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ELECTRIC SEPARATION OF EMULSIONS

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Fig. 1

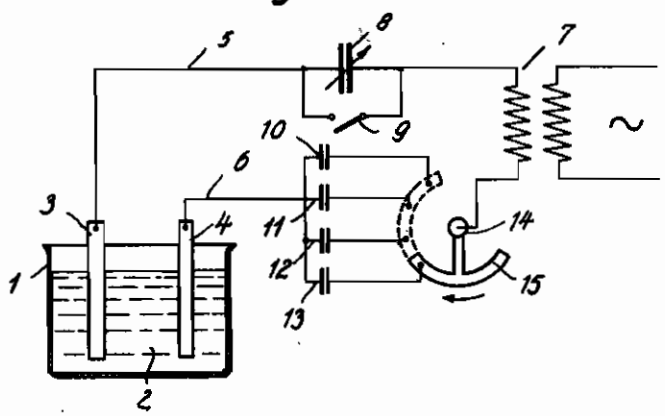
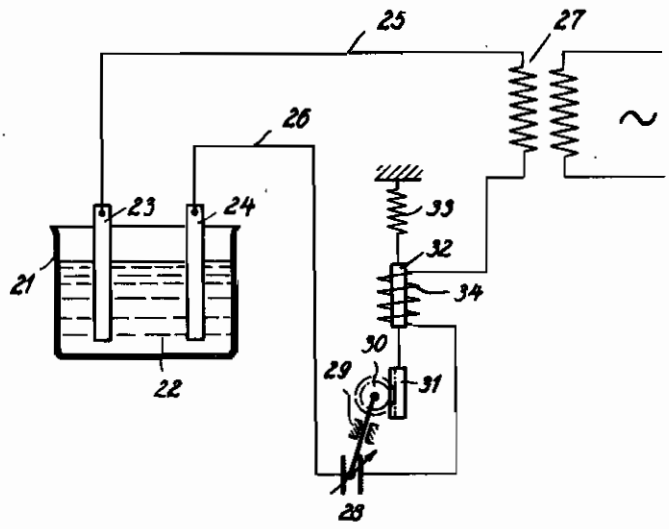


Fig. 2



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ELECTRIC SEPARATION OF EMULSIONS

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The present invention relates to the separation of emulsions and the like by means of an electric current.

It is known to separate emulsions and the like, for instance, an emulsion of oil and water by the electrical treatment by suspending in the container for the separation of emulsions metallic electrodes which are particularly supplied with high-voltage alternating or three-phase current. The known method presents the drawback that during the treatment the intensities of current are extremely high with respect to the consumption of energy in the case of a great water content of the emulsions. In the case of a high initial water content of the emulsions it has therefore already been proposed to keep the intensity of current small by employing, for instance, metallic electrodes insulated by glass. It is true that in this manner a small intensity of current may be sufficient at the beginning of the electrical treatment; however, in the case of a small capacity of the electrodes the intensity of current decreases during the treatment in accordance with increasing dehydration. In the following is shown how these difficulties may be removed when separating emulsions by the electrical method.

According to the invention the electrical separation of the emulsions is carried out in the manner that in the current supply conductor leading to the preferably metallic electrodes are inserted one or more capacitors having a continuously or gradually regulable capacity which is gradually increased or short-circuited with increasing dehydration of the emulsions. It is thus possible with increasing dehydration of the emulsions to gradually increase the capacity or to completely short-circuit it so that an economical operation of the separation plant may be effected with an approximately uniform intensity of current. Under circumstances the arrangement can be designed in such a manner that the capacities of the capacitors are gradually increased or completely short-circuited automatically in accordance with the variation of the intensity of current. In the case of the above-mentioned method the capacitors are preferably inserted in the supply conductors leading to the electrodes preferably outside the container for the separation of the emulsions.

In the majority of cases it might be sufficient to insert capacitors in the supply conductor leading to either electrode or to a pair of electrodes. In some cases, particularly with emulsions having a high water content or when using three-phase current it may also be preferable to insert regulable capacitors in the conductors leading to all electrodes. In all cases it is finally possible to design the arrangement in such a manner that the capacitors are controlled in the container automatically in accordance with the variation of the intensity of current, thus rendering the method according to the invention particularly simple.

In the accompanying drawings are shown two embodiments according to the invention. In Fig. 1, 1 denotes a tank in which is contained the emulsion 2 to be separated, for instance, an emulsion of oil and water. The emulsion is separated by means of two electrodes 3 and 4 arranged in the tank 1 and which are connected to the secondary winding of the transformer 7 through conductors 5 and 6, the transformer being supplied with energy from an alternating-current supply circuit. In the conductor 5 is inserted a variable capacitor which may under circumstances be also short-circuited by means of a switch 9. By such an arrangement the current supply to the electrodes placed in the tank may therefore be controlled in the desired manner in accordance with increasing dehydration of the emulsion. In the conductor 6 are inserted the four capacitors 10, 11, 12, 13 connected in parallel relation to each other. Furthermore, a rotary contact device 15 mounted on the shaft 14 is provided, by means of which device the four capacitors 10 to 13 may be switched in or out of the circuit one after the other. By such an arrangement also the current supply to the electrodes in the tank may be effected in the desired manner. Instead of four capacitors also a greater number of capacitors may naturally be provided.

In Fig. 2 is shown an embodiment of a device by which the capacity is automatically controlled in accordance with the intensity of current. 21 is a tank with the emulsion 22 to be separated and in which are provided the electrodes 23 and 24. The two electrodes are connected through the conductors 25, 26 to the secondary winding of the transformer 27 energized by the alternating-current supply circuit. In the conductor 26 is inserted a variable capacitor 28 which is controlled by means of a rotatably mounted shaft 29. A gear 30 mounted on the shaft 29 and meshing with the rack 31 serves to control the variable capacitor 28. The rack 31 is secured to the lower end of an iron core 32 which is suspended by means of a spiral spring 33. The iron core 32 may be displaced within the current coil 34 in the axial direction which is inserted in the conductor 26. In accordance with the variations of the intensity of the current flowing through the coil 34 the iron core 32 is more or less drawn into the coil 34 thus moving the rack 31 in the upward or downward direction thereby controlling the variable capacitor 28 in the desired manner automatically in accordance with the intensity of the current feeding the electrodes 23, 24.

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