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W. STERN

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DEVICES FOR REMOTE SUPERVISION OF A PERIODICAL MOTION

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Fig. 1.

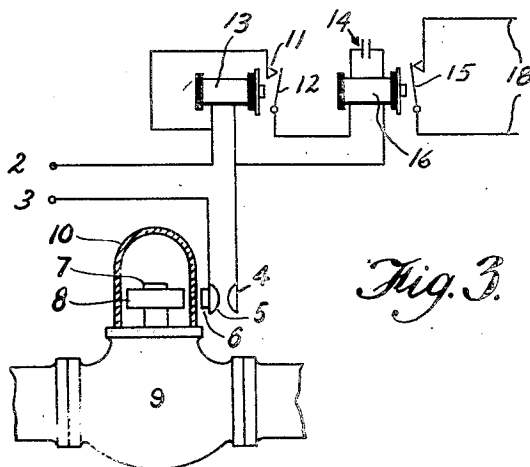
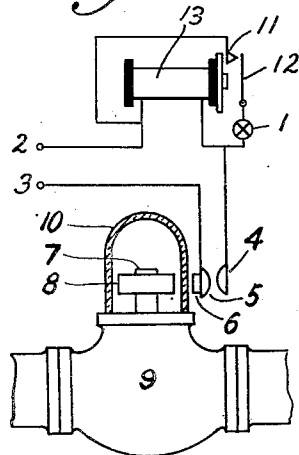
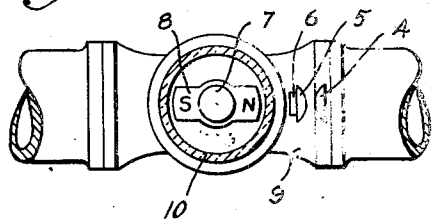


Fig. 3.

Fig. 2.



Inventor

Walter Stern

By *Frederick G. Hall*

UNITED STATES PATENT OFFICE

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DEVICE FOR REMOTE SUPERVISION OF PERIODICAL MOTION

Walter Stern, Anerley, London, England

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3 Claims. (Cl. 177-311)

This invention relates to devices for supervising a periodical motion for example the motion of rotating or oscillating parts. A device according to this invention comprises an electric circuit including electric supervisory means, a movable contact in the circuit, co-operating magnetic means secured to this contact and to the part whose motion is to be supervised, a second movable contact connected in series with the first contact and operable by a coil connected in parallel with the second movable contacts and in series with the first movable contact so that the second movable contact breaks the circuit when the first contact is closed. The operating coil of a delayed action relay may be connected to the electric supervisory circuit to control further supervisory means for example machinery or apparatus in accordance with the supervised motion.

More details will be apparent from the accompanying drawing which illustrates diagrammatically and by way of example means according to this invention applied to a liquid indicator.

Fig. 1 shows a diagram of an electrical supervisory circuit and a flow indicator operating same.

Figure 2 shows a partial plane view of Figure 1, and

Figure 3 shows a flow indicator, a supervisory circuit controlled by the same and a retarded relay whose operating coil is connected to the supervisory circuit and which may serve to control other supervisory means, for instance, the operation of other devices dependent upon the continuity or stoppage of the supervised motion.

According to Fig. 1 a signalling lamp 1 fed through terminals 2, 3 from a low voltage battery or the like is arranged to be controlled by cooperating normally closed contacts 4, 5. A piece of magnetic material 6 is provided on the movable contact 5 and a permanent magnet 8 is secured to the rotatable spindle 7 of a liquid flow indicator 9 so that the contact 5 is attracted and interrupts the supervisory circuit every time when the poles of the magnet 8 pass nearby the said contact. A glass dome 10 secured to the casing of the liquid flow indicator is provided to protect the rotating parts 7, 8. The contacts 4, 5 are arranged outside the glass dome and may be under a separate cover which is not shown in the drawing.

A second set of normally closed contacts 11, 12 is connected in the supervisory circuit of lamp 1 in series with the first set of contacts 4, 5. A coil 13 opens contacts 11, 12 if excited and is connected in series with the contacts 4 and 5

and in parallel with the contacts 11, 12. If coil 13 is energized it attracts movably arranged contact 12 and interrupts the supervisory circuit of lamp 1.

The characteristic of the electromagnet 13 is so chosen that it is slow to pick up so that short impulses due to momentary closing of contacts 4, 5 do not attract contact 12 and to interrupt the supervisory circuit as long as spindle 7 moves normally. Under normal conditions therefore lamp 1 flickers in accordance with the speed of spindle 7. If the spindle stops in a position in which magnet 8 attracts contact 5, the supervisory circuit and lamp will be interrupted at contacts 4 and 5. If the spindle stops in a position in which magnet 8 does not attract contact 5, coil 13 is energized and will interrupt the supervisory circuit by opening contacts 11 and 12.

The supervisory circuit controlled by contacts 4, 5 and 11, 12 can be used as initiating circuit for energising relays controlling other apparatus.

Fig. 3 shows an additional circuit including a delayed action relay 14 whose coil 16 is connected to the controlled circuit in series with the contact sets 4, 5 and 11, 12 and which is slow to release the contacts controlled by it. The delayed functioning of the relay is obtained by a condenser 17 connected in parallel to the coil 16 or by other means known in the art. By this means a contact bridge 15 of relay 14 is kept closed unaffected by short interruptions due to the rotating movement of magnet 8 as explained in connection with the flickering of lamp 1. If spindle 7 stops with magnet 8 in any position the initiating circuit is permanently opened either by contact 5 or by contact 12 as explained before, coil 16 is de-energized after a predetermined length of time and the outgoing operating circuit 18 of the delayed action relay is interrupted. This circuit includes further supervisory means and may be connected to any control device, for example a no-volt control circuit of a motor switch so that the motor is disconnected if the supervised liquid flow is reduced or interrupted.

Variations are possible without departure from this invention. The magnetic material may be secured to the part whose motion is to be supervised and a permanent magnet may be connected to a movable contact. An electromagnet can be used instead of a permanent magnet. Audible signals and alarms can be provided instead of or apart from visible signals. A number of signals, alarms or supervisory means can be controlled by one supervisory or initiating circuit and the relays used need not be of the electromagnetic

type but can be of any other suitable type known in the art, e. g. of the thermal type.

I claim as my invention:

1. A device for remote supervision of a part having periodical motion comprising an electric circuit including supervisory means, circuit controlling means in said circuit comprising a stationary contact and a movable contact normally in circuit closing relation with the stationary contact, cooperating magnetic means secured to the movable contact and to the periodic movable part causing periodic opening of said contacts, another circuit controlling means in said circuit comprising a stationary contact and a movable contact normally in engagement with the last mentioned stationary contact and delayed electromagnetic means having an operating coil connected in parallel with the second circuit controlling means and in series with the first circuit controlling means and adapted when the coil is energized for a predetermined time to move the second mentioned movable contact out of engagement with its cooperating stationary contact, whereby the supervisory means will be intermittently energized during periodic motion of the part and will be permanently deenergized when the periodic motion of the part stops in a position wherein it either opens the first circuit controlling means or leaves it closed.

2. A system as in claim 1, a further circuit, normally closed contacts in said circuit and

means operated by said first supervisory means when energized to open said contacts in said further circuit, said supervisory means maintaining the said contacts closed during the short periods of the deenergization of the supervisory means.

3. A device for supervising a revolving spindle of a liquid flow indicator comprising an electric circuit including supervisory means, circuit controlling means comprising a stationary contact and a movable contact, cooperating magnetic means secured to the movable contact and to said spindle causing periodic opening of said contacts, another circuit controlling means in said circuit comprising a stationary contact and a movable contact normally in engagement with the last mentioned stationary contact and delayed electromagnetic means having an operating coil connected in parallel with the second circuit controlling means and in series with the first circuit controlling means and adapted when the coil is energized for a predetermined time to move the second mentioned movable contact out of engagement with its cooperating stationary contact, whereby the supervisory means will be intermittently energized during periodic motion of the part and will be permanently deenergized when the periodic motion of the part stops in a position wherein it either opens the first circuit controlling means or leaves it closed.

WALTER STERN.