100% POLYESTER MATERIAL FOR THE MANUFACTURE OF A PEST CONTROL APPLICATOR

BACKGROUND OF THE INVENTION

This application is a continuation-in-part of application Ser. No. 07/995,628, filed Dec. 21, 1992, now abandoned, in the name of the same inventor, for 100% Polyester Reinforced Material for the Manufacture of Pest Control Applicator.

1. Field of the Invention

This invention relates to a 100% polyester reinforced material in the form of a laminated film to hold a pest control agent, and process for the manufacture of a laminated film. The application also relates to an applicator formed from such reinforced, laminated film and containing a fumigating agent for the control of pests which may be found in grain, processed food, animal fodder, non-edible manufactured goods such as wood and others stored in warehouses, silos, holds of vessels, boats, wagons, etc. An outstanding feature of the invention is that it ensures the release of phosphine gas through reaction with air humidity of the fumigation agent, preferably a solid or powdered metallic phosphide, contained in the applicator. Due to the innovative features of the laminated film intrinsic to the final applicator, a highly improved fumigation efficiency rate and subsequent removal of toxic residue is achieved in comparison with similar films and applicators to which the field often resorts.

2. Description of Related Art

It is well known that grain storage, whether simple storing in warehouses, silos and such, or through carriage in vessels and such craft, must necessarily rely on an efficient means of disinfecting of any pests found therein, which is generally done by using a fumigating product, in particular a metallic phosphide, preferably aluminum phosphide, hydrolyzable through the action of air humidity, which reaction triggers the release of the toxic gas phosphine which is lethal to pests until substantially the entire phosphide content is released. To this end, the premises must be kept tightly closed and only be opened after the gas activity period has elapsed. In such ideal application conditions, the pesticide agent is packed, as various measured doses, inside a gas and humidity-permeable wrapping.

In view of the toxic nature of the metallic phosphide, it is required that no direct contact between the latter and the grain occurs, and to this end, one of the methods of distribution in the bulk of the grain is the parcelling out of small envelopes or bags, known in the market as "sachets", each containing a predetermined quantity of metallic phosphide, preferably aluminum phosphide, as required for the efficient disinfestation of the premises.

The aforementioned sachets must necessarily possess certain characteristics to achieve the desired effect. Thus they are made, according to the present state of the art, from material such as paper, non-woven from a cellulose base, or certain synthetic polymers of multiple types. Among the most common examples of such elements, there can be mentioned polyamide, polyesters, and polyacrylic compounds, particularly polyacrylamide, as well as glass fibers, or other sealing materials with a lower melting or softening point.

Characteristics pertaining to the material used are vitally important in the case of an applicator as described, not only with regard to the closing, but also with regard to essential factors such as humidity and gas permeability, porosity,

mechanical resistance, among others, which keep present manufacturers and researchers in the search for constant improvement.

Thus, recently the state of the art learned of a sachet made from TYVEK, a synthetic polymer manufactured by DU PONT, composed of 100% high density polyethylene fibers and a second sealing component. An example of this development is Brazilian patent application 8802477.

Insofar as a general study of the state of the art is concerned, it can be said that the envelope, or paper sachet, one of the first to be developed, is sewn next to the borders with a view to providing a fully sealable and air permeable packaging, in order to allow for the occurrence of the aluminum phosphide reaction, so as to release phosphine gas.

However, use of a product such as paper results in some drawbacks in the finished packaging, namely in the applicator, such as smaller physical resistance and durability, particularly if one considers that such envelopes generally remain under tons of grain, therefore subject to heavy compressive and tensile stress, and tearing. Another negative point is that the packaging sewn or glued next to the border, may allow for leaking of aluminum phosphide, especially through the seams, placing the product in direct contact with the grain, which is undesirable.

With regard to sachets made from a non-woven material with a cellulose base and/or from multiple component synthetic polymers, comprising at least one film-forming material to form fibers with a melting or softening point above 165 degrees Centigrade and a second material with thermoplastic properties and a melting or softening point below 145 degrees Centigrade, or within the ranges 180 to 235 degrees Centigrade and 80 to 120 degrees Centigrade, respectively, these have limited physical characteristics and during use, may tear or break open, releasing highly toxic aluminum phosphide which will come into direct contact with the grain undergoing fumigation.

On the other hand, proofers used on synthetic fabrics do not form an even layer during the application procedure, resulting in a disproportionate release of phosphine which hinders fumigation and delays water penetration thus requiring that the fumigant package be placed in a container with water to accelerate residual phosphide reaction.

With regard to 100% high or low density polyethylene synthetic fabrics, coated on one side with thermoplastic adhesive, they show, like the previous ones, the drawback of other non-woven materials, especially with regard to disproportionate release of phosphine, rendering the phosphine gas concentrations very low, particularly close to the sachet surface. Besides, because of the characteristic of impermeability of this material, it is rendered less efficient when, upon completion of fumigation, it is necessary to neutralize the residual aluminum phosphide by immersion in water.

SUMMARY OF THE INVENTION

In view of these and other drawbacks, the inventor envisaged the present material, obtained through its own particular process, resulting in a laminated sheet with improved properties for usage as an applicator for hydrolyzable phosphides utilized in fumigating different enclosures; this laminated material differing from prior materials used for such purposes in that it is basically made up from a polymerized reinforced non-woven 100% polyester, with its own self-thermosealing characteristics and therefore not requiring the use of glues, pasting, agglutinant or other adhesive substances.