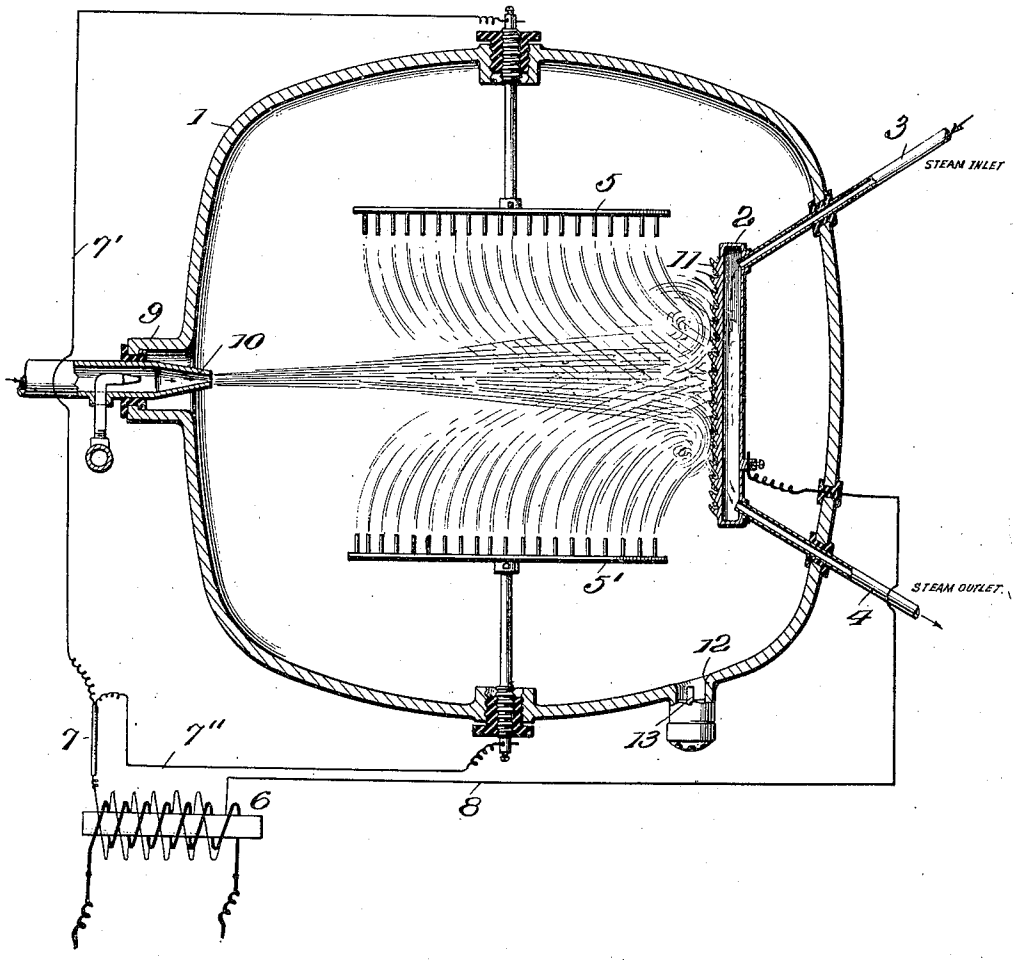
T. B. WALKER.

PROCESS OF HYDROGENATING FATS, OILS, AND WAXES.

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1,123,962. Patented Jan. 5, 1915.



Inventor

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UNITED STATES PATENT OFFICE.

THOMAS BAILEY WALKER, OF AUSTIN, TEXAS.

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Application filed May 22, 1913. Serial No. 769,290.

To all whom it may concern:

Be it known that I, THOMAS BAILEY WALKER, of Austin, Texas, have invented a new and useful Improvement in Processes of Hydrogenating Fats, Oils, and Waxes, which improvement is fully set forth in the following specification.

This invention relates to the conversion of oils, fats, waxes and similar substances into products having higher melting points, by converting the unsaturated fatty acids thereof (or their esters) into saturated bodies, such conversion of these substances being brought about through the addition of hydrogen in the presence of a suitable catalyzing agent, such as a metal in a finely divided state.

Broadly stated, my invention consists in subjecting the fats, oils, waxes or other substances to the simultaneous action of heat, hydrogen and a catalyzing agent, in the presence of an electrical discharge.

In carrying out my invention, I inclose in a suitable tank or receptacle a metallic plate provided with means for heating the same, which plate constitutes one of a pair of opposing electrodes, and upon one face of this plate I support, in any suitable manner, the catalyzing agent, preferably in the form of a finely divided metal, such as nickel or nickel oxid. Within the same receptacle, I mount the other member of the opposing electrodes, preferably forming this second member of the electrode as a compound member, as hereinafter described. I then project, in the form of a finely divided spray, the oil or fat or other substance to be treated, and simultaneously project against said plate a current or stream of hydrogen. If desired, the oil, fat or other substance may be projected against the plate, together with the hydrogen, or may be carried against the plate by the action of the stream of hydrogen itself. During the time that the oil or fat and the hydrogen are being projected against the face of the heated plate supporting the catalyzing agent, an electrical discharge is maintained between the compound electrode member and the plate constituting the opposing electrode, the desired hydrogenated oil or fat falling into the receptacle. Means are provided such as a pressure relief valve, which automatically opens at any desired pressure to permit the hydrogenated product to flow from the receptacle, and at the same time prevent the over-accumulation of pressure therein.

The inventive idea involved is capable of being carried out with a variety of forms of apparatus, one of which, for the purpose of illustrating the invention, is shown diagrammatically in the accompanying drawings, but it is to be expressly understood that the process is capable of being practised with other forms of apparatus, and is not limited to the particular form chosen for illustration, the limits of the invention being defined in the appended claims.

Referring to the drawing, which is a diagrammatic view, 1 is any suitable tank or receptacle, and 2 a hollow, metallic plate provided with an inlet pipe 3, and an outlet pipe 4, for the inlet and outlet of a suitable heating fluid, such as superheated steam. This plate 2 may be supported in any suitable way within the receptacle 1, and preferably insulated therefrom. 5, 5′, together constitute a compound terminal electrode opposing the electrode 2.

6 is any suitable source of high-tension electrical current, one of the leads 7 from which is divided into the branches 7′ and 7″, one of which branches leads to the member 5, and the other branch to the member 5′ of the compound electrode. 8 is a corresponding lead between the opposite terminal of the source of electrical energy, connecting said source to the electrode 2.

At a point 9 in the walls of the receptacle 1, I mount a suitable injector 10, by means of which I inject the hydrogen and the oil, fat or other substance to be treated, simultaneously and under high pressure, so that the same impinge simultaneously against the face of the plate 2, upon which face there is supported, in any suitable manner, a mass or layer of the finely divided catalyzing agent, such as metallic nickel or nickel oxid. This catalyzing agent may be supported upon the face of the plate 2 in any suitable or desired manner. One convenient way of thus supporting the catalyzing agent consists in forming the face of the plate with channels or corrugations filled with finely divided catalyzing agent. Or, with some forms of catalyzing agent, such as finely divided iron or nickel, the agent may be supported upon the face of the plate by magnetic action.

The apparatus being constructed as de-

scribed, high-tension electrical discharge passes from one member of the electrode to the other, through the space intervening between the electrodes and the finely divided fats, oils or other substance under treatment, together with the hydrogen being projected against the plate, and reaction results through the combined action of the electrical discharge and the catalyzing agent.

As thus far described, pressure within the receptacle 1 would mount up in the receptacle 1, as the result of the injection of the oils under treatment and the hydrogen, and for the purpose of limiting the degree of pressure within such receptacle, and for drawing off the product resulting from the process, I provide a discharge opening 12 at the bottom of the vessel, and mount therein a relief valve 13, of any suitable or ordinary construction, adjusted to open at a predetermined pressure, and permit the product to flow out, and at the same time relieve the pressure within the receptacle.

By this process, I am enabled to secure the hydrogenation of the oils, fats, waxes or other substances under treatment, in a most thorough and efficient manner, and at a minimum cost. A further advantage of very great importance in the art results from the fact that by my process, I am enabled to secure the hydrogenation of the fats, oils or waxes without the injurious results which would follow from subjecting the same to the extended application of heat. Instead of supporting the catalytic agent upon the heated plate, I may inject the same by means of the current of hydrogen against the heated plate.

What is claimed is:—

1. The process of hydrogenating fatty acids and their compounds, consisting in subjecting said body or bodies in a comminuted condition to the action of hydrogen gas and a catalytic body while in presence of heat and an electric discharge.

2. The process of hydrogenating fatty acids and their compounds, consisting in subjecting said body or bodies in a comminuted condition to the action of hydrogen gas under superatmospheric pressure and a catalytic body while in presence of heat and an electric discharge.

3. The process of hydrogenating fatty acids and their compounds, consisting in subjecting said body or bodies in a comminuted condition to the action of hydrogen gas under superatmospheric pressure and finely divided metal while in presence of heat and an electric discharge.

4. The process of hydrogenating fatty acids and their compounds, consisting in discharging said body or bodies in a spray against a body of catalytic material in presence of hydrogen gas and an electric discharge.

5. The process of hydrogenating fatty acids and their compounds, consisting in discharging said body or bodies in a spray with hydrogen gas against a heated body of catalytic material in presence of an electric discharge.

6. The process of hydrogenating fatty acids and their compounds, consisting in discharging said body or bodies in a spray with hydrogen gas against a body of catalytic material in presence of an electric discharge between said catalytic body and an electrode.

7. The process of hydrogenating fatty acids and their compounds, consisting in introducing under pressure said body or bodies in a finely divided condition into a closed receptacle in presence of hydrogen gas and simultaneously subjecting the mixture to the action of heat, a catalytic agent and an electric discharge.

8. A process of hydrogenating fatty acids and their compounds, consisting in subjecting said body or bodies in a finely divided state to the action of a magnetic catalytic agent magnetically supported on a plate in presence of hydrogen gas and an electric discharge.

9. In a process of hydrogenating fatty acids and their compounds, the step consisting in subjecting said body or bodies in a finely divided state to a magnetic catalytic agent supported magnetically on a plate.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

THOMAS BAILEY WALKER.

Witnesses:

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