UNITED STATES PATENT OFFICE.

ISRAEL ROOS, OF FRANKFORT-ON-THE-MAIN, GERMANY.

PROCESS OF MAKING SALTS OF PARAMIDOPHENOL.

SPECIFICATION forming part of Letters Patent No. 602,109, dated April 12, 1898.

Application filed June 19, 1895. Serial No. 553,297. (Specimens.) Patented in England June 8, 1895, No. 11,288; in Belgium June 10, 1895, No. 116,014; in Austria June 10, 1895, No. 45/3,366; in France June 11, 1895, No. 248,069, and in Hungary June 14, 1895, No. 4,805.

To all whom it may concern:

Be it known that I, ISRAEL ROOS, chemist, a subject of the German Emperor, residing at Frankfort-on-the-Main, in the Kingdom of Prussia and German Empire, have invented certain new and useful Improvements in the Manufacture of Citrates, Tartrates, and Amygdalates of Paranisidin and Paraphenetidin; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to the manufacture of salts formed by the action of citric acid upon the alkyl ether of paramidophenol, and particularly with paraphenetidin and paranisidin.

For this process a patent has been granted in England, No. 11,288, dated June 8, 1895; in Belgium, No. 116,014, dated June 10, 1895; in France, No. 248,069, dated June 11, 1895; in Hungary, No. 4,805, dated June 14, 1895, and in Austria, No. 45/3,366, dated June 10, 1895.

The new salts are obtained by bringing together one molecule of citric acid and one molecule of amidophenol ether in an appropriate solvent like alcohol.

The reaction which takes place is explained by the following equation:

$$C_6H_8O_7 + NH_2C_6H_4O\ \text{alkyl} = C_6H_8O_7.NH_2C_6H_4O\ \text{alkyl}.$$

Citric acid. Amidophenol ether. Citrate of amidophenol ether.

An excess of the base does not alter the reaction, as it will remain in the solvent. The salts thus formed, which may be called "primary citrates of amidophenol ether," having the general formula $C_6H_8O_7.NH_2C_6H_4O$ alkyl, are new and not identical with other already-known compounds which are obtained by heating citric acid with amidophenol ethers. These latter compounds, the constitution of which is expressed by the equation

$$C_6H_8O_7 + NH_2C_6H_4O\ \text{alkyl} = C_6H_7O_6.NHC_6H_4O\ \text{alkyl} + H_2O,$$

Citric acid. Amidophenol ether. Citryl amidophenol ether.

are not salts, but amid-like bodies. One of these amid-like compounds formed by heating citric acid with phenetidin is apolysin, the composition of which corresponds to the formula

$$C_6H_7O_6{=}NHC_6H_4OC_2H_5.$$

By heating citric acid (one molecule) and amidophenol ethyl ether (one molecule) water splits off and apolysin is obtained; but by mixing the said components in a solvent a salt is obtained, which is the object of this application, and this salt is already on the market as citrophen.

The citrate of paraphenetidin ($C_6H_8O_7.NH_2C_6H_4OC_2H_5$) is, for instance, obtained in the following manner: Equivalent quantities of citric acid and paraphenetidin are brought together in alcoholic solution. The mixture forms crystals in a short time, which may be washed with alcohol. The crystals are white prisms without smell and taste a little of citric acid. They are very soluble in water and less so in alcohol. They have a melting-point of 186° centigrade. The citrate of paranisidin ($C_6H_8O_7.NH_2C_6H_4OCH_3$) may be obtained in a similar manner. The melting-point of this latter salt is 186° centigrade.

All citrates of alkyl ethers of paramidophenols are decomposed at a low temperature by the action of alkalies, the components citric alkali and alkyl ethers of paramidophenol being reproduced. All these citrates are very soluble in water, less so in alcohol, and are very nearly insoluble in petroleum ether and in benzene.

The citrates of amidophenol alkyl ester are employed in cases of rheumatic and feverish illnesses at doses from 0.6 to two grains per diem.

Having now described my invention, what I claim is—

1. Process for the manufacture of primary citrates of alkyl ethers of paramidophenols, which consists in dissolving molecular quantities of citric acid and amidophenol alkyl ether in a suitable solvent, such as alcohol and crystallizing out the salt thus obtained, substantially as described.

2. As new products of manufacture, the primary salts of citric acid with alkyl ethers

of paramidophenol composed according to the formula

$$C_6H_8O_7.NH_2C_6H_4O \text{ alkyl},$$

being white crystallizing compounds, melting at 186° to 187° centigrade, easily soluble in water, less soluble in alcohol and almost insoluble in petroleum ether and benzene.

In testimony whereof I have affixed my signature in presence of two witnesses.

ISRAEL ROOS.

Witnesses:
JEAN GRUND,
FRANK H. MASON.