KREUSLER & PELTON.

Apparatus for Distilling Spirits.

No. 50,876. Patented Nov. 7, 1865.

Fig. 2.

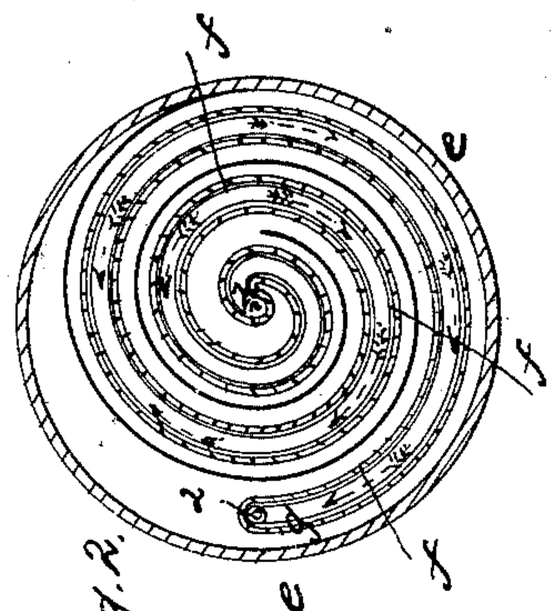


Fig. 4.

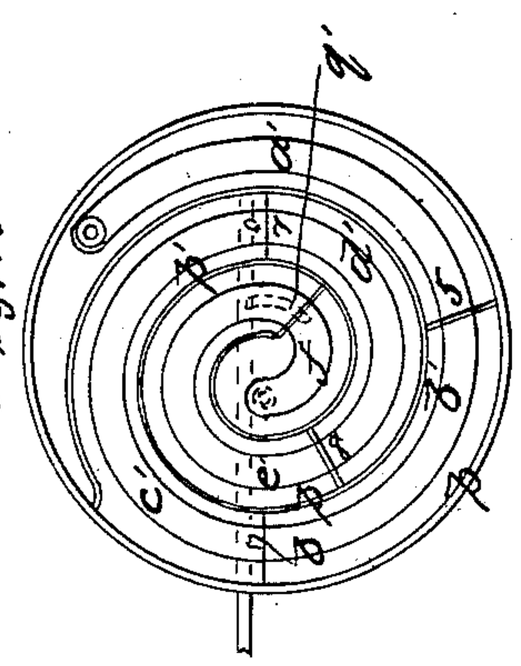


Fig. 3.

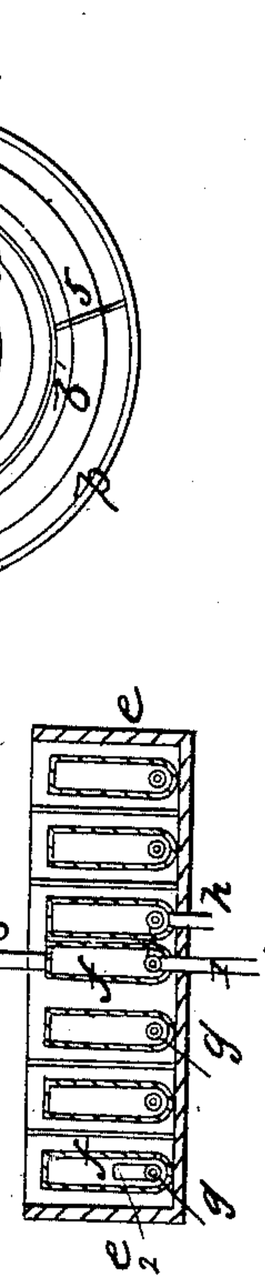


Fig. 5.

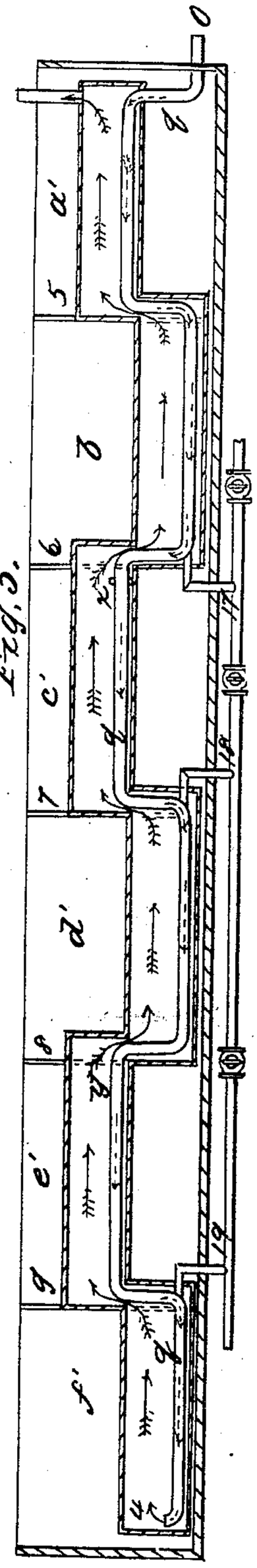
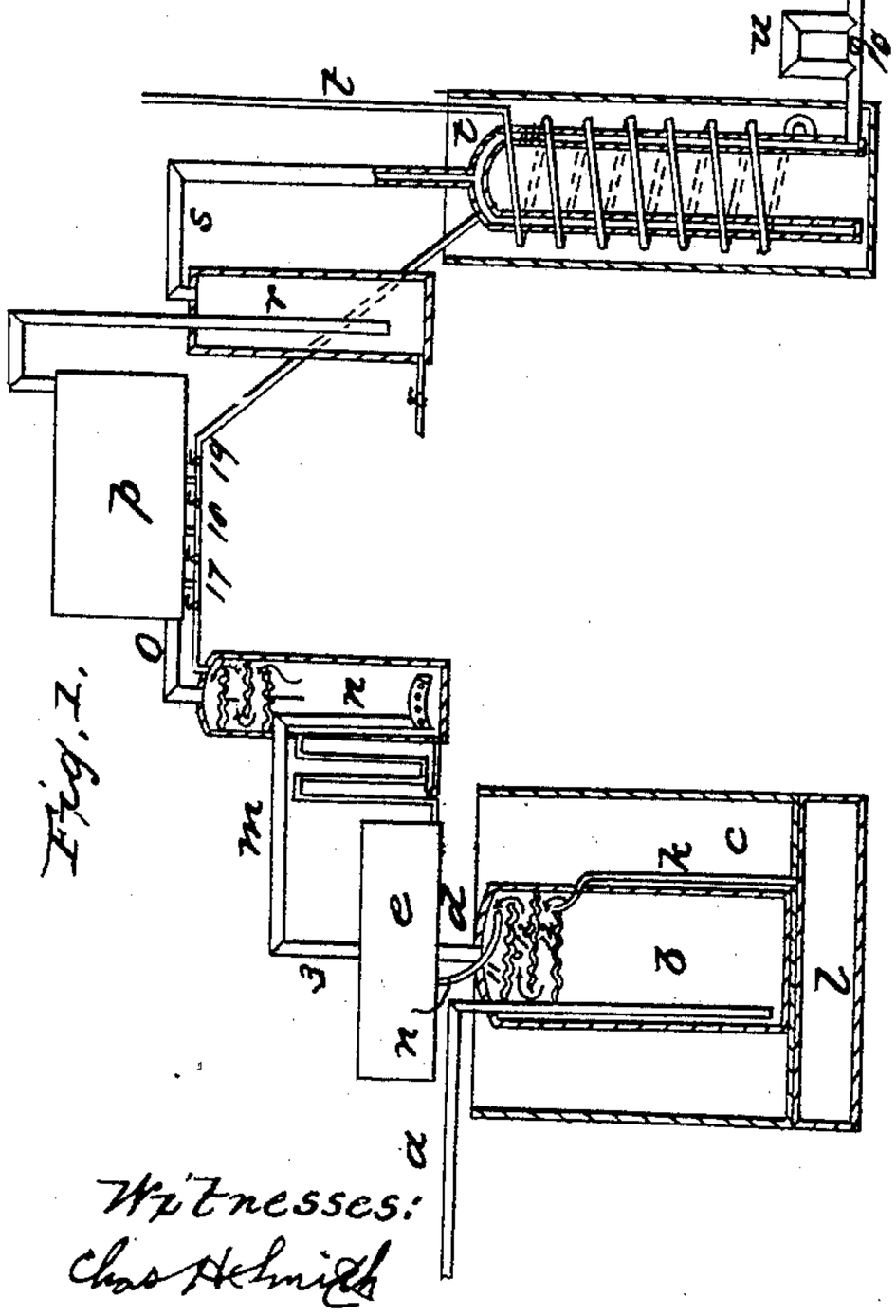


Fig. 1.



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UNITED STATES PATENT OFFICE.

ARNOLD KREUSLER AND W. T. PELTON, OF NEW LEBANON, NEW YORK,
ASSIGNORS TO W. T. PELTON, OF SAME PLACE.

IMPROVED APPARATUS FOR DISTILLING SPIRITS.

Specification forming part of Letters Patent No. **50,876,** dated November 7, 1865.

To all whom it may concern:

Be it known that we, ARNOLD KREUSLER and W. T. PELTON, of New Lebanon, in the county of Columbia and State of New York, have invented an Improved Means for Distilling, Rectifying, Purifying, and Condensing Spirits, Oils, Ethers, and Chloroforms; and we do hereby declare the following to be a full, clear, and correct description of the said invention, reference being had to the annexed drawings, making a part of this specification, wherein—

Figure 1 is a section representing our apparatus generally. Fig. 2 is a sectional plan of one of our dephlegmators. Fig. 3 is a vertical section, and Fig. 4 is plan of the second dephlegmator, and Fig. 5 is a view representing this dephlegmator as if the coil was laid out straight.

Similar marks of reference denote the same parts in all the figures.

Our invention relates to the evaporization and purification of such liquids as alcohol, ether, &c.

The nature of our said invention consists in a means for applying the heat of the vapor from the still in the re-evaporation of the alcohol or other substance until entirely separated from the liquid that passes over with it from the still.

The vapor coming from the stills through the pipe *a* is condensed in the rectifier *b* by the surrounding mash in the tub *c*. When the mash in the tub *c* becomes heated the condensed alcoholic vapor in rectifier *b* becomes again vaporized and passes through pipe *d* into the dephlegmator *e*, the construction of which is as follows:

f is a copper chamber in a spiral form, (see Figs. 2 and 3,) in the lower part of which there is a copper pipe, *g*, placed a very small distance from the bottom and sides of the chamber. The height of the chamber is about five times the diameter of the pipe, its circumference depending upon the capacity of the stills. The vapor enters the pipe *g* at 1, passes through the spiral pipe in the direction of the arrows from center to circumference, and is discharged at 2, through an elbow at the end of the pipe, into the chamber *f*. The vapor then passes through the spiral chamber *f* from circumference to center, and is discharged through the top of the chamber at 3, directly over 1, at which it entered.

The spiral chamber is placed in a tub which is filled with mash or cold water, which condenses the heavier vapors, the alcohol in which will be again evaporated by the heat of the vapor passing through the pipe *g*. The vertical section, Fig. 3, illustrates a chamber of this construction. That part of the fluid which is not thus vaporized runs back through the pipe *h*, Fig. 1, into the rectifier *b* upon evaporating-tables constructed as follows: In the upper part of the copper cylinder *b*, Fig. 1, are two, three, or more thin copper plates, 11, 12, and 13, tightly fitted at their circumference to the inside of the cylinder *b* at equal distances from each other, each of them having a spiral indentation upon its surface. The pipe *h* discharges its contents on the upper plate at the circumference of the spiral indentations, the liquid follows the indentations to the center of the plate, and is discharged through the pipe *i* upon the next plate below, and so on to the next. The vapor formed in the lower part of rectifier *b*, rising in the directions of the arrows through openings in these plates, heats the plates and evaporates the lighter portion of the fluid passing over them, and the heavier portion is discharged through a pipe, *k*, into a small receiver standing below the rectifier *b*, marked *l*, and after distillation is run back into the still, it containing too small a proportion of alcohol to be mixed with the fluid contained in *b*. The high-wines rising from the chamber *f* in the dephlegmator *e* pass through the pipe *m*, Fig. 1, into a small receiver, *n*, constructed like *b*. To prevent too much condensation this receiver is to be inclosed in a wooden box lined with some substance which is a non-conductor of heat. The vapor passes from *n* through pipe *o* into the dephlegmator *p*, constructed as follows:

Fig. 4 represents a copper chamber with a copper pipe in the lower part of it similar to dephlegmator *e*, except that instead of the volutes or spirals being in a line they are divided into six sections, which are arranged as shown in Fig. 5, the sections a' b' c' d' e' f' being alternately above and below, beginning with section a' outside above, and b' below, and so on, until in the inside of the spiral (the section f') is below. In each section the top of one below is upon the level with the bottom of the succeeding one. Vapor enters in outside section,

a', follows through the pipe q to 4, there discharges into the chambers, follows direction of arrows, and discharges from section a'. In section c', at x, there is a partition across the chamber extending a small distance above the outside diameter of the pipe q, fastened both to the sides of the chamber and to the pipe so as to be steam-tight. A similar partition is to be in section e' at y. (Shown in Fig. 5.) The end of pipe q, at 4, extends one and a half inch above the outside diameter of the horizontal part of the pipe in the same section.

Fig. 4 is the sectional plan view. The dephlegmator p is placed in a tub, a small place being left between its bottom and that of the tub. Partitions p', of copper or other metal, are fastened to the bottom of the tub in a spiral form, running parallel to the sides of the chamber, dividing the space equally between each coil of the spiral chamber. The space lengthwise is divided into six sections by five partitions placed at right angles to those mentioned, as at 5, 6, 7, 8, and 9, Fig. 5. The object of these partitions is to thus divide the water contained in the tub into separate spaces, so that its temperature where it comes in contact with the copper chamber shall be first hot, then warm, then cool, and thus the vapor passing through the chambers shall be more fully condensed as it passes through each succeeding temperature. A water-pipe brings water into the first space, filling it so as to surround the first section, a', of the chamber, Fig. 5, then passes through a pipe or hole at the top of the first cross-partition, 5, into the second space, filling this and surrounding section b' of the chamber, then passes through a pipe on the top of the second cross-partition, 6, into the third space, and so on to the last, from which it is discharged, near boiling, through another pipe. That portion of the fluid in the chamber which is not evaporated by the heat of the pipe contained in it runs back through three pipes, placed in sections b' d' f', at 17 18 19. These three pipes are introduced in one horizontal pipe, in which there are four cocks between the perpendicular pipes, as shown in Figs. 1 and 5, so that the fluid from all or a part of the sections can be conducted to the condenser or back, for another rectification, to receiver n, this depending upon the strength required in the product. When receiver n is filled to a certain height the fluid flows back through a pipe in the shape of U to the dephlegmator e.

To empty receiver n a pipe may lead from its bottom into rectifier b, which pipe is closed with a cock. From dephlegmator p the vapor is conducted through a pipe into the receiver r, which contains a preparation, which is neither acid nor alkali, for removing the fusel-oil. This receiver is inclosed in some non-conducting substance, so as to prevent the condensation of the vapor. After passing through this receiver the vapor passes through pipe s into the condenser t, constructed of two concentric cylinders of copper or other thin metal, closed or united at the bottom, and dome-shaped at the top, and the alcohol is discharged through conductor, as shown in Fig. 1, at u, so that a certain quantity of alcohol accumulates in the lower part of the condenser, through which no vapor can pass. Thus all danger of explosion by the igniting of the vapor is prevented. The condenser can be emptied by opening the cock at 10.

To allow the escape of carbonic acid and other gases produced by distillation a small pipe is introduced into the condenser at v, either straight or in a spiral form, as shown at Fig. 1. The upper end of the pipe passes into the open air.

Any alcoholic vapors which may rise in the pipe are condensed by the water surrounding the condenser and fall back.

Results: First, by this apparatus alcohol of ninety-five degrees can be obtained directly from the mash, by which one-third of the fuel used in the ordinary mode of distilling and rectifying is saved; second, the product is entirely free from fusel-oil; third, much less time is needed to produce a certain quantity of spirits than by any other apparatus; fourth, all waste attendant upon redistillation and rectification is prevented; fifth, from one-third to one-half of the barrels necessary to contain the production of any distillery are saved by the increased strength of the spirits produced by this apparatus; sixth, this apparatus applies to petroleum and other oils, separates the light oils from the heavier ones, purifies the product, and accomplishes a similar saving in fuel, time, and waste as in the distillation of spirits; seventh, this apparatus can be easily taken apart for the purpose of cleaning and tinning.

What we claim, and desire to secure by Letters Patent, is—

1. The rectifier b, with the plates 11, 12, and 13, for the purposes and as set forth.

2. The spiral dephlegmator e, constructed and acting as set forth.

3. The rectifier n, constructed in the manner and for the purposes specified.

4. The spiral dephlegmator p, constructed in sections, as and for the purposes specified.

5. The water-partitions in the tub containing the dephlegmator p, constructed so as to allow the water in different parts of the tub to be different in temperature, as set forth.

6. The bent pipe and cock u at the lower part of the condenser, to retain a portion of the alcohol in the condenser or allow it to be entirely emptied, as and for the purposes set forth, and in combination therewith the pipe v for the escape of gases, said pipe passing through the condensing water, as set forth.

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