may be of any desired size, and those about twenty inches square (20'') have proved very efficient in service.

There will be about seventy or eighty perforations or holes 8 in the plate to thus let the excess rising moisture escape from the concrete as the same is being hardened by the heat from the alternating current.

Referring to Fig. 1 again for the moment, I have shown the four electrodes 3 in what might be termed a row A, and after about twelve to thirteen minutes of the alternating current passing through the concrete, the excess moisture will have all passed out through the perforations 8, and the concrete in the row will then be hard enough for workmen to walk on the same and trowel or surface the row A. The current will then be turned off and the workmen will move the electrodes 3 over to what might be termed the strip B; and while the concrete is being troweled in strip A, it will be hardening and drying in strip B. The procedure may then be repeated in strip C, etc.

The current necessary is the ordinary house current of one hundred ten volts (110 volts) and I have found that thirty amperes (30 amps.) will provide sufficient current to accelerate the hardening of the concrete in from twelve to thirteen minutes.

Thus, it will be seen that the trowelling of the upper surface can take place within a relatively few minutes after the concrete is poured, which is not possible when the concrete is laid in relatively cold weather. Thus, many hours may be saved in the hardening and trowelling of the concrete.

The current flowing through the concrete row preserves a uniform temperature throughout the entire row.

It will be understood that I can use any number of these portable electrodes 3 as desired, but I have found that at one time, the method should be used on a slab not over four hundred feet (400') square.

I am aware that it is old to pass an alternating electric current through a plastic mass (concrete) in which there is water, as set forth in Patent No. 1,808,762, of June 9, 1931, to Albert Brund and Helge Bohlin; but I am not aware of a method of laying a concrete monolith slab wherein perforated portable electrodes may be arranged in rows to heat the concrete so that the concrete may be trowelled in a relatively short time, and, as the trowelling proceeds, an adjacent row of the concrete may be hardened.

The method has proved extremely efficient and permits the laying and trowelling of the concrete in relatively cool weather without any waiting for the concrete to harden sufficiently to trowel or surface the same.

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

1. The method of accelerating the hardening of concrete monoliths which have reinforcing metal therein, which consists in connecting one lead of an alternating current to said metal reinforcing within the monolith, placing a plurality of perforated reinforced copper plates in a row on top of said monolith, passing an alternating current through the metal reinforcing, copper plates and concrete, the excess moisture from the heated concrete passing up through the perforations in the copper plates, shutting off the current when the moisture stops passing through the perforations in the copper plates, trowelling the surface so treated, moving the copper plates across the slab to accelerate the hardening of an adjacent row or strip while the first row is being trowelled, and continuing the method until the entire slab has been hardened.

2. The method of accelerating the hardening of a metal reinforced concrete slab, which consists in connecting the metal reinforcing to an electric current conductor to form one electrode, placing a number of copper electrodes, in the form of relatively large plates, in a row on top of the concrete, connecting them to the other lead of the alternating current, said copper electrodes provided with a plurality of perforations for the escape of excess moisture, running the current through said metal reinforcing, copper electrodes and concrete for substantially twelve to thirteen minutes, moving the said copper electrodes to form another row, trowelling the concrete of the first row, and repeating the process until the entire slab has been hardened and troweled.

3. The method of accelerating the hardening of a freshly poured metal reinforced concrete slab, which consists in connecting the metal reinforcing to a conductor of an alternating electric current to form one electrode, placing a number of copper electrodes in the form of plates substantially twenty inches square in a row on top of the concrete slab, connecting them to the other conductor of the alternating current, said copper electrodes provided with a plurality of perforations for the escape of excess moisture, running a current of one hundred ten volts and thirty amperes through said electrodes and concrete for substantially twelve to thirteen minutes, moving the said copper electrodes to form another row, and repeating the process until the entire slab has been hardened.

4. The method of accelerating the hardening and finishing of a metal reinforced concrete slab, which consists in connecting the metal reinforcing to one conductor of an alternating electric current to thus form one electrode, placing a number of copper electrodes in the form of perforated plates in a row on top of the concrete, connecting them to the other lead of the alternating current, said copper electrodes provided with a plurality of perforations for the escape of excess moisture, running an alternating current of one hundred ten volts and thirty amperes through said electrodes and concrete until the excess moisture stops passing through the perforations in the said copper electrodes, moving the copper electrodes to form an adjacent row or strip, trowelling the first row while the second row is being treated, and repeating the process until the entire slab has been hardened and trowelled.

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