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HEAT TRANSFER SYSTEM

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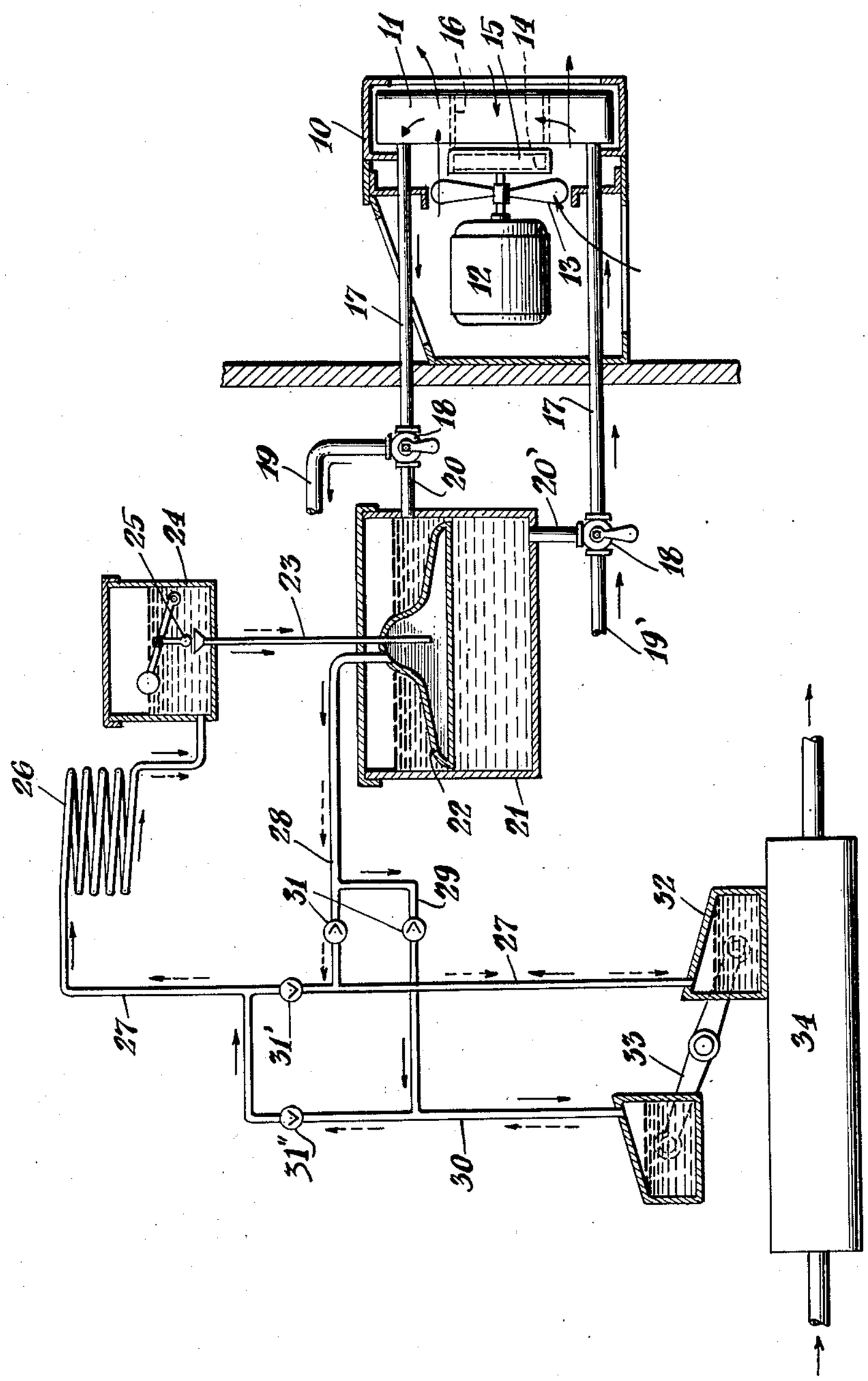

INVENTOR

Carl E. Meyerhoefer

BY

Dull, Kane & Smoot

ATTORNEY

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HEAT TRANSFER SYSTEM

Carl E. Meyerhoefer, Brooklyn, N. Y., assignor to E. A. Laboratories, Inc., Brooklyn, N. Y., a corporation of New York

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4 Claims. (Cl. 62—118)

This invention relates to a structurally and functionally improved heat transfer system and apparatus which may be advantageously employed in confined spaces, and especially in association with motor vehicles to reduce or raise the dry bulb temperature within the body of such vehicle or any other enclosure.

This application is a division of my previous application on Heat transfer device filed in the United States Patent Office under date of July 15, 1937, and identified under the Serial Number 153,743.

It is an object of the invention to provide a layout of apparatus by means of which the foregoing object may be accomplished and which may ideally utilize as its operating basis a more or less conventional layout of mechanism such as exists, for example, in a modern motor car. Moreover, by means of the present invention, a layout of apparatus is furnished which will be extremely simple and function in virtually an automatic manner so that no skill will be required to supervise its operation.

A still further object is that of providing an apparatus of this type which may be substantially instantaneously converted to provide for efficient heating of the enclosure with which it is associated and in which moreover such conversion may again be achieved by an unskilled person.

Still another object is that of furnishing an apparatus of this character which will embody relatively few and individually rugged parts, capable of quantity manufacture and assemblage by comparatively unskilled labor, so that the entire apparatus may be marketed for a nominal figure. Moreover, an apparatus provided in accordance with the teachings of this invention will function over long periods of time with freedom from all difficulties and at minimum expense.

With these and other objects in mind, reference is had to the attached sheet of drawings illustrating one practical embodiment of the invention.

In this drawing there has been shown a diagrammatic layout of apparatus and particularly the method of coupling a primary heat transfer device to the operating mechanism.

It will be understood that the partition illustrated may represent the dash or floor-board of a motor vehicle, to each side of which the units of the mechanism are disposed. This is merely for the purpose of illustrating one convenient layout of apparatus in accordance with the teachings of the invention.

Thus, the numeral **10** indicates a casing with which air deflecting means (not shown) may be associated. Enclosed within this casing is a core **11**, to the rear of which a motor **12** is disposed. This motor may drive a fan **13** and blower wheel **14** disposed within a casing **15**. A duct (not shown) may extend from casing **15** for the purpose of distributing air as desired. The core **11** preferably includes headers between which there is interposed a heat transfer structure of a honeycomb, tube, or any other convenient type. This has not been shown in detail because it is well known in the art and to do so would amount to mere surplusage. The details of the aforementioned construction are well illustrated in my previously issued Patent No. 2,087,160, dated July 13, 1937, Serial No. 141,273, filed May 7, 1937.

Suffice it to say that as illustrated the blower wheel will suck air through the central portion of core **11** and discharge such air through the duct while fan **13** will blow air outwardly through the core, such air being conveniently controlled by the panels. In case a cellular type of core is employed, all areas of the same are transversely segregated by the cells which, in effect, provide partitions. If, however, a tube or similar type of core is employed, then partition members **16** (indicated in dotted lines) may be utilized to prevent conflict between the opposing air flows as induced by the fan and blower wheel.

At this time it is to be understood that the heat transfer device, as heretofore described, is merely provided for the purpose of depicting an operative and complete combination of mechanism. Many other types of units could be properly employed. All of these, however, would have the same general characteristics, including a motor, air impeller, heat transfer core and probably casing and control panels. They might or might not include the blower wheel and the mechanism associated therewith, although it is preferred, in a complete apparatus, that a structure be employed such that an air flow distinct from that direcly discharged by the fan be provided for.

In any event, however, there extends from the core tubes **17** which are preferably connected adjacent opposite corners of the core headers so that the benefit of thermosiphon action may be had. These tubes are connected by valves **18** to further tubes **19** and **19'** coupled, for example, to the cooling system of an internal combustion motor so that heated fluid from the latter may flow through the core, thus heating the latter. The details of such connection are also well known to those skilled in the art and, therefore, also will not be described herein.

It is to be understood that valves **18** are of such type that they may optionally couple tubes **17** to tubes **19** and **19'** or tubes **20** and **20'**. Such valves may also function to completely isolate tubes **17** from tubes **19** and **19'**, or **20** and **20'**, so as to preclude circulation of fluid through the core. Tubes **20** and **20'** are connected respectively adjacent the upper and lower ends of a tank **21** containing a brine or similar solution. Within this

tank an evaporator 22 is disposed. A conduit 23 extends from the evaporator to a chamber 24 within which a float controlled valve 25 is arranged for the purpose of governing the height of the liquid within the same. A condenser 26 is coupled to chamber 24 and this condenser should be so disposed that cooling fluid may circulate in contact therewith. In the case of a motor vehicle, the condenser may be conveniently arranged in the slip stream of the fan which is associated with the radiator of such vehicle. A tube 27 is connected to the condenser 26 and a branch 28 extends from the evaporator and is connected to such tube 27. A further branch 29 extends from branch 28 and is connected to a tube 30 also having connection with tube 27. Check valves 31 are interposed in branch 29 and between the point of coupling of the latter with branch 28 and the connection of such branch 28 with tube 27. Moreover, above the latter point of connection a further check valve 31' is disposed in tube 27 and tube 30 has a final check valve 30'' interposed within its body between the points at which it connects with branch 29 and tube 27. These check valves are all arranged to permit a flow of fluid in the directions indicated by the arrows but to prevent such flow in opposite directions. Tubes 27 and 30 are coupled to silica gel absorbers 32 conveniently coupled to each other by a shifting lever 33. Of course, tubes 27 and 30 at least adjacent their outer ends must incorporate a structure such that the absorbers may be shifted. Such structure may take numerous desired forms and has therefore not been illustrated in detail. One suggested form is that of armoured flexible tubing to be provided adjacent the lower ends of tubes 27 and 30.

In any event, the absorbers may be brought in contact with a source of heat, as, for example, the exhaust manifold 34. With a refrigerant such as SO_2 (sulphur dioxide), it is obvious that with the parts in the position shown, the cycle of operation will be similar to that indicated by the full line arrows. In other words, the vaporized refrigerant will move up tube 27, past the check valve 31' arranged in such tube, and through condenser 26. It being thus converted into a fluid, it will flow into chamber 24 and under the control of valve 25 will flow in the evaporator 22. Thence it will flow through branch 28 and thence to branch 29 past the second check valve 31 disposed in the latter branch and so to the left hand absorber. After the right hand absorber has been more or less completely discharged, it will be obvious that the left hand absorber will be charged. Thereupon, by simply shifting lever 33 the operator will cause a flow similar to that just described, but in which the cycle will be as indicated by the fragmentary arrows.

Under these circumstances it will be apparent that the fluid within tank 21 will be cooled and if the valves 18 are properly set, this fluid, or its functional equivalent, will flow through core 11. Such flow may conveniently occur incident to the thermo-siphon circulation provided by the coupling of tubes 20 to tank 21. Of course, if a pump should prove desirable, such an element may readily be interposed in this line to thus accelerate the circulation of cooling fluid.

Thus, it is apparent that if the valves 18 are properly set, the dry bulb temperature of core 11 may be efficiently lowered and that by a layout of mechanism such as that presently proposed, a constantly functioning system is presented. Again, by properly setting the valves 18, the core may be coupled to a source of heated fluid, thus raising its dry bulb temperature. In either event, the air circulated through the core by the impellers 13 and/or 14 will properly heat or cool the space with which the core is in communication or within which it is disposed.

Obviously, numerous changes in construction and re-arrangement of the parts might be resorted to without departing from the spirit of the invention as defined by the claims.

Having thus described the invention, what is claimed is:

1. An apparatus of the character described, including a heat exchange core, air impelling means disposed adjacent thereto, said core being adapted to be arranged within the interior of a motor driven vehicle having an exhaust duct extending from the motor thereof, a refrigerating system operatively connected to said core to deliver refrigerant to the latter, and manually movable absorbers forming a part of said system and means for moving said absorbers in operative association with said exhaust duct for controlling the functioning of said system.

2. An apparatus of the character described, including a heat exchange core, air impelling means disposed adjacent thereto, said core being adapted to be arranged within the interior of a motor driven vehicle having an exhaust duct extending from the motor thereof, a refrigerating system operatively connected to said core to deliver refrigerant to the latter, a plurality of movable absorbers connected to said system and disposed adjacent said exhaust duct, and means controllable by the operator of said vehicle for moving one of said absorbers into operative association with said exhaust duct for operating said system.

3. An apparatus of the character described, including a heat exchange core, air impelling means disposed adjacent thereto, said core being adapted to be arranged within the interior of a motor driven vehicle having an exhaust duct extending from the motor thereof, a refrigerating system operatively connected to said core to deliver refrigerant to the latter, a plurality of movable energizers connected to said system and disposed adjacent said exhaust duct, and means controllable by the operator for moving one of said energizers into operative association with said exhaust duct and for moving out of operative association therewith another of said energizers, whereby said first named energizer will discharge to cause an operation of said system, and said second energizer will be recharged and be potentialized for causing further functioning of said system.

4. An apparatus of the character described, including a heat exchange core to be disposed within the body of a motor driven vehicle having a member heated by the exhaust products of its motor, air impelling means in association therewith, a refrigerating system including a pair of movable absorbers, and means controllable by the operator for alternately moving said absorbers to a position of heat exchange relationship with the heated member of said vehicle.

CARL E. MEYERHOEFER.