July 7, 1936. G. E. NAGEL 2,047,109

PRECAST INSULATED CONCRETE DECK SLAB

Filed Dec. 16, 1935

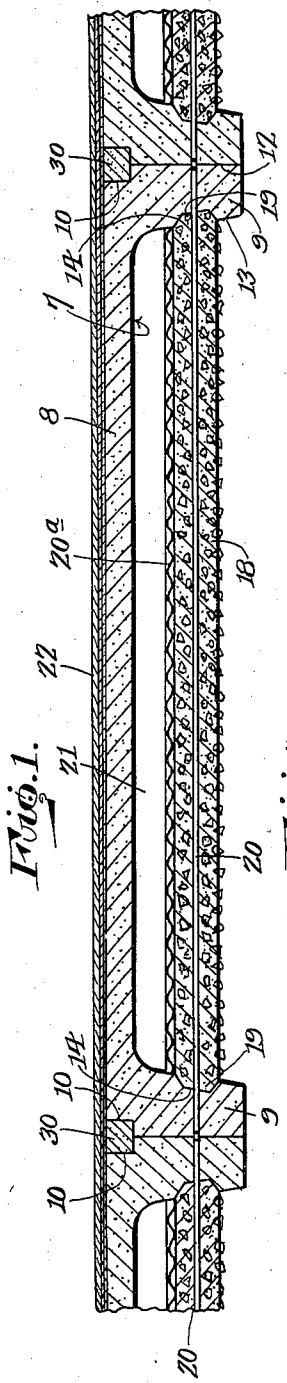


Fig. 1.

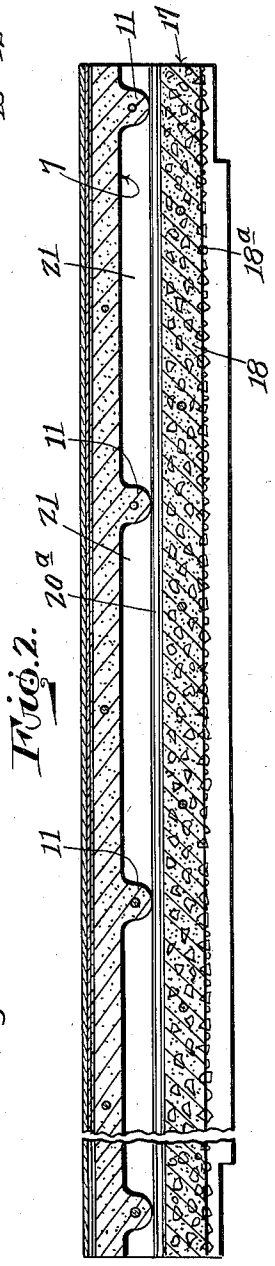


Fig. 2.

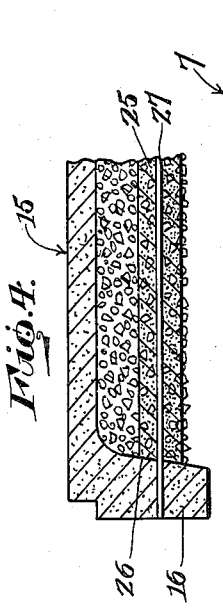


Fig. 4.

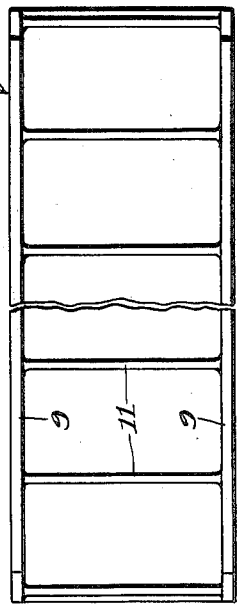


Fig. 6.

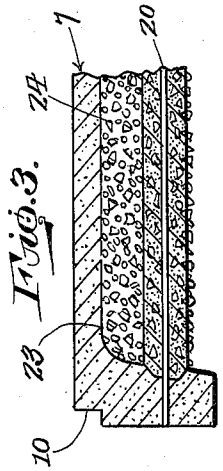


Fig. 3.

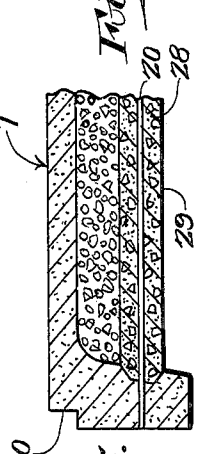


Fig. 5.

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PRECAST INSULATED CONCRETE DECK SLAB

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Application December 16, 1935, Serial No. 54,769

7 Claims. (Cl. 72—68)

This invention relates to a pre-cast insulated concrete deck slab and has for its object to provide, in a manner as hereinafter set forth a slab of the class referred to so formed as to overcome heat loss as well as to prevent the forming thereon and the dripping therefrom of condensates.

The invention further claims to provide, in a manner as hereinafter set forth a pre-cast insulated concrete deck slab so constructed as to overcome the objections now present in the use of pre-cast non-insulated deck slabs, such objections, primarily reside in the high loss of heat through the thin section of concrete, and when used on buildings, which must be heated, condensation forms on the under side of the slab surface causing water to drip therefrom.

The invention further aims to provide, in a manner as hereinafter set forth, a pre-cast concrete deck slab which is comparatively simple in its construction, strong, durable, compact, thoroughly efficient when used, readily installed in roofing position, and comparatively inexpensive to manufacture with respect to the slabs of the class to which this invention belongs.

With the foregoing and other objects which may hereinafter appear the invention consists of the novel construction, combination and arrangement of parts as will be more specifically referred to and as are illustrated in the accompanying drawing wherein are shown several embodiments of the invention, but it is to be understood that changes, variations and modifications may be resorted to which fall within the scope of the invention as claimed.

In the drawing:

Figure 1 is a fragmentary view in transverse section of a course of slabs in accordance with this invention,

Figure 2 is a longitudinal sectional view of the slab,

Figures 3, 4 and 5 are fragmentary views in transverse section of modified forms of slabs with the water proof outer facing omitted, and

Figure 6 is an inverted plan of the body section of the slab and with the latter broken away intermediate its ends.

With reference to Figures 1, 2, 3, 5 and 6 they illustrate a pre-cast insulated concrete deck slab, in accordance with this invention which is generally indicated at 7. The slab includes an inverted channel-shaped concrete body or outer section having a metallic reinforced top 8, a pair of spaced parallel like flanges 9 depending from top 8, a rabbet 10 in each side marginal portion of the top 8, and a series of spaced metallic reinforced parallel rounded ribs 11 of like form depending from the inner or lower face of top 8. The ribs 11 are of materially less height than that of the flanges 9. The outer side face 12 of the flanges 9 is squared and flush with the side edges of top 8. The inner side faces 13 of the flanges 9 extend from their bottoms to their tops at an inclination towards the longitudinal median of the top 8. The inner side face 13 of each flange 9 is formed with a flared groove 14 which is open at each end and extends from one end to the other end of the flange.

The body or outer section employed in the modified form of slab 15 shown in Figure 4 is generally of the same construction as that shown in Figures 1, 2, 3, 5 and 6 with the exception that the flanges 16 of body or outer section of slab 15 are not provided in their inner side faces with the grooves 19.

With reference to Figures 1, 2, and 3 the slab includes a thin inner section 17 of concrete impregnated with irregular shaped particles 18 of any suitable material possessing acoustic properties. The particles 18 provide the faces of the section 17 rough or irregular. The upper and lower side marginal portions are oppositely beveled to form short tapered tongues 19 which snugly engage throughout the walls of the grooves 14 whereby the outer and inner sections of the slab 7 are connected together. The sections of the slab 7 are also connected together by spaced metallic reinforcing rods 20 (only one of which is shown) extending through the flanges 9 and section 17. The ends of the rods are flush with the outer faces of the flanges.

With reference to Figures 1 and 2 the section 17 has mounted thereupon between its ends and the flanges 9 a web 20^a of any suitable material possessing an insulating characteristic and which is shown by way of example, as a sheet of corrugated card board abutting the bottom of the ribs 11. The web 20^a in connection with the ribs 11 and the lower face of the top of the outer section of slab 7 provide parallel dead air chambers 21. The upper face of the top of the outer section of slab 7 is provided with a water proof surface 22 which is formed of built up layers of asphalt and felt.

The form shown in Figure 3 will be the same as that illustrated by Figures 1 and 2 with the exception that the web 20^a in the inner section 17 is omitted and that the section 17 is positioned directly against the ribs 11 of the outer section of the slab 7. The section 17 coacts with the ribs

11 and lower face of the top 8 of the outer section of the slab 7 to provide spaced parallel chambers 23 filled with loosely arranged porous particles 24 of suitable insulating material. Otherwise than that as stated, the form shown in Figure 3 will be the same as the one illustrated by Figures 1 and 2.

With reference to Figure 4 the slab 15 includes an inner section 25 formed of the same materials as that of the section 17. The section 25 is not provided with the tongues 14 at its sides. The side edges 26 of section 25 are oppositely beveled and wedge against the inner faces of the flanges 16 of the slab 15. Metallic reinforcing rods 27 extend through the flanges 16 and section 25 for connecting the outer and inner sections of the slab 15 together. Otherwise than that as stated the form shown in Figure 4 will be the same as the form shown in Figure 3.

With reference to Figure 5 the inner section 28 of the slab 7 has its exposed face 29 ground flat for decorative purposes, and otherwise than that as stated the form shown in Figure 5 will be the same as the form illustrated by Figure 3.

The method of making the slab 7 is first to cast the outer section thereof with the openings in the flanges for the passage of the reinforcing rods and with the flanges formed with the grooves with which the openings communicate.

When the outer section of the slab 7 is cast to form the grooves and openings, it is also provided, at such time with the spaced transverse ribs on its lower face.

Relative to the method of making the slab 15, the body section of the latter is first cast in the same manner as the body section of slab 7, but with this exception, that the inner faces of the flanges of the outer section of slab 15 are not formed with grooves, as are the flanges of the outer section of slab 7.

After the outer section of the slab 7 has set, it is removed from the mold and positioned in a manner to have its flanges extended upwardly. After the outer section of the slab 15 has set, it is removed from the mold and positioned in a manner to have its flanges extended upwardly.

With reference to the form shown in Figures 1 and 2 after the outer section of the slab 7 has been positioned as aforesaid, the web 20^a is mounted upon the ribs and against the inner faces of the flanges, and which provides, in connection with the ribs, the dead air spaces. The reinforcing rods 20, are then extended through the flanges 9, after which the inner section 17 is cast thus joining sections 17 and 7 into one reinforced unit.

With reference to the forms shown in Figures 3, 4 and 5, instead of positioning the web 20^a against the ribs, the spaces between the latter are filled with loose insulating material of any suitable type preferably porous, after which the inner section is secured to the outer section of the slab.

With reference to Figure 4 the side edges of the inner section 25 have its side edges abut against the non-grooved inner faces of the flanges 16 and the sections of the slab 15 are connected together by the reinforcing rods.

The method of making the form of slab shown in Figure 5 would be the same as that employed for the slab illustrated by Figure 3 with the additional step that the exposed surface of the inner section is ground to a flat surface for decorative purposes.

The water proof surface or covering is applied after the slab has been completed and placed upon the building. Asphalt or similar material 30 is employed to seal and insulate the joints between the slabs of a course.

Although the slab is designed primarily for roofing or deck purposes, yet it is to be understood it is to be used in any connection for which it may be found applicable.

What I claim is:

1. In a pre-cast insulated concrete deck slab, a pre-cast inverted channel shaped outer section formed of a top, side flanges depending from the top and spaced parallel ribs depending from and disposed transversely of the inner face of the top between and at right angles to the flanges, said ribs being of less height than that of the flanges, and a pre-cast inner section arranged within the outer section below the ribs between and being secured to the inner faces of said flanges.

2. A pre-cast insulated concrete deck slab comprising a pre-cast inverted channel shaped outer section formed of a top, side flanges depending from the top and spaced parallel ribs depending from and disposed transversely of the inner face of the top, said ribs being arranged between and of less height than that of the flanges, and means within said section, spaced above the bottoms of the flanges, secured to the inner faces of said flanges and coacting with the ribs to provide the slab with spaced chambers, and particles of insulating material loosely arranged in each of said chambers.

3. A pre-cast insulated concrete deck slab comprising a pre-cast inverted channel shaped outer section formed of a top, side flanges depending from the top and spaced parallel ribs depending from and disposed transversely of the inner face of the top, said ribs being of less height than that of, and arranged between and disposed at right angles to the flanges, and a precast inner section arranged within the outer section below the ribs and secured to the inner faces of said flanges, said inner section consisting of a body of concrete impregnated with particles possessing an acoustic characteristic.

4. A precast insulated concrete deck slab comprising a pre-cast inverted channel shaped outer section formed of a top, side flanges depending from the top and spaced parallel ribs depending from and disposed transversely of the inner face of the top, said ribs being of less height than that of the flanges, a fibrous web positioned against the bottoms of and forming in connection with said ribs dead air chambers, and a pre-cast inner section arranged between and secured to the flanges of the outer section, said inner section abutting said web and confining it in position.

5. A pre-cast insulated concrete deck slab, comprising pre-cast inner and outer sections, said outer section being of inverted channel shape and formed on the inner face of its top with spaced ribs, said outer section including spaced parallel depending flanges merging at the upper portions of their inner faces into the ends of said ribs, said inner section being confined within said outer section between and above the bottoms of the flanges, and insulating means interposed between the said sections.

6. In a pre-cast insulated concrete deck slab, a pre-cast inverted channel shape outer section having parallel depending flanges and spaced ribs below the flanges, a pre-cast inner section of slab-like-form confined within the outer section below said ribs between the inner faces of said flanges, said inner section consisting of a body of concrete impregnated with particles possessing an acoustic characteristic, and spaced combined

coupling and reinforcing rods extending transversely through said inner section and having their end portions embedded in said flanges.

7. In a pre-cast insulated concrete deck slab, a pre-cast inverted channel shaped outer section formed of a top, side flanges depending from said top and spaced parallel ribs depending from the inner face of said top, said flanges being of greater height than that of the ribs, and means arranged completely within said outer section between the inner faces of and above the bottom of the flanges and below and coacting with said ribs and flanges to provide the slab with spaced chambers, said means being secured to the inner faces of said flanges, and said ribs having their ends merging into the upper portion of the inner faces of said flanges.

GEORGE E. NAGEL.