Oct. 25, 1938. W. D. HARPER 2,134,121

AIR CONDITIONING APPARATUS

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Fig. 1.

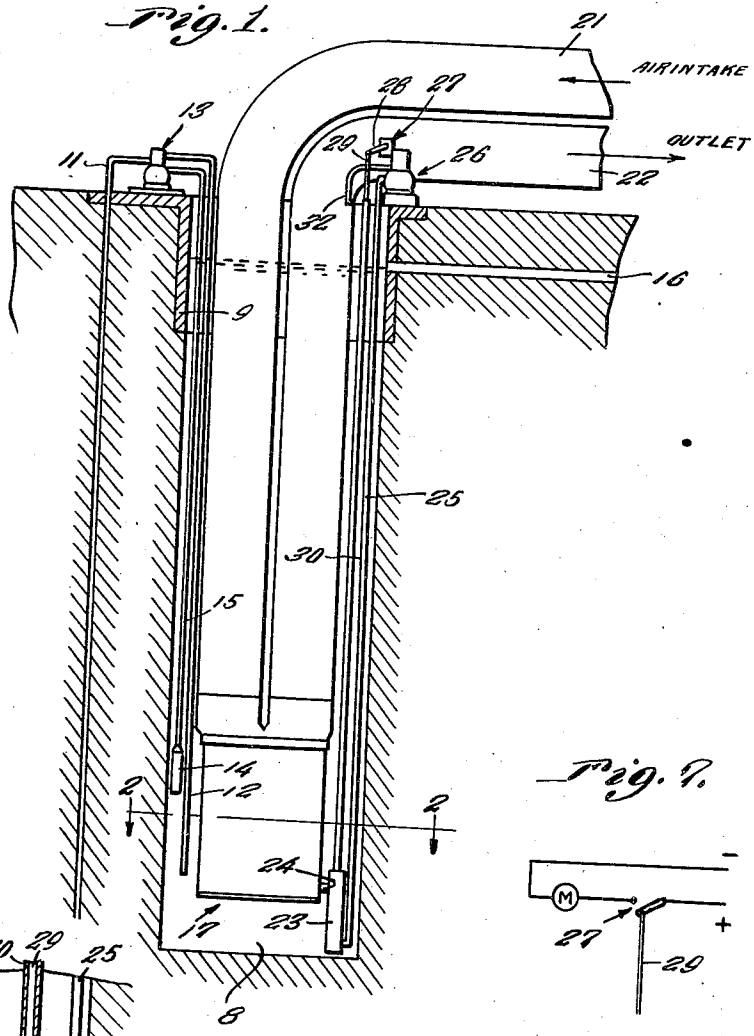


Fig. 7.

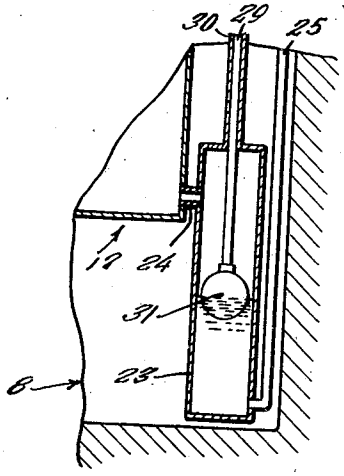


Fig. 6.

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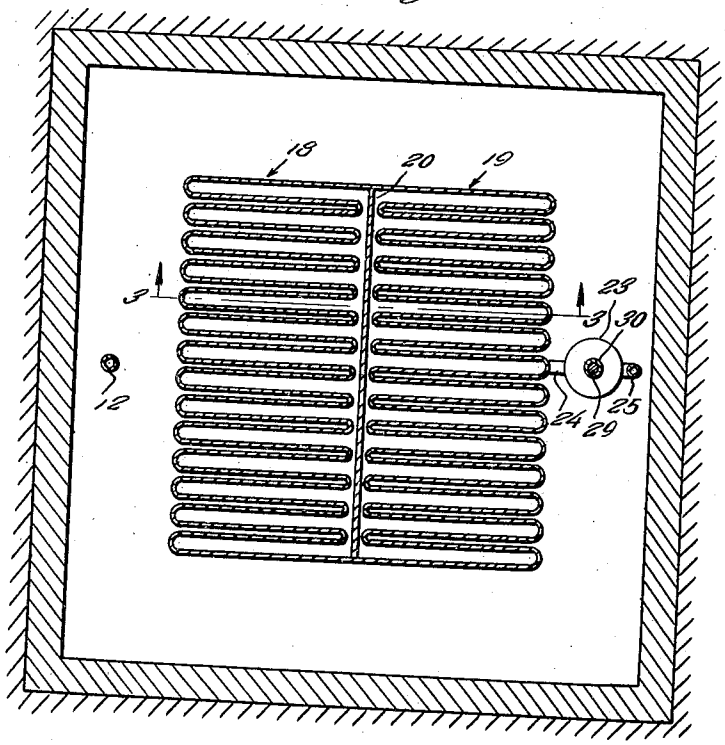
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Fig. 2.



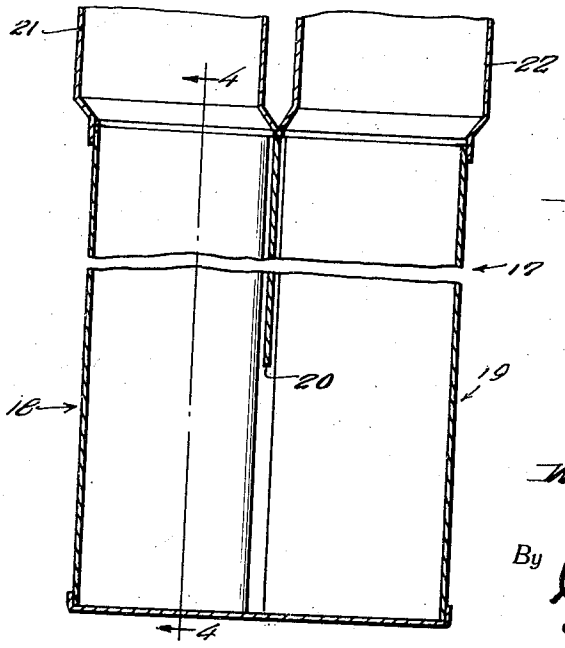


Fig. 3.

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AIR CONDITIONING APPARATUS

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Fig. 5.

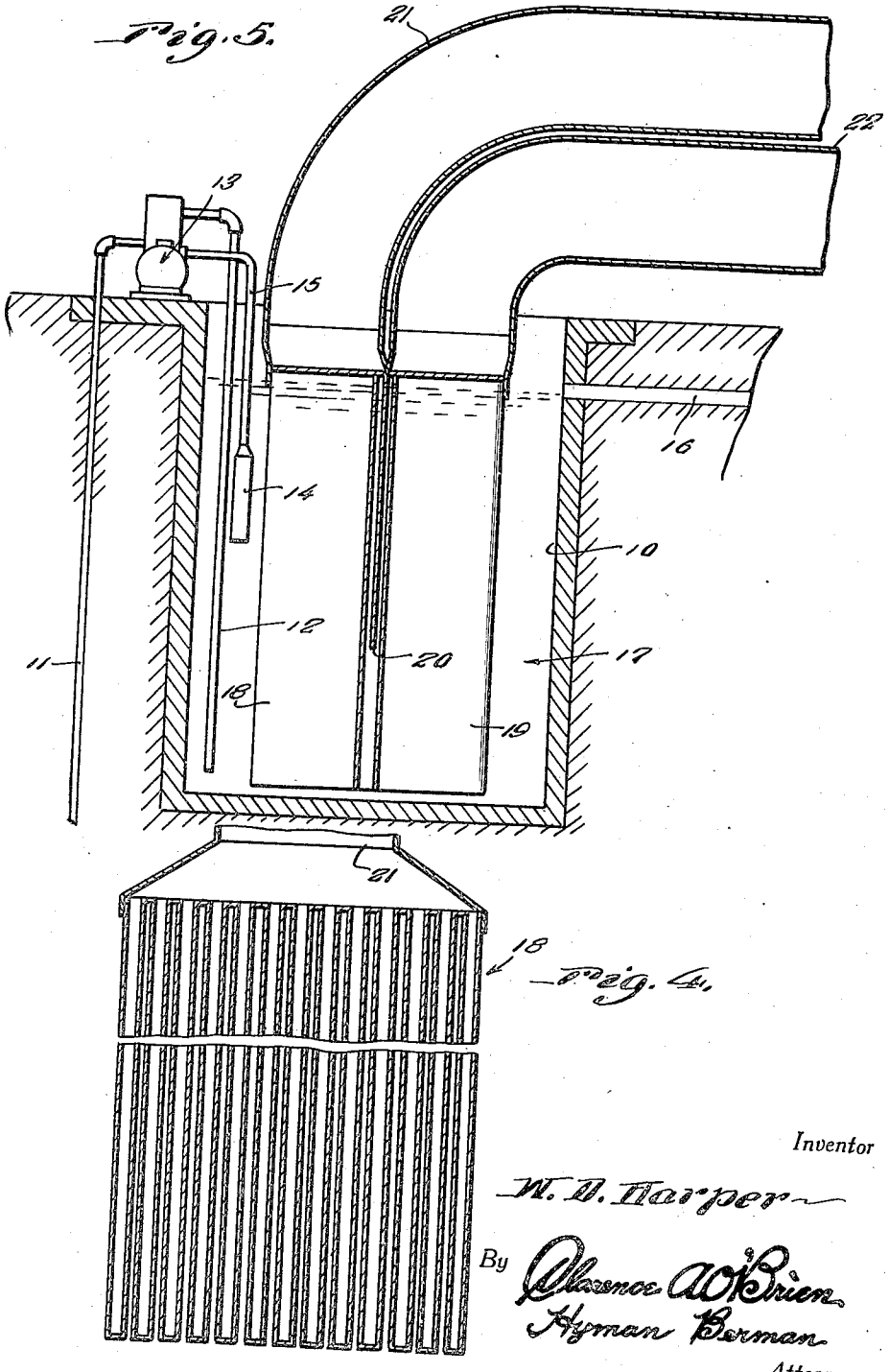


Fig. 4.

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UNITED STATES PATENT OFFICE

2,134,121

AIR CONDITIONING APPARATUS

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Application August 13, 1936, Serial No. 95,885

2 Claims. (Cl. 257—256)

This invention relates to what is believed to be an ingenious discovery involving a satisfactory system and physical means for cooling or conditioning atmospheric air to render it susceptible of adequate use in a building or home for so-called air cooling and conditioning purposes.

In reducing the principles of the inventive conception to actual practice, I have evolved and produced an electro-mechanical apparatus believed to be an innovation in this particular line of endeavor in that it affords the user a reliable and economical way and means of conditioning the air in the enclosure or building using a natural source of water supply as the constant, properly regulated, cooling medium or agent.

Briefly described, the preferred embodiment of the invention comprehends the use of a submerged reservoir constituting an adequate container for the cooling medium. This reservoir is supplied with cold water, the cooling medium, from a remote source such as a subterranean stream of water, the inflow of water being automatically controlled by a temperature-actuated thermostat and pump. Immersed in the water in said reservoir is a desirable type air circulator and radiation unit with which the intake and supply pipes connect.

By way of contrast with highly elaborate expensive air conditioning machines, the present organization is regarded as comparatively simple and efficient, and one feature of appreciable importance is the constant supply of cold water as the cooling agent from the subterranean stream and the thermostatically controlled or regulated delivery line cooperable with the aforementioned reservoir.

A feature of outstanding advantage and importance is directed to the incorporation in the structural organization of a condensation trap, and electric pump means, float controlled, which is associated with said trap for automatic disposal of the condensation so as to minimize the amount of moisture drawn into the building under the influence of suction or pressure, as the case may be.

Considered along other lines, the predominating phase of the invention has to do with the reservoir or sunken well properly located in relation to the building so as to accommodate the air intake and delivery conduits and the circulator coil constituting an integral part thereof.

Other features and advantages may become more readily apparent from the following description and drawings.

In the drawings, wherein like numerals are employed to designate corresponding parts throughout the various views:

Figure 1 is an elevational view showing the general assembly of features constituting the so-called unitary apparatus demonstrating the preferred embodiment of the invention.

Figure 2 is an enlarged horizontal section taken approximately on the plane of the line 2—2 of Figure 1.

Figure 3 is a vertical section taken approximately on the plane of the line 3—3 of Figure 2.

Figure 4 is a section through the circulator coil or heat exchange radiator, the section being on the vertical line 4—4 of Figure 3.

Figure 5 is a view similar to Figure 1 showing a consolidated short pit or reservoir arrangement which might be called a slight modification by way of contrast with Figure 1.

Figure 6 is an enlarged fragmentary detail section, partly in elevation, disclosing the condensation trap and condensate disposal means.

Figure 7 is a diagrammatic view showing the electric condensation pump controlling switch.

By way of introduction, and comparing Figures 1 and 5, it will be observed that the principle of construction is identical. The chief difference is in the specific formation of the pit or receptacle for the water. This may be broadly referred to either as a sunken well or a reservoir, and in Figure 1 the well is denoted by the numeral 8, the same having an appropriate concrete adapter or foundation 9 at its top. In Figure 5 the reservoir is a concrete submerged tank or the like, as indicated at 10. In either instance, however, it is believed that the term "submerged reservoir" is applicable to both.

As before implied, the cooling medium or agent utilized in this system or apparatus is natural water obtained from a natural source of supply. This feature in itself is of outstanding importance. The water thus utilized is obtained from a subterranean stream (not shown). The delivery or supply pipe from the subterranean stream is denoted in the drawings by the numeral 11, and is obviously so arranged as to conduct the water into the submerged well adjacent the surface of the ground. This supply line includes a depending section or part 12 leading into the reservoir or well. In the line is an electric pump 13 of appropriate construction for periodically and automatically delivering the water to the reservoir. The pump includes in its make-up a temperature-controlled thermostat 14 (of any suitable construction) which has operating connection by way of the pipe 15 with the pump. Consequently, when the temperature of the water in the reservoir reaches a predetermined degree, the thermostat automatically operates the pump to replenish the supply by feeding out the warm water and replacing it with cold water. Also, when the temperature of the water is lowered to a predetermined degree, the thermostat cuts out the pump, this operation being repeated very much the same way as is accomplished in electro-me-

chanical refrigerators and the like. In connection with this water supply and replenishment feature, attention is called to the numeral 16 which designates an appropriate overflow pipe which takes care of the water level and keeps it at a constant elevation. That is to say, it regulates the high level of the water and avoids overflowing within the vicinity of the reservoir.

Incidentally, the apparatus may be of the indoor type, or the out-of-doors type, as desired, and when out of doors may be properly shielded against the elements.

Attention is now invited to that phase of the invention which has to do with the delivery of air into the reservoir and the conduction therefrom of the cooled moistened air. Broadly, this might be called a conduit including a delivery and return section, as well as the air cooling coil. The coil is represented broadly by the numeral 17, and may be of varied construction. The preferred embodiment, however, is somewhat in the nature of a double column radiator, that is, a structure embodying companion sections 18 and 19 and a partitioning or divider plate 20 therebetween. Each section is in effect made up of a series of spaced tubes or tubular fins such as divide and subject the air current to indeterminate circulatory action and allow the cold water to play between the fins for effective radiation and cooling purposes. The plate 20 in addition to serving as a divider and transforming the casing or coil 17 into separate compartments, functions as a baffle and turns the flow of air from one direction to another. The air from the building (not shown) enters through the so-called intake pipe 21. It is thereby carried on into the air circulator or cooling coil 17 and subjected to the requisite cooling action and passed from the compartment or section 18 into the compartment 19 where it is carried back to the building by way of the delivery pipe 22. It is obvious, therefore, that the air circulating means is in effect an appropriate conduit made up of suitable pipes to take in the air, cool it, and carry it back to the building, and to at the same time subject it to a retarded tortuous passage through the coil or cooler unit 17. In Figure 5, only the unit 17 is submerged in the water. In Figure 1, said unit, as well as the adjacent end portions of the pipes 21 and 22 are submerged in the water.

In an apparatus of this kind it is obvious that condensation will collect in the bottom of the multiple fin tank forming the cooling unit 17, and it is advisable, if not necessary, to dispose of this.

Reference being had to Figure 6, the condensation disposal means is shown partially. Here there is a cylinder 23 having connection at 24 with the coil unit 17. The condensation water gravitates into this trapping cylinder 23. It is sucked up from the cylinder through a pipe 25 having operating connection with an electric pump 26 on the surface, as shown in Figure 1. This pump is of appropriate connection and includes a mechanically controlled electric switch 27 to periodically operate the pump. The switch is actuated by a crank arm 28 having operating connection with a link 29, which in turn operates through a protector tube 30 leading down to and connected with the cylinder 23. As shown to advantage in Figure 6, on the lower end of this rod is a float 31. Hence, as the water in the cylinder builds up to a predetermined level, it lifts the link or rod 29, closes the switch 27, and sets the pump 26 into operation. The suction pump lifts the water from the cylinder 23 and disposes of it through a return goose-neck pipe 32, as indicated in Figure 1. Thus, the condensate disposal means is substantially automatic or self-operating, and is an important feature in that it prevents needless flooding of the coil-equipped conduit and avoids the conditioned air entering the building from becoming too wet.

In conclusion, it is desirable to point out that the air is circulated through the conduit and coil, which conduit is made up of the parts 21, 22, and 17, by way of a suction fan, or a pressure fan (not shown), as the case may be. In other words, any suitable source of power may be utilized to force the air on through the conduit so that it may be properly cooled and then returned to the building.

It is evident that the structure is adequately and aptly constructed for commercial success and unqualified endorsement in the trade. It possesses the requisite electro-mechanical features and attributes and other component parts to render it practicable and efficient in every way. It is of reasonable simplicity, and its sufficiency is determined largely by the advantageous results which are assured from its use. The selection of parts is ample, comprehensive, and provides an arrangement calculated to perform satisfactorily.

The chief novelty is not so much in the abstract idea, but rather in the principle and means for taking natural water from a subterranean stream or the like, delivering it into a reservoir, and handling it properly to function as a cooling agent, and circulating air through a conduit and coil whose features are submerged in the cold water.

It is thought that the description taken in connection with the drawings will enable a clear understanding of the invention to be had. Therefore, a more lengthy description is thought unnecessary.

While the preferred embodiment of the invention has been shown and described, it is to be understood that minor changes coming within the field of invention claimed may be resorted to if desired.

I claim:

1. As a component part of an air conditioning apparatus of the class described, an air circulating radiator unit comprising a casing constructed at its top to accommodate air inlet and return pipes, a central depending partitioning and baffle plate mounted in said casing and dividing it into separate chambers communicating with said respective pipes, corresponding walls of said casing being corrugated to define a multiplicity of perpendicular spaced parallel fins on opposite sides of said baffle, said fins serving to permit an exterior cooling medium to play between and around the same, and said fins further converting said casing into a cellular interior subjecting the circulating air to a delayed circulatory action.

2. As a component part of an air conditioning structure of the class described, an air circulating radiator unit comprising a casing having a hood top to accommodate air inlet and return pipes, end walls and intervening side walls between the end walls, said side walls being corrugated to define a multiplicity of perpendicular spaced parallel hollow fins, said fins being disposed in distinguishable rows, and a central depending partitioning and baffle plate mounted in the casing, located between the rows of fins and dividing the casing into separate communicating chambers.

WALTER D. HARPER.