United States Patent

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[54] **DEVICE FOR TESTING CONCRETE**
1 Claim, 5 Drawing Figs.

[52] U.S. Cl. 249/139, 249/160, 249/DIG. 4, 264/31
[51] Int. Cl. B28b 7/10, E04b 1/16
[50] Field of Search 264/31; 249/66, 139; 25/128.1

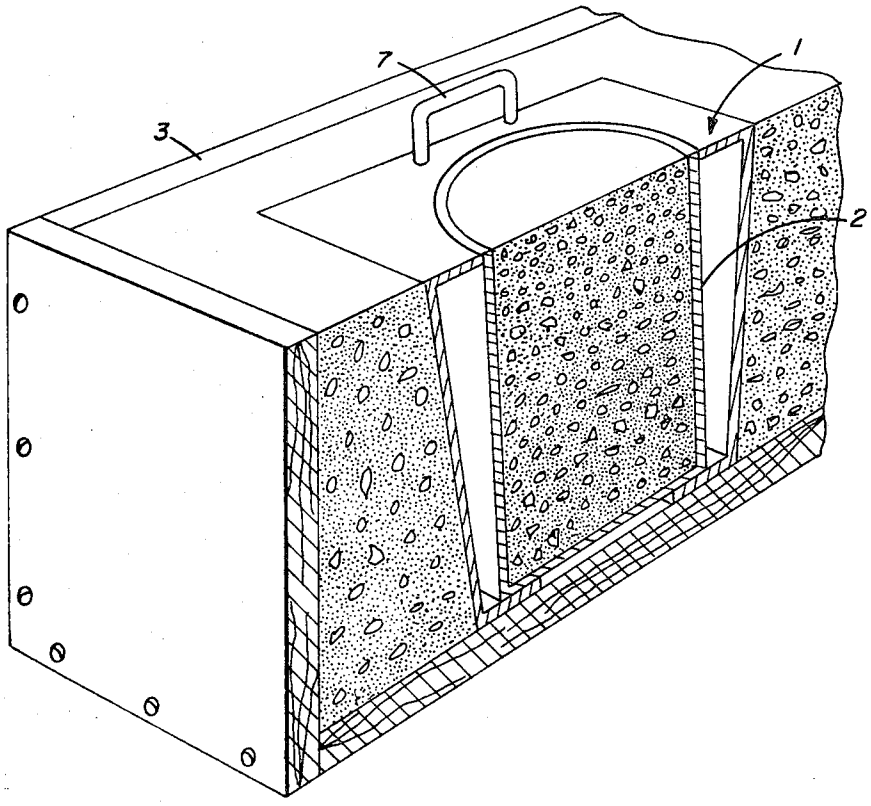
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ABSTRACT: A device for obtaining concrete test specimens having the same curing environment as the structural element from which the specimens are taken is disclosed. The device comprises a rigid outer member which is in the shape of a truncated pyramid, cone, etc. In use, the base of the truncated member is placed in a pouring form for the structural element. A cylindrical paper test mold is inserted within a hole in the top of the truncated member. Liquid concrete is poured into the form and the test specimen mold is filled. The concrete is set and cured for a desired time. The truncated member and test specimen are removed from the structural element and the test specimen is subjected to conventional tests after removal from the outer member. The hole left in the structural element is readily patched because of the converging sides thereof.



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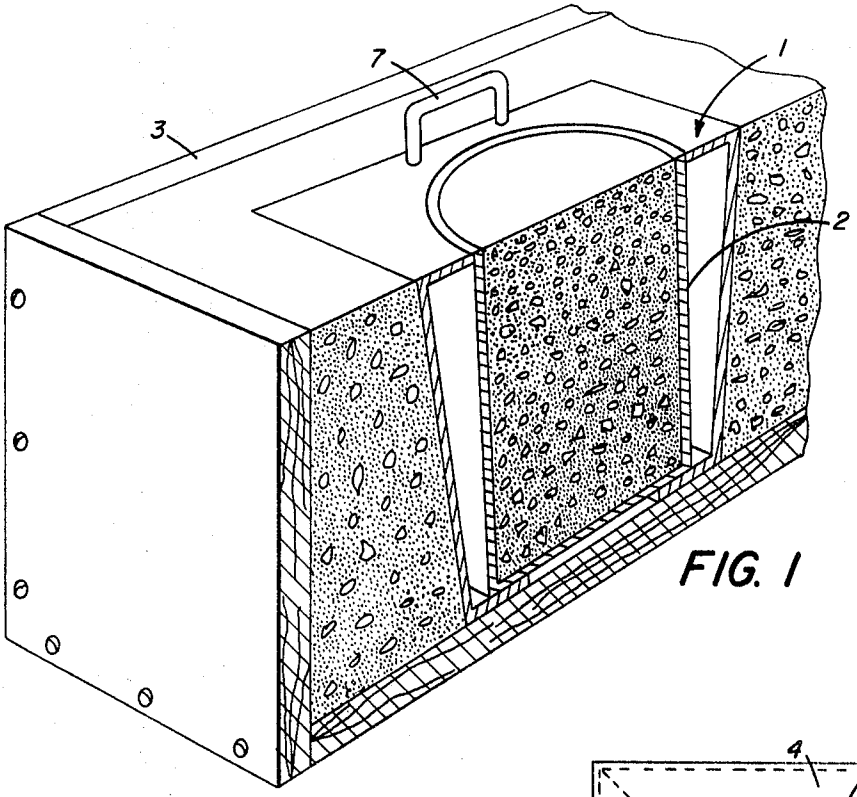


FIG. 1

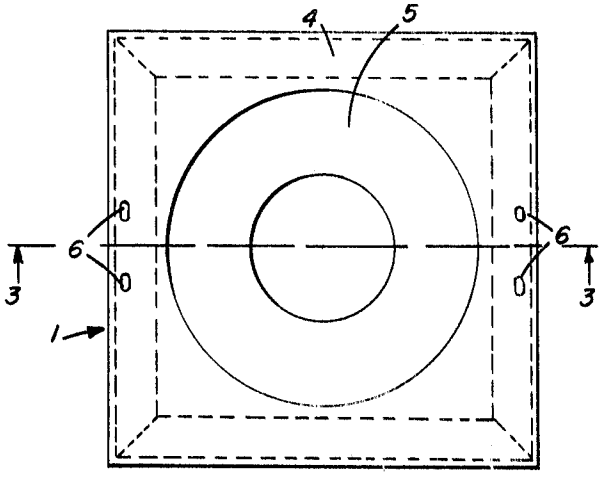


FIG. 2

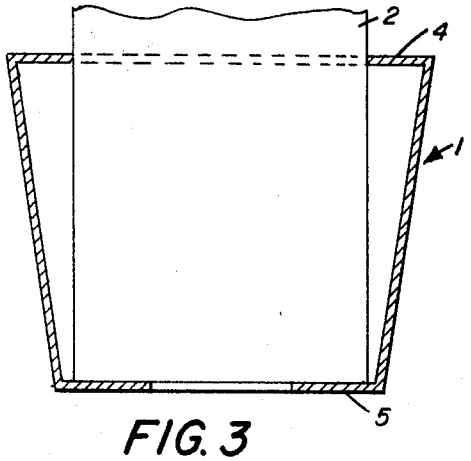


FIG. 3

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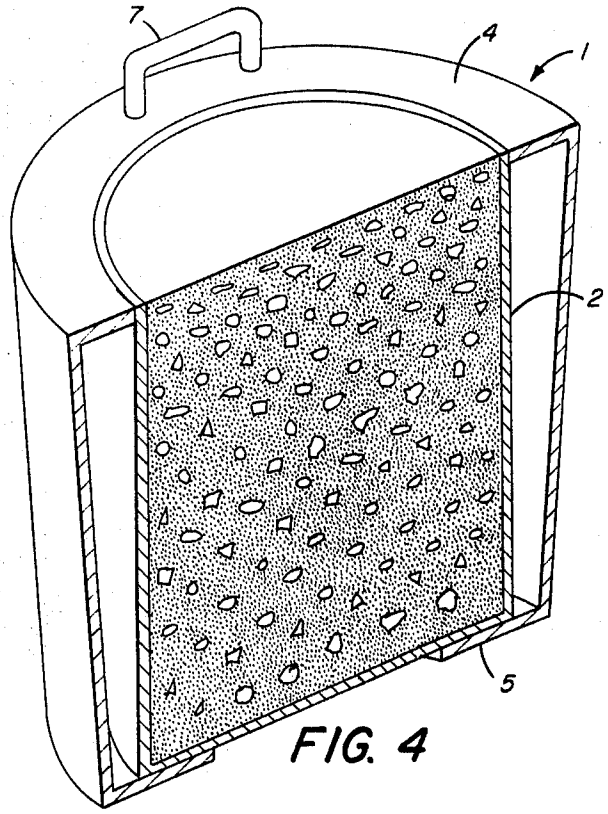


FIG. 4

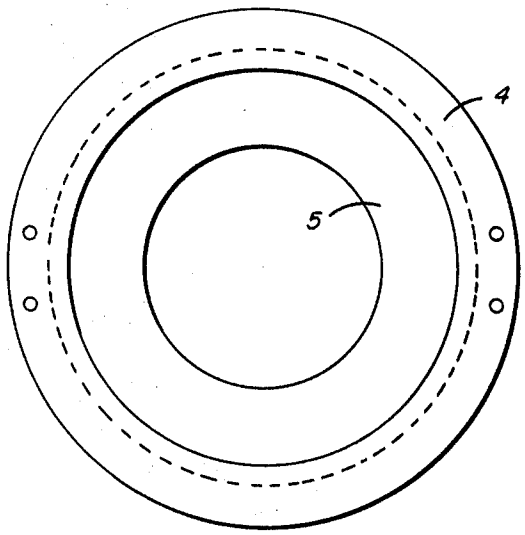


FIG. 5

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DEVICE FOR TESTING CONCRETE

The present invention relates to the testing of concrete or the like and, more particularly, to an improved fixture for supporting a mold while obtaining test specimens.

In certain instances, when poured concrete is used to form structural elements of buildings, road surfaces, or the like, it is desirable to obtain test specimens of the concrete which have set and cured under substantially the same conditions of temperature, humidity, workmanship, and the like, as the concrete forming the structural element. One known device for obtaining such specimens comprises a rigid outer cylindrical member which is open at its top and has lugs at its bottom for securing it to a concrete-pouring form, and a rigid inner cylindrical member having an open top, a bottom wall, and an outwardly extending flange at its upper portion. To use this known device, the inner member is telescoped inside of the cylindrical outer member with the flange extending radially outward and resting on the upper edge of the outer cylindrical member. The inner member may have a cardboard liner telescoped inside of it. During the pouring of the fluid concrete into its form, the inner member of the device, or the cardboard liner, is filled with concrete. After suitable curing has taken place, the inner member is withdrawn from the concrete and the cavity, defined by the cylindrical outer member, may be filled with fluid concrete to thereby patch the structural element. The specimen formed within the inner member or cardboard liner is removed and tested according to known concrete-testing procedures. While the above method and device may provide acceptable test elements, some disadvantages are present especially when used on a widespread basis.

One such disadvantage encountered with the above device and method, results from the fact that the outer cylindrical support member is not reuseable since it is secured in place in the pouring mold by means of lugs. Thus, significant expense can be encountered when many test specimens are to be taken because an equal number of mold support members must be consumed. Another disadvantage created by the use of the above method and device, is the fact that the final patching of the cavity may be difficult or unacceptable from the standpoint of structural strength. This is a result of the interposition of the cylindrical support member between the body of the concrete structural element and the concrete patch. The cylindrical configuration of the cavity creates a tendency for the fluid concrete of the patch to displace from the main concrete element if patching is attempted without a suitable pouring form. Also, the cylindrical configuration may lead to dislodgement of the patch even after curing since the concrete of patch does not readily adhere to the cylindrical support member.

An object of the present invention is to provide an improved device for obtaining of concrete or the like test specimens.

Another object of the invention is to provide a specimen forming device which has a reuseable and inexpensive fixture for supporting a test specimen mold during the curing of the specimen in place in a structural element.

Still another object of the invention is to provide a device for producing a cavity in a concrete element which facilitates the formation of a patch and improves the adherence between the concrete of the patch and the concrete element.

Other objects and advantages of the present invention will be apparent to those skilled in the art by the description of preferred embodiments of the invention which follows.

The objects of the present invention are accomplished by a fixture and method wherein the material of the structural element adjacent the test specimen mold is supported in a convergent configuration during introduction, setting, and curing of the material in a pouring form for said element.

While the terms "fluid concrete" and "concrete" are used to describe preferred embodiments of the present invention, it should be understood that they are intended to define in a generic sense any material which is poured and cured in an analogous manner.

Reference is now made to the accompanying drawings wherein like reference numerals and characters designate like parts and wherein:

FIG. 1 is an oblique view of a section through one embodiment of the improved specimen-forming device as it would be positioned in a form during the curing of the test specimen and the concrete structural element.

FIG. 2 is a plan view of the reuseable mold support fixture according to the present invention.

FIG. 3 is a sectional view, along line 3–3, of the mold support fixture of FIG. 2 showing the position of a paper specimen mold when inserted in such a mold support fixture.

FIG. 4 is an oblique view of a section through another embodiment of the improved specimen-forming device of the present invention.

FIG. 5 is a plan view of the mold support fixture according to the embodiment of the present invention shown in FIG. 4.

FIG. 1 is an oblique view of a preferred embodiment of the present invention as it would appear if an imaginary section were taken through the pouring form, specimen mold and mold support fixture while in place in a concrete structural element, such as a slab. While the following description refers to the preferred embodiment wherein a single specimen mold is supported in a support fixture, it should be apparent that a plurality of test specimens could be simultaneously cured by using a mold support fixture which has a corresponding plurality of mold-receiving holes. The mold support fixture 1 of one preferred embodiment is fabricated from sheet metal into the configuration of a truncated pyramid. This configuration facilitates withdrawal of the fixture from the structural element. The mold support fixture 1 receives a standard 4 inch by 8 inch paper concrete specimen mold 2 which has been cut so that the height of the mold is substantially even with the top surface of the mold support fixture 1.

Referring to FIG. 1, the paper mold 2 and the sheet metal mold support 1 are placed within the confines of a pouring form 3 for the concrete slab such that the top of the paper mold 2 and fixture 1 are even with the intended finished level of the concrete slab. In the process of pouring fluid concrete into form 3 the mold 2 is filled. When the designated aging time has elapsed for the concrete, the paper mold 2 and mold support fixture 1 are removed, leaving a square hole with convergent sides in the concrete slab. The paper mold 2 is removed from the mold support fixture 1, permitting the mold support fixture 1 to be reused at other concrete-pouring locations. The paper mold 2 may be stripped from the cured concrete specimen which is then tested as is known in the art.

FIGS. 2 and 3 illustrate various constructional features of a preferred mold support fixture 1. Top plate 4 has a central hole of a diameter generally corresponding to the external diameter of the standard paper concrete specimen mold e.g. 4 inches. Bottom plate 5 may also have a central aperture to facilitate pushing the concrete specimen and its mold 2 from the support fixture 1 after removal from a concrete slab. In a preferred embodiment, the mold support fixture 1 is fabricated from 11-gauge metal and the various top, bottom and side members are joined together by welding to create a sturdy device capable of reuse.

As can be seen in FIG. 2, top plate 4 may have a series of holes 6 (or handles 7 as seen in FIG. 1) to facilitate the lifting of the concrete specimen and the mold support fixture from the cured concrete slab. As described above, the convergent configuration of the fixture also facilitates removal from the concrete slab.

While we have referred to a preferred embodiment of our invention in the above description, those skilled in the art will understand that the mold support fixture may have other configurations such as a truncated cone as shown in FIGS. 4 and 5 or three-sided pyramid. Also, under some circumstances, the sides of the mold support fixture may converge inwardly from the closed to the open end of the mold. Also, the specimen

mold may be made of various materials and have other configurations.

The invention has been described in detail with particular reference to preferred embodiments thereof, but it will be understood that variations and modifications can be effected within the spirit and scope of the invention as described hereinabove.

We claim:

1. A device for forming a concrete test specimen having substantially the same curing conditions as the concrete element from which said specimen is obtained and for forming a cavity in said element of a configuration which facilitates patching after the device is removed therefrom,

said device including in combination a hollow cylindrical test specimen mold having upper and lower ends and a fixture for supporting said mold;

said fixture comprising:

a wall portion spaced radially outward from and surrounding the cylindrical outer surface of said test specimen mold, said wall portion converging inwardly from a wide upper fixture end to a narrower lower fixture end;

a base plate attached to and partially enclosing the lower end of said fixture and adapted to support the mold;

a cover plate for said wide fixture end integrally attached to and extending solely radially inward from the corresponding extremity of said wall portion, said cover plate having an aperture therein concentric with the upper end of said mold, the diameter of the aperture and mold being substantially equal and the aperture adapted to receive and engage the adjacent end of said mold to hold it in a desired position; and means to facilitate removal of said fixture and mold from the cured concrete.