

UNITED STATES PATENT OFFICE.

I. SMITH HYATT AND JOHN W. HYATT, OF NEWARK, N. J., ASSIGNORS TO
THE CELLULOID MANUFACTURING COMPANY, OF SAME PLACE.

IMPROVEMENT IN MANUFACTURING SOLIDIFIED COLLODION.

Specification forming part of Letters Patent No. **156,352**, dated October 27, 1874; application filed
September 8, 1874.

To all whom it may concern:

Be it known that we, I. SMITH HYATT and JOHN W. HYATT, of Newark, in the county of Essex and State of New Jersey, have invented certain Improvements in the Art of Manufacturing Solidified Collodion, of which the following is a specification:

The object of our invention is to overcome certain objections which are involved in the use of liquid solvents as ordinarily employed in the manufacture of solidified collodion. Heretofore liquid solvents have been used in dissolving pyroxyline by first preparing the solvent—for instance, ether and alcohol, nitro-benzole, &c.—and then saturating the pyroxyline with the solvents. When the pyroxyline and such solvents are brought into contact the transforming action of the solvent upon the pyroxyline commences at once, so that the portions of the pyroxyline first exposed to the action of the solvent become first dissolved, and absorb an excess of the solvent during the mixing process and before the conversion of the entire mass of pyroxyline has taken place, thereby involving a waste of the solvent, and an increased expense of time and labor in the manufacture of large masses of the solidified product. This excess of solvent renders the compound soft, and the excess must be separated from the mass by evaporation or otherwise before a solid and useful product can be obtained. We have overcome these objections by certain processes, for which we have obtained two several Letters Patent.

The first method is that described in Letters Patent No. 91,341, issued to us June 15, 1869; and consists in using the smallest practical proportion of a liquid solvent, and bringing it into contact with every part of the pyroxyline by heavy pressure, securing thereby cheaper and better results than had been heretofore described.

The second method is that described in our reissued Letters Patent No. 5,928, dated June 23, 1874, in which a solid solvent is used, which is latent at ordinary temperature, but which becomes active by the application of heat, this method permitting a mechanical mixture with the pyroxyline of the solvent in the precise

proportions required to produce a solid result, the solvent remaining latent or inactive to suit the convenience of the operator, but becoming active when required by the application of heat and pressure.

Our present improvement consists in transforming pyroxyline into solidified collodion or "celluloid," (see trade-mark No. 1,102, registered January 14, 1873,) by using a liquid instead of a solid solvent, which liquid solvent, like the solid, is latent at ordinary temperatures, but becomes active and dissolves the pyroxyline upon the application of heat.

The following is a description of our improved process: We make a weak solution of camphor in alcohol, the proportions being, by weight, one part of camphor to eight parts of alcohol. This solution of camphor is not a solvent of pyroxyline at ordinary temperatures, and we therefore term it a latent liquid solvent, but it becomes an active solvent at an elevated temperature. There being differences, however, in the solubility of different grades of pyroxyline, a corresponding change in the strength of the solution of camphor becomes necessary, which may readily be determined by experiment.

In using this latent liquid solvent we first reduce the pyroxyline to a pulp, and mix therewith such coloring or other matter, if any, as are suitable to the required character of the product. The aqueous moisture is then expelled from the pulp in any suitable manner, preferably by the process described in our Letters Patent No. 133,229, issued November 19, 1872. We then add to the dried pyroxyline or pyroxyline compound the above-described latent liquid solvent in about the proportions, by weight, of fifty parts of the solvent to one hundred parts of the pyroxyline. The solvent is stirred into the pulp, and the whole kept in a closed vessel until the solvent becomes evenly diffused throughout the mass, no solvent action taking place to retard or prevent this even diffusion, as would be the case in the use of solvents that are active at ordinary temperatures. The compound is then subjected to heat and pressure in a similar manner to that employed when using the solid solvents, de-

scribed in our aforesaid reissued Letters Patent No. 5,928.

Any liquid solvent of pyroxyline that is latent at an ordinary temperature, and that becomes active at a higher temperature, can be used as a substitute for camphor and alcohol in our improved process. The latent solvent may be combined with the pyroxyline without first reducing the pyroxyline to a pulp. In doing so, we add the latent solvent to the pyroxyline, and after allowing it to become diffused, preferably in a closed vessel, we develop the latent solvent, and complete the transformation of the pyroxyline, either in heated molds under pressure, as in the previously-described process, or by passing the compound through heated rollers, in the latter case the heat developing the activity of the solvent, and the rollers compacting the compound. The coloring or other matter may also be added while the material is being masticated between the rollers, care being had to continue this masticating process until the component parts of the compound are thoroughly and evenly diffused throughout the mass.

The solvent and pyroxyline may also be mixed and the compound subjected to heat in

any other suitable manner than those above described. Furthermore, the subjecting of the compound to pressure during the transforming or converting process is not essential in the working of our process, although the manufacture of the completed product is facilitated and the cost thereof lessened by the combined action of heat and pressure, as hereinbefore described.

What we claim as our invention is—

1. The process herein described of manufacturing solidified collodion by mixing pyroxyline with a latent liquid solvent, which becomes active only upon the application of heat, as and for the purposes set forth.

2. In the manufacture of solidified collodion, the process of making a homogeneous mass by mixing pyroxyline with one (1) part of camphor and eight (8) parts of alcohol, which forms a solvent that will remain latent at ordinary temperatures, and becomes active upon the application of heat, substantially as described.

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Witnesses:

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