WATER SUPPLY AND DISPENSING APPARATUS

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ABSTRACT OF THE DISCLOSURE

Apparatus having a collapsible, water-filled bag in an enclosing shell container mounted in the lower portion of a cabinet with the bag connected to a dispensing valve located in the upper part of the cabinet, the shell including a movable wall to which a force is applied to collapse the bag and force the water up to the outlet in accordance with use.

BACKGROUND OF THE INVENTION

The field of the invention is the water cooler and dispensing art in which the water supply is drawn from a replaceable container located at the point of use.

Bottle water coolers in which the water supply bottle is mounted on top of the cooler in inverted position for gravity supply of the water are widely used. There are some objections to allegedly unsanitary conditions with the use of this type of cooler, as well as objections relating to the bottle handling problems and appearance. Some of these objections are obviated by locating the water bottle in the lower part of the cabinet and pumping the liquid up to the dispenser normally located in the upper part of the cabinet. Another type of cooler which avoids some of the objections has a water supply which takes the form of a cardboard carton enclosing an inner collapsible bag filled with water and in sealed relation to the atmosphere except for its outlet connection. U.S. Patent 3,060,703 illustrates such a water supply in connection with a water cooler. However, in the arrangement there illustrated the carton is placed on top of the cabinet to utilize gravity flow of the water to the cooling chamber and dispenser. In contrast therewith, my arrangement provides for mounting the collapsible bag container in the lower portion of the cabinet, and applying sufficient force to the collapsible bag to create a pressure sufficient to elevate the water to the dispensing outlet.

SUMMARY OF THE INVENTION

A water cooler according to the invention includes a cabinet having an upper and a lower portion with a water dispensing valve in the upper portion of the cabinet, and a storage space for a water supply container in the lower portion of the cabinet. The supply container includes an outer shell enclosing an inner, collapsible bag containing the water. The shell has at least one wall movable within the shell in a direction to collapse the bag and force the water through conduit means connecting the bag outlet to the dispensing valve. Finally, means are provided for applying a force to the movable wall of the container as mounted in the cabinet lower portion so that the water in the bag is maintained under sufficient pressure to elevate the water to the dispensing valve for discharge upon demand. The means for applying the force to the movable wall collapsing bag may take various forms. In one form, for example, the movable wall of the container shell may overlie the collapsible bag with a weight being applied to the movable wall to pressurize the water in the bag and effect the bag collapse as water is withdrawn from the dispensing valve. In another form, the container is mounted so that spring means can exert a force affecting relative movement between the movable wall and the shell as the water is withdrawn to collapse the bag. By using a spring force or a gravity force to pressurize the water sufficiently to permit its discharge from a higher elevation than the container, an extremely simple and inexpensive arrangement is provided as contrasted to an arrangement using an electrically energized pump for elevating the water. Of course, the other advantages obtained from the use of the flexible collapsible bag, such as cleanliness, are also had.

DRAWING DESCRIPTION

FIGURE 1 is a side view of one example of a water cooler incorporating the invention and with one wall of the cooler cabinet omitted to expose the interior of the cooler; FIG. 2 is a front view of the lower part of the cabinet or cooler of FIG. 1 with the front access door removed, and illustrating the water supply container in a partially exhausted condition; FIG. 3 is a fragmentary side view similar to FIG. 1 illustrating another arrangement for applying force to the water supply; and FIG. 4 is a fragmentary side view similar to FIGS. 1 and 3 illustrating still another arrangement for applying force to the water supply.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The parts of the water cooler and dispensing system in the drawing which are generally conventional are partly shown in diagrammatic form since their exact nature may vary without departing from the invention. The cabinet illustrated is of a generally rectangular-box shape and includes front wall 10, rear wall 12, top wall 14, bottom wall 16, opposite side walls 18, and a front access panel 20 which may be suitably mounted as by hinges to permit opening for access to the interior of the cabinet.

The basic parts of the refrigerating system illustrated include the compressor 22, condenser 24, expansion or capillary section 26, evaporator 28 in the form of lines wrapped about an enclosed water cooling chamber 30 and in heat exchange relation thereto, and a return line 32 to the compressor.

The water supply container generally designated 34 may take the form of an outer rectangular-box-shape casing 36. One wall 38 of the casing has a relatively large, centrally located opening 40. This apertured end wall 38 is disposed at the bottom in FIGS. 1, 2 and 4, and at the top in FIG. 3. A false movable wall 42, generally coextensive in area with the cross-sectional area of the interior of the casing, is positioned inside the casing 36 and flat against the apertured wall 38 so that it covers the opening 40.

The supply of water is held by a thin flexible wall, sealed, collapsible bag 34 within the casing 36 and having a single outlet 46 extending through a wall of the casing 36 in the end portion generally opposite the end having the movable wall 42 initially. The collapsible bag may be made of a water impervious material having suitable characteristics such as polyethylene film. The casing 36 is preferably of a cheap, disposable character, having adequate strength to withstand normal handling with the water filled bag inside, such as corrugated cardboard or paper-board.

The outlet tube 46 is connected through flow passage means to the dispenser. The means shown include a suitable detachable coupling 48 between tube 46 and interior water line 50 which runs to the water cooling reservoir 52, and outlet line 54 connected to the dispensing valve 56.
It is contemplated that in accordance with the invention a force will be applied to the movable wall 42 in a direction to squeeze the collapsible water bag 44 with sufficient force that the pressure created is adequate to elevate the water up into the cooling reservoir 52. It is also contemplated that to keep the arrangement simple and straightforward, the force be applied through either gravity, or a spring arrangement, so that there is no requirement for a pump or other powered equipment to raise the water.

The embodiments shown in FIGS. 1, 2 and 4 illustrate arrangements using spring force combined with the force of gravity to obtain the pressure. In FIG. 3, a gravity force alone is used to pressurize the bag.

In FIGS. 1 and 2, the water supply container is mounted within the cabinet between a pair of top rails 58 and bottom rails 60 which may take the form of angles as shown secured to the inner faces of the opposite side walls 18 of the cabinet. A vertically disposed compression spring 62 has its bottom end based upon the bottom wall 16 of the cabinet and is aligned with the opening 40 in the apertured wall 38 of the casing so that when the container 34 is positioned properly within the cabinet, the top end of the compression spring bears up against the movable wall 4. The wall transmits this force to the collapsible bag and the water therein. In FIG. 1 the spring 62 is shown in the substantially compressed form it has when a supply container full of water is only inserted. In FIG. 2, the spring is shown after it has completed about half of its travel and half of the water has been forced out of the container.

The function of the bottom rails 60 is to support the container while it is being inserted in the cabinet, while the function of the top rails 58 is to provide a bearing surface for the top of the container to prevent its upward movement while the spring 62 is applying force upwardly against the movable wall 42.

It may be desirable in some instances to provide special means for facilitating the retraction of the compression spring 62 to a position out of the way of the container during insertion. One form that may be used is a spring-centered cable attached at one end to the top of the spring and passing around a pulley near the bottom of the spring. Hence, by pulling upon the cable, the spring may be retracted to a position permitting easy insertion of the water supply container.

The arrangement in FIG. 4 is similar to that of FIG. 1 in large degree, but in this instance a fixed pedestal 64 is provided with a top platform 66 upon which the movable wall 42 seats. A pair of tension springs 68 having their bottom ends secured to the cabinet base and their top ends detachably secured to the container serve to pull the container down upon the pedestal. With this arrangement, both the weight of the water, and the force derived from the tension springs, work against the pedestal to pressurize the water within the bag. Since the container will move downwardly in the FIG. 4 arrangement, sufficient length must be provided in the line 50 leading to the cooling chamber to accommodate the drop of the container as the water is dispensed.

In FIG. 3 a weight 70 is provided to bear against the movable wall 42. In this arrangement, the supply container is disposed with its apertured wall 38 at the top, so that the weight 70 will force the wall 42 downwardly. A cable 72 and pulley 74 are provided so that the weight may be retracted to its top position after the supply container has been exhausted and a new one to be inserted. If desired, the cable 74 may be attached to a hinged fringe of an access door so that when the door is opened, this movement automatically elevates the weight 70 and holds it up out of the way for the removal of the exhausted container and the insertion of the new water filled container.

Several points are deemed worthy of mention in connection with the differing arrangements. In the FIG. 1 arrangement, it will be noted that when the compression spring 62 is retracted to its fullest extent, and therefore is capable of exerting its greatest upward force, this position corresponds to the container being full and exerting the greatest counterforce against the spring. As water is exhausted, the weight of the water bearing against the spring decreases, as well as the height to which the remaining water must be elevated progressively decreases as the container is progressively exhausted. The opposite situation prevails in the FIG. 4 arrangement in which as water is exhausted, and the spring force of the tension spring decreases, the remaining water must be elevated to progressively greater heights. In the FIG. 3 arrangement the force exerted by the weight 70 will remain the same at all positions, but as water is exhausted the remainder must be elevated to progressively greater heights.

While the preferred embodiments as now contemplated have been illustrated, it will be appreciated that departures in detail from that illustrated may be readily made by those skilled in the art without departing from the inventive concept. For example, the concept does not require that the movable wall be disposed at the top or bottom necessarily, but could within the scope of the concept be disposed at one side or another with the spring force being horizontally directed. The container may take a cylindrical shape. The movable end wall may have non-planar forms providing advantageous features. The outlet of the collapsible bag need only be in an end portion of the container as distinguished from an end wall. Other differences in the general arrangement will also suggest themselves to those skilled in the art.

What is claimed is:

1. A water dispenser comprising:
   a cabinet having an upper and a lower portion;
   a water dispensing valve in the upper portion of said cabinet;
   a water supply container adapted to be mounted in said lower portion of said cabinet, said container including an outer shell enclosing an inner collapsible bag containing water and having a single opening only therein, said opening being in the top portion thereof and serving as an outlet therefrom, said shell including at least one wall thereof movable relative to said shell in a direction to collapse said bag, said shell and said bag being disposable as a whole after a single use thereof;
   flow passage means connecting said bag outlet to said dispensing valve; and
   means for applying force to effect said relative movement of said wall with said shell as water is withdrawn to maintain said water in said bag under sufficient pressure to elevate said water through said flow passage means to at least the level of said dispensing valve for discharge therefrom, said container being mounted in said cabinet lower portion with said wall being located initially at the bottom of said container for upward movement of said wall relative to said shell.

2. A water dispenser according to claim 1 wherein:
   said force applying means comprises spring means.

3. A dispenser according to claim 2 wherein:
   said cabinet includes means for holding said casing in a stationary position; and
   said spring means comprises compression spring means having one end bearing against said cabinet, and the other end bearing against said wall.

4. A cooler according to claim 3 wherein:
   said compression spring bears upwardly against said wall to force the water up out of the container.

5. A water dispenser according to claim 1 wherein:
   said cabinet includes an upwardly projecting pedestal in said lower portion of said cabinet;
   said container is mounted upon said pedestal with said wall resting thereupon; and
said force applying means is directed against said container to move said shell downwardly.

6. A water cooler comprising:
   a. a water cooling chamber in said upper portion;
   b. a water dispensing valve connected to receive water from said chamber;
   c. a water supply container adapted to be mounted in said lower portion of said cabinet, said container including an outer shell encasing an inner, collapsible bag containing water and having a single opening only therein, said opening being in the top portion thereof and serving as an outlet therefrom, said shell including at least one wall thereof movable relative to said shell in a direction to collapse said bag, said shell and said bag being disposable as a whole after a single use thereof;
   d. conduit means connecting said bag outlet to said chamber;
   e. a refrigerating system for cooling said chamber, including a refrigerant compressor mounted in the lower portion of said cabinet and refrigerant evaporator means in heat exchange relation with said cooling chamber; and
   f. means for applying force to effect said relative movement of said wall with said shell as water is withdrawn to maintain said water in said bag under sufficient pressure to elevate said water through said conduit means to at least the level of said chamber, said container being mounted in said cabinet lower portion with said wall being located initially at the bottom of said container for upward movement of said wall relative to said shell.

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ROBERT B. REEVES, Primary Examiner
H. S. LANE, Assistant Examiner

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222—146, 326