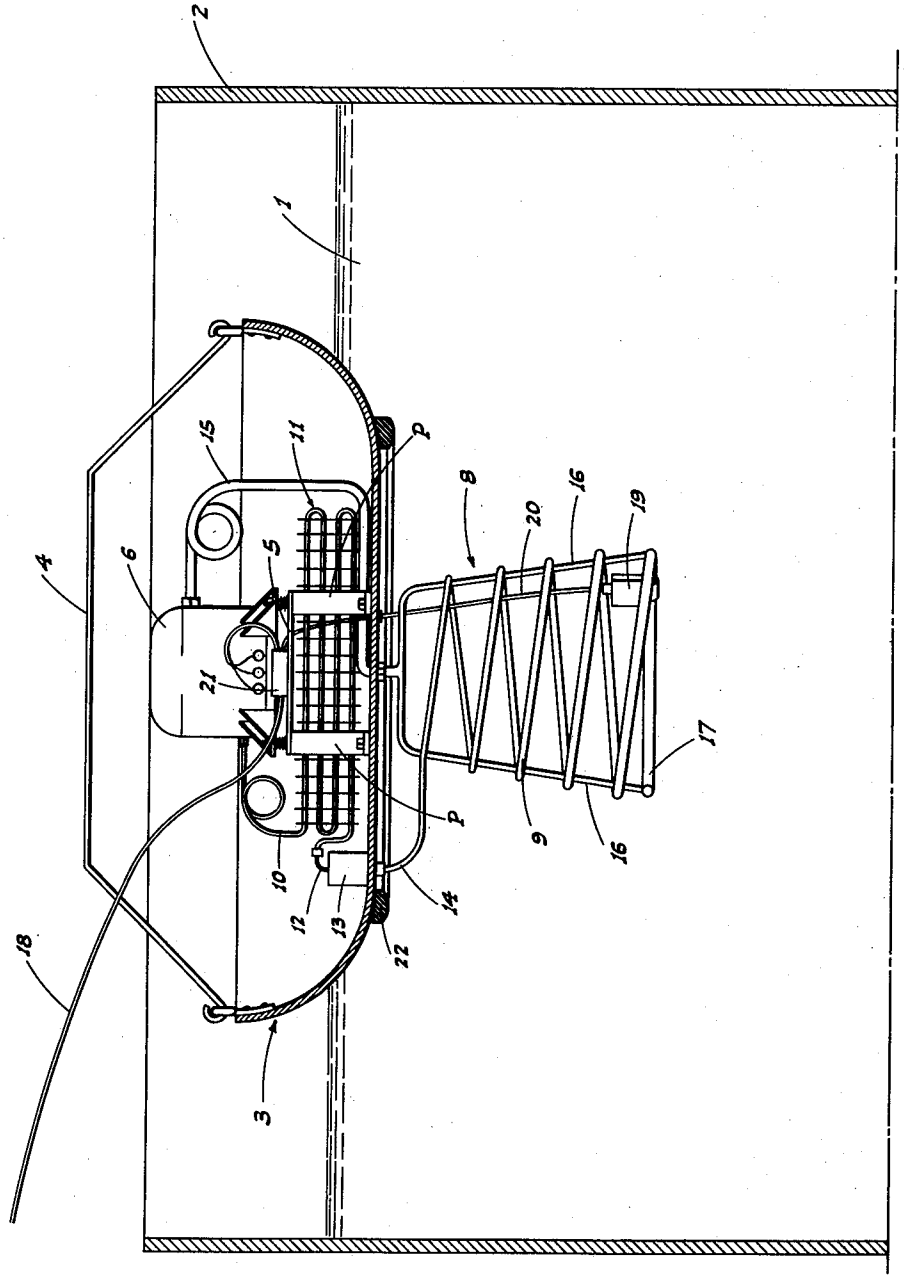
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FLOATING COOLING DEVICE FOR BULK LIQUIDS

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## FLOATING COOLING DEVICE FOR BULK LIQUIDS

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4 Claims. (Cl. 62—158)

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This invention is directed to, and it is an object to provide, a novel portable device for cooling bulk liquids in a tank or other open top receptacle.

Another object of the invention is to provide a cooling device which comprises the novel combination of a float supported compressor, and a heat transfer unit, such as a cooling coil, coupled to the compressor and mounted beneath the float in the liquid.

A further object of the invention is to provide a cooling device, as in the preceding paragraph, which—by reason of the float—is operative even when the liquid level in the tank is rising or falling.

An additional object of the invention is to provide a cooling device arranged in a manner to automatically cause a continual circulation of the liquid in the tank so that a substantially uniform temperature is maintained throughout the same.

It is also an object of the invention to provide a cooling device, for the purpose described, which is designed for ease and economy of manufacture, and simplicity of use.

A still further object of the invention is to provide a practical and reliable cooling device for bulk liquids.

These objects are accomplished by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

The figure of the drawing is a sectional elevation of the device.

Referring now more particularly to the characters of reference on the drawing, the device is adapted for cooling a bulk liquid, indicated at 1, which is retained within an open-topped receptacle or tank 2; such device comprising a flat-bottomed, round-ended buoy or float 3, which is of a size and configuration such that it is readily manually portable.

In order to facilitate the movement of the device from place to place the float 3 is provided with a bail 4.

Centrally thereof, and within the same, the float 3 is provided with upstanding posts P which carry a platform 5 on which a compressor 6 is mounted; said compressor being in a central position for stability of the float 3 and may be driven by an electric motor or other prime mover.

A heat exchange unit indicated generally at 8 is disposed below float 3; this unit being in the form of a multiple-turn vertically elongated coil 9 which progressively increases in size from the top down both as regards the diameter of the

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coil as well as the cross sectional area of the tubing of the coil as shown.

One conduit 10 leads from compressor 6 to a condenser 11 from which another conduit 12 leads to any suitable type of valve 13 incorporated in the system, and which regulates the boiling distance of the gas within the coil. The upper end of the coil connects with the valve 13 through the bottom of the float, as at 14.

The return conduit 15 to the compressor from the coil includes a pair of vertical branches 16 disposed within the turns of the coil at opposite points and connected at their lower end to the lowermost and largest turn 17 of the coil at diametrally opposed points. The size of the conduit branches 16 relative to that of said coil turn 17 is designed so as to equally divide and efficiently take care of the quantity of gas within the coil at its lower end and where said gas reaches its boiling point.

The electric motor driven compressor 6 is energized through the medium of a flexible electric cord 18; such energization of the compressor 6 being controlled by a thermostat 19 mounted within the coil at its lower end. The thermostat circuit is included in a liquid-proof cord 20 which extends upwardly form the thermostat 19 to connection into a relay box 21 mounted on the platform 5 adjacent the compressor 6. The thermostat 19 controls the compressor 6 in response to the temperature of the liquid being cooled.

When the device is in use it is placed, by means of the bail 4, in the tank 2, with the float 3 riding the liquid 2, and with the cooling coil 9 depending into such liquid in the manner shown in the drawing.

Thereafter operation of the compressor 6, with resultant heat exchange by the cooling coil 9, results in effective cooling of the liquid 1 to a temperature predetermined by setting of the thermostat 15.

The device works in a wholly automatic manner to maintain a substantially uniform temperature throughout the liquid 2 in the tank 1, because as the liquid cools about the coil 9 the cooled portion tends to drop to the bottom of the container, and the warm portion to rise; thus automatically creating a circulation of the liquid about and through the cooling coil 9.

It should also be noted that an advantageous feature of the device is the fact that with rise or fall of the level of the liquid 1 in the tank 2, such device correspondingly rises and falls, thereby always functioning in the manner desired.

The device is free floating in the tank 2; the

flexible electric cord 14 being of sufficient length and slack enough to permit of this action.

The device is especially useful for cooling of liquids in connection with the commercial processing thereof, as for example wine, beer, milk, water, etc.

It may at times be desirable to use the unit to cool a liquid within a closed tank having a manhole in the top. In such cases, the float 3 is outside the tank with the heat exchange unit 8 depending through the manhole; the float on its bottom having a cushion ring 22 adapted to rest on the rim of the manhole in sealing relation. The return conduit assembly 15 not only functions as such, but due to its arrangement, serves also as a supporting and stabilizing leg assembly for the coil itself, as will be evident.

From the foregoing description it will be readily seen that there has been produced such a device as substantially fulfills the objects of the invention, as set forth herein.

While this invention sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described the invention, the following is claimed as new and useful, and upon which Letters Patent are desired:

1. A cooling device for bulk liquids comprising the combination with a tank containing a liquid of an open topped float adapted to ride the liquid, a handle member on the float whereby it may be manually transported from point to point, a tubular heat exchange element mounted on and depending below the float, a motor driven compressor mounted on the float, means connecting the heat exchange unit in operative communication with the compressor, and a flexible electric cable connected in operative relation with the motor of the compressor.

2. A device as in claim 1 in which the heat exchange element includes a multiple-turn vertically elongated tubular coil in which the coil and cross sectional area of the tube forming the coil both progressively increase in size from top to bottom of the element.

3. A device as in claim 2 including a pair of vertically disposed branching tubes connected with the large end of the tube of the coil and converging together, one of the connections with the compressor including a tube connected with the converging ends of the branching tubes and the compressor and having a cross sectional area substantially equal to the combined cross sectional areas of the branching tubes, and the combined cross sectional areas of the branching tubes being substantially equal to the cross sectional area of the coil tube at its large end, the other connection with the compressor comprising a tube connected between the compressor and the small end of the coil tube and having a cross sectional diameter substantially equal that of the small end of the coil tube.

4. A cooling device for bulk liquids comprising the combination with a liquid containing tank, of a buoyant body adapted to ride the liquid and unattached to the tank, a compressor mounted on the body and a heat exchange coil depending from the body and operatively connected to the compressor; the coil being of smaller dimensions horizontally than the bottom of the body and symmetrically disposed relative to the area of said bottom whereby the body may come in contact with the side walls of the tank without possible damage to the coil; the body being formed as a float of sufficient displacement to support the weight of the parts mounted thereon from the liquid.

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