Jan. 13, 1953 C. B. HALL 2,625,360

ARTICLE RETAINING CLAMP

Filed July 31, 1948

Fig. 1.

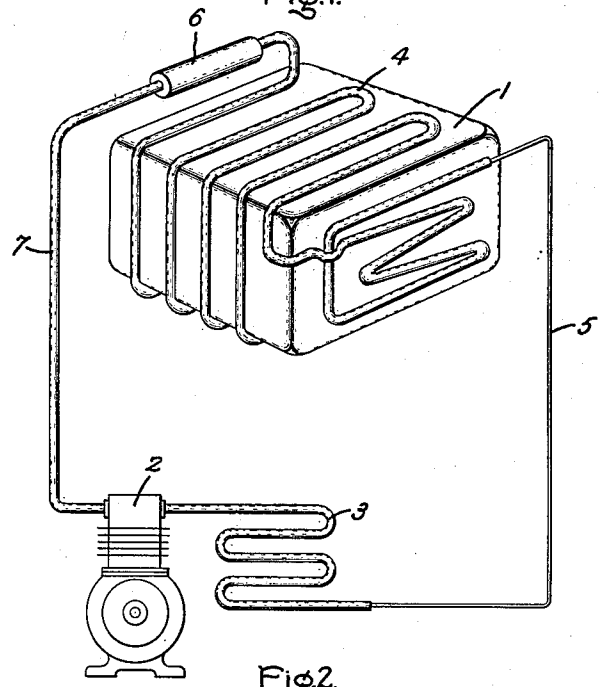


Fig. 2.

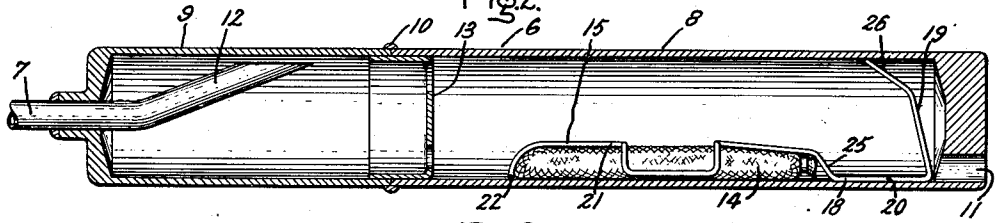


Fig. 3.

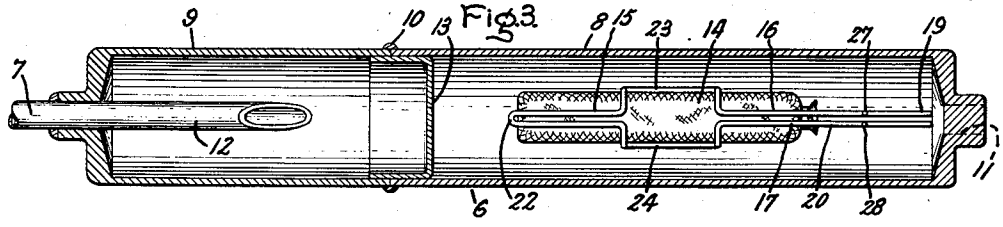
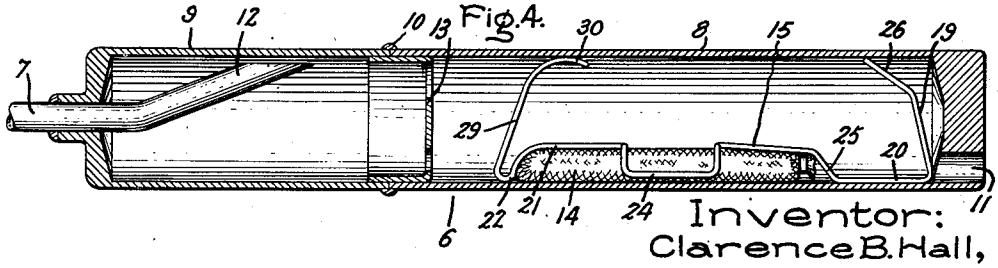


Fig. 4.



Inventor:
Clarence B. Hall,
by William B. Edwards, Jr.
His Attorney.

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ARTICLE RETAINING CLAMP

Clarence B. Hall, Schenectady, N. Y., assignor to General Electric Company, a corporation of New York

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6 Claims. (Cl. 248—361)

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My invention relates to clamps and more particularly to clamps for holding articles in fixed positions within closed chambers.

It is sometimes necessary to provide a clamp which may be easily inserted within a chamber and which may be utilized for retaining an article in a definite position within the chamber. For example, in refrigerating systems a drier consisting of some moisture-absorbing material, such as silica gel, is frequently employed for absorbing any moisture which may collect within the system. This drier may, for convenience, be a non-rigid container, such as a cloth bag, positioned within a header associated with the evaporator of the system. It is desirable for such purposes to provide some arrangement for holding the container for the silica gel firmly in a predetermined position within the drier so that it will not be jarred loose and to simplify the insertion of the clamp and the silica gel into position within the header.

Accordingly, it is an object of my invention to provide an improved clamp for holding an article in position within a chamber.

It is a further object of my invention to provide a clamp which is readily assembled within a chamber and which is adapted to clamp a non-rigid article in position without injury to the article.

Further objects and advantages of my invention will become apparent as the following description proceeds and the features of novelty which characterize my invention will be pointed out with particularity in the claims annexed to and forming part of this specification.

For a better understanding of my invention, reference may be had to the accompanying drawing in which Fig. 1 is a schematic representation of a portion of a refrigerating system embodying my invention; Fig. 2 is a sectional elevation view of the header of the refrigerating system showing details of my invention; Fig. 3 is a sectional plan view of the embodiment shown in Fig. 2; and Fig. 4 is a sectional elevation view of a modified form of my invention.

Referring now to Fig. 1, there is shown a refrigerating system which may be utilized, for example, to cool a compartment 1 of a refrigerator. The refrigerating system includes a compressor 2, a condenser 3 and an evaporator 4. The evaporator is arranged in heat exchange relationship with the exterior of the compartment 1 in order to absorb heat from articles placed within the compartment. After being compressed, the refrigerant is condensed in the condenser 3 and the

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liquid refrigerant is supplied to the evaporator through a flow-restricting tube 5, sometimes referred to as a capillary tube. Due to the absorption of heat from the compartment 1, the liquid refrigerant is vaporized and the vaporized refrigerant passes into a header 6. From the header, the vaporized refrigerant is withdrawn through a suction line 7 and returned to the compressor.

Referring now to Figs. 2 and 3, the header 6 includes two tubular portions 8 and 9. These two portions are joined at 10 by welding or in any other suitable manner to form the unitary header. Refrigerant from the evaporator is delivered into the portion 8 through a passage 11 and vaporized refrigerant is delivered to the suction line 7 through a tube 12 whose inlet opening is positioned near the top of the header. Since some liquid refrigerant may find its way into the header, a baffle 13 having openings near the top and bottom is provided in order to insure a quiet zone adjacent the tube 12 so that liquid refrigerant will not be accidentally drawn into the tube and delivered to the compressor.

Since any moisture which may collect within the regrigerating system introduces the possibility of such moisture freezing in the small diameter capillary tube and thereby blocking the flow of refrigerant, a moisture-absorbing material, such as silica gel, is provided within the header. The silica gel may, for example, be placed within a container, such as a cloth bag 14. A clamp 15 is provided within the chamber formed within the portion 8 of the header for retaining the bag 14 firmly in position against a side or wall of the chamber, the clamp and bag being positioned before the header portions 8 and 9 are welded together. It is necessary that the clamp not only retain the bag 14 in a predetermined position in the header, but also that the clamp have no tendency to puncture the bag and thereby allow the silica gel to escape into the refrigerating system. It is further desirable that the clamp be constructed so that it may be easily assembled within the header and so that the bag 14 may be easily placed in the proper position with relation to the clamp. In order to accomplish these objectives, the clamp is formed as shown in Figs. 2 and 3.

The clamp 15 is formed of a length of resilient wire which is bent to form two substantially parallel portions or elements 16 and 17. The clamp is of generally L-shape with the longer leg 18 of the L extending longitudinally of the header and the shorter leg 19 extending transversely of the header from one section of the wall of the

header to a section generally opposite thereto. The leg 18 includes a straight portion 20 which, in the assembled position of the clamp, is in engagement with the wall of the header. The remainder of the leg 18 is shaped to provide a substantially U-shaped portion 21, the end 22 of this U-shaped portion being resiliently pressed against the wall of the header. The U-shaped portion 21 includes two complementary portions 23 and 24 which are formed by extending the central parallel wire portions 16 and 17 outwardly and downwardly. The portions 23 and 24 cooperate to prevent any transverse shifting of the bag 14, and any longitudinal shifting of the bag is prevented by the bent end 22 and a complementary portion 25 adjacent the portion 20 of the leg 18. The U-shaped portion thus provides a cage for retaining the bag in position. It will be noted that the U-shaped portion 21 effectively embraces the bag 14 and contains no sharp edges which might puncture the bag.

The leg 19 of the clamp is longer than the inside diameter of the header and the leg is inclined toward the open end of the portion 8 of the header. The end of the leg 19 is bent toward the open end of the portion 8 of the header, as indicated at 26, forming an acute angle with the wall, in order that the sharp ends of the wire may effectively bite into the wall of the header to resist movement of the clamp toward the open end. Since the leg 19 includes the two parallel portions 16 and 17 of the wire of which the clamp is composed, the above construction provides two tips 27 and 28 for engagement with the wall of the header. As shown in Fig. 2, the sharp edge of each of these tips engages the wall of the header. To facilitate such engagement no attempt is made to smooth these edges and any burrs resulting from cutting the wire during manufacture of the clamp are allowed to remain.

Since the portion 26 of the clamp is inclined toward an open end of the portion 8 of the header, the clamp may be freely moved toward the closed end of this portion of the header, and the clamp is pushed into the header until the leg 19 touches the closed end. Movement of the clamp in the opposite direction, that is toward the open end of the portion 8 of the header, is resisted by the biting of the tips 27 and 28 of the clamp into the wall of the header. The clamp is thus self-locking and, once inserted into position, accidental shifting of the clamp within the header is prevented. The U-shaped portion 21 of the leg 20 is resiliently forced toward the longitudinal wall of the header by the natural resilience of the material of which the clamp is composed. To place the bag of silica gel in position within the header the portion 21 is lifted, the bag is inserted thereunder, and the portion 21 is then released to clamp the bag in position against the wall of the header.

In the embodiment shown in Figs. 2 and 3, the natural resilience of the wire of the leg 18 is utilized to hold the leg 18 against the wall and thereby to clamp the bag in position. The modification shown in Fig. 4 includes an additional element to assist in maintaining the leg 18 in engagement with its adjacent wall. The same numerals have been applied to corresponding parts in all three figures. Referring now specifically to Fig. 4, the clamp 15 includes an additional leg 29 at the opposite end of the clamp from the leg 19, and the leg 29 extends transversely of the header and is inclined away from the open end of the portion 8 of the header. The

leg 29 is longer than the inside diameter of the header and forces the end 22 of the portion 21 into firm engagement with the wall of the header. In order to prevent the leg 29 from interfering with the insertion of the clamp into the header, the end of the leg is curved away from the wall of the header, as indicated by 30, so that this end will have no tendency to bite into the wall. The possibility of biting into the wall of the header is further minimized by the fact that the end 30 constitutes the closed end of the two parallel portions 16 and 17 of which the clamp is formed. The modified form of clamp shown in Fig. 4 is inserted into the header in the same manner as described in connection with Figs. 2 and 3 and shifting of the clamp within the header is similarly prevented.

While I have shown specific embodiments of my invention in connection with the header of a refrigerating system, other applications will be readily apparent to those skilled in the art. I do not desire, therefore, that my invention be limited to the particular constructions shown and described and I intend, by the appended claims, to cover all modifications within the spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. In combination with means providing a chamber including spaced walls, a resilient clamp for holding an article within said spaced walls, said clamp comprising an elongated portion lying against one of said walls and formed to provide a cage for holding an article against said one of said walls, and a second portion extending transversely of said elongated portion, said second portion resiliently engaging both of said spaced walls whereby said second portion is effective to maintain said elongated portion in engagement with said one of said walls.

2. In combination with means providing a chamber including spaced walls, a resilient clamp for holding an article within said spaced walls, said clamp comprising an elongated portion extending along said one of said walls, said portion including a first section lying adjacent said one of said walls and a second section spaced from said one of said walls and shaped to provide a cage for receiving an article and for retaining said article against said one of said walls, and a second portion extending transversely of said elongated portion, said second portion resiliently engaging both of said spaced walls, one end of said second portion engaging the other of said spaced walls at an acute angle in the direction of motion of said clamp during assembly of said clamp between said spaced walls whereby said end bites into said other of said spaced walls to prevent movement of said clamp in the opposite direction.

3. In combination with means providing a chamber including spaced walls, a resilient clamp for holding an article within said spaced walls, said clamp comprising an elongated portion extending along one of said walls, said portion including a section spaced from said one of said walls and shaped to provide a cage for receiving an article and for retaining the article against said one of said walls, a second portion extending transversely of said elongated portion from one end thereof, said second portion resiliently engaging both of said spaced walls, and a third portion extending transversely of said elongated portion from the opposite end thereof, said third portion resiliently engaging both of

said spaced walls for maintaining said elongated portion in its article-retaining position.

4. In combination with means providing a chamber including spaced walls, a resilient clamp for holding an article within said spaced walls, said clamp comprising an elongated portion extending along one of said walls, said portion including a first section lying adjacent said one of said walls and a second section spaced from said one of said walls and shaped to provide a cage for receiving an article and for retaining the article against said one of said walls, a second portion extending transversely of said elongated portion from one end thereof and engaging the other of said spaced walls to prevent movement of said clamp in one direction, and a third portion extending transversely of said elongated portion from the opposite end thereof and resiliently engaging said other of said spaced walls for maintaining said elongated portion in its article-retaining position, the end of said third portion being curved to facilitate free movement along said other of said spaced walls, the end of said second portion engaging the other of said spaced walls at an acute angle in the direction of motion of said clamp during assembly of said clamp between said spaced walls whereby said end bites into the other of said spaced walls to prevent movement of said clamp in the opposite direction.

5. In combination with means providing a chamber including spaced walls, a resilient clamp for holding an article within said spaced walls, said clamp comprising an elongated portion extending along one of said walls, said portion including a U-shaped section for preventing movement of the article longitudinally of said portion, the ends of said U-shaped section engaging said one of said walls and the length of said section intermediate said ends being spaced from said one of said walls, said U-shaped section including elements extending transversely from said intermediate length of said U-shaped section and toward said one of said walls for preventing movement of the article transversely of said portion, and a second portion extending transversely of said elongated portion and engaging the other of said spaced walls, said second portion resiliently engaging both of said spaced walls for maintaining said elongated portion in engagement with said one of said walls.

6. In combination with means providing a chamber including spaced walls, a resilient clamp for holding an article within said spaced walls, said clamp comprising a wire of resilient material bent to form two substantially parallel elements, said parallel elements being formed in an L-shape including one elongated leg extending along one of said walls and a second leg extending transversely of said elongated leg, said second leg engaging the other of said walls and resiliently engaging both of said spaced walls, said elongated leg being shaped to provide a U-shaped portion for retaining an article against longitudinal movement, the ends of said U-shaped section engaging said one of said walls and the length of said section intermediate said ends being spaced from said one of said walls, said parallel elements included within said U-shaped portion being extended transversely away from each other and toward said one of said walls to retain the article against lateral movement.

CLARENCE B. HALL.

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