Oct. 22, 1929. W. K. NELSON 1,732,243

HEAT AND SOUND INSULATED CONSTRUCTION

Filed Aug. 8, 1927

Fig. 1.

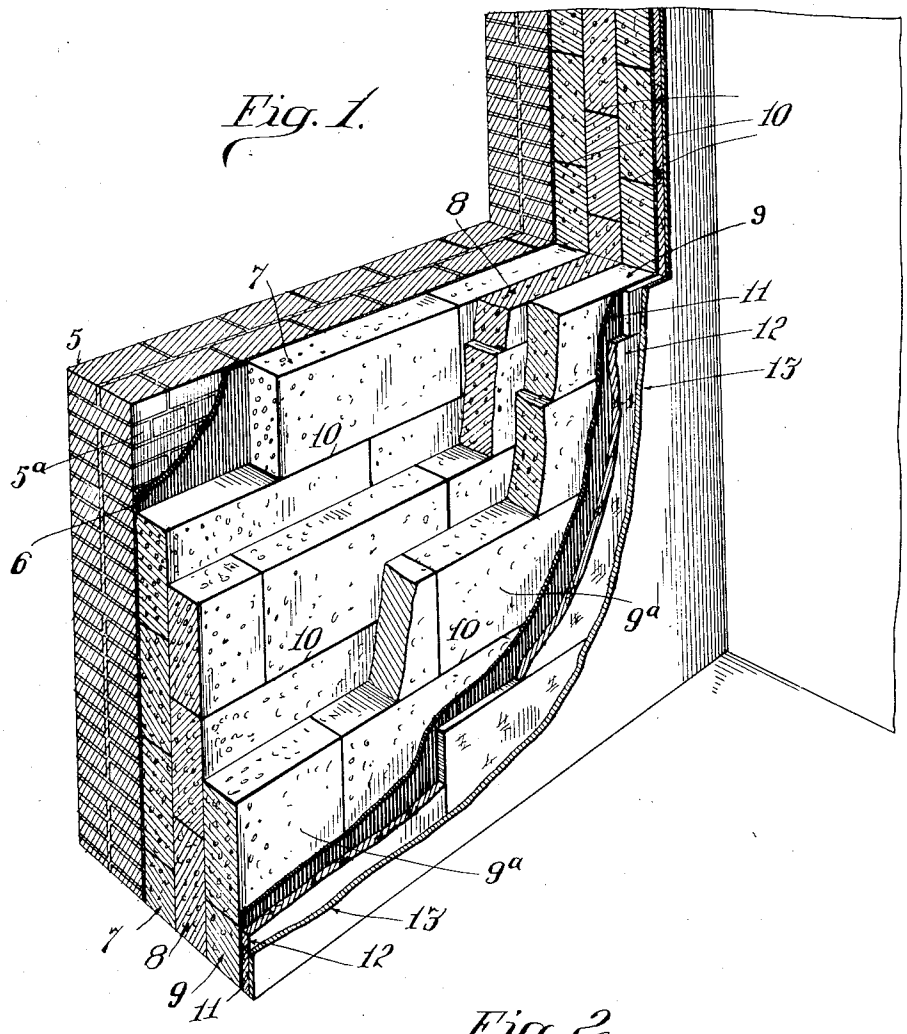
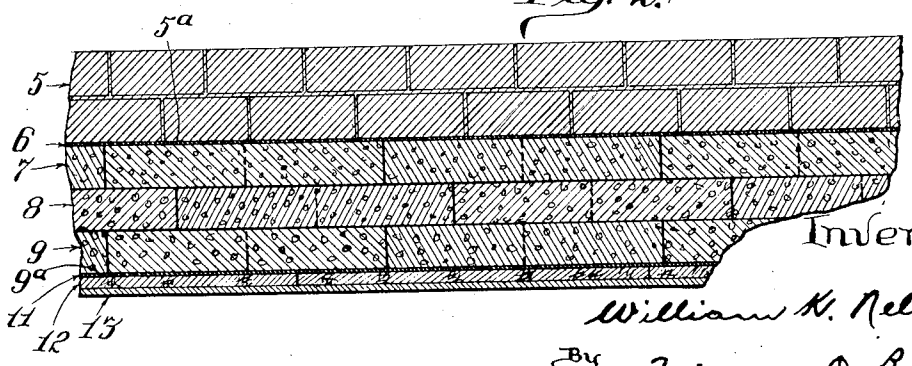


Fig. 2.



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UNITED STATES PATENT OFFICE

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HEAT AND SOUND INSULATED CONSTRUCTION

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My invention relates particularly to heat insulated constructions for the walls, ceilings and floors of refrigeration rooms, buildings, receptacles and the like.

In constructions of the class mentioned, one of the most commonly used insulating materials is cork, either in granular form or compressed slabs. As a heat insulating material cork is highly efficient in that it has a low thermal conductivity value. However, cork installations are expensive, the supply of cork for future needs is limited, cork is not fire-resisting to any marked extent, it is not highly resistant to disintegration and it is not vermin proof. One of the objects of my present invention is the provision of an improved insulated construction which shall be highly resistant to heat transmission, convenient and readily installed and comprising materials readily available in large quantities in numerous places and at a cost much less than the materials now commonly used.

A further object of my invention is the provision of a construction which shall be highly fire-resisting, durable and not attractive as a breeding place for pests such as rats, mice, insects and the like.

Another object of my invention is to preserve the high value of the insulating material employed as well as to prevent its disintegration by providing damp-proof protective films or coatings preferably on the inner and outer surfaces of the insulating material.

My invention consists in the novel constructions and arrangements to be hereinafter described for carrying out the above stated objects and such other objects as will appear from the following specification taken in connection with the accompanying drawings illustrating a preferred embodiment of my invention wherein:

Fig. 1 is a perspective view of a fragmentary portion of a wall construction embodying the principles of my invention, and

Fig. 2 is a longitudinal sectional view through the wall construction.

Referring now to the accompanying drawings, it will be seen that the wall construction illustrated therein comprises a plurality of units in layer or sheet-like form. The outer unit 5 is of brick laid in mortar in the usual way and serves as a supporting or protecting means for the other units of the construction. Either the outside or the inside surface of the wall 5 is preferably provided with a coating of damp-proofing material of any suitable composition. In the embodiment illustrated the inner surface 5^a of the brick unit 5 is provided with a coating 6 of damp-proofing material comprising mainly an asphaltic composition. Units 7, 8 and 9, each comprising a plurality of pre-cast cellular, gypsum slabs or blocks are preferably arranged adjacent the damp-proofing material 6 substantially as shown in the drawings. It will be noted that the gypsum slabs in each unit are so arranged that the joints or crevices therebetween, both longitudinally and transversely, are broken, staggered or offset with respect to the joints of the slabs of the adjacent unit or units, thus guarding against any direct paths through the gypsum units being present for the passage of air currents, heat or sound waves. The joints or crevices 10 between the gypsum slabs in each unit are preferably filled with a suitable cementitious material such as pitch, asphaltic composition or the like. A coating 11 of any suitable damp-proofing material is preferably applied to the inner surface 9^a of the inner unit of gypsum slabs, said coating preferably comprising an asphaltic composition. A unit of slabs of some material suitable as a base for plaster or cement is preferably provided adjacent the coating 11. In the embodiment illustrated the last-named unit comprises a plurality of cork slabs 12 which are held in place and are bonded to the inner unit of gypsum slabs by the asphaltic composition coating 11. A coating 13 of Portland cement plaster or other suitable finishing material is preferably applied to the inner face or surface of the cork slabs 12.

The cellular slabs used in the units 7, 8 and 9 may be formed of any suitable mineral material. A satisfactory formula for the production of cellular, gypsum slabs weighing approximately 20 lbs. per cu. ft. is as follows: 100 lbs. calcined gypsum (substantially free of impurities), 9 lbs. aluminum sulphate,

4 lbs. calcium carbonate, 7 oz. soap and 1 lb. talc. The soap may be used either in powdered or in solution form. The mixture of the aforesaid materials is gauged properly with a suitable quantity of water, agitated for a short interval of time and then poured into a mold of the size of the slab and allowed to set. The heat transmission resistance of a cellular gypsum slab having a density of approximately 20 lbs. per cu. ft. is not less than one-half of that of cork for the same thickness, that is to say, a cellular gypsum slab two inches thick of the density aforesaid will have a heat transmission resistance at least equal in value to a cork slab of one inch thickness.

The cellular gypsum blocks may be pre-cast at a factory, delivered to the job and readily set in place by any workman skilled in laying walls of brick or tile. The materials entering into the cellular gypsum blocks are readily obtainable at numerous places. The cost of the gypsum blocks installed in a wall construction as described is much less than slabs of cork having the same insulation value.

A wall constructed in accordance with my invention is highly fire resisting, is durable and is ill-adapted and unattractive as a breeding place for rats, mice, insects and the like. Other suitable materials, such as gypsum wallboard, fibre wallboard and the like, may be employed, instead of cork, as a base for the finishing material. The thin unit of cork or other suitable material, being substantially completely encased by mineral composition material and near the inner or coldest part of the wall, is difficult of access and unattractive to vermin.

The protective coatings 6 and 11 of damp-proofing material effectively prevent moisture and vapors from penetrating the cellular gypsum slabs in the intervening units. The slabs of cellular material used in said units, therefore, are well preserved against disintegration due to such destructive or weakening agents. Since the cellular gypsum slabs are kept dry at all times by the damp-proofed coatings and the joints of the slabs are broken and of a suitable cementitious material, the insulating value of the slabs is maintained constant and at high efficiency.

An insulated construction embodying the principles of my invention is well adapted to resist the passage of heat, cold and sound waves. The construction is highly useful in cold storage houses, refrigeration buildings, rooms, compartments, receptacles and the like. While the invention has been illustrated in connection with a vertical wall, it will be obvious that it is equally well adapted for use in floors and ceilings.

I have illustrated and described in detail one preferred embodiment of my invention, but I do not wish to limit my invention to the construction shown and described, except only in so far as certain of the appended claims are specifically so limited, as it will be obvious that changes may be made in practising the invention without departing from the spirit or principles thereof.

I claim:

1. In a heat and sound insulated construction for walls, ceilings or floors of rooms, buildings, receptacles and the like, the combination of a plurality of units in layer or sheet-like form placed face to face and of pre-cast, highly cellular light weight gypsum material, and coatings of damp-proofing material next to the outer and inner surfaces of the respective outer and inner units of said gypsum material for maintaining the gypsum material in condition to resist effectively heat and sound transmission.

2. In a heat and sound insulated construction for walls, ceilings or floors of rooms, buildings, receptacles and the like, the combination of a plurality of units in layer or sheet-like form placed face to face and of pre-cast, highly cellular, light weight gypsum material, a coating of damp-proofing material next to the outer surface of the outer unit of said gypsum material, a coating of damp-proofing material on the inner surface of the inner unit of said gypsum material, said coatings of damp-proofing material serving to maintain the gypsum material in condition to resist effectively heat and sound transmission, and a unit of plaster or cement receiving material held against the inner unit of said gypsum material by the coating of damp-proofiing material applied thereto.

3. In a heat and sound insulated construction for walls, ceilings or floors of rooms, buildings, receptacles and the like, the combination of a plurality of units in layer or sheet-like form placed face to face, each unit comprising a plurality of pre-cast, highly cellular, light weight gypsum slabs placed edge to edge, the joints of said slabs being of a cementitious material and broken both vertically and horizontally with respect to each other, and coatings of damp-proofing material next to the outer and inner surfaces of the respective outer and inner units of said slabs for maintaining the slabs in condition to resist effectively heat and sound transmission.

WILLIAM K. NELSON.