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# UNITED STATES PATENT OFFICE.

KUNO WOLF, OF BERLIN, AND EGON LANGSTEIN, OF BAD OLDESLOE, NEAR HAMBURG, GERMANY, ASSIGNORS, BY MESNE ASSIGNMENTS, TO AMERICAN ELECTRO-OSMOSIS CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

## PROCESS FOR THE ELECTROOSMOTIC PURIFICATION OF SACCHARINE JUICES.

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*To all whom it may concern:*

Be it known that we, KUNO WOLF, a subject of Holland, and EGON LANGSTEIN, a citizen of Czechoslovakia, residing in Berlin, Germany, and Bad Oldesloe, near Hamburg, Germany, respectively, have invented new and useful Improvements in Processes for the Electroosmotic Purification of Saccharine Juices, of which the following is a specification.

The invention relates to improvements in processes and apparatus for purifying saccharine juices, sugar syrups, etc., electro-osmotically and consists in submitting the juice to the action of a direct electric current between diaphragms which divide the electro-osmotic cell into three compartments, with the material to be treated in the middle compartment and the electrodes in the end compartments whereby the diaphragms separate the material to be treated from the electrodes. The practical application of this process, however, involves a number of difficulties, particularly in the selection of the diaphragms. On the one hand, there often occurs an undesirable dilution of the solution contained in the middle compartment due to cathodic or anodic migration of water. On the other hand, both on account of the dimensions of the pores and the electric charge of the diaphragms used, losses of valuable substances occur owing to their migration from the middle compartment to the side chambers. In the electro-osmotic purification of saccharine juices there is also the additional practical difficulty that the formation of invert-sugar can only be avoided by keeping the juice neutral or slightly alkaline. The latter consideration is closely connected with the choice of the diaphragms for use in the process.

It is impracticable to select quite empirically from the large number of combinations of diaphragms that combination which is most suitable for the process in question.

Further and more specific objects, features and advantages will more clearly appear from the following description taken in connection with the accompanying drawing which forms a part of this specification. The drawing is a vertical section through an electro-osmotic cell adapted for carrying out the invention.

Referring to the drawing 1 represents a suitable container divided into three compartments 2, 3 and 4 by semi-permeable diaphragms 5 and 6. In the compartment 2 is placed an anode 7 and in the compartment 4 is placed a cathode 8 while the juice or solution to be purified is placed in the middle compartment 3. Suitable electrolyte such as ordinary water or water with a small amount of electrolyte is placed in the electrode compartments 2 and 4. Upon passage of a suitable electric current between the electrodes, impurities are carried from the juice or solution in the middle compartment to the electrodes in the electrode compartments.

By the present invention in its preferred form, saccharine juices can be electro-osmotically purified in a manner which fulfills practical requirements and is free from the above-mentioned defects, by using an anodic diaphragm of impregnated quinone-tanned leather, and a cathodic diaphragm of closely woven sail-cloth.

The quinone-tanned leather diaphragm according to the invention may be prepared as follows:—

Hides which have been cleaned and delimed are placed in a rotary tanning cask about one-third full of an aqueous solution of quinone of about 0.4 per cent strength. The cask is rotated for about 2–4 hours when the thorough impregnation is generally completed, and a section of the leather should be dark-violet. Finally, the leather is thoroughly washed. Before use as diaphragm, the leather is immersed in boiling water for at least 1 hour, in order to promote shrinking so that the pores may be reduced to the requisite size.

While we have described our invention in detail and with respect to preferred forms, we do not desire to be limited to such details or forms since many changes and modifications may be made and the improvements embodied in widely different forms without departing from the spirit and scope of the invention in its broader aspects. Hence we desire to cover all modifications and forms coming within the language and scope of any one or more of the appended claims.

What we claim as new and desire to secure by Letters Patent, is:

1. The process of purifying saccharine juices which consists in submitting an aque-

ous solution thereof to the action of an electric current with the solution separated from the electrodes by semi-permeable diaphragms, the anodic diaphragm being leather impregnated with quinone and the cathodic diaphragm being sail cloth.

2. An electro-osmotic cell having an anode compartment and a cathode compartment and an intermediate compartment for the material to be treated, the intermediate compartment being separated from the electrode compartments by semi-permeable diaphragms, with the anodic diaphragm composed of leather impregnated with quinone.

3. An electro-osmotic cell having an anode compartment and a cathode compartment and an intermediate compartment for the material to be treated, the intermediate compartment being separated from the electrode compartments by semi-permeable diaphragms, with the anodic diaphragm composed of leather impregnated with quinone, and the cathodic diaphragm composed of closely woven sail cloth.

In testimony whereof we affix our signatures.

DR. ING. KUNO WOLF.
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