

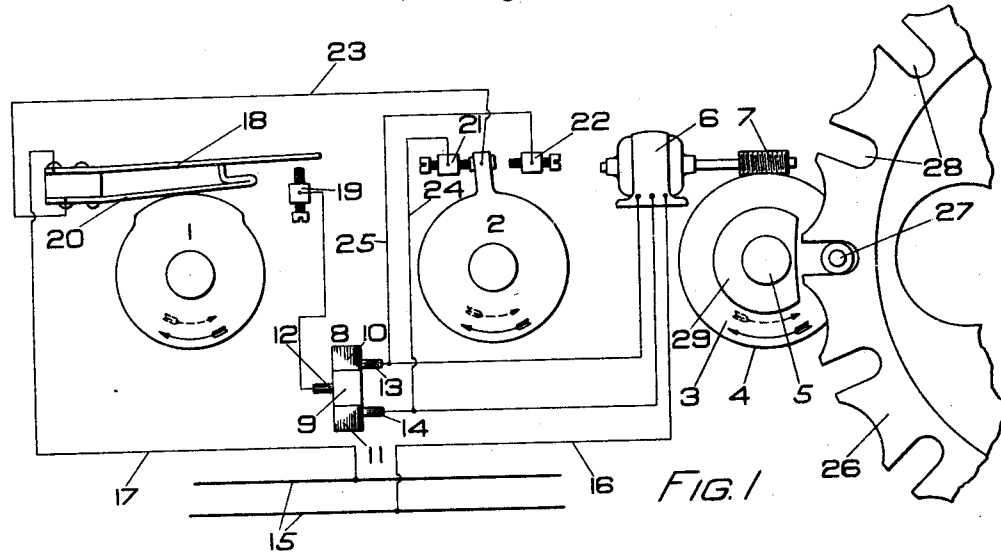
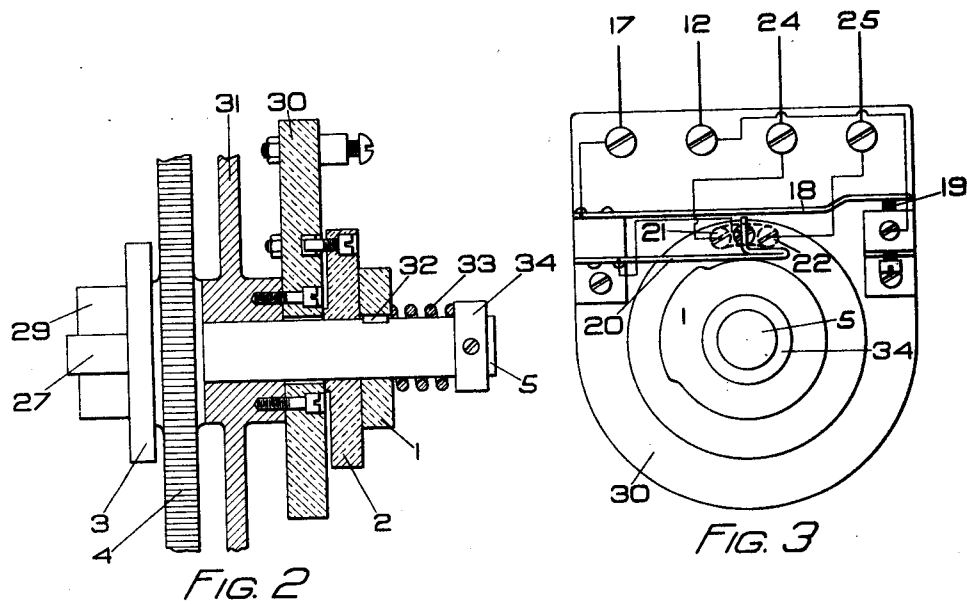
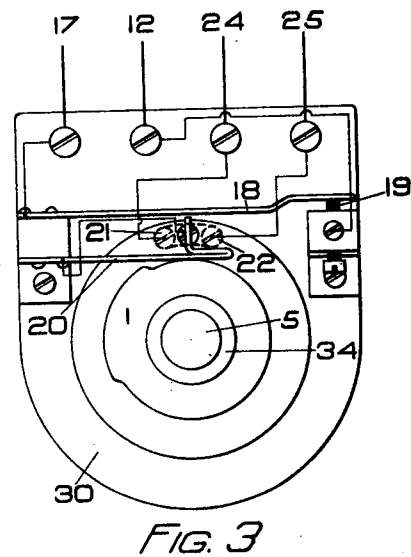
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ELECTRIC MOTOR DRIVEN INTERMITTENT DRIVING GEAR

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INVENTOR.

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ELECTRIC MOTOR-DRIVEN INTERMITTENT-DRIVING GEAR

Application filed August 10, 1925. Serial No. 49,328.

This invention relates to electric motor driven intermittent driving gear and consists in certain improvements in operating intermittent driving gears for use in connection with motor operated regulators such as disclosed in my application Serial No. 34,039, filed June 1st, 1925, or for general application to apparatus requiring a positive intermittent operation.

The object of my invention is to effect an intermittent operation from a continuous operating motor or from an electrically reversible motor which operates in either of two directions, but more particularly to prevent the motor being stopped or reversed during the intermittent driving period.

The invention provides means whereby a divided or secondary circuit is established by the starting of the motor after the motor is once started from a primary circuit through the means of a pilot switch. The establishment of this secondary circuit insures an uninterrupted operation during the intermittent driving period regardless of whether or not the primary circuit remains closed. These and other improvements which constitute the invention are set forth in detail in the following specifications and are pointed out in the appended claims.

Referring to the drawing, Fig. 1 represents a diagrammatic view of the intermittent driving gear, the motor and the motor operating circuit.

Fig. 2 shows a section of the secondary circuit motor operating switch.

Fig. 3 shows a front view of the switch shown in Fig. 2.

Referring to Fig. 1, cam (1) and switch (2) correspond to parts (1) and (2) in Fig. 2. Driving gear (3) and worm gear (4) correspond to parts (3) and (4) in Fig. 2; these parts being all assembled on the worm gear shaft (5). The motor (6) operates driving gear (3) by means of a worm (7) which operates worm gear (4). Motor (6) is controlled and its direction of rotation is controlled by a pilot switch (8). Pilot switch (8) has a conducting portion (9) and two insulated portions (10) and (11) the switch being shown in a neutral or open circuit

position. This switch has a sliding contact with main line terminal (12) and with motor terminals (13) and (14). The current for operating motor (6) is taken from main line (15). One side of the main line circuit is connected direct to motor (6) by wire (16). Wire 17 extends from the opposite side of the main line (15) to pilot switch terminal (12). In this line is installed a switch (18) which has a contacting point (19), these two parts being shown in an open circuit position. Switch (18) is made up of three parts (18), (19) and (20), part (20) being insulated from part (18) but being arranged to make contact therewith. As shown in Fig. 1, part (20) is in contact with part (18) and the circuit is broken between part (18) and (19). This switch is operated by cam (1) which when revolved, breaks the contact between (18) and (19) and simultaneously makes the contact between (18) and (20).

Assuming that contact is made between (18) and (19) it will be seen that when pilot switch (8) is raised current will flow from main line to terminal (12), thence by conducting portion (9) to terminal (13) and to the motor. This operates the motor in one direction, and when switch (8) is lowered current will flow from the terminal (12) to terminal (14) to operate the motor in the opposite direction, the return circuit being in both cases by wire (16). Switch (2) does not rotate with the shaft (5) but is driven by friction and oscillates to make contact with either contact point (21) or (22) depending on the direction or rotation of the motor. Assuming the motor is operated by the pilot switch to operate parts (1), (2), (3) and (4) in the direction shown by dotted arrow, first switch (2) will make contact with (21) as shown, immediately thereafter cam (1) will operate part (20) to make contact with part (18) and simultaneously part (18) will break the circuit between (18) and (19). This operation cuts out the pilot switch as the current now flows from the main line (15) by wire (17) to switch (18) thence to switch (20) and by wire (23) to contact (21), thence by wire (24) to a wire which extends from terminal (14) of the pilot

valve to the motor. Likewise if the pilot switch should operate the motor parts (1), (2), (3) and (4), as shown by the solid line arrows, then switch (2) is moved to make contact with point (22) and again the cam (1) operates switch (20) to make contact with switch (18), and the contact is simultaneously broken between (18) and (19), and thereafter so long as the high part of the cam holds switch (20) in contact with switch (18) the motor continues to operate in one direction only regardless of what may take place in the operation of the pilot switch, the connections now being from main line by wire (17) to switch (18) thence to switch (20) and by wire (23) to contact (22) thence by wire (25) to motor wire which extends from the motor to terminal (13) of the pilot switch.

As set forth in the statement of invention the object of the invention is to prevent the motor being stopped during the driving period of the intermittent driven gear (26). The starting, stopping, or reversing of the motor may be effected between the intermittent driving periods, but the motor circuit can not be interrupted during the driving period.

The intermittent driving gear can be of any preferred construction; what is shown is what is commonly known as a Geneva intermittent driving gear. It will be understood by those skilled in the art that the driving of the wheel (26) is effected by stud (27) engaging one of the slots (28) in the wheel (26) and the latter is thereby turned through an arc which will move the wheel from one slot to the next succeeding slot.

The driven wheel (26) is locked against rotation when the driving stud (27) is not in mesh by means of a circular locking device (29) which fits closely into the concave surfaces between the slots (28). It will be understood that one side of the locking device (29) must be released or cut away to release the wheel (26) during the driving period.

Referring to Figs. (2), and (3), (30) is a part of the switch which controls the timing of the secondary circuit, this part being constructed of insulating material and fastened to the housing (31) which supports the driving shaft (5).

It will be noted that the cam (1) is secured against rotation on shaft (5) by means of key (32), but is free to be moved longitudinally on shaft (5). A spring (33) and spring collar (34) presses the cam (1) against the face of switch (2) which causes this switch to oscillate when the motor is reversed to selectively shift the lead wire (23) and make connection to either (21) or (22) motor operating lead, depending on which direction the pilot switch has started the motor. It will be understood that cam (1) and switch (2) are also constructed of insulating material to

prevent grounding of the various electrical connections.

In the operation of this invention the secondary switch is so timed that after the motor is started by the pilot switch and just before the driving period of wheel (26) takes place, the pilot switch is cut out of the circuit and the motor runs uninterrupted until the driving period ceases, when the secondary circuit is broken and the control of the motor returned to the pilot switch. The degree of operation of wheel (26) between one of the slots (28) and the next succeeding slot, corresponds to an angle of rotation represented by the high part of the cam (1).

In the application of my invention to motor operated regulators as shown in my application Serial Number (34,039) and especially where such regulators are employed to operate drum controllers or rheostats, it is desirable not to stop the controller or rheostat between speed regulating points, otherwise a firm contact would not be made and arcing and consequent burning of the contacts would result. My invention provides means for effecting a positive intermittent operation for such controllers, or for any general applications where a positive intermittent operation is desirable.

It will now be seen by those skilled in the art, that I have devised new and useful improvements in motor operated intermittent driving gear and that certain modifications in the construction and arrangement of the parts may be made within the scope of my invention.

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

1. In an electrically reversible motor, a supply circuit for said motor, a pilot switch in said circuit, said switch having an open circuit position and two closed circuit positions arranged to start said motor in either direction, means operated by the motor for closing a main switch for operating the motor a predetermined number of revolutions, said means rendering the pilot switch ineffective for controlling the motor during the predetermined period of operation, and a switch effective upon the starting of the motor to selectively operate the motor circuit to insure the operation of the motor by the main switch in the same direction as the operation by the pilot switch.

2. In a motor control system, comprising an electrically reversible motor, a two way pilot switch for starting said motor in either direction, a main switch for operating the motor for a predetermined number of revolutions in either direction and a circuit controlling switch operated by the motor for insuring the operation of the motor in the same direction as started by the pilot switch.

3. In an intermittent power drive, comprising an intermittent driven gear, an elec-

trically reversible motor for driving said gear intermittently in either direction from a continuous operation of said motor, a two way pilot switch for starting, stopping or reversing said motor, a main switch operated
5 intermittently by the motor for operating the motor during the driving period of the gear, said switch rendering the pilot switch inoperative for controlling the motor during the
10 driving period, and a selector switch arranged to insure the operation of the motor by the main switch in the same direction as operated by the pilot switch.

4. In an intermittent power drive, comprising an intermittent driven gear, a reversible motor for driving said gear intermit-
15 tently in either direction from a continuous operation of said motor, a pilot control arranged to start, stop or reverse said motor, a
20 main control operated by the motor arranged to control the motor during the driving period of the gear, said main control rendering the pilot control inoperative for controlling the motor during the driving period, and
25 a selector control arranged to insure the operation of the motor by the main control in the same direction as operated by the pilot control.

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