

ALIEN PROPERTY CUSTODIAN

PROCESS FOR THE GELATINIZATION OF CELLULOSE NITRATE

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In the manufacture of guncotton devoid of solvent the gelatinization of cellulose nitrate is effected by such substances as continue to remain in the guncotton as a finished product also. Gelatinizing substances of this kind are e. g. nitroglycerin, or nitro glycol, or mixtures containing these compounds with, for instance, stabilizers or flame-reducing substances added to them. Gelatinization is effected in such a manner that the gelatinizing substance is allowed to flow into an aqueous dispersion, produced by means of compressed air, of cellulose nitrate, following which mixing is likewise effected by means of compressed air. After the completion of the process of mixture the surplus water is removed, e. g. by means of centrifuging, from the gelatinized material, following which the wet mass is stored during a considerable length of time, for instance during one week, in order to mature it. The purpose of maturation is to ensure that the gelatinizing substance should come into contact with those particles of cellulose nitrate also which it has been unable to reach during the process of mixture by means of compressed air. The cellulose nitrate impregnated with gelatinizing substances which has been produced in this manner is subjected to treatment on rollers, thereby converting it into guncotton. During treatment on the rollers, however, the material will frequently take fire, this being due, chiefly, to the fact that not all particles of the cellulose nitrate have been gelatinized completely, and that therefore the dry particles of cellulose nitrate are liable to take fire during the course of their mechanical treatment on rollers, owing to the friction set up during such treatment, and to ignite the whole material treated. The process according to the invention enables these drawbacks to be eliminated.

According to the invention it is in the form of a fine aqueous emulsion that the gelatinizing substance is added to the aqueous suspension, produced by means of hydraulic mixing, of the cellulose nitrate. This process will ensure very uniform and intimate contact. Gelatinization will thus take place rapidly and in a perfect manner, so that, after separating the gelatinized cellulose nitrate from the water, it will be possible to continue the treatment of the cellulose nitrate without employing any process of maturation.

In a preferable method, described by way of example, of carrying the process according to the invention into effect, the cellulose nitrate cut into fine particles is suspended in warm water by means of energetic mechanical mixing. To this suspension an aqueous emulsion of the gelatinizing substance (for the production of which, likewise, warm water should be employed), is added under energetic mixing. A water-jet pump fed with warm water is employed for producing the emulsion of the gelatinized substance. The suction pipe of the water-jet pump is dipped into the liquid gelatinizing substance, whilst the emulsion produced by means of the water-jet pump is passed directly into the cellulose nitrate suspension. The gelatinizing substance should preferably also be preheated before introducing it into the water-jet pump. The aqueous cellulose nitrate suspension is, when introducing the gelatinizing substance into it, subjected to thorough mixing by means of mixing ladles and the mixing is continued for a short time also after the introduction of the emulsion has been completed. After the completion of the process of mixing, the crude guncotton gelatin is separated from the water, e. g. by means of centrifuging, and converted into guncotton without employing any special process of maturation.

Another advantage of the process according to the invention, as compared to the process in which mixing is effected by means of compressed air, consists in the fact that the mixing may be performed in a closed vessel, from which no nitroglycerin vapours or particles of cellulose nitrate carried along by the compressed air are liable to get into the atmosphere of the room in which the process of manufacture is being performed. Any process of maturation is dispensed with and the storage rooms required for such a process likewise become unnecessary. The material which has become gelatinized in a high degree and in a uniform manner may be treated on the rolling mills more rapidly and with less danger than the non-uniform mixture obtained by the earlier process. Moreover, the guncotton manufactured by means of the new process also possesses a more uniform structure, which circumstance is advantageous from a ballistical point of view.

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