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W. R. SWANSON
FABRIC PANEL CLAMP
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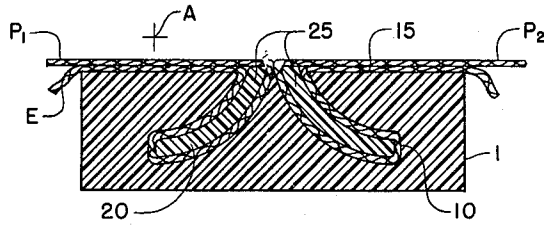


FIG. 1

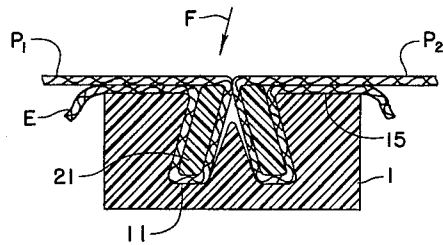


FIG. 2

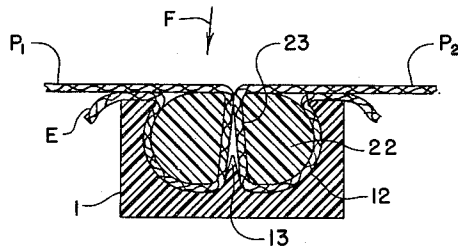


FIG. 3

INVENTOR.

WALLACE R. SWANSON

BY
Reynolds & Beach
ATTORNEYS

UNITED STATES PATENT OFFICE

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FABRIC PANEL CLAMP

Wallace R. Swanson, Seattle, Wash., assignor to Boeing Airplane Company, a corporation of Delaware

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6 Claims. (Cl. 160—181)

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Wall panels of fabric are not uncommonly used in airplanes, busses, railway cars, and the like, and such use is particularly advantageous where periodical cleaning and freshening of the fabric is necessary, or it is occasionally necessary to gain access to the space beneath the panel. However, if the panels are to remain serviceable throughout the normal or expected life of the fabric, they must be supported in a manner that will not damage them, and that will permit re-mounting of them after cleaning or removal for other cause, without the necessity of reengaging fixedly positioned grommets or the like in the fabric with mounting studs similarly fixedly positioned upon the panel support or wall. This is true because the panel is almost bound to be distorted, either shrunk or stretched, and differently in different portions, in the process of cleaning it. Moreover, the mounting should be such that it is inconspicuous, or, in some cases, invisible, and of such nature that it will hold the panel evenly taut along its entire edge, rather than at separated points along the edge. Where two panels abut edge to edge the desired effect at the joint is that of a sewed seam, and such effects have been difficult to obtain with the panel mounting devices heretofore employed.

Panel-mounting devices of a nature which required piercing the fabric at locations corresponding to the locations of fixed studs, have been used heretofore in this art, and are particularly objectionable, for since there was almost certain to be some slight variation in these locations as between the first and succeeding mountings, such repeated piercing of the fabric edge in locations not far removed from one another tended quickly to destroy the fabric in the vicinity of the edge. Not only that, but in all cases it was necessary to provide some sort of trim or finish strip which would hide the actual fabric securing means, and while such trim strips might themselves be of ornamental design, it is evident that they were always visible, and never was it possible to achieve an invisible effect, or the effect of a sewn seam.

In my Patent No. 2,526,912, issued October 24, 1950, on a copending application, wherein the desired effect, coupled with independence of the two panels, is for the first time achieved, dependence for maintaining tautness of the fabric is partly upon resilience of one or both interengaged pieces, so that they will snap over a hump into secured position with the fabric interposed. This requires the designing of the securing means in accordance with the thickness of the inter-

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posed fabric, hence with some precision, and securing means suited to one fabric may not so well secure a different fabric. A securing means somewhat less critical in this respect is desirable for certain installations.

It goes without saying that it is desirable in such installations to stretch the panel tautly, and to maintain it in even tension throughout, without the likelihood of slippage, and that the securing means must be readily engageable for mounting the panel and disengageable for taking it down. They should, too, be capable of independent use in single or double forms for the edges of single panels or for the abutting edges of adjoining panels, respectively, and should also be of such form as is capable of being used at outside and inside corners.

The above outlines generally the objects of the present invention, and among additional objects are to make such a panel fabric clamp or support of material such as plastic, if desired, and in a manner, as by extrusion, which permits them to be made conveniently and cheaply.

With such objects in mind, the invention comprises the novel parts relatively arranged and combined in the manner indicated in the accompanying drawings, described in this specification, and as will be more fully defined in the claims.

In the accompanying drawings the principles of the present invention are shown embodied in three representative forms of execution.

Figure 1 is a transverse section through a double panel clamp, with parts engaged with the respective panels, in one form of execution, and Figures 2 and 3 are similar views showing respectively different modifications.

It has been proposed heretofore, by others prior to me, to employ a slotted support and a key interfitting snugly therein with the fabric interposed therebetween, wherein the slot and key are, in cross-section, arcuate about a center located somewhat above the final plane of the panel, and towards the center of the panel from the slot's entrance. The tension of the fabric panel, towards its center, will thus produce a component reacting upon the seated key tending to draw it farther inwardly towards the bottom of the slot, hence no resilient engagement or snap action is required to hold the key within its slot, nor to retain the panel tensioned. This I disclaim as my invention, but the present invention is in the nature of an extension of the idea described above, in somewhat simpler forms of execution, and an adaptation of that idea, originally

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intended for securing control surface fabric skin panels, where appearance was a minor factor, to the securing of interior wall panels, and in particular to the line of abutment of two such wall panels, where appearance is a very important factor.

The present device, as in the prior arrangement described above, utilizes the tension in the fabric panel as a means of assisting in holding parts in the engaged position, but in a somewhat different and simpler arrangement. Herein, speaking generally, a backing member or support 1, for attachment to suitable structure, is of a length to extend along the margin of a panel or of two adjoining panels. It is formed with a cavity opening in its outer face, and running the length of the backing member, in which cavity, in the double form, a rib 13 rises abruptly from the bottom or floor, to divide the cavity into two like slots 10, 11, or 12. Two keys or strips 20, 21, or 22 are of a cross-sectional form and length to fill rather snugly the respective slots of the cavity, when wrapped in the edge of the panel which each is to retain taut; each wrapped strip or key, independently of its companion strip, is receivable within its slot by movement generally inwardly from the slotted face of the backing member or support 1. So received, the tension of the panel creates a rotative tendency, acting on the strip to rotate it, but the formation of the strip and its slot, including the engagement of an inner corner of one face of the strip within an angle of the cavity's slot, resists this rotative tendency, wherefore the wrapped panel edge is pinched between the strip and the walls of its slot, and the panel as a whole is held taut. Where two adjoining panels are thus held by companion strips, the shape of the slots, strips, and intermediate ribs are such that the wrapped edges of the two panels are held closely adjacent, or actually abutting.

In the form of Figure 1 a support or strip 1, which is of a length to extend along one side of the abutting edges of two adjoining panels, and which is intended to be secured by any convenient means to a suitable bracket or other support by which it is mounted upon the wall, is provided with slots 10 which are arcuate in cross-sectional form, each being formed as a circumferential segment of a cylinder generated about the axis such as A. This axis is located somewhat outwardly of the panel-engaging face 15 of the strip 1 and offset from the entrance to this slot somewhat nearer the center of the panel P1, which it is intended to secure.

Cooperating with each slot 10 is a key 20, which is of generally complementary shape, to fit within the slot 10. It is sufficiently smaller that the edge of the panel may be wrapped or folded about it, perhaps only once, or perhaps more than once. Each panel first extends from its center across the outer edge of each key 20, thence being wrapped about the key, and then, as the key is inserted into the slot 10, the free edge of the panel P may extend beneath the panel and towards or beyond the edge of the strip 1, to hang free.

In the operation of inserting the key 20 within the slot 10, with the panel edge thus wrapped about it, the panel at the beginning of the entering movement of the key lies outside the axis A. During the course of the inserting movement, as the key 20 sinks into the slot, rotating about the axis A, the panel P1 moves across to

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the inner or surface side of the axis A. It is understood, of course, that the panel is reasonably stretched taut before the engagement is effected, and that it is stretched equally taut throughout the length of the key 20. By this engagement it tends to be pulled more tightly about the key, due to holding the edge E against such resistance as is occasioned by the depression of the panel edge in advance of the key as the latter enters the slot.

When parts are in their position of final engagement, as shown in Figure 1, the tension in the panel P1, tending to pull to the left, acts upon the key 20 to press its upper, left-hand corner against the corresponding edge of the slot, and tends to rotate the lower or innermost edge of the key counterclockwise about that upper, left-hand corner as a fulcrum. However, the inner or lower corner of the key, the one diagonally opposite the one first mentioned, is engaged by the closely conforming wall of the slot, as an opposed fulcrum, and hence such rotation is blocked, and the key and panel, once they reach this position of final engagement, are held against further movement of any kind, except of purposeful withdrawal, and the panel is gripped sufficiently tightly, over an appreciable area, as to secure it against slippage.

The panel-securing means thus far described in detail was invented, in single form, by another prior to my invention. It required modification, however, to adapt it to engage or to retain taut two abutting panels. The slots 10, it will be noted, have a common entrance approximately twice the width of a single slot, so that after one key has been fully seated the second key can just slide past it to its seat. Moreover, the keys both fit so snugly in their respective slots, notwithstanding the tensioning pulls tending to separate them, that the abutting corners 25 of the keys extend outwardly toward one another, to lie when seated substantially in contact and in the plane of the outer surface 15 of the strip 1. The effect is to hold the two panels P1 and P2 in actual engagement throughout the length of the keys, and so evenly tensioned throughout that length that the two panels appear to be stitched together. The smooth, continuous effect is neat and pleasing, yet each panel is separately dismountable.

When it is desired to dismount the panels it is only necessary to pull one panel outwardly sufficiently to move it, at least locally, outwardly of its axis A, and then to pull its edge outwardly in a generally circumferential fashion about the axis A. So long, however, as the panel remains in a plane between the axis A and the key itself the tendency is rather to hold the key in place, and while it might be considered that the tension of the panel tends to rotate the key about an axis within itself, and such is actually the case, the parts fit sufficiently snugly that no appreciable rotation is possible, certainly not sufficient to overcome the inward or retaining tendency acting upon the key through the tension on the panel. Each panel is thus dismounted separately.

A somewhat simpler arrangement, which I believe to be novel either in single or in double form, and utilizing somewhat similar principles, is illustrated in Figure 2. Here the key 21 and its slot 11 are not curved in cross section, but straight. However, each slot 11 diverges from the other to leave an intervening rib, that is, each slot is inclined somewhat from the surface

15 inwardly toward the center of its panel P1 or P2, the edge of which is wrapped about it, with the result that the tension of the panel creates a force, indicated by the arrow F, which has a component in the direction of the plane of the panel and towards its center, as well as a component directed normally to the surface 15. Accordingly, the component directed toward the center of the panel tends to urge the key 21 the more snugly into its slot 11, for it fits rather snugly within this slot, rather than tending to pull it outwardly. The snug fit is sufficient to prevent any rotation about an axis within the key 21 itself, and consequently the inward tension and the component caused thereby serves to retain the key in place, or urge it more deeply into the channel, rather than the reverse.

A similar arrangement is shown in Figure 3. Here the key 22 is of substantially D-shape in cross section, and indeed it may be of material which is somewhat yielding or resilient. The flat face 23 of the D is faced outwardly from the center of the panel. The panel's edge E is wrapped about the key 22, and while it may be rotated to some degree in inserting it or removing it, this inclined face 23 is still inclined in line with the force F, and is so held by the rib or stop 13, forming part of the slot 12, that there is produced a component of the inward force which is directed toward the center of the panel which is being tensioned and held. The rotational effect of the rounded portion of the key 22 assists somewhat in engaging it within its slot, but once its lower or inner corner is engaged as a fulcrum with the stop wall 13 of the slot, such rotation ceases, and the wall 13 by its engagement with the face 23 retains the key, against the tension of the panel P1, in such position that the tension produces the inward or centrally directed component already referred to.

In this panel clamp no resilient materials are necessary, other than the inherent resilience of the fabric, and the fit between the key and its slot is not critical, neither per se nor with relation to the thickness of the panel fabric. Should the fit be somewhat loose, it is unlikely that slippage will occur, since the panel's tension acts, of itself, to press the key against the slot walls, in addition to urging the key deeper into its slot or groove. Also, to fit the key more snugly in its slot, the panel's edge may be wrapped more than once about the key.

I claim as my invention:

1. Fabric panel supporting mechanism, comprising an elongated backing member having a cavity extending lengthwise thereof, a rib projecting abruptly from the floor of said cavity of a height substantially less than the depth of the cavity and having opposite sides forming dihedral angles with the adjacent wall portions of said cavity, two strips received in said cavity at opposite sides of said rib, respectively, and wrapped in adjacent fabric panel edges, the adjacent sides of said strips having inner corners complementary to said dihedral angles and received therein, re-

spectively, with the opposite sides of said strips in engagement, respectively, with opposite sides of said cavity, and the adjacent sides of said strips forming with their outer sides acute angled outer corners disposed at the opening of said cavity, at least as far outward as any other portion of said strips and substantially overlying the center of said rib, to dispose the portions of the fabric panels overlying the outer sides of said strips in coplanar, substantially abutting relationship.

2. Fabric panel supporting mechanism, comprising an elongated backing member having a cavity extending lengthwise thereof, a rib projecting abruptly from the floor of said cavity tapered, from its base to its outer edge, and having opposite sides forming dihedral angles with the adjacent wall portions of said cavity, two strips received in said cavity at opposite sides of said rib, respectively, and wrapped in adjacent fabric panel edges, the adjacent sides of said strips having inner corners complementary to said dihedral angles and received therein, respectively, with the opposite sides of said strips in engagement, respectively, with opposite sides of said cavity, and the adjacent sides of said strips forming with their outer sides acute angled outer corners disposed at the opening of said cavity, at least as far outward as any other portion of said strips and substantially overlying the center of said rib, to dispose the portions of the fabric panels overlying the outer sides of said strips in coplanar, substantially abutting relationship.

3. The fabric panel supporting mechanism defined in claim 2, wherein the opposite faces of the rib, and the adjacent faces of the strips are planar.

4. The fabric panel supporting mechanism defined in claim 2, wherein the opposite sides of the rib are concave and the adjacent sides of the strips are convex complementary to the rib sides and have their respective centers of curvature located outward beyond the outer face of the support.

5. The fabric panel supporting mechanism defined in claim 2, wherein both strips have parallel straight sides, and the opposite sides of the rib are planar.

6. The fabric panel supporting mechanism defined in claim 2, wherein the strips are of generally D-shape, with their flat sides adjacent and inclined slightly toward each other outwardly from the bottom of the cavity.

WALLACE R. SWANSON.

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