Feb. 4, 1936. F. W. SEVING ET AL 2,029,679

INSULATION

Filed Dec. 22, 1933

Fig. 1.

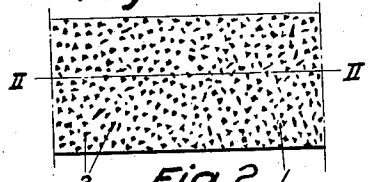


Fig. 2.

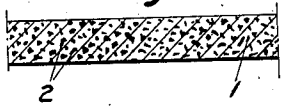


Fig. 3.

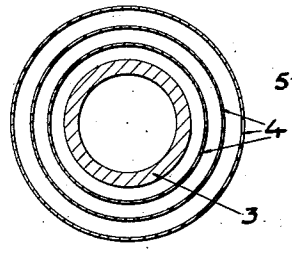


Fig. 4.

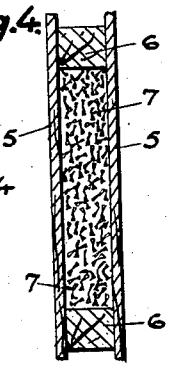


Fig. 5.

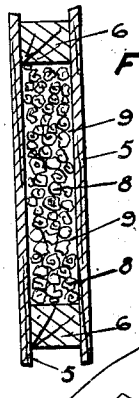


Fig. 6.

Fig. 7.

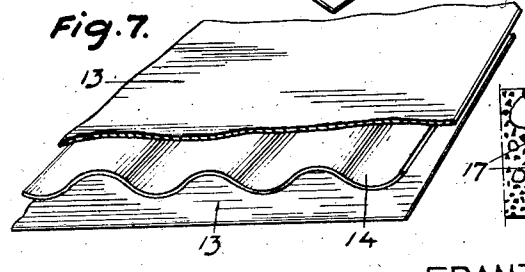
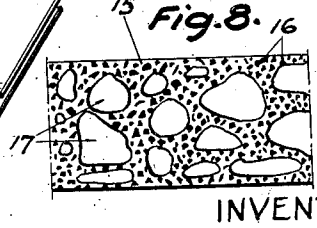


Fig. 8.



INVENTORS
FRANZ WILLIAM SEVING
ABEL BERGQVIST
KARL ERIC OLSSON
BY Haseltine, Lake & Co.
ATTORNEYS

Published by AsbestosClaims.Law
asbestosclaims.law/library/22818/1

Patented Feb. 4, 1936

2,029,679

UNITED STATES PATENT OFFICE

2,029,679

INSULATION

Franz William Seving, Abel Bergqvist, and Karl Eric Olsson, Stockholm, Sweden, assignors to Kooperativa Forbundet Forening u. p. a., Stockholm, Sweden

Application December 22, 1933, Serial No. 703,544
In Sweden June 3, 1933

11 Claims. (Cl. 154—45)

The present invention relates to insulations against heat transmission with the use of a material reflecting rays of heat.

The object of the invention is an improvement in the insulations of this kind used hitherto in which foils of metal separated from each other by air intermediate spaces or cells, or intermediate layers of some insulating material have been used as reflecting bodies.

According to the invention the said metal foils are replaced by transparent foils having the mechanical character of paper with a low heat conductibility, but with particles of metal alloys, material containing metal, or similar materials having a metallic lustre intermingled with the transparent mass constituting the foils. Due to the fact that the said brilliant particles, which preferably consist of metal powder, metal grains or small metal flakes, lie insulated from the surrounding air the particles maintain their faculty of reflecting the rays of heat also during very disadvantageous outer atmospheric circumstances.

When using metal foils, on the other hand, a heat balancing is obtained along the plain of the foil, and heat is transmitted between the foils also where the foils contact each other.

It is already known that by using very thin aluminium foils it is possible to reduce this transmission of heat by conduction. However, such thin foils are relatively expensive and sensible to mechanical action.

In insulations according to this invention all such transmission of heat by conduction is prevented, even if the foils are relatively thick in relation to the thin aluminium foils, which have a thickness of for instance .002 to .007 mm. Contrary to what has been the case before, the foils may be placed very close to each other since the risk of transmitting heat from foil to foil by conduction is almost excluded. Thus, it is obtained that the insulation does not require so large a space as those hitherto used.

The foils may also be placed according to all methods, which are known in themselves in insulating by foils, but no precautionary measures need be taken as when insulating by aluminium foils.

The material, with which the particles preferably of metal are intermingled, substantially consists of acetate cellulose, which has proved to be completely unhygroscopic, and not actuated by corrosive agents in the air, and which, moreover, is very soft and flexible.

The production of such acetate cellulose foils makes the intermingling of the metal particles very simple.

The foils may be made more or less corrugated.

In order to force the particles to assume such a position that the reflection capacity of the foils becomes the highest possible the foils may be subjected to a rolling process.

The invention is illustrated by way of example in the accompanying drawing, in which

Fig. 1 is a horizontal view of a part of a foil on an enlarged scale;

Fig. 2 is a vertical section along the line II—II of Fig. 1,

Figs. 3, 4, 5, 6, 7 and 8 are various embodiments of insulations according to the invention.

In Figures 1 and 2 the numeral **1** indicates the mass of acetate cellulose with which metal particles **2** are intermingled.

An insulation about a tube may have the aspect as illustrated in Fig. 3, which is a cross section of a tube having an insulation according to the invention. The tube is indicated by **3**, and the foils by **4**. The foils may be held separated from each other for instance by means of rings of a material having a low heat conductivity.

Fig. 4 is a cross section of a barrack wall or the like in which **5** indicates the sides of the wall, and **6** the cross beams. In the air space of the wall a jumble of very thin foil strips **7** is located.

The insulation shown in Fig. 5 differs from the last mentioned one in that foils **8**, which are very thin, but as large as possible, have been located in the air spaces of the wall by the foils having been wrinkled and placed loosely on each other so as to produce air spaces **9** between them.

Fig. 6 shows in a perspective view a suitable embodiment of supports or the like adapted to hold the foils at a distance from each other. The figure shows two such foils, one of which **11** is located above the other **10**, part of the former being cut away. On each foil there are applied longitudinal ribs **12** having a V-shaped cross section. The ribs **12** are located in two directions at right angles to each other so as to form a network. Where the ribs cross each other one rib is provided with a V-shaped recess so that also at that place the network obtains the same height. It is very easy to fix the ribs to the foils when the transparent material consists of acetate cellulose since the ribs at the contact lines only need be slightly spread over with a solution agent for acetate cellulose, by which the said contact sur-

Published by AsbestosClaims.Law
asbestosclaims.law/library/22818/2

faces immediately on being applied adhere to the foil. The ribs may consist of acetate cellulose, but it is not necessary to intermingle particles having a metallic lustre.

The ribs may, of course, also consist of other relatively high insulating material, and may be applied in other ways for instance without crossing each other at right angles and so on.

Thus, when several foils disposed in the said manner are placed above each other, there will result air chambers between the foils, the said air chambers being limited by the ribs. If one wishes to make a hole for applying a hook or the like in a refrigerator using such an insulation it is but a trivial risk to damage the same in view of the insulating power of the assemblage since only one or at most, a few chambers are damaged, and the other still remain intact.

The foils may also by the ribs easily be divided into smaller parts by being broken along the ribs.

Fig. 7 shows an insulation consisting of foils **13**, between which there is located a corrugated foil **14** of the same material with or without intermingling of metal particles.

In order to reduce the heat conductivity of the mass one may also blow, whip, or in a similar way mix small air bubbles into the mass when producing same. A foil treated in this way is illustrated on an enlarged scale in Fig. 8 in which **15** indicates the transparent mass, **16** the metal particles, and **17** the air bubbles.

Having now described our invention, what we claim as new and desire to secure by Letters Patent is:

1. An insulation consisting of a material reflecting rays of heat, comprising a plurality of superposed foils having the mechanical character of paper and individually consisting of a transparent mass of material having a low heat conductivity, the said mass forming each foil having particles of material possessing a metallic lustre imbedded within the same.

2. An insulation according to claim 1, wherein the particles intermingled with the transparent mass in each foil consist of metal.

3. An insulation according to claim 1, wherein the particles intermingled with the transparent mass in each foil consist of a material containing metal.

4. An insulation according to claim 1, wherein the transparent mass in each foil consists of cellulose acetate forming the main bulk thereof.

5. An insulation for an object according to claim 1, wherein the plurality of foils are located at the surface of said object and spaced apart so as to include intermediate spaces between the same containing an insulating body having a low heat conductivity.

6. An insulation for an object according to claim 1, wherein the plurality of foils are located at the surface of said object and are disposed in a jumbled arrangement.

7. An insulation for an object according to claim 1, wherein the plurality of foils are located at the surface of said object and are wrinkled and lie in irregular fashion with respect to each other.

8. An insulation consisting of a material reflecting rays of heat, comprising a plurality of superposed foils having the mechanical character of paper and individually consisting of a transparent mass of material containing heat reflective matter in its structure and having a low heat conductivity, which transparent mass has a plurality of bubbles containing a gaseous medium such as air distributed throughout the same.

9. An insulation consisting of a material reflecting rays of heat, comprising a plurality of superposed foils having the mechanical character of paper and individually consisting of a transparent mass of material having a low heat conductivity, which transparent mass has both a plurality of particles with metallic lustre and a plurality of bubbles containing a gaseous medium such as air distributed throughout the same.

10. An insulation according to claim 1, wherein each foil has a plurality of intersecting longitudinal ribs or elevations spacing the foils apart and subdividing the resulting intermediate spaces into a plurality of hollow chambers.

11. An insulation consisting of a material reflecting rays of heat, comprising a plurality of substantially coextensive spaced foils having the mechanical character of paper, and individually consisting of a transparent material having a low heat conductivity, the material constituting each individual foil having a plurality of particles of metallic lustre individually embedded therein and distributed throughout the same.

FRANZ WILLIAM SEVING.
ABEL BERGQVIST.
KARL ERIC OLSSON.

Published by AsbestosClaims.Law
asbestosclaims.law/library/22818/3