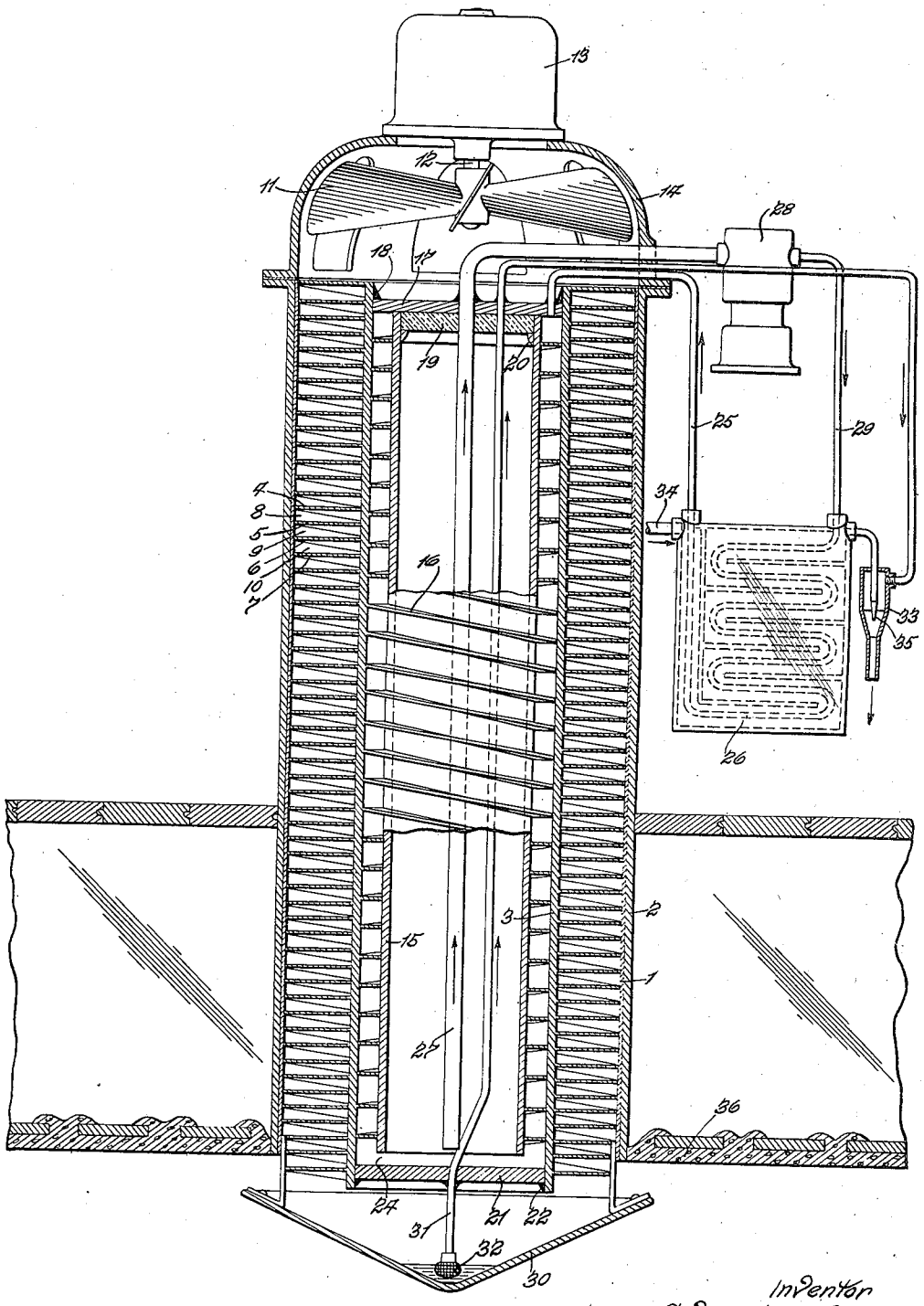
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AIR CONDITIONING APPARATUS

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AIR CONDITIONING APPARATUS

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11 Claims. (Cl. 257—244)

This invention relates to air conditioning apparatus.

An object of the invention is to provide an improved apparatus for conditioning and circulating air, said apparatus including a number of passages having walls subjected to the influence of a conditioning fluid and opening in opposite directions to discharge and distribute the air in and about the room in which the air is to be conditioned.

Another object of the invention is to provide an improved air conditioning apparatus embodying the improved features of construction, arrangement and combination of parts and elements, and functioning to obtain the advantageous effects and results herein disclosed, reference being made to the annexed drawing.

The single view of the drawing is a vertical sectional view of an air conditioning apparatus constructed in accordance with the present invention.

As shown, the invention comprises a wall 1 preferably enclosed by an insulating wall 2. A cylindrical wall 3 is mounted concentrically within the wall 1, and a series of spaced spiral walls 4, 5, 6, and 7 is mounted between the walls 1 and 2 and form separate spiral passages 8, 9, and 10. These passages 8, 9, and 10 extend from the upper ends of the walls 1 and 3 to the lower ends thereof. Said passages 8, 9, and 10 open at the upper end of the annular space between the walls 1 and 3 and receive air driven by a blower 11. The blower 11 is attached to a shaft 12 driven by an electric motor 13 mounted on a support 14 attached to the upper end of the unit comprising the walls 1, 2, and 3. The walls 4, 5, 6, and 7 are continuous and imperforate from the upper end of the annular space between the walls 1 and 3 to the lower end of said space.

An annular wall or tubular member 15 is mounted concentrically within the wall 3 and is separated therefrom by an intervening space through which a continuous spiral wall 16 extends from the upper end of said space to the lower end thereof. An upper wall 17 is mounted on the upper end of the wall or member 15 and forms a hermetic joint therewith and with the wall 3. The hermetic joint with the wall 3 may be provided by solder 18 or by welding, or otherwise, as desired. An insulation wall 19 is located against the under surface of the wall 17 and has a hermetic joint 20 with the tubular wall member 15. A lower end wall 21 has a hermetic joint 22 with the wall 3 and is separated from the lower end of the wall member 15 by a space 24.

A pipe 25 extends from a condenser unit 26 and opens into the upper end of the space between the walls 3 and 15. A pipe 27 opens into the lower end of the space within the cylinder 15 and extends upwardly through said space and outwardly to a pump compressor 28 of any known or appropriate construction. From the pump compressor 28 a pipe 29 extends into and coils through the condenser unit 26 in continuation of the pipe 25. It is apparent that, when the pump compressor 28 is operating, any refrigerating fluid or gas will be forced from the pump compressor 28 through the pipe 29 and the continuation thereof in the condenser unit 26, and thence through the pipe 25 into the upper end of the annular space between the walls 3 and 15 and downwardly through the spiral passage in said space. From the lower end of the spiral passage in the space between the walls 3 and 15, the refrigerating gas or fluid will be forced through the pipe 27, which is of larger diameter and capacity than the pipe 25, and into and through the pump compressor 28, and thence again into the pipe 29. Thus, a continuous circulation and flow of the refrigerating gas or fluid will be maintained so long as the pump compressor 28 operates. When the motor 13 is operating, air will be continuously forced by the blower 11 through the spiral passages 8, 9, and 10 and discharged laterally from the lower ends of said passages.

A pan or receptacle 30 is supported below the lower ends of the spiral passages formed by the walls 4, 5, 6, and 7 and will receive condensed moisture which may be accumulated during the operation of the apparatus. A pipe 31 has a strainer inlet 32 attached to the lower end thereof within the pan 30, and said pipe 31 extends upwardly through the hermetically sealed space within the wall 15 and into a jet nozzle casing 33.

A water supply pipe 34 opens into the condenser unit 26 and a jet nozzle member 35 extends from the condenser unit and opens into the jet nozzle casing 33. The jet nozzle 35 is of less diameter and capacity than the pipe 34. Consequently, when there is a continuous flow of water through the jet nozzle 35 and the casing 33 therefor, most of the condensed moisture in the pan 30 will be drawn upwardly through the pipe 31 and discharged into and through the casing 33.

As shown, the apparatus extends through a ceiling 36 and the spiral passages provided by the walls 4, 5, 6, and 7 in the space between the walls

1 and 3 open laterally adjacent to the underside of the ceiling. Thus, the cool or conditioned air is forced into the room laterally and nearly horizontally close to the ceiling, which is a desirable point for discharge of the cooled air.

From the foregoing, it will be apparent that, when the motor 13 and the pump compressor 28 are in simultaneous operation, cooled currents of air will be continuously supplied and discharged into the room. The condensed moisture will be received by the pan 30 and discharged therefrom through the pipe 31 so long as a continuous flow of water through the condenser unit 26 and the jet nozzle device 33, 35 is maintained.

The invention may be varied in numerous respects without departure from the nature and principle thereof. I do not restrict myself unessentially, but what I claim is:—

1. An apparatus of the character described comprising two concentric cylindrical walls separated by an intervening annular space, a series of spiral walls mounted in said space and forming spiral passages having inlets at their upper ends and outlets at their lower ends, mechanism for forcing air through said passages, a tubular member concentric with one of said first named walls and separated therefrom by an intervening annular space and having its lower end opening into said space, a spiral wall mounted in said last named annular space and forming a continuous spiral passage, and mechanism for forcing a refrigerant into and through said last named spiral passage.

2. An apparatus of the character described comprising three concentric cylindrical walls the middle one of which is separated from the other two by non-communicating annular spaces and the inner end of which has one end opening into the surrounding annular space, spiral walls in said annular spaces, respectively, and cooperating with said cylindrical walls to form spiral passages, means for forcing air through one of said spiral passages, and mechanism for forcing a refrigerant through another spiral passage.

3. An apparatus of the character described comprising three concentric cylindrical walls the middle one of which is separated from each of the other two by an intervening annular space and the inner end of which has one end opening into the surrouding annular space, spiral walls mounted in said annular spaces, respectively, and forming non-communicating spiral passages one of which has an air inlet at one end and an air outlet at the opposite end, mechanism for forcing air into said inlet and through the spiral passage having said inlet, and mechanism for maintaining a circulation of refrigerant through the spiral passage in another annular space.

4. An apparatus of the character described comprising three concentric cylindrical walls the middle one of which is separated from each of the other two by an intervening annular space and the inner end of which has one end opening into the surrounding annular space, spiral walls in the outer annular space forming continuous spiral passages from one end of said outer annular space to the other end thereof and said passages having inlet openings at one end and outlet openings at the opposite end, mechanism for forcing air into said inlet openings and through said annular passages, a spiral wall mounted in the other annular space and forming a spiral passage therein at the inner side of said middle wall, and means for forcing a refrigerant through said last named spiral passage.

5. An apparatus of the character described comprising three concentric cylindrical walls the middle one of which is separated from each of the other two by an intervening annular space and the inner end of which has one end opening into the surrounding annular space, spiral walls in the outer annular space forming continuous spiral passages from one end of said outer annular space to the other end thereof and said passages having inlet openings at one end and outlet openings at the opposite end, mechanism for forcing air into said inlet openings and through said annular passages, a spiral wall mounted in another annular space and forming a spiral passage therein at the inner side of said middle wall, means for forcing a refrigerant into said last named spiral passage adjacent to said inlet openings to said first named spiral passages, and mechanism for withdrawing the refrigerant from the opposite end of said last named spiral passage.

6. An apparatus of the character described comprising three concentric cylindrical walls the middle one of which is separated from each of the other two by an intervening annular space and the inner end of which has one end opening into the surrounding annular space, means hermetically sealing the ends of the inner cylindrical wall, spiral walls in the annular space between the outer and middle cylindrical walls forming continuous spiral passages from one end of said space to the other and which passages have inlet openings at one end and outlet openings at the opposite end, mechanism for forcing air through said spiral passages, a spiral wall in the annular space between the inner and middle cylindrical walls forming a continuous spiral passage therein, mechanism for forcing a refrigerant into the end of said last named spiral passage adjacent to said inlet openings to said first named spiral passages, and a pipe opening from the lower end of said second spiral passage and communicating with said mechanism for conducting the refrigerant from said last named spiral passage to said mechanism.

7. An apparatus of the character described comprising three concentric cylindrical walls the middle one of which is separated from each of the other two by an intervening annular space and the inner end of which has one end opening into the surrounding annular space, means hermetically sealing the upper end of the inner cylindrical wall, spiral walls in the annular space between the outer and middle cylindrical walls forming continuous spiral passages from one end of said space to the other and which passages have inlet openings at one end and outlet openings at the opposite end, mechanism for forcing air through said spiral passages, a spiral wall in the annular space between the inner and middle cylindrical walls forming a continuous spiral passage therein, mechanism for forcing a refrigerant into the end of said last named spiral passage adjacent to said inlet openings to said first named spiral passages, and a pipe opening near the lower end of said second spiral passage and communicating with said mechanism for conducting the refrigerant from said last named spiral passage to said mechanism, said pipe extending longitudinally through the space in said inner cylindrical wall.

8. An apparatus of the character described comprising three concentric cylindrical walls the

middle one of which is separated from each of the other two by an intervening annular space and the inner end of which has one end opening into the surrounding annular space, means for forcing a flow of air through the annular space between the middle and outer annular walls, and mechanism for forcing a refrigerant through the annular space between the inner and middle annular walls.

9. In apparatus of the character described comprising three walls one within the other and separated by intervening non-communicating spaces and the inner one of which has one end opening into the surrounding space, means in said spaces forming spiral passages, means for forcing air through one of said spiral passages, and mechanism for forcing a refrigerant through the other spiral passage and thence through and from the space within the inner cylindrical wall.

10. In apparatus of the character described comprising three concentric cylindrical walls the middle one of which is separated from each of the other two by an intervening annular space and the inner one of which has one end opening into the surrounding annular space, elements mounted in said annular spaces forming non-communicating passages one of which has an air inlet at one end and an air outlet at the opposite end, mechanism for forcing air through said inlet and through the communicating passage having said inlet, and mechanism for maintaining a circulation of refrigerant through the other passage and outwardly through the space formed by the inner cylindrical wall.

11. In apparatus of the character described comprising three concentric walls the middle one of which is separated from each of the other two by an intervening annular space, the inner of said spaces opening into the space within the inner cylindrical wall, means for forcing a flow of air through the annular spaces between the middle and outer cylindrical walls, and mechanism for forcing a refrigerant through the annular space between the inner and middle walls and thence through the space within the inner wall.

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