

ALIEN PROPERTY CUSTODIAN

ADHESIVES

Hendrik Willem Meijer, Veendam, Netherlands;
vested in the Allen Property Custodian

No Drawing. Application filed May 1, 1940

The object of the present invention is to provide an adhesive which is excellent for many purposes and may be applied in the form of a viscous suspension or paste and obtains its adhesive power by subsequent heating.

An other object of the invention is to provide an adhesive capable of sticking layers of cardboard to cardboard, paper to cardboard, or paper to paper, to form a quasi homogeneous unit. Again an other object of the invention is to provide a neutral adhesive fit for being applied to metal foils, such as aluminium foils and other substances that are not alkali proof. An other object is to provide a cheap and easily obtainable adhesive for industrial application which does not chalk on drying.

The adhesive according to the invention is obtained by suspending non starchified amyllum, such as sago amyllum, tapioca amyllum, maize amyllum, but preferably potato amyllum, in a colloidal mannan containing aqueous solution of constituents of ground dried bulbs of plants of the genus amorphophallus, and especially of bulbs, of amorphophallus oncophyllus.

If this suspension is heated to a temperature at which the amyllum starchifies it becomes a very strong adhesive.

The adhesive according to the invention may be applied as a layer between the objects to be united and then sufficient heat is added to starchify the amyllum. The starchified amyllum is the principal adhesive. The mannan containing carrier assists its action and promotes the water proofness of the layer of adhesive. This is caused by the property of the mannan solution that by drying at elevated temperature the mannan becomes insoluble in water. The water proofness may be increased by the action of alkali (e. g. ammonia) but preferably alkalis are not added before the adhesive is applied between the objects to be united because alkali has a deflocculating action on the mannan hydrosol, generally if the pH of the sol is above about 11.

In order to make the adhesive fit for being stored it is preferable to add a suitable antiseptic in order to prevent decomposition by moulds or bacteria.

The preparation of the adhesive is very simple, e. g. the bulbs of amorphophallus oncophyllus, after sufficient cleaning, are cut into slices which are dried and ground. It is important to obtain a very finely ground meal, because the finer the particles, the easier it is to obtain a solution of high viscosity. The finely ground meal is then dissolved at ordinary or slightly increased tem-

perature e. g. to obtain a solution containing 0.2-2% of the meal. Boiling of the solution should be avoided because the meal dissolves badly in boiling water. Obviously the mannan is affected by boiling water. Amyllum and mannan are preferably mixed together before dissolving.

The obtained solution is a viscous hydrosol in which large quantities non starchified amyllum, preferably potato amyllum, can be suspended. The viscosity is increased thereby. By adjusting the concentration of the colloidal solution and the quantity of suspended amyllum the viscosity can be controlled within wide limits. In order not to increase the viscosity unduly one may use a less concentrated hydrosol with the same quantity of amyllum. Even in a diluted hydrosol it remains suspended and can be used as an adhesive. In order to develop the adhesive properties, however, it is necessary to heat until the amyllum is sufficiently starchified to obtain the required adhesive power. If sufficient heat is applied also the mannan of the hydrosol becomes insoluble and waterproof, said reaction being promoted by the presence of alkali.

It is, however, a considerable advantage of the new adhesive that it has a neutral reaction. An excellent adhesion is obtained without any alkali, e. g. it is possible to unite layers of cardboard which is impossible with common starch. The adhesive impregnates the layers before the development of the adhesive power. By the subsequent heating starchifying takes place and adhesive properties are developed. In such manner the layers are completely united.

Due to its neutral reaction the adhesive is also very fit for applying to substances which are not alkali proof, such as aluminium foil.

The adhesive may be mixed either before or after dissolving also with a modified starch e. g. an oxidised or hydrolysed or malt-treated starch or with other substances with adhesive properties.

Example 1

300 cm³ water are stirred at room temperature with 1 g finally ground bulbs of amorphophallus oncophyllus, thereby obtaining a viscous hydrosol. 30 g ordinary potato amyllum are suspended therein and thereby an adhesive is obtained that on heating develops excellent adhesive properties. One may add to the suspension further quantities of potato amyllum and obtain thereby suspensions or pastes of any viscosity. It is also possible to dilute the hydrosol considerably by the addition of water before adding the amyllum. In this

manner larger quantities of potato amyllum may be added for obtaining the same viscosity.

Example 2

30 g potato amyllum and 1 g oncophyllus are mixed. The mixture is suspended in 300 cm³ cold water by simply stirring for 30 minutes.

The longer is stirred the more homogeneous the amyllum suspension becomes. After that 10 time it is ready for use.

Example 3

50 g sago amyllum and 0.6 g oncophyllus are mixed. The mixture is suspended in 300 cm³ water and stirred for 30 minutes and is then ready for use.

The amyllum containing adhesive may be brought into the trade if a preservative is added which prevents the growths of moulds and bacteria.

HENDRIK WILLEM MEIJER.