

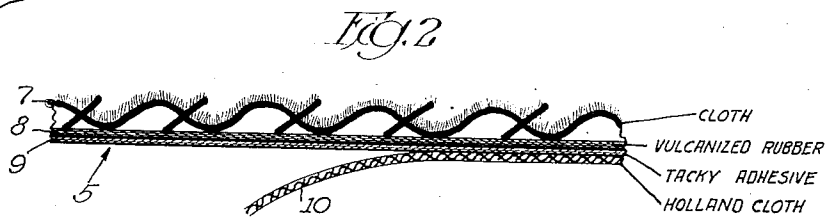
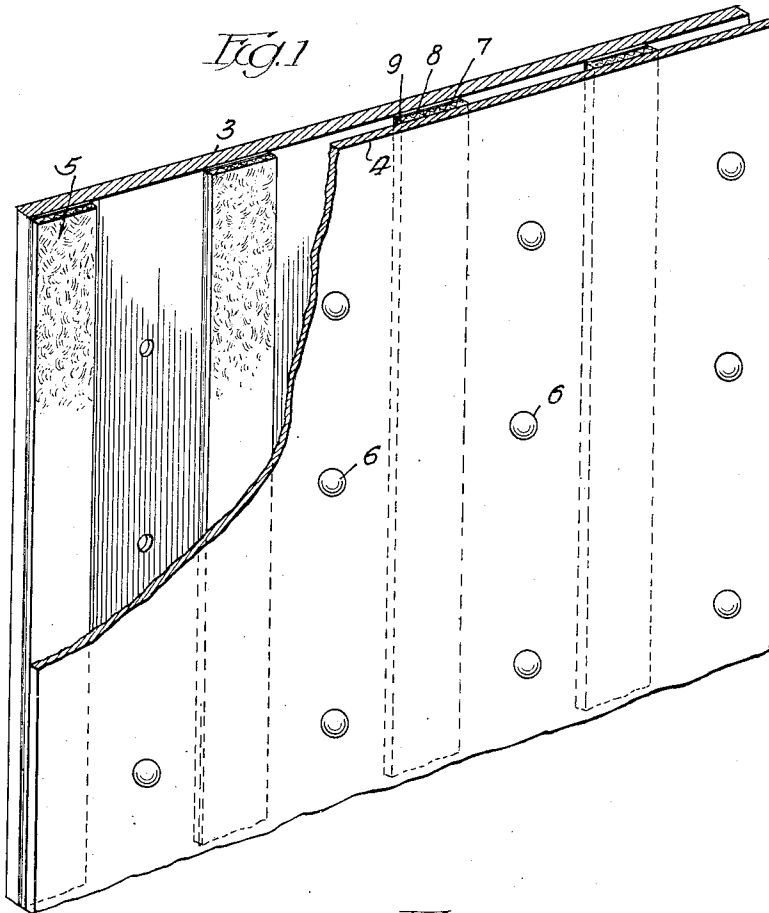
Aug. 10, 1943.

F. VAN CLEEF

2,326,581

PANEL STRUCTURE

Filed March 4, 1940



Inventor:
Felix Van Cleef
By Fred Gerlach
his Atty.

UNITED STATES PATENT OFFICE

2,326,581

PANEL STRUCTURE

Felix Van Cleef, Chicago, Ill., assignor to Van Cleef Bros., Chicago, Ill., a partnership composed of Noah Van Cleef, Felix Van Cleef, and Paul Van Cleef

Application March 4, 1940, Serial No. 322,175

6 Claims. (Cl. 154—45.9)

The present invention relates generally to panel structures. More particularly the invention relates to that type of panel structure which is employed or used in connection with railroad car and other construction and comprises spaced apart outer and inner panels together with yielding spacer pieces between the panels, and means for cross connecting the two panels and holding them in clamped relation with the pieces.

It has heretofore been customary to employ in a panel structure of this type spacer pieces of cork or sponge rubber. In practice it has been found that such pieces are objectionable for several reasons. In the first place, due to the fact that cork or sponge rubber has a comparatively high coefficient of friction, objectionable noises occur when after assembly of the structure relative movement of the two panels takes place. Secondly, when relative movement of the panels occurs the pieces are subjected to such forces that they tend to disintegrate or break up and thereby lose their function as spacing and sound absorbing media.

One object of this invention is to provide a panel structure of the type under consideration which is an improvement upon, and eliminates the objectionable features of, previous panel structures. The improved structure is characterized by the fact that the spacer pieces consist of body parts of comparatively thick cloth, such as cotton flannel or felt, and outer coatings of permanently tacky pressure sensitive adhesive for securing the pieces in substantially fixed relation with the outer panel of the structure. By employing body parts of cloth, that is, a material with a comparatively low coefficient of friction, noises are effectively eliminated in the event of relative movement of the two panels. A further advantage of employing cloth body parts is that such parts readily conform to any surface irregularities on the panels and serve to absorb sound and vibration. By employing pressure sensitive permanently tacky adhesive coatings on the outer faces of the cloth body parts of the pieces the pieces may be readily fixed in place in connection with installation of the inner panel with respect to the outer panel.

Another object of the invention is to provide a panel structure of the type and character under consideration in which the spacer pieces have vulcanized rubber coatings between the cloth body parts and the tacky adhesive coatings in order to prevent disintegration or breaking up of the body parts and preclude the adhesive coatings from penetrating the body parts.

A further object of the invention is to provide a panel structure which is generally of new and improved design and has certain inherent advantages over previously designed structures, including greater durability and permanency and the ability to be more quickly and easily assembled.

Other objects of the invention and the various advantages and characteristics of the present panel structure will be apparent from a consideration of the following detailed description.

The invention consists in the several novel features which are hereinafter set forth and are more particularly defined by claims at the conclusion hereof.

In the drawing which accompanies and forms a part of this specification or disclosure and in which like numerals of reference denote corresponding parts throughout the several views:

Figure 1 is a fragmentary perspective of a panel structure embodying the invention, parts of the inner panel being broken away for purposes of illustration, and

Figure 2 is an enlarged section of one of the spacer pieces before positioning of the piece between the two panels of the structure.

The panel structure which is shown in the drawing constitutes the preferred form of the invention. It is principally usable in connection with railroad car and other or like construction and consists of spaced apart substantially parallel outer and inner panels 3 and 4 and a set or series of spacer pieces 5 between the two panels. The panels are cross-connected by any suitable means, such for example as rivets 6, and are maintained in clamped relation with the spacer pieces 5 by such means.

The pieces 5 serve as sound and vibration absorbing media and operate to prevent objectionable noises in connection with movement of one panel relatively to the other. They are spaced apart as illustrated in Figure 1 and consist of comparatively thick body parts 7, thin permanently tacky pressure sensitive adhesive coatings 8, and thin vulcanized rubber coatings 9 between the body parts 7 and the adhesive coatings 8. The vulcanized rubber coatings 9 and the adhesive coatings 8 are formed on the outer faces of the body parts 7. The adhesive coatings serve to hold the pieces 5 in fixed or connected relation with the inner face of the outer panel 3 of the structure. The coatings 9 serve to hold together the body parts 7 and prevent the adhesive coatings 8 from penetrating the body parts. The body parts 7 are formed of comparatively

thick cloth. Preferably either cotton flannel or felt is employed. If flannel is employed it is contemplated that the flannel shall be approximately .0012 inch thick and have the inner face thereof napped and the outer face thereof unnapped, as illustrated in Figure 2. The vulcanized rubber coatings 9 are applied to the outer unnapped faces of the body parts 7. The spacer pieces 5 are formed by applying to the unnapped face of a large sheet of flannel a vulcanizable rubber coating. Such coating is preferably applied by spreading on the sheet a plurality of coatings of rubber composition which is composed of the following ingredients in substantially the proportions specified:

Rubber (smoked rubber sheets).....	pounds.....	40
Whiting	do.....	60
Zinc oxide	do.....	2
Cumar	do.....	2
Vulcanizing agent (sulphur).....	do.....	$\frac{1}{2}$
Antioxidant	ounces.....	$6\frac{1}{2}$

The foregoing composition is dissolved in approximately 40 gallons of naphtha. Preferably four coatings of the aforementioned composition are employed and these coatings are applied successively one on top of the other by way of a doctor knife on a spreading machine. After application of the coatings to the sheet the sheet is hung or festooned in a heating chamber and subjected for a period of approximately one hour to a temperature of about 250° F. During the heating operation the solvent is evaporated and vulcanization of the composition takes place due to the action of the vulcanizing agent. After the vulcanizing operation or step the adhesive coating is formed by spreading onto the composite vulcanized rubber coating a rubber composition which is composed of the following ingredients in substantially the proportions specified:

	Pounds
Crepe rubber.....	38
Pitch	$18\frac{1}{4}$
Zinc oxide.....	12
Carbon black.....	4

The aforementioned composition is dissolved in approximately 12 gallons of naphtha or other solvent. Upon evaporation of the solvent the resulting coating is permanently tacky and pressure sensitive. Such coating is covered with a coextensive sheet of holland 10. After application of the coating of vulcanized rubber to the body forming sheet, the adhesive coating to the vulcanized rubber and the holland to the adhesive coating the product is cut into strips and the latter are rolled preparatory to use and constitute the spacer pieces 5. Before applying the spacer pieces the holland 10 is removed so as to expose the adhesive coatings 8 of the pieces.

In assembling the panel structure the spacer pieces 5 are first rid of the holland 10 by stripping the latter from the adhesive coatings 8. Thereafter the pieces are applied to the inner face of the outer panel 3 by pressing the permanently tacky pressure sensitive rubber base adhesive coatings 8 into adhering relation with such face. After application of the pieces the inner panel 4 is placed against said pieces and is riveted or otherwise cross connected to the outer panel in such manner as to place the pieces 5 under clamping pressure. When the structure is assembled the spacer pieces 5 are adhesively connected to the outer panel and the napped faces of the cotton flannel body parts 7 are in

abutment with the inner face of the inner panel 4. Because of the fact that the body parts 7 are of cloth any sliding action between the body parts and the inner panel due to relative movement of the two panels results in no noise whatsoever. The vulcanized rubber coatings 9 between the adhesive coatings 8 and the body parts 7 not only hold the body parts 7 together but also prevent the adhesive coatings from penetrating into the body parts. By eliminating any penetration of the adhesive coatings into the body parts the body parts cannot become bonded or adhesively connected to the inner face of the inner panel 4. Due to the softness of the body parts 7 vibration and sound are absorbed and the spacer pieces conform readily to any surface irregularities on the opposed faces of the two panels. If felt is employed instead of flannel as the material for the body parts of the spacer pieces it is contemplated that woolen felt of approximately $\frac{1}{8}$ of an inch in thickness be used. Such felt has substantially the same softness and pliability as cotton flannel.

The herein described panel joint may be assembled with facility due to the fact that the spacer strips will stay in place during cross connection of the inner panel with respect to the outer panel. It is free from squeaks when relative movement of the two panels occurs and is characterized by the fact that it is durable and permanent.

It is to be understood that the word or term "panels" is used in a broad or generic sense and includes molding strips as well as wall and other panels. It is also to be understood that the invention is not to be restricted to the details set forth since these may be modified within the scope of the appended claims without departing from the spirit and scope of the invention.

Having thus described the invention what I claim as new and desire to secure by Letters Patent is:

1. A panel structure comprising a pair of opposed spaced apart cross-connected panels, and a spacer piece clamped between the two panels and embodying a body part formed of comparatively thick flannel and having one face thereof napped and in direct abutment with the inner face of one of the panels and its other face unnapped, an intermediate coating of resilient impervious material covering, and joined to, the unnapped face of the body part, and a thin adhesive coating covering, and joined to, the intermediate coating and in contact and connected relation with the inner face of the other panel.

2. A panel structure comprising a pair of opposed spaced apart cross connected panels, and a spacer piece compressed between the two panels and embodying a body part formed of comparatively thick flannel cloth and having one face thereof napped and in direct abutment with the inner face of one of the panels and its other face unnapped, an intermediate coating of resilient impervious material covering, and joined to, the unnapped face of the body part, and a thin permanently tacky pressure sensitive adhesive coating extending over, and united to, said intermediate coating and in direct contact and connected relation with the inner face of the other panel.

3. A panel structure comprising a pair of opposed spaced apart cross connected panels, and a spacer piece clamped between the two panels and embodying a body part formed of comparatively thick cloth and having one face thereof

in direct abutment with the inner face of one of the panels, a vulcanized rubber coating bonded to and completely covering the other face of the body part, and a thin adhesive coating carried by and completely covering the vulcanized rubber coating and in contact and connected relation with the inner face of the other panel.

4. A panel structure comprising a pair of opposed spaced apart cross connected panels, and a spacer piece clamped between the two panels and embodying a body part formed of comparatively thick cloth and having one face thereof in direct abutment with the inner face of one of the panels, a comparatively thin coextensive vulcanized rubber coating on the other face of the body part, and a thinner coextensive coating of permanently tacky pressure sensitive rubber base adhesive, covering the first mentioned coating and in contact and connected relation with the inner face of the other panel.

5. A panel structure comprising a pair of opposed spaced apart cross connected panels, and a spacer piece clamped between the two panels and embodying a body part formed of com-

paratively thick cotton flannel and having one face thereof napped and in direct abutment with the inner face of one of the panels and its other face unnapped, a thin coextensive coating of vulcanized rubber on the unnapped face of the body part, and a thin coextensive coating of permanently tacky pressure sensitive rubber base adhesive covering the vulcanized rubber coating and in contact and connected relation with the inner face of the other panel.

6. A panel structure comprising a pair of opposed spaced apart cross connected panels, and a spacer piece clamped between the two panels and embodying a body part formed of comparatively thick felt cloth and having one face thereof in direct abutment with the inner face of one of the panels, a thin coextensive vulcanized rubber coating bonded to the other face of the body part, and a thin coextensive coating of permanently tacky pressure sensitive rubber base adhesive covering the vulcanized coating and in contact and connected relation with the inner face of the other panel.

FELIX VAN CLEEF.