

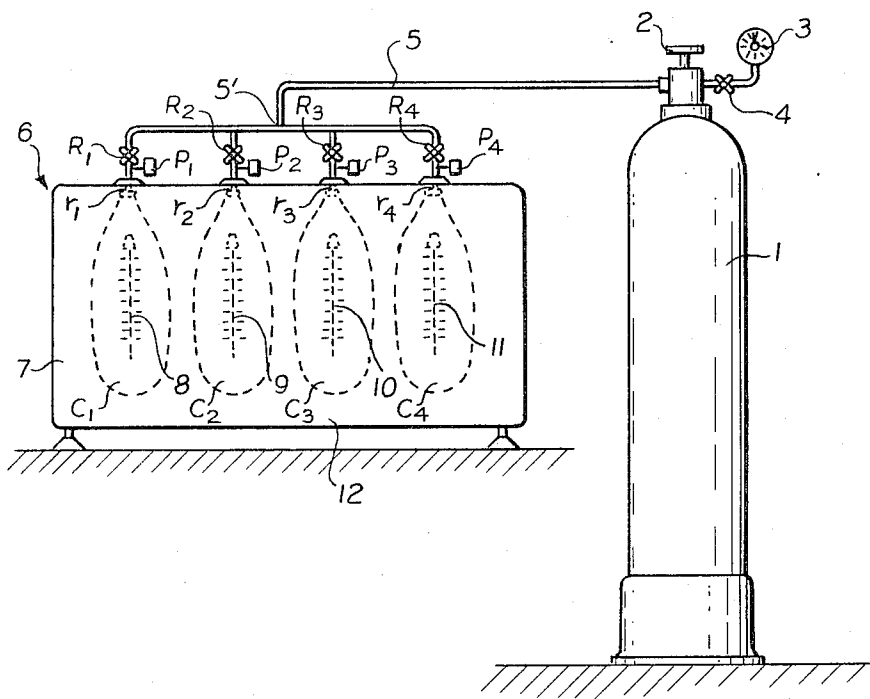
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A. BOTTANI

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COOLING APPARATUS EMPLOYING EXPANDING GAS

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INVENTOR
ANGELO BOTTANI
BY *Hubbell, Cohen & Stigal*
ATTORNEYS.

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COOLING APPARATUS EMPLOYING EXPANDING GAS

Angelo Bottani, Via Salvini 1, Milan, Italy

Continuation-in-part of application Ser. No. 550,036,

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Claims priority, application Italy, May 13, 1965, 10,650

5 Claims. (Cl. 62—514)

ABSTRACT OF THE DISCLOSURE

Cooling apparatus for cooling bottled liquids and the like comprising a source of pressurized gas, a gas-permeable receptacle for the object to be cooled, a spray nozzle communicating with the interior of the receptacle and with the source of pressurized gas and valve means for regulating the flow of gas between the gas source and the receptacle.

This is a continuation-in-part of my application Serial No. 550,036, filed May 13, 1966, now abandoned.

The present invention relates to an apparatus for cooling objects or substances, particularly bottled liquids. In particular the invention relates to apparatus for quickly and efficiently cooling substances, for example beverages, by means of expanding gases.

The well known cooling effect resulting from the rapid expansion of gases has long been employed for a variety of cooling applications.

It is an object of this invention to provide an apparatus operating on this principle which apparatus permits almost instantaneous cooling of the objects or substances to be cooled. A particularly preferred gas for use in this apparatus is carbon dioxide (CO₂).

In accordance with one embodiment of the invention, a source of CO₂ under pressure is connected by at least one pipe to a cooling station comprising one or more means for distributing CO₂ or other suitable gas and containers to hold and enclose the objects or substances to be cooled during the delivery of cooling medium. Preferably, the means for distributing the CO₂ are cocks connected in parallel to the supply pipe, and the containers are composed of fabric bags secured to the respective nozzles of the cocks or movable baskets disposed beneath the nozzles during the cooling phase.

According to one modification of the invention, the CO₂ distribution means comprises a portable gun device connected to the CO₂ pipe or source by means of a flexible pipe.

Other features and characteristics of the invention will be illustrated with reference to the accompanying drawing which illustrates, by way of examples, one particular form of construction of the cooling apparatus.

In the drawing, the single figure is a schematic view of one embodiment of the cooling apparatus of the present invention. The source of carbon dioxide (CO₂) is a cylinder 1 containing the gas under suitable pressure and provided with delivery and control devices, such as a discharge valve 2 and a pressure gauge 3. A two-way valve 4 is interposed between the gauge and the cylinder 1. A conduit 5, preferably a copper pipe, conducts the compressed gas from the cylinder to the cooling station 6. Flow of gas from the cylinder 1 to the conduit 5 is controlled by the valve 2. The cooling station 6 is preferably disposed at a distance from the cylinder 1 and comprises a fixed bench 7 which serves as a support for CO₂ distribution means R₁, R₂, R₃ and R₄ and for cooling containers C₁, C₂, C₃ and C₄.

In the illustrated embodiment, the CO₂ distributor means comprises four cocks or valve means R₁, R₂, R₃

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and R₄, connected in parallel to the end 5' of the supply pipe 5. Of course, any number of cocks could be used, depending upon the needs of the user. At the end of each cock is an atomizing nozzle r₁, r₂, r₃ and r₄, which has a small outlet hole through which the jet of CO₂ is sprayed into the containers C₁, C₂, C₃ and C₄ to effect the desired cooling. The cocks may in addition be provided with flow indicators P₁, P₂, P₃ and P₄, which indicate the amount of CO₂ delivered. It is thus possible to adjust the cocks to adapt the CO₂ flow to the requirements for the particular object to be cooled and to avoid possible damage which might be caused by too violent a jet of CO₂. The containers C₁, C₂, C₃ and C₄ are adapted to receive the objects to be cooled, which may be, for example, bottles containing liquid. In the illustrated embodiment these containers C₁, C₂, C₃ and C₄ are bags which are secured to their respective nozzles r₁, r₂, r₃ and r₄.

These bags may be of cloth, e.g., wool, or of any suitable fabric or material capable of withstanding the violence of the jet of CO₂ during the cooling stage and at the same time capable of permitting the slow passage therethrough of the expanded CO₂. The container encloses the bottle in such a manner that the flow of cooling CO₂ surrounds the bottle and then slowly passes out of the container. Each bag is provided with an opening for the insertion and withdrawal of the bottle, this opening being closed before operating the cock for delivering CO₂. In the drawing these openings are at the sides of the bags and are controlled by sliding clasp fasteners 8, 9, 10 and 11.

In another embodiment (not illustrated), the containers C₁, C₂, C₃ and C₄ are in the form of baskets or buckets supported on the bottom of the bench 7 and placed beneath the nozzle during cooling. In a further embodiment, the cock assembly may be replaced by portable gun devices, in which case the connection to the conduit 5 or the entire connection to the cylinder 1 may be by means of a flexible pipe. A single cylinder has been illustrated but it is obvious that the source of CO₂ may comprise a plurality of cylinders, preferably disposed in parallel, and each provided with delivery and control devices as illustrated for the cylinder 1. Additionally, the cooling station distribution means may comprise a mixture of cocks and gun devices.

The cooling operation is extremely simple and takes a few moments. A bottle containing, e.g., a beverage is placed in the bag or bucket beneath the nozzle, the cock is opened and the bottle bathed by the expanded, cooled gas. The expansion of CO₂ produces an extremely cold spray which almost instantaneously cools the bottle. The cock is then closed and the cooled bottle then removed from the container, ready for consumption of the beverage.

While I have herein shown and described the preferred form of the present invention and have suggested modifications therein, other changes therein may be made within the scope of the appended claims without departing from the spirit and scope of this invention.

What I claim is:

1. Cooling apparatus comprising a source of pressurized gas, a gas-permeable receptacle, a spray nozzle communicating with the interior of said receptacle, a conduit communicating said gas source with said spray nozzle and a valve means for regulating the flow of gas between said gas source and said receptacle, said receptacle being a bag of material permeable to the flow of said gas and having a closeable opening therein for introducing an object to be cooled into said receptacle and for removing a cooled object therefrom.

2. The apparatus of claim 1 wherein said opening is formed by a slidable clamp fastener.

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3. The apparatus of claim 1 which comprises a plurality of said receptacles and further includes gas distribution means separately communicating the associated spray nozzle of each of said receptacles with said conduit.

4. The apparatus of claim 3 wherein said gas distribution means comprises a series of cocks connected in parallel to said gas conduit.

5. The apparatus of claim 1 wherein said gas source is a source of CO₂.

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10 MEYER PERLIN, *Primary Examiner.*