

No. 824,104.

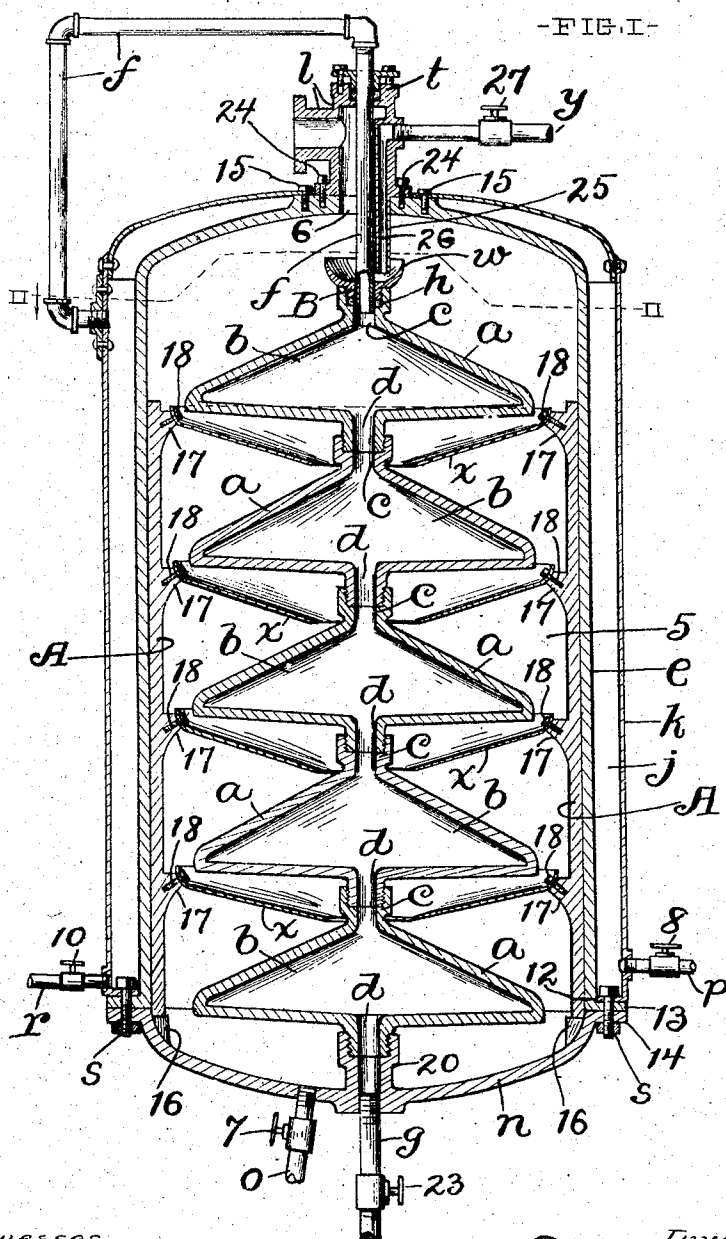
E. R. EDSON.

PATENTED JUNE 26, 1906.

APPARATUS FOR SEPARATING NAPHTHA, &c., FROM OIL OR OTHER LIQUIDS.

APPLICATION FILED NOV. 7, 1902.

2 SHEETS—SHEET 1.



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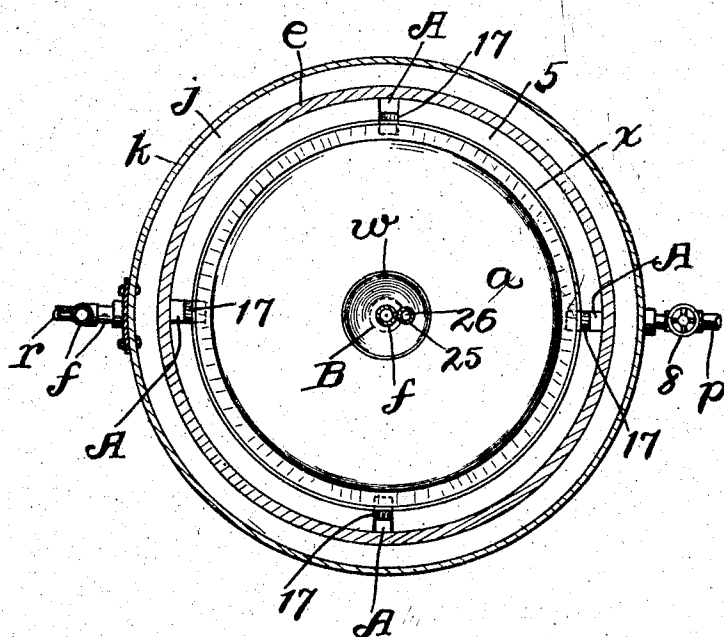
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2 SHEETS—SHEET 2.

FIG. 11



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UNITED STATES PATENT OFFICE.

EUGENE RILEY EDSON, OF CLEVELAND, OHIO.

APPARATUS FOR SEPARATING NAPHTHA, &c., FROM OIL OR OTHER LIQUIDS.

No. 824,104.

Specification of Letters Patent.

Patented June 26, 1906.

Application filed November 7, 1902. Serial No. 130,473.

To all whom it may concern:

Be it known that I, EUGENE RILEY EDSON, a citizen of the United States of America, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Apparatus for Separating Naphtha, &c., from Oil or other Liquids; and I hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

This invention relates to improvements in apparatus for separating naphtha or other readily volatile matter from oil or other liquid, and more especially designed for separating and eliminating naphtha from oil extracted from oil-yielding material by the treatment of the said material with naphtha.

The object of this invention is to provide apparatus of the character indicated which is simple and durable in construction, whose component parts are readily assembled, which has a large capacity and great efficiency, and which is not liable to get out of order.

With this object in view the said invention consists in certain features of construction and combinations of parts, hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure I is a side elevation, largely in central section, of apparatus embodying the said invention. Fig. II is a top plan in section on line II II, Fig. I.

My improved apparatus comprises a tank, which consists, in the main, of a cylindrical section *e* and a section *n*, which forms the bottom of the chamber 5 of the section *e*. The tank-section *e* is provided at the top and centrally with a vapor-outlet 6. The bottom-forming section *n* is dish-shaped, so as to form a basin, and a drain-pipe *o*, which has a normally closed valve 7, is provided to conduct off oil or liquid received by and within the said basin.

A heating-jacket *k* surrounds the tank-section *a* between the basin-forming bottom section *n* and the vapor-outlet 6, and *p* represents a pipe, which has a valve 8 and is arranged to conduct steam or other heating fluid under pressure to the chamber *j* of the jacket. A drain-pipe *r* communicates with

the lower end of the chamber *j* of the jacket *k* and has a normally closed valve 10.

An interiorly chambered or hollow heating-drum or heater is arranged vertically within and centrally of the tank-section *e* and comprises several conical sections *a*, which are arranged at different elevations, respectively, and in-line vertically, and the drum illustrated has five separable sections *a*, which correspond in construction and shape and are interchangeable. Each drum-section *a* is provided interiorly with a chamber *b*.

Each drum-section *a* is provided at the top and centrally with an internally screw-threaded vertical induction-port or fluid-inlet *c*, which extends above the remainder of the said section and communicates with the chamber *b* of the said section. Each drum-section *a* is provided at the bottom and centrally with an eduction-port or fluid-outlet *d*, which depends below the remainder of the said section.

The surrounding wall of the outlet *d* of each section *a* has external screw-threads corresponding with the internal threads of the inlet *c* of the said section *a*, so that each section *a* can be screwed at its fluid-outlet *d* into a section *a* next below at the fluid-inlet *c* of the last-mentioned section. Each drum-section *a* consists, preferably, of a conical metal shell, which is largest diametrically or transversely at the bottom. The said shell flares downwardly, therefore, so as to have an outer downwardly and outwardly sloping surface.

The jacket *k* is provided at its lower end and internally with an annular horizontally-arranged flange or rim 12, and the tank-section *e* is provided at its lower end and externally with an annular flange or horizontally-arranged rim 13, which extends in under the rim 12 of the jacket *k*. The bottom section *n* is provided at the top with a horizontally-arranged annular rim 14, which extends in under the tank-section *e* and in under the heating-jacket *k*. The rims 12, 13, and 14 are removably secured together by suitably-applied bolts and nuts, as at *s*. The jacket *k* is removably secured at its upper end to the top of the tank-section *e* by bolts or screws 15.

The bottom section *n* is provided at the top and interiorly of the basin formed thereby with four lugs 16, which are arranged at

equal intervals circumferentially of the basin. Upon each lug 16 removably rests a standard A, which is arranged vertically and contiguous to the surrounding wall of the chamber 5. There are, therefore, four standards A and funnels *x*, arranged to receive any liquid from the lower and larger ends of the drum-sections *a*, are supported from the said standards, resting and having bearing upon lugs 17, formed on the said standards, and preferably removably attached to the said lugs by screws 18.

The basin *n* at the bottom and centrally of the lowermost drum-section *a* is provided with a port-forming tubular projection 20, which discharges upwardly through the fluid-inlet *c* of the said drum-section into the chamber *b* of the said drum-section, and the said upwardly-projecting member 20 is provided internally at its upper end with screw-threads, which engage with threads formed upon and externally of the inlet of the said drum-section. The lowermost drum-section *a* is therefore removably secured to the basin *n*, and a drain-pipe *g* communicates with the port formed by the tubular projection 20 and has a normally closed valve 23.

A pipe *f* is arranged to conduct steam or other heating fluid under pressure to the chamber *b* of the uppermost drum-section *a* from the upper portion of the jacket-chamber *j* and communicates with the said chamber *b* at the fluid-outlet of the said chamber. The pipe *f* extends upwardly from the tank-section *e* through a stuffing-box *t*, with which an elbow *l*, which is removably secured by screws 24 to the top of the tank-section *e*, is provided. The elbow *l* communicates with and forms an extension of the vapor-outlet 6 of the tank-section *e*. The pipe *f* extends through and is slidable endwise and snugly fits internally of an externally screw-threaded bushing B, which is screwed into the uppermost drum-section *a* at the fluid-outlet of the said drum-section. The pipe *f* extends from outside of the tank-section *e* and a suitable distance above the elbow *l* to and communicates with the jacket-chamber *k*. By this construction any possible slight upward expansion of the heating-drum or any upward expansion of the tank-section *e* and connected jacket *k* will neither interfere with the operation of nor strain the pipe *f*. The joint between the pipe *f* and the bushing B may, if required, be suitably packed, as at *h*. However, the packing of joints wherever required is too well understood to require further description and illustration in this application.

The upper end of the plug or bushing B is provided with a basin *w*, extending around the pipe-section *f*, and the elbow *l* is provided with a depending tubular member 25,

whose interior passage-way 26 discharges into the said basin *w*. A pipe *γ*, which has a normally closed valve 27, communicates with the upper end of the passage-way 26 and conducts the mixed oil and naphtha or other liquid which is to be treated by causing it to flow adown the exterior of the heating-drum, when the latter is heated, to the said passage-way 26.

By the construction hereinbefore described it will be observed that each drum-section *a* is conical externally, increasing in size transversely toward and being largest at its bottom, that liquid conducted into the basin *w* formed at the top and centrally of the uppermost drum-section *a* overflows from the said basin and gradually covers and flows adown the said section *a*, whence it flows onto the said section *a* next below and adown the last-mentioned section *a*, and then successively adown the remaining sections *a*; that the heating agent supplied to the interior of the heating-drum heats the drum and results in heating the liquid flowing adown the external surfaces of the sections *a* of the drum; that the naphtha of the mixed oil and naphtha flowing adown the drum vaporizes and passes from the oil to the vapor-outlet 6; that the apparatus is simple and not liable to get out of order; that the apparatus possesses great efficiency, and that the component parts of the apparatus are readily assembled and quickly and conveniently separated for repairs, renewal, and cleaning.

The lower and larger end of each drum-section *a*, except the lowermost drum-section, is surrounded by the upper and transversely-larger end of a funnel *x*, whose said end is enough larger transversely than the said end of the said drum-section to accommodate a free passage of liquid from the said drum-section into the said funnel. The funnel is arranged to conduct liquid received thereby onto the upper portion of the drum-section arranged next below, and any liquid running adown the lowermost drum-section is received by and within the basin *n*, whence it is conducted through the pipe *o* upon opening the valve 7.

The drum-sections *a* are preferably of cast metal, whereas the funnels *x* are made, preferably, of sheet metal. The construction hereinbefore described, whereby the funnels *x* are supported independently of the drum-sections *a* accommodates the use of sheet-metal funnels in connection with cast-metal drum-sections and will be found especially convenient in the assemblage of and in cleaning or repairing the said parts. Also the supporting of the funnels *x* from the standards A, instead of supporting them from the drum-sections *a*, is advantageous in that their weight is not upon the said drum-sections

What I claim is—

1. Evaporating apparatus comprising a tank having a vapor-outlet; a heating-drum or heater arranged within the chamber of the tank and consisting of externally-conical interiorly-chambered sections arranged at suitable intervals vertically, with the interior chambers of adjacent drum-sections in open relation with each other; means for conducting liquid from the lower end of the upper of adjacent drum-sections onto the upper end of the lower of the said sections; a pipe communicating with the interior chamber of the lowermost drum-section; means for draining from the tank any liquid descending or flowing from the lowermost drum-section; an elbow secured to the top of the tank and forming an extension of the aforesaid outlet; a heating-jacket surrounding the tank; and a pipe communicating with the chamber of the heating-jacket and discharging into the interior chamber of the uppermost drum-section and extending from the drum upwardly through the aforesaid elbow.
2. Evaporating apparatus comprising a tank provided, at the top and centrally, with a vapor-outlet; a heating-drum or heater arranged within the chamber of the tank and consisting of externally-conical interiorly-chambered sections arranged at suitable intervals vertically, with the interior chambers of adjacent drum-sections in open relation with each other; a basin arranged centrally of the top of and supported from the uppermost drum-section; means for conducting a liquid into the said basin; means for conducting liquid from the lower end of the upper of the adjacent drum-sections onto the upper end of the lower of the said sections; a pipe communicating with the lowermost drum-section; means for draining the interior chambers of the drum-sections; a heating-jacket surrounding the tank, and a pipe communicating at one end with the chamber of the uppermost drum-section centrally of the latter and extending from the drum or heater upwardly through the aforesaid basin and through the aforesaid vapor-outlet, which pipe communicates, at its opposite end, with the chamber of the jacket.
3. Evaporating apparatus comprising a basin; means for draining the basin; an upright jacketed tank-section resting upon and secured to the basin and provided at the top with a vapor-outlet; a heating-drum or heater supported from the said basin and arranged within the chamber of the aforesaid tank-section and consisting of exteriorly-conical sections arranged at suitable intervals vertically, with the interior chambers of adjacent drum-sections in open relation with each other; means for supplying a heating agent to the interior of the drum or heater,

and a funnel arranged to conduct liquid from the lower end of the adjacent drum-sections to the upper end of the lower of the said sections, which funnel is supported independently of the aforesaid tank-section.

4. In apparatus of the character indicated, a tank having a vapor-outlet; a heating-drum arranged within the chamber of the tank and consisting of separable externally-conical sections arranged at suitable intervals vertically; means for heating the drum; means for conducting liquid onto the uppermost drum-section; a funnel arranged to conduct liquid from the lower end of the upper of adjacent drum-sections onto the upper end of the lower of the said sections; means for draining from the tank any liquid descending or flowing from the lowermost drum-section; an elbow secured to the top of the tank and forming an extension of the aforesaid vapor-outlet, which elbow has a tubular passage-way forming member discharging downwardly; a basin arranged at the top of the uppermost drum-section in position to receive the discharge from the said tubular member, and a liquid-conducting pipe having a valve and discharging into the passage-way formed by the said tubular member.

5. In apparatus of the character indicated, a tank having a vapor-outlet; a heating-drum or heater arranged within the chamber of the tank and consisting of separable externally-conical interiorly-chambered sections arranged at suitable intervals vertically, with the interior chambers of adjacent drum-sections in open relation with each other; means for conducting a heating agent into the interior of the drum; means for conducting liquid from the lower end of the upper of adjacent drum-sections onto the upper end of the lower of the said sections; a valved drain-pipe communicating with the interior chamber of the lowermost drum-section; means for draining from the tank any liquid descending or flowing from the lowermost drum-section; an elbow secured to the top of the tank and forming an extension of the aforesaid outlet; a heating-jacket surrounding the tank; means for conducting fluid into the chamber of the jacket and a pipe communicating with the chamber of the heating-jacket and discharging into the interior chamber of the uppermost drum-section and extending from the drum upwardly through the aforesaid elbow.

In testimony whereof I sign the foregoing specification, in the presence of two witnesses, this 29th day of October, 1902, at Cleveland, Ohio.

EUGENE RILEY EDSON.

Witnesses:

C. H. DORER,
TELSA SCHWARTZ.