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J. J. STRANG ET AL
AIR CONDITIONING DEVICE

1,933,771

Filed Oct. 8, 1932

2 Sheets-Sheet 1

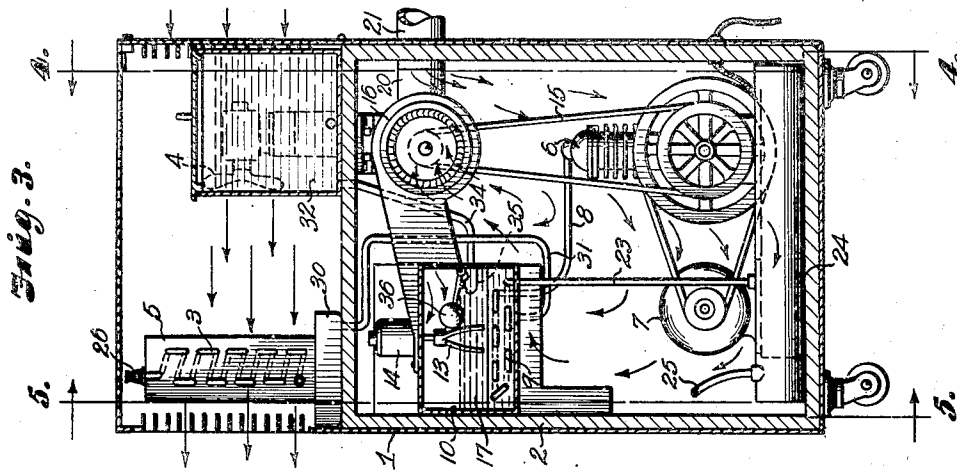


Fig. 2.

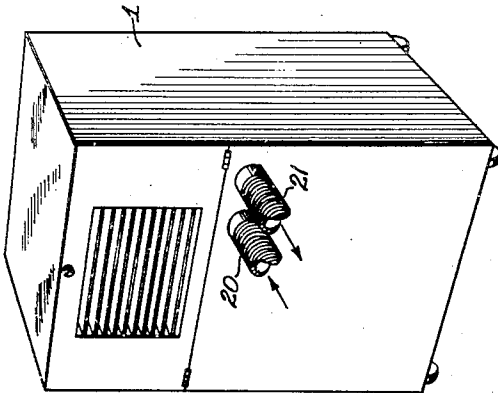


Fig. 1.

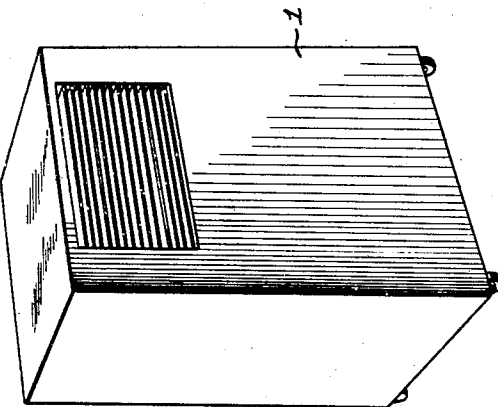


Fig. 7.

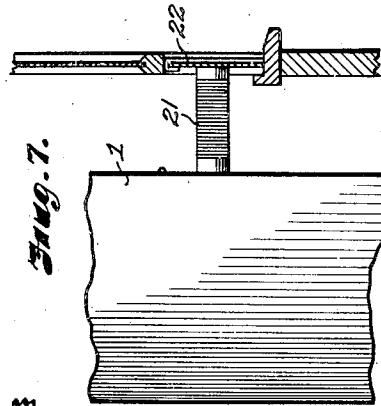
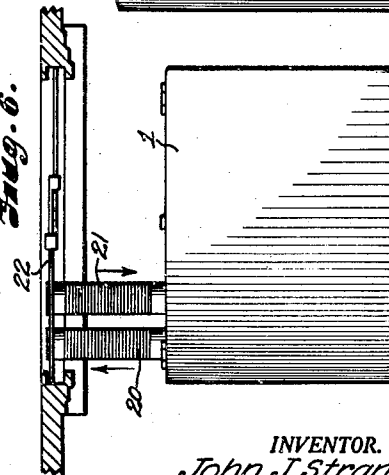


Fig. 6.



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Fig. 5.

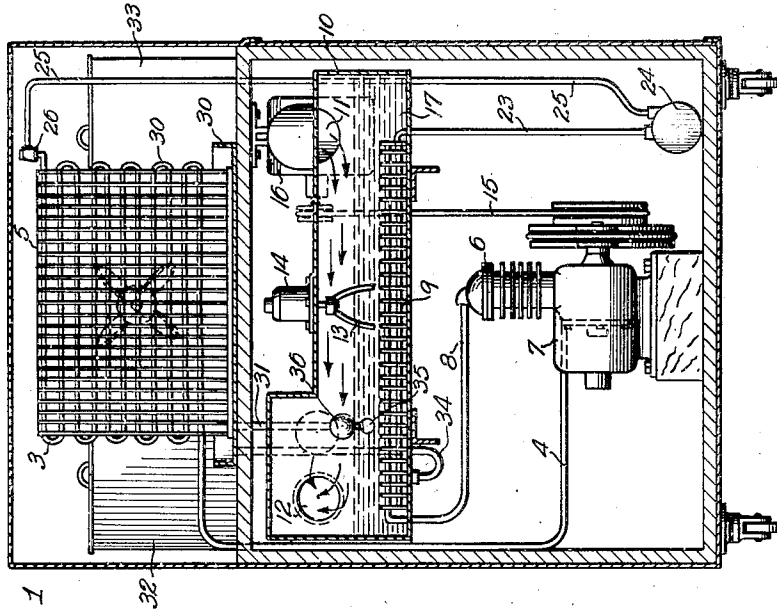
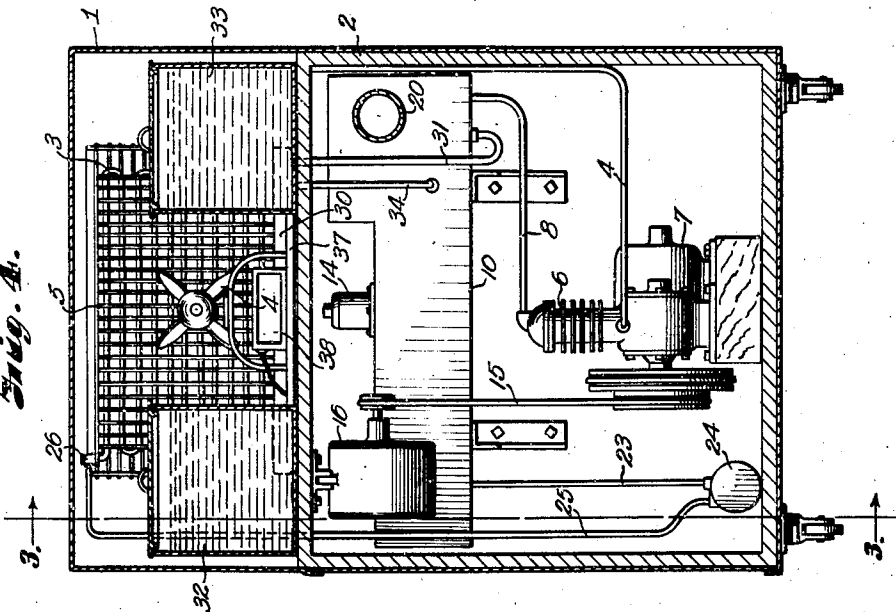


Fig. 4.



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UNITED STATES PATENT OFFICE

1,933,771

AIR CONDITIONING DEVICE

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Application October 8, 1932. Serial No. 636,871

6 Claims. (Cl. 62—129)

Our invention relates to an air conditioning device and more particularly to a device adapted to reduce the temperature and humidity of the air in the room. The present application is a continuation in part of our co-pending application, Serial No. 600,697, filed March 23, 1932.

Air conditioning and principally the cooling and reduction of the humidity in living room spaces has been growing rapidly of late. The mechanical refrigeration and absorption refrigeration systems which have been developed for small ice boxes in the homes have led manufacturers to attempt to make air conditioning devices having cooling means similar to those used in refrigerators. Inasmuch as a considerably greater amount of heat must be handled, it was found necessary to provide water cooling means for condensers of the refrigerating systems. This necessitated the circulation of water around the condensers entailing the cost and consumption of a large quantity of water.

One object of our invention is to provide a refrigeration unit for an air conditioning means in which the condenser thereof is water cooled.

Another object of our invention is to provide a water cooling means for the condenser of a refrigerating unit for an air conditioning device in which the necessity of circulating water is eliminated.

Further and other objects of our invention will appear from the following description.

In the accompanying drawings which form part of the instant specification and which are to be read in conjunction therewith;

Figure 1 shows a perspective view of the front of a cabinet containing the device of our invention.

Figure 2 shows a perspective view of the air portion of a cabinet containing one method of carrying out our invention.

Figure 3 shows a sectional elevation through a cabinet containing a device embodying one method of carrying out our invention.

Figure 4 is a sectional view taken on the line 4—4 of Figure 3.

Figure 5 is a sectional view taken on the line 5—5 of Figure 3.

Figure 6 is a plan view partly in section showing a detail of our invention.

Figure 7 is a fragmentary elevation partly in section showing a detail of our invention.

In general, our invention contemplates a cabinet or other suitable supporting means having any conventional refrigerating system of either the compression and expansion or the absorption

type in which the refrigerating coil comprises the cooling means to cool the air in the spaces being conditioned. A blower is provided to blow a stream of air over the cooling coil. The condenser of the refrigerating system is immersed in a tank of water to cool the same. The water is cooled by evaporation. We blow a stream of air taken from a source independent and outside of the space being conditioned over the water tank containing the condensing coil. The evaporation of the water of the tank will serve to keep its temperature within the limits required for cooling purposes. We provide means for increasing the surface of the water contacted by a mechanical agitator which will throw up a water spray and thus increase the surface area of the water exposed to the evaporating air stream.

More particularly referring now to the drawings, a suitable cabinet which may be made out of metal, wood, or any other suitable material, is shown at 1. The cabinet is divided into appropriate compartments as may be convenient. We place the compressor and motors of our system in the lower portion of the cabinet which is insulated by sound proof material 2 to reduce the noise occasioned by the operation of our device. While we have shown a compression expansion system for the purpose of illustration, it is to be understood that any suitable refrigerating system may be used. The expansion coil 3 in which the compressed fluid is expanded is placed in any suitable location in our device. In front of or behind the expansion coil we provide a blower 4 adapted to take air from the room and blow it past the expansion coil. Suitable fins 5 may be placed around the expansion coil 3 to increase the heat exchange area. The liquid in the refrigerating system may be any of the well known gases such as sulphur dioxide, ethyl chloride, or any easily compressible gas.

A compressor 6 takes suction from the expansion coil 3 through line 4 to compress the gas. The compressor is driven by an electric motor 7 or by any other suitable means. The gas, upon being compressed in compressor 6 is piped through pipe 8 to condenser coil 9. Condenser coil 9 is situated in closed water tank 10. Water tank 10 is provided with an air inlet opening 11 and an air outlet opening 12. An agitator 13 is driven by a small electric motor 14. Driven by the motor 7 through any suitable connecting means such as belt drive 15 is a blower 16 which takes suction outside the air space being conditioned. The blower 16 will blow air over the

surface of the water 17 in tank 10. The motor 14, driving the agitator 13, will set up a spray of water within the tank 10 and increase the area of water exposed to evaporation. The air blown by blower 16 through inlet 11 will evaporate water from the tank and will be discharged through outlet 12, through conduit 20, which discharges outside of the air space being conditioned. A conduit such as conduit 21 may supply air to the blower. The conduits 20 and 21 may pass through suitable adjustable window board 22 as can be readily seen by reference to Figures 6 and 7. It is to be understood that these conduits 20 and 21 may be placed in any suitable position in our cabinet 1. The evaporation of the water will keep the temperature thereof lowered sufficiently to allow the water 17 in the tank 10 to cool the condensing coil 8. The cooled, compressed gas will leave condensing coil 9 through line 23 and pass through tank 24, through line 25, through expansion valve 26 to expansion coil 3 in which the refrigeration effect is produced by the expansion of the cooled and compressed gas. The air passing in contact with expansion coil 3 and heat exchange fins 5 will be chilled below the dew point, and the water collecting upon the fins 5 and the coil 3 will collect in pan 30 which is connected by line 31 to the water tank 10. Above the water tank 10 we provide suitable water storage tanks 32 and 33 which are in communication with water tank 10 through line 34. Line 34 terminates in a valve 35 which is controlled by a float 36, governed by the level of the water 17 in water tank 10. As evaporation proceeds, the level of the water 17 in tank 10 drops allowing the float 36 to fall to maintain the water level thereof. Tanks 32 and 33 are interconnected by means of a line 37. If desired, we may provide an ozonator or ozone machine 38 in the path of the air blower 4.

It is believed that the operation of our device will be apparent from the foregoing description. It will be appreciated that we have provided a means for cooling the condenser of a mechanical refrigerating system without the necessity of providing water circulation. In this manner, we are enabled to use our machine independently of any water supply and without the necessity of pipes for piping the water to the condenser cooling tank. The heat taken from the room is discharged ultimately through conduit 20 outside of the air space being conditioned. The expense of the water used to cool the condenser is eliminated. Furthermore, in places where the water supply is limited, a device of our nature will be able to be used.

It will be understood that certain features and sub-combinations are of utility and may be employed without reference to other features and sub-combinations. This is contemplated by and is within the scope of our claims. It is further obvious that various changes may be

made in details within the scope of our claims without departing from the spirit of our invention. It is therefore, to be understood that our invention is not to be limited to the specific details shown and described. For example, if desired, the motor 7 may be controlled by a thermostat operated by the room temperature so that when the room or air space being conditioned reaches the desired temperature, the motor operating the compressor will be cut off. The motor controlling the fan 4, however, will be allowed to run continuously so that the air will be circulated through the air space being conditioned.

When the temperature in the air space being conditioned drops to a predetermined amount, the thermostat will again set the motor 7 in operation.

Having thus described our invention, what we claim is:

1. An air conditioning apparatus including in combination a refrigeration system having a condenser coil and a refrigerating coil, said condenser coil being immersed in liquid, means for circulating the air to be conditioned over said refrigerating coil, means for passing a separate air stream in contact with the liquid surrounding the condenser, and means for offering an increased surface for the evaporation of the liquid.

2. An air conditioning device having in combination a refrigerating system having a condensing means, a tank containing liquid, said condensing means being immersed in the liquid in said tank, means for passing an air stream over the surface of the liquid in said tank to evaporate the same to cool it, means for increasing the effective surface of the liquid in said tank exposed to said air stream, an air cooling means and means for passing a separate air stream through said air cooling means.

3. An air conditioning apparatus as in claim 2 including a water reservoir, a duct connecting said reservoir with said tank and a valve controlled by the water level in said tank for controlling the flow of water through said duct.

4. An air conditioning device as in claim 2 including in combination a receptacle positioned under said air cooling means adapted to collect the water precipitated from the air being passed through said means, and a drain duct for discharging said precipitated water into said tank.

5. An air conditioning device as in claim 2 wherein said means for increasing the effective surface of the liquid in said tank comprises an agitator having a blade extending into said liquid and means for moving said blade to agitate the water.

6. An air conditioning apparatus as in claim 2 including a housing for said apparatus and wheels for movably supporting said housing.

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