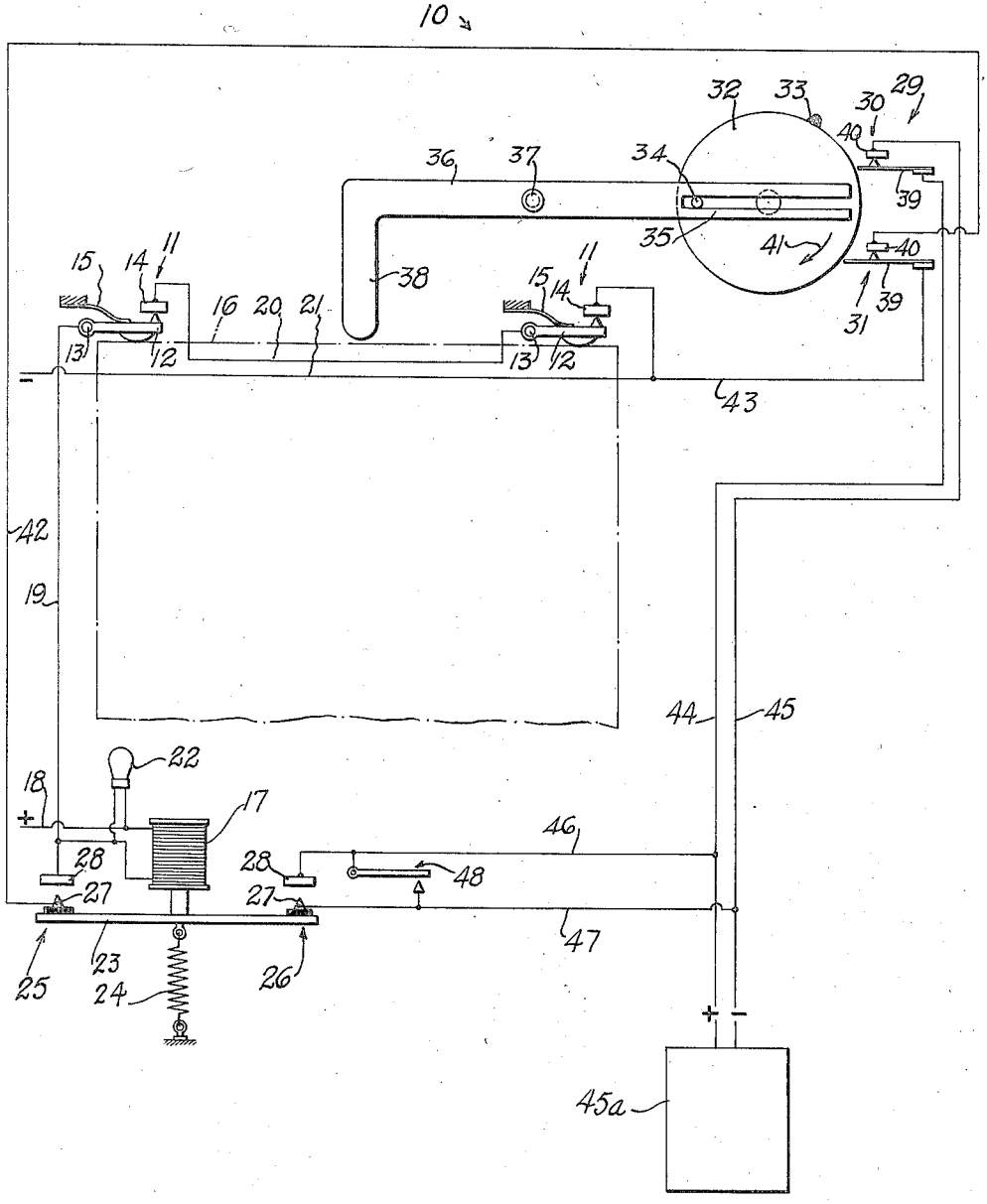
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INTERMITTENT GAUGE CONTROL FOR CONSTANTLY OPERATING MACHINES

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INTERMITTENT GAUGE CONTROL FOR CONSTANTLY OPERATING MACHINES

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6 Claims. (Cl. 192—127)

This invention relates to gauge controls for constantly operating machines and to gauge controls for intermittently gauging or alining the work.

One object of the invention is to provide an improved device of the character described having improved means whereby a gauge controls both the starting and stopping of a normally constantly operating machine, which gauge is intermittently responsive to the work and performs its operation while permitting continuous operation of the machine on the work.

Accordingly the invention is applicable to many types of work, as for measuring size, shape, weight, color, or for gauging the position or alinement of the work, with the intention and for the purpose that the starting and stopping of the machine may be controlled according to the invention and that the operation of the machine shall normally continue without interruption. Thus the machine is rendered capable of either producing uniform results or of preventing improper work from interfering with the normal operation of the machine.

By the term work as used herein is particularly meant work which is discontinuous or consists of separate articles, especially where the work is fed through the machine in this manner; but the invention is applicable also to work of a continuous character.

More specifically, the invention is applicable to the so called Dexter folder machines and Quad folder machines, both of which are well known on the market. In these machines, a sheet of paper must be accurately alined for the folding device, disalinement not only resulting in destruction of the work, but also causing the machine to jam. These machines act on different sheets of paper at high speed, and in a continuous manner. While long sought for, no suitable device has heretofore been found for fulfilling these conditions.

It is therefore an object of the invention to provide a device which shall fulfill the objects of this invention and be well adapted for practical use.

Other objects of the invention and advantages thereof will become apparent as the specification proceeds.

With the aforesaid objects in view, the invention consists in the novel combinations and arrangements of parts hereinafter described in their preferred embodiments, pointed out in the subjoined claims, and illustrated in the annexed drawing, wherein like parts are designated by the same reference characters throughout the several views.

In the drawing is shown a diagrammatic view showing a device embodying the invention.

The advantages of the invention as here outlined are best realized when all of its features and instrumentalities are combined in one and the same structure, but, useful devices may be produced embodying less than the whole.

It will be obvious to those skilled in the art to which the invention appertains, that the same may be incorporated in several different constructions. The accompanying drawing, therefore, is submitted merely as showing the preferred exemplification of the invention.

Referring in detail to the drawing, **10** denotes a device embodying the invention. The same may include one or more gauges, or indicators for size, shape, weight, color or position, illustratively shown as the feeler-type electrical switches **11**, but which may also be photosensitive elements, and the like, responsive to a required condition. Each switch **11** may have a feeler element **12** pivoted at **13** and normally held out of contact with the element **14** by a delicate strip spring **15**. When a sheet of paper **16**, shown in dot-dash lines, is inserted into a machine and presses against both feeler elements **12**, both switches **11** are closed. Thus it is determined that the sheet of paper is in correct alinement with the feeding or folding or other mechanism or devices of the machine.

Associated with the switches **11** is any retarded or lockable device which may include a solenoid **17** the coil of which is connected at **18** to a source of current, and the circuit including a conductor **19** that may be connected to a switch **11** as at **13**, both switches **11** being suitably interconnected by a conductor **20**, the circuit being completed by a lead **21**. Accordingly, if one of the switches is open, the described circuit for the solenoid **17** is open. If desired, an indicator lamp **22** may be connected across the solenoid.

Actuated by the solenoid is a core having a head **23** which is normally outwardly moved by the tension coil spring **24** when the solenoid is deenergized. This head **23** controls a plurality of switches **25**, **26**, of which the head **23** may carry the insulated contacts **27** for the companion contact elements **28**. Thus if the solenoid **17** is energized, both switches **25**, **26** are closed simultaneously.

Cooperating with the switches **25**, **26** is an intermittently operating switch means for controlling operation of the machine, this switch means

29 introducing a retardation or lag so timed as to prevent interruption in the continued operation of the machine. For example, the switch means may include a pair of switches 30, 31 whose intermittent open positions occur at different times. As a whole, the switch means 29 operates in timed relation to the action of the indicator devices 11, or to the completion of their action.

By way of illustration, I employ an actuator 32 rotating constantly at uniform speed and being of any desired size, and having an insulated cam element at 33 for successively opening the switches 30, 31. Also carried by the actuator 32 is an eccentric pin 34 that works in the fork 35 of a lever 36 oscillatable about its pivot 37. Operated by the free end of the lever is a means, for instance, a head or finger 38 for periodically contacting and moving the sheet of paper 16 away from the indicator switches 11.

Each switch 30, 31 is normally closed, having a spring contact arm 39 for its fixed companion contact 40. With the actuator rotating in the direction of the arrow 41, it is seen that the switch 33 is located in advance of the switch 31, the cam 33 successively engaging the spring contacts 39 of these switches to open the same.

Desirably the switch 25 is connected in series with the switch 31 as by a conductor 42 and a conductor 43 connected to the return line 21 of the circuit. It is noted that the contact 28 is connected to the conductor 19.

From the switch 30 extend a plurality of conductors 44, 45, which lead to the power circuit of the machine 45*a*, and which may carry a higher voltage than the circuits hereinbefore described. These conductors 44 may be connected to the switch 26 as at 46, 47 so that the switches 26 and 30 are in parallel. A switch 48 for cutting out the machine control may be connected across the switch 26.

It will be understood that the switches may be gravitationally as well as spring operated and may also consist of mercury switches and the like.

The speed at which the device 10 is intended to operate may be indicated from the fact that the switches 11 operate once every ⅜ to ½ of a second, and the solenoid 17 operates every ⅛ to ⅛ of a second, which indicates the reason for using a solenoid instead of a relay. The switches 25, 26, 30 and 31 operate at correspondingly high speeds.

In operation, the machine is started by placing a sheet of paper 16 to close the indicator switches 11, causing the solenoid 17 to be energized. The latter closes the switches 25, 26, of which the switch 25 keeps the solenoid 17 energized, subject to the timed intermittent operation of the switch 31, even if the switches 11 become open. The circuit 44, 45 to the machine is closed by either of the switches 26 and 30, so that the machine shall not be stopped, these switches being arranged to open at different periods of time. Because the switch 31 is closed while the switch 30 is open, assurance is had that the relay is not deenergized and the switch 26 opened while the switch 30 is open. Should it happen that a sheet of paper does not close the two switches 11, the solenoid 17 remains deenergized and the switch 26 remains open; then when the switch 30 opens, the machine stops. According to one point of view, it may be said that the time interval between the switches 30, 31 allows for the lag of the solenoid 17, to assure opening of the relay at the proper time.

Obviously, the indicator means 11 may indicate any desired condition, and may, for instance, be a gravity indicator upon which the element 16 may rest or from which it may be suspended.

It is thus seen that the invention comprises an indicator 11, a first intermittent machine control 30, a second intermittent retarded means 17, 25, 26, and 31 operated by indicator 11 for controlling the machine, the latter being operative by either means, and the second means being released subsequent to operation of the first means. The switch 31 may or may not be considered a part of the means that includes the parts 17, 25 and 26. If the switch 31 be considered an independent member for intermittently releasing the means 17, 25, 26, then the latter may or may not operate at regularly recurrent time intervals.

I claim:

1. A device including a gauge means for a desired condition of an article, a retarded means controlled by the gauge means, a circuit, and an intermittently operating switch therefor, the retarded means including means for releasing the same subsequent to the operation of the intermittently operating switch, and the retarded means including means for closing said circuit while the intermittently operating switch is open and for opening while the intermittently operating switch closes the circuit, and the circuit controlling means of the retarded means being open when the retarded means is released.

2. A device including a gauge means for determining a required condition of an article, a first switch means and a second switch means, a machine adapted for continuous operation for acting on the article, said machine including a power circuit having a plurality of branch circuits, the first switch means intermittently opening and closing to control one of said branch circuits, the second switch means being retarded and operating intermittently and opening and closing the other of said branch circuits, the second switch means being controlled by the gauge means, the machine being operative by both said branch circuits, and the first switch operating subsequently to the branch circuit controlling operation of the second switch.

3. A device including a gauge means for determining a desired condition of an article to be acted upon by a constantly operating machine, a first means and a second means, the second means being intermittently actuated by the gauge means and being retarded, said second means controlling the starting and stopping of said machine, the first means operating intermittently and controlling the starting and stopping of said machine, either of said means being adapted to cause operation of said machine, and the first means acting to cause stopping of the machine while the second means acts to cause operation of the machine, the retardation of the second means being sufficient to prevent coincident machine stopping operation of both of said means, and a prolonged inoperative position of the second means causing coincident operation of the first and second means to stop the machine.

4. A device according to claim 3, wherein the first and second means comprise a member movable along a path for successively causing operation of the first means and release of the second means.

5. A device including an indicator for determining the condition of an article to be acted upon by a constantly operating machine, a solenoid having a circuit closable by said indicator,

a first and a second switch closed by the solenoid when the latter is energized, a third and a fourth switch, both of the latter being normally closed, actuator means for causing timed successive intermittent opening of the third and fourth switches, the first switch being in series with the fourth switch and the solenoid for delayed deenergization of the latter, the second switch being connected to a machine operating circuit in parallel with the third switch, the solenoid being deenergized by opening of the fourth switch, and the actuator means causing release of the article from the indicator.

6. A device including a gauge means for determining a desired condition of an article to be acted on by a machine, a first means and a second means, the latter being actuated by the gauge means, an intermittently operating member cooperating with said second means to releasably retard operation thereof, the second means being adapted for controlling the starting and stopping of the machine, the first means operating intermittently and controlling the starting and stopping of said machine, either of the first and second means being adapted to cause operation of the machine, the retardation of the second means being sufficient to prevent coincident machine stopping operation of the first and second means simultaneously, the operation of the said member being subsequent to the operation of said first means, and a prolonged inoperative position of the second means permitting coincident operation of the first and second means to stop the machine.

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