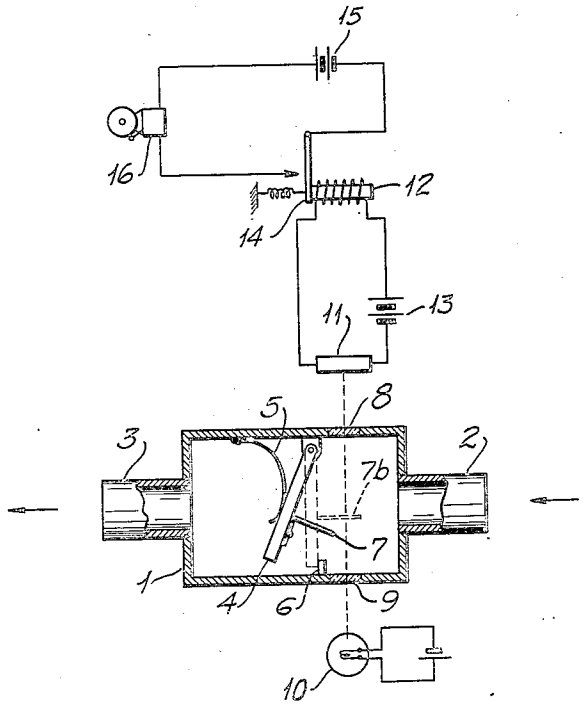
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FLUID FLOW INDICATOR

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FLUID FLOW INDICATOR

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2 Claims. (Cl. 177—311)

My invention pertains to fluid flow indicators employed with fluid cooled electron discharge devices used in high power radio transmission circuits.

In the use of electron discharge devices of the fluid cooled anode type it is essential to provide a continuous fluid flow around the anode in order to dissipate the heat created. This cooling fluid is usually provided through a conduit, such as a length of rubber hose, or glass tubing, connected with means for providing fluid circulation, such as a pump. During the operation of such an electron discharge device of the fluid cooled type it is important that the cooling medium be kept constantly circulating. Failure of circulation results in damage to the electron discharge device and necessitates costly replacement.

One of the objects of my invention consists in providing means for positively and instantaneously controlling a protective or alarm circuit in accordance with conditions of fluid circulation.

A further object comprises producing a fluid flow indicator actuated by fluid pressure for controlling a circuit and which does not employ a mechanical agency for the transfer of motion from the interior of a fluid flow channel to an external contactor or other electrical device.

I accomplish these and other desirable objects in a novel fluid flow indicator employing a member actuated by fluid flow for affecting light incident upon a photosensitive device for controlling a circuit connected therewith.

In the drawing which accompanies and forms a part of this specification I have represented one embodiment of my fluid flow indicator showing a longitudinal sectional view of a fluid circulation housing together with an electrical organization employed therewith.

Referring to the drawing in detail, there is provided a fluid flow circulation housing 1 having an inlet pipe 2 and an outlet pipe 3 disposed in opposite walls thereof. A vane 4 is hinged at a central position of the top wall of the housing 1. A resilient member 5 is secured to the top wall of the housing 1 for exerting a force against the vane 4 to hold the same in a normal position at rest against a pin 6 secured in the bottom wall of the housing 1. An opaque fin 7 is secured at right angles to the vane 4 for normally obstructing the optical path between two transparent windows 8 and 9 in the top and bottom walls of the housing 1, respectively.

In accordance with my invention a source of light 10 is provided adjacent the window 9, and a photosensitive device, such as a selenium cell 11, is positioned adjacent the window 8. A relay including a winding 12 is connected with the photosensitive device 11 in circuit with the battery 13. An armature 14, controlled by the winding 12, completes an alarm circuit including battery 15 and warning bell 16. It will be understood, of course, that any type of warning or control circuit can be utilized in accordance with my invention. For example, the relay winding 12 may be utilized to directly control the power supply to the associated electron discharge device.

The operation of my fluid flow indicator is as follows:

When no fluid is flowing through housing 1, the resilient member 5 will hold the vane 4 in a position at rest against pin 6 whereby the fin 7 will be interposed between the windows 8 and 9 as indicated by dotted line position 7b. If fluid flows through the housing 1, the vane 4 will be moved against the force of resilient member 5 and the fin 7 will be moved out of the optical path between the windows 8 and 9. Light from the source 10 will then become incident on the photosensitive cell 11 for causing the current to flow through winding 12 and cause armature 14 to interrupt the circuit to the alarm bell 16. Should the circulation of fluid through the housing 1 be interrupted for any reason, such as failure of the circulation pump, the resilient member 5 will cause the member 4 to be moved to a position at rest against pin 6 whereby the fin 7 will interrupt the light incident upon the photosensitive cell 11 and the winding 12 will become deenergized. Upon the deenergization of winding 12 the armature 14 will be released whereby the circuit to the alarm bell 16 will be completed for warning purposes indicative of failure of fluid circulation.

It will now be apparent that I have provided a novel system for fluid flow indicator which avoids the use of bellows, stuffing glands, or other expedients for transfer of mechanical motion from the interior of a fluid chamber heretofore used and which are generally faulty in operation. My fluid flow indicator may be also utilized, if desired, as an indicator for the sediment condition of the circulating fluid. Since the transparency of the fluid is an indication of the suspended matter therein, it will be obvious that when sufficient light is obstructed by such sustained matter, the associated alarm circuit will be actuated to warn of the presence of undesirable sediment in the circulating fluid which vitiates the cooling properties thereof. Although I have shown a preferred embodiment

of my fluid flow indicator I do not desire to be limited thereto except insofar as may be pointed out in the appended claims.

What I claim as new and original and desire to secure by Letters Patent of the United States is:

1. A fluid flow indicator comprising, a fluid circulation chamber having aligned transparent portions, a photosensitive resistance adjacent one of said portions and aligned therewith, a control circuit connected with said photosensitive resistance, means adjacent the other of said portions and aligned therewith for directing a beam of light through both of said portions and incident upon said photosensitive resistance, a vane pivoted within said chamber, a shutter attached to said vane for intercepting said light and a spring having a tendency to hold said vane and shutter in said intercepting position, said vane being movable to carry said shutter out of the path of said light in accordance with the flow of fluid through said chamber.

2. A fluid flow indicator comprising, a fluid circulation chamber having transparent portions, a photosensitive resistance adjacent one of said portions, a control circuit connected with said photosensitive resistance, a source of light adjacent the other of said portions, said transparent portions, said photosensitive resistance and said source of light being in alignment that a beam of light from said source may be directed through both of said portions and incident upon said photosensitive resistance, a vane pivoted within said chamber, a shutter attached to said vane and intercepting said beam of light, and a spring having a tendency to hold said vane and shutter in said intercepting position, said vane being movable to carry said shutter out of the path of said beam of light in accordance with the flow of fluid through said chamber.

CHANCE E. BOHNER.