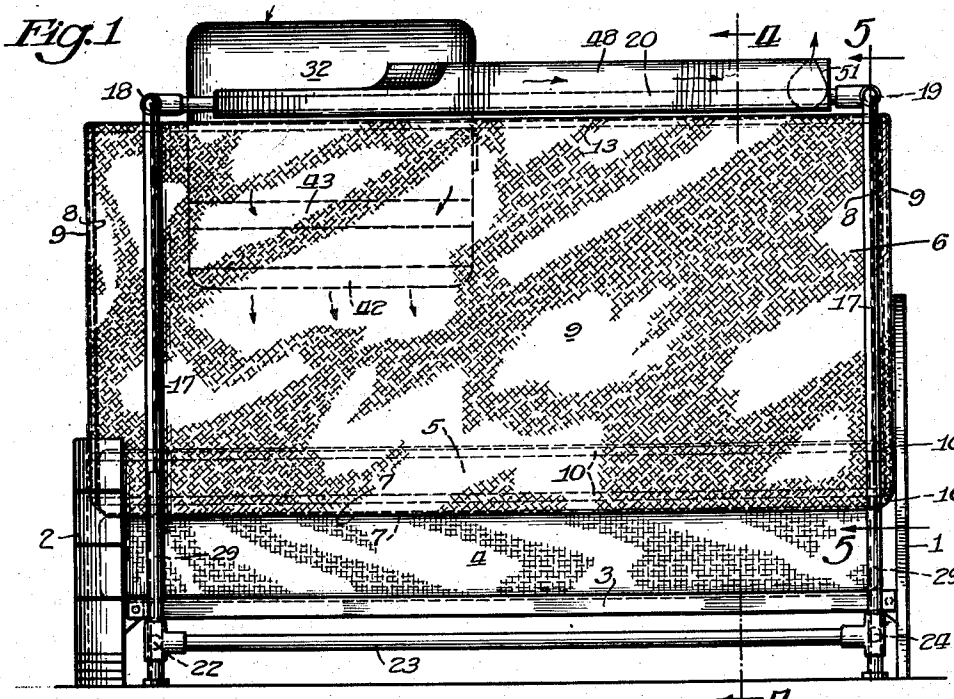
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Fig. 1



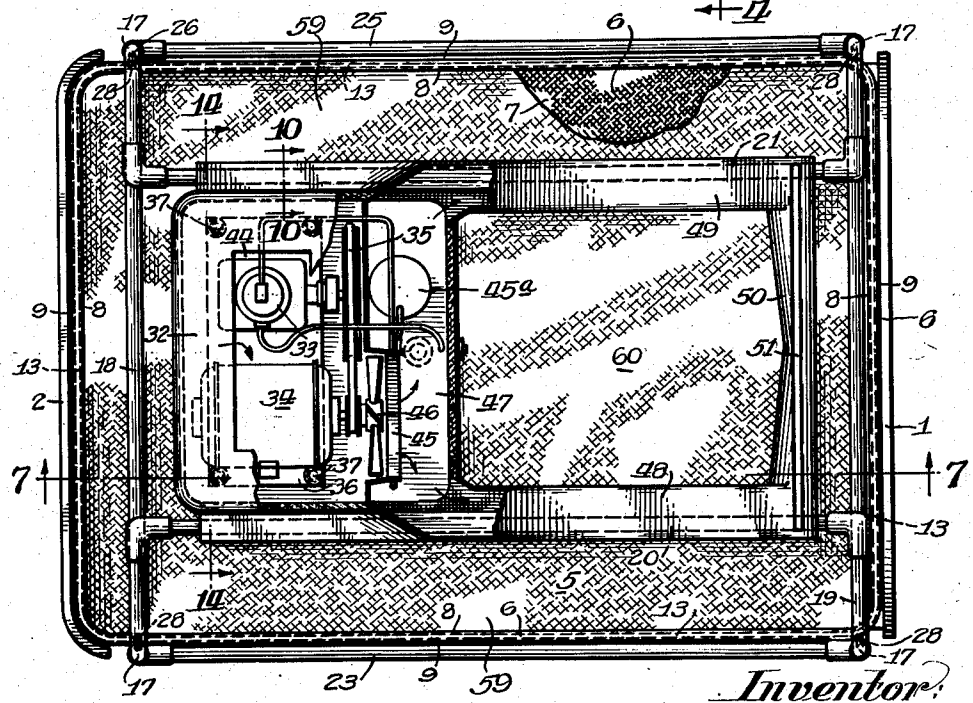


Fig. 2

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Fig. 3

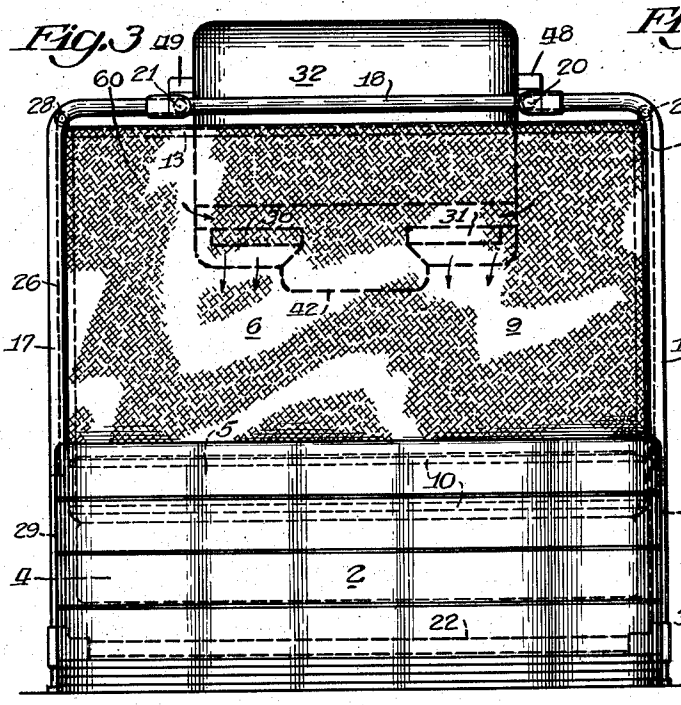


Fig. 5

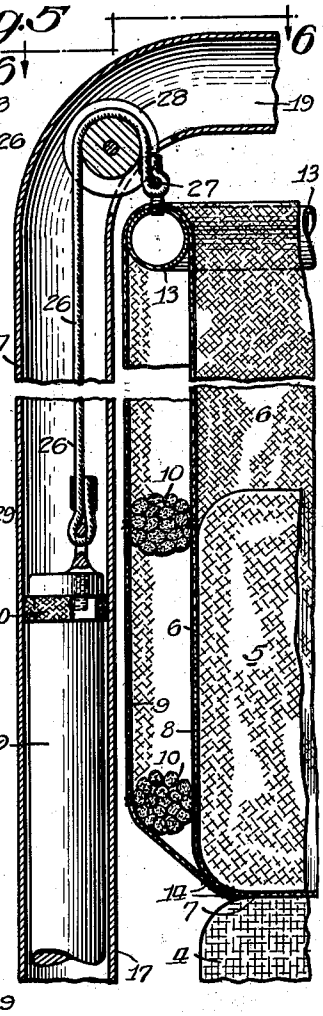


Fig. 4

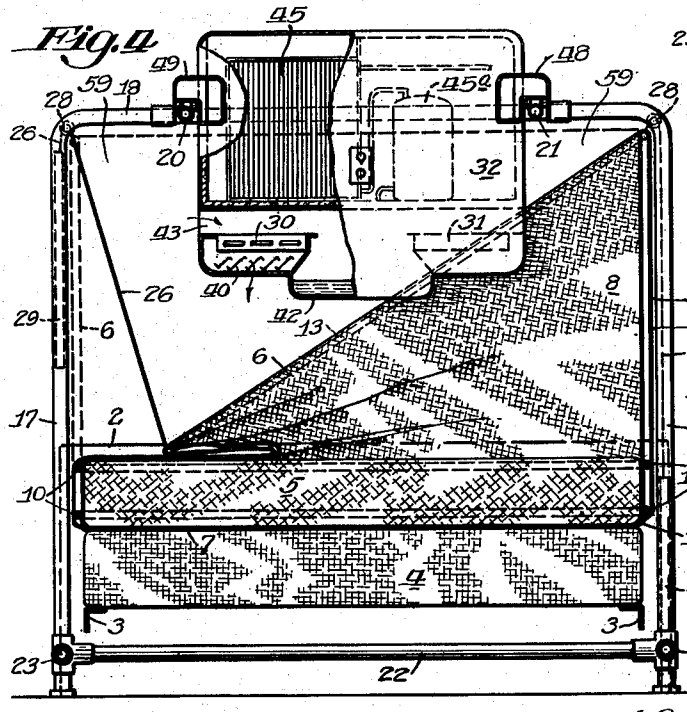
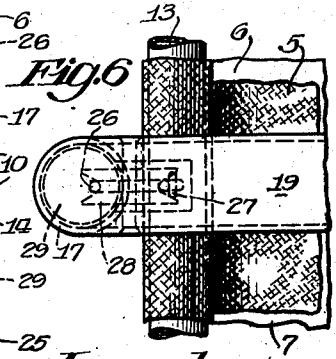


Fig. 6



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Fig. 7

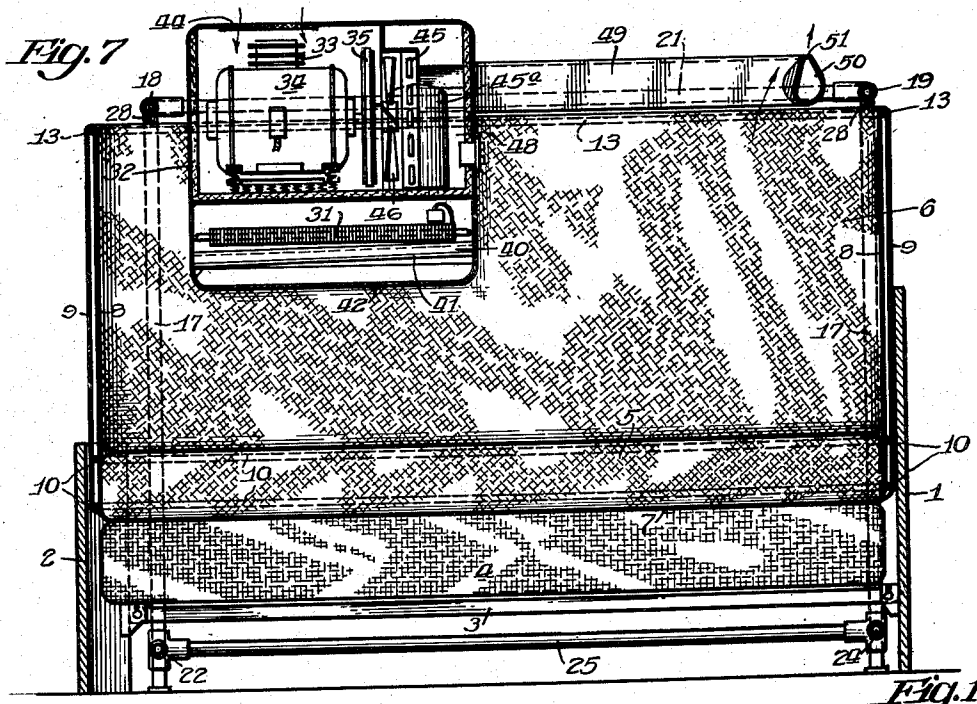


Fig. 8

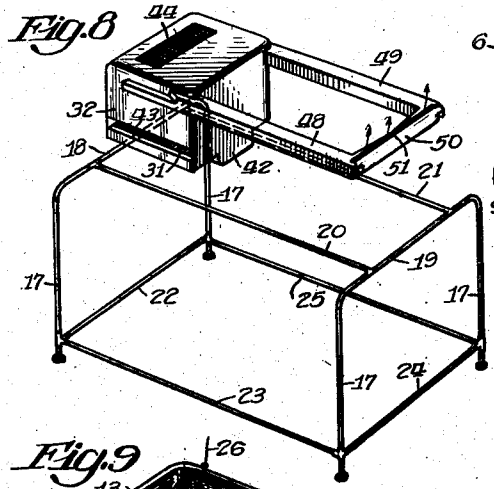


Fig. 9

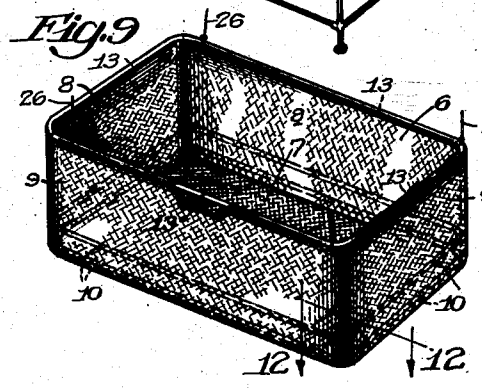


Fig. 10

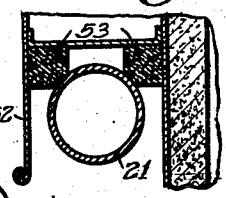


Fig. 11

Fig. 12



Fig. 13



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Fig. 14

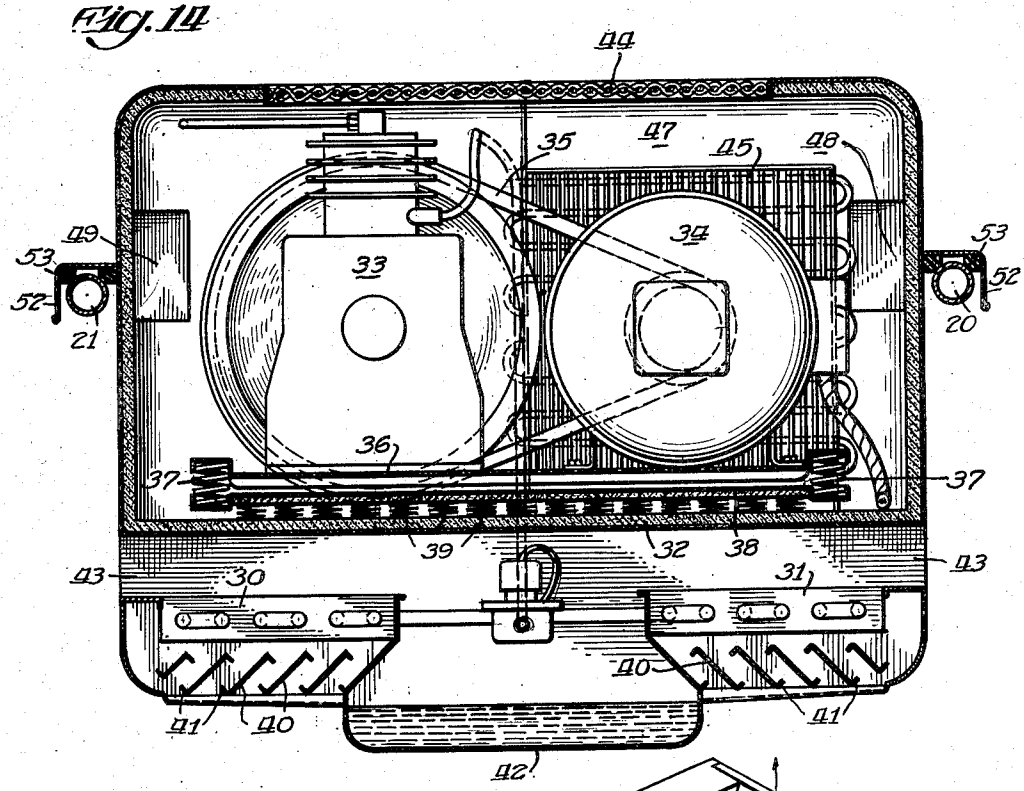
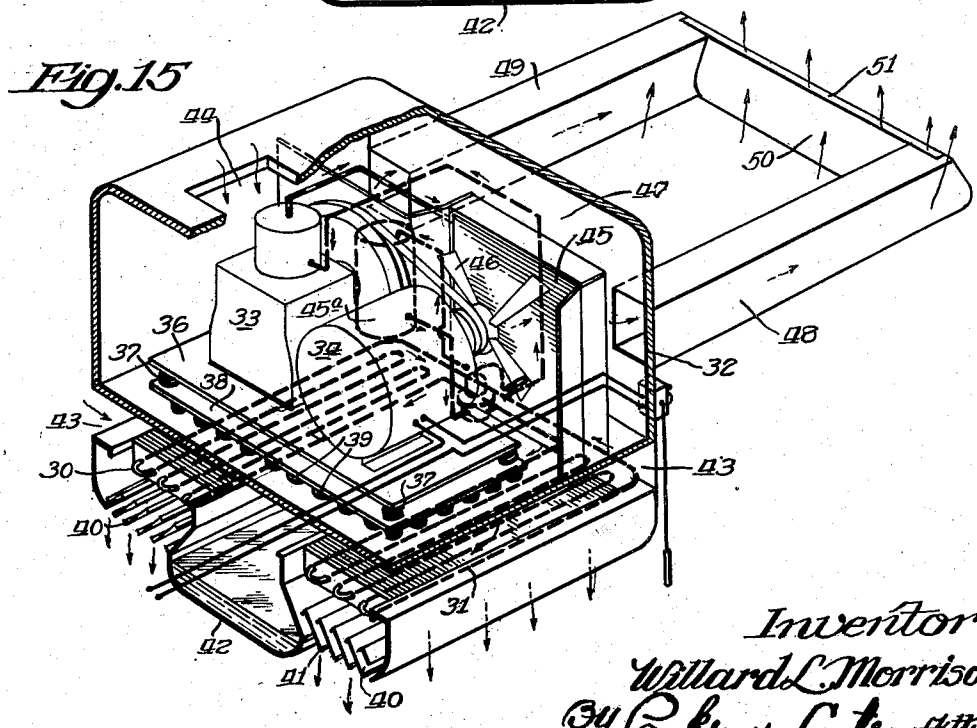


Fig. 15



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Patented May 21, 1935 2,002,235

UNITED STATES PATENT OFFICE

2,002,235

AIR COOLING AND CIRCULATING DEVICE

Willard L. Morrison, Lake Forest, Ill.

Application July 26, 1934, Serial No. 737,018

19 Claims. (Cl. 62—129)

This invention relates to air cooling and circulating devices and has for its object to provide a new and improved device of this description. The invention has as a further object to provide a device of this description where there is a receptacle to be cooled, with means to permit one or more persons to enter, and with a cooling apparatus mounted at the top of the receptacle. The invention has as a further object to provide such a device where the cooling apparatus is mounted upon a supporting structure separate from but encompassing the receptacle. The invention has as a further object to provide such a device where there is a mattress with a flexible receptacle having an air tight seal with the mattress and extending above the mattress so as to form a receptacle into which one or more persons may be received with the cooling apparatus associated therewith. The invention has as a further object to provide such a device where the unit can be plugged in the wall socket of a room. The invention has further objects which are more particularly pointed out in the accompanying description.

Referring now to the drawings, Fig. 1 is a side elevation of one form of device embodying the invention;

Fig. 2 is a plan view of the device shown in Fig. 1 with parts broken away;

Fig. 3 is a rear end view of the device shown in Fig. 1;

Fig. 4 is a sectional view taken on line 4—4 of Fig. 1 with parts broken away showing one side of the receptacle lowered for entrance therein;

Fig. 5 is an enlarged sectional view taken on line 5—5 of Fig. 1 with parts omitted;

Fig. 6 is a view taken on line 6—6 of Fig. 5 with parts omitted;

Fig. 7 is a sectional view taken on line 7—7 of Fig. 2;

Fig. 8 is a perspective view showing the cooling apparatus and the supporting structure, the cooling apparatus being shown as it is being lowered onto the supporting structure;

Fig. 9 is a perspective view showing the receptacle;

Fig. 10 is an enlarged sectional view taken on line 10—10 of Fig. 2 with parts omitted;

Fig. 11 is an enlarged sectional view showing a modified construction for connecting the outer section of the receptacle with the inner section to the mattress;

Fig. 12 is an enlarged sectional view showing one construction for holding the outer and inner sections of the receptacle apart, taken on line 12—12 of Fig. 9;

Fig. 13 is a view similar to Fig. 12 showing a modified construction for holding the inner and outer sections of the receptacle apart;

Fig. 14 is an enlarged sectional view taken on line 14—14 of Fig. 2;

Fig. 15 is a diagrammatic perspective view showing the elements of the refrigerating apparatus and connecting pipes.

Like numerals refer to like parts throughout the several figures.

Referring now to the drawings, I have shown one form of air cooling and circulating device particularly adapted to be used for cooling beds. It may be associated with any desired bed construction or with chairs, couches or the like. In the bed construction I have illustrated a conventional bed consisting of a head piece 1 and a foot piece 2 and the connecting members 3 with a spring member 4 and a mattress 5. A receptacle 6 is provided which may be made of any suitable flexible material, such as cloth of any desired kind. This flexible material may be of any proper design or color to harmonize with the room in which it is located and the furnishings thereof. This receptacle has a sealing connection with the mattress so that no air can pass down from it past the mattress and out of the receptacle.

Any suitable means for forming a sealing connection between the receptacle and the mattress may be used. A preferred construction is that wherein the receptacle has a bottom 7, the mattress being located in the receptacle so that the receptacle extends along the bottom of the mattress and the sides and ends thereof and upwardly as desired. Any other sealing means may of course be used.

The receptacle 6 is preferably arranged at its sides and ends with double walls so that it acts as a heat insulator to keep out the exterior heat to keep the exterior heat from passing into the receptacle. In the construction shown this flexible receptacle is made up along its sides and ends of an inner wall 8 and an outer wall 9, the two walls being held separated so as to provide a suitable air space between them in any convenient manner. As shown for example in Fig. 5, these walls are separated by members 10 located between them and holding them separated as shown for example in this figure. These separating members 10 may be of any suitable material, such for example as rope, and may be attached to the outer and inner walls so as to hold them properly spaced apart.

I have illustrated in Fig. 13 a modified construction wherein the walls are provided with pleats or folds 11 with air spaces 12, as shown in this figure, thus forming an insulating wall for the receptacle.

Some means is provided for holding the upper portion of the flexible receptacle in its up position and for permitting it to be moved down to permit a person to enter or leave the receptacle. In the particular construction illustrated the receptacle is open at the top and is provided with one or more members 13 to which the upper edge of the receptacle is connected. I prefer to loop the upper edge of the receptacle over the member 13, as shown in Fig. 5. The lower edge of the outside section 9, after being looped over the member 13, passes down along the member 8 and is attached at 14 to the inside member 8 by any attaching means, as by being sewed, riveted or the like. This connection may be made easily removable, as shown for example in Fig. 11, by having snap buttons 15 extending along the edge of the outer section which engages the members 16 on the inner section. By this means the edge of the outer section 9 may be easily disconnected from and connected to the inner section 8.

Some suitable means is provided for properly supporting the upper portion of the receptacle so that it may be easily moved downwardly. In the construction herein shown there is a supporting structure which consists of a frame having the upright members 17 which are cross connected at the top by the members 18 and 19, and the members 18 and 19 are connected together by the longitudinal members 20 and 21. The members 17 are connected at the bottom by the members 22, 23, 24 and 25, as clearly shown in Fig. 8. The members 17 straddle the bed, as illustrated in Figs. 1, 2 and 4. Attached to the members 13 at suitable separated points are the flexible members or cords 26, said cords being attached by the attaching devices 27, as shown in Fig. 5, and passed over pulleys 28 located in the frame members 17, which are hollow as indicated in Fig. 5. Connected with each flexible member 26 is a weight 29 which slides in the hollow members 17. These weights are preferably provided with non-metallic pieces 30 which engage the inner walls of the members 17 so as to prevent noise or vibration and insuring proper and smooth movement of the weight along the member 17. The person desiring to enter the receptacle takes hold of the top of the receptacle, which in this case will be the member 13, and pulls it down to the mattress, the weight 29 moving upward to permit this. The person can then enter the receptacle and upon releasing the upper edge of the receptacle the weight will pull it back to its up position as indicated in Fig. 5.

The air cooling apparatus is located above the receptacle and is mounted and supported upon the supporting structure which straddles or encompasses the bed. In the construction shown this cooling apparatus is made in a unit which can be placed in position as a unit over the top of the receptacle. Any suitable cooling apparatus may be used. For purposes of illustration I have shown a cooling apparatus which consists of one or more cooling elements, and I have illustrated the two cooling elements 30 and 31 located at separated points and supported upon the casing 32 in which is carried a compressor 33 and a motor 34 for operating the compressor, the motor being connected with the compressor by the belt 35. The motor and compressor are supported upon the support 36 which is mounted on springs 37 on a base 38 which is supported by springs 39 on the bottom of the casing 32. This casing completely encompasses the motor and the compressor and by means of this construction noise and vibration is prevented. The cooling elements 30 and 31 may be of any desired form and for purposes of illustration I have simply shown them as coils. Located below the cooling elements 30 and 31 are the baffle plates 40 which have at their lower ends the troughs 41 which catch the water produced by the moisture condensing on the coils and which moisture is discharged into the receiver 42. The casing below the motor and compressor is provided with the air passageway 43.

When the device is in operation the air passes in through the passageways 43 and through the cooling elements 30 and 31 and past the baffle plates down into the receptacle, any water due to condensation being collected in the receiver 42. The casing is also provided at the top with an opening 44. Associated with the refrigerating apparatus is a condenser element 45 and a tank 45a, see Fig. 2.

I prefer to provide an air moving device such as a fan 46 which is run from the motor shaft and which directs air against the condenser element 45. This air enters a cross passageway 47 connected with the casing 32. The passageway 47 communicates with the ducts 48 and 49 which extend longitudinally toward the front end of the device and which connect with the cross duct 50 which has the discharge 51 which preferably extends entirely thereacross, as shown in Fig. 2. It is of course understood that the cooling element, condenser element, compressor and tank 45a are connected in circuit by suitable pipes as is customary in the use of such cooling element.

The entire cooling element is preferably removably mounted upon the supporting frame work in any suitable manner. I have illustrated certain means for this purpose. There are provided, extending longitudinally along the sides of the refrigerating apparatus, the channels 52 into which are received the longitudinal members 20 and 21 of the supporting frame. There are provided packing members 53 between the refrigerating apparatus and the members 20 and 21 which prevent or reduce vibration of the parts. There is also an opening 60 above the occupant. It will be seen that by means of this opening, if anything should happen so that the refrigerating apparatus does not work properly, the occupant will still get plenty of air. With these openings at the top, the cold air being heaviest, settles at the bottom and will not pass out through these openings, only the warm air passing out of the receptacle. The speed of the natural draft is predetermined or regulated to fit each case by arranging the fins closer or wider apart, or the depth of the coil, or the height of the coil above the bottom of the bed. In this way any desired control of the speed of the natural draft can be attained.

It will further be seen that the receptacle can be opened from either or both sides by simply pushing the upper frame of the receptacle down, and that the receptacle automatically assumes its normal position as the occupant enters and releases the upper frame. It will further be noted that the bed has no substantial contact or connections with the cooling apparatus. It will further be seen that I have here a portable self-contained cooling unit suitable for mounting over any bed.

The use and operation of the device are as follows:

The device may be applied to any suitable bed, chair, couch or the like and is made the proper dimensions, depending upon the device to which it is applied. The part on which the user is to rest, such for example as the mattress, is inserted in the flexible receptacle and the supporting element placed in position over the bed as indicated. The cooling element is then placed in position on the supporting element and the top of the receptacle connected with the flexible members. The refrigerating mechanism is then started up and the refrigerant circulated therethrough. The cooling elements then cool the air and it drops down into the receptacle. The fan drives air through the conduits 48 and 49 and 50 and out through the discharge opening 51. The cold air which drops into the receptacle passes along the receptacle above the mattress and the party on the mattress, and the air when warmed passes up and out through the opening 59, being displaced by the cold air as it drops in, thereby producing a circulation of air through the receptacle above the occupant so that the occupant is out of the direct draft.

The discharge of the air through the discharge opening 51 may be utilized to assist in causing the warm air to pass up out of the receptacle, as the air discharged through the opening or nozzle at a velocity, will decrease the air pressure adjacent, causing the air in the bed to take its place and flowing with the discharged air of the nozzle.

When the occupant desires to enter the receptacle the top of the receptacle is grasped and pulled down and this causes the weights 29 to move up. When the top of the receptacle is pulled down to the proper distance from the top of the mattress, the occupant can then get in on the mattress, and upon releasing the top of the receptacle the weights will automatically move the top back up to its proper position, see Fig. 4.

I claim:

1. An air cooling and circulating device comprising a receptacle, a cooling device suspended at the upper part of said receptacle, the receptacle being made of flexible material, with means for holding it in its operative position.

2. An air cooling and circulating device comprising a receptacle, a cooling device suspended at the upper part of said receptacle, the receptacle being made of flexible material, with means for holding it in its operative position, the upper part of said receptacle being movable downward to enter it, and means for returning the upper part of said receptacle to its normal operative position.

3. An air cooling and circulating device comprising a receptacle, a cooling device suspended at the upper part of said receptacle, the receptacle being made of flexible material, the upper part of the receptacle having a movable connection with the support for the refrigerating unit.

4. An air cooling and circulating device comprising a bed having a mattress, a supporting device for said mattress, a receptacle having a portion which projects above said mattress, said receptacle being open at the top and closed at the bottom, a cooling device, a supporting device for the cooling device, separate from and independent of the supporting device for the mattress and located at the upper part of the receptacle so that air cooled thereby drops to the bottom of the receptacle by gravity, whereby the mattress is independent of the vibration of the operating parts for the cooling device when in operation.

5. An air cooling and circulating device comprising a bed having a mattress, a supporting device for said mattress, a receptacle having a portion which projects above said mattress, said receptacle being open at the top and closed at the bottom, a cooling device, a supporting device for the cooling device, separate from and independent of the supporting device for the mattress and located at the upper part of the receptacle so that air cooled thereby drops to the bottom of the receptacle by gravity, whereby the mattress is independent of the vibration of the operating parts for the cooling device when in operation, said cooling device being detachably connected to its support so that it may be easily removed and replaced.

6. An air cooling and circulating device comprising a bed having a mattress supporting structure, a receptacle projecting upwardly from said mattress and open at the top, a cooling device removably suspended above said bed, a supporting structure therefor independent of the supporting structure of the bed.

7. An air cooling and circulating device comprising a bed having a mattress and a support therefor, a flexible receptacle having its bottom portion connected with said mattress all the way around so as to form a sealed connection, the flexible receptacle being open at the top, and means for inserting cooled air through said opening into the compartment by gravity.

8. An air cooling and circulating device comprising a bed having a mattress and a support therefor, a flexible receptacle having its bottom portion connected with said mattress all the way around so as to form a sealed connection, the flexible receptacle being open at the top, and means for inserting cooled air through said opening into the compartment by gravity, said flexible receptacle having a double wall with air space between the double wall.

9. An air cooling and circulating device comprising a bed having a mattress and a support therefor, a flexible receptacle closed at the bottom and into which the mattress is received, the bottom of the receptacle extending entirely across the bottom of the mattress, means for holding said receptacle in an upright position with the mattress at the bottom thereof, and means for inserting cooled air into the top of said receptacle.

10. An air cooling and circulating device comprising a bed having a mattress and a support therefor, a flexible receptacle closed at the bottom and open at the top and into which the mattress is received, the bottom of the receptacle extending entirely across the bottom of the mattress, means for holding said receptacle in an upright position with the mattress at the bottom thereof, and means for inserting cooled air into the top of said receptacle.

11. An air cooling and circulating device comprising a bed having a mattress and a support therefor, a flexible receptacle having its bottom portion connected with said mattress all the way around so as to form a sealed connection, the flexible receptacle being open at the top, means for inserting cooled air through said opening into the compartment by gravity, and means for holding the walls of said flexible receptacle in an upright position.

12. An air cooling and circulating device comprising a bed having a mattress and a support therefor, a flexible receptacle having its bottom

portion connected with said mattress all the way around so as to form a sealed connection, the flexible receptacle being open at the top, means for inserting cooled air through said opening into the compartment by gravity, means for holding the walls of said flexible receptacle in an upright position, and means for lowering one portion of the wall to permit entrance into said receptacle.

13. An air cooling and circulating device comprising a bed having a mattress and a support therefor, a flexible receptacle having its bottom portion connected with said mattress all the way around so as to form a sealed connection, means for inserting cooled air into the top of said receptacle and causing it to drop by gravity to the bottom thereof, and means for discharging warmer air from said receptacle at a point spaced away from the point where the cooled air enters.

14. An air cooling and circulating device comprising a bed having a mattress, a support therefor, a receptacle open at the top projecting upwardly beyond said mattress, a cooling device, a separate support for the cooling device, the portion thereof to which the cooling device is attached projecting inwardly beyond the plane of the adjacent portion of the receptacle so that cool air from the cooling device will drop by gravity into the receptacle.

15. An air cooling and circulating device comprising a bed having a mattress, a support therefor, a receptacle open at the top projecting upwardly beyond said mattress, a cooling device, a separate removable support for the cooling device, the cooling device being in a different vertical plane from its supporting device so that when the supporting device is moved into position the cooling device will be over the open top of the receptacle.

16. An air cooling and circulating device comprising a receptacle of flexible material projecting upwardly from said mattress and open at the top located in a room so as to be independent of the sensible heat of the walls of said room, and means for taking air from said room and cooling it and dropping it into said receptacle by gravity, the air returning to the room as it becomes warmed.

17. An air cooling and circulating device comprising a reecptacle of flexible material projecting upwardly from said mattress and open at the top located in a room so as to be independent of the sensible heat of the walls of said room, a cooling coil in the upper part of said receptacle for removing heat and water from the air and causing the air to be dropped by gravity from the room into the receptacle so that the temperature and humidity of the receptacle may be regulated independent of the room.

18. An air cooling and circulating device comprising a receptacle into which the person is received, said receptacle having a wall, a portion of which is movable in a substantially vertical direction to secure entrance and exit from said receptacle, and means for inserting cooled air into said receptacle.

19. An air cooling and circulating device comprising a receptacle into which the person is received, said receptacle having a wall, a portion of which is movable in a substantially vertical direction to secure entrance and exit from said receptacle, said movable portion of said wall being flexible so as to have an accordion action when moved, and means for inserting cooled air into said receptacle.

WILLARD L. MORRISON.

DISCLAIMER

2,002,235.—*Willard L. Morrison*, Lake Forest, Ill. AIR COOLING AND CIRCULATING DEVICE. Patent dated May 21, 1935. Disclaimer filed January 8, 1938, by the patentee.

Hereby enters this disclaimer to claims 18 and 19 of the said patent.

[*Official Gazette February 8, 1938.*]

DISCLAIMER

2,002,235.—*Willard L. Morrison*, Lake Forest, Ill. AIR COOLING AND CIRCULATING DEVICE. Patent dated May 21, 1935. Disclaimer filed May 2, 1938, by the patentee.

Hereby enters his disclaimer to claim 1 of the said patent.

[*Official Gazette May 24, 1938.*]