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2,181,484

ELECTRIC HEATING ELEMENT

Original Filed Dec. 26, 1935

FIG. 1.

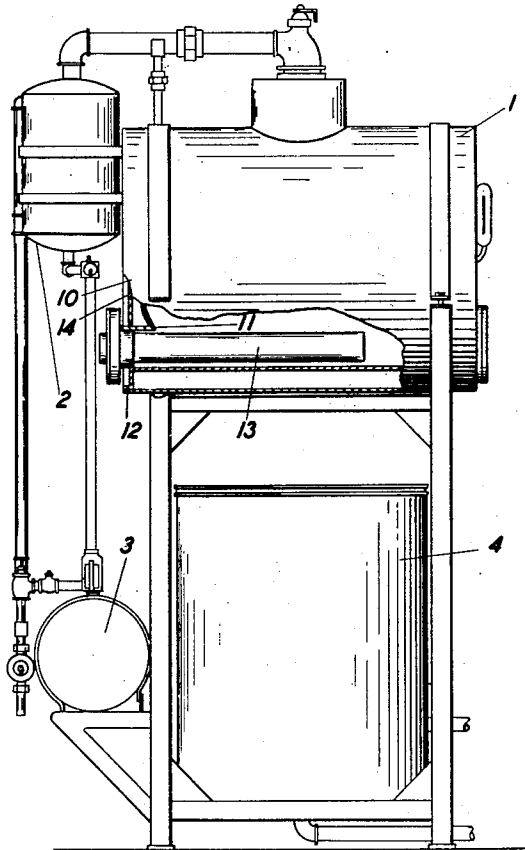
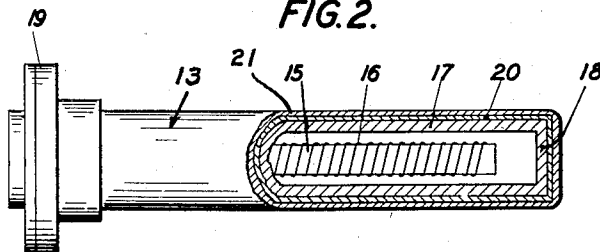


FIG. 2.



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ELECTRIC HEATING ELEMENT

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Refiled for abandoned application Serial No.
56,137, December 26, 1935. This application
January 12, 1937, Serial No. 120,253

1 Claim. (Cl. 201-67)

My invention relates to electric heating elements, which are designed to be used in connection with the re-refining of used lubricating oil such as is described in my copending application, Serial No. 5,172, of which this application is a continuation in part. This application is substituted for application Serial No. 56,137.

As pointed out in that specification, the diluents and light ends remaining in the oil, after treatment by the sulphuric acid, are vaporized in a still, which is heated by an electric element. In the vaporizing of these diluents in the still, preparatory to the drawing off of the purified or re-refined oil, a sludge is deposited in the bottom of the still.

One of the disagreeable features of the work is the removal of this sludge from the still.

In the operation of the still the intense heat also produces a scale on the walls of the casing surrounding the electrically heated element or elements and the sludge deposits on this scale. This is objectionable for two reasons—primarily because the scale and the sludge act as an insulation which so retards the heat transfer from the electric element to the oil in the still that an excessive amount of current is required in order to raise the temperature of the oil to the required degree.

It has also been found in practice that due to the insulation of the heating element by the scale and the sludge which has been deposited thereon has the effect of preventing the element from dissipating the heat generated in the element with sufficient rapidity so that the heat will not affect the metal in the casing.

The result of this is that eventually the insulation will be so thick that the metal of which casing is formed will be heated to so high a degree that the elasticity of the metal of which it is formed will be exceeded. When this occurs the casing will collapse and this breaks the expensive electric heating element which is mounted inside of the casing.

Another objectionable feature is that the metal forming the enclosure for the heating element will scale on the inside and this sometimes results in short circuiting the heating element.

The principal object of my invention is to provide a casing, for the electric heating elements, which will not scale and upon which the sludge will not deposit and which will therefore not over-heat and break the electric heating elements.

A further object is to so construct the casing so that it will be a comparatively simple matter to clean it when desired.

A further object of my invention is to provide

means for preventing the short circuiting above referred to.

My means of accomplishing the foregoing objects may be more readily understood by having reference to the accompanying drawing, which is hereunto annexed and is a part of this specification, in which—

Fig. 1 is a side elevation of a portion of the apparatus illustrated in the copending application above referred to in which the still is equipped with my improved electric heating element, a portion of the still being broken away to show the mounting of the element; and

Fig. 2 is an enlarged sectional detailed view of the electric element, part of the wall being broken away to show the interior of the construction.

Similar reference numerals refer to similar parts throughout the entire description.

As shown in the drawing, I have illustrated the following units—a still 1; a condenser 2; dilution tank 3, a contact filter 4; and various piping connections for connecting the same. The still 1 is preferably formed with an outer shell 10 and an inner shell 11, the latter being made to withstand extremely high pressures and temperatures and is preferably spaced within the outer shell, for example, by angles 12.

My improved electric heating element 13, only one of which is illustrated, is preferably located in the lower portion of the inner shell 11 of the still or retort. Although I illustrate a single element, it will be obvious that any desired number may be used.

These elements 13 are mounted in the front wall 12 of the still 1 and extend into and longitudinally of the same. They are formed as clearly seen in the detail view of the inner case 15 which may be of porcelain around which the resistance wire 16 is wound or it may consist of a plurality of porcelain disks (not shown) through which a number of the resistance wires are passed. This electric element 13 is then mounted inside of a tubular sleeve or casing 17, the inner end 18 of which is closed, the other end being closed, by a plate 19 from which the element is supported. The casing 17 has its outer surface machined and highly finished and polished. This is then coated with a layer of nickel plate 20 which is buffed until it is highly polished. The casing is plated inside and out with chromium 21 and the outside chromium is then highly polished.

The result of this construction is that the pores of the metal of which the tubular casing 17 is formed are completely and entirely closed with the resultant effect that no scale will form on its

surface and no sludge can deposit thereon, nor will the inside scale even when subjected to a high temperature, thus the danger of a short circuit is avoided. As a consequence there can be no insulating effect and I have been able in practice to materially reduce the cost of electric current used in the operation of the apparatus and I have also materially increased the life of the elements to an indefinite period of time where-
as prior to my invention and discovery in practice the elements were constantly being replaced and renewed.

Although I have described with some particularity a specific construction for embodying my invention, such description is not to be taken as a limitation upon my invention or as confining me to such specific details of construction, for it will be obvious to persons skilled in the art that numerous changes in the configuration of the

heating element might be resorted to without departing from the spirit of my invention as hereinafter claimed.

Having described my invention what I regard as new and desire to secure by Letters Patent is—

In an electric heating assembly for heating oil in a still, a tubular sleeve closed at one end, an electric heating element formed of resistance wire having a porcelain support mounted in said sleeve spaced from the walls thereof, the outer surface of said sleeve being machined smooth and highly polished, a layer of nickel deposited on the outer surface of said sleeve and a layer of chromium deposited on said nickel, a layer of chromium deposited on the interior of said sleeve, and means to mount the opposite end of said sleeve in a still so that its interior is closed to the oil under treatment.

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