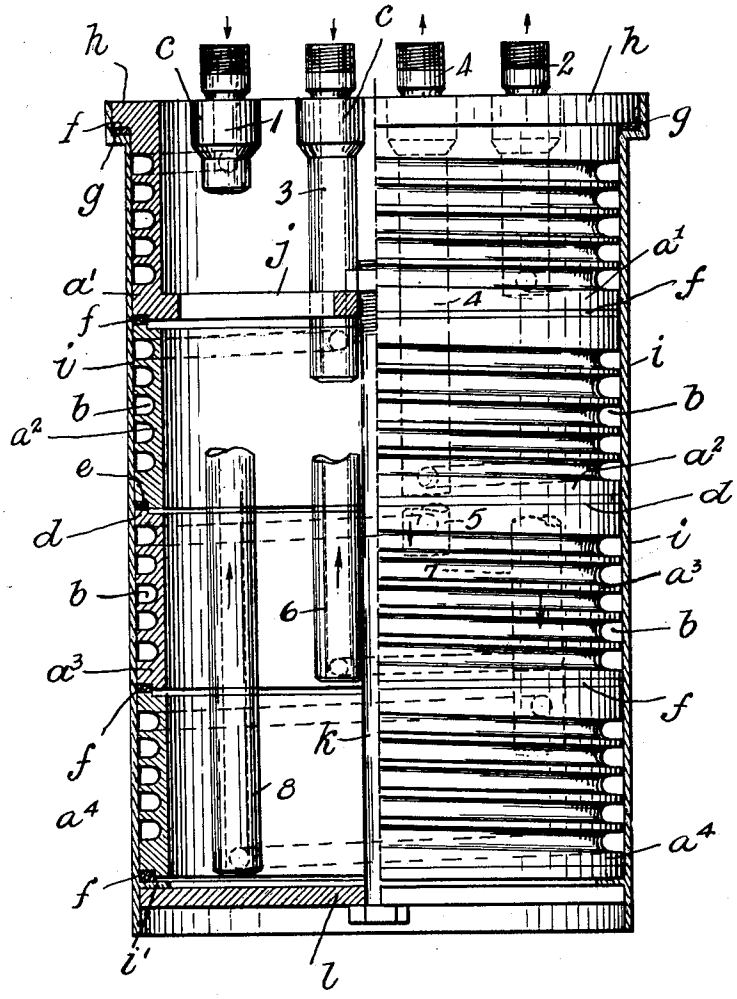
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APPARATUS FOR COOLING LIQUIDS

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APPARATUS FOR COOLING LIQUIDS

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The invention is directed to a unitary structure designed primarily for the purpose of permitting the simultaneous cooling and the selected drawing off of one or several fluids.

It has been heretofore proposed to provide for the simultaneous cooling and drawing off of one or several different kinds of liquids without intermixing, such previous structures involving helicoidal channels forming distinct superimposed passages closed by a casing wall, with the superimposed passages independent of communication and connected with the feed and evacuation pipes, the cooling mixture being placed within the core. These channels of previous devices were formed in cylindrical walls of different diameters, with the core in step form and fitted in a casing of corresponding shape. These constructions involved serious drawbacks in the commercial development, the necessary deformations of the cast metal rendering the subsequent working difficult and expensive.

The primary object of the present invention is to provide a unitary device lacking the disadvantages of the previous devices and involving more particularly the provision of channels in cylindrical surfaces of a sectional core, with the sections of the same diameter but otherwise independent, and fitting within a cylindrical casing of uniform diameter.

The invention is more particularly illustrated in the accompanying drawing, in which:—

The figure represents a view in elevation, partly in section, of the improvement.

The improved structure comprises a casing i formed immediately adjacent its lower end with an internal annular flange i', in which casing there is arranged in superimposed relation a series of wholly independent rings or annular bodies a^1, a^2, a^3, and a^4. It is, of course, understood that the unit may be made up of any number of such annular bodies regardless of the showing of four of such bodies in the present instance. The lowermost ring a^4 rests upon the flange i', with an interposed sealing gasket f, the remaining annular bodies being substantially identical and arranged in superimposed relation.

The uppermost ring a^1 is provided with a thickened upper margin laterally extended to form a flange h, and the casing i is correspondingly offset at g to receive said flange, there being gaskets f interposed between the respective bodies and between the flange h and horizontal portion of the offset g. The meeting faces of the respective rings are preferably formed to interfit, one such edge being formed with an annular projection d, and the other such edge with a channel e in which is fitted the sealing gasket f. A retaining plate l, either as a solid or spider-like plate, underlies the flange i' at the bottom of the casing, and the lower end of the uppermost annular body is formed with a spider j having a central opening in alignment with a corresponding opening in the plate l to receive a securing bolt k, the head of which underlies the plate l and the threaded end of which is extended above the spider j to receive a nut for securing all of the bodies in fixed relation within the casing.

This construction provides for the convenient removal of the bodies and their equally convenient reassemblage, as will be evident. Each of the bodies is substantially of identical formation, so far as the cooling effect of the fluid is concerned. That is to say, each body is formed in its exterior surface with a helicoidal channel b which originates in the upper portion of the particular body and terminates at the lower portion thereof. Each channel is wholly independent of and without any communication whatever with the similar channels of the remaining bodies. The channels of the respective bodies are fully open on their outer sides, so far as the body is concerned, and are closed to form fluid conduits by the wall of the casing i.

Each body is provided with means by which the fluid to be cooled may be introduced and withdrawn. For example, the uppermost annular body or ring a^1 is interiorly provided with a short length of tubular construction 1 open at the top and closed at the bottom and formed immediately above the bottom with a lateral port which directly communicates with the extreme upper portion of the channel b in said annular body or ring a^1. A corresponding tubular element 2 extends within the upper body, being closed at its lower end and open at its upper end, and communicating through a lateral opening with the extreme lower portion of the channel b of that body or ring.

The second body a^2 is correspondingly provided with inlet and outlet conduits 3 and 4. The third body a^3 has similar inlet and outlet conduits 5 and 6, while the fourth body a^4 has similar inlet and outlet conduits 7 and 8. In each instance, the conduits are of pipe-like form connected to the body with which they communicate and extend upwardly into the plane of the upper flange h of the uppermost body. Here they may be conveniently formed for the connection of pipes or other removable conduits for the inlet and outlet of the fluid to be cooled.

It is, of course, understood in this connection that the respective inlet and outlet conduits 1, 2, 3, 4, 5, 6, 7 and 8 are so relatively arranged as to avoid interference one with the other in their longitudinal projection through the interior of the hollow annular bodies.

The respective annular bodies or rings are completely sealed one against the other, so far as the fluid channels are concerned, and thus provide a convenient unitary structure which in the instance shown will provide for the independent cooling of four distinct fluids, any one of which may be admitted or withdrawn without regard to the other of such fluids, though obviously all such fluids or any number thereof may be simultaneously admitted and simultaneously withdrawn. This provides for the selective admission, cooling and withdrawing of one or any number of the independent fluids within the capacity of the construction provided, such admission and withdrawal being independent in point of time or simultaneous at will.

I claim:

1. Apparatus for drawing off and cooling liquids, comprising an outer cylindrical casing, superimposed cylindrical rings of equal diameters, said rings being fitted within said casing, distinct helicoidal grooves in the outer surfaces of said rings and feed and exit pipes for the liquid in said rings connected to the ends of said grooves.

2. Apparatus according to claim 1, comprising interengaging circumferential ribs and grooves on the adjacent end surfaces of said rings, packing joints interposed between said ribs and grooves, a bottom on said casing, a transverse bar in the uppermost of said rings and an axial tensioning rod connecting said bottom to said transverse bar.

3. Apparatus for cooling liquids comprising a cylindrical casing of uniform diameter, a plurality of annular bodies arranged in the casing in superimposed relation, each of the bodies being formed with a helicoidal groove in its outer surface, means for securing the bodies and casing as a unit, means for sealing the grooves of the respective bodies against each other, and conduits extending longitudinally of the interior of the bodies and communicating respectively with the opposite ends of the grooves of each body.

4. Apparatus for cooling liquids including a casing of uniform diameter, a plurality of superimposed annular bodies arranged in the casing, each of the bodies having a helicoidal groove formed in its outer surface, with the groove formed into a closed channel by the wall of the casing, means for securing the annular bodies and casing as a unit, means intermediate the respective bodies for sealing the groove of one body against the groove of the other, a tubular member communicating with the entrance end of the groove of the uppermost body, a tubular element communicating with the exit end of the groove of the uppermost body, similar tubular elements connecting with the inlet and exit end of the grooves of the respective bodies, all of said tubular elements being arranged within the bodies and extending upwardly therethrough.

5. Apparatus for cooling a plurality of liquids including a cylindrical casing, a series of superimposed annular bodies arranged in the casing, each of the bodies being formed in its outer surface with a helicoidal channel closed by the wall of the casing, and independent means for each body for admitting the fluid to be cooled to the inlet groove of that body, and withdrawing the cooled fluid from the exit end of the groove in that body, said independent means being arranged within and extending axially of the body with which they communicate.

6. Apparatus for cooling a plurality of liquids including a cylindrical casing, a series of superimposed annular bodies arranged in the casing, each of the bodies being formed in its outer surface with a helicoidal channel closed by the wall of the casing, and independent means for each body for admitting the fluid to be cooled to the inlet groove of that body, and withdrawing the cooled fluid from the exit end of the groove in that body, said independent means being arranged within and extending axially of the body with which they communicate, all of said means extending upwardly with open ends substantially in line with the upper edge of the uppermost body.

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