

No. 708,847.

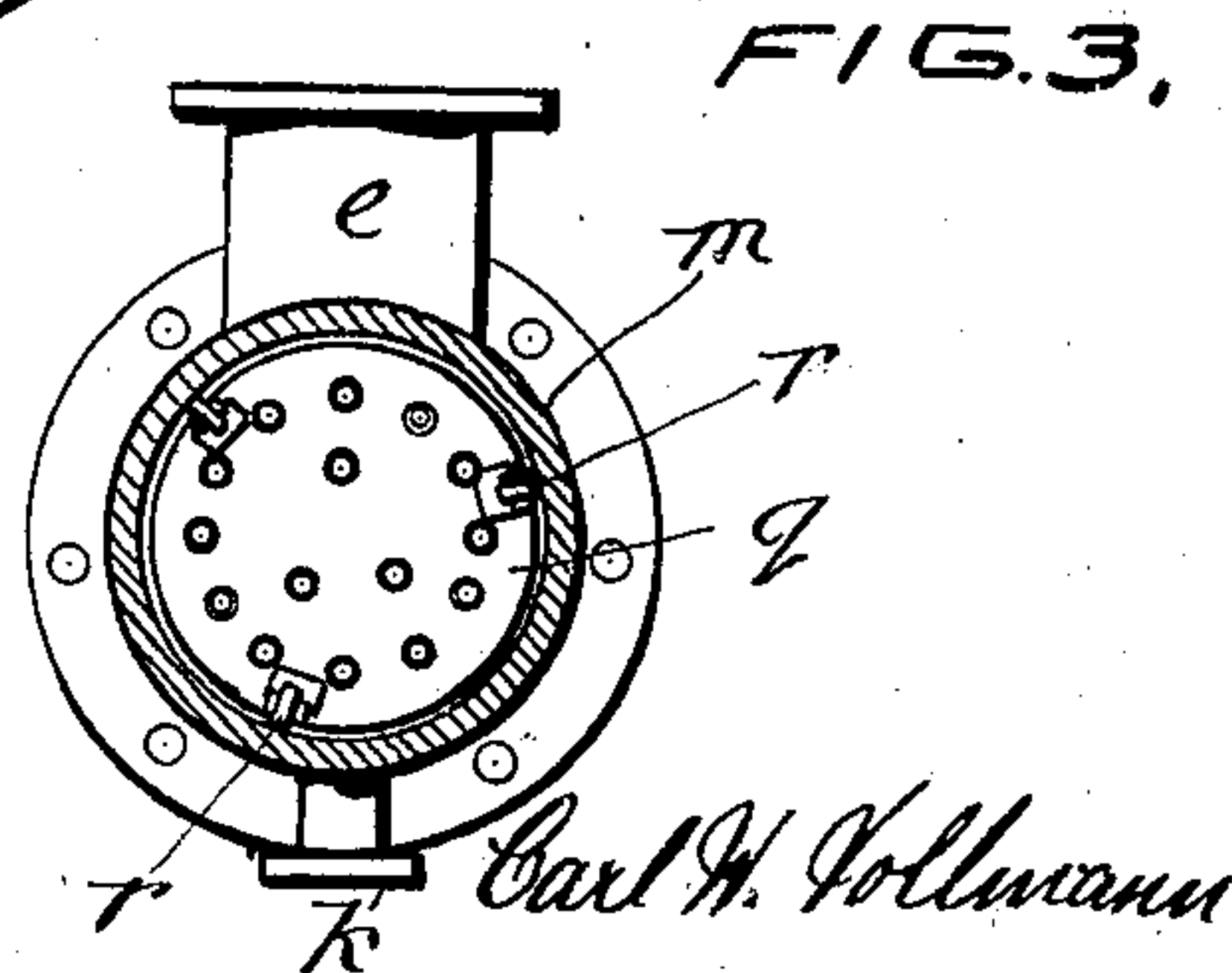
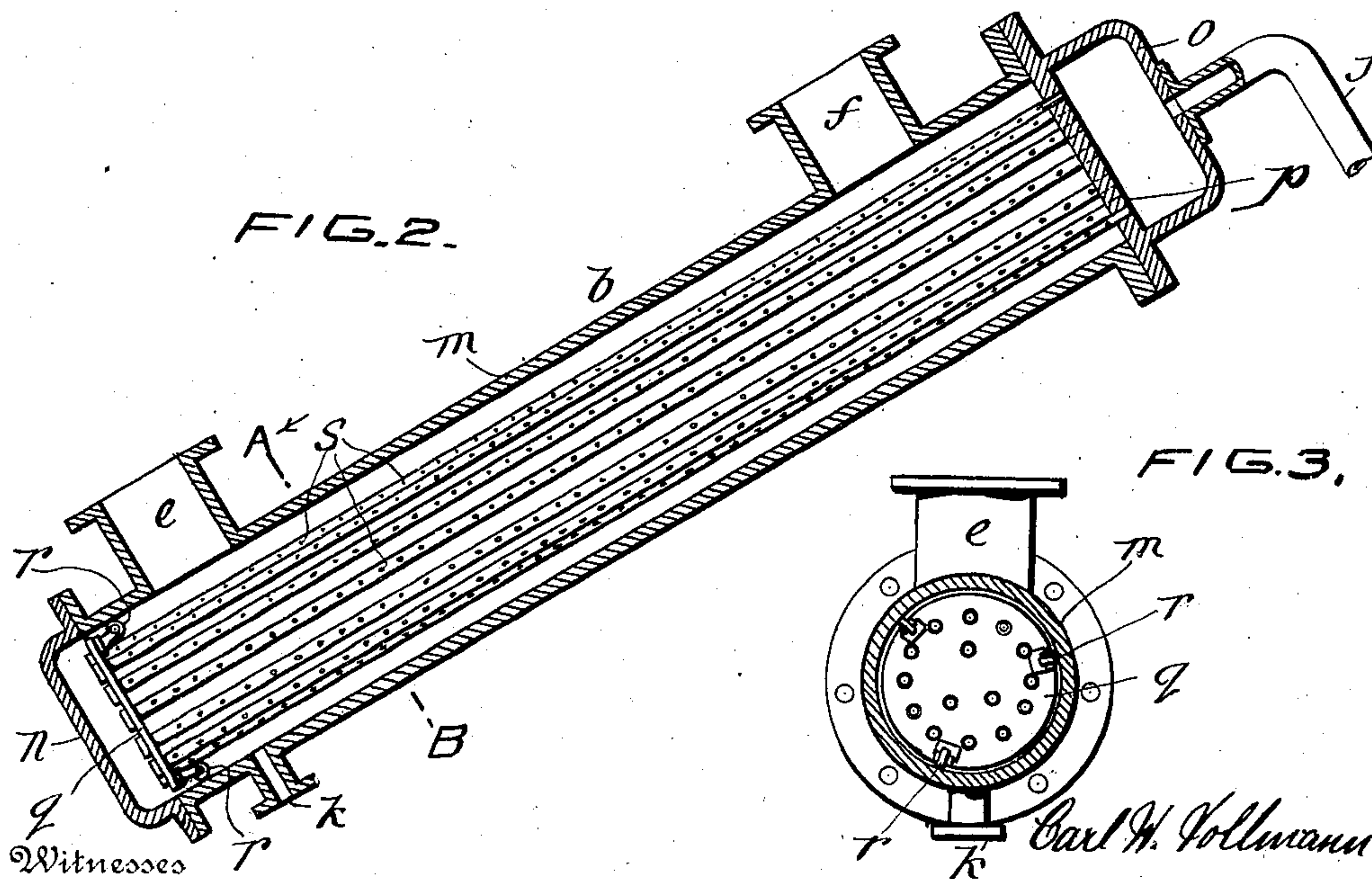
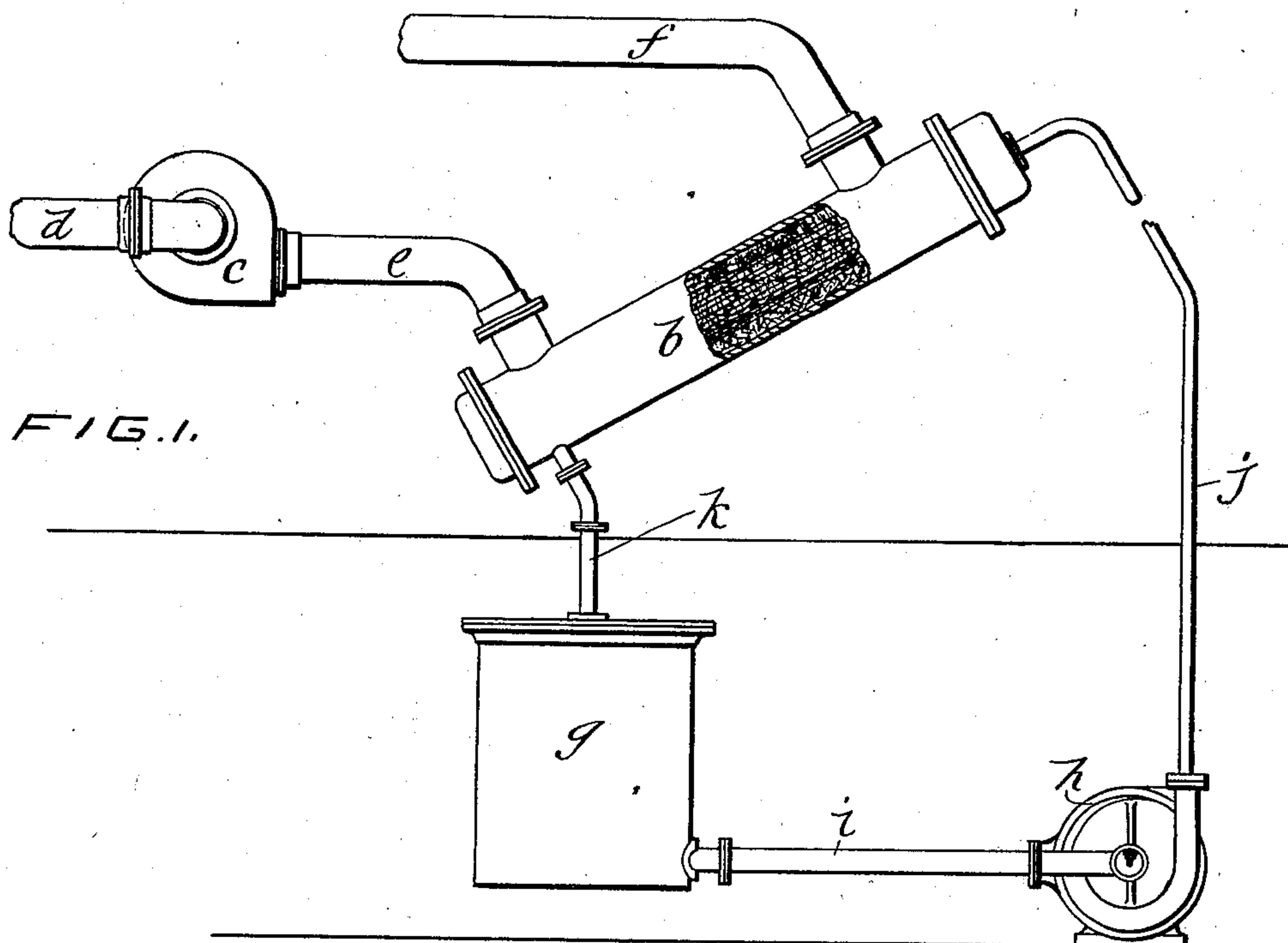
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AIR COOLING AND PURIFYING APPARATUS.

(Application filed Apr. 13, 1901.)

(No Model.)



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UNITED STATES PATENT OFFICE.

CARL WILHELM VOLLMANN, OF MONTREAL, CANADA.

AIR COOLING AND PURIFYING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 708,847, dated September 9, 1902.

Application filed April 13, 1901. Serial No. 55,783. (No model.)

To all whom it may concern:

Be it known that I, CARL WILHELM VOLLMANN, of the city of Montreal, in the district of Montreal and Province of Quebec, Canada, have invented certain new and useful Improvements in Air Cooling and Purifying Apparatus; and I do hereby declare that the following is a full, clear, and exact description of the same.

My invention relates particularly to apparatus for cooling and purifying the air in the holds or other compartments of sea-going vessels; and it has for its object to enable the air of a compartment to be cooled and purified without the necessity of supplying fresh air from the exterior of the compartment.

To this end the invention may be said briefly to consist in providing a chamber proper, an auxiliary chamber, said chamber proper containing a series of brine-conducting sections communicating at one end with the interior of said auxiliary chamber, means for forcing a cooling fluid into said hollow head and through said pipes, said pipes having fluid-exhaust openings, means for spraying the cooling fluid over and between said pipes, a fan or other means for exhausting the air from the compartment and causing it to pass through said chamber proper and in contact with the brine flowing over said brine-conducting sections and being sprayed, and thence be returned to the compartment in a cooled and purified state. For full comprehension, however, of my invention reference must be had to the accompanying drawings, forming a part of this specification, in which like symbols indicate the same parts, and wherein—

Figure 1 is a diagrammatical view of an air cooling and purifying apparatus constructed according to my invention. Fig. 2 is a longitudinal sectional view of my preferred form of closed chamber drawn to a larger scale; and Fig. 3 is a transverse vertical sectional view thereof, taken on line A B, Fig. 2.

My improved apparatus is illustrated as using chilled brine as a cooling fluid, and the apparatus comprises a closed air cooling and purifying chamber *b*, a fan *c*, air-conducting pipes *d*, *e*, and *f*, leading, respectively, from

the apartment to the fan, from the fan to one end of the closed chamber and from the other end of the closed chamber to the apartment, the cooling-fluid supply preferably consisting of a brine-refrigerator *g*, a brine-pump *h*, and brine-pipes *i*, *j*, and *k*, leading, respectively, from the brine-refrigerator to the pump, from the pump to one end of the air cooling and purifying chamber, and from the other end of the said air cooling and purifying chamber to the brine-refrigerator.

In this apparatus, though consisting in itself of a novel combination, the novel features of detail construction reside in the closed air cooling and purifying chamber, which consists of a cylinder *m*, supported, preferably, in an inclined position and having its lower end closed by a cap *n*, while its other end is closed by a head *o*, formed with a transverse diaphragm *p*, cutting off the interior of said latter head from the interior of the cylinder and constituting thereby an auxiliary chamber. This diaphragm has a series of tapped openings, into which the screw-threaded ends of a series of perforated pipes are screwed, the opposite ends whereof are supported in and localized by a spacing-plate *q*, supported in turn on the interior of the cylinder by rollers *r*. The perforations *s* of each pipe of the series are preferably disposed in staggered relation to the perforations in the pipes adjacent thereto.

The method of cooling and purifying the air of a compartment, such as the hold of a ship, with my improved apparatus is as follows: The air is exhausted from the hold by the fan and driven through the cylinder back to the hold again. During this passage of the air through the cylinder brine will be pumped from the refrigerator and forced into the hollow head or auxiliary chamber, and thence through the perforated pipes and ejected therefrom in the form of sprays, which are directed from each pipe upon the portions to the pipes adjacent thereto between the perforations thereof, while the sprays from the outermost pipes of the series are directed upon the interior of the cylinder. One of the main structural features of my invention consists in providing the auxiliary chamber

in connection with the closed chamber proper and connecting thereto a series of pipes which extend through the closed chamber proper, the cooling fluid being fed into said auxiliary chamber and forced therefrom through the pipes and is again and repeatedly chilled and returned to the auxiliary chamber, thereby causing a circulation to be maintained, as just described. The inclined arrangement of the cylinder causes the brine to run down the interior surface thereof and the outer surface of the pipes to the exit end of said cylinder, and thereby completely coat said surface with a film of brine, while the staggered arrangement of the sprays and the splashing thereof upon the pipes and the interior surface of the cylinder will completely fill the interior through which the warm foul air from the hold must pass before being returned to the hold. The function of the rollers for loosely supporting the inner ends of the brine-conducting pipes or sections and the connection thereof to the removable brine-head is to enable the complete sections to be readily removed bodily for cleansing, repairs, or other purposes. The foul air is purified during its passage through the closed chamber by being brought into contact with constantly-flowing pure chilled brine, which has an affinity for the impurities of the air, which are thereby absorbed and destroyed, while the film of brine running along the exterior of the pipes presents a very extensive surface of constantly-flowing chilled pure brine in contact with which the air must come, and at the same time each pipe will be kept free from snow, which would otherwise be formed by the moisture carried into the chamber in the air.

It is obvious that, if desired and within the spirit of my invention, the closed air cooling and purifying chamber can be arranged horizontally, or, if desired, the interior brine-sections be inclined or other changes made in the precise construction and arrangement of my invention.

What I claim is as follows:

1. An air cooling and purifying apparatus, comprising a closed chamber consisting of a cylinder having one end closed by a cap, and its other end closed by a hollow head; a series of perforated pipes within said cylinder and extending longitudinally thereof, and having one end of each closed and the other ends thereof rigidly secured to and communicating with the interior of said head, means for forcing brine into said hollow head; a brine-exhaust port in said closed cylinder, and an air supply to and exhaust from said cylinder, substantially as described and for the purpose set forth.

2. An air cooling and purifying apparatus consisting of a closed chamber consisting of an inclined cylinder having one end closed by a cap, and its other end closed by a hollow head; a series of perforated pipes within said

cylinder and extending longitudinally thereof, and having one end of each closed and the other ends thereof rigidly secured to and communicating with the interior of said head, means for forcing brine into said hollow head; a brine-exhaust port in said closed cylinder, and an air supply to and exhaust from said cylinder, substantially as described and for the purpose set forth.

3. An air cooling and purifying apparatus comprising a closed chamber consisting of an inclined cylinder having one end closed by a cap, and its other end closed by a hollow head; a series of perforated pipes within said cylinder and extending longitudinally thereof, and having one end of each closed and the other ends thereof rigidly secured to and communicating with the interior of said head, the perforations in each of said pipes being in staggered relation to the perforations in the pipes adjacent thereto, means for forcing brine into said hollow head; a brine-exhaust port in said closed cylinder, and an air supply to and exhaust from said cylinder, substantially as described and for the purpose set forth.

4. An air cooling and purifying apparatus consisting of a closed chamber consisting of an inclined cylinder having one end closed by a cap, and its other end closed by a hollow head; a series of perforated pipes within said cylinder and extending longitudinally thereof, and having one end of each closed, and the other ends thereof rigidly secured to and communicating with the interior of said head, the perforations in each of said pipes being in staggered relation to the perforations in the pipes adjacent thereto, a spacing-plate supporting the closed ends of said pipes, a series of rollers mounted upon said plate and bearing upon the interior surface of said cylinder, means for forcing brine into said hollow head; a brine-exhaust port in said closed cylinder, and an air supply to and exhaust from said cylinder, substantially as described and for the purpose set forth.

5. An air cooling and purifying apparatus comprising a closed chamber consisting of an inclined cylinder having one end closed by a cap, and its other end closed by a hollow head; a series of perforated pipes within said cylinder and extending longitudinally thereof, and having one end of each closed and the other ends thereof rigidly secured to and communicating with the interior of said head, the perforations in each of said pipes being in staggered relation to the perforations in the pipes adjacent thereto, a spacing-plate supporting the closed ends of said pipes, a series of rollers mounted upon said plate and bearing upon the interior surface of said cylinder, a brine-refrigerator, a pump, a brine-pipe leading from said refrigerator to said pump, a brine-pipe leading from said pump to said hollow head, a brine-pipe leading from the lower end of said cylinder to said refrigerator, a fan, an

air-pipe leading from the compartment to be cooled to said fan, an air-pipe leading from said fan to the lower end of said cylinder, and a return air-pipe leading from the upper end
5 of said cylinder to said compartment, substantially as described and for the purpose set forth.

In testimony whereof I have affixed my signature in presence of two witnesses.

CARL WILHELM VOLLMANN.

Witnesses:

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