July 22, 1958 J. C. SNITKER 2,844,501

FIRE-RETARDING BOARD

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Fig. 1

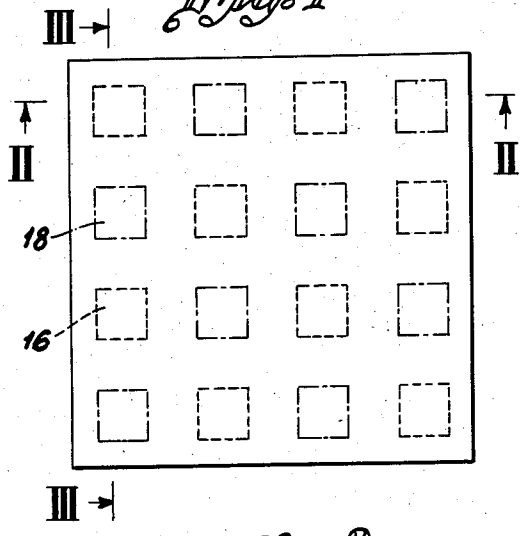


Fig. 3

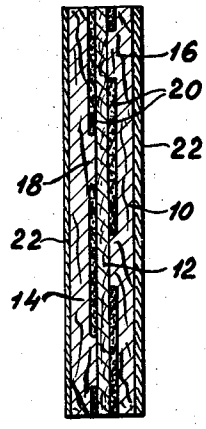


Fig. 2

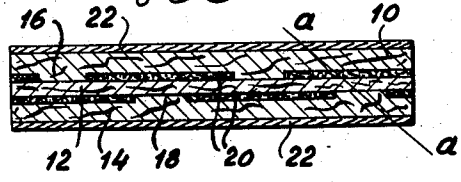
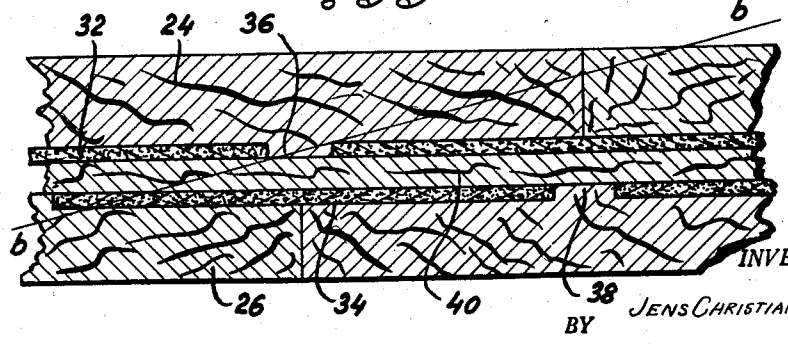


Fig. 6



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Fig. 4

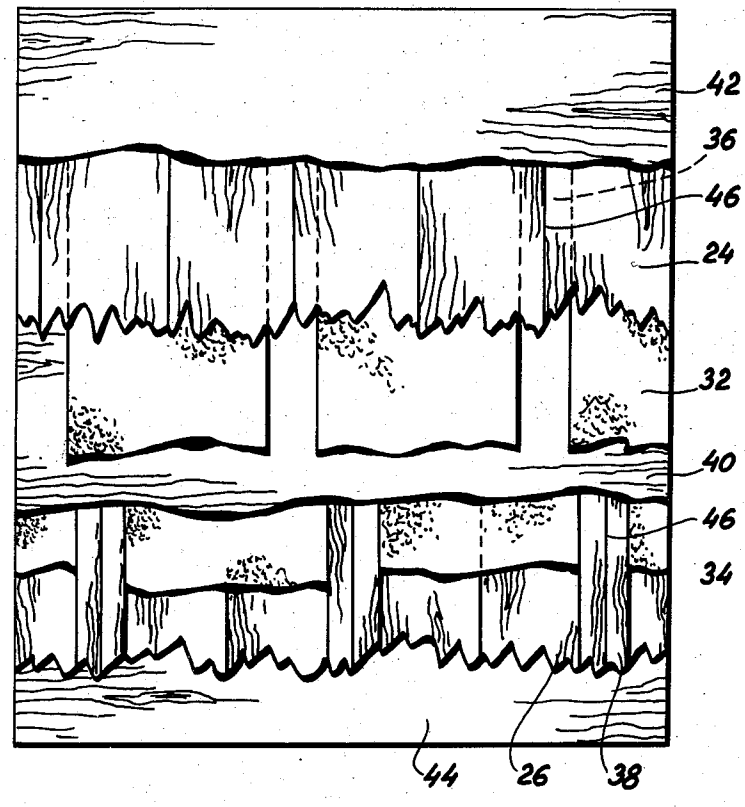
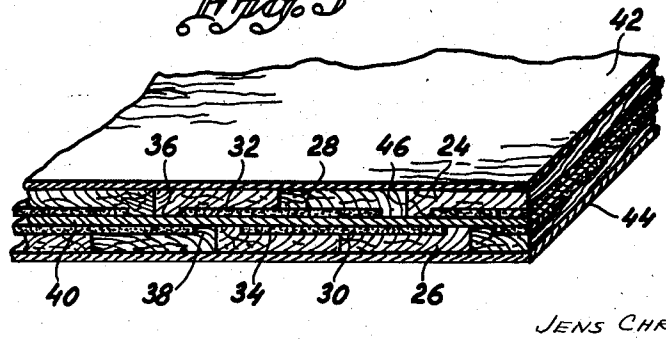


Fig. 5



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Fig. 7

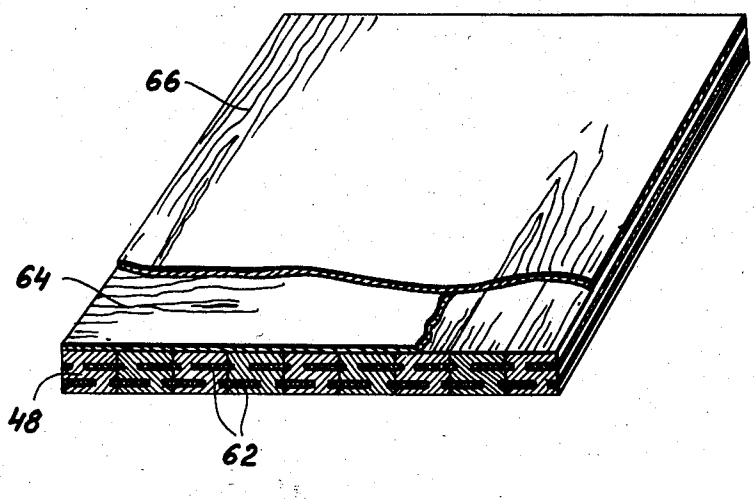
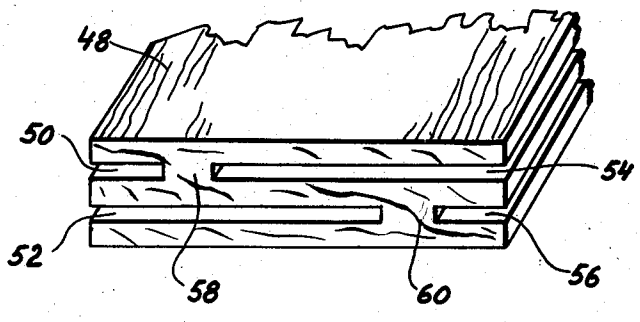


Fig. 8



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FIRE-RETARDING BOARD

Jens C. Snitker, Riisskov, Denmark, assignor of one-half to Soren Clausen, Aarhus, Denmark

Application December 28, 1953, Serial No. 400,594

Claims priority, application Denmark December 30, 1952

1 Claim. (Cl. 154—44)

The invention relates to a fire-retarding board, which consists mainly of combustible material, preferably wooden material, with incombustible material inlaid.

The board is intended for use in the building industry to provide partitions, wall covering, and doors, but it is mainly intended for use in ships, notably passenger-carrying ships, as fire-resisting bulkhead, known as the B-class bulkhead, which is designed to prevent flames from spreading rapidly, if a fire arises. For such use the board according to the present invention may constitute the B-class bulkhead itself or part thereof, and it may also constitute the material, of which doors or hatches in the bulkhead are manufactured.

The object of the invention is to provide a fire-retarding board, which mainly consists of wood or wooden material, but nevertheless can prevent fire from penetrating through the board, at any rate for a certain length of time.

Another object is to provide a board which can be used in the same way as ordinary boards of furniture plywood and worked upon and shaped by conventional tools and machinery.

A further object is to provide a board of the kind in question, which will be strong and durable even under varying conditions as to moisture and heat.

With the above and other objects in view the present invention consists in the combination and arrangement of parts, hereinafter more fully described, illustrated in the accompanying drawings and more specifically pointed out in the claims, it being understood that changes may be made in the form, size, proportions, and details of construction without departing from, or sacrificing any of the advantages of the invention.

In the drawings

Fig. 1 is a side-view of one embodiment,

Figs. 2 and 3 are cross-sections of the same embodiment, on the lines II—II and III—III, respectively, in Fig. 1,

Fig. 4 is a side-view of a second embodiment,

Fig. 5 is a perspective view of one corner of the embodiment shown in Fig. 4,

Fig. 6 is a cross-section of the embodiment shown in Figs. 4 and 5,

Fig. 7 is a third embodiment, in perspective, and

Fig. 8 is part of a wooden slat for this embodiment, also in perspective.

In the embodiment shown in Figs. 1–3, the fire-retarding board consists of three wooden layers **10**, **12** and **14**. On the layer **10**, square projections **16** are provided at one side face, which projections are mutually interspaced on a regular pattern, as will be seen in Fig. 1, where said projections are shown dotted. On the layer **14**, similar projections **18** are provided according to the same pattern, and are shown in dot-and-dash line in Fig. 1. When the layers **10** and **14** are placed side by side with that face uppermost on which the projections **16** and **18** are provided, the patterns formed by the projections on the two layers will be perfectly congruent, but when

the layers **10** and **14** are placed with said faces towards each other, the projections **18** will be seen to be evenly distributed between the projections **16**, as appears from Fig. 1.

The layers **10** and **14** may be made of a wooden sheet, in one side face of which cross-way grooves are cut, so that the aforesaid projections appear. The said layers, however, may also be constructed of an ordinary wooden sheet with plane-parallel side faces, to one of which there are glued low wooden blocks, which constitute the projections. In this case it is suitable that all blocks should have the same direction of fibre as the underlying sheet.

The layer **12** is a simple sheet with plane-parallel side faces.

Before the three layers **10**, **12** and **14** are assembled, a layer of incombustible material **20** has to be provided on the sides of the two outer layers **10** and **14**, which carry the projections **16** and **18**. This layer **20** must be of the same thickness as the projections, so that the latter penetrate the layer.

The incombustible material is suitably made up of asbestos. It may, for example, be formed of an asbestos sheet, in which square apertures are punched to correspond to the projections. The said sheet **20** is glued to the corresponding outer layer in such a way that the projections extend through the apertures in the sheet. It is also possible first to glue the asbestos sheet to the plane side face of the outer layer and thereupon to insert the blocks, which are to constitute the projections, in the apertures in the asbestos sheet, at the same time glueing them to the outer layer.

Another method of producing the layer of incombustible material is to use a pulp of asbestos fibre, the fluid component of which is water-glass. The pulp is spread over the side of the outer layer, on which the projections are provided, and the excess pulp is stripped off by moving a bar over the projections, so that the layer thickness becomes exactly equal to the height of the projections. The water-glass acts as a weak, yet sufficient, binding agent between the asbestos fibres themselves and between the fibres and the wood. After a suitable drying the three layers **10**, **12** and **14** are glued together, e. g., with a synthetic resin glue, and the compound board is inserted in a glue press, where it remains for a suitable period.

Besides asbestos, other fire-resistant substances may be used as incombustible material, e. g., inorganic substances, preferably of mineral origin, such as mica. It is expedient that the substance should be of a fibrous or laminated nature, so that good cohesion is imparted to its component parts when pressed, possibly in the presence of a suitable binding agent, such as water-glass. Furthermore, a fire-resistant substance with good thermal insulation properties is preferred.

In order to avoid bending and warp in the compound board, it is expedient that the direction of fibre in the layer **12** forms an angle, e. g., a right angle, with the direction of fibre in the layers **10** and **14**, which preferably have the same direction of fibre. The layer **12** will then act as an arresting layer. Furthermore, thin wooden sheets **22** may be glued to either side of the compound board, the fibre directions of which coincide with that of the layer **12**, and thus also act as arresting layers.

The board heretofore described possesses the quality that wood is glued to wood in the process of assembling the individual layers, thus effecting a high degree of cohesion between these layers with the result that the compound board is comparable to ordinary boards of furniture plywood and can be used as such. Furthermore, an arbitrary line across the board will always cut through at least one layer of the incombustible material,

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even if the line forms a considerable angle with the perpendicular to the board, see e. g. the line *a—a* in Fig. 2. This means that radiant heat, which is the most dangerous factor in a fire, when part of the board has been burnt away, will always hit incombustible material and thereby be retarded or prevented from igniting the wooden material behind it, so that a complete burning through of the compound board will be prevented or at any rate delayed for a considerable time. This is of paramount importance in the case of fire in buildings and ships, in which wood is used for partitions, doors, and the like.

The embodiment shown in Figs. 4 and 5 is constructed of two wooden layers **24** and **26**, in one side face of which there are provided wide grooves **28** and **30**, respectively, which are filled with incombustible material, e. g. strips **32** and **34**, respectively, which are cut from asbestos sheet. Between the grooves in each sheet there are provided narrow ribs **36** and **38**, respectively. The two wooden layers **24** and **26** with the asbestos-filled grooves **28** and **30** are placed against an intermediate wooden layer **40** and connected thereto, preferably by glueing, in such a way that the ribs of the outermost layers are displaced in relation to each other.

It is to be preferred that the grooves **28** and **30** in the layers **24** and **26**, respectively, are low and that the intermediate layer **40** is thin. Hereby, radiant heat, which penetrates a rib **36** or **38** as obliquely as possible in relation to the normal on the board, will always hit the incombustible material formed by the asbestos strip **32** or **34** in the opposite outer layer. This can be seen in Fig. 6 at the line *b—b*.

In the embodiment shown in Figs. 4 and 5, the layer **40** is designed as an arresting layer. The same applies to the sheets **42** and **44**, which are glued to the outer sides of the compound board.

In order to obtain a board, which is not subject to expansion or contraction, the layers **24** and **26** are preferably constructed in the following way:

A number of kiln-dried deal boards are glued together with the side surfaces toward each other in such a way that right faces right and wrong faces wrong. The block thus formed is cut up in the direction perpendicular to the glued side faces in sheets, which may have a thickness of, e. g., 9 millimetres. In one side face of these sheets there are cut grooves, e. g., 50 millimetres wide and 1.5 mm. deep, the distance between each of which is 6 millimetres. In Figs. 4 and 5 the glue joints between the boards are denoted with the numeral **46**.

According to Fig. 7 the board is constructed of wooden slats **48**, which are glued together edge to edge. At its side edges each slat is provided with grooves of different depths. As will be seen from Fig. 8, a low groove **50** is provided at the uppermost part of the left side edge of the slat and a deeper groove **52** at the lowermost part. At the uppermost part of the right side edge there is provided a deep groove **54** and at the lowermost part a low groove **56**. The grooves **50** and **54** are on the same plane, and the same applies to the grooves **52** and **56**. Between the grooves **50** and **54** a narrow bridge **58** is provided in the wooden material, and between the grooves **52** and **56** there is another narrow bridge **60**, which is displaced in relation to the former.

When the slats **48** are assembled as shown in Fig. 7, mutually displaced channels will be provided on two different planes. In the assembling process, incombustible material, e. g., asbestos strips **62**, is inserted in said channels. The strips **62** are suitably glued to the channels.

The groove arrangement described in the foregoing may be provided on more than two different planes, if so desired.

To the uppermost and lowermost sides of the resulting board, an arresting layer **64** may be glued and on top thereof a covering layer **66**, the fibres of which preferably extend parallel to the longitudinal direction of the slats **48**.

When, in the process of assembling the board, the adjoining layers are placed as arresting layers in the way described heretofore, a board will be provided, which has the same strength and the same resistance to contraction and expansion as the known boards of furniture plywood.

Having thus fully described my invention I claim as new and desire to secure by Letters Patent:

A fire-retarding board, consisting of slats of wooden material, having at their side edges grooves of different depths, so arranged that channels will be formed when the slats are joined edge to edge, said channels being so disposed on at least two different planes that the channels on one plane are displaced in relation to the channels on the other plane, said channels enclosing strips of asbestos.

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