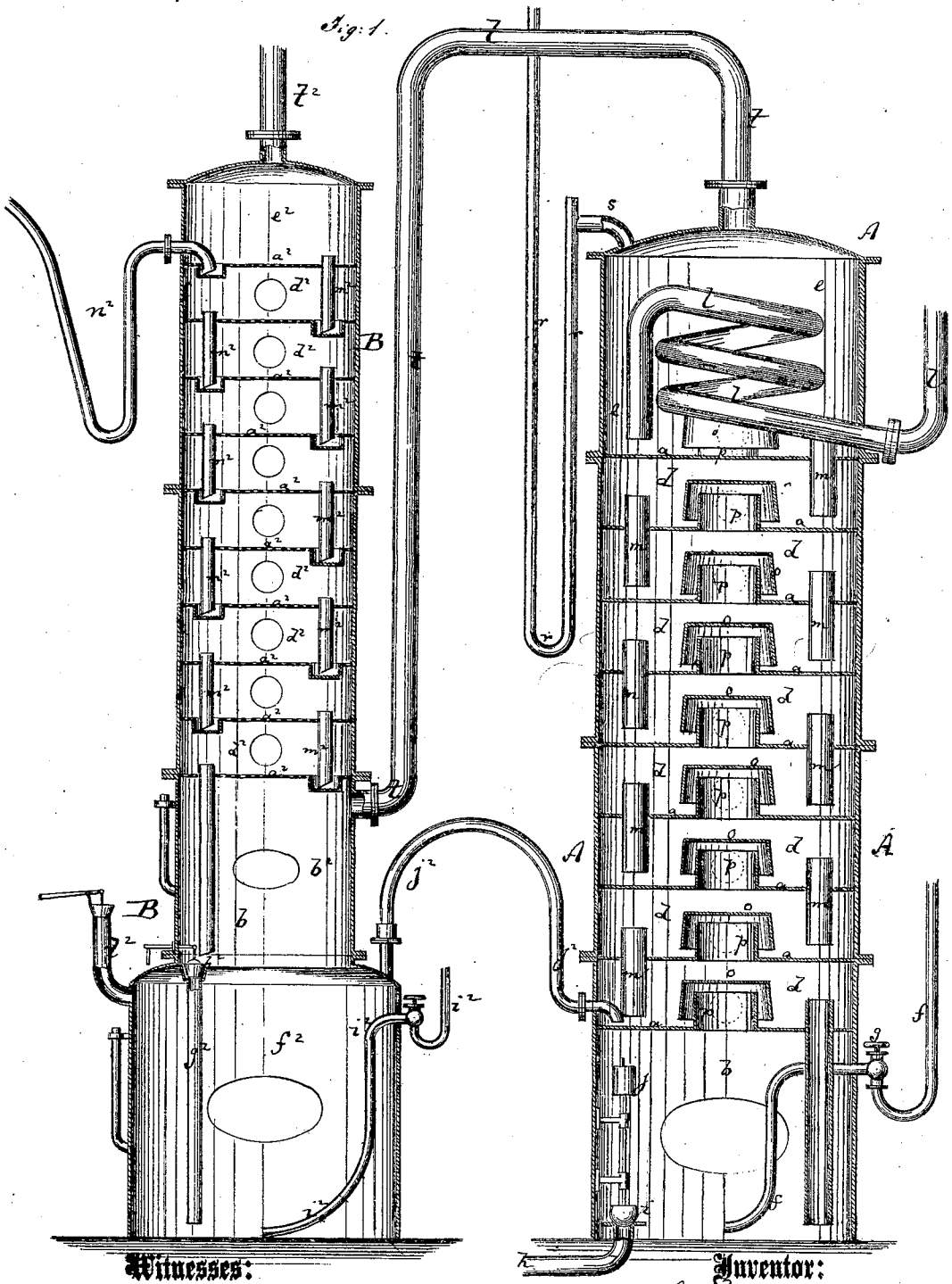
2 Sheets--Sheet 1.

H. DRUDING.

Improvement in Apparatus for Distilling.

No. 128,291. Patented June 25, 1872.

Fig: 1.



Witnesses:

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2 Sheets--Sheet 2.

H. DRUDING.

Improvement in Apparatus for Distilling.

No. 128,291. Patented June 25, 1872.

Fig: 3.

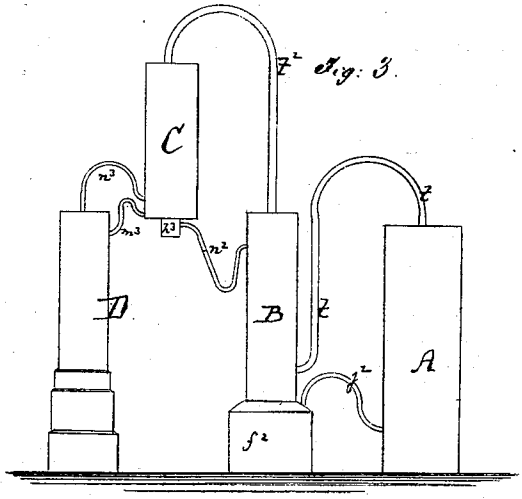
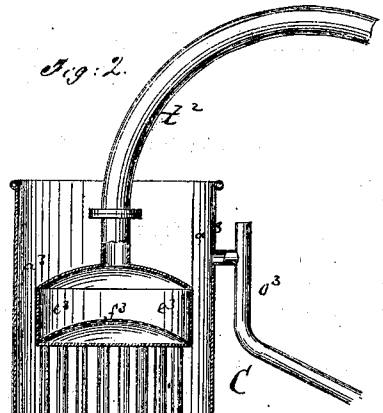


Fig: 2.



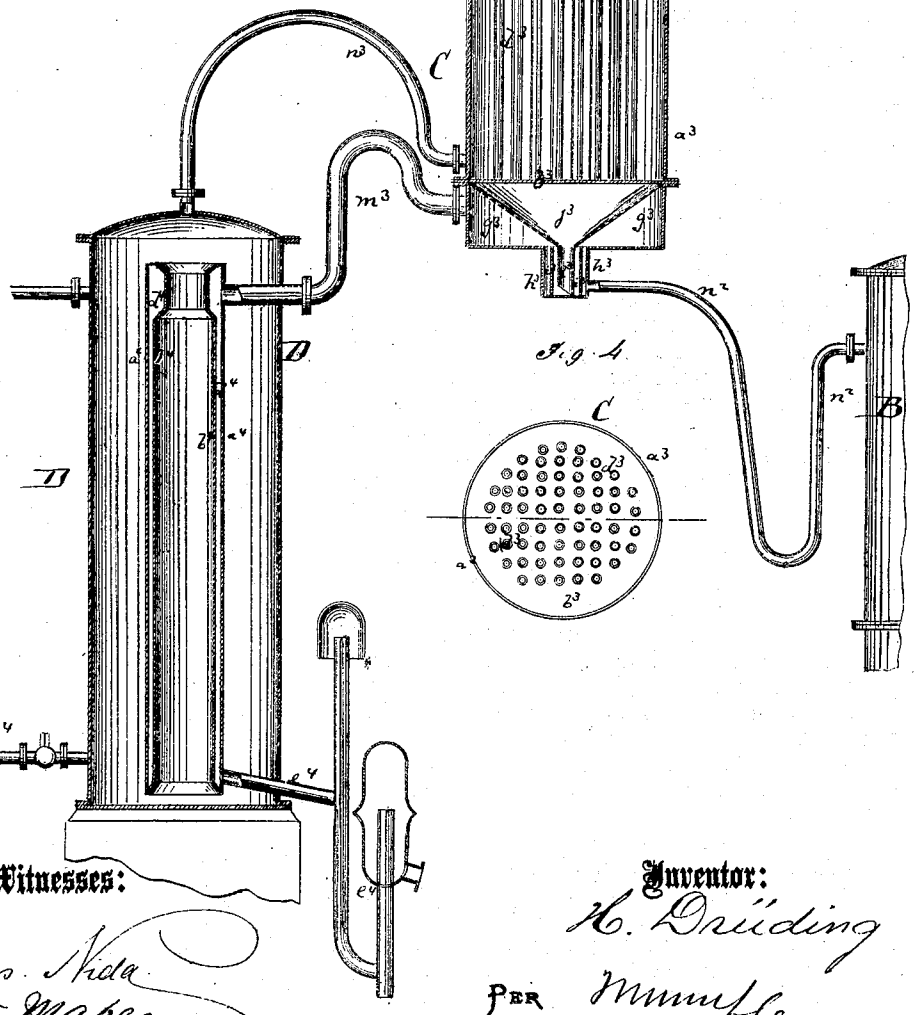


Fig. 4.

Witnesses:

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UNITED STATES PATENT OFFICE.

HEINRICH DRÜDING, OF BRIEG, PRUSSIA, ASSIGNOR TO EWALD SCHMIDT, OF HUDSON CITY, NEW JERSEY.

IMPROVEMENT IN APPARATUS FOR DISTILLING.

Specification forming part of Letters Patent No. 128,291, dated June 25, 1872.

Specification describing a new and Improved Distilling Apparatus, invented by HEINRICH DRÜDING, of Brieg, Prussia.

Figure 1 represents a vertical central section of the mashing apparatus and column. Fig. 2 is a vertical central section of the condenser and cooler. Fig. 3 is a diagram, showing all parts connected. Fig. 4 is a detail horizontal section of the cooler taken on the line *c c*, Fig. 2.

Similar letters of reference indicate corresponding parts.

This invention relates to a new distilling apparatus, which has for its object to obtain the largest practicable yield of spirits in the shortest time from a given quantity of mash, and consequently to be more economical in its operation than the devices for the same purpose now in use. The invention consists in a new arrangement of mashing apparatus, rectifying-column, condenser, and cooler, all as hereinafter more fully described.

The apparatus *in toto* consists of four principal parts—the mash apparatus A, rectifying-column B, condenser C, and cooler D—they being represented as properly connected in Fig. 3. The mashing apparatus A, shown in Fig. 1, is a cylindrical upright vessel, having a series of transverse partitions, *a a*, which form a lower mash-collector, *b*, a number of intermediate compartments, *d d*, and an upper injecting-chamber, *e*. A pipe, *f*, conducts the steam by which the mash is heated to the lower compartment *b*, and has a cock, *g*, by which the admission of steam can be regulated. The spent mash escapes from the compartment *b* through a pipe, *h*, which is closed by a valve, *i*. This valve *i* is connected to a float, *j*, and is elevated only where there is sufficient liquid in *b* to raise the float. There is consequently a constant collection of mash within the compartment *b*, from which the steam, entering through *f*, separates whatever can be evaporated. The fresh mash enters the injecting-chamber *e* through a pipe, *l*, which is coiled upward within *e* to be heated by the ascending vapors. This will cause the mash to enter in a warm state. From the chamber *e* the mash overflows through a pipe, *m*, to the compartment *d* next below, and from this further down through another overflow-pipe, *n*, until it finally arrives in the compartment *b*, whence it escapes through the pipe *h*. The steam entering the compartment *b* through the pipe *f* ascends, through a central aperture in the lower partitions *a*, into the lower compartment *d*, and thence upward through central openings in all the partitions *a a*. There are caps *o o* placed inversely over the tubular projections *p* which surround the central openings in the partitions *a*. The steam is by the caps crowded down under the surface of the mash in the several compartments, and thereby brought in such intimate contact with the liquid as to evaporate the alcoholic contents of the same. *r* is a safety-pipe, U-shaped. It is applied to the top chamber *e*, and filled with water to the height of its knee *s*. The chief characteristic of the mash apparatus A consists, therefore, of the perforated partitions *a a*, having the pipes *p* and inversely-arranged caps *o*, whereby the ascending steam and descending mash are brought into such intimate contact as to be productive of the desired results. Another distinctive characteristic of this mash apparatus consists in the arrangement of the coil *l*, in which the mash, before entering the chamber *e*, ascends to be heated. Provision is made for the complete emptying of the chambers *d* by plugs fitted close to their bottoms. The products of evaporation are, in a pipe, *t*, carried from the top of the vessel A to the lower part of the column B. This column is also of cylindrical form, and divided, by a series of perforated horizontal partitions, a^2 a^2, into a lower receiving-chamber, b^2, intermediate chambers d^2 d^2, and a top chamber e^2. The alcoholic vapors from the apparatus A enter the chamber b^2 through the pipe *t*, and ascend through the perforated partitions to escape through a top pipe, t^2, into the condenser C. Whatever is condensed on the way drops from the several perforated pipes either in drops, or, if it collects in greater masses, through overflow-pipes m^2 m^2. Under the chamber b^2 is another chamber, f^2, into which such products of condensation finally escape through a pipe, g^2, which is closed by a valve, h^2. Steam is let into the chamber f^2 through a pipe, i^2, and serves to re-evaporate such products of condensation, which are then, by a pipe, j^2, carried back to the lowermost

chamber d of the mash apparatus. l^2 is a safety-pipe on the chamber f^2. n^2 is a pipe which carries products of condensation back to the column B from the condenser C. The condenser C consists of an outer cylinder, a^3, which is filled with water and has a bottom, b^3. Within the cylinder is a series of upright pipes, d^3 d^3, whose lower ends fit through the bottom b^3, while their upper ends enter a vessel, e^3, which connects with the pipe t^2. The alcoholic vapors from the column enter the vessel e^3, and there pass through a perforated diaphragm, f^3, which separates the stream and distributes it for the several pipes d^3. In passing through these latter the vapors are exposed to the condensing action of the cold water, and enter finally, together with any products of condensation, a vessel, g^3, which is affixed to the lower end of C, as shown. There is a depression, h^3, in the bottom of g^3, and a cylinder, i^3, open on top, fitted into the same. The pipe n^2 extends from the outer part of h^3. A funnel, j^3, perforated, is arranged within g^3, under the bottom b^3, and terminates in a small tube, l^3, which enters the cylinder i^3, and is open at the bottom. A pipe, m^3, extends from the side of the vessel g^3 into the cooler D, carrying the vapors to the latter. Products of condensation enter the funnel j^3 and flow thence to i^3. All the heavy matter overflowing from i^3 enters the depression h^3, and escapes finally, through the pipe n^2, into B. The cold water is supplied to the lower part of the vessel a by a pipe, n^3, from the cooler. The warm water escapes at top in a pipe, o^3. The cooler D consists of a double pipe, a^4 b^4, which furnishes an annular space, d^4, into which the alcohol is conducted by the pipe m^3, and whence it is discharged by a pipe, e^4. Cold water surrounds and enters the double pipe a^4 b^4, and is supplied from below through a pipe, f^4, and discharged at the top by the pipe n^3. In this cooler the alcohol is fully condensed. The pipe e^4 has a suitable lock for collecting and discharging the alcohol.

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

1. The coil l, arranged in the upper chamber e of the mash apparatus to allow the mash to ascend and become warm before entering the apparatus, as specified.

2. The discharge-pipe h of the mash apparatus, provided with the float-valve j, to be opened only when the spent mash has reached a certain height in the chamber b, as set forth.

3. The cooler D, containing the double pipe a^4 b^4 and pipe e^4, as set forth.

4. The combination, in one apparatus, of the vessels A, B, C, and D, when they are all arranged in the manner substantially as herein shown and described.

The above specification of my invention signed by me this 20th day of November, 1871, at Brieg, in Prussia.

HEINRICH DRÜDING.

Witnesses:

WILHELM NIEMANN,
Public Notary in Prussia.

JOHANNES CARL HERMANN,
Clerk at Brieg.