

Sept. 6, 1955

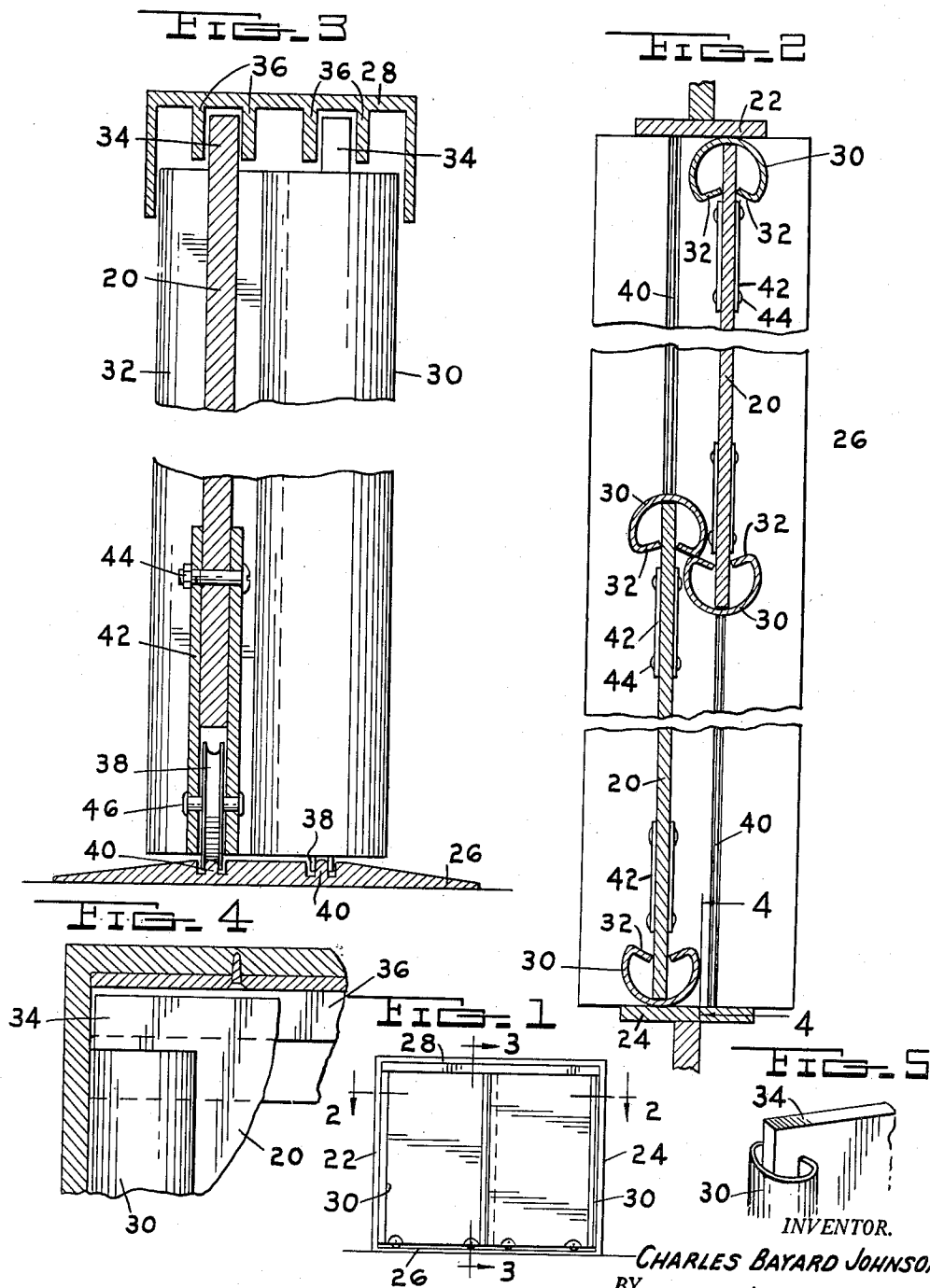
C. B. JOHNSON

2,716,804

METHOD OF MAKING PANELS

Original Filed Dec. 9, 1948

2 Sheets-Sheet 1



INVENTOR.
CHARLES BAYARD JOHNSON
BY
Burton & Parker
ATTORNEYS

Sept. 6, 1955

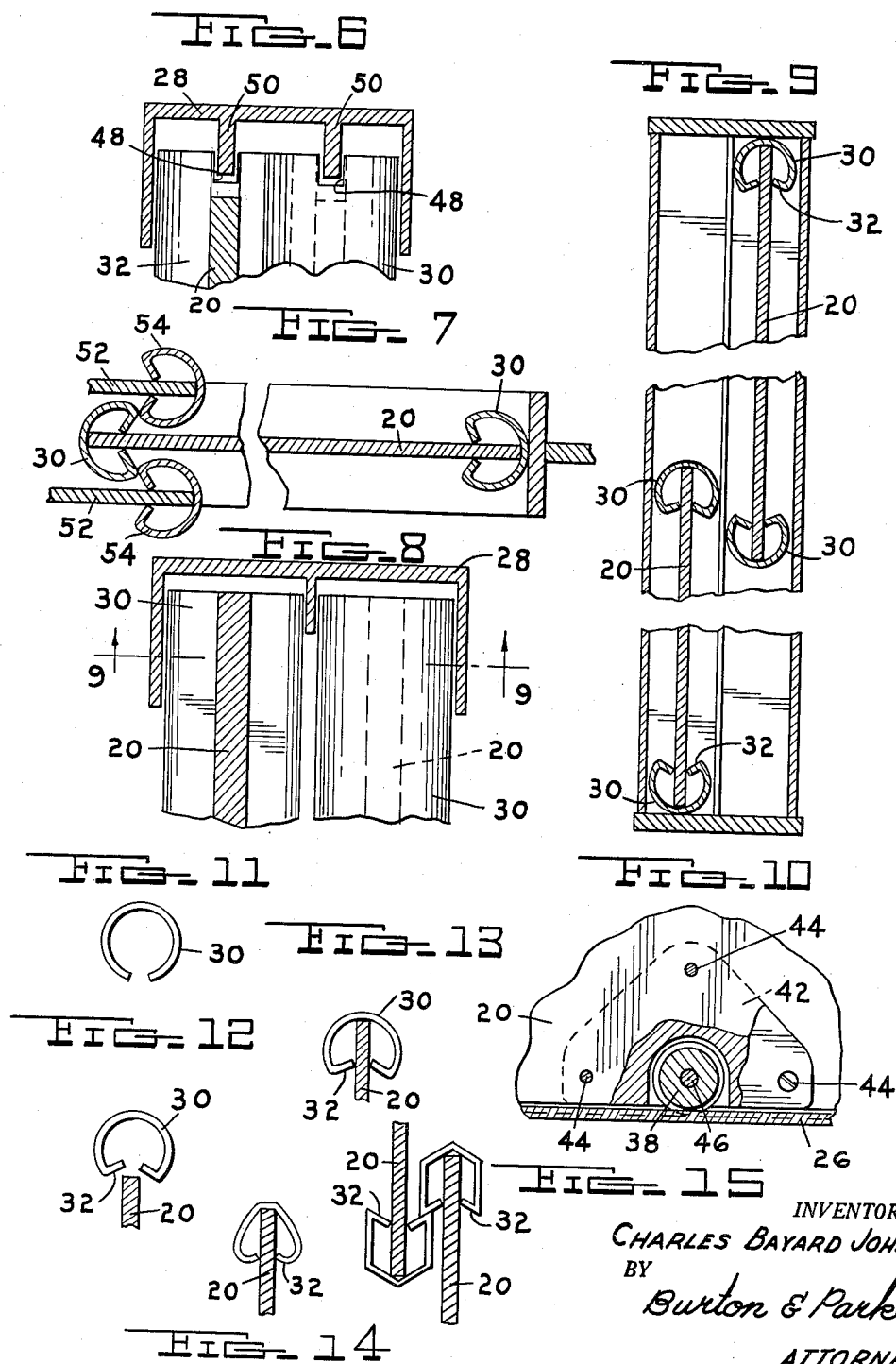
C. B. JOHNSON

2,716,804

METHOD OF MAKING PANELS

Original Filed Dec. 9, 1948

2 Sheets-Sheet 2



INVENTOR.
CHARLES BAYARD JOHNSON
BY
Burton & Parker
ATTORNEYS.

2,716,804

METHOD OF MAKING PANELS

Charles Bayard Johnson, Detroit, Mich., assignor to Woodall Industries, Inc., Detroit, Mich., a corporation of Michigan

Continuation of abandoned application Serial No. 64,371, December 9, 1948. This application January 14, 1950, Serial No. 138,621

2 Claims. (Cl. 29—453)

This invention relates to an improved process of fabricating a panel and to an improved panel resulting therefrom. This application is a continuation of my application, Serial No. 64,371, filed December 9, 1948, now abandoned.

The invention relates particularly to the fabrication of a panel which embodies the combination of a structural panel sheet provided with an improved reinforcing tubular marginal element secured thereto. It pertains primarily to the fashioning of the marginal tube and to the mounting of such tube upon the margin of the panel sheet.

The panel which results from my process is simple and inexpensive, is light in weight, and is of a strong and rigid construction. The broad expanse of the panel consists of a sheet of structural material and the margin of the panel consists of a split tube which extends along and embraces the margin of the sheet so as to substantially rigidify the sheet. The tube is so shaped in cross section as to grippingly engage the sheet and prevent accidental removal of the tube from the sheet. The secure engagement of the tube with the sheet is accomplished without the employment of auxiliary fastening means and through the shape and resilient character of the tube itself and the method of mounting the tube upon the sheet.

Panels of this character may be used as sliding doors for cabinets, closets, or other rooms in houses or other buildings. A plurality of similar panels may be so mounted as to open or close to form a sliding wall structure, and various modifications for panel mounting are illustrated herein. Inasmuch as the tubular margins of the panels may be brought into forceful abutting contact during sliding movement it is desirable that the tubes be so mounted upon the panel sheets that repeated striking abutting contact will not loosen them therefrom. The construction is such that a force tending to draw the tube outwardly away from the margin of the panel sheet causes the tube to grip the sheet more securely.

Through the employment of the process of my invention a particularly shaped split tube may be readily permanently secured over the margin of a panel sheet. The split tube has the margins of its side walls at the split intumed. Such side walls are resilient and a panel sheet may be inserted directly between the intumed margins along a line perpendicular to the axis of the tube with little resistance, while the resistance offered to the withdrawal of the panel sheet from between such intumed margins is relatively great. The insertion of the panel into the tube along a line normal to the axis of the tube tends to spread such side walls apart and may therefore be easily accomplished while any force tending to withdraw the same therefrom tends to pull such side walls together and is therefore strongly resisted. Furthermore, my split tube is so formed and so mounted upon the margin of the sheet as to resist tilting.

Other objects, advantages and important features will more fully appear from the following specification, claims and accompanying drawings, wherein:

2

Fig. 1 is an elevation of a pair of sliding closure panels embodying this invention;

Fig. 2 is a horizontal sectional view taken on the line 2—2 of Fig. 1;

Fig. 3 is a vertical sectional view taken on the line 3—3 of Fig. 1;

Fig. 4 is a fragmentary sectional view taken on the line 4—4 of Fig. 2;

Fig. 5 is a perspective of a corner fragment of a panel such as is shown in Fig. 4;

Fig. 6 is a vertical sectional view through a fragment of a closure panel representing a modification for sliding mounting as compared with Figs. 4 and 5;

Fig. 7 is a horizontal sectional view through a sliding panel and two stationary panels embodying the invention;

Fig. 8 is a vertical sectional view through a construction exhibiting a pair of panels embodying a slight structural modification of my invention;

Fig. 9 is a horizontal sectional view taken on the line 9—9 of Fig. 8;

Fig. 10 is a fragmentary view illustrating a supporting roller attachment for a sliding panel;

Fig. 11 is a cross section through a split tube prior to its shaping to form the marginal tube of the panel;

Fig. 12 is a similar sectional view through the split tube shown in Fig. 11 but showing the same shaped to receive the margin of the panel sheet with the sheet in place to be moved thereinto;

Fig. 13 is a sectional view taken on the same line as Fig. 12 showing the panel sheet following the insertion thereof into the tube;

Fig. 14 is a fragmentary sectional view through a modified form of cross-sectional shape of marginal tube designed to prevent tilting; and

Fig. 15 is a fragmentary sectional view through a pair of overlapping panels showing marginal tubes of modified cross-sectional shape.

It is to be understood that panels of the character indicated may be used in many different places. They may constitute stationary panels or shiftable closure panels. Each panel comprises a sheet of suitable material, as for example a sheet of relatively rigid composition fiberboard 20 such as Masonite, and is provided with a tubular margin. Such tubular margin is formed from a split tube 30 so shaped and so secured upon the panel sheet 20 as to permanently retain its place thereupon.

Such tube may be a split metal tube. The opposite margins of the tube 30 at the split are intumed as at 32. The opposite side walls are resilient. Before assembly of the tube upon the panel, these two intumed margins are normally spaced apart a distance less than the thickness of the panel sheet 20.

In one satisfactory embodiment of the invention it has been found that when a panel sheet $\frac{3}{16}$ of an inch in thickness is fitted with a marginal tube, such a tube may be so formed as to exhibit originally a gap of approximately $\frac{3}{32}$ of an inch. When the panel sheet is shoved into the tube between the intumed margins they will be spread apart an additional distance of $\frac{3}{32}$ of an inch. These figures are not given as limits but merely as a suitable example under manufacturing conditions. When the sheet 20 is inserted between these intumed margins 32, such intumed margins so grip the sheet as to make it very difficult to withdraw the tube therefrom. A withdrawal force applied to the sheet pulls the intumed margins more tightly against the sheet and the tube is, therefore, held permanently upon the sheet.

Furthermore, it has been found that when the sheet is moved directly between the intumed margins of the tube along a line perpendicular to the axis of the tube, that such margins yield outwardly easily and the sheet

can be moved to a seat upon the bottom of the tube without difficulty. To so secure a tube such as shown in Fig. 11 upon a panel sheet would be difficult and it would not securely hold its place thereon. It is also very difficult to secure a tube with inturned edges, such as shown in Fig. 12, upon a sheet by moving the tube lengthwise over the margin of the sheet. The force required for such movement is so great as to be likely to damage the tube or sheet. Grooves are cut by the edges of the tube in opposite sides of the sheet and the tube does not securely hold its place upon the sheet when so installed. When the sheet is inserted into a tube formed as herein described by being advanced therinto along a line normal to the tube axis, the walls of the tube not only yield readily outwardly so as to facilitate such insertion, but in addition such walls are so tensioned as a result of such movement of sheet insertion, that the walls are thereafter grippingly tensioned against the sheet, and neither the tube nor the sheet has been damaged by the process. The sheet is advanced into the tube until it bottoms therein.

In carrying out my process I provide a panel sheet 20 of suitable structural material and a split resilient tube 30 having its opposite edges at the split bent inwardly as at 32. Such marginal portions 32 are bent inwardly to a distance less than a radius. They spread apart as they are bent inwardly. They measure outwardly between them an angle less than 180°. The original gap between the marginal portions is less than the thickness of the panel sheet to be associated with the tube. Preferably the tube would be initially formed as shown in Fig. 12, however, the conventional split tube of Fig. 11 could be bent into the shape of Fig. 12.

Due to the opposite edge portions 32 of the tube being bent inwardly of the tube, it is possible, as above described, to quickly insert the margin of a panel 20 between such edge portions. This step may be carried out with relative ease because the edge portions spring apart as the margin of the panel is shoved therebetween. The margin of the panel is shoved all the way in until it abuts that portion of the tube side wall opposite the split. The tube may be formed of resilient material such as steel. When the panel is shoved all the way down, as shown in Fig. 13 for example, the marginal portions 32 of the tube grippingly engage the opposite faces of the panel along a line spaced inwardly from the margin of the panel and offset the axis of the tube inwardly of the panel. The edge of the sheet 20 is so engaged by the tube wall that any force tending to tilt the tube about its axis relative to the panel is resisted. Due to the angle of engagement between the inturned marginal portions 32 of the tube and the adjacent faces of the panel, such angle being less than a right angle, substantial resistance is offered to any attempt to withdraw the panel from the tube.

As shown, the tube 30 has a diameter substantially greater than the thickness of the panel sheet 20. By "diameter" is meant the internal transverse dimension of the tube perpendicular to the plane of the sheet. The tubes may be of circular or non-circular cross sectional shape. In Figs. 2, 7, 9, 11, 12 and 13, the tubes are generally circular in cross section. A split tube of circular cross section may be initially formed to have its edges at the split inturned as shown in Fig. 13, or it may be initially shaped as shown in Fig. 11 and thereafter have the edges inturned as shown in Fig. 13.

In Fig. 14 the tube is somewhat heart-shaped in cross section, but it exhibits inturned edges 32 at the split. In Fig. 15 the tubes are generally hexagonal in cross-section but such tubes also have inturned sheet engaging edges 32. In these modifications of Figs. 14 and 15, the edge of the panel sheet 20 so seats against the bottom of the tube that it is held thereby so as to resist any tendency of the tube to tilt about its axis upon the sheet. Any tendency of a tube so seated upon a sheet to tilt is also resisted by the inturned marginal portions 32 of the tube being bent inwardly a distance less than a radius of the

tube. Panels so formed as herein described may be used in many ways and the panel itself may be slightly modified to suit its mounting.

Several modifications and uses are shown in the drawings and hereinafter described. In the illustrative construction shown in Figs. 1 and 2 there are two upright closure panels disposed for slidable travel between a pair of upright stationary frame members 22 and 24. In this structure there is a stationary floor 26 and a stationary header member 28. These members 26 and 28 together with the upright frame members 22 and 24 define a closure opening.

In Figs. 3, 4 and 5 the marginal tubes 30 are shown as of less vertical height than the sheets 20. Each panel sheet 20 projects beyond the upper ends of the marginal tubes 30 as at 34 in Figs. 4 and 5. The header 28 of the door opening is so shaped as to define a pair of guide channels 36 within which these upwardly projecting portions 34 of the panel sheets are slidably mounted. The tubular margins 30 of the overlapping sliding panels are adapted to be brought into abutting engagement as shown in Figs. 1, 2 and 3 to form a tight joint. The two opposite tubular margins of the same panels are adapted to abut the upright stationary frame members 22 and 24.

The panel may be supported at the bottom for slidable movement upon grooved rollers 38 mounted to travel upon rails 40 carried by the floor member 26. Such rollers may be secured to the panel by attachment plates 42 and bolts 44. The roller is mounted upon an axle 46 carried by the plates 42. Such support for sliding movement of the panel may be provided in any suitable form. Instead of the panels being supported upon floor engaging rollers they might be carried by upwardly extending hangers provided with rollers in a manner which is well understood.

In Fig. 6 another modification in mounting is shown wherein the tubes 30 extend upwardly beyond the top of the sheet 20 and these tubes are cut out above the sheet as at 48 to receive a tongue 50 of the header 28 which tongue serves to guide the slidable travel of the panel.

In Fig. 7 a panel 20 having marginal tubes 30 is supported for slidable travel between a pair of stationary panels 52. Each panel 52 is provided with a tubular margin 54. The tube 54 is of the same character as has heretofore been described. It is secured to the stationary panel sheet 52 in the same manner as hereinabove described. The relative arrangement of the sliding panel and the stationary panels is obvious.

Fig. 8 illustrates another modification in mounting. The stationary header 28 defines a pair of runways or guides of sufficient width to receive the upper ends of the tubes 30. This construction is also illustrated in Fig. 9.

What I claim is:

1. That process of fabricating a panel comprising providing a sheet of relatively rigid panel forming material, providing a split tube having opposite resilient edge portions at the split, bending said edge portions correspondingly inwardly of the tube a distance less than half of a diameter of the tube to a position projecting toward each other and spaced apart a distance less than the thickness of the sheet, inserting under pressure along a path perpendicular to the axis of the tube a marginal portion of the panel sheet into the tube between said inturned edge portions spreading said edge portions resistingly apart so that the inturned edge portions of the tube are tensioned by such insertion to grippingly engage the opposite faces of the panel sheet inwardly of the tube and continuing such insertion along said path until the margin of the panel sheet seats against that portion of the side wall of the tube opposite the split.

2. That process of securing a split resilient tube along the margin of a panel sheet comprising bending the opposed edge portions of the tube along the line of the split inwardly of the tube for a distance less than a radius and

to a position separated by an outward angle of less than 180° but more than 90° and spacing such intumed edges apart a distance less than the thickness of the panel sheet, inserting a marginal portion of the panel between said intumed edge portions of the tube along a path perpendicular to the axis of the tube and spreading said edge portions apart against the yielding resistance thereof tensioning said edge portions to grippingly engage the opposite faces of the panel inwardly of the tube and continuing the insertion of the panel sheet until the margin thereof bottoms against the side wall of tube opposed to the split.

1,687,952
1,801,080
1,875,728
1,941,025
2,021,290
2,030,072
2,080,593
2,142,438
2,192,063
2,197,150
2,263,815
2,486,666

References Cited in the file of this patent

UNITED STATES PATENTS

1,343,545 Betz June 15, 1920

15 336,033

Stander Oct. 16, 1928
Hart et al. Apr. 14, 1931
Henry Sept. 6, 1932
Stein Dec. 26, 1933
Chambers Nov. 19, 1935
Peschel Feb. 11, 1936
Albert May 18, 1937
Faiveley Jan. 3, 1939
Hopkins Feb. 27, 1940
Lambert Apr. 16, 1940
Northrup Nov. 25, 1941
Maudlin Nov. 1, 1949

FOREIGN PATENTS

Italy Feb. 12, 1936