

By introducing into the cup formed by the bulging of the bulb, cold water, alcohol, ether or ice, the refrigeration, the diminution of pressure, and the ebullition are all simultaneously accelerated, since these results are reciprocally dependent on each other.

The advantage of this apparatus and method of operating, lies first in the certainty and facility with which the apparatus is secured against the access of the atmosphere; and in the next place, in the index of the diminishing resistance, afforded by the rise of the mercurial column.

*Hydro-Pneumatic Cistern. By the author of the preceding article.*

In Silliman's Journal was to be found an engraving and description of a pneumatic cistern, which I employed in the experimental illustrations of my lectures for more than ten years; and which I should probably continue to use now, had not the command of water from the public works, put it into my power to dispense with the mechanism for keeping the water at a proper level. As I am now situated, any deficit of water is easily supplied from the pipes known here as the hydrant pipes, by which the city is supplied with water; and any excess is carried off by a waste pipe. Many chemists designate as a pneumatic trough or tub, apparatus for the purposes to which that in question is applied. Neither of these names is, in my opinion, as applicable to the apparatus which I have hitherto used, as that of cistern, to which I resorted; and although the last term be less suitable to the apparatus which I am about to describe, yet I beg leave to adhere to it for want of a better appellation.

A A, Fig. 1. is a water-tight platform, surrounded by a wooden rim, R R R R, rising above it about an inch and a half. B, C, T, three wells or cavities, each in the form of a hollow parallelepiped, with all of which the cavity bounded by the rim communicates, so that when supplied with water to the level of the waste pipe, this liquid fills the wells, and covers the platform to the depth of about three-fourths of an inch.

E, F, G, shelves, which severally move in grooves over the wells, so that they may be placed in the most convenient position. Under H is a waste pipe. At I is the rod, which, when turned by the winch opens and shuts the orifice of the hydrant pipe. K, a pipe for emptying the wells and casks, with all of which it may be made to communicate when requisite by means of cocks. N, O, casks which act as gas holders, each having a communication with the cistern at Q or q, for letting in water from that source; the orifices being controlled by valves. By means of a pipe proceeding from its vertex, each gas holder communicates with a cock, at S or s, furnished with a gallows screw as represented in the figure.

To these gallows screws, flexible leaden pipes may be attached, for transferring gas either from one of the holders to a bell glass, or from a bell glass to one of the holders. When a communication is established between the cavities, either of these offices may be performed, accordingly as the pressure within the holder is made greater, or less, than that of the atmosphere. It will be greater when the valve for the admission of water is opened, that for letting it out being shut: and less when these circumstances are reversed.

Fig. 1

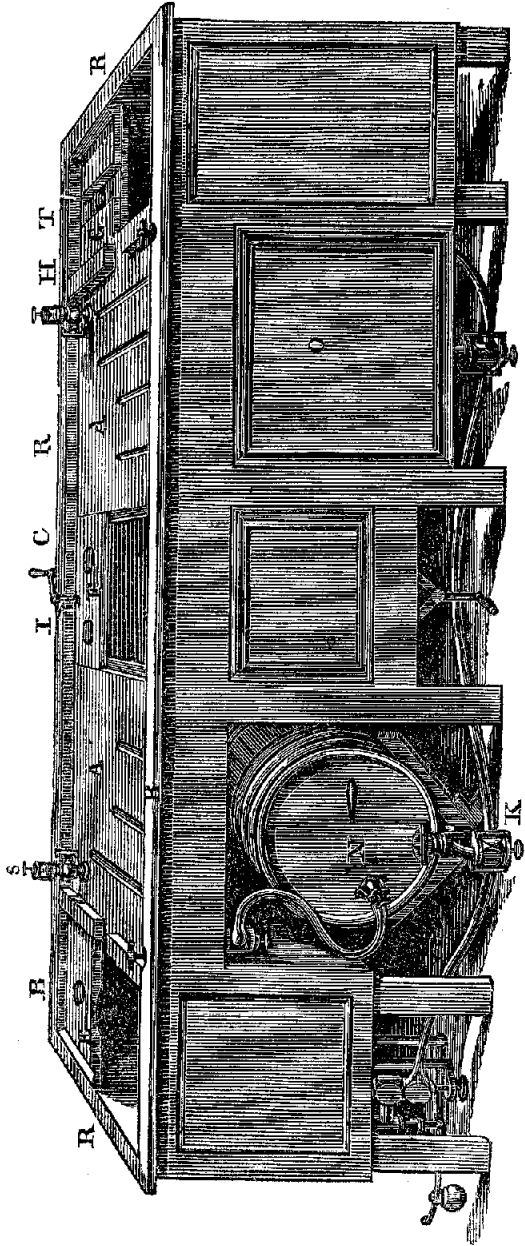


Fig. 2 affords a view of the lower side of the sliding shelf, in the wood of which it will be seen that there are two excavations, converging into holes. This shelf is loaded with an ingot of lead at L, to prevent it from floating in the water of the cistern.

Fig. 2.



*On the Cause of the Collapse of a Reservoir while apparently subjected within to great Pressure from a Head of Water. By the author of the preceding article.*

In September, 1834, I was requested by Mr. Haydock, a respectable and intelligent plumber of this city, to call at his shop in order to see a copper reservoir, which had collapsed while apparently subjected to internal pressure, arising from a communication with the mains proceeding from the public water-works.

For the purpose of refrigerating the contents, the reservoir was placed in spring water, at the bottom of a well, so as to be at a small depth below the surface: receiving the river water by one pipe, it was made to deliver it by another.

The pressure of the water with which the city of Philadelphia is supplied, is known to be sufficient, when at its maximum, to command the most elevated rooms in our dwelling houses. Hence, had the reservoir been burst, it would not have excited surprise; but the converse appeared inexplicable. The figure annexed will convey a correct idea of the reservoir as it appeared when I examined it; or subsequently, when a drawing of it was made at the Franklin Institute, to which it had been removed, at the instance of some of the members of that institution.

A is a pipe with a stop cock to allow the air to escape on first filling the reservoir. B, a pipe by which a communication with the mains of the public water-works was established. C, a pipe for delivering the water.

The height of the vessel was three feet; greatest diameter eighteen inches, least diameter twelve inches.

Some days had elapsed, during which I was unable to offer any explanation of the phenomenon; but having mentioned the occurrence to another highly respectable and intelligent plumber, Mr. Ewing, he alleged that facts no less surprising had fallen within the range of his experience. He had known openings to be made in leaden pipes, and to be closed immediately afterwards; upon one occasion a small fish was caught in the fissure.

It then occurred to me that the phenomenon of the collapse had been the consequence of circumstances the inverse of those which are known to take place in the water ram

