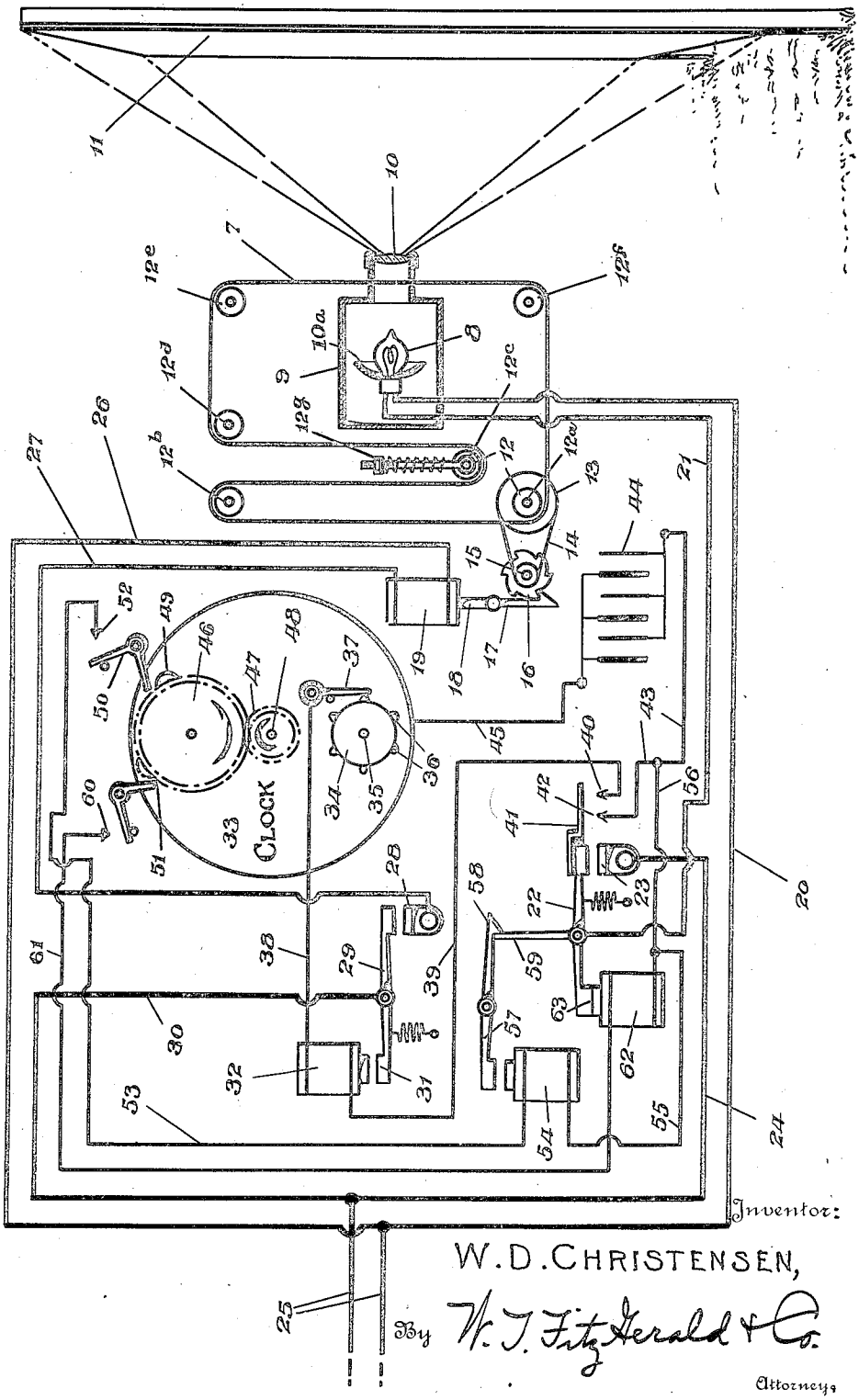
Dec. 16, 1924. 1,519,808

W. D. CHRISTENSEN

AUTOMATIC CHANGEABLE PROJECTOR

Filed Feb. 2, 1923



Inventor:
W. D. CHRISTENSEN,
By W. J. Fitzgerald & Co.
Attorneys

Patented Dec. 16, 1924. 1,519,808

UNITED STATES PATENT OFFICE.

WALTER D. CHRISTENSEN, OF PUEBLO, COLORADO.

AUTOMATIC CHANGEABLE PROJECTOR.

Application filed February 2, 1923. Serial No. 616,574.

To all whom it may concern:

Be it known that I, WALTER D. CHRISTENSEN, a citizen of the United States, residing at Pueblo, in the county of Pueblo and State of Colorado, have invented certain new and useful Improvements in Automatic Changeable Projectors; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to changeable stereopticons or projectors, and aims to provide a novel and improved automatic machine of that kind for displaying a series of advertisements, pictures, or the like, on a screen during a predetermined interval of time each day.

Another object of the invention is the provision of novel automatic controlling means for starting the machine in operation at a predetermined time, such as at twilight or early in the evening, and for stopping the machine after a predetermined interval of time, such as at midnight, the controlling means automatically starting and stopping the machine at the predetermined times desired without manual attention so as to eliminate wasted energy by the useless operation of the machine when not effective.

With the foregoing and other objects in view, which will be apparent as the description proceeds, the invention resides in the construction and arrangement of parts, as hereinafter described and claimed, it being understood that changes can be made within the scope of what is claimed, without departing from the spirit of the invention.

The invention is illustrated in the accompanying drawing, wherein the figure is a diagrammatical view of the apparatus.

The series of advertisements, pictures, or other matter to be projected, are contained on an endless film 7 of suitable length, which passes in front of the lamp 8 of the projector proper for the illumination of the advertisements or "slides" one at a time in succession as they are moved step by step into position for projection. The lamp 8 is located in the usual lamp house 9, and a reflector 10^a and lens 10 are provided for projecting the advertisement, printed matter or view on a screen 11, which may be located in a show window, on a billboard, or elsewhere. The film 7 is trained around guide rollers 12, 12^a, 12^b, 12^c, 12^d, 12^e and 12^f for circuitous motion, and the film is looped between the rollers 12^b and 12^d around the roller 12^c which is spring-pressed by a suitable spring 12^g to keep the film taut. A pulley wheel 13 is secured to the roller 12^a and is connected by a belt 14 with a pulley wheel 15 secured to a ratchet wheel 16, forming a part of the operating means for the film or series of "slides." A pawl 17 engages the ratchet wheel and is pivoted to the core 18 of a solenoid 19, whereby the intermittent energization of said solenoid will reciprocate the pawl to advance the ratchet wheel 16 and film 7 step by step.

A leader or conductor 20 is connected to one terminal of the lamp 8, and a leader or conductor 21 is connected to the other terminal thereof and to a switch 22 arranged to engage a contact 23. The conductor 20, and a conductor 24 connected to the contact 23, are connected to the electrical supply or line wires 25, which furnish the high potential current for lighting the lamp 8 and energizing the solenoid 19 during the operation of the machine. The switch 22 is pivoted to engage the contact 23, for closing the circuit of the lamp 8.

A leader or conductor 26 is connected to one terminal of the solenoid 19, and a leader or conductor 27 is connected to the other terminal of said solenoid, the conductor 27 being connected to a contact 28 which is arranged to be engaged by a pivoted switch 29. The conductor 26 and a conductor 30 connected to the switch 29 are also connected to the supply wires 25 for energizing the solenoid 19 when the switch 29 is closed.

An armature 31 is carried by the switch 29 to be attracted by an electro-magnet 32 for intermittently closing the switch 29 during the operation of the machine.

The intermittent operating means of the projector proper and the control of the lamp and solenoid circuits depend on a clock 33. The intermittent energization of the magnet 32 is obtained by a contact wheel 34 secured on the second hand arbor 35 of the clock work, which wheel has the contacts 36 to engage a contact 37 in periodical succession. As shown, there are six contacts 36 for closing the circuit of the magnet 32 every ten seconds. The contact 37 is insulated from the clock work, while the contact wheel 34

is grounded to said clock work. The circuit of the magnet 32 includes the contact 37, a conductor 38 connecting said contact and magnet 32, a conductor 39 connecting said magnet and a contact 40, a switch 41 carried by and insulated from the switch 22, a companion contact 42 to be engaged by said switch, a conductor 43 leading from the contact 42, a battery 44 or other source of low potential current, and a conductor 45 leading from the other pole of the battery and connected to the clock work in electrical connection with the contact wheel 34. Thus, with the switch 41 bridging the contacts 40 and 42, each time a contact 36 engages the contact 37, the magnet 32 is energized for attracting the armature 31 and closing the switch 29 against the contact 28, thereby closing the circuit of the solenoid 19 for pulling the pawl 17 to advance the ratchet wheel 16 and film 7 one step. When the contact 36 leaves the contact 37, the circuit of the magnet 32 is opened, thereby releasing the armature 31 and permitting the switch 29 to open so that the solenoid 19 is deenergized to release the pawl 17. This intermittent action continues while the machine is in operation for advancing the film step by step periodically.

The starting and stopping of the machine is also controlled by the clock. A day wheel 46 is geared to a pinion 47 secured to the hour hand arbor 48 of the clock work, whereby the wheel 46 makes one revolution per day. The wheel 46 has a cam 49 for closing the starting switch 50 and stopping switch 51 at predetermined times of the day. Said switches may be located at different positions around the wheel 46 for determining the time when the machine is to be started and stopped.

When the cam 49 reaches the starting switch 50 so as to swing said switch, the switch is brought against a contact 52, which is connected by a conductor 53 with a starting electro-magnet 54. The other terminal of said magnet 54 is connected by a conductor 55 to a conductor 56 which is connected to the conductor 43 leading to the battery 44, the circuit being completed by way of the conductor 45 and clock work to which the switch 50 is grounded. The closing of the switch 50 closes the circuit to energize the magnet 54, which attracts an armature 57 carried by a catch 58 which holds an arm 59 secured to the switch 22. The catch normally holds the switch 22 open, so that when the armature 57 is attracted by the magnet 54, the arm 59 is released to permit the switch 22, as well as switch 41, to close, thereby closing the lamp circuit and also the circuit of the magnet 32. The lamp is thus lighted when the predetermined time of day is reached, and the switch 41 bridging the contacts 40 and 42 will now enable the magnet 32 to be energized by the engagement of the contacts 36 in succession with the contact 37, thereby energizing the solenoid 19 intermittently for advancing the film or series of slides.

The operation of the machine continues until the cam 49 reaches and moves the switch 51, so that said switch engages the contact 60. The contact 60 is connected by a conductor 61 with a stopping electro-magnet 62, which has its other terminal connected to the conductor 56, to complete the circuit by way of the conductor 43, battery 44, conductor 45 and clock work to which the switch 51 is grounded. An armature 63 carried by the switch 22 is attracted by the magnet 62 when the circuit of the magnet 62 is closed by the engagement of the switch 51 with the contact 60, thereby swinging the switch 22 open, as well as opening the switch 41, thereby opening the lamp circuit and also the circuit of the intermittent magnet 32. The magnet 54 having been deenergized by the opening of the switch 50 after the cam 49 leaves the switch 50, will result in the catch 58 engaging the arm 59 and holding the switches 22 and 41 in open position. The machine will therefore remain at rest until the cam 49 again reaches and closes the switch 50.

Having thus described the invention, what is claimed as new is:—

1. A projector having a series of slides and a lamp, a switch controlling said lamp, a catch for holding said switch in one position, a clock work, an electro-magnet controlling said switch to move it to said position for the engagement of the catch, an electro-magnet controlling said catch to release said switch, operating means for said series of slides controlled by the clock work, and switches for said electro-magnets controlled by the clock work at predetermined times.

2. A projector having a series of slides and a lamp, a switch controlling said lamp, a catch for holding said switch in one position, a clock work, means controlled by the clock work and controlling said catch to release said switch at a predetermined time, operating means for said series of slides controlled by the clock work, and means controlled by the clock work at a predetermined time for moving said switch to be held by said catch.

3. A projector having a series of slides and an electric lamp, a source of high potential current, a switch for connecting said lamp with said source, an intermittent high potential electro-magnetic operating means for said series of slides, a clock work, a switch for connecting said operating means with said source, a source of low potential current, a low potential electro-magnet controlling the secondnamed switch, an inter-

mittently operable switch in the circuit of said electro-magnet and operated by the clock work, a switch in the circuit of said electro-magnet arranged to be opened and closed simultaneously with the opening and closing of the firstnamed switch, means controlled by the clock work for closing the firstnamed switch at a predetermined time, and means controlled by said clock work for opening the firstnamed switch at a subsequent time.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WALTER D. CHRISTENSEN.

Witnesses:

WILLIAM B. STEWART,

A. T. MANZANARES.