

(No Model.)

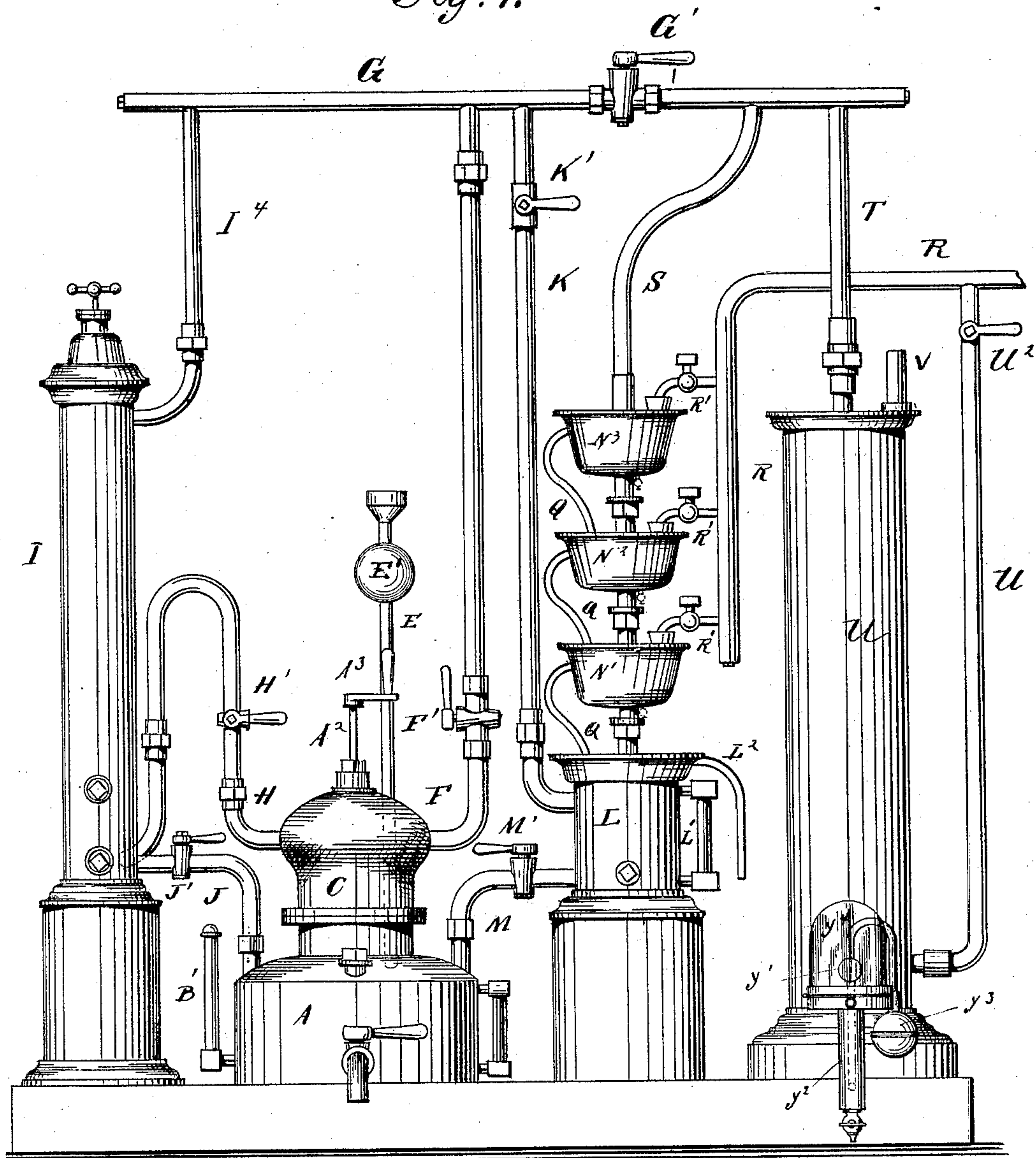
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J. SCHAFHAUS.
DISTILLING AND RECTIFYING APPARATUS.

No. 476,930.

Patented June 14, 1892.

Fig. 1.



WITNESSES:

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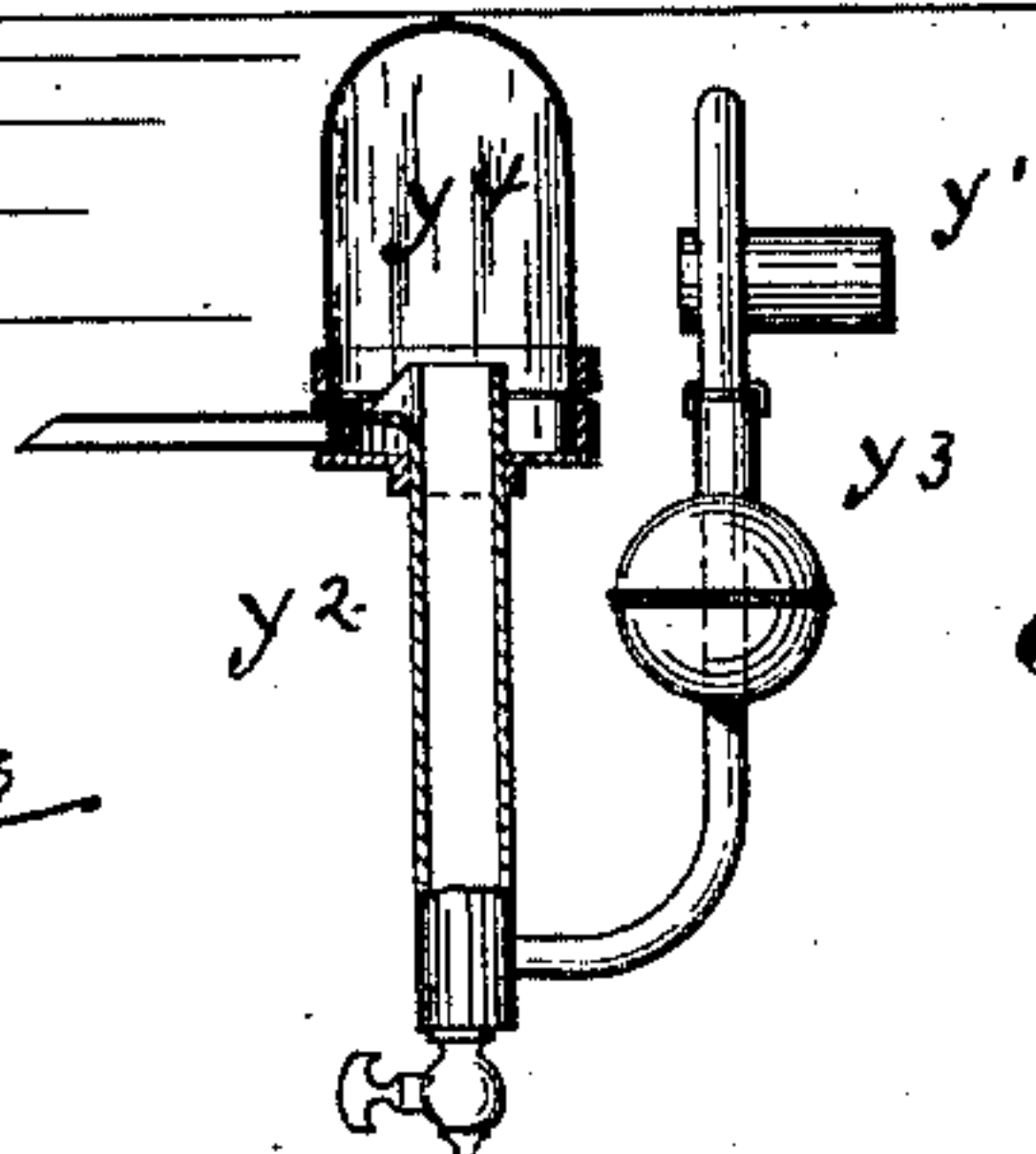


Fig. 10.

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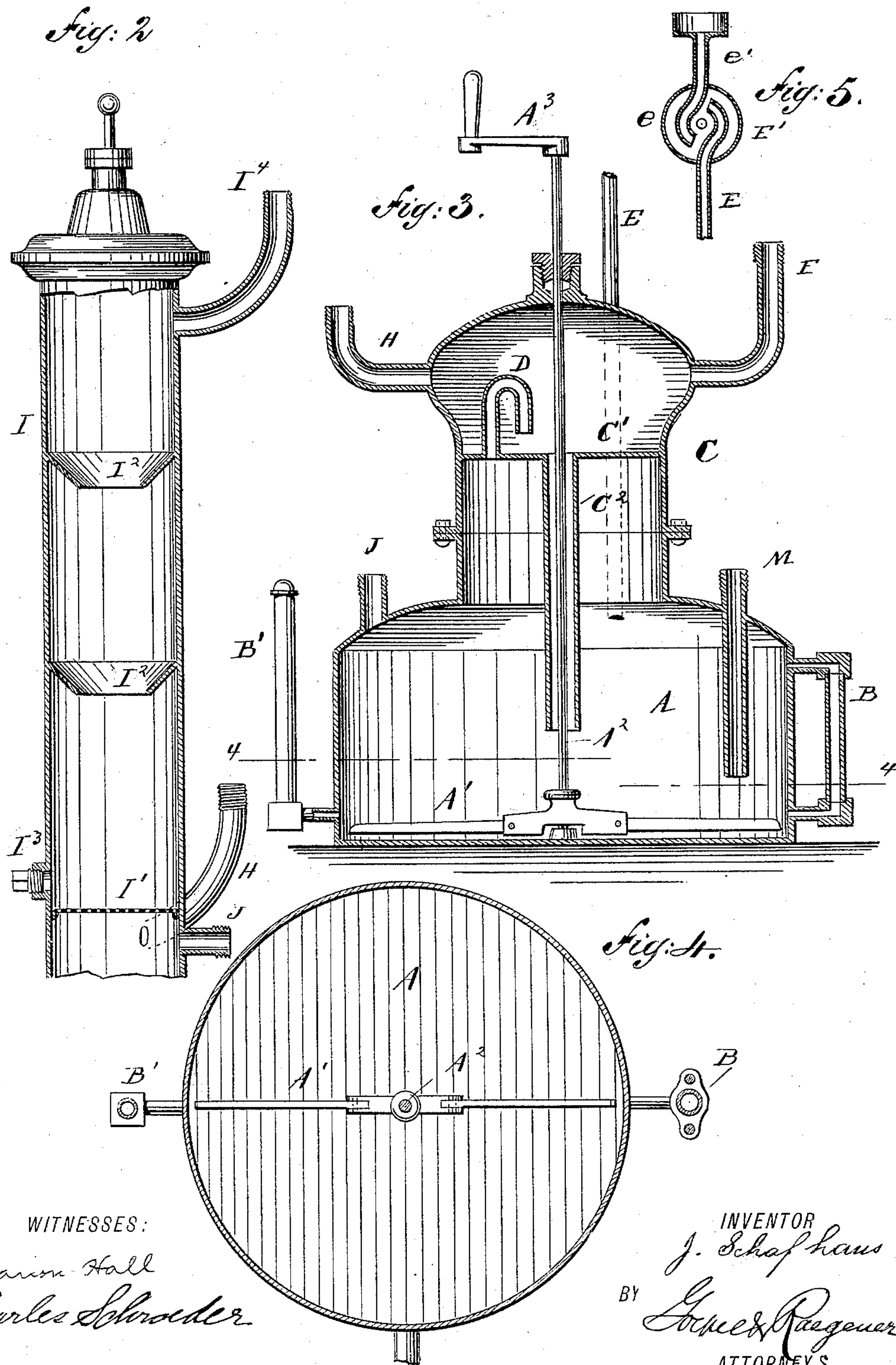
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Fig. 6.

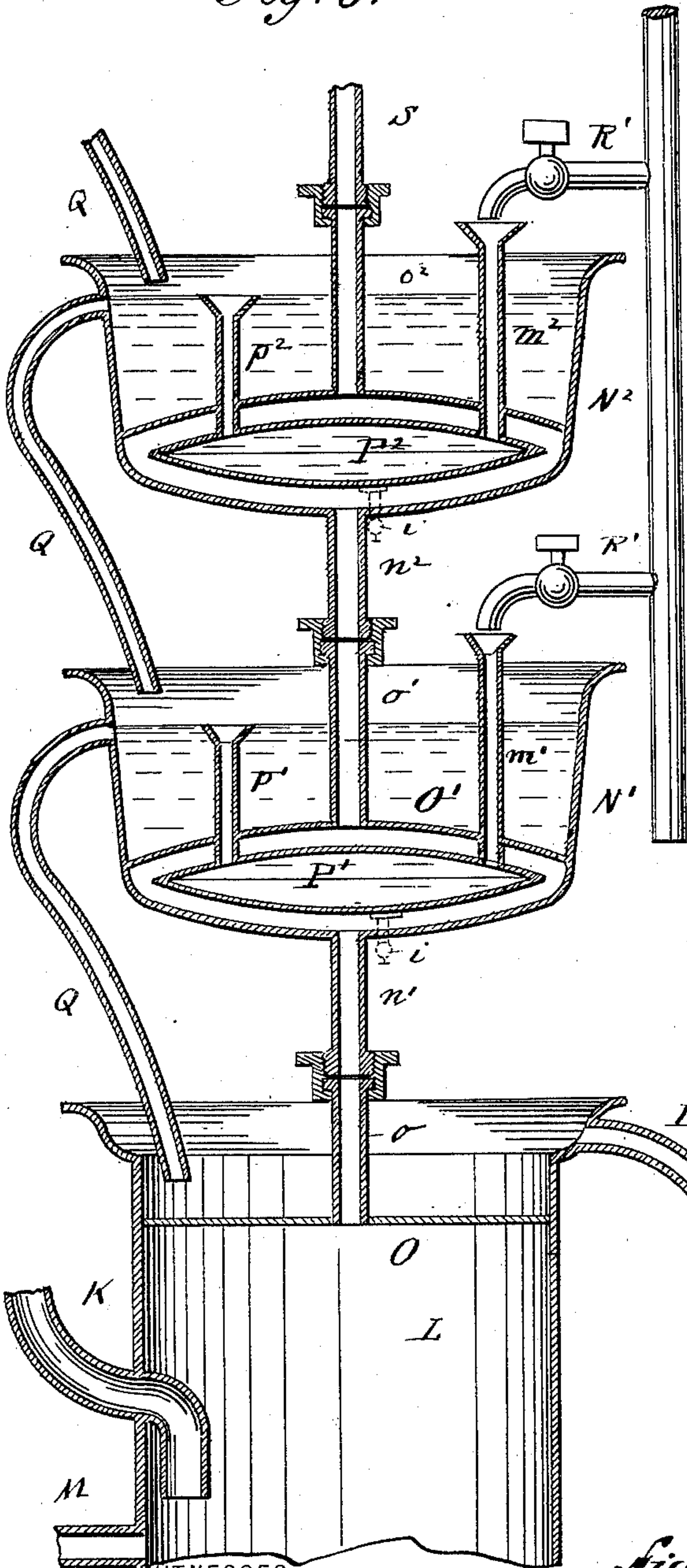


Fig. 7.

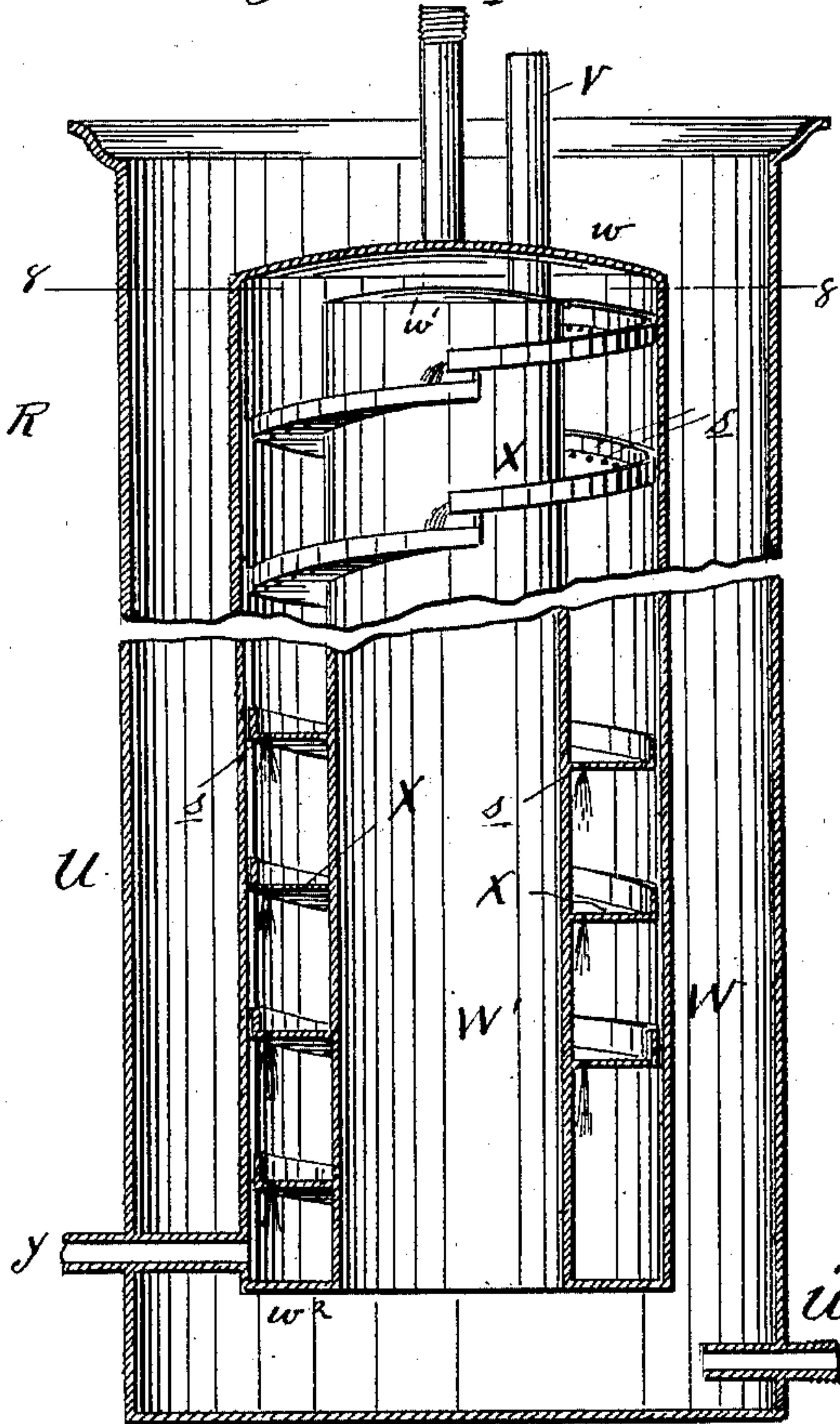


Fig. 8.

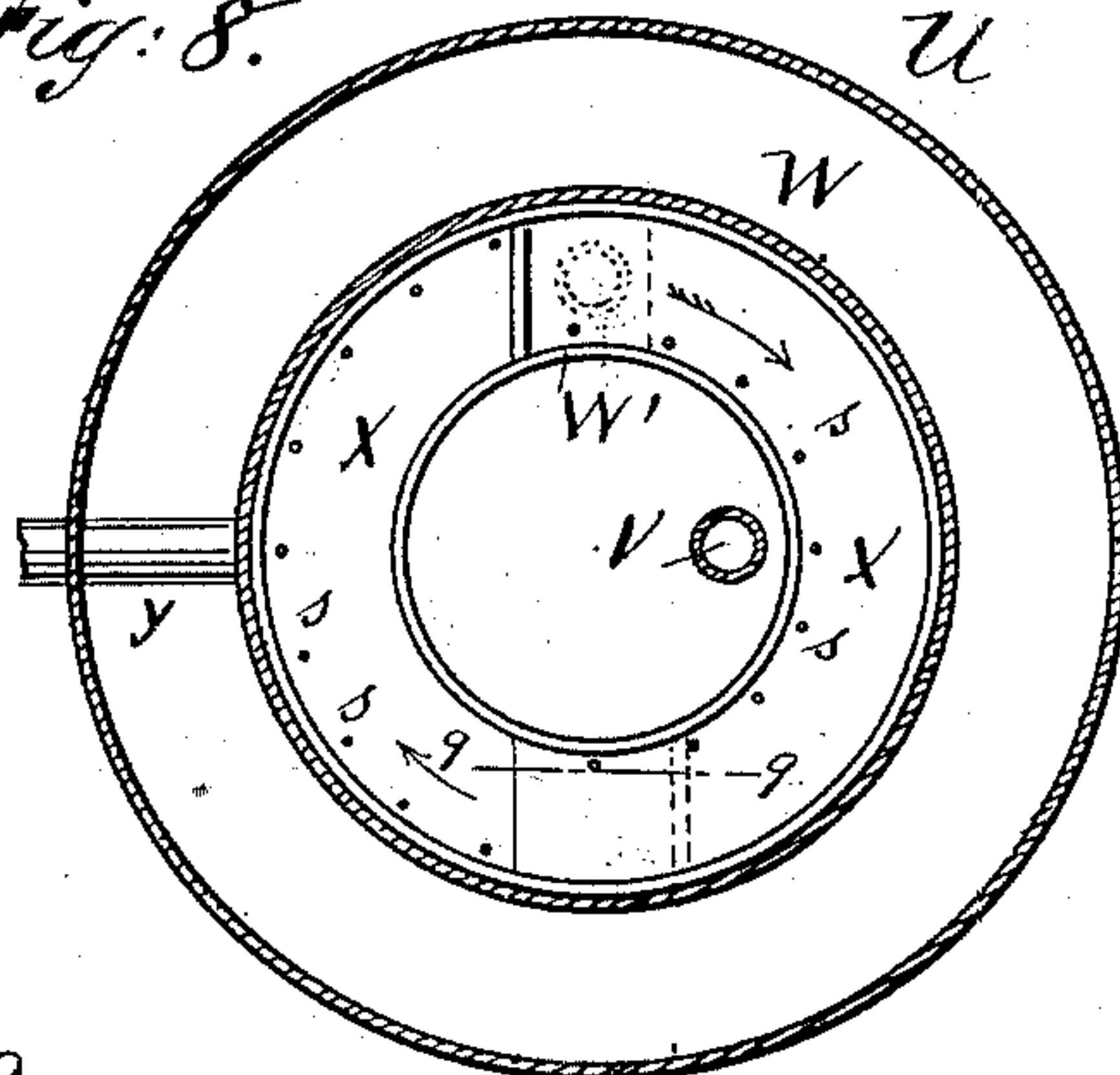
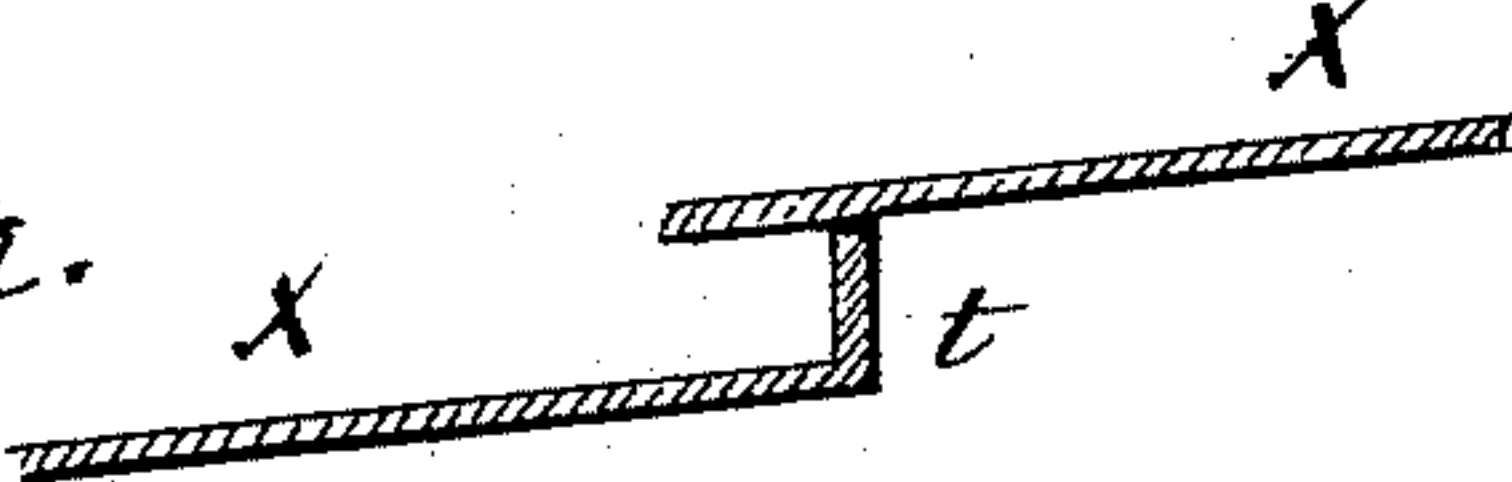


Fig. 9.



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UNITED STATES PATENT OFFICE.

JEAN SCHAFHAUS, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO
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DISTILLING AND RECTIFYING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 476,930, dated June 14, 1892.

Application filed September 24, 1891. Serial No. 406,760. (No model.)

To all whom it may concern:

Be it known that I, JEAN SCHAFHAUS, a citizen of the United States, and a resident of the city of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Distilling and Rectifying Apparatus, of which the following is a specification.

This invention relates to an improved distilling and rectifying apparatus which is simple in construction and which thoroughly separates the fusel-oil from the spirits very rapidly.

The invention consists in a still-body provided with a head having a transverse horizontal partition, a curved or siphon tube projecting upward from said partition, and a tube projecting from said partition downward into the still-body.

The invention further consists in a fusel-oil separator composed of a cylinder containing bone-black, coke, charcoal, or other material and one or more funnel-shaped horizontal partitions.

The invention further consists in a rectifier provided with two curved horizontal partitions and a closed receptacle for water between the same, said receptacle being provided with water inlet and outlet pipes; and the invention further consists in a condenser composed of two concentric cylindrical vessels, closed at their upper ends and connected at their lower ends, and a serpentine gutter formed between them.

The invention also consists in a construction and combination of parts and details, as will be fully described and set forth hereinafter, and finally pointed out in the claims.

In the accompanying drawings, Figure 1 is an elevation of my distilling apparatus. Fig. 2 is a vertical transverse sectional view of the fusel-oil separator. Fig. 3 is a vertical transverse sectional view of the still-body. Fig. 4 is a horizontal sectional view of the same on the line 4 4 of Fig. 3. Fig. 5 is a detail transverse sectional view of the regulator. Fig. 6 is an enlarged vertical transverse sectional view of the rectifying-column. Fig. 7 is a vertical transverse sectional view of the condenser, parts being broken out. Fig. 8 is a horizontal sectional view of the condenser on

the line 8 8 of Fig. 7. Fig. 9 is an enlarged detail sectional view on the line 9 9 of Fig. 8. Fig. 10 is a detail sectional view of the discharge and gaging device.

Similar letters of reference indicate like parts in all the figures.

The body A of the still is of the usual construction and is provided with a mixer or stirring apparatus A', fixed on the vertical shaft A², provided at its upper end with a handle A³. The said body is provided with a gage-glass B and a thermometer B'. On the top of the body the head C is secured, which is provided about half this height with a horizontal transverse partition C', from which the tube C² projects downward into the still-body A, the vertical shaft A² passing through the said tube C². A curved or siphon pipe D projects upward from the horizontal transverse partition C'. In case the contents of the still-body boils to such an extent that the liquid passes through the pipe D into the upper part of the head C said liquid can pass through the pipe C² back into the body of the still, thus keeping the steam, &c., in the upper part of the head C dry and preventing it from carrying along the moisture.

A pipe E projects upward from the still-body and carries a safety-valve E', consisting of the closed vessel e, into the top of which a pipe e' projects, and through the bottom of said vessel e the pipe E projects. The vessel is filled with water and forms the water-joint or safety-valve. The pipe F, connected with the head C, is provided with a cock F', and at its upper end is connected with a pipe G, that leads to a condenser. The pipe H, provided with a cock H', is also connected with the head C and conducts the vapors from said head to the bottom of the cylinder I, containing the screen I' above the inlet of said pipe, and also provided with one or more funnel-shaped horizontal partitions I². Said cylinder I is filled with coke, charcoal, bone-black, or any other suitable substance for absorbing and retaining the fusel-oil contained in the vapors. A second pipe J is provided with a cock J' and serves to conduct the phlegm from the cylinder I to the still-body.

I³ is a plug for closing the aperture through which the coke, charcoal, bone-black, or other

material can be removed from said cylinder I. The upper end of the cylinder I is connected by the pipe I⁴ with the pipe G, leading to the condenser. The funnel-shaped partitions I² serve for the purpose of deflecting the vapors and preventing them from rising in said cylinder along the side walls of the same and compel said vapors to pass through the interstices between the deflectors and the filling material. The pipe K, having a cock K', serves to conduct the vapors from the pipe G into the rectifier L, which is of the usual construction, with a cooling-top, and is connected by the pipe M, having a cock M', with the still-body, said pipe M serving to conduct the phlegm back into the still-body.

The rectifier is provided with a gage-glass L' and overflow-pipe L². A tube *o* projects upward from the partition O of the rectifier, and the upper end of the same is connected with the lower end of the pipe *n'*, projecting from the curved bottom of a bowl or basin N', provided with a curved transverse partition O', which, with the curved bottom of the basin or bowl N', forms a space in the bottom of said basin or bowl N', in which space a circular vessel P' of lens-shaped cross-section is arranged, said vessel P' being provided with two pipes *p'* and *m'*. Above the basin or bowl N' another basin or bowl N² like it is arranged, and contains the vessel P², provided with water-pipes *p*² and *m*², and is connected with the vessel P' by the pipes *o'* and *n*², and soon. Any number of cooling basins or bowls can be arranged one above the other. Each basin or bowl N' and N² is provided with an overflow-pipe Q for conducting the water from one basin or bowl N' or N² into the one below it, the last pipe Q serving to take the water from the lowest basin or bowl N' into the top of the rectifier L. A pipe R is provided with a number of cocks for conducting cold water into the several pipes *m'* *m*². Each lens-shaped vessel P' P² is provided with a drain-cock *i*, (shown in dotted lines,) by means of which the water can be drawn off when necessary to prevent fouling. The pipe *o*² of the uppermost basin or bowl is connected with a pipe S, which in turn is connected with the pipe G, having a cock G', arranged between the pipes S and K. The pipe G is connected by the pipe T with the top of the condenser, which consists of an exterior cylinder U, the bottom part of which is connected by the pipe U', having a cock U², with the cold-water pipe R. Within said cylinder U a smaller cylinder W is arranged, said cylinder W containing another small or concentric cylinder W'. The cylinder W is provided with the head *w*, and the interior cylinder W' is provided with the independent head *w'*. The bottom edges of the cylinders W and W' are indicated by the ring-shaped bottom *w*², the cylinder W' being open at the bottom, so that the cold water can rise in the same. The outer cylinder W is surrounded by water, and the inner cylinder W' is thus filled with wa-

ter. A pipe V extends from the top of the inner cylinder W' through the head *w* of the outer cylinder W, and serves for conducting off the spent cooling-water. Between the outer cylinder W and the inner cylinder W' a serpentine gutter is formed of a series of semicircular spiral steps X, the ends of said steps slightly overlapping each other, as shown, so that a break is formed in said serpentine gutter at every half-turn. The alternate step-sections of said gutter are provided with apertures *s* along the inner and outer edges, through which apertures the liquid can pass as a spray. To prevent the liquid that flows off one step-section from flowing backward and falling in a stream instead of a fine spray through the apertures, the ends of the step-sections are connected by the short vertical partitions A, as shown in Fig. 9. The outlet-pipe *y* is connected by the pipe *y'* with the tube *y*² for receiving a gage. *y*³ is a protecting-valve. *y*⁴ is a glass globe.

The operation is as follows: When the cock H' is closed and the cock F' is open, the vapors can pass through the pipes F, G, and T directly into the condenser, the cock G' being open and the cock K' closed. When the cock F' is closed and the cock H' open, all the vapors are compelled to pass through the pipe H' into the fusel column or cylinder I and to pass through the pipe I⁴ to the pipe G and through the pipe K into the rectifier L, the cock G' being closed and the cock K' open. The vapors entering the rectifier through the pipe K strike the partition of the rectifier and are condensed to a certain degree. The vapors that are not condensed pass through the tube *o* and circulate around the several lens-shaped vessels P' P², &c. They also strike against the cool partitions O' and O² of the bowls. The condensed liquid flows through the several pipes *o'* *o*² and *n'* *n*² and through the pipe M back into the still-body. The vapors that are not condensed in the rectifier pass through the pipe S into the pipe G and through the pipe T into the condenser. They pass over the serpentine gutter formed by the spiral sections X, and the condensed spirits are drawn off through the pipe *y*.

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

1. In a distilling apparatus, the combination of two concentric cylinders having their upper ends closed and their lower ends united, a serpentine gutter formed between said cylinders and composed of a series of semicircular spiral sections, the lower end of each semicircular spiral section overlapping the upper end of the next lower section, and short partitions connecting the upper end of each section with the under side of the lower end part of the next section above it, substantially as set forth.

2. In a distilling apparatus, a cooler formed of two concentric cylindrical vessels and spiral gutters formed between said vessels, said

gutters being provided with apertures, substantially as set forth.

3. In a distilling apparatus, the combination of a still, a fusel-oil separator, a valved pipe H, connecting the top of said still with said separator, a pipe I⁴, extending from said separator, a common connecting-pipe G, connected with said pipe I⁴, a rectifier, a pipe K, provided with a valve K' and connected with said pipe G, a pipe S, leading from said rectifier to said pipe G, a valve G' in said pipe G, between said pipes K and S, a condenser, and a pipe connecting said condenser with said pipe G on the same side of the valve G' as the pipe S.

4. In a distilling apparatus, the combination of a still, a fusel-oil separator, a valved pipe H, connecting the top of said still with said separator, a pipe I⁴, extending from said

separator, a common connecting-pipe G, connected with said pipe I⁴, a rectifier, a pipe K, provided with a valve K' and connected with said pipe G, a pipe S, leading from said rectifier to said pipe G, a valve G' in said pipe G between said pipes K and S, a condenser, a pipe connecting said condenser with said pipe G on the same side of the valve G' as the pipe S, and a pipe F, provided with a valve F', connecting the upper portion of the still with the said pipe G.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

JEAN SCHAFHAUS.

Witnesses:

OSCAR F. GUNZ,
CHARLES SCHROEDER.