March 30, 1937. G. C. SQUASSI 2,075,368

MEANS FOR HEATING ROOMS

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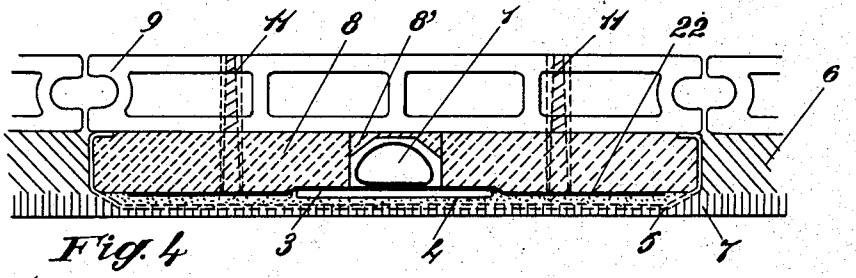


Fig. 4

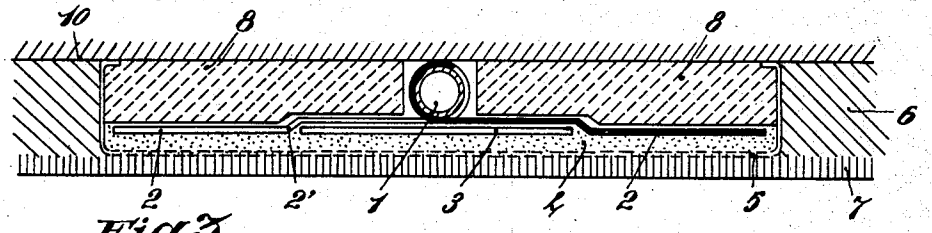


Fig. 3

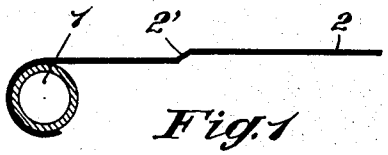


Fig. 1

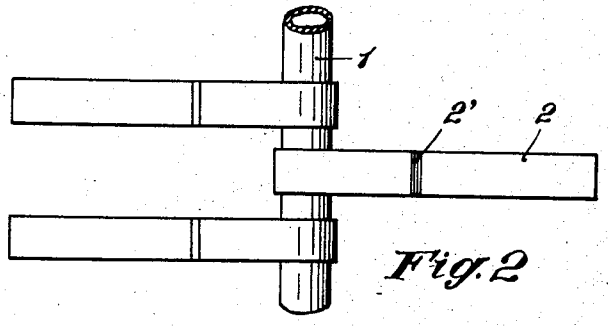


Fig. 2

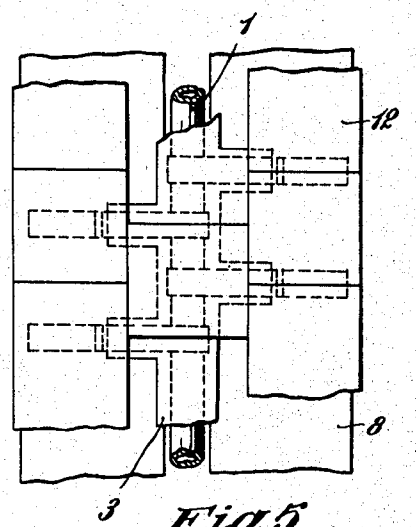


Fig. 5

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MEANS FOR HEATING ROOMS

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6 Claims. (Cl. 257—256)

My invention relates to room-heating systems of the kind in which the heating elements are concealed within the walls, the floor or the ceiling. The invention has for its object the provision of room-heating elements which may be installed in such a small outside layer of the walls, ceilings and floors as normally is formed for instance by the plaster work. The heater according to the invention has therefore the double advantage of a minor loss of heat due to the thin concealing layer and of a cheaper installation, the provision of grooves in the wall-structure hitherto usual, being avoided.

According to the invention the heating pipes used are of a small diameter, for instance of about 10–20 mm. for vertical installation in walls and of about 20–25 mm. for horizontal installation in floors and ceilings. To these pipe lines metal radiating strips are applied tangentially to the pipes and in a plane which is parallel to the heat transmitting surface of the wall, floor or ceiling. The radiating strips which may, for instance, be of aluminium or another high conductive material are distinguished according to the invention by the circumstance of having a zone near the pipe covered with a heat-insulating material and a distant zone which is directly radiating. Thus a greater uniformity of heat transmission is attained. The metal radiating strips may be arranged at various distances from each other according to the amount of heat which it is desired to transmit. Preferably the pipes are placed between pieces of an insulating material, as for instance Celotex adapted simultaneously to form a backing for the metal strips.

In the case of floor heating these few members placed directly beneath the parquet floor or beneath an earthenware or cement tile pavement may be sufficient to form a good room heating system, but for concealing them in the plaster of a wall or of a ceiling special provisions are necessary to avoid the destruction of this easily crumbling material as a consequence of the thermal expansion of the metal parts. According to the invention the concealing of heating elements, always moving under the effects of the changes of temperature, beneath a thin coat of wall or ceiling plaster is provided for by means of a thin layer of metal wool, metal wadding and like materials of high heat conductivity and elasticity which is located between the elements and the plaster. This layer of metal wool may be fixed in its position by suitable means, preferably by wire netting. This latter material may also be used to hold together complete heating aggregates in the form of a board comprising an insulating base, a metal pipe, metal heat-transmitting strips and a layer of metal wool, these aggregates which do not exceed the thickness of the first plaster coat of a wall being mounted at the workshop, applied on the wall and covered with the second coat of plaster.

The invention will be more clearly understood by a consideration of the following detailed description taken in connection with the accompanying drawing forming part of this specification, with the understanding however that the invention is not confined to any strict conformity with the showing in the drawing, but may be changed and modified as long as such changes and modifications mark no material departure from the salient features of the invention as expressed in the appended claims.

In the drawing:—

Fig. 1 is a section through a heating pipe and heat transmitting strip.

Fig. 2 is a front view of a pipe line with its metal strips.

Fig. 3 is a horizontal section of a wall heating aggregate.

Fig. 4 is a vertical section of similar aggregate applied to a ceiling.

Fig. 5 is a plan view of a floor heating element.

In the drawing the numeral 1 indicates the pipe lines conveying for example hot water. These pipes are shown of a round or oval section but they may have any other suitable section. On the pipes are applied by soldering or only by their springiness metal strips 2, making at one of their ends an extensive contact with the pipe so as to ensure a good transmission of heat. As shown in Figures 1 and 2, the metal strips 2 have a small step 2' dividing the inner zone, which has to be covered by an insulating material 3, having the thickness of the step from the directly radiating outer zone. In Figs. 3 and 4 there is shown a layer of metal wool 4 covering both the inner and the outer zones of the strips extending alternatively on the two sides of the pipe. The metal wool layer being protected adjacent the pipe against the heat of the pipe by the insulating material 3, shown by way of example in Fig. 3, thus receives a moderate and a very uniform temperature through its whole breadth and the material 7 of the second coat of plaster, which penetrates more or less in the metal wool layer, absorbs this heat for retransmitting it to the room. Fig. 3 shows on a wall 10, pieces 8 of a suitable material, for example boards of Celotex so applied as to leave between the said boards a groove for the pipe 1 and also forming a base for the heat transmitting metal strips. It is understood that instead of strips 2 extending only on one side of the pipe, as shown in Fig. 1, strips may be used extending on both sides, as shown in Fig. 2, and instead of using separate strips in close adjacence, use may be made of a single continuous sheet 22 (Fig. 4) which may be welded to the pipe 1. In order to reduce the effect of expansion, the metal sheet 22 may preferably be notched like a comb.

The layer of metal wool 4 is fixed in contact with the radiating strips 2 and the insulating material by wire netting 5 nailed upon the pieces 8 and upon the wall 10. Instead of assembling the said parts of the heating system into the building only, they may also form a complete aggregate to be applied for example as a whole on the ceiling by means of screws 11 as shown in Fig. 4. The wire netting forms an excellent base for the plaster, which penetrates through it into the metal wool, absorbing the heat without reaching the metal strips. As the thermal expansion of the said strips is always small, a layer of 2 or 3 mm. will be sufficient to take up the said expansion towards the plaster, which will never be damaged by them.

On the contrary the thinness of this layer ensures that the plaster ground maintains the necessary stiffness.

In the case of floor heating the metal wool layer may be dispensed with. As shown in Fig. 5, the slabs 12 directly cover the metal strips 2 and the insulating material 3, but in laying the slabs provision is to be made to allow for a little movement of the metal strips 2.

The construction according to the invention is very simple and therefore economical. As the heating elements are incorporated in the coat of the walls of the rooms and insulated towards the walls, all of the radiated heat is utilized in the rooms.

What I claim is:

1. A heating unit particularly adapted for use in the heating of rooms and to be positioned in a wall, ceiling or floor, directly anterior to the outer surface thereof, said unit comprising plates of insulating material defining a recess therebetween adapted to receive a pipe line of small diameter therein, a pipe line through which a heating medium is adapted to flow arranged in said recess, heat transmitting elements attached to said pipe line and extending substantially tangentially therefrom in a plane substantially parallel to the general plane of the wall, ceiling or floor, said plates serving also as a backing for said heat transmitting elements.

2. A heating unit particularly adapted for use in the heating of rooms and to be positioned in a wall, ceiling or floor, directly anterior to the outer surface thereof, said unit comprising plates of insulating material defining a recess therebetween adapted to receive a pipe line of small diameter therein, a pipe line through which a heating medium is adapted to flow arranged in said recess, heat transmitting elements attached to said pipe line and extending substantially tangentially therefrom in a plane substantially parallel to the general plane of the wall, ceiling or floor, said plates serving also as a backing for said heat transmitting elements, the portions of said heat radiating elements adjacent to said pipe line being provided with an insulating covering while the portions thereof remote from said pipe line are uncovered.

3. A heating unit particularly adapted for use in the heating of rooms and to be positioned in a wall, ceiling or floor, directly anterior to the outer surface thereof, said unit comprising insulating plates defining a recess adapted to receive a pipe line of small diameter therein, a pipe line through which a heating medium is adapted to flow arranged in said recess, a plurality of metallic heat transmitting elements attached to said pipe line and extending in alternately opposite directions substantially tangentially therefrom in a plane substantially parallel to the general plane of the wall, ceiling or floor, said plates serving also as a backing for said heat transmitting elements, said elements being offset intermediate the ends thereof to define a recess adjacent said pipe line, and an insulating layer in said last-named recess, whereby the hottest parts of said elements and the pipe line are covered by said layer.

4. A heating unit particularly adapted for use in the heating of rooms and to be positioned in a wall, ceiling or floor, directly anterior to the outer surface thereof, said unit comprising plates of insulating material defining a recess therebetween adapted to receive a pipe line of small diameter therein, a pipe line through which a heating medium is adapted to flow arranged in said recess, heat transmitting elements attached to said pipe line and extending substantially tangentially therefrom in a plane substantially parallel to the general plane of the wall, ceiling or floor, said plates serving also as a backing for said heat transmitting elements, the portions of said elements adjacent to the pipe line being provided with an insulating covering, and a thin outer layer of metal wool arranged over the whole.

5. A heating unit particularly adapted for use in the heating of rooms and to be positioned in a wall, ceiling or floor, directly anterior to the outer surface thereof, said unit comprising plates of insulating material defining a recess therebetween adapted to receive a pipe line of small diameter therein, a pipe line through which a heating medium is adapted to flow arranged in said recess, heat transmitting elements attached to said pipe line and extending substantially tangentially therefrom in a plane substantially parallel to the general plane of the wall, ceiling or floor, said plates serving also as a backing for said heat transmitting elements, the portions of said elements adjacent to the pipe line being provided with an insulating covering, a thin outer layer of metal wool arranged over the whole, and means for retaining the several parts of the unit in assembled relationship.

6. A heating unit particularly adapted for use in the heating of rooms and to be positioned in a wall, ceiling or floor, directly anterior to the outer surface thereof, said unit comprising plates of insulating material defining a recess therebetween adapted to receive a pipe line of small diameter therein, a pipe line through which a heating medium is adapted to flow arranged in said recess, heat transmitting elements attached to said pipe line and extending substantially tangentially therefrom in a plane substantially parallel to the general plane of the wall, ceiling or floor, said plates serving also as a backing for said heat transmitting elements adjacent to the pipe line being provided with an insulating covering, a thin outer layer of metal wool arranged over the whole, and means for retaining the several parts of the unit in assembled relationship, said last-named means including a wire netting extending over the layer of metal wool and being secured to said plates.

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