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L. C. SMITH

2,023,749

REFRIGERATING DEVICE

Filed April 10, 1934

Fig. 1.

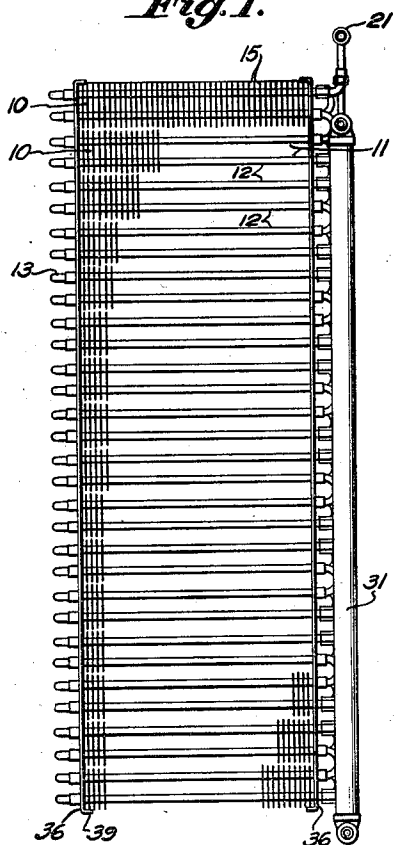


Fig. 2.

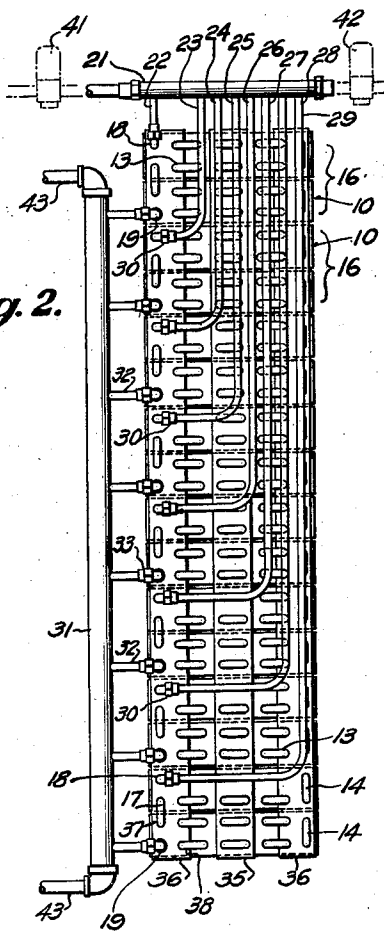


Fig. 3.

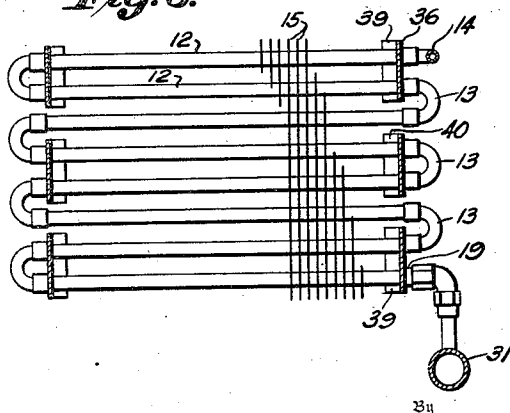
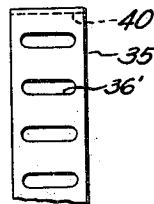


Fig. 4.



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REFRIGERATING DEVICE

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4 Claims. (Cl. 62—126)

The invention relates to refrigerating devices which are adapted for use in the cooling of air.

The invention is directed to a means for manifold-
folding the extremely large coils of this type,
whereby liquid refrigerant is supplied at a uni-
form rate to the coils and expanded refrigerant
is withdrawn at an equally uniform rate from
all portions of the device. There is also incor-
porated in the manifold and coil structure a
gravitational flow characteristic which provides
against the trapping of oil under any operating
condition. These features, together with a novel
coil assembly structure, are more specifically set
forth in the accompanying specification and
drawing, wherein:

Fig. 1 is a front view of the device;

Fig. 2 is a side view of the device shown in
Fig. 1;

Fig. 3 is an enlarged section on the line 3—3
of Fig. 1;

Fig. 4 is an enlarged front view of one of the
connecting plates.

The cooling device is formed of a plurality of
sections 10 which are secured together in super-
imposed relation to form a vertical structure.
Each section includes a plurality of horizontal
rows 11 of straight tubing 12, the tubing in each
row being connected in series by horizontal loops
13, and the rows being connected to each other
by a vertical loop 14 which thus cooperates to
form a continuous refrigerant passage in the sec-
tion. Vertical fins 15 cooperate to retain the
tubing in assembled relation, and they are
formed with apertures through which the tub-
ing is engaged and secured.

It is proposed that one or more sections may
constitute a unit 16 to receive refrigerant and
exhaust it in an expanded state through indi-
vidual supply and output means with but a
small frictional loss.

As herein illustrated, each unit 16 comprises
two sections 10, connected in series by coupling
the free extremities of adjacent rows of tubing
with a vertical loop 17. The remaining free ex-
tremities of the unit, thus formed, are denoted
as the upper or input end 18 and the lower or
output end 19.

A horizontally disposed input header 21, com-
prising a length of tubing, is disposed above the
device, and pipes 22, 23, 24, 25, 26, 27, 28, and
29 are secured thereto and depend along the side
of the device for connection with the input ends
18 of the various units by means of unions 30.

An output header 31 is also provided and it is

formed of a large tube which is disposed ver-
tically, adjacent the device. Pipes 32 are se-
cured to the header 31 and they are each con-
nected to an output end 19 by a union 33.

Various structural means may be employed to
retain the units in a rigid assembly. As here-
in shown, the assembly means comprises a num-
ber of heavy gauge steel plates 35 and 36 ar-
ranged on opposed faces of the units. The plates
are slotted as indicated by the numerals 36, 37,
38 and 39 to engage over the various loops of the
units and they are secured to the tubing 12 by
brazing. The extremities of the plates 35 and
36 are formed with protective flanges 39 and
40 which extend over the exposed corner fins 15
and thus prevent their mutilation.

In operation the device may be inserted ver-
tically in a wind tunnel (not shown) with the fins
disposed in alignment with the air stream where-
by the air may be cooled and the fins may be
gravitationally drained of any condensates de-
posited thereon. The device may be connected
in numerous types of refrigeration systems, for
example, when used with a "dry" system of
evaporation, the opposite open ends of the input
header 21 may be connected to expansion valves
41 and 42 respectively, thus providing a dual
input and the resultant uniform feeding of re-
frigerant to the input pipes. Similarly, the ends
of the output header 31 may be connected to dual
output conduits 43 wherein the suction reaction
on the output pipes may be substantially
equalized.

Special attention is directed to the method of
connecting the tubing, whereby the gravitational
drainage of each unit of oil volumes carried with
the refrigerant is assured. This conception is
also present in the disposal of both the input and
output pipes, and it provides a device which is
entirely free of oil traps.

While the preferred embodiment of the inven-
tion has been specifically described, it is to be
understood that the invention is not limited to
the illustrated embodiment, but may be other-
wise embodied, within the scope of the following
claims.

I claim:

1. A refrigerating device comprising a plurality
of superimposed units adapted to be mounted
vertically, each unit comprising a plurality of
horizontal rows of tubing, loops connecting the
tubes in each row in series, loops connecting ad-
jacent rows in series to provide a continuous re-
frigerant passage in the unit, and vertically dis-
posed fins secured to the tubes, an input header

disposed above the device and provided with a plurality of depending pipes, each pipe being connected to the uppermost free tubing extremity of a unit, and an output header disposed vertically adjacent the device and provided with a plurality of horizontally disposed pipes, each pipe being connected to the lower free tubing extremity of a unit.

2. A refrigerating device comprising a plurality of superimposed units, each unit comprising a plurality of rows of tubing and loops connecting the tubing to form a continuous refrigerant passage in each unit, an input header comprising a tube provided with radially connected input pipes, each input pipe communicating with a free tubing extremity of each unit, refrigerant supply means for the input header comprising an input conduit communicating with each end thereof, and an output header formed with a plurality of output pipes, each output pipe communicating with the remaining free extremity of each unit.

3. A refrigerating device comprising a plurality of superimposed units, each unit comprising a plurality of rows of tubing and loops connecting the tubing to form a continuous re-

frigerant passage in each unit, input and output headers comprising open tubes formed with radial pipes, each passage having its free extremities connected to an input pipe and an output pipe respectively, refrigerant supply conduits secured to each extremity of the input header, and suction conduits secured to each extremity of the output header.

4. A refrigerating device comprising a plurality of superimposed units adapted to be mounted vertically, each unit comprising a plurality of sections formed of a plurality of horizontal rows of tubing, loops connecting the tubing in series, and vertical fins formed with apertures for receiving the tubing in each section, loops connecting the tubing in adjacent sections of each unit in series to form a continuous refrigerant passage in each unit, bars secured to the opposite extremities of the tubing and structurally connecting the units, input and output headers each formed with a plurality of pipes, and means connecting the opposite ends of each passage to an input pipe and an output pipe respectively.

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