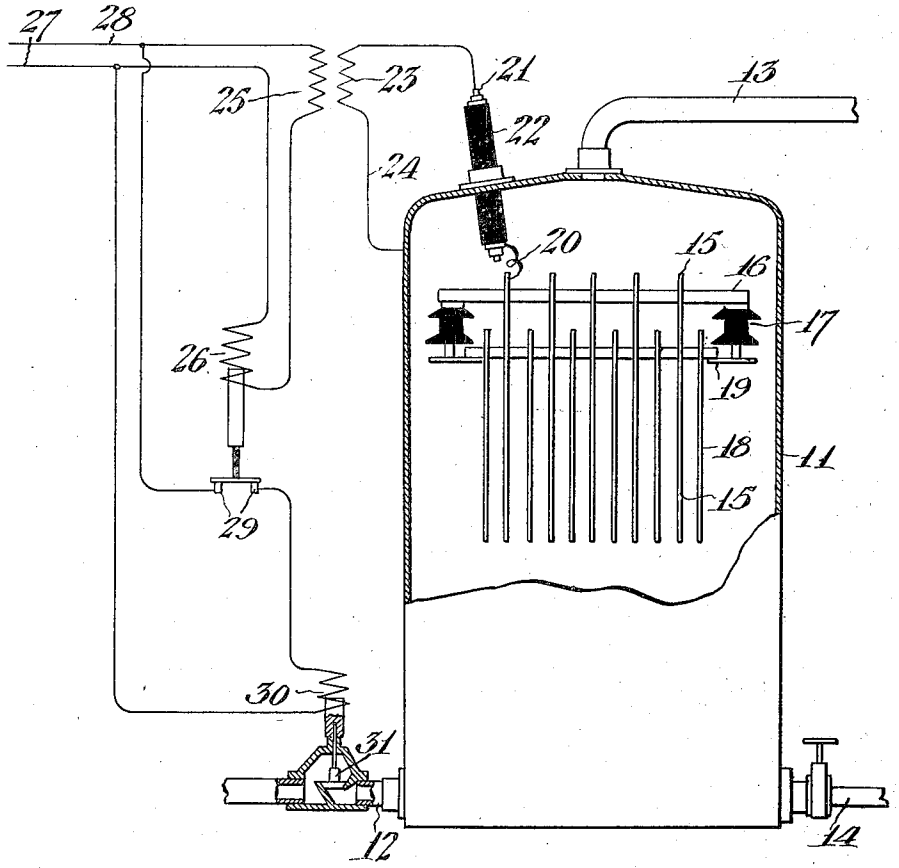
F. W. HARRIS.

METHOD OF AUTOMATIC DEHYDRATION.

APPLICATION FILED MAY 31, 1921.

1,430,302. Patented Sept. 26, 1922.



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UNITED STATES PATENT OFFICE.

FORD W. HARRIS, OF LOS ANGELES, CALIFORNIA, ASSIGNOR TO PETROLEUM RECTIFYING COMPANY, A CORPORATION OF CALIFORNIA.

METHOD OF AUTOMATIC DEHYDRATION.

Application filed May 31, 1921. Serial No. 473,875.

To all whom it may concern:

Be it known that I, FORD W. HARRIS, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Improvement Comprising a Method of Automatic Dehydration, of which the following is a specification.

My invention relates to dehydrators in which electricity is used for the purpose of causing the fine water globules to agglomerate into larger masses, which will settle out under the action of gravity. It is a well-known fact that when petroleum emulsions are subjected to an electrical potential that the fine water particles contained therein are in some manner brought together to form larger masses which can then be removed by allowing the mixture to stand until the water settles out. I have found that it is possible to dehydrate these emulsions by passing them through a large tank in which electrodes are suspended, the agglomeration and settling taking place simultaneously. I have found however that in such case the capacity of the water to settle determines the capacity of the apparatus and that if the rate of flow through the tank is made too great, the water does not have time to settle out and excessive currents flow between the electrodes, due to the presence of large water globules between the electrodes, with the result that the efficiency of the apparatus is greatly reduced.

It is the object of the present invention to provide automatic means for regulating the rate of flow so that the water will have time to settle, thus preventing the accumulation of free water masses between the electrodes. Further objects and advantages will be set forth hereinafter.

Referring to the drawing which is for illustrative purposes only, I show a dehydrator partly in section, together with the electrical apparatus necessary for its operation. In this drawing a tank 11 is provided with an emulsion inlet pipe 12 and clean oil outlet pipe 13 and a water outlet pipe 14. A series of plates forming live electrodes 15 are suspended on pipes 16, which in turn are carried on insulators 17, secured in the tank 11. These live electrodes hang between grounded electrodes 18, which are suspended on pipe supports 19, connected directly to the tank 11. The electrodes 15 are considerably narrower than the electrodes 18 so that clearance is provided between their edges and the pipe supports 19.

The particular type of dehydrator described forms no part of the present invention, which is applicable to any type of electrical dehydrator.

Current is supplied to the electrodes through a flexible wire 20 connected to a conductor 21 passing through an insulator 22 in the top of the tank, the conductor 21 being connected to one side of the high tension secondary 23, the other terminal of which is connected through a wire 24 to the tank 11. The secondary 23 is energized by a low tension primary 25, which is connected through a relay 26 with a supply main 27, the other terminal of the primary 25 being connected to a supply main 28. The contacts 29 of the relay 26 are connected in series with an operating coil 30 of the electrically operated valve 31, this coil being connected across the lines 27 and 28, in series with the contacts 29. The electrically operated valve 31 is in the supply pipe 12 and is arranged to be closed by gravity, being opened whenever the coil 30 is energized.

The method of operation is as follows:

The tank 11 being filled with wet emulsion, current is applied to the lines 27 and 28, thus energizing the secondary 23 and imposing a potential difference of say ten thousand bolts between the electrodes 15 and 18. This results in an agglomeration of the fine water particles in the emulsion which settle out into the bottom of the tank 11, from which they may be withdrawn through the pipe 14. With the tank 11 full of wet emulsion, the current flow between the electrodes 15 and 18 is sufficient to operate the relay 26, pulling the core thereof upwardly and opening the circuit between the contacts 29. This opens the circuit through the coil 30 of the electrically operated valve 31, with the result that this valve closes under the action of gravity, thus shutting off any flow of oil in the tank 11. Wet emulsion is of course supplied under constant pressure to the pipe 12, so that whenever this valve opens emulsion will flow into the tank. Whenever the amount of water in the oil between the electrodes 15 and 18 falls below a certain amount, the current flowing

through the coil 26 of the relay will fall to a sufficient amount to allow the core of the relay to fall, thus establishing a circuit across the contacts 29 and through the coil 30, which opens the valve 31. Emulsion will then flow into the tank 11 until the current rises to a sufficient amount to again actuate the relay 26.

It will be seen therefore that the amount of moisture in the oil regulates the rate of flow of fresh emulsion into the tank, the flow being shut off whenever the amount of water becomes too great between the electrodes 15 and 18 and being opened whenever this current falls. In the event that for any reason the current supply is interrupted, as sometimes occurs in large power systems, the potential across the wires 27 and 28 is insufficient to hold the valve 31 open so that it closes and shuts off the supply of oil until the current supply comes on again.

I claim as my invention:

1. A dehydrator comprising a tank: electrodes in said tank; wires supplying electric current to said electrodes; an inlet pipe supplying oil to said tank; a valve in said inlet pipe; and means for closing said valve upon failure of the current supply.

2. A dehydrator comprising a tank: electrodes in said tank; wires supplying electric current to said electrodes; an inlet pipe supplying oil to said tank; a valve in said inlet pipe; and means for closing said valve whenever the current flowing in said wires exceeds a predetermined value.

3. A dehydrator comprising a tank: electrodes in said tank; wires supplying electric current to said electrodes; an inlet pipe supplying oil to said tank; a valve in said inlet pipe; a relay connected in series with one of said wires; and means by which an excessive current in said relay closes said valve.

4. The method of controlling the percentage of water in an emulsion emerging from an electrical dehydrator which comprises reducing the flow of emulsion into said dehydrator as the current taken by said dehydrator increases.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 25th day of May, 1921.

FORD W. HARRIS.