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U. LORENTZ.

DISTILLING AND RECTIFYING APPARATUS.

APPLICATION FILED SEPT. 14, 1906.

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Fig. 1

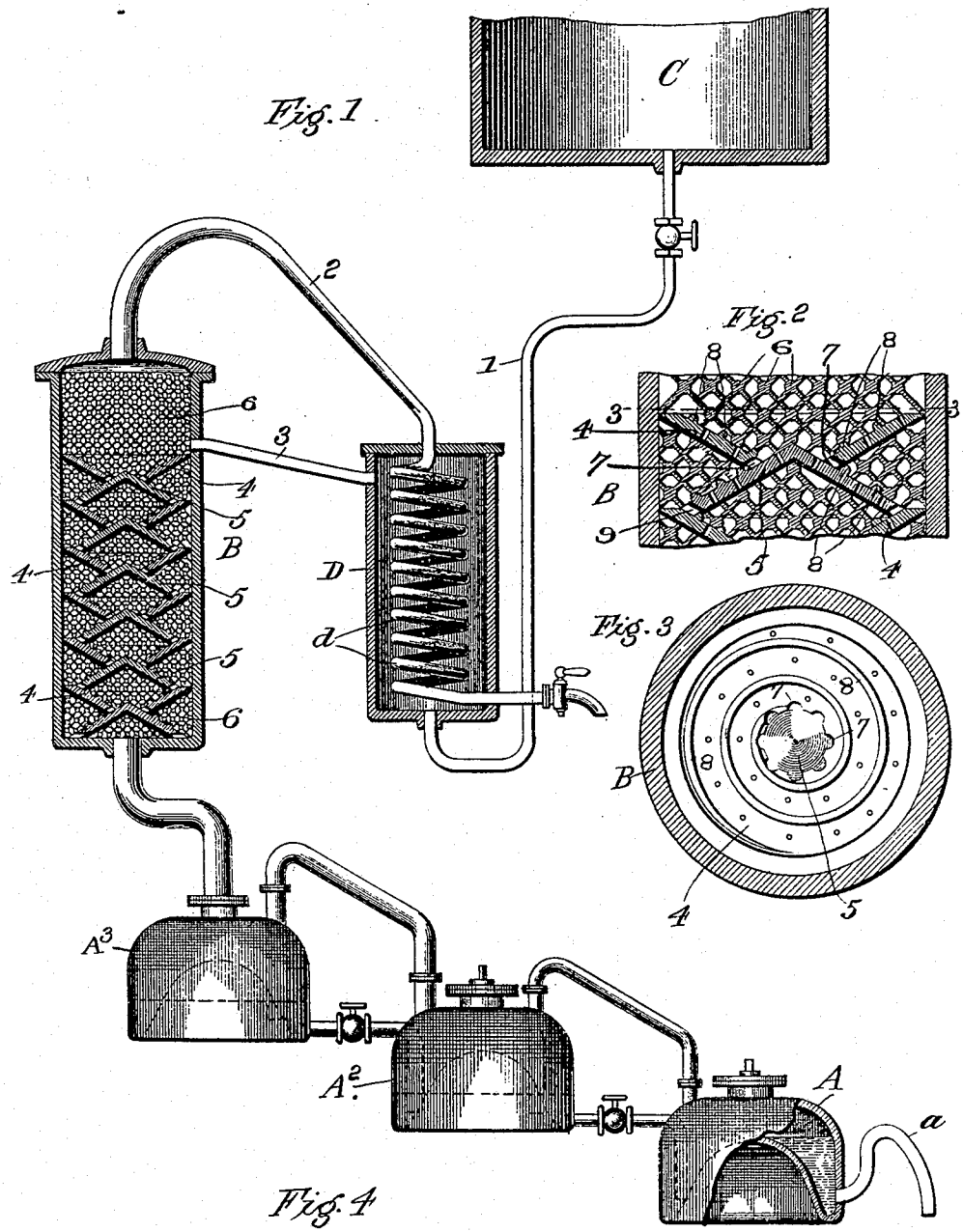
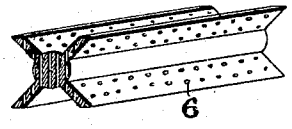


Fig. 2

Fig. 3

Fig. 4



WITNESSES

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DISTILLING AND RECTIFYING APPARATUS.

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To all whom it may concern:

Be it known that I, UPTON LORENTZ, a citizen of the United States, and a resident of Cristobal, Canal Zone, Isthmus of Panama, have invented an Improved Distilling and Rectifying Apparatus, of which the following is a specification.

My invention is an improved apparatus for distilling or rectifying alcoholic liquids, the process being effected with great rapidity and economy.

In carrying out my invention I make use of lightly-burnt clay diaphragms or partitions and also other media formed of the same material for distributing and diffusing the mash or mash liquor in the still-column, the porosity and rough surface of these parts being highly effective in producing the desired separation of the aqueous and alcoholic elements. In genera terms, therefore, the apparatus is distinguished by two principal features—namely, a large aggregate amount of surface for the distribution and diffusion of the mash and by the porosity and roughness of such surface.

The details of construction, arrangement, and operation are as hereinafter described, and illustrated in the accompanying drawings, in which—

Figure 1 is mainly a sectional elevation of my improved distilling and rectifying apparatus. Fig. 2 is an enlarged central vertical section of a portion of the still-column. Fig. 3 is a horizontal section on the line 3 3 of Fig. 2. Fig. 4 is a perspective view of a preferred form of distributing and diffusing bars employed in the still-column.

A A^2 A^3 indicate a series of stills which are connected by pipes in a well-known manner, the upper one of the series being connected with the still-column B. The lowest still A is provided with a concave bottom to form a large heating-surface, and it is preferably constructed of burnt clay. It is shown provided with a siphon *a* in the usual manner.

C indicates the mash-tub, and D a condenser which contains a coil *d*. The condenser D is connected with the tub C by a pipe 1, and the coil *d* is connected by a pipe 2 with the still-column B in a well-known manner. Another pipe 3 extends from the top of the condenser to the top portion of the column B.

The body of the column B is preferably cylindrical in form, and it is constructed of burnt clay, the exterior being glazed and the interior unglazed, so that it has a certain degree of porosity. Within the column I arrange media for distributing and diffusing the mash which enters the column through the pipe 3. These media consist of diaphragms or partitions 4 5 and intervening or associated devices 6, which may have various forms, but are preferably constructed as illustrated in Fig. 4. The partitions are preferably provided with perforations, as shown, for the passage of small quantities of the mash. The diaphragms have a concavo-convex form, and the same are alternately inverted. Thus the diaphragm 4 is cut away at the center or apex and the concave side is uppermost and it rests upon a diaphragm 5, whose apex projects into said opening. The truncated or lower end of the diaphragms 4 is provided with a series of notches 7 (see Figs. 2 and 3) to permit the flow of the mash from the concave surface of the diaphragms 4 upon and over the convex surface of the diaphragms 5. The concave side of the diaphragms 4 is provided with a spiral rib 8, extending from the periphery to the center, the function of the same being to retard the flow of mash and direct it in a spiral course in place of permitting it to flow directly and quickly downward to the apertured center of the diaphragm. The upper side of the diaphragms 5 is similarly provided with a spiral rib 9, which in like manner retards the direct downward flow of the mash and causes it to take a spiral course. The edges of the diaphragms 5 are provided with notches 10 in the same manner and for the same purpose as the notches 7 of the inverted diaphragms 4. Thus the diaphragms 4 5 are arranged in the still and supported upon the lowermost one and may be easily and quickly removed or the number increased or diminished, as conditions may require, the top of the still being in practice made detachable.

A special feature of my invention is the construction of the diaphragms 4 5 of lightly-burnt unglazed clay, the same having a degree of porosity and roughness which greatly facilitates the distilling or rectifying operation.

Another feature of my invention is the use in the still-column B of other media for distributing and diffusing the mash, which are formed of the same material—to wit, lightly-burnt unglazed clay. In the preferred form

which is represented in Fig. 4 these media are in the nature of bars having radial longitudinal flanges and provided with perforations to permit the passage of the mash liquor. These are placed in the still, preferably in parallel position, one resting upon another, above, below, and between the diaphragms 4 5. The parallel position economizes space, and thus enables me to obtain a maximum amount of surface for the distribution and diffusion of the mash.

When constructed as shown, my improved apparatus is adapted for continuous distillation—that is to say, an uninterrupted flowing stream of fermented mash passes from the tank or tub C through the pipe 1, the condenser D, and the pipe 3 into the column B. Water having been supplied to the stills A A^2 A^3 in requisite quantity and heat being applied to the required degree, steam is generated, which advances through the column B and acts upon the descending column of mash in such a way that the latter must yield its alcohol to the steam. The alcohol being thus volatilized, the vapors pass over through the pipe 2 into the condensing-coil *d*, through which it is drawn off. The mash proper being entirely deprived of alcohol leaves the apparatus as spent mash. As in the well-known forms of stills, the mash itself is utilized for cooling the coil *d*, and thus condenses the alcoholic vapors, effecting a desirable economy in the consumption of heat.

It will be seen that the mash is so retarded, distributed, and diffused in the still as to be thoroughly exposed to the ascending steam and that, owing to the form of the media 4 5 6 contained in the column and the porosity and roughness of the same, the diffusion may be said to reach a maximum. In other words, the lightly-burnt perforated porous unglazed diaphragms or plates, together with the bars 6, cause the descending mash to be exposed in the thinnest stratum to the ascending aqueous vapors, whereby distillation and practically rectification are rapidly effected. Each descending drop of the mash is, in fact, diffused or spread over the rough surface of the diaphragms or plates 4 5, and the other media 6 arranged and associated with the diaphragms. The descending mash liquid is, in fact, held by diffusion and distribution in the interstices or recesses of the roughened porous surface in such manner as to come in contact directly and constantly with the ascending steam, whereby the separation of the alcoholic vapors from the mash is effected more rapidly and economically than is practicable with smooth metallic plates or distributing media which have been heretofore used. The result attained by my improved apparatus in consequence of the retardation of the downward flow of mash and the minute distribution or diffusion of the same is a rapid and very complete distillation, so that it amounts practically to rectification. In brief, by the extreme diffusion of the descending liquid, owing to the roughness and porosity of the surface of the media over which it flows, dephlegmation occurs to a degree which gives practically rectified spirits direct from the mash and at one distilling operation.

The body of the still-column B being itself constructed of burnt clay and the contained media 4 5 6 being also of the same material, it is obvious that the same may be very economically constructed.

What I claim is—

1. In a distilling apparatus a column comprising a hollow body formed of burnt clay having a glazed exterior and an unglazed interior surface and contained media for diffusing and distributing all of the mash, the same being constructed of lightly-burnt unglazed clay, substantially as described.

2. In a distilling apparatus, a still-column comprising a hollow body and contained distributing and diffusing media, the same being formed of burnt unglazed or porous clay, substantially as set forth.

3. A still-column comprising a hollow body, and contained media for distribution and diffusion of the mash, which comprise a series of diaphragms arranged one above another and adapted to deliver the mash from one to the other successively, the same being formed of burnt unglazed clay, substantially as described.

4. In combination with the hollow body of a still-column, a series of concavo-convex diaphragms or partitions arranged one upon another each alternate diaphragm being inverted with its concave side uppermost and the same being formed of burnt unglazed clay, substantially as described.

5. The combination with the hollow body of a still-column, of a series of concavo-convex diaphragms, each alternate one being arranged with its concave side uppermost and its apex cut away and provided with projections whereby it is adapted to receive and rest upon the underlying diaphragm whose apex projects into the opening of the upper one, substantially as set forth.

6. The combination with the hollow body of a still-column, of a diaphragm arranged therein and formed of burnt unglazed clay, the same having its upper side provided with ribs for retarding the direct downward flow of mash, substantially as described.

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Witnesses:
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