May 23, 1933. E. SCHMIDT 1,910,127

FIREPROOF MATERIAL

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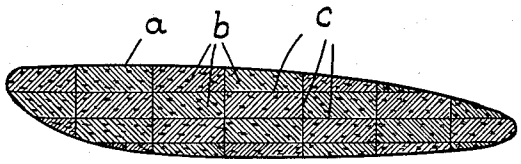



Fig. 1.

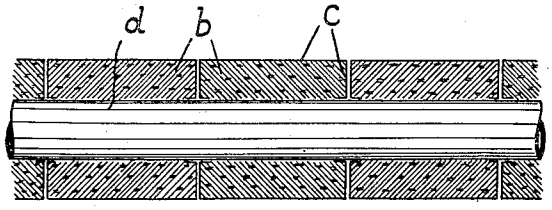



Fig. 2.

Inventor
Ernst Schmidt
By B. Singer, atty.

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# UNITED STATES PATENT OFFICE

ERNST SCHMIDT, OF DANZIG-LANGFUHR, FREE CITY OF DANZIG

## FIREPROOF MATERIAL

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The cause of many conflagrations is that combustible organic substances, such as cotton, wood, cork, peat and the like become ignited in some way and then smoulder on until at last an open fire results. The smouldering may last for a long time and spread extensively in the material. The oxygen contained in the pores of the material is frequently sufficient to maintain the same in smouldering condition so that the danger is not avoided even when the exterior air is entirely excluded. Especially dangerous are the materials made of cork or another material which are found in warships, life-saving boats, floats of airplanes and the like and serve to increase buoyancy. Another example are organic insulating materials such as are employed for protection against losses of heat or cold or against the transmission of sound. For instance, in a pipe insulation for steam, hot water or refrigerating liquids, a fire can proceed for long distances along the pipe line simply by the continuous smouldering of the fire within the insulation. Something similar may be said of wood and organic insulating materials such as are employed for increasing the heat-resistance of structural parts.

Naval constructors have tried to subdivide organic substances used for increasing buoyancy by filling them into containers made of sheet metal, but this involves a very considerable increase of weight and the cost of such containers is considerable. The subdivision of maritime cargo-rooms for inflammable substances by means of fast or removable partition walls made of metal for impeding the extension of fires is also known.

The present invention impedes the extension of the seat of the fire by subdividing the combustible organic substances by means of fine-meshy tissues consisting of thin metal wires or by means of paper-thin metal foils which are inserted between the organic materials or are wrapped around them. By "fine-meshy tissues" such tissues are implied as are made of wires the latter having, for instance, a diameter of some tenths of millimetres down to the finest possible tissues. By "metal foils" layers are understood which have, for instance, the thickness of about 0.2 mm. down to a few thousandths of millimetres and can be folded and wound around with the hand like paper without the need of special means.

The fire-checking effect of these tissues and foils rests upon the high heat conductivity of the metals.

If the smouldering reaches the heat well-conducting metal surface, the heat is spread by the metal over a larger area and the temperature is reduced to such an extent that the combustion is stopped at the metal surface and does not extend to the material at the other side of the metal surface. The weight of the thin metal tissue or metal foils is so small that, for instance, in the case of floating bodies, no essential diminution of the carrying capacity is involved, and, in the case of insulations, the heat-resistance is scarcely impaired. The process can be applied in such a manner that the individual parts of the combustible material are wrapped with metal tissues or foils so that they are bordered by metal surfaces on all sides or at least at those places where they come into contact with adjacent material being inclined to smoulder on. Floating bodies for ships, for instance, can be made in such a manner that cork plates are packed together and piled up whilst inserting metal tissue or metal foils. Also in the case of wood this process may be applied if a high degree of fire-resistance is demanded. In wooden parts wrapped in this way, nails may be driven in without putting an end to the protection, because the holes of the metal layers produced by the nails are filled out by the iron of the nail. In a similar way the process may be applied for organic insulating substances made of cork or peat, cotton, silk-tress and the like by wrapping every one of the parts of the material mostly employed in the form of plates, cork pipe coverings, tresses or special pieces with metal tissue or metal foils so that there are no quantities of material cohering for longer distances, but there are always successively separating layers consisting of thin metal. In this behalf, not always an all-around

wrapping is necessary, but it is sufficient if in those places where the individual parts of the material cohere, the mentioned thin metal layers are arranged. A complete wrapping with foil, however, has the further by-effect of preventing the access of fresh air.

In the case of organic substances serving for increasing the buoyancy of ships and other vessels, the complete water-tight wrapping with foil has the further advantage that the organic substance will not be soaked with water and will retain, therefore, a higher buoyancy. Especially well suited for the above-mentioned purpose are tissues and foils made of aluminum, because this metal has a very high heat conductivity and does not permit any local raising of the temperature; it is also not expensive, is resistant against chemical influences and can easily be worked. Other metals, however, such as copper or iron, can also be applied for the same process.

By way of example, the invention is represented in Figs. 1 and 2. Fig. 1 shows the application for the float of an airplane wherein *a* is the outer skin of the float which is filled with pieces of cork *b* the latter being subdivided by means of thin metal tissue or metal foils *c*. Fig. 2 is an application for pipe insulations wherein *d* is the pipe, *b* are the insulating coverings, for instance, consisting of cork each of them being wrapped with metal tissue or metal foils. In this case the wrapping is confined to the exterior surfaces and to the frontal surfaces at which the individual coverings cohere; the wrapping is usually not necessary at the inner surface lying upon the metal pipe.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A fire proof body consisting of compactly arranged members of combustible material each covered by a metallic fine mesh fabric.

2. A fire proof body consisting of compactly arranged members of combustible buoyant material each covered by a thin metallic foil.

In testimony whereof I affix my signature.

ERNST SCHMIDT.