H. R. QUINBY.

DEHYDRATOR FOR PETROLEUM OILS.

APPLICATION FILED FEB. 25, 1920.

1,382,234. Patented June 21, 1921.

2 SHEETS—SHEET 1.

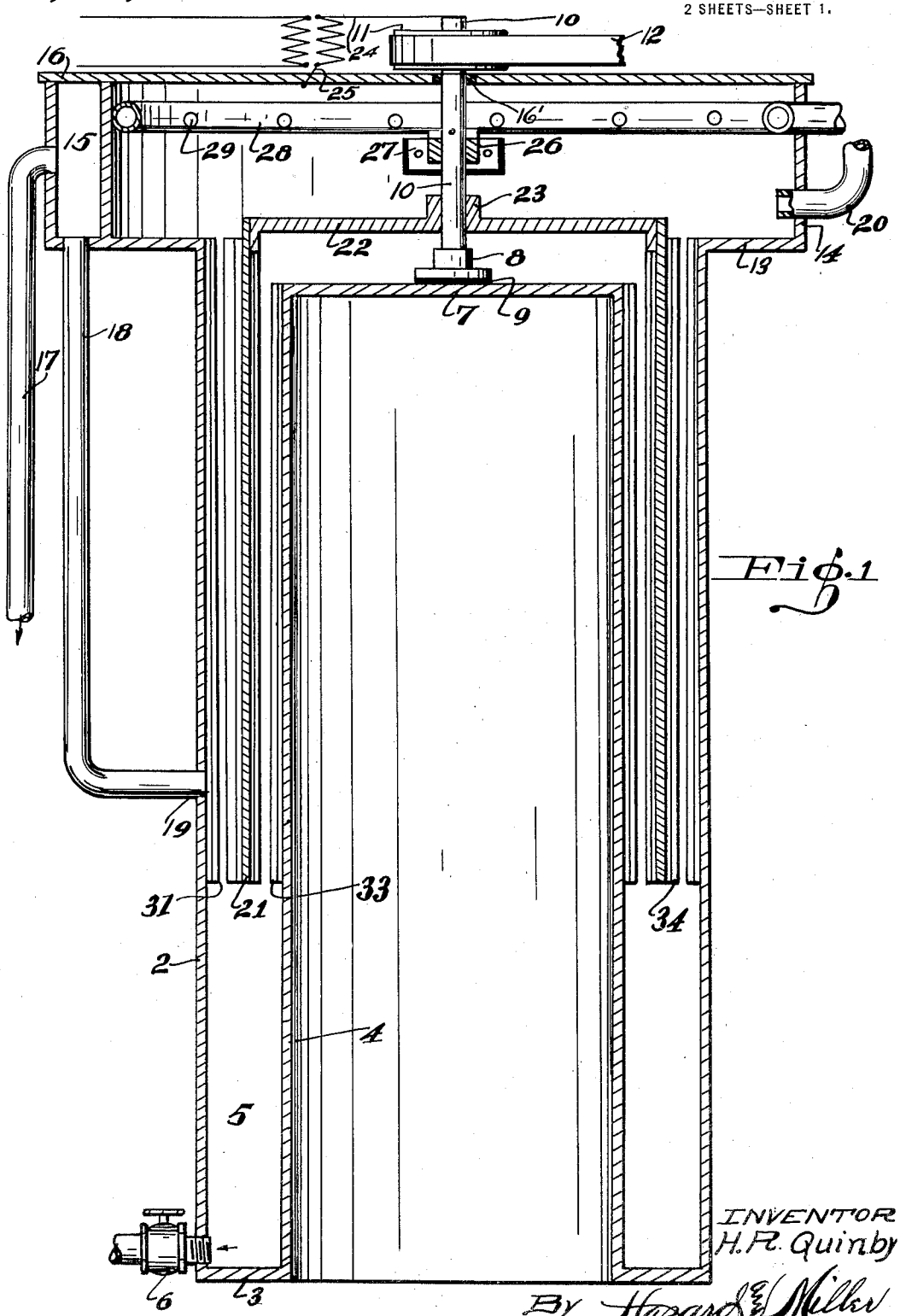


Fig. 1

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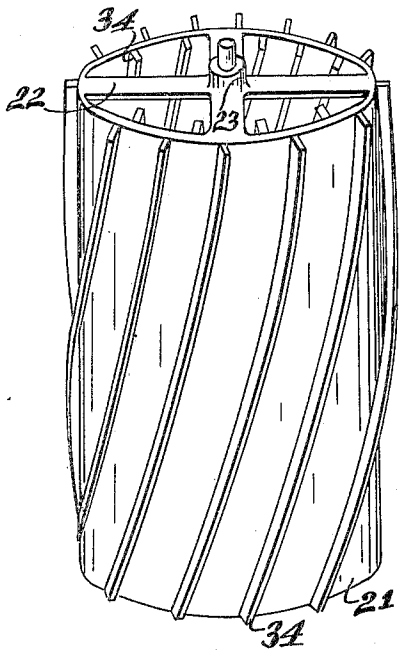
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2 SHEETS—SHEET 2.

Fig. 2



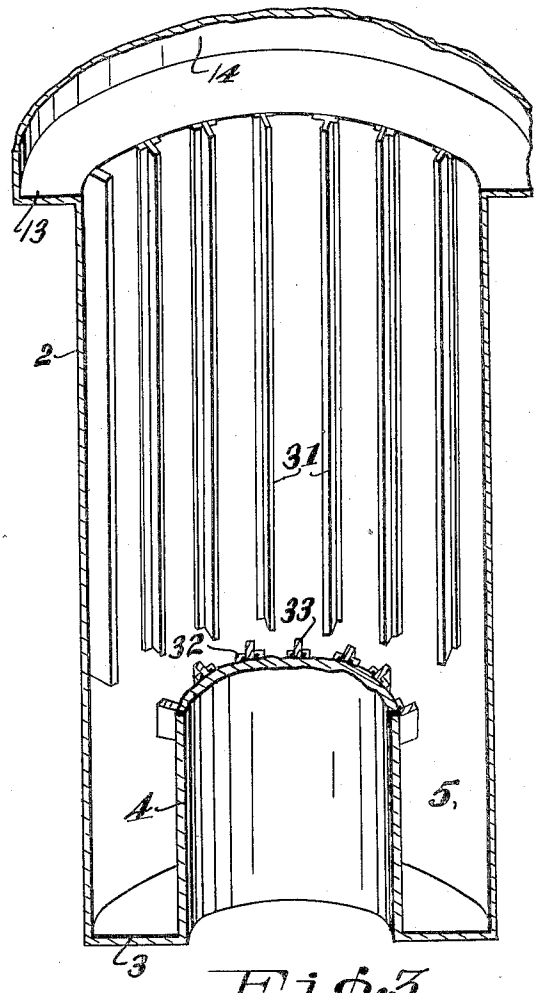


Fig. 3

Fig. 4

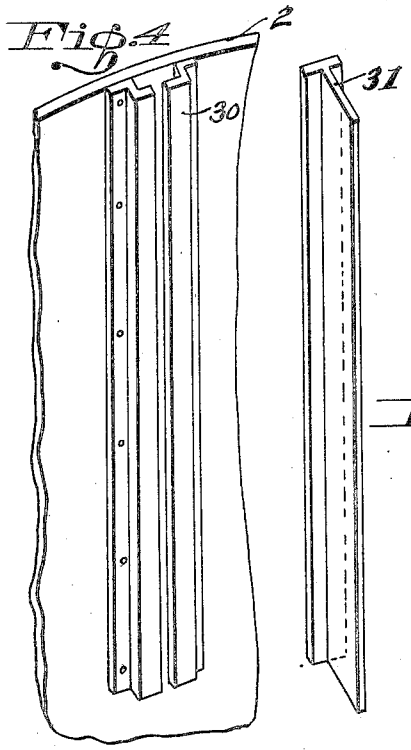


Fig. 5

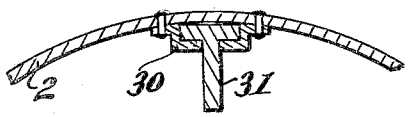


Fig. 6

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UNITED STATES PATENT OFFICE.

HENRY R. QUINBY, OF MARICOPA, CALIFORNIA, ASSIGNOR TO PETROLEUM RECTIFYING COMPANY, OF SAN FRANCISCO, CALIFORNIA, A CORPORATION OF CALIFORNIA.

DEHYDRATOR FOR PETROLEUM-OILS.

1,382,234. Specification of Letters Patent. Patented June 21, 1921.

Application filed February 25, 1920. Serial No. 361,351.

To all whom it may concern:

Be it known that I, HENRY R. QUINBY, a citizen of the United States, residing at Maricopa, in the county of Kern and State of California, have invented new and useful Improvements in Dehydrators for Petroleum-Oils, of which the following is a specification.

This invention relates to apparatus for dehydrating petroleum oils and has for its object to provide an apparatus of this kind operative with a minimum consumption of energy and maximum capacity for efficiently separating the water content found in oil flowing directly from wells. A further object of the invention is to provide an apparatus of this kind that is simple, substantial, and reliable in action and by which, through the aid of electricity, the water content from the oil may be separated continuously as the oil is passed through the apparatus. A further object of the invention is to provide for the adaptation of the apparatus for the effectual treatment of oils of different characteristics, that is, differing in the proportion of water and oil in the volume.

The invention consists of the construction, the combination, and in details and arrangements of the parts, an embodiment of which invention is illustrated in the accompanying drawings and described and claimed hereinafter.

Figure 1 is a central vertical section through the apparatus.

Fig. 2 is a perspective of the intermediate rotor.

Fig. 3 is a perspective of a segmental portion of the separating chamber.

Fig. 4 is a perspective of the separating means for one of the adjustable ribs mounted on the inside of the chamber wall.

Fig. 5 is a perspective of one of the detached ribs.

Fig. 6 is a cross sectional detail showing the assembled removable rib mounted on a part of the chamber wall.

An object of the present invention is to provide means whereby a large volume of oil or emulsion from oil wells can rapidly be subjected to electricity and the separation of the water from the oil economically accomplished, and to that end the invention comprises an apparatus in which there is an exterior and preferably cylindrical chamber 2 of any suitable height and diameter, and this is provided with a bottom 3 that may be in the form of a flat ring from the inner edge of which there extends upwardly an interior tank or drum 4 forming, with the wall 2, an annular chamber or space 5. The bottom of the chamber 5 is shown as provided with a valved outlet 6 whereby water may be withdrawn from the apparatus either continuously or at suitable intervals.

The inner chamber or drum 4 is therefore shown as hollow and has a head or top 7 on which is mounted a step bearing 8, this being insulated preferably, as shown at 9, and extending upwardly from this bearing is a shaft 10 carrying a pulley 11 driven by a belt 12.

The upper end of the outer shell or chamber 2 is provided with a flange 13 preferably arranged horizontally and being somewhat above the level of the head 7 of the inner drum. The flange 13 is provided with an upwardly extending wall 14 on one side of which there is provided a pocket 15 and on the wall 14 there is provided a removable cover 16. The shaft 10 passes through the cover 16 which is provided with an insulating bearing 16′, electrically insulating the shaft 10 from the cover 16. From a suitable height in the pocket 15 there is extended an outlet or oil discharge pipe 17 and from the bottom of this pocket 15 there extends a pipe 18 leading into the shell 2 at a point intermediate its height, as shown at 19.

At any suitable location in the upright wall 14 there is provided a supply pipe 20 by which oil to be treated is admitted to the head of the apparatus so that it will pass downwardly into the space 5 between the concentric walls 2 and 4.

Arranged in this annular space 5 is an upright and concentrically arranged rotor or sleeve 21 that is provided with a suitable head 22 providing a substantial connection between the sleeve or rotor 21 which is cylindrical, and the shaft 10 which is passed through the hub 23 of the head 22. The shaft 10 is shown as electrically connected to a feed wire 24 and another feed wire 25 is connected to a suitable ground or portion of the shell structure so that a charge of alternating current at about 10,000 volts can

be supplied to the apparatus. This current is discharged between the intermediate cylindrical sleeve or rotor 21 and the outer and inner walls 2 and 4, the electricity traversing the oil content in the space 5 and having the effect of breaking up the combination or liberating the water content in the oil mass so that the water can freely settle to the bottom of the chamber 5 and be tapped off while the oil may pass through the pipe 19—18 and accumulate in the trap chamber or pocket 15, thence passing through the outlet 17 which is located at such level as to maintain a body of the oil well above the top or head 22 and the flange 13 so as to keep the electric terminals 21 and 24 well covered with oil.

The shaft 10 is shown as passing through an upper bearing 26 supported by brackets having bases 27 attached to but insulated from the wall structure 14 or in other preferred portion so as to secure an efficient support for the bearing 26.

There preferably is provided under the cover 16 a steaming pipe 28 apertured at 29 so that in case of fire within the top of the apparatus steam or other gas may be admitted so as to extinguish the fire.

One of the important features of the present invention is provision of means for efficiently causing the equal distribution of the electricity between the pole members 2, 21, 4, and to provide for the variation of the gap or distance between the relatively stationary parts and the rotary part according to the characteristics of the oil being treated. To that end the inner surface of the shell or wall 2 is preferably provided with means to which may be attached inwardly projecting and interchangeable rib members, these members being of different effective widths relative to the width of the annular space 5 so that the space between these rib members and other rib members formed on the rotor can be varied as desired. The ribs shown may be permanently fixed on the electrodes or made adjustable as to width to suit requirements of practice. It will be seen that when the electrode of Fig. 2 rotates within the electrode of Fig. 3 there will be a discharge gap of minimum length corresponding with the distance from each rib of each electrode to each proximate rib of the other electrode, and when the ribs are of the spiral pitch shown in Fig. 2 there will be at all times two such discharge gaps for each of the ribs of the electrode of Fig. 3. As one of these electrodes rotates with respect to the other all of the said discharge gaps will travel along the electrodes thus insuring all of the treatment through the entire path of the emulsion between the electrodes.

In Fig. 4 is shown a portion of the outer wall 2 and this is provided with guide forming members 30 and into the guide way formed thereby there is inserted one or another of ribs 31, Fig. 5, that may conveniently be made of T iron having webs of different width or length. The exterior surface of the inner drum or wall 4 is similarly provided with guide ways 32 and into these may be inserted web members 33 that may be adjusted as to the length of their webs as required. The inner and outer surfaces of the rotor or sleeve 21 are also provided with ribs as at 34 and these preferably are helically arranged and extend from end to end of the sleeve 21. From this it will be seen that the ribs 34 on the sleeve 21 may be fixed permanently to the sleeve so as to have a predetermined diameter with respect to the circle formed by the edges of the inner and outer ribs 34 and it is only necessary to change the ribs 31 and 33 on the outer shell 2 and the inner drum 4 in order to secure differences in the gaps formed between the edges of the ribs 34 and those of the ribs 31—33 which are stationary as to the ribs on the drum or rotor 21. It is found desirable to arrange coöperative ribs 31 and 34 and 33 so as to use a comparatively large space when an oil heavy in emulsion is being treated, but where oil is light in emulsion ribs 31 and 33 of greater length web can be substituted and therefore a lesser space used.

In the operation of the apparatus the rotor 21 is driven at a suitable speed as will be determined by the characteristics of the oil being handled and may be rotated at a speed of from 125 to 300 revolutions per minute, and while rotation is being imparted to the sleeve electricity is supplied through the conductors 24—25 and is caused to traverse the space betweeen the rotated terminal 21 and the stationary members 2—4, thus subjecting all of the oil as it is admitted to the top of the apparatus and as it flows down toward the outlet 19 to electrification.

Various changes may be made without departing from the spirit of the invention as claimed.

What is claimed is:

1. An apparatus for dehydrating oils, comprising an electrode formed of a pair of concentric metallic walls forming therebetween an annular space into and through which the oil to be treated is passed; and an electrode arranged intermediately in the annular space.

2. An apparatus for dehydrating oils, comprising an electrode formed of a pair of concentric metallic walls forming therebetween an annular space into and through which the oil to be treated is passed; a cylindrical electrode arranged intermediately in the annular space; and projections of different widths interchangeably mounted upon said electrodes for varying the effective

gap or space between contiguous surfaces of the electrode elements.

3. An apparatus for dehydrating oils, comprising an electrode formed of a pair of concentric metallic walls forming therebetween an annular space into and through which the oil to be treated is passed; a cylindrical electrode arranged intermediately in the annular space; and means for relatively moving the electrode members.

4. An apparatus for dehydrating oils, comprising concentric cylindrical wall members connected to form an electrode; an electrical device arranged to rotate in medial position between the concentric walls and forming another electrode; and projections of different widths interchangeably mounted upon said electrodes for varying the effective space or gap between the electrodes.

5. An apparatus for dehydrating oils, comprising an electrode formed of a pair of concentric metallic walls forming therebetween an annular space into and through which the oil to be treated is passed; a cylindrical electrode arranged intermediately in the annular space; means for relatively moving the electrode members; and means for maintaining a head of oil above the electrodes.

6. An apparatus for dehydrating oils, comprising an electrode formed of a pair of concentric metallic walls forming therebetween an annular space into and through which the oil to be treated is passed; a cylindrical electrode arranged intermediately in the annular space; means for relatively moving the electrode members; and means for extinguishing combustion above the oil being treated.

7. An apparatus for the treatment of emulsions by electric discharge comprising concentric electrodes, each of said electrodes provided with a plurality of projections, said projections disposed toward each other, the projections on one electrode arranged at an angle with the projections on the other electrode and means constructed and adapted to rotate one of the electrodes and means for delivering emulsion between said electrodes.

8. In apparatus for the electric treatment of emulsions, cylindrical concentric electrodes, one of the electrodes fitted with projecting discharge bands and the other electrode having projecting discharge bands disposed spirally with respect to the bands on the other electrode, and means for rotating one of the electrodes with respect to the other electrode.

In testimony whereof I have signed my name to this specification.

HENRY R. QUINBY.