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METHOD OF APPLYING AN AIRCRAFT COVERING

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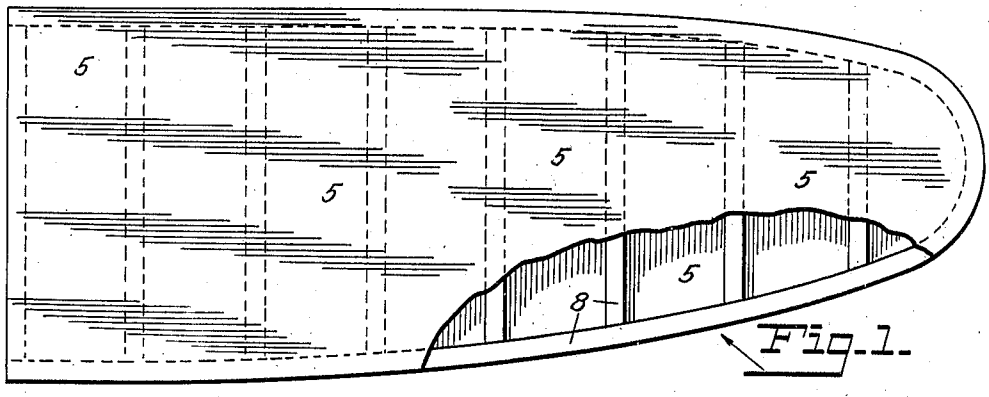


Fig. 1.

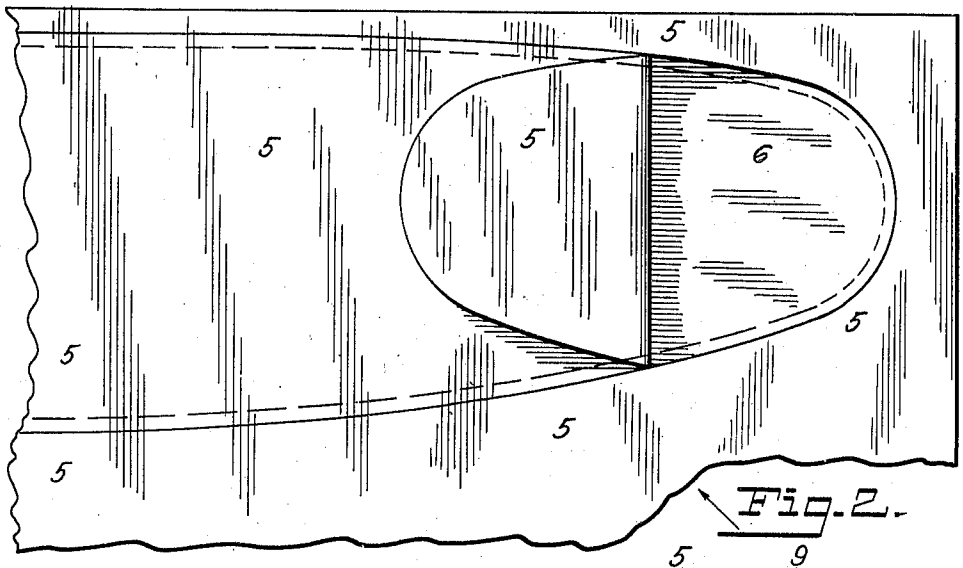


Fig. 2.

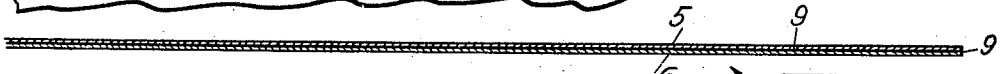


Fig. 3.

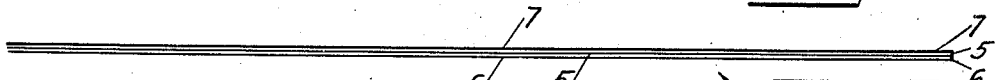


Fig. 4.

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METHOD OF APPLYING AN AIRCRAFT COVERING

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9 Claims. (Cl. 244—133)

This invention relates to aircraft and more particularly to a frame cover therefor and the method of preparing and applying said cover. The covering for wings and other parts of aircraft, which is the subject matter of the present invention, is adapted to be used on conventional airplanes of any size and it is also suitable for covering model airplanes, the material for the former being, of course, somewhat heavier and having a higher order of tensile strength. Model airplanes, such as are extensively built by boys for sport and for competitive purposes, usually comprise light weight skeleton frames of wood which are covered with light weight flexible material. Ordinarily the cover is formed of paper, the edge portions of which are glued to the frame members and the paper then coated with a solution of protecting and strengthening material. Not only is such paper covering very fragile and easily damaged but it is difficult to so apply the same as to provide a smooth taut surface because it is not easy to maintain the paper taut in all directions while it is being applied to the frame and while the glue is drying and, further, the moistening of the paper by the glue and coating solution has a tendency to wrinkle the paper. Moreover, the surface coating and the glue are very apt to be distributed more or less unevenly over the surface and such unequal distribution results in an unequal distribution of weight which produces an unbalanced condition in the airplane.

One object of the invention is to provide a frame cover for aircraft and the like which may be easily applied to the frame and which will be of light weight and relatively strong.

A further object of the invention is to provide a frame cover which will have little or no tendency to wrinkle when applied to the frame and which will not require the addition of a protecting coating after it is so applied.

A further object of the invention is to provide a frame cover of such a character that even when applied by a novice the weight of the cover will be uniformly distributed over the frame.

A further object of the invention is to provide such a cover of a thin tough film of material which can be rendered adhesive by the application of a solvent thereto.

A further object of the invention is to provide material for forming such a cover which can be easily handled and cut to the desired shape and size and which will be inexpensive.

Other objects of the invention may appear as the same is described in detail.

In the accompanying drawing Fig. 1 is a plan view of a wing of a model airplane with the cover partly broken away; Fig. 2 is a plan view of a sheet of cover material, the film of which has been cut according to the frame pattern and partly removed from the backing sheet; Fig. 3 is a section taken through the cover material and showing the same in exaggerated thickness; and Fig. 4 is a similar section showing a slightly modified form of the cover material.

For the purpose of illustration I have shown a cover applied to a wing of a model airplane but it will be understood that the cover may be applied to all parts of a full-sized or model airplane, which require covering, or to various other frames requiring a similar covering. In carrying out my invention I provide a film 5 of thin tough material having a high degree of flexibility, which can be easily cut to the size and shape required for the particular frame which is to be covered. The film is preferably formed by applying the material in a liquid or semi-liquid condition to a thin flexible backing sheet 6 from which it can be readily removed. The material may be applied to the backing sheet in any suitable manner which will cause the same to be distributed over the backing sheet to form a film of substantially uniform thickness throughout its area, but I prefer to use a known type of coating machine for this purpose. The use of such a backing sheet not only enables the film to be formed at small cost but it also facilitates the handling of the film and protects the same against injury. Further, the backing sheet forms a support for the film which enables it to be laid in a smooth flat condition best adapted for cutting the same to size and form, and when portions of the film have been cut out and removed from the backing sheet the remainder of the film remains on the backing sheet and is always in a condition for use.

The film may be formed of any suitable material having the necessary strength and flexibility but it is also desirable that it should be formed of a material which will have a normally dry adhesive surface which can be rendered adhesive or tacky by moistening the same with a solvent, so that the film may be secured to the frame without the addition of glue or the like. Various materials having a cellulose base are suitable but I prefer to use ordinary lacquer as this embodies in itself all the necessary characteristics. However, it is not necessary that the body of the film should be of adhesive material, and, if desired, the body may be formed of non-adhesive material, such as shellac, and a thin

coating of lacquer or other normally dry adhesive applied to the shellac after it has dried, as shown at 7 in Fig. 4.

The backing sheet is preferably made of paper and a glassine paper is well adapted for the purpose, but the backing sheet as well as the film, may be either opaque or transparent. The use of a transparent lacquer on a transparent backing sheet provides a cover material which may be placed over a pattern of the cover and the pattern traced on the film with a knife or stylus, thus accurately cutting the film in accordance with the pattern. Further, a transparent film when applied to a frame, such as the wing frame shown at 8, enables the frame structure to be seen through the film.

While the lacquer or other film forming material may be applied directly to the backing sheet it is preferable to provide a bond between the lacquer and the backing sheet which will eliminate any possibility of the same separating in spots due to age and at the same time permit the film to be easily removed from the backing sheet. This bond, which is shown at 9 in Fig. 3, may be in the form of a suitable adhesive applied to the backing sheet before the lacquer is spread thereon. Satisfactory results have been secured by spreading a thin coating of rubber cement on the backing sheet, allowing the same to become tacky and then applying the lacquer thereto, thus forming a firm bond from which the film may be easily stripped.

When the frame is to be covered the film is cut to a size and shape determined by the contour of the frame. If the cover material is transparent it may be placed over a pattern and the outline traced on the film with a knife, or the pattern may be placed on non-transparent cover material and the film cut in accordance therewith. Preferably the film only is cut, leaving the backing sheet intact, and the cut portion of the film is then stripped from the backing sheet. However, should it be desired both the film and the backing sheet may be cut out and the film removed from the cut portion of the backing sheet at a subsequent time, but by cutting out the film only and leaving the backing sheet intact the remaining portions of the film are protected against injury and maintained in a condition for use. The removed portion of film is moistened with the solvent, at the edges or other parts thereof which are to be attached to the frame members. This moistening renders the moistened parts of the film adhesive or tacky and when they are placed in contact with the frame members they quickly adhere thereto. The solvent may be applied to the film either by placing the same directly thereon or by placing the solvent on the frame members to which the film is to be attached and applying the film thereto before the solvent has dried. The tacky nature of the moistened film causes the same to adhere quickly to the frame members so that the cover may be attached to one side of the frame and then drawn across the frame and attached to the other side thereof without waiting for the adhesive to dry. This enables the film to be stretched in all directions on the frame to form a smooth taut cover therefor and as the moistened edge portions thereof dry they have a tendency to further stretch the film. Should there be a slight slackness in the cover, or a tendency to wrinkle, after it has been applied, this can be eliminated by brushing over the entire surface of the cover with the solvent to slightly moisten the cover, and as the latter dries it will stretch tight and smooth.

The film being of uniform thickness throughout and nothing being added thereto, such as the usual glue and surface coating, it follows that the weight of the cover will be uniformly distributed over the frame. In applying the surface coating, and even in applying the glue, to the cover in the ordinary manner it requires a high degree of skill to apply the same evenly so as to secure a uniform distribution of weight and the builders of model airplanes do not as a rule have that degree of skill and as a result model airplanes are not infrequently out of balance.

The film not only forms a relatively strong cover which is not easily injured but should the cover be injured, as by punching a hole therethrough, it can be easily repaired by placing over the hole a patch of moistened film and as this patch dries it will tend to draw the edges of the hole together so that the cover with its patch will be substantially smooth. The film itself being quite thin there is very little projection of the same above the surface of the cover. Likewise in joining the edges of the adjacent covers they can be overlapped and secured one to the other without a material increase in thickness.

As was previously stated, the covering material for full sized planes differs from that used for covering model airplanes principally in that the former is of greater thickness and tensile strength. In order to form a homogeneous film of requisite strength and thickness, it is desirable to form it of a laminated structure by running the same through a coating machine a number of times, thereby forming a plurality of superimposed coats of the material which, when dry, makes a single unitary film of very considerable strength considering its relative thickness. By forming the film of requisite width, a large aircraft may be covered in a remarkably short time.

While I have illustrated and described one embodiment of my invention and the method of preparing and applying the same I wish it to be understood that I do not wish to be limited to the details thereof as various modifications may occur to a person skilled in the art.

Having now fully described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. The method of covering an aircraft frame which consists in cutting from a sheet of laminated material comprising a thin film and a carrier sheet, a portion of such film corresponding in shape to the area to be covered, removing the film from the carrier sheet, the film having a cellulosic base capable of being rendered adhesive by the application of a solvent thereto, applying a solvent to portions of the film and then pressing such portions into engagement with the frame.

2. The method of covering an aircraft frame which consists in cutting from a sheet of laminated material comprising a thin film and a carrier sheet, a portion of such film corresponding to the size and shape of the area to be covered, removing the film from the carrier sheet and then applying the film to the frame, the film having a cellulosic base and having a normally dry adhesive surface, applying a solvent to portions of the film to render the same adhesive and then pressing such portions into engagement with the frame.

3. The method of covering an aircraft frame which consists in cutting from a sheet of separable laminated material comprising a thin

flexible film and a carrier sheet, a portion of such film corresponding to the area to be covered, stripping the film from the carrier sheet and then applying the film to the frame, the film being made from material capable of being made adhesive by applying a solvent thereto, applying such solvent to portions of the film and then pressing such portions into engagement with the frame.

4. The method of covering an aircraft frame which consists in cutting from a sheet of laminated material comprising a thin flexible film of substantially uniform thickness and a flexible carrier sheet, a portion of such film corresponding to the area to be covered, removing the film from the carrier sheet, the film being made from cellulosic material capable of being rendered adhesive by the application of a solvent, applying such solvent to portions of the frame and then stretching the film over the frame and pressing the portions of the film engaging the frame into firm contact therewith.

5. The method of covering an aircraft frame which consists in cutting from a separable sheet of laminated material comprising a film and a carrier sheet, a portion of such film corresponding to the size and shape of the area to be covered, removing the film from the carrier sheet and then applying the film to the frame, the sheet having a layer of material interposed between the film and the carrier sheet, such layer of material being joined to the film and being capable of being rendered adhesive by the application of a solvent thereto, applying such solvent to portions of the material to render the same adhesive and then pressing such portions into engagement with the frame.

6. The method of covering an aircraft frame which consists in cutting a sheet of laminated material comprising a thin film and a carrier sheet to the shape of the area to be covered, removing the film from the carrier sheet, the film having a cellulosic base and having a normally dry adhesive surface, applying a solvent to portions of the film to render the same adhesive and then pressing such portions into engagement with the frame.

7. The method of covering an aircraft frame which consists in cutting a sheet of laminated material comprising a thin film and a carrier sheet, a portion of such film corresponding to the shape of the area to be covered, removing the film from the carrier sheet, the film having a cellulosic base and having a normally dry adhesive surface, applying a solvent to portions of the frame and then stretching the film over the frame and pressing the portions in contact with the frame into firm engagement therewith.

8. The method of covering an aircraft frame which consists in cutting from a sheet of separable laminated material comprising a thin flexible film and a carrier sheet, a portion of such film corresponding to the area to be covered, stripping the film from the carrier sheet and then applying the film to the frame, the film being made from material capable of being made adhesive by applying a solvent thereto, applying a solution containing a solvent to portions of the film and then pressing such portions into engagement with the frame.

9. The method of covering an aircraft frame which consists in cutting from a sheet of laminated material comprising a film and a carrier sheet, a portion of such film corresponding to the size and shape of the area to be covered, removing the film from the carrier sheet and then applying the film to the frame, the film comprising a plurality of layers of nitrocellulose lacquer, applying a solvent to portions of the film to render the same adhesive, pressing such portions into engagement with the frame and then applying a solution containing a solvent to the exterior of the film to cause the same to become taut.

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