June 27, 1950 F. H. EDGERLY 2,512,854

HEATED FLOOR CONSTRUCTION

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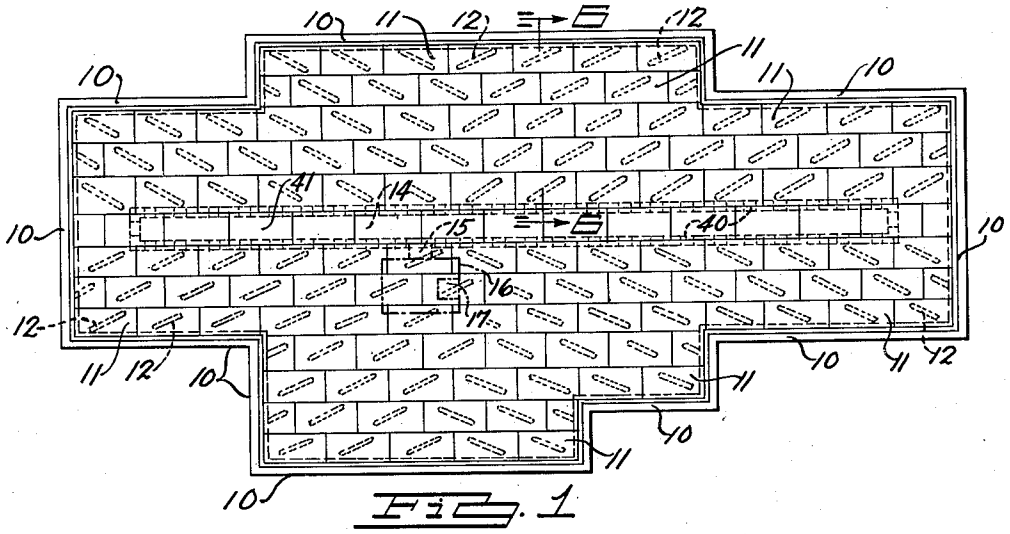


Fig. 1

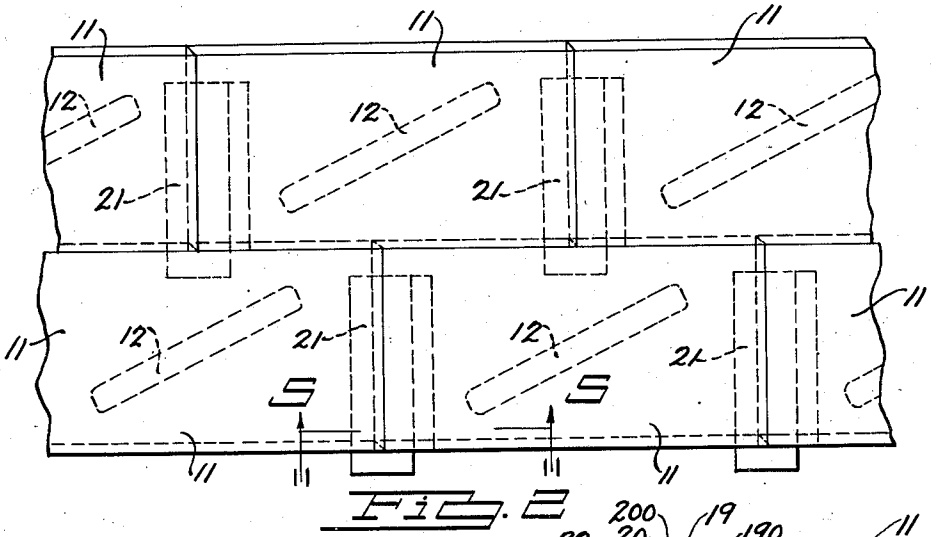


Fig. 2

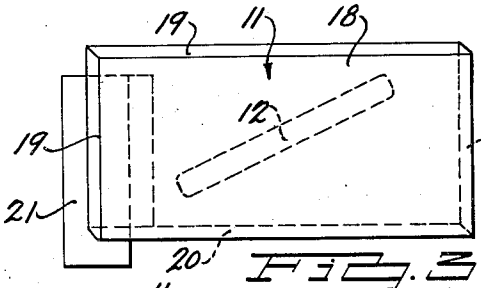


Fig. 3

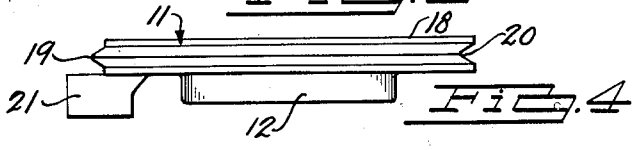


Fig. 4

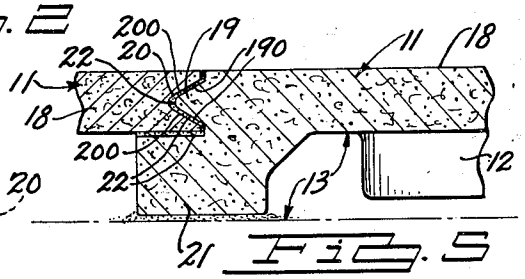


Fig. 5

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HEATED FLOOR CONSTRUCTION

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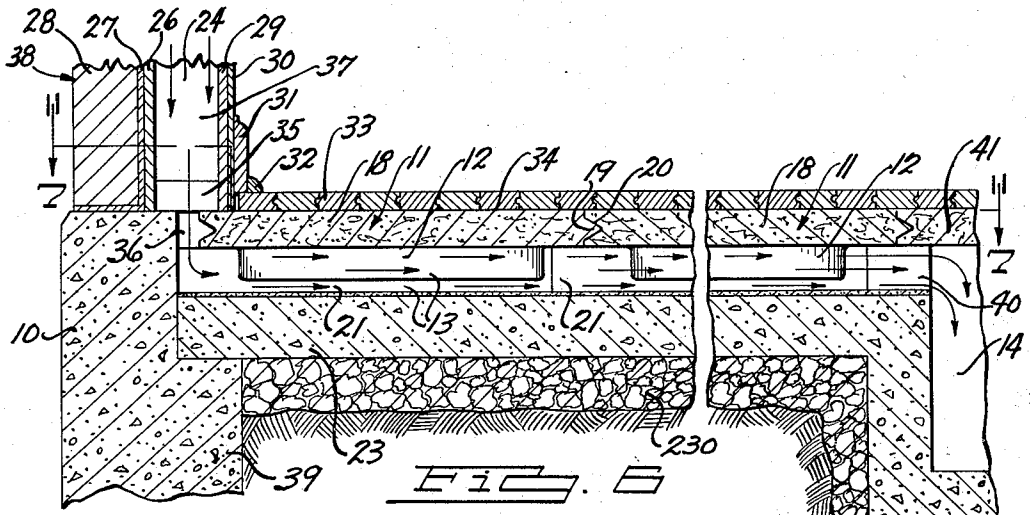



Fig. 6

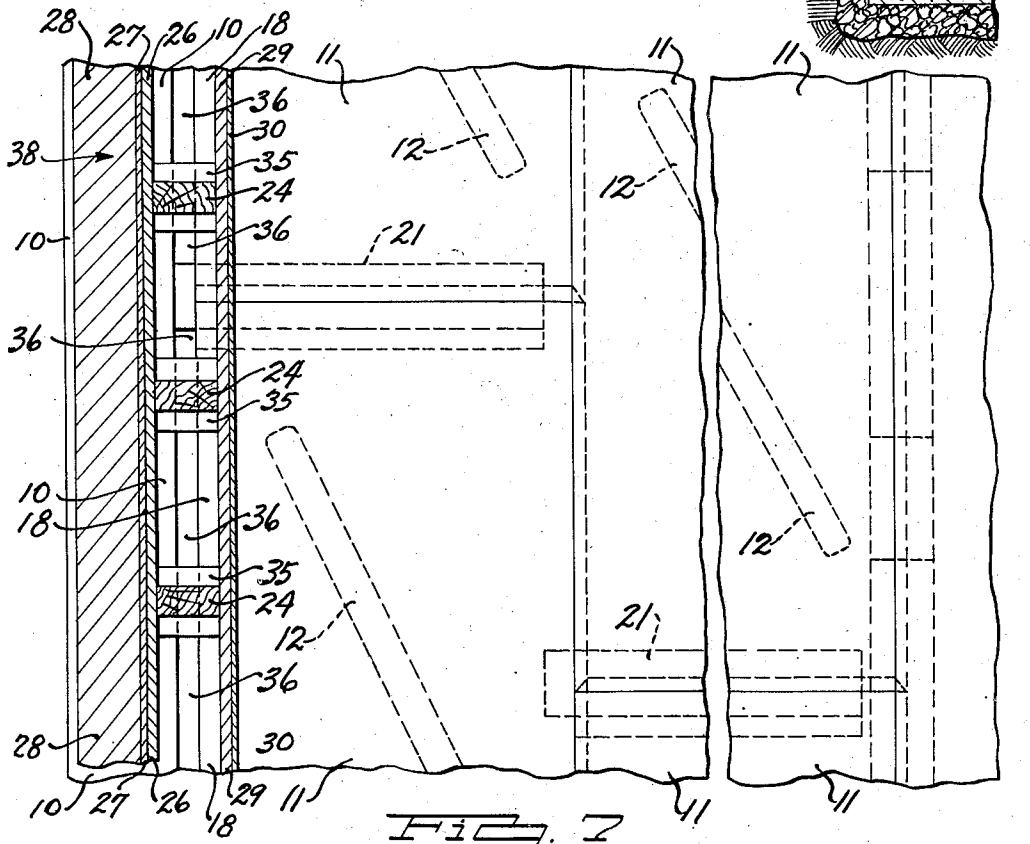



Fig. 7

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## HEATED FLOOR CONSTRUCTION

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Application February 15, 1946, Serial No. 647,873

6 Claims. (Cl. 72—67)

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This invention relates to floor construction and in particular to floor construction for houses, for structures heated by radiant heat, and for structures employing an under-floor air space or plenum chamber.

Most recent trends in house construction are to ranch house style houses which are preferably one story in height and with a utility room replacing the basement. Coupled with the trend toward one story ranch type houses is modern radiant heating normally accomplished by embedding heating pipes into the walls and floor and circulating hot water therethrough. As an alternate, the attic of a house is sometimes insulated at the underside of the roof and employed as a plenum chamber for heated air, the outside walls of the house are hollow and heated by warm air drawn downwardly therethrough from the attic plenum chamber into a plenum chamber below the floor from which the warm air is drawn into a heat transfer unit in which the circulated air is re-heated to a higher temperature and again discharged into the attic plenum chamber for recirculation as above indicated.

Because of the extreme rectangular shape of some one story structures such as ranch houses, uniformity of warm air circulation has been a difficult problem. Also, in all types of houses or other structures without basements particularly when used for living quarters, offices, or assembly purposes, the difficult problem of providing a satisfactory dry, warm, vermin-proof and fireproof permanent flooring is presented.

With the foregoing in view, the primary object of the invention is to provide an economical, dry, warm, vermin-proof and fireproof permanent flooring for houses and other structures without basements.

Another object of the invention is to provide an economical easily erected precast floor construction for houses and other structures without basements which is not only dry, warm, vermin-proof, fireproof and permanent but which provides an under-floor air space for under-floor warm air heating system including radiant heating.

Another object of the invention is to provide an economical and easily erected precast floor construction which serves as a plenum chamber for the passage of air in under-floor heating systems including radiant heating wherein means is provided integral with the floor construction for directing the flow of air from the corners of rectangular structures to a central duct whereby to assure an even movement of air in the

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under-floor plenum chamber from all parts of the structure to said duct.

Other objects of the invention will become apparent by reference to the following detailed description taken in connection with the accompanying drawings, in which:

Fig. 1 is a plan view of the floor of a ranch house illustrating the invention showing a typical duct and under-floor plenum chamber arrangement for a radiant heating system.

Fig. 2 is an enlarged fragmentary plan view of the floor construction disclosed in Fig. 1 showing in detail one of many possible arrangements of precast floor panels embodying the invention.

Fig. 3 is a plan view of a precast floor panel of the type employed in Figs. 1 and 2 to illustrate the invention.

Fig. 4 is a side elevational view of the floor panel shown in Fig. 3.

Fig. 5 is an enlarged sectional view taken on the line 5—5 of Fig. 2 showing a typical joint between precast floor panels embodying the invention.

Fig. 6 is an enlarged cross sectional view taken on the line 6—6 of Fig. 1 showing in considerable detail the general construction of a ranch house embodying the invention.

Fig. 7 is a plan view taken on the line 7—7 of Fig. 6.

Referring now to the drawings wherein like numerals refer to like and corresponding parts throughout the several views, the ranch house selected to illustrate the invention is much longer than it is wide and is shaped as indicated in Fig. 1 which shows the outer foundation wall 10, a plurality of floor panels 11 including return air directing baffles 12 arranged to assure adequate flow of return air drawn from the extremities of the ranch house through the under-floor plenum chamber 13, see Fig. 6, and return air ducts 14 and 15 to the hot air furnace 16 from which re-heated air leaves through the hot air duct 17 to the attic space of the ranch house.

Floor panels 11 embodying the invention are shown in detail in Figs. 3 and 4 and comprise a slab 18 which may be reinforced if the floor panels are cast in sufficient size to warrant reinforcement, complementary tongues 19 and grooves 20 on opposite sides and ends of the said slab 18, a bearing block 21 preferably along the tongued end of the slab 18, and a diagonally disposed air directing baffle depending from said slab 18 but of less depth than the said bearing block 21. It will be noted that the apex of each tongue 19 is

flattened to provide space for cement or mastic material 22 between the apex of the tongue 19 and base of the groove 21 as indicated in Fig. 5. The sides 190 of the tongues 19 and the sides 200 of the grooves 20 are complementary so that they become in substantial engagement with each other when floor panels 11 are juxtaposed, only a very thin film of mastic cement or other cementitious material 22 remaining therebetween. Thus, the floor panels 11 are self-leveling to the extent of providing a smooth top surface when laid over a substantially level sub-floor 23. The said floor panels 11 may be cast of concrete, cement mortar or other suitable cementitious material and may have admixed thereto expanded vermiculite or other material which will make the floor panels 11 lighter and easier to handle and more readily cut to fit special details which are usually encountered in erecting precast panels.

Fig. 2 shows in an enlarged plan view a typical portion of the floor of the structure described in Fig. 1 wherein floor panels 11 are erected in the proper relationship with respect to each other. Fig. 5 shows in a further enlarged sectional view a typical joint between floor panels 11 wherein the exposed top of the bearing block 21 on one of the said floor panels 11 has been spread with cement or mastic 22, the groove 20 of another floor panel 11 has been buttered with cement or mastic 22 and both floor panels 11 have been urged together in self-leveled relationship with the sides 190 of the tongues 19 in substantial engagement with the sides 200 of the complementary grooves 20. Obviously any suitable cementitious material may be employed instead of the cement or mastic 22. The horizontal dot and dash line in Fig. 5 represents the sub-floor upon which floor panels 11 are erected, and the space indicated by the numeral 13 between the said sub-floor and the bottom of the slab 18 of the floor panel 11 comprises the under-floor plenum chamber 13.

When air is withdrawn from the plenum chamber 13 into the hot air furnace 16 through the return air ducts 14 and 15, its normal travel is directly transverse of the floor panels 11 through the space below the slab 18 of the floor panels 11 and between the bearing blocks 21 thereof. However, the air directing baffles 12 restrict the said transverse flow of air and only permit a portion of the air to flow under the said baffles 12 directly from the outer walls of the structure to the main return air duct 14. The air directing baffles 12 cause a large portion of the air being withdrawn from the outer walls of the structure through the under-floor plenum chamber 13 created by the floor panels 11 to be drawn from the extreme corners of the structure than otherwise would be possible, thus causing a more even heating of the structure by a hot air radiant heating system which is preferably employed when floor construction embodying the invention is used.

Figs. 6 and 7 show in detail the general floor and wall construction of the ranch house disclosed in Fig. 1 employing precast floor panel construction embodying the invention. The foundation wall 10 has a brick veneer wall 38 thereon composed of studs 24, sheathing 26, waterproofing 27 and brick veneer 28. Inside the studs 24 is plaster board 29, plaster 30 and the usual base 31 and shoe 32. A wood flooring 33 is disposed over the floor panels 11 and can be nailed directly thereto if the floor panels are constructed of nailable material, otherwise, the said wood flooring may be set in a mastic or tar composition 34. The studs 24 are set on blocks 35 rather than the usual continuous sill whereby to provide a plurality of communicating passages 36 between the studs 24 connecting the air spaces 37 in the brick veneer wall construction 38 with the under-floor plenum chamber 13.



The said foundation wall 10 has a ledge 39 formed therein onto which the under-floor 23 is seated preferably on crushed stone or cinders 230. The floor panels 11 are positioned on the under-floor 23 as hereinbefore described. The slab portion 18 of the floor panels 11 is held back laterally from the back of the foundation wall 10 as indicated in Fig. 6 to avoid blocking the communicating passages 36 between the air spaces 37 in the brick veneer wall construction 38 and the under-floor plenum chamber 13. A plurality of ports 40 connect the under-floor plenum chamber 13 with the main return air duct 14. Floor panels 41 having no air directing baffles 12 are preferably employed over the main return air duct 14.

When an under-floor plenum chamber without air directing baffles is desired, floor panels 41 composed only of a tongue and groove slab portion 18 and a bearing block 21 may be employed. The use of floor panels having integral bearing blocks are extremely economical to lay inasmuch as the particular arrangement of the bearing block and disposition of a tongue 19 thereover as best shown in Figs. 3, 4 and 5 provide substantially automatic leveling while the floor panels are being layed in peripheral interlocked juxtaposition to each other as indicated in Figs. 2 and 5. If the said automatic leveling of floor panels 11 embodying the invention lifts or tilts an integral bearing block 21 off the sub-floor 23, the workman laying the floor fills the space between the bottom of the bearing block 21 and the sub-floor 23 with cement, mortar or any other suitable material. However, if the bearing blocks 21 are cemented with a stiff mastic, mortar or the like to the sub-floor 23, pressure on a high spot in the slab 18 of joined floor panels 11 prior to the initial set of the cementitious material employed under the bearing blocks 21 will lower the high spot or high end of any bearing block 21 and provide a level floor; that is, a floor in which the tops of juxtaposed panels are in transverse alignment as distinguished from having upright offsets therebetween.

Although but one embodiment of the invention has been disclosed and described, it is obvious that many changes may be made in the size, shape, arrangement and details of the various elements thereof without departing from the spirit of the invention as defined by the appended claims.

I claim:

1. In precast panel floor construction, a plurality of precast floor panels erected and cemented together in longitudinal and lateral juxtaposed position over a sub-floor with the joints therebetween in staggered relationship, each panel including a diagonally disposed depending baffle cast integral therewith extending short of the sides and ends thereof and a narrow bearing block cast integral therewith located along one end thereof extending laterally from the said end and from one side adjacent said end supporting one end of said panel and the end of a panel adjacent the bearing block end of said panel and the center of the side of a panel adjacent the side of the said panel from which the said bearing block extends whereby to provide a completed

precast panel floor construction supported by a minimum of bearing points wherein each floor panel is supported on all four sides and a plenum chamber is established thereunder, the said baffle being of less depth than the depth of the said bearing block but deeper than one-half the depth thereof whereby to cause the larger portion of air within the said plenum chamber to follow a diagonal course under said floor construction when air is circulated therethrough.

2. In a precast panel floor construction which forms a plenum chamber, a duct system comprising spaced inlet and outlet ducts, a plurality of precast floor panels each including integral means supporting the same in spaced relationship over a sub-floor, said floor panel being erected and cemented together in longitudinal and lateral juxtaposed position with the joints therebetween in staggered relationship, diagonally disposed air directing baffles depending from said floor panels less in depth but greater than one-half the height of the said supporting means and spaced laterally therefrom directing to the desired distribution the greater portion of air passing through the said plenum chamber, said panels having complementary angular tongues and grooves formed in opposite sides and ends thereof less in width than the thickness of the said panels and of such proportions that only the sides of the grooves engage the complementary sides of the tongues when the panels are juxtaposed whereby a floor panel being laid becomes self-leveled with respect to panels adjacent thereto.

3. In precast panel floor construction, a plurality of precast floor panels each including integral bearing blocks supporting the same in spaced relationship over a sub-floor at one end thereof and supporting the floor panels adjacent one end and one side thereof said floor panels being erected and cemented together in longitudinal and lateral juxtaposed position with the joints therebetween in staggered relationship, diagonally disposed air directing baffles depending from said floor panels less in depth but greater than one-half the height of the said bearing blocks and spaced laterally therefrom, said panels having complementary angular tongues and grooves formed in opposite sides and ends thereof less in width than the thickness of the said panels and of such proportions that only the sides of the grooves engage the complementary sides of the tongues when the panels are juxtaposed whereby a floor panel being laid becomes self-leveled with respect to panels adjacent thereto.

4. In precast panel floor construction, a plurality of precast floor panels erected and cemented together in longitudinal and lateral juxtaposed position over a sub-floor with the joints therebetween in staggered relationship, each panel having a narrow bearing block cast integral therewith located along one end thereof extending laterally from the said end and from one side adjacent said end supporting one end of said panel and the end of a panel adjacent the bearing block end of said panel and the center of the side of a panel adjacent the side of the said panel from which the said bearing block extends whereby to provide a completed precast panel floor construction supported by a minimum of bearing points wherein each floor panel is supported on all four sides and a plenum chamber is established thereunder, and diagonally disposed air directing baffles depending from said floor panels less in depth but greater than one-half the height of the said bearing blocks and spaced laterally therefrom.



5. In precast panel floor construction, a plurality of precast floor panels erected and cemented together in longitudinal and lateral juxtaposed position over a sub-floor with the joints therebetween in staggered relationship, each panel having a narrow bearing block cast integral therewith located along one end thereof extending laterally from said end and from one side adjacent said end supporting one end of said panel and the end of a panel adjacent the bearing block end of said panel and the center of the side of a panel adjacent the side of the said panel from which the said bearing block extends whereby to provide a completed precast panel floor construction supported by a minimum of bearing points wherein each floor panel is supported on all four sides and a plenum chamber is established thereunder, and diagonally disposed air directing baffles depending from said floor panels less in depth but greater than one-half the height of the said bearing blocks and spaced laterally therefrom, said panels having complementary angular tongues and grooves formed in opposite sides and ends thereof less in width than the thickness of the said panels and of such proportions that only the sides of the grooves engage the complementary sides of the tongues when the panels are juxtaposed whereby a floor panel being laid becomes self-leveled with respect to panels adjacent thereto.

6. A precast floor construction comprising a plurality of rectangular panels of cementitious material each including integral means supporting the same in spaced relationship over a sub-floor at one end thereof, the said supporting means extending from one end and a portion of one side of each of the said panels and supporting floor panels erected adjacent one end and one side thereof, diagonally disposed air directing baffles less in depth but greater than one-half the height of the said supporting means depending from the said floor panels, said panels having complementary angular tongues and grooves formed in opposite sides and ends thereof less in width than the thickness of the said panels and of such proportions that only the sides of the grooves engage the complementary sides of the tongues when panels are juxtaposed whereby a floor panel being laid becomes self-leveled with respect to panels adjacent thereto, the aggregate of the said floor panels forming a plenum chamber between the precast floor construction and the said sub-floor wherein the greater portion of air therein is moved as directed by said baffles when said air is circulated therethrough.

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