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UNITED STATES PATENT OFFICE

GEORGE ARTHUR BROWN, OF SALEM, MASSACHUSETTS, ASSIGNOR TO BENNETT, INCORPORATED, OF SALEM, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS

PROCESS OF MAKING WATERPROOF PAPER

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This invention relates to the production of waterproof paper or paperboard for practical purposes uniformly permeated with waterproofing material, and has for its object to provide a process of utilizing for such purpose wax paper clippings or waste which have heretofore been considered practically non-reclaimable.

In accordance with the process of this invention, a paper furnish comprising waste wax paper, together, if desired with sulphite fiber, mixed papers or other paper stock, is placed in the beater engine, together with sufficient water to ensure circulation of the mass. The furnish is then heated to a temperature sufficiently high to soften or melt the paraffin or other wax with which the waste paper is waterproofed, as well as to soften or melt rosin or like surface tension-reducing thermoplastic waterproofing material, such as carnauba or Montan wax, which it may be desired to incorporate additionally. The heated furnish is then beaten for a sufficient period to effect a disintegration of the paper, whereupon rosin or equivalent waterproofing material may be added thereto. A solution of sodium silicate, preferably in heated condition, is then added to the furnish and uniformly disseminated therethrough by the operation of the engine. The sodium silicate solution serves to disperse the softened or molten waterproofing material into fine, discrete particles, with the formation of only an adventitious amount of sodium resinate if rosin, or of other soap if other saponifiable waterproofing material has been added. While the wax constituent of the waxed paper in itself may be dispersed in the sodium silicate solution, yet the rosin or other waterproofing material, being of lower surface tension than the paraffin, acts to permit a fine dispersion of the wax in solution. The furnish is then preferably cooled to a temperature below the congelation point of the waterproofing material, whereupon alum or other suitable precipitant is added in sufficient amount to produce a slightly acid reaction. The alum reacts with the sodium silicate, producing a voluminous, flocculent precipitate of aluminum silicate which carries down therewith and fixes the particles of waterproofing material on the fibers. The furnish may then be sheeted into paper. The paper may be heated to a temperature above the point of fusion of the waterproofing material. This causes the particles to flow and coalesce within the paper, resulting in a product permeated with waterproofing material.

The applicability of the process of the present invention for producing a paper of high waterproofness may best be appreciated by reference to a particular example of procedure such as the following. A furnish comprising 70 parts of waste paraffin paper, together with 30 parts of other fiber, such as mixed paper or sulphite fiber, is placed in the beater engine, together with sufficient water to ensure circulation thereof. The furnish is heated to a temperature sufficiently high to soften rosin, say, about 170° F. The heated furnish is beaten for about half an hour to effect a disintegration of the paper. About 5 to 20 parts of rosin, depending upon the amount of paraffin in the paraffin paper and the character of the product which it is desired to produce, is then added and disseminated throughout the furnish. A solution of sodium silicate of about 42° Baumé, preferably heated to a temperature of about 210° F., is added in amount necessary to produce the desired dispersion, about three to four parts sodium silicate to one part of rosin being satisfactory. The silicate solution is beaten into the furnish for about half an hour, during which time a dispersion of the paraffin and rosin into fine, discrete particles is effected. After dispersion, the furnish is preferably cooled somewhat, as by the addition of water at seasonable temperature, to a temperature below the congelation point of the dispersed particles, say, to about 120° F. Alum is then added in amount to produce a slightly acid reaction, about 30% to 40% alum, based on the weight of the dry sodium silicate, producing this result. The alum reacts with the sodium silicate to produce a voluminous, flocculent precipitate of aluminum silicate, which carries down therewith and fixes the dispersed particles of waterproofing material on the fibers.

The furnish is run off on a paper machine which may be equipped at its dry end with dryers and calender rolls which are maintained at a temperature above the fusing point of the waterproofing material. Upon passing through the dry end of the machine, the particles of waterproofing material flow and coalesce within the paper, the fibers acquiring a coating thereof.

Paper thus made is uniformly permeated with waterproofing material which is present in substantially unsaponified condition. Such paper is more resistant to moisture or water than paper waterproofed by the same amount of saponified waterproofing material, such as rosin size.

The present invention thus makes possible the production of paper of commercial value from waste material heretofore considered practically valueless.

Having thus described the nature of this invention, it is evident that various changes might be resorted to without departing from the spirit or scope of invention as defined by the appended claims.

What I claim is:

1. A process which comprises disintegrating a paper furnish comprising waste wax paper, dispersing the wax constituent thereof, fixing the dispersed material thereon by a coagulum, and running off on a paper machine.

2. A process which comprises disintegrating a paper furnish comprising waste wax paper, dispersing the wax constituent thereof with sodium silicate, adding a precipitant to fix the dispersed material thereon, and running off on a paper machine.

3. A process which comprises heating and disintegrating a furnish comprising waste wax paper, dispersing the wax constituent thereof with sodium silicate, adding alum, and running off on a paper machine.

4. A process which comprises disintegrating and heating a paper furnish comprising waste wax paper to a temperature above the softening point of another waterproofing material, adding such other material, dispersing the waterproofing material, fixing the dispersed material on the fiber constituent of the furnish, and running off on a paper machine.

5. A process which comprises disintegrating and heating a paper furnish comprising waste wax paper to a temperature above the softening point of rosin, adding rosin, adding a solution of sodium silicate to effect a dispersion of the paraffin and rosin, adding a precipitant to fix the dispersed material on the fiber constituent of the furnish, and running off on a paper machine.

6. A process which comprises disintegrating and heating a paper furnish comprising waste wax paper to a temperature above the softening point of rosin, adding rosin, adding a solution of sodium silicate to effect a dispersion of the paraffin and rosin, adding alum, sheeting it into paper, and heating the paper to a temperature above the fusing point of the rosin.

7. A process which comprises disintegrating and heating a paper furnish comprising waste wax paper to about 180° F., adding rosin, adding a solution of sodium silicate to effect a dispersion of the wax and rosin, cooling it, adding sufficient alum to produce a slightly acid reaction, running off on a paper machine, and heating the paper to a temperature above the fusing point of the rosin.

8. A process which comprises disintegrating a paper furnish comprising waste wax paper, dispersing the wax constituent thereof in the presence of a coagulable dispersing agent, coagulating said agent to cause the fixation of dispersed material on the fibers, and running off on a paper machine.

In testimony whereof I have affixed my signature.

GEORGE ARTHUR BROWN.