June 23, 1936. H. GRIESEL 2,044,844

CONSTRUCTION OF BUILDINGS

Filed Oct. 6, 1932

Fig.1

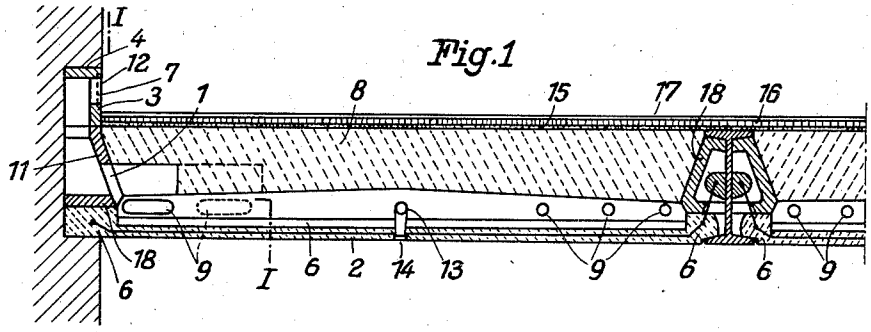


Fig.2

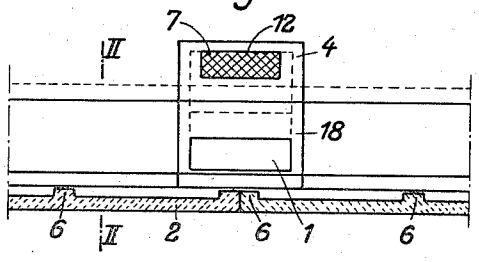


Fig.3 (II–II)

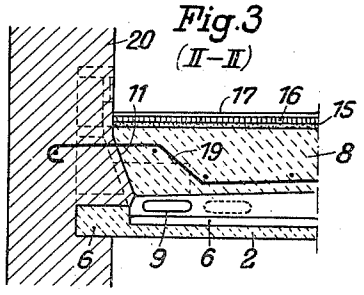


Fig.5

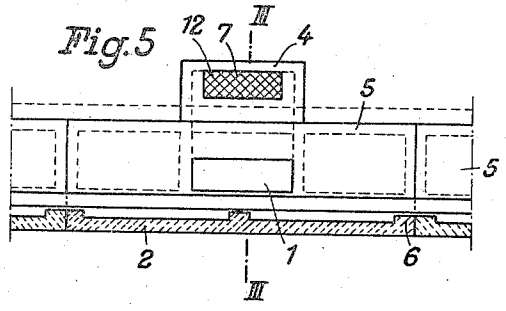


Fig.4 (III–III)

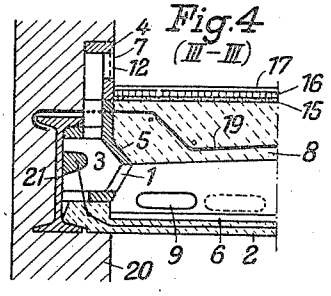


Fig.8

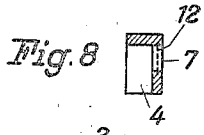


Fig.6

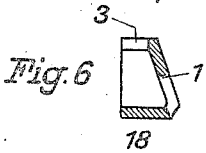


Fig.7

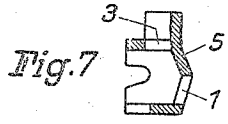
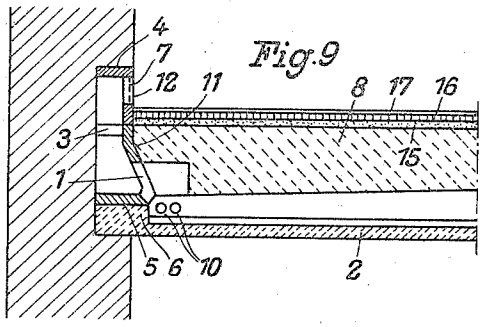


Fig.9



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UNITED STATES PATENT OFFICE

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CONSTRUCTION OF BUILDINGS

Heinrich Griesel, Berlin, Germany

Application October 6, 1932, Serial No. 636,439
In Germany October 10, 1931

3 Claims. (Cl. 72—66)

My invention relates to improvements in the utilization of hollow ceilings which at the same time form the floor of the story above or the roof for heating, cooling or ventilating purposes as well as for conduits for electric cables and the like. In such floor and roof structures superimposed ceiling and cover plates of concrete or the like are arranged with a cavity therebetween between beams or other supports of iron, reinforced concrete, masonry or the like; in particular my invention relates to such a floor and roof construction in which blocks or beams are positioned on a ceiling plate which may if necessary be reinforced in the form of a carrying frame, said blocks or beams carrying the load-carrying cover plate beneath which a cavity is formed. Due to its vertical bearing pressure the cover plate clamps the ceiling plate and at the same time exerts a lateral thrust as in a vaulted construction, against its supports due to its oblique surfaces.

One feature of my invention resides in accommodating between the ceiling plate and the cover plate means for heating, cooling or ventilating the air or electric cables and to provide passages in the longitudinal beams or bearing blocks which direct the air from the cavity into the space which is to be heated, cooled or ventilated or serve for passing the electric conductors in and out.

A further feature of my invention resides in providing longitudinal beams or bearing blocks in the form of hollow members provided with apertures in their walls which form exhaust passages or flues for the heated, cooled or purified air or provide passages for introducing and leading out electric cables. The openings can also serve as grips for carrying and positioning the blocks.

A further feature of my invention resides in superimposing on the longitudinal beams or supporting blocks hollow stones the lateral openings of which terminate in the space above the ceiling construction and the further apertures of which are connected with the passages in the longitudinal beams or bearing blocks so that a continuous connecting conduit is formed between the ceiling cavity and the space outside.

Such a ventilation, heating or cooling from the floor or from the ceiling is more suitable for reasons of heat technology and hygiene than a heating, cooling or ventilating by means of heating bodies, such as stoves or radiators, or cooling or ventilating apparatus which are disposed in the room. The carrying of the pipes and conduits on the ceiling plate has the further advantage that they are readily examined and interchanged and their connections with rising and falling conduits and the like are readily accessible and simple to provide.

Further features and advantages of my invention will be described in the appended claims and shown in the drawing which constitute a part of my application.

Referring to the drawing:

Fig. 1 shows a cross-section through a ceiling construction in which heating or cooling pipes and sprinkler conduits are positioned on the ceiling plate.

Fig. 2 shows a view looking toward a bearing block and a cover stone carried thereon looking in the direction of the line I—I of Fig. 1, the cover plate being omitted.

Fig. 3 shows a section along the line II—II of Fig. 2.

Fig. 4 is a cross section along the line III—III of Fig. 5.

Fig. 5 is a view looking towards a longitudinal beam and a cover stone carried thereon, the cover plate being omitted.

Figs. 6 and 7 show two embodiments of longitudinal beams or bearing blocks in cross section.

Fig. 8 shows a cover stone in cross section and Fig. 9 shows a further embodiment in which electric conductors are accommodated in the cavity between the ceiling plates and the cover plates.

2 is the ceiling plate which may be reinforced in the form of a supporting frame by means of longitudinal and transverse ribs 6, and on which the bearing blocks 18 constructed as hollow stones are positioned. The cover plate 8 is inserted between the bearing blocks 18 and it abuts with oblique surfaces 11 against corresponding oblique surfaces on the hollow stones 18 so that it clamps the plate 2 and at the same time exerts a lateral thrust on the hollow stones as in a vaulted construction.

The actual floor covering 17 is then laid in the usual way on the cover plate 8 over a layer of sand or slack 15 or a plaster floor 16. The heating pipes 9 are disposed in the cavity between the plates 8 and 2 on the plate 2 which in consequence of its small thickness and good conductability offers a ready passage to the heat. In order to attain that the heat radiating from the heating pipe in the ceiling areas should find a rapid and efficient passage into the space above the ceiling, apertures 1 and 3 are provided in the bearing blocks 18 as clearly seen from Fig. 6.

Further, a cover stone 4 constructed in the form of a hollow stone with an outlet aperture 7 is incorporated above the aperture 3. Together with the apertures 1 and 3 this aperture

forms a good flue or discharge passage for the rising heat. The apertures 7 which are disposed somewhat above the level of the floor are preferably covered with wire gratings 12 or perforated sheet metal or the like in such way that the heat can pass out without obstruction but the passage itself is protected against fouling and blocking. Such passages for carrying off the heat can be arranged in the walls in any desired position. As shown in Fig. 1, apertures 14 are provided in the ceiling plate 2 beneath the sockets of the sprinkler conduits 13 which are disposed on the ceiling plate 2, so that a good sprinkling can be effected through the ceiling.

Fig. 3 shows that the abutment for the cover plate 6 passes between the bearing blocks 18 and also shows the manner in which the cover plate 6 is anchored to the surrounding wall 20 by means of its iron reinforcements 19.

In Fig. 4, 21 is the outermost ceiling beam of a structural steel framing on the flange of which the ceiling plate 2 is laid. For the rest the construction of the ceiling is exactly as in the embodiment according to Fig. 1. Instead of short bearing blocks 18 however, longitudinal beams 5 are preferably used. As seen from Fig. 5 these extend over the entire width of the plate 2. The anchoring of the cover plate 6 is effected by its iron reinforcement 19 which is bent about the upper flange of the beam 21.

Fig. 7 shows a longitudinal beam as used in the embodiment according to Fig. 4. The longitudinal beam 5 can however be of the same cross-section as a bearing block 18. Fig. 5 shows such a construction of the longitudinal beam.

The arrangement of the flues or discharge passages as described above affords the same advantages if the cavity of the ceiling is used for cooling or ventilation purposes.

If the cavity between the two plates is utilized for accommodating electric cables for power and normal currents as shown in Fig. 9, which for the rest corresponds with the construction according to Fig. 1, then similar passages to those described are provided in the lateral wall and branch conductors from the cables, the vertical conductors and the like are passed out therethrough. Connecting plugs can be accommodated directly in the cover stones 4 and preferably the aperture 7 is then closed by a closure cover such as is usual for such connections.

In the above description and in the drawing a number of advantageous embodiments of my invention are described and shown without in any way restricting the scope of the invention thereto.

What I claim is:—

1. A ceiling construction comprising a pair of supports, a ceiling plate disposed between and carried by said supports, spaced abutment members carried on said ceiling plate, and a cover member extending between and supported by said abutment members, said cover member being spaced from the ceiling plate to form a space for circulation of air, at least one of said abutment members having a passage therethrough, said passage communicating with the space between the ceiling plate and the cover member, and the space above said cover member, whereby air may pass from one of said spaces to the other.

2. A ceiling construction comprising a pair of supports, a ceiling plate disposed between and carried by said supports, spaced abutment members carried on said ceiling plate, said abutment members having oblique surfaces on their opposing faces, and a cover member having oblique surfaces on opposite sides thereof, said cover member extending between said abutment members and having its oblique surfaces resting upon and supported by the oblique surfaces of the abutment members, said cover member being spaced from the ceiling plate to form a space for circulation of air, at least one of said abutment members having a passage therethrough, said passage communicating with the space between the ceiling plate and the cover member, and the space above said cover member, whereby air may pass from one of said spaces to the other.

3. A ceiling construction comprising a pair of supports, a ceiling plate disposed between and carried by said supports, spaced abutment members carried on said ceiling plate, at least one of said abutment members having a passage therethrough, a cap member mounted on the abutment member, said cap member having a passage therethrough, and a cover member extending between and supported by said abutment members, said cover member being spaced from the ceiling plate to form a space for circulation of air, the passage through said abutment member communicating at one end with the space between the ceiling plate and the cover member and at its other end with one end of the passage through the cap member, the other end of the passage through the cap member communicating with the space above the cover plate whereby a continuous passage for air between said spaces is provided.

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