(No Model.)

P. R. GRAY, Jr.

ABSORBER FOR REFRIGERATIVE APPARATUS.

No. 437,192. Patented Sept. 30, 1890.

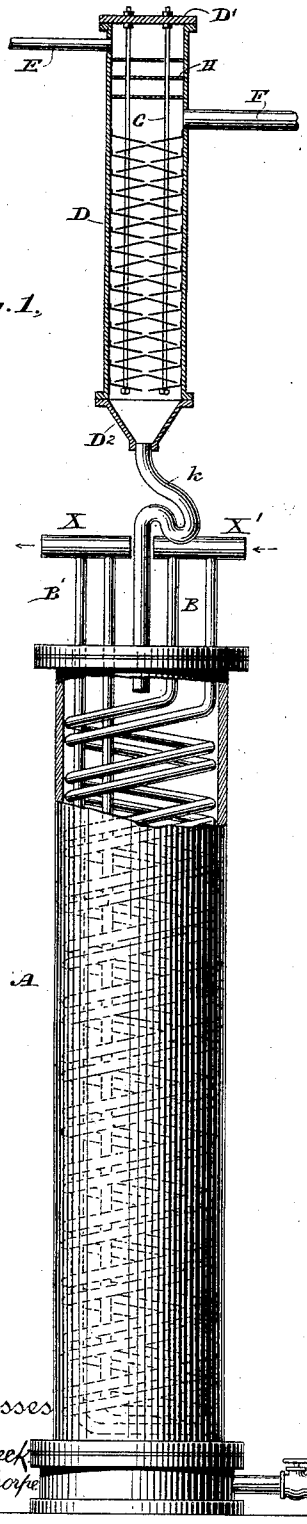


Fig. 1.

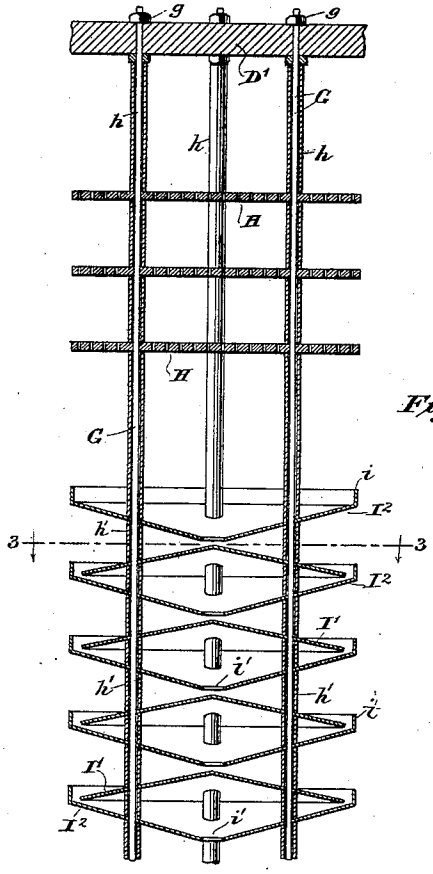
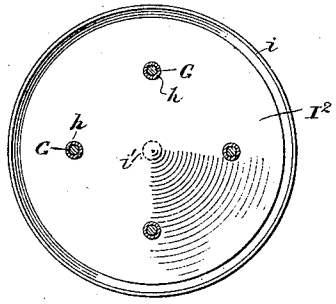


Fig. 2.

Fig. 3.



Witnesses
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UNITED STATES PATENT OFFICE.

PHILANDER R. GRAY, JR., OF ELIZABETH, NEW JERSEY.

ABSORBER FOR REFRIGERATIVE APPARATUS.

SPECIFICATION forming part of Letters Patent No. 437,192, dated September 30, 1890.

Application filed November 13, 1889. Serial No. 330,167. (No model.)

To all whom it may concern:

Be it known that I, PHILANDER R. GRAY, Jr., a citizen of the United States, residing at Elizabeth, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Absorbers for Refrigerating Apparatus, of which the following is a specification.

My invention more especially relates to refrigerating apparatus in which aqua-ammonia or a similar cooling agent is alternately vaporized and absorbed. Such apparatus is shown in United States Letters Patent No. 406,345, granted to Philander R. Gray and myself jointly July 2, 1889.

The object of my invention is to provide a simple and efficient absorber, the parts of which can readily be removed or replaced without disturbing the other parts of the apparatus.

My improvements consist in certain novel organizations of instrumentalities hereinafter specified.

The accompanying drawings represent so much of an absorber as is necessary to illustrate the subject-matter claimed. Unless otherwise indicated the parts are of usual well-known construction.

Figure 1 shows an elevation with the absorber proper in section and the lower casing broken away to show the internal organization. Fig. 2 shows a similar view of the absorber proper on an enlarged scale, with the casing removed; and Fig. 3, a horizontal section on the line 3 3 of Fig. 2.

The drawings show a double coil B extending from the top to near the bottom of the lower cylinder A, and thence extending straight up to the top again, as multiples B′. A discharge-pipe C opens into the bottom of the cylinder.

In the present instance I substitute for the aspirator or injector shown in the patent above mentioned a case D, having heads detachably connected therewith in well-known ways. The weak-ammonia pipe E enters this case near its top on one side, while the gas-pipe F enters it at a lower level on the opposite side.

Rods G, secured to the upper head D′ by nuts *g* or other suitable well-known means, project parallelly downward inside the case nearly to its bottom. Tubes or thimbles *h*, encircling these rods, sustain a series of horizontal parallel reticulated diaphragms or sieves H, arranged one above the other near the upper part of the case between the liquid-ammonia and gas pipes above mentioned. These tubes also sustain a series of inclined plates of a convex or shield shape in cross-section, arranged parallelly in pairs one above the other below the gas-pipe a slight distance apart, with their convex sides outward, so as to appear substantially lozenge or diamond shape in cross-section. Each lower shield or basin I^2 is dish-shaped, with a central opening *i′* and an upright circumferential flange *i*. The upper shield or deflector I′ is imperforate and roof-shaped and of smaller diameter than the flange of its corresponding basin, into which it fits in such manner as to leave an annular peripheral passage between them.

The tubes, as before remarked, are made in sections interposed not only between the sieves themselves and between the sieves and shields, but also between the basins and deflectors themselves, constituting the shields, and thus act as distance-pieces or spacing-thimbles. The thimbles *h′* have their ends inclined or cut diagonally to conform to the inclination of the basins and deflectors between which they are interposed, thus supporting and bracing them firmly, while rendering their parts readily separable or replaceable. Four sets of rods and spacing-thimbles are shown at some distance from the center. These tubes may also be connected at their lower ends with a head in the same manner as described for the upper end, except that its diameter should be small enough to permit it to be freely withdrawn from the casing. I thus secure the firm support and connection of the basins and deflectors and prevent their being bent or twisted out of place by the weight of the overflowing liquid, and am also enabled to leave the center of the basins clear for the passage of the liquid. The topmost deflector of the series is dish-shaped, corresponding with the basin below it, but having no upper deflector. This prevents the scattering or radial dispersion of the liquid falling from the sieves.

The lower head D^2 of the case is cone-shaped and connected with the cylinder A below it by a pipe provided with a goose-neck or trap *k*.

Owing to the construction above described, the sieves, basins, and deflectors may all readily be removed with the head D′ by simply detaching it from the case.

In operation, the weak ammonia enters the case D near its top and falls through the sieves H in a shower. At the same time the gas enters through the pipe F and fills the space between the sieves and the basins and deflectors. Consequently the weak ammonia absorbs the gas in its passage through it, and the two are mingled, descending and flowing over the basins and deflectors into the lower head D^2, whence they pass through the pipe and flow over the coils B to the lower part of the apparatus, and subsequently pass out from the cylinder through the discharge-pipe C. The accumulation in the trap *k* prevents gas from escaping downward until thoroughly mingled with the liquid.

Having thus fully described the organization and operation of my improved absorber, what I claim therein as new, and as of my own invention, is—

1. The combination, substantially as hereinbefore set forth, of the case, its removable upper head, the basins and deflectors, and the suspension-rods forming the sole connection between said head, basins, and deflectors.

2. The combination, substantially as hereinbefore set forth, of the case, its removable upper head, the sieves, the basins, the deflectors, and the suspension-rods directly connecting the sieves, basins, and deflectors with the head and forming their sole means of support.

3. The combination, substantially as hereinbefore set forth, of the case, its removable upper head, the suspension-rods secured thereto, the sieves supported by the rods, and the spacing-thimbles interposed between the sieves and encircling the rods to sustain the sieves thereon.

4. The combination, substantially as hereinbefore set forth, of the case, its detachable upper head, the suspension-rods secured thereto, the inclined-surfaced basins and deflectors through which the rods pass, and the interposed spacing-thimbles encircling the rods and sustaining the deflectors in proper relation to each other.

5. The combination, substantially as hereinbefore set forth, of the case, the liquid-inlet pipe near its top, the gas-inlet at a lower level, the removable upper head, the series of sieves between the liquid and gas inlets, the inclined-surfaced basins and deflectors beneath the gas-inlet, and the suspension-rods passing through the sieves, basins, and deflectors.

6. The combination, substantially as hereinbefore set forth, of the case, its liquid and gas inlet pipes passing through the sides of the case, the removable upper head, the suspension-rods secured thereto, the inclined-surfaced basins and deflectors suspended by the rods below the gas-inlet, the lower cylinder, its coils and multiples, the pipe connecting the cylinder with the bottom of the absorber, and the trap in said pipe to prevent the escape of gas until thoroughly mingled with the liquid.

7. The absorber hereinbefore described, consisting of the combination of the upper cylinder, the liquid-inlet pipe near its upper end, the gas-pipe entering at a lower level, the series of sieves interposed between these pipes, the inclined-surfaced basins and deflectors below the pipes, the series of suspension-rods passing through and connecting the sieves, basins, and deflectors with the head, the lower cylinder, its coils, multiples, and discharge-pipe, and the outlet-pipe and its trap interposed between the cylinder and the absorber, the combination being and operating as described.

In testimony whereof I have hereunto subscribed my name.

P. R. GRAY, JR.

Witnesses:
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