

UNITED STATES PATENT OFFICE.

ROBERT GROPPNER, OF BERLIN, GERMANY.

PROCESS OF SOLIDIFYING FORMALDEHYDE.

SPECIFICATION forming part of Letters Patent No. 705,667, dated July 29, 1902.

Application filed August 9, 1901. Serial No. 75,358. (No specimens.)

To all whom it may concern:

Be it known that I, ROBERT GROPPNER, doctor of philosophy, a subject of the German Emperor, residing at 7 Motzstrasse, in the city of Berlin, Kingdom of Prussia, and German Empire, have invented a certain new and useful Process of Solidifying Formaldehyde, of which the following is a specification.

Formaldehyde is extensively used for disinfecting and other technical purposes, both in its original gaseous state and in a forty-per-cent. solution. Pure formaldehyde has been solidified by converting it into its polymeric modification; but it has been impossible heretofore to solidify the aqueous solution in which the formaldehyde is contained as such in its monomolecular and not in its polymerized state. It is well known that in its polymerized modification formaldehyde has lost its antiseptic properties, which it only recovers when heated to a temperature of one hundred and fifty degrees (150°) centigrade. The solidified solution of formaldehyde offers various advantages as compared with the forty-per-cent. solution as ordinarily employed, inasmuch as it is easily administered—for instance, in the form of tablets, lozenges, and the like, and in that shape it is very easy of application.

Formaldehyde has the property of liquefying rather considerable quantities of potassium soap, while, on the other hand, when treated with sodium soaps the formaldehyde, as I have found, will solidify. I am aware that very small quantities of a solution of formaldehyde have already been combined with very large quantities of sodium soap for the treatment of diseases of the skin—for instance, where a preparation consisting of a sodium soap with an addition of five per cent. (5%) of a solution of formaldehyde is employed; but this is entirely different from my invention, inasmuch as in this preparation only small quantities of formaldehyde are used and a solidifying action of the constituents is not produced. In my invention, on the contrary, very large quantities of a solution of formaldehyde are treated with small quantities of sodium soap and are thereby converted into the solid state. Very small quantities of sodium soap are already sufficient for solidifying a solution of formalde-

hyde. Ordinary sodium soap—cocoanut-oil sodium soap, for instance—on being treated with three parts of water yields a frothy liquid and, at best, jelly-like mass. By substituting, however, three parts of a thirty-five to forty per cent. solution of formaldehyde for the water formaldehyde yields a solid plastic mass. Still better results are obtained if perfectly dry sodium soap is used. I have found sodium stearate to be especially useful in effecting the solidification of formaldehyde solution. Thus two parts of sodium stearate will, for instance, suffice for solidifying one hundred parts of a forty-per-cent. solution of formaldehyde.

For carrying out my invention the necessary amount of ordinary and preferably dried neutral or acid sodium soap, the quantity of which corresponds to the degree of firmness it is desired to produce, is dissolved in the corresponding amount of an aqueous solution of formaldehyde with the aid of a reflux condenser. When cool, the mass solidifies. If stearic-acid soap is to be used for effecting the solidification of formaldehyde, I employ molten stearic acid free from lime, to which I add as much concentrated solution of sodium hydrate or dry carbonate of soda as is necessary for saponification. After the constituents have been combined the necessary amount of formaldehyde solution is added to the mass. I may also modify the process for effecting the solidification of solutions of formaldehyde, so as to add anhydrous formaldehyde to a solution of sodium soap in the required amount of water, or I may add solution of sodium hydrate or dry caustic soda or sodium carbonate and the necessary amount of fatty acids for neutralization of the alkali to the solution of formaldehyde. In all these cases the amount of soap added is governed by the hardness it is desired to impart to the solution of formaldehyde. This solidified solution of formaldehyde may assume any desired shape. It may be made into tablets, rods, bougies, and the like, and odorous or disinfecting principles may also be incorporated with this new preparation.

If for some purposes it is desired to reduce the consistence and soften the solidified solution of formaldehyde as produced according to my invention, this is best effected by add-

ing a corresponding amount of potassium soap to the sodium soap employed for solidification, or a corresponding amount of caustic potash or carbonate of potash is added to the
5 caustic soda or sodium carbonate in the saponification process.

What I claim, and desire to secure by Letters Patent of the United States, is—

10 The process for the manufacture of solidified solutions of formaldehyde which consists in mixing small quantities of sodium soap

with an aqueous solution of formaldehyde and dissolving the soap in the formaldehyde solution with the application of a gentle heat.

In witness whereof I have hereunto signed 15 my name, this 28th day of July, 1901, in the presence of two subscribing witnesses.

ROBERT GROPPLER.

Witnesses:

PAUL HORLITZ,
ARTHUR QUOSIGK.