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METHOD OF TREATING CELLULOSE ETHERS

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9 Claims. (Cl. 260—232)

The present invention relates to cellulose ethers, particularly water soluble cellulose ethers.

In the manufacture of water-soluble cellulose ethers by the usual processes there are obtained products of a fibrous structure; generally, the cellulose ether has the form of a loose flocculant fibrous mass which contains much air and has a low apparent density. For making a solution this product is swollen by means of hot or boiling water; on cooling it passes into solution. Dissolution in cold water is practically impossible. When the flocks are in contact with cold water they suffer superficial swelling quickly, but then there soon intervenes agglutination and formation of clumps, whereby the progress of dissolution is hindered.

One object of this invention is a method by which cellulose ethers made in the known manner may be converted into a form very quickly and easily soluble even in cold water and having a high apparent density. Another object of the invention are cellulose ethers obtained by the said method. For the purpose of the invention the fibrous cellulose ether mass, preferably in the moist condition, for instance containing 40–60 per cent of water, is treated between moving surfaces which are a short distance from each other and are provided with teeth or other projections. Advantageously rotating surfaces are used. The material is thus subjected to a rolling movement which may be accompanied by subdivision, so that small twisted or drilled bundles of fibres are obtained. Depending upon the kind of surfaces used for working upon the cellulose ether and their distance from each other, as well as the speed of movement, the size and form of the bundles obtained may be varied greatly. The dimensions of the bundles of fibres may be between a fraction of a millimetre and several millimetres. The individual fibres of the bundles may be somewhat agglutinated with another; it is, however, recommended to lead the rolling operation in such manner that homogeneous products are not produced. The apparent density in the dry state of the products obtained is generally between about 2.5 and 10 litres per kilo. The invention is applicable primarily for the treatment of water-soluble cellulose ethers. It may, however, be applied also to cellulose ethers which are, for example, soluble in organic solvents.

The products obtained by the method may be dried in the normal manner. When the water-soluble products are introduced into water, the mass absorbs the liquid like a sponge and within quite a short time sinks in the water. The water soaks easily into the individual fibres and within a short time a homogeneous solution is produced.

The following example illustrates the invention:

A water-soluble cellulose ether product, for example a methyl cellulose, containing 40–60 per cent of water, is treated in the form of small pieces in a device which consists of two parallel plates having riffled surfaces. One plate is stationary while the other rotates at a speed of, for example 600–1000 revolutions per minute. The distance between the plates may vary according to the size of the pieces of material fed and the desired fineness of subdivision from a fraction of a millimetre, for example 0.1 millimetre to several millimetres, for example 4 millimetres. For improving the throughput a current of air is passed between the serrated inner surfaces by means of a fan. The product may be subjected to a repeated treatment under the same conditions, whereby particularly fine particles are produced. The material is then dried in normal manner and, if desired, sifted. It dissolves very quickly in water. In similar manner a water-soluble methyl-oxyethyl cellulose, a salt of cellulose ether carboxylic acid and other water-soluble cellulose ethers may be treated.

I claim:

1. A method of converting a fibrous soluble cellulose ether into a quickly soluble form which comprises introducing the fibers between two parallel plates spaced a short distance apart and having corrugated inner surfaces, and rotating said plates relative to each other until the fibers are transformed into twisted bundles.

2. A method of converting a fibrous water-soluble cellulose ether into a quickly water-soluble form which comprises introducing the fibers between two parallel plates spaced a short distance apart and having corrugated inner surfaces, and rotating said plates relative to each other until the fibers are transformed into twisted bundles.

3. The method of claim 1 in which the fibers are introduced between the two parallel plates in the form of small pieces.

4. A method of converting a fibrous water-soluble cellulose ether into a quickly water-soluble form which comprises introducing the fibers in moist condition between two parallel plates spaced a short distance apart and having corrugated inner surfaces, and rotating said plates relative to each other until the fibers are transformed into twisted bundles.

5. The method of claim 4 in which the cellulose ether contains from 40–60% of moisture.

6. The method of claim 1 in which the surfaces of the two parallel plates are serrated.

7. A method of converting a fibrous water-soluble cellulose ether into a quickly soluble form which comprises introducing the fibers in moist condition between two parallel plates spaced a short distance apart and having serrated inner surfaces, and rotating said plates relative to each other until the fibers are transformed into twisted bundles.

8. The method of claim 7 in which the cellulose ether contains from 40–60% of moisture.

9. A method of converting a fibrous water-soluble cellulose ether selected from the group consisting of methyl cellulose, oxyethyl cellulose and methyloxyethyl cellulose into a quickly soluble form which comprises introducing the fibers in moist condition between two parallel plates spaced a short distance apart and having serrated inner surfaces, and rotating said plates relative to each other until the fibers are transformed into twisted bundles.

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