Dec. 6, 1960 H. O. PIERSON 2,962,802

METHOD OF APPLYING A WIRE TO THE SURFACE OF A BODY ALONG A GIVEN PATTERN

Filed Feb. 13, 1957

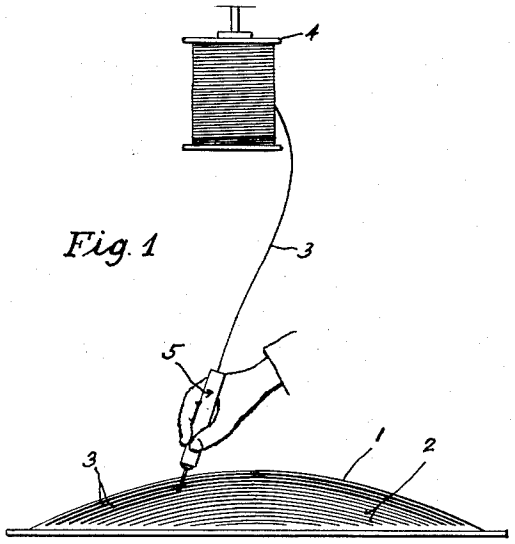


Fig. 1

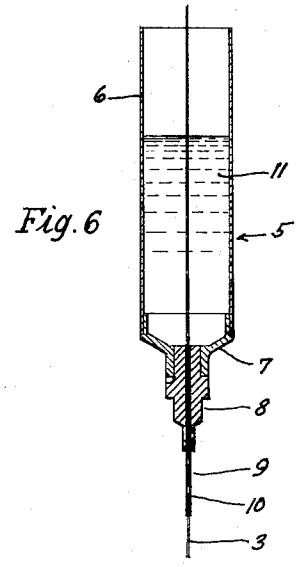


Fig. 6

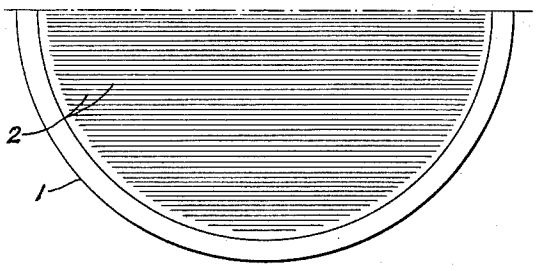


Fig. 2

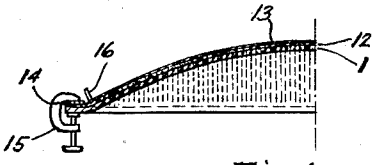


Fig. 4

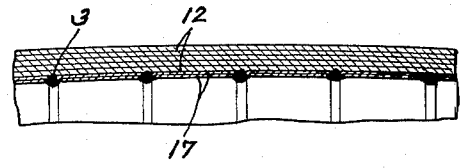


Fig. 5

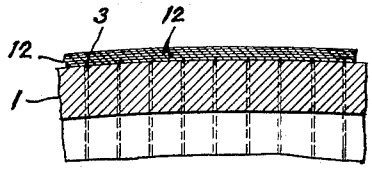


Fig. 3

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METHOD OF APPLYING A WIRE TO THE SURFACE OF A BODY ALONG A GIVEN PATTERN

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4 Claims. (Cl. 29—155.5)

This invention relates to a method to apply a wire to a given surface, or to incorporate the wire with a plastic body in such application as radar reflector grids, electronic circuits, wire heating devices, and similar products.

It is the general object of the invention to provide an improved method for making radar reflectors and the like and including wires embedded in plastic usually reinforced with fiber glass.

Another object of the invention is to provide a method of the type described characterized by inexpensiveness, speed, lack of requiring skill and excellence of product.

The aforesaid objects of the invention, and other objects which will become apparant as the description proceeds are achieved by providing that method of making a reflector for electrical waves which includes the steps of providing a plurality of parallel grooves of a depth about half the groove width in a body of metal, treating the body to prevent plastic from adhering thereto, guiding a flexible electro-conductive strand element into proximity with each groove in turn, coating each element during the guiding step with a tacking adhesive cover of a diameter about equal to the groove width, depositing the coated element progressively in each groove, the length thereof, the coating substantially filling the groove, applying sheet-like plastic material over the body and elements, curing the material and the coatings, stripping away the body to leave the elements embedded in the material, and applying a plastic cover sheet over the material and elements to protect the elements.

For a better understanding of the invention reference should be had to the accompanying drawings wherein

Fig. 1 is a side elevation of apparatus utilized with one embodiment of the invention.

Fig. 2 is a one-half top view of a male mold for forming a radar reflector thereon.

Fig. 3 is in larger scale a fragmentary cross-ectional view through the mold showing the grid wires laid therein.

Fig. 4 is a half cross-sectional view of the mold with the reflector plies placed on the mold against the grid wires and ready for curing.

Fig. 5 is in over-sized scale a fragmentary cross-sectional view through the finished article.

Fig. 6 is a cross-sectional view of a grid wire applicator for inserting the wire in the mold grooves.

With specific reference to the form of the invention illustrated in the drawing, the numeral 1 indicates a male mold, usually made of metal, provided with surface grooves 2 lying in parallel planes and to receive grid wires 3 from a rotatable spool 4 conveniently mounted above the mold. For laying the grid wires 3, an adapter designated as a whole by the numeral 5 is employed. The adapter 5 consists of a feed cartridge 6, open at the top, and having a bottom 7 into which fits a readily removable insert 8 carrying a hollow needle 9, similar to a hypodermic needle, having a hole 10 slightly larger than the wire 3 to just coat it with the right amount of

contact pressure adhesive 11, such as a solution of polyvinyl acetate in acetone, which will hold the wire in the groove during the application of plies of resin-impregnated glass fiber cloth to the mold, as hereinafter described.

In applying this invention, grooves 2 lying in parallel vertical planes are cut into the surface of the mold 1 to receive the grid wires 3. The grooves 2 have a width slightly larger than the diameter of wire 3 and a depth of little more than half the wire diameter which by example may be ten thousandths of one inch. Now the surface of the mold is covered with wax or like anti-adhesive. A wire 3 is now laid in each groove 2. This is done by the operator holding the end of the adhesive-coated wire in a groove 2 with a finger to stick the end of the wire thereto. Whereupon the adapter 5 is used like a pencil by guiding the needle 9 along the groove. This is a very efficient, practical and time-saving method to insert the wire in its grooves.

Next the required number of resin-impregnated plies 12 of fibre glass cloth are placed over the mold 5 and covered by a thin, transparent, skin 13 which is sealed against the rim of the mold by a ring 14 and clamps 15, whereupon the air enclosed within cover 13 is evacuated through an outlet 16 to let atmospheric pressure act upon the plies 12. After curing the resin in the plies, for example at low temperature, by ultraviolet rays, the plies 12, together with the wires 3 formerly placed into the grooves 2 and now adhering to the plies, form, when removed from the mold, the radar reflector, which for protection of the wires 3 is provided with one or more thin plies of resin-impregnated fibre glass cloth 17. These plies also are tightly secured to the reflector by evacuating the air between reflector and protecting plies and then are cured by ultraviolet rays.

From the aforesaid it will be recognized that the objects of this invention are fully achiever for obtaining a product of highest quality and performance.

While certain representative embodiments and details have been shown for the purpose of illustrating the invention, it will be apparent to those skilled in this art that various changes and modifications may be made therein without departing from the spirit or scope of the invention.

What is claimed:

1. That method of making a reflector for electrical waves which includes the steps of providing a plurality of parallel grooves of a depth about half the groove width on the outside of dish-like body of metal, coating the body and grooves with an anti-adhesive to prevent plastic from adhering thereto, progressively guiding a flexible electro-conductive strand element into proximity with each groove in turn, progressively coating each each element during the guiding step with a tacking adhesive cover of a diameter about equal to the groove width, depositing the coated element progressively in each groove over the length thereof, the coating substantially filling the groove, covering the body and elements with sheet-like fiberglass cloth and plastic material, evacuating the air between the material and the body, curing the material and the coatings by ultra-violet rays, stripping away the body to leave the elements embedded on the inner surface of the female-shaped material and the coatings adhered thereto, and applying a plastic cover sheet over and into contact with the material and elements to protect the elements.

2. That method of making a reflector for electrical waves which includes the steps of providing a plurality of grooves on the outer surface of a convexly dished body of metal, coating the body and grooves with an anti-adhesive to prevent plastic from adhering thereto, guiding

a flexible electro-conductive strand element progressively into proximity with each groove in turn, progressively coating each element during the guiding step with a tacking adhesive cover of a diameter about equal to the groove width, depositing the coated element progressively in each groove over the length thereof, the coating substantially filling the groove, covering the body and elements with sheet-like plastic material, evacuating the air between the material and the body, curing the material and the coatings, stripping away the body to leave the elements embedded in the concave surface of the material, and applying a plastic cover sheet into sealing contact with the material and elements to protect the elements.

3. That method of making a reflector for electrical waves which includes the steps of providing a dish-shaped body of metal having a plurality of grooves therein, coating the body and grooves with an anti-adhesive to prevent plastic from adhering thereto, progressively guiding a flexible electro-conductive strand element into proximity with each groove in turn, progressively coating each element during the guiding step with a tacking adhesive cover, depositing the coated element progressive in each groove, the coating substantially filling the groove, covering the body and elements with sheet-like plastic material, curing the material and the coatings, stripping away the body to leave the elements embedded in the material and the coatings adhered thereto, and applying a plastic cover sheet in sealing relation with the material and elements to protect the elements.

4. That method of making a reflector for electrical waves which includes the steps of providing a plurality of grooves in a body, coating the body and grooves with an anti-adhesive to prevent plastic from adhering thereto, progressively guiding a flexible electro-conductive strand element into proximity with each groove in turn, progressively coating each element during the guiding step with a tacking adhesive cover, depositing the coated element progressively in each groove, the coating substantially filling the groove, applying sheet-like plastic material over and into sealing contact with the body and elements, curing the material and the coatings, and stripping the body to provide a reflector consisting of the plastic material, the coatings and the strand elements.

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