ABSTRACT: A fluid-operated logic device for use in conjunction with an annunciator system, the device including a pair of slidable pistons which are moved together when there is a trouble signal which has been acknowledged by the operator. When the system returns to normal, and there is an alert signal present, the pistons separate and provide a return to normal signal until the device is returned to an off position by interrupting the alert supply.
Fig. 1

Passive Off

Trouble Signal
Alert Supply

Fig. 2

Operator Acknowledge

Trouble Supply
Alert Signal

Fig. 3

Monitoring Condition

Trouble Supply
Alert Signal

Fig. 4

Return to Normal

Output Signal

No Trouble Alert Supply

Inventor: Kenneth W. Misevich

By:

Attorney
RETURN MONITOR WITH LOGIC DEVICE

This invention relates to a pneumatically operated arrangement for use in an annunciator system.

Industrial control systems require annunciator arrangements to indicate condition of the system and particularly when it is in an abnormal condition and when there is a return to normal or the trouble disappears. The device is particularly useful in conjunction with logic piston devices such as described in copending application Ser. No. 857,900, filed Sept. 15, 1969.

One of the objects of the present invention is to provide a logic arrangement for a fluid or pneumatically operated annunciator system.

Another object of the invention is to provide an arrangement which will indicate a return to normal condition.

In one aspect of the invention, a fluid logic device having a pair of pistons slidable in a bore are provided. The pistons are movable together from an off position when both a trouble signal and an operator acknowledge signal are applied. Upon removal of the trouble signal or when a return to normal condition is reached, the pistons move toward their first or off position, and if an alert supply from the system is still present, the pistons will separate to give a return to normal signal until the operator resets the device.

These and other objects, advantages and features of the present invention will be apparent from the accompanying description and drawings, which are merely exemplary.

In the drawings:

FIG. 1 is a longitudinal sectional view of the invention showing the arrangement in the passive off and alert position;

FIG. 2 is similar to FIG. 1 after operator acknowledge action;

FIG. 3 shows the arrangement in the monitoring position; and

FIG. 4 shows the arrangement in the return to normal condition.

Referring to the drawings, body 10 has a pair of pistons 11, 12 slidable in bore 13 of body 10. Bore 13 has a spring 14 acting against the pistons tending to move the pistons to the left-hand or "off and alert" position. Piston 12 has an aperture 15 therein for the reason that will be set forth hereafter. Trouble signal connection pipe 16 and alert supply pressure pipe 17 are connected to body 10. The acknowledge pressure connection 18 is in the end wall of body or cylinder 10.

Bleed passage 19 is provided so that if there is leakage past piston 11, it will leak so as to maintain the left end of piston 11 at ambient pressure. Passage 20 also permits the interior of body 10 to be kept at ambient pressure.

If there is a trouble signal present, such as the result of action from another device, for example, that described in copending application, Ser. No. 857,900, filed Sept. 15, 1969, the operator may acknowledge the same by activating or applying a pressure to passage 18 in any suitable manner. When such occurs, pistons 11, 12 will move to the right as shown in FIG. 2 and the trouble signal will then enter behind piston 11. As the pistons 11 and 12 move together to the right, the movement is such that they will pass the alert supply signal passage 17 and will remain together, moving on to the position shown in FIG. 3 which is the monitoring position.

When the trouble signal is turned off, then pistons 11 and 12 will start movement to the left towards the positions shown in FIG. 1. As the alert supply port 17 is passed and if there is alert supply pressure present, the pistons will separate as shown in FIG. 4. The alert supply will enter space 21 between pistons 11 and 12 and will provide a return to normal signal through passage 22.

In order to reset the arrangement after the return to normal signal is present, the alert supply pressure can momentarily be cut off which will then permit spring 14 to return piston 12 toward the left to the position of FIG. 1.

Thus, it can be seen that the device provides a signal when the monitored signal disappears and has been acknowledged. The device can be arranged such that the pressure has to be sufficient to overcome the force of spring 14. The alert supply pressure also has to be sufficient to overcome the spring force.

It should be apparent that variations can be made in details of construction without departing from the spirit of the invention except as defined in the appended claims.

What is claimed is:

1. A fluid logic device for providing signals comprising a body having a bore therein, a pair of slidable pistons means in said bore, means urging said pistons together at a first end of said body, means applying a first input signal to said first end, means applying a second input signal adjacent to said first end, a third input signal located remote from said first and second input signals, said pistons being movable when pressure is applied by said first and second input signals, said pistons continuing their motion and remaining at the other end of the body only when second input also is energized, upon deenergization of said second input signal, said urging means starting movement of said pistons toward said first end, said movement continuing until the interface between said pistons reaches said third input signal at which time when there is a signal at the third input, the signal passes between the pistons, one of said pistons stops and the other returns to the first end and provides an output signal from a port connected to the space between said pistons, said second piston moving toward the first piston when the third input signal is interrupted.

2. A logic device as claimed in claim 1 wherein there is a bleed passage adjacent the first input and a bleed passage adjacent the end of the body remote from the first input.

3. A logic device as claimed in claim 1 wherein the means urging said pistons together is a spring.