(No Model.)

C. A. COX & C. N. BROCKINGTON.

REFRIGERATING VALVE AND REGULATOR.

No. 450,575. Patented Apr. 14, 1891.

Fig. 1.

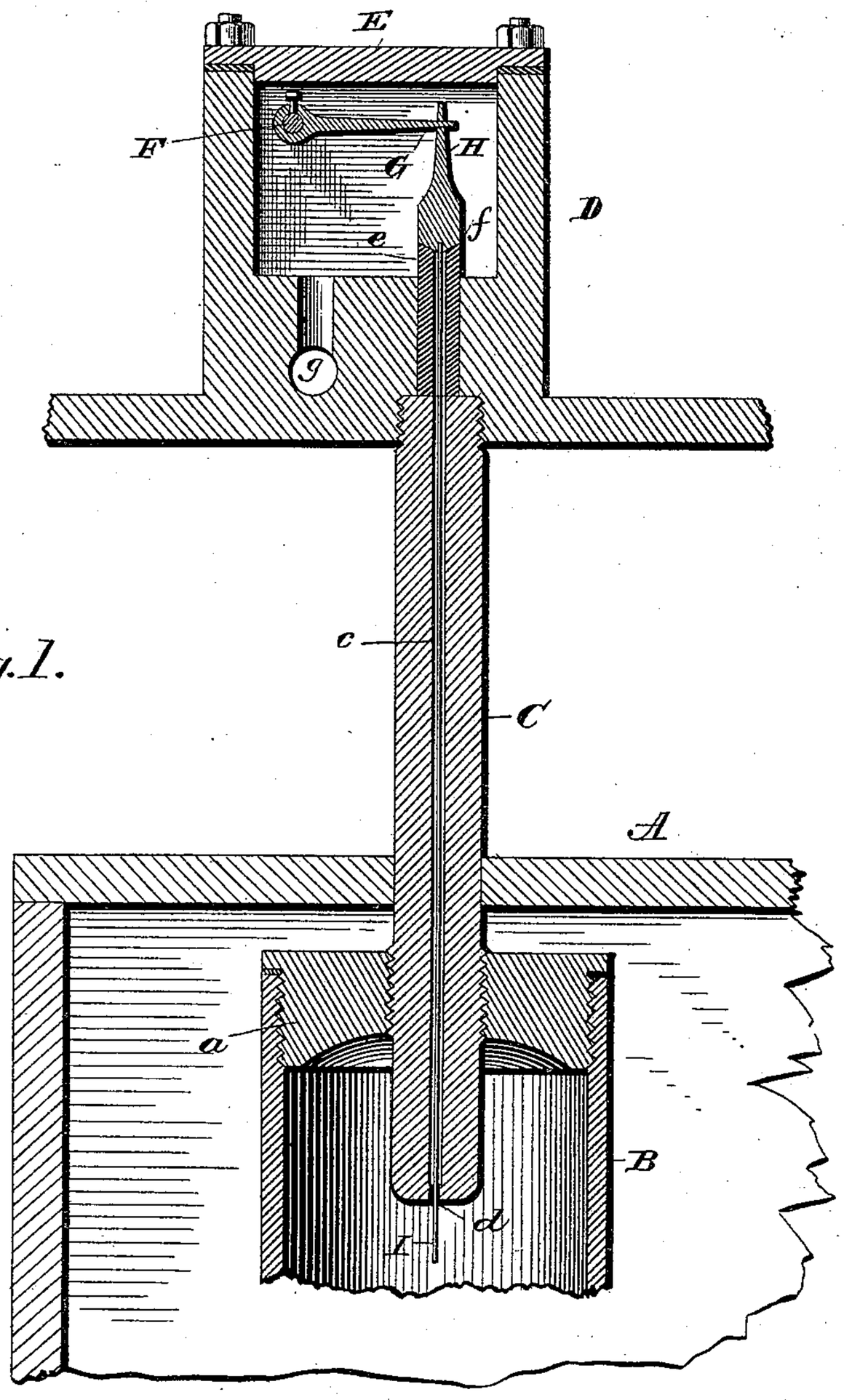
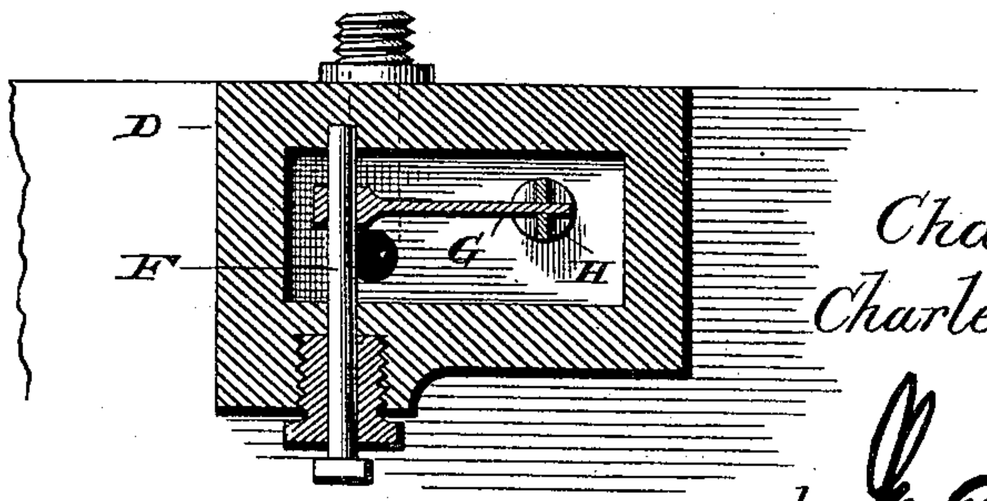


Fig. 2.



Witnesses
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UNITED STATES PATENT OFFICE.

CHARLES A. COX AND CHARLES N. BROCKINGTON, OF LOUISVILLE, KENTUCKY, ASSIGNORS OF ONE-FIFTH TO J. FRANK COX, OF SAME PLACE.

REFRIGERATING-VALVE AND REGULATOR.

SPECIFICATION forming part of Letters Patent No. 450,575, dated April 14, 1891.

Application filed March 20, 1890. Serial No. 344,602. (No model.)

To all whom it may concern:

Be it known that we, CHARLES A. COX and CHARLES N. BROCKINGTON, citizens of the United States of America, residing at Louisville, in the county of Jefferson and State of Kentucky, have invented certain new and useful Improvements in Refrigerating-Valves and Regulators Therefor; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

Our invention has reference to refrigerating and like apparatus designed for the artificial generation of cold; and it consists in the improved construction hereinafter described and set forth, whereby the refrigerating-liquid is properly supplied to the expansion header or coil within the refrigerating-compartment and the effective operation of the parts at all times assured. Furthermore, the construction and operation are such that the liquid will be economically delivered to the expansion header or coil by being caused to enter the same in a divided or sprayed condition.

In the accompanying drawings, forming part of this specification, Figure 1 shows in vertical sectional elevation a valve-box, valve, and connection with the expansion header or chamber of an apparatus for producing artificial cold, and Fig. 2 a plan view of the valve-box.

Heretofore, in so far as we have been advised, the most common arrangement for delivering the volatile liquid to the expansion header or coil has been through a valve located adjacent thereto and within the refrigerating compartment or chamber, said valve being operated by hand, the discharge-port and valve proper being so intimately located that they were subjected to all the effect of the sudden cold produced and the metal of the valve and other parts unduly contracted. Another disadvantage consisted in the fact that the liquid was discharged from the supply-pipe compactly into the expansion-chamber. By our improvements the discharge and expansion is effected at some distance from the valve, so that the cold effect is remote from the valve, and the liquid is sprayed into the expansion-chamber in a thoroughly separated condition.

In said drawings, A designates a portion of the walls of the box or compartment in which said artificial cold is to be produced, and B a portion of one of the headers of the pipe system therein, a screw-plug *a* closing the end opening of said header and centrally perforated and threaded for the engagement and passage of an extended tube C, externally threaded for its rigid connection with said plug and having additional threads at its outer extremity for its engagement with the threaded recess in the base of the valve-chamber D. As will be noted, the tube C is of comparatively extended length and has its lower end portion projected into the header for a slight distance. The longitudinal passage *c* in the tube is of small diameter, and at the lower end of said passage the tube is provided with an internal flange *d*, so as to contract thereat the diameter of said passage *c*. The said base of the valve-chamber D is internally enlarged and has a vertical opening containing a short tubular section *e*, having a passage registering with the passage *c* and of the same diameter, and the upper end of said section *e*, which is extended above the base and is concaved to form the valve-seat *f*. The said base has also a passage *g*, having a vertical and lateral branch, through which the volatile liquid is supplied to the chamber. The valve-box with its several parts, for the sake of strength and to prevent leakage, is preferably cast in a single piece and has its upper open end closed by means of a plate E, secured in position by threaded lugs and nuts.

Horizontally within the valve-chamber and bearing in one of the sides of the same is a shaft F, one end of which extends outside of the chamber for the application of a suitable operating medium. Upon the shaft and within the chamber is secured a horizontal arm G, the free end of which plays through a horizontal opening formed in the upper end of a

vertical valve H, the lower end of which is tapered to fit snugly against the valve-seat below.

In practice the valve H, through the medium of the arm and shaft, is raised from its seat to permit the desired quantity of volatile liquid to pass through the channel *c* to the expansion-header. The location of the spindle at the discharge end of the tube C, in conjunction with the flange *d* of the tube C, divides the charge of liquid and compels it to be discharged into the header in a fine sheet or spray. The most important result attained is secured by having the discharge end within the header and the valve and its seat outside of the same at the other end of the extended tube, as experience has shown that the congealing effect is confined entirely within the walls of the compartment in which the expansion takes place, and is not even communicated to nor affects the external portion of the tube C, much less the locality of the valve and valve-seat. The spindle I, secured to the lower end of the valve and extending through the passage *c*, is of the same diameter throughout, so that while its movements serve to keep the passage clear and unobstructed at all times, and its lower end operates to separate and spray the liquid into the header, it at no time contracts any portion of said passage above said end, which would be the case were a tapered spindle employed.

The purpose of extending the inner end of tube C within the header to form the annular space between said extended portion and the adjacent part of the header is to prevent the discharge end of said tube becoming closed by the contraction of the metal under the action of frost or snow. If the discharge opening of said tube C terminated flush with the inner end of the header, the metal forming said header end and surrounding the tube, under the congealing action, would contract and close the comparatively small discharge-opening. Therefore by extending the tube C, as described, the discharge-opening is located where it cannot be affected by the congealing action, because it is at all times surrounded by an expanding gas, absorbing heat from the metal of the header and thus securing for the discharge-opening the benefit of this heat-laden gas.

From the foregoing it will be seen that the entire arrangement is not only simple and durable, but that it can be effectively and positively operated at all times, and by its use the liquid most economically delivered to the expansion-chamber.

We claim—

1. The combination, with the refrigerating-compartment containing an expansion-header, of a tube having an inner contracted opening communicating with said header, together with a valve located at the external end of said tube, substantially as set forth.

2. The combination, with the refrigerating-compartment containing an expansion-header, of a tube projecting into the header, together with a valve located at the external end of said tube, substantially as set forth.

3. The combination, with a refrigerating-compartment containing an expansion-header, of a tube having its inner contracted portion communicating with said header, together with a valve located at the external end of said tube and carrying a spindle extending through the tube and its contracted inner opening, substantially as set forth.

4. The combination, with the refrigerating-compartment containing an expansion-header, of a tube projecting into the header and having a contracted terminal opening within said header, together with a valve located at the external end of said tube and carrying a spindle extending through the tube and its contracted inner opening, substantially as set forth.

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

CHARLES A. COX.

Witnesses:
WILLIAM PAXTON,
E. W. JOHNSON.

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

CHARLES N. BROCKINGTON.

Witnesses:
WM. G. VANCE,
GEO. MITCHELL.