July 18, 1939. A. H. HABERSTUMP 2,166,435

METHOD OF FORMING INNER TRIM PANELS

Filed Feb. 11, 1937

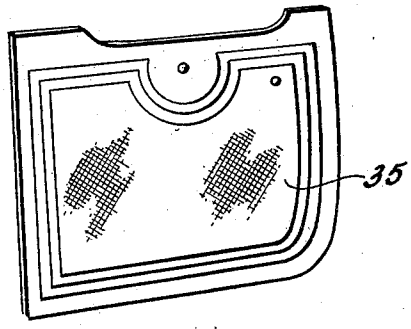


FIG. 1.

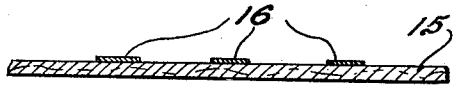


FIG. 2.

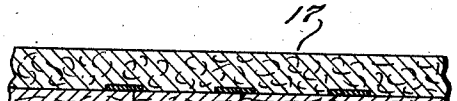


FIG. 3.

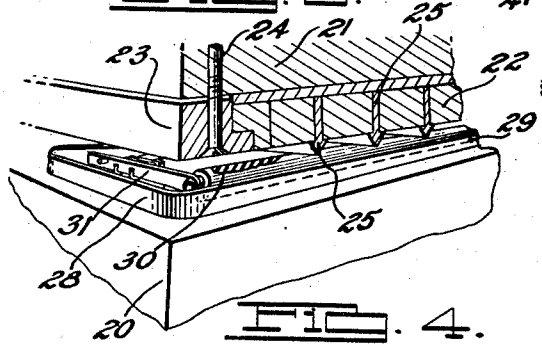


FIG. 4.

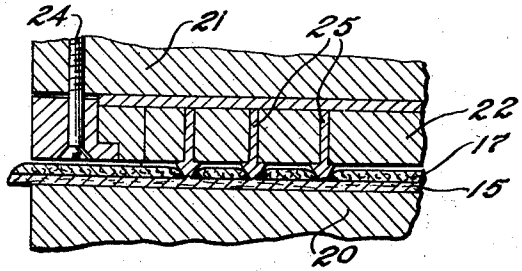


FIG. 5.



FIG. 6.

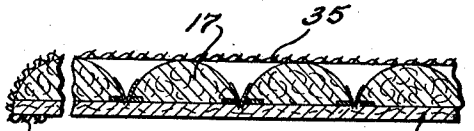


FIG. 7.

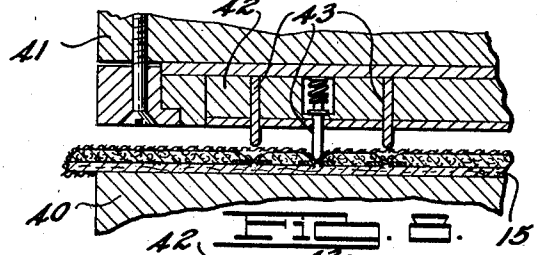


FIG. 8.

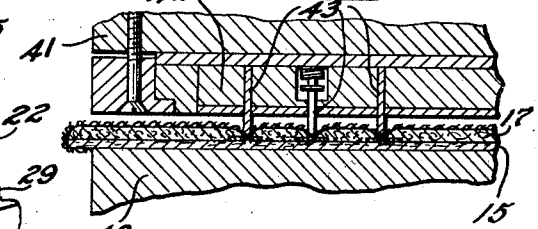


FIG. 9.

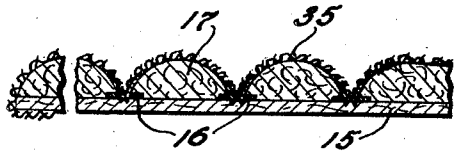


FIG. 10.

INVENTOR
Alfred H. Haberstump.
BY
Haines, Dickey, Pierce & Hann.
ATTORNEYS

Patented July 18, 1939 2,166,435

UNITED STATES PATENT OFFICE

2,166,435

METHOD OF FORMING INNER TRIM PANELS

Alfred H. Haberstump, Detroit, Mich., assignor to The Murray Corporation of America, Detroit, Mich., a corporation of Delaware

Application February 11, 1937, Serial No. 125,249

5 Claims. (Cl. 154—2)

This invention relates to an improved method of manufacturing inner trim panels.

The present invention is primarily directed to a specific improvement in the method of manufacturing inner trim panels of the type which are commonly used for covering various portions of the interior surface of automotive vehicle bodies. Such inner trim panels generally comprise a relatively stiff cardboard backing sheet having a layer of loosely felted, non-woven fibrous material adhesively secured to one surface thereof. This padded backing sheet, as is common in practice today, is covered with a section of woven fabric finish material which is tightly stretched over the padded surface of the backing sheet and secured in position thereon.

The particular inner trim panels with which the improved method of the present invention is primarily concerned, have embossments or other decorations on the exposed surface thereof, which decorations are formed by cutting through the padding material and forming the surface of the padding to a predetermined desired surface configuration. After the fabric finish material has been applied to the padded backing sheet the fabric finish material is preformed to the configuration of the padding material and adhesively bonded to the backing sheet in the zones in which the padding material has been cut, in order not only to maintain the padding material in predetermined position on the backing sheet, but at the same time to reproduce in the fabric covered surface of the trim panel the ornamental decoration desired.

It is a primary object of the present invention to provide an improved method of manufacturing inner trim panels, which method is exceptionally cheap to practice, and which inherently results in the production of finished products of extremely ornamental appearance and rugged, long lasting construction.

Inasmuch as the adhesive material commonly used for bonding together the various portions of inner trim panels must be waterproof, these materials have been found to be extremely expensive. Consequently, it is a primary object of the present invention to provide a method of forming inner trim panels which method results in a very substantial saving in the amount of adhesive necessarily used without in any way impairing the trim panel construction produced, and effecting a consequent reduction in the cost of manufacture.

The present invention contemplates the provision of novel and improved mechanism for applying adhesive material to predetermined portions of the padding and backing sheet at the time the padding of the backing sheet is cut and formed to the predetermined desired configuration.

Still another object of the present invention is to provide novel means for cutting the fibrous padding material, which cutting means at the same time serves to provide additional adhesive material to the particular zones of the padding material where said adhesive will be most useful.

Many other and further objects, advantages and features of the present invention will become more clearly apparent from the following specification when considered in connection with the accompanying drawing forming a part thereof.

In the drawing:

Figure 1 is a perspective view of a completed inner trim panel manufactured in accordance with the improved method of the present invention.

Fig. 2 is an enlarged fragmentary sectional view taken through a portion of the backing sheet illustrating the manner in which adhesive material is applied thereto to secure the padding in place thereon.

Fig. 3 is a fragmentary sectional view similar to Fig. 2 illustrating in detail the manner in which the layer of loosely felted non-woven fibrous padding material is applied to the backing sheet.

Fig. 4 is a fragmentary perspective view of one corner of a press utilized in the present method for cutting and forming the padded backing sheet.

Fig. 5 is a fragmentary sectional view through the press shown in Fig. 4 illustrating in detail the manner in which the press operates upon a padded backing sheet to provide the decorative grooves or channels therein.

Fig. 6 is an enlarged fragmentary sectional view through a padded backing sheet after the same has been operated upon by the press mechanism illustrated in Figs. 4 and 5.

Fig. 7 is a fragmentary sectional view similar to Fig. 6 illustrating in detail the manner in which the fabric finish material is applied to the preformed padded backing sheet.

Fig. 8 is a fragmentary sectional view through a press utilized for the purpose of conforming the fabric finish material to the conformation of the padded backing sheet.

Fig. 9 is a fragmentary sectional view similar to Fig. 8 illustrating in detail the manner in which the blades in the die member of the press

are utilized to preform and tension the fabric finish material to the conformation of the backing sheet.

Fig. 10 is an enlarged fragmentary sectional view similar to Figs. 6 and 7 illustrating in detail the cross-sectional configuration construction of the improved inner trim panel.

With more particular reference to the drawing, it will be readily understood that the specific steps hereinafter enumerated constitute merely one specific preferred form of the method disclosed in the present application, the scope of which is clearly defined in the appended claims.

In the manufacture of inner trim panels in accordance with the method herein disclosed, a backing sheet 15 is provided, which backing sheet is preferably formed from a suitable section of a relatively stiff, hard pressed cardboard or other relatively stiff sheet material. This backing sheet 15 is cut or stamped out in order that its peripheral configuration will be substantially identical with the pheripheral configuration of the inner trim panel which it is desired to produce. In Fig. 1 of the drawing is shown a completed inner trim panel manufactured in accordance with the method of the present invention, and it will be readily understood that the trim panel therein disclosed is primarily designed for covering the interior surface of a vehicle door. Manifestly, the particular shape of the inner trim panels to be produced forms no part of the present invention, and the form shown in Fig. 1 is merely illustrative of one form which the improved inner trim panel may take.

After the backing sheet 15 has been blanked or stamped out to the predetermined desired configuration, liquid adhesive 16 is deposited upon the surface of the backing sheet. While, if it is desired, the liquid adhesive 16 may be sprayed or painted over the entire surface of the backing sheet, it has been found satisfactory and quite practical, merely to apply this adhesive as shown, to predetermined areas of the backing sheet and specifically to such areas as will lie underneath the particular portion of the subsequently applied padding material which it is desired to form in accordance with the particular design produced upon the panel.

If the adhesive material 16 is only applied on certain localized zones of the backing sheet, it will be readily appreciated that a substantial saving in adhesive material may be made. After the application of the adhesive material 16 to the backing sheet 15, a layer of loosely felted, woven, fibrous material 17 is applied to the surface of the packing sheet. This loosely felted non-woven, fibrous mat or pad may conveniently be generated from jute fibers and is preferably blanked or stamped out in order that its peripheral configuration will be substantially congruant to the peripheral configuration of the cardboard backing sheet 15. It will be readily appreciated that this layer of non-woven fibrous padding material may be applied to the exposed surface of the cardboard backing sheet while the adhesive material 16 is damp and that the adhesive material 16 will serve to retain this pad in predetermined position upon the cardboard backing sheet.

As is clearly seen in Fig. 4 of the drawing, a press is provided which serves the purpose of forming the padding material to the predetermined desired configuration and at the same time serves to cut through the fabric pad in order to subsequently permit the securement of the fabric finish material to the cardboard backing sheet at various points throughout the surface thereof. While the press may take any suitable desired form, it preferably constitutes a bed 20 which has in cooperation therewith a ram 21 to which a die 22 is secured by means of a frame 23 and screws 24. This die 22 has mounted therein a plurality of cutting blades 25, which cutting blades are rigidly secured in the die member 22. These cutting blades 25 are preferably provided with a small recess in the crests or edges thereof in order to provide two spaced relatively sharp cutting edges. The recess between these cutting edges serves, as will hereinafter be more clearly seen, to attain adhesive material subsequently utilized in the formation of the improved inner trim panel.

The blades may be arranged in any suitable desired configuration throughout the die member 22 in order to produce upon the padded backing sheet the particular design sought. In the specific embodiment of the invention disclosed in the drawing, the inner trim panel has the surface thereof decorated by three substantially parallel lines disposed inwardly from the marginal edges of the trim panel and, consequently, the three knives 25 are utilized for the purpose of producing these lines.

Before the knives 25 are utilized for the purpose of operating upon a padded backing sheet, an adhesive applying apparatus 28 is passed over the bed of the press. This adhesive applying apparatus includes in general a pan or dish 29 which is partially filled with suitable adhesive material such, for example, as Latex. A roller 30 is mounted upon arms 31, which arms are pivoted in the pan 30 and suitable spring means may be utilized for the purpose of urging the arms upwardly away from the pan 28 in order to urge the roller 30 carried thereby into engagement with the knives 25 carried by the die member 22. It will be readily appreciated that as the adhesive applying apparatus 28 is slid over the bed of the press, the roller 30 will engage the knife blades 25 and apply adhesive from the pan 29 thereto, the adhesive covering the crest portions of the knives and being carried in the groove between the cutting edges thereof.

After the adhesive material has been applied to the knife blades 25, the padded backing sheet in the form substantially as illustrated in Fig. 3 is placed upon the bed of the press and the ram thereof is moved downwardly until the knives 25 reach approximately the position illustrated in Fig. 5 of the drawing. It will be readily understood that these knives serve to cut through the padding material to the backing sheet without substantially injuring or cutting the cardboard backing sheet. It will be readily appreciated that the adhesive material which has been applied to the knife blades, serves to bond together the ends of the fibers cut and retain these bonded ends closely together adjacent the cardboard backing sheet. As has been explained above, it is preferable to apply the adhesive material 16 only to certain localized zones of the backing sheet and in the specific embodiment of the invention illustrated and described herein, it will be understood that this liquid adhesive material 16 is only applied to such zones of the backing sheet as the knives 25 act upon. The cutting operation performed by the press shown in Figs. 4 and 5, is preferably performed while the adhesive material 16 is still wet in order that this adhesive will blend with the adhesive carried by the cutting knives.

After the completion of the forming operation by the press as shown in Figs. 4 and 5, the padded backing sheet will appear substantially as is illustrated in the enlarged fragmentary sectional view in Fig. 6. It will be seen by reference to this figure that the cutting knives have served the purpose of applying additional liquid adhesive material to the bases of the channels or grooves formed in the padding material by the knives.

A section of fabric finish material 35 having a peripheral configuration substantially similar to but slightly larger than the padded backing sheet is stretched thereover and has the marginal edges 36 thereof adhesively secured to the reverse side of the backing sheet 15. After the marginal edges of this fabric finish material have been secured in position, the fabric covered padded backing sheet is preferably placed in a press of the type shown in Figs. 8 and 9. This press includes a bed 40 and a ram 41. The ram 41 serves to carry a die 42 having a plurality of blades 43 therein. In the particular form of the invention illustrated herein where three substantially parallel lines are formed in the padded backing sheet, it has been found preferable to mount the central of the three blades 43 by means of springs in order that this blade will normally protrude slightly further than the blades 43 on each side thereof. These blades 43 are arranged within the die 42 in substantially the same manner as the knives 25 were positioned in the die 22. As the ram of the press descends, the central of the blades 43 will enter the central channel which has been formed in the padding material and urge the fabric finish material into this channel where the fabric finish material will be adhesively bonded directly to the backing sheet. As the die descends further, as is clearly seen in Fig. 9, the springs serving to support the central blade 43 will be compressed and the blades 43 on each of the sides thereof will enter their respective channels and urge the fabric material therein, thus bonding this fabric finish material directly to the cardboard backing sheet in the bases of these channels. It will be readily understood that the utilization of the central spring pressed blade serves the purpose of tensioning the fabric finish material over the surface of the padded backing sheet evenly and uniformly and the blades together serve to conform the fabric finish material to the configuration of the preformed padded backing sheet.

After the completion of the operation performed by the press shown in Figs. 8 and 9, the padded inner trim panel will appear in cross section substantially as is illustrated in Fig. 10. It will be clearly seen that the fabric finish material is tensioned over preformed padding material and is bonded adhesively directly to the backing sheet in the bases of each of the grooves formed by the cutting knives 25.

The above described method is merely illustrative of the generic inventive concept presented in this application. Many other and further modifications thereof falling within the scope of the invention as defined in the subjoined claims will become readily apparent to those skilled in the art.

What is claimed is:

1. The method of forming padded inner trim panels which comprises adhesively securing a layer of loosely felted non-woven fibrous padding material to a backing sheet, coating cutting knives with liquid adhesive material, utilizing said cutting knives to cut through said padding material to emboss the same and at the same time to deposit liquid adhesive in the bases of said lines of cut, whereby said liquid adhesive will not only serve to bond together the ends of the cut fibrous material but will bond the same to said backing sheet, stretching a section of fabric finish material over said padded backing sheet and securing the same to said backing sheet in the bases of said lines of cut.

2. In a process of preparing inner trim panels in which the padding of a padded backing sheet is cut along predetermined lines to provide an ornamental surface, the steps which comprise coating cutting knives with liquid adhesive material and utilizing said knives to cut through said padding to emboss the same and at the same time to deposit liquid adhesive on said backing sheet in the bases of said lines of cut, whereby said liquid adhesive will not only serve to bond together the ends of the cut fibrous material but will bond the same to said backing sheet.

3. The method of preparing inner trim panels which includes adhesively securing a layer of padding material in superimposed relation upon a relatively stiff backing sheet, subjecting said padded backing sheet to the action of cutting knives to cut through the padding to said backing sheet, coating said cutting knives with liquid adhesive material prior to said cutting operation whereby said adhesive material carried thereby will be deposited in the bases of said lines of cut, applying a section of fabric finish material over the surface of said padded backing sheet and urging said fabric finish material into said lines of cut whereby said adhesive will serve to bond said fabric finish material directly to said backing sheet.

4. The method of forming inner trim panels which includes adhesively securing a section of padding material in superimposed relation upon a backing sheet, subjecting said padded backing sheet to the action of cutting knives while the adhesive material securing said padding to said backing sheet is still liquid, applying liquid adhesive material to said cutting knives prior to said cutting operation whereby said liquid adhesive material will be deposited in the bases of said lines of cut and merge with the liquid adhesive utilized to secure said padding to said backing sheet, applying a section of fabric finish material over said padded backing sheet and urging said fabric finish material into said lines of cut whereby said liquid adhesive material will serve to bond said fabric finish material directly to said backing sheet in the bases of said lines of cut.

5. The method of forming padded inner trim panels which includes adhesively securing a section of padding material to a backing sheet, applying adhesive material to the blades of a plurality of spaced rigidly mounted cutting knives, urging said knives into engagement with said padded backing sheet whereby said knives will cut through the padding thereof and deposit some of the liquid adhesive carried thereby upon said backing sheet in the bases of the lines of cut thus formed, applying a section of fabric finish material over said backing sheet, urging said fabric finish material into the bases of said lines of cut whereby said adhesive material will bond said fabric finish material to said backing sheet in the bases of said lines of cut.

ALFRED H. HABERSTUMP.