Patented Jan. 23, 1951 2,538,926

UNITED STATES PATENT OFFICE

2,538,926

METHOD OF MAKING WATERPROOF FIBROUS CONTAINERS

Daniel Manson Sutherland, Morrisville, Pa.

No Drawing. Application March 25, 1946, Serial No. 657,067

2 Claims. (Cl. 92—21)

1

It has heretofore been practiced to make boxes of either solid or of corrugated fibre sheets in which, in order to make the fibre water resistant melamine or other synthetic resins or asphaltic emulsions have been added to the slush pulp; and to improve the vapor resistance of such board two or more layers thereof have been cemented together with a hot asphalt, having a melting point from 120° F. to 140° F. Corrugated boxes of similar material have been made with an outer liner varying from .016 to .030 inch in thickness, and an inner liner varying in thickness from .010 inch to .016 inch depending upon the required length. These liners are made water resisting by addition of rosin size and alum to the slush pulp. The corrugated medium has usually been made of kraft straw or chestnut pulps and waste papers. Sometimes the corrugating medium has been unsized so as to more readily absorb the silicate paste by which the liners are cemented to the corrugating medium. In order to increase the water resistance, synthetic resins in paste form combined with starch have been used but when these materials are formed into boxes and exposed to wet weather or to humidity or when used in refrigerators with deposition of snow they are apt to become soft and useless. Solid boxes, both folding set up, have also been made water resisting by addition of rosin size and alum to the pulp but they too become soft and useless when exposed to wet conditions.

My present process produces a solid fibre box, or a corrugated box, that will withstand wet conditions indefinitely, and I effect this result at low cost compared with the use of synthetic resin suspended in the pulp suspension. I also produce a stronger box in both dry and wet condition according to the amount of waterproof material incorporated.

To produce this waterproof container, whether of solid fibre or corrugated sheets, I proceed as follows:

I add to the pulp suspension from which the sheet is to be produced gilsonite in wet powdered form preferably gilsonite which has been subjected to vacuum extraction as disclosed in my U. S. Patent No. 2.493,507, but additional sizing agents may be added, such as rosin size and alum. The component sheets are made on the usual board and paper machines but care is taken to hold down the temperature of the dryers so that fusion of the gilsonite, which melts at 270° F. to 375° F. does not take place. The resulting fibrous sheets are then wound into rolls which go to

2

the box plant where, by standard equipment either as plain or corrugated sheets, they are cut to size and scored and assembled as containers, all without substantial fusion of the gilsonite and fibre. In order to attach the corrugating media to the liners, low melting point asphalt may be used in place of the usual silicate of soda or synthetic resins and starch.

After thus producing these fibrous sheets or liners or boards, and after they have been cut and scored, the sheets are subjected to a heat treatment which rapidly and completely fuses the gilsonite and fibre together thereby producing a truly waterproof and rigid sheet. High frequency electrical current may be used to effect this fusion of the gilsonite. The heat thus used should exceed 300° F., preferably 325° F. or over. In some cases it is best to combine pressure with this heating procedure. When electronic heating is used, the heating of each particle of gilsonite begins from the inside and proceeds outwardly with the result that there is a more complete fusion and a more complete union of the fibers and more effective waterproofing.

As a result of the wide dispersion of this completely fused gilsonite along with the fibre contained in the sheets, fibre boards are obtained which are completely water resisting and do not become soft from exposure to moisture, and because the electronic heating is applied only after the water has been expelled from the sheet, the expense of such heating is greatly reduced. There is a further advantage in my process that there is no difficulty in recovering the waste. This wastage whether resulting from the process of making the sheets or from the operations in the board or paper mill or at the box plant, having been produced before the gilsonite has been melted, can on this account be readily repulped and reclaimed.

Having thus described my invention, I claim:

1. The process of making a waterproof container from a suspension of fibrous pulp, which consists of adding to the pulp a suspension containing wet powdered gilsonite and water, thoroughly mixing said pulp and suspension to form a pulp-gilsonite mix, producing a sheet from said mix on a suitable forming machine, drying the sheet at a temperature above the boiling point of water and below the melting point of gilsonite, removing excess material from the sheet to form container elements, repulping said excess material for re-use in the process, assembling the container elements in the form of a container, and

raising the temperature of the container to a value above the melting point of gilsonite thereby fusing and dispersing the gilsonite among the fibres and forming a strong, rigid, waterproof container.

2. The process of making a waterproof box from a suspension of fibrous pulp, which consists of adding to the pulp a suspension containing wet powdered gilsonite and water, producing relatively water absorbent sheets from the mixed product on a suitable forming machine, drying the sheets at a temperature of 212–270° F. thereby preventing fusion of the gilsonite admixed with the fibres and retaining the water absorbent characteristic of the sheets, cutting and scoring the sheets, returning the excess material from the cutting operations to the pulp-gilsonite mix, thereby repulping said excess material for re-use in the process, assembling the sheets produced in the form of a box, raising the temperature of the box to a value above the fusion point of gilsonite, thereby fusing and dispersing the gilsonite uniformly among the fibres, and cooling the box to solidify the gilsonite, thereby forming a strong, rigid and waterproof box.

DANIEL MANSON SUTHERLAND.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,778,147	Edwards	Oct. 14, 1930
1,900,699	Ellis	Mar. 7, 1933
1,981,573	Stafford	Nov. 20, 1934
2,249,959	Johannessen	July 22, 1941
2,274,095	Sawyer	Feb. 24, 1942
2,301,998	Bernstein et al.	Nov. 17, 1942
2,368,371	Minge et al.	Jan. 30, 1945
2,376,687	Goldstein	May 22, 1945
2,493,507	Sutherland	Jan. 3, 1950