

BEST AVAILABLE COPY

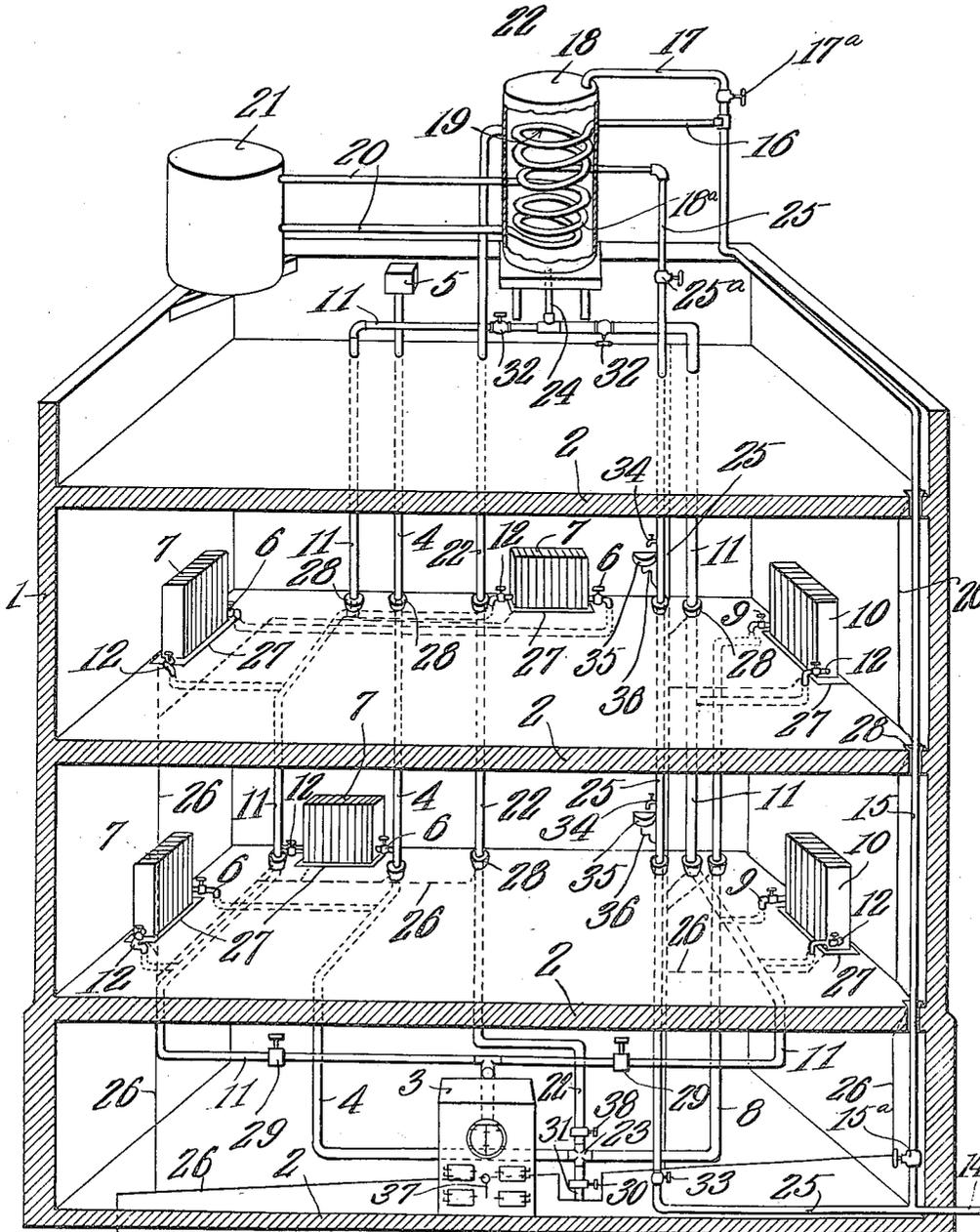
M. G. WILD & F. J. AIKIN.

COOLING APPARATUS.

APPLICATION FILED APR. 10, 1911.

1,065,415.

Patented June 24, 1913.



Merton G. Wild & F. J. Aikin,

Inventor

Witnesses

*J. P. Conroy*  
*L. A. Wilson*

by

*C. Snow & Co.*  
Attorneys

# UNITED STATES PATENT OFFICE.

MERTON G. WILD AND FORREST J. AIKIN, OF LOVELAND, COLORADO.

## COOLING APPARATUS.

1,065,415.

Specification of Letters Patent. Patented June 24, 1913.

Application filed April 10, 1911. Serial No. 620,042.

*To all whom it may concern:*

Be it known that we, MERTON G. WILD and FORREST J. AIKIN, citizens of the United States, residing at Loveland, in the county of Larimer, State of Colorado, have invented a new and useful Cooling Apparatus, of which the following is a specification.

It is the object of this invention to provide a device which may be employed for cooling a building, it being within the scope of the invention to cool various parts of the building to different degrees. The invention aims to provide novel means for regulating the temperature of the cooling medium in different parts of the building, and to provide novel means whereby a circulation of the cooling medium may be secured.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of invention herein disclosed can be made within the scope of what is claimed without departing from the spirit of the invention.

The invention is shown in a single perspective figure.

Referring to the drawing, a building is shown, and denoted by the numeral 1, the numeral 2 indicating successive floors of the building. In the basement of the building, a heater 3 is disposed, the same constituting a part of a system whereby a heating fluid is carried through successive portions of the building. The heater 3 is connected with a pipe 4, adapted to convey the heating fluid from the element 3, the pipe 4 carrying at its upper end, an expansion tank 5 located adjacent the top of the building. This pipe 4 is connected, as shown at 6, with a series of radiators 7, located on successive floors 2 of the building. The heater 3 is likewise connected to another heating pipe 8, the same being connected, as shown at 9, with other radiators 10, disposed upon the different floors 2 of the building.

The invention further includes a continuous return pipe 11, extending upwardly from one side of the heater 3, through all of the floors 2, and returning, downwardly, through the floors, to the other side of the heater. The return pipe 11 is connected, as shown at 12, with the radiators 7 and 10.

The water supply pipe, constituting a

part of an urban system, or otherwise, is denoted by the numeral 14. The water supply pipe 14 enters the lower portion of the building and one branch of this pipe, denoted by the numeral 15 and having a cut-off valve 15<sup>a</sup>, extends upwardly through all of the floors of the building, to a point adjacent the top of the building, where the portion 15 of the water supply pipe diverges into two branches 16 and 17. The branch 17 discharges into a container, shown in the form of a tank 18, and the branch 16 discharges into the upper end of a coil 19 located in the tank 18. In the tank 18 there is a cut-off valve 17<sup>a</sup>. In the tank 18 is a coil 18<sup>a</sup> connected as shown at 20, with a cooling apparatus 21, of any desired construction, ammonia, preferably, although not necessarily, being employed as the cooling agent. From the tank 18, a pipe 22 extends downwardly through all of the floors 2 of the building, the pipe 22 communicating with the pipe 8, as shown at 23. The bottom of the tank 18 communicates with the uppermost portion of the pipe 11, by means of a branch pipe 24. From the coil 19, a pipe 25 having a cut-off valve 25<sup>a</sup> extends downwardly through the several floors 2 of the building, the pipe 25 communicating with the water supply pipe 14.

A sewer system 26, denoted by a single line, extends upwardly through the several floors 2, the sewer pipe 26 being connected to basins 27, disposed beneath the several radiators 7 and 10. The vertical pipes, such as the pipes 15, 8, 25, 22, 4 and 11, are all provided, where they pass through the floors 2, with cups 28, these cups being connected with the sewer system 26. In the pipe 11, upon both sides of the heater 3, there are cut-off valves 29. In the pipe 22, in close vicinity to the pipe 8, and upon opposite sides thereof, there are cut-off valves 30 and 38, the pipes 22 and 8 communicating with the sewer 26, as shown at 31, below the cut-off valve 30. In the uppermost portion of the pipe 11, upon either side of the pipe 24 which forms a communication between the pipe 11 and the tank 18, there are cut-off valves 32. In the pipe 25, adjacent the bottom of the building, there is a cut-off valve 33. The pipe 25 is supplied with a plurality of cocks 34, adapted to discharge into basins 35, located upon the several floors 2, the basins being connected, as shown at 36, with the sewer system 26. At this point it

may be stated that the basins 35 are to be taken as typical of any elements adapted to receive the water upon the several floors 2 of the building. In order to heat the water  
 5 in the pipe 8, when necessary, an auxiliary heater 37 may be employed, but, as will be pointed out hereinafter, the heater 37 may or may not be necessary.

Let it be supposed that the valves 32, 15<sup>a</sup> and 25<sup>a</sup> are closed, that the valves 29 and 33 are open, and that the heater 3 is in operation, the system being employed, under such circumstances, to raise the temperature of the building. The operation, in such case,  
 10 is as follows: The heated fluid, rising in the pipe 4, will enter the radiators 7 at one side, the heated fluid rising in the pipe 8 entering the radiators 10 at the other side also. After traversing the radiators 7, the heating fluid will enter the pipe 11, the heating fluid from the radiators 10 following a similar course, the fluid being returned by the pipe 11 to the heater 3 for a re-heating, and a recirculation through the  
 15 pipes 4 and 8. Let it be supposed, however, that the system is to be employed for cooling the temperature of the building. The operation under such circumstances is as follows: The heater 3 being out of commission, the valves 29 and 33 are closed, and the valves 32, 15<sup>a</sup>, 25<sup>a</sup> and 17<sup>a</sup> are opened. The cooling apparatus 21 is put into operation. The water, entering the building by the pipe 14, will traverse the branch 15, and  
 20 pass from thence by the branch 17 into the tank 18. The temperature of the contents of the tank 18 will be lowered by the action of the coil 18<sup>a</sup> which is connected, as shown at 20, with the refrigerating apparatus 21. The contents of the tank 18, delivered there-  
 25 into by the pipe 17, and cooled by the coil 18<sup>a</sup>, will enter the pipe 24, and pass thence, in both directions, into the branches of the pipe 11, the cooling liquid entering the radiators 7 at one side and passing from the radiators 7 into the pipe 4, and thence into the pipe 22. The valve 30 being closed and the valve 38 being opened, the cooling fluid will rise through the pipe 22 and enter the  
 30 tank 18, whereupon the temperature of the fluid will again be reduced to a low point, by the action of the coil 18<sup>a</sup> which is connected with the cooling apparatus 21. By the time that the cooling fluid has traveled from the top of the building to the bottom thereof, its temperature will be raised sufficiently so that it will rise through the pipe 22. However should it be desired to accelerate the passage of the cooling fluid up-  
 35 wardly, through the pipe 22 and into the tank 18, the heater 37 may be employed, to raise the temperature of the cooling fluid at the point where it enters the pipe 22 from the pipes 4 and 8. The water, traversing  
 40 the branch 15, will pass through the branch

16, and into the coil 19, where the temperature of the water will be cooled, the water passing thence downwardly through the pipe 25, to serve for domestic purposes, as clearly understood. Moisture accumulating upon the radiators 7 and 10, will find its way into the basins 27, the water accumulating in the basins being carried away into the sewer system 26. Likewise, the moisture accumulating upon the vertical pipes of  
 45 which the pipe 15 may be taken as typical, will accumulate in the cups 28, and since these cups are connected with the sewer system 26, the moisture will thus be carried away.

The liquid in the coil 19 is at a very low temperature, and the pipe 25 is normally filled with this liquid, the pipe 25 being cut off from the pipe 14, by the closing of the valve 33. When an occupant of any floor  
 50 in the building, therefore, desires a supply of cold water, for drinking purposes and the like, it is necessary merely to open one of the cocks 34, whereupon such a supply may be obtained, the excess passing into the basins 35, and thence through the connections 36, into the sewer system 26.

It is to be noted that the heater 3—37 may be employed for accelerating the return flow through the pipe 22, the pipe 22  
 55 being referred to hereinafter as the secondary return pipe, the pipe 22 communicating with the pipe 8, which may be denominated a primary return pipe, the other primary return pipe being designated by the reference character 4. Suppose that the right hand valve 32 is open and that the left hand valve 32 is partly open, the right hand valve 29 being closed and the left hand valve 29 being open, the heater 3—37 being  
 60 in operation. Then the cold water from the tank 18 will traverse the pipe 24, the right hand portion of the pipe 11, the heat interchanging elements 10, and pass by way of the pipes 8 and 22 into the tank 18, the upward flow of the water through the pipe 22 being promoted by the supply of water from the heater 3—37 which is delivered into the pipe 8 at the base of the pipe 22. In this manner the right hand side of the  
 65 building will be cooled to a maximum degree. The water in the heater 3—37, still at a cooling temperature, but warmer than the water in the tank 18 will rise in the pipe 4 and pass by way of the pipes 6 through the heat interchanging elements 7, the left hand side of the building being thus cooled to a less degree than the right hand side, because the temperature of the water in the heat interchanging elements 7 has been raised slightly by passage through the heater 3—37. The water passes from the heat interchanging elements 7 into the pipes 12 and thence into the left hand portion of the pipe 11 and from the pipe 11 into the heater 130

3—37. The cold water from the tank 18, proceeding through the left hand portion of the pipe 11 will not interfere with the flow of water through the pipes 4 and 6 and the heat interchanging elements 7 because the left hand valve 32 is but partially open, the cold water from the tank 18 flowing directly through the pipe 11 to the heater 3—37. In this way the temperature of the water flowing through the left hand side of the system will be kept down to a point slightly above the temperature of the water in the right hand side of the system, because a supply of cold water is continually delivered to the heater 3—37.

Having thus described the invention, what is claimed is:—

In a device of the class described, a tank located at the top of the building to be cooled; means for cooling the contents of the tank; a heater located at the bottom of the building; a continuous pipe passing from the top of the building to the bottom thereof and in circuit with the heater; a communication between the top of the continuous pipe and the tank; heat interchanging elements; connections between the heat interchanging elements and opposed por-

tions of the continuous pipe; primary return pipes leading from the heat interchanging elements to the heater; a secondary return pipe leading from one of the primary return pipes to the tank; upper valves in the top of the continuous pipe and located on opposite sides of the communication; and lower valves in the continuous pipe on opposite sides of the heater; one of the lower valves being adapted to be closed and the corresponding upper valve being adapted to be opened, the other lower valve being adapted to be opened and the corresponding upper valve being adapted to be partially opened thereby to secure the continuous addition of an increment of cooling medium to a sub-circuit including the heater, one primary return pipe, one portion of the continuous pipe and the heat interchanging element connected therewith.

In testimony that we claim the foregoing as our own, we have hereto affixed our signatures in the presence of two witnesses.

MERTON G. WILD.  
FORREST J. AIKIN.

Witnesses:

WILLIAM H. TRINDLE,  
IDA J. ROOT.