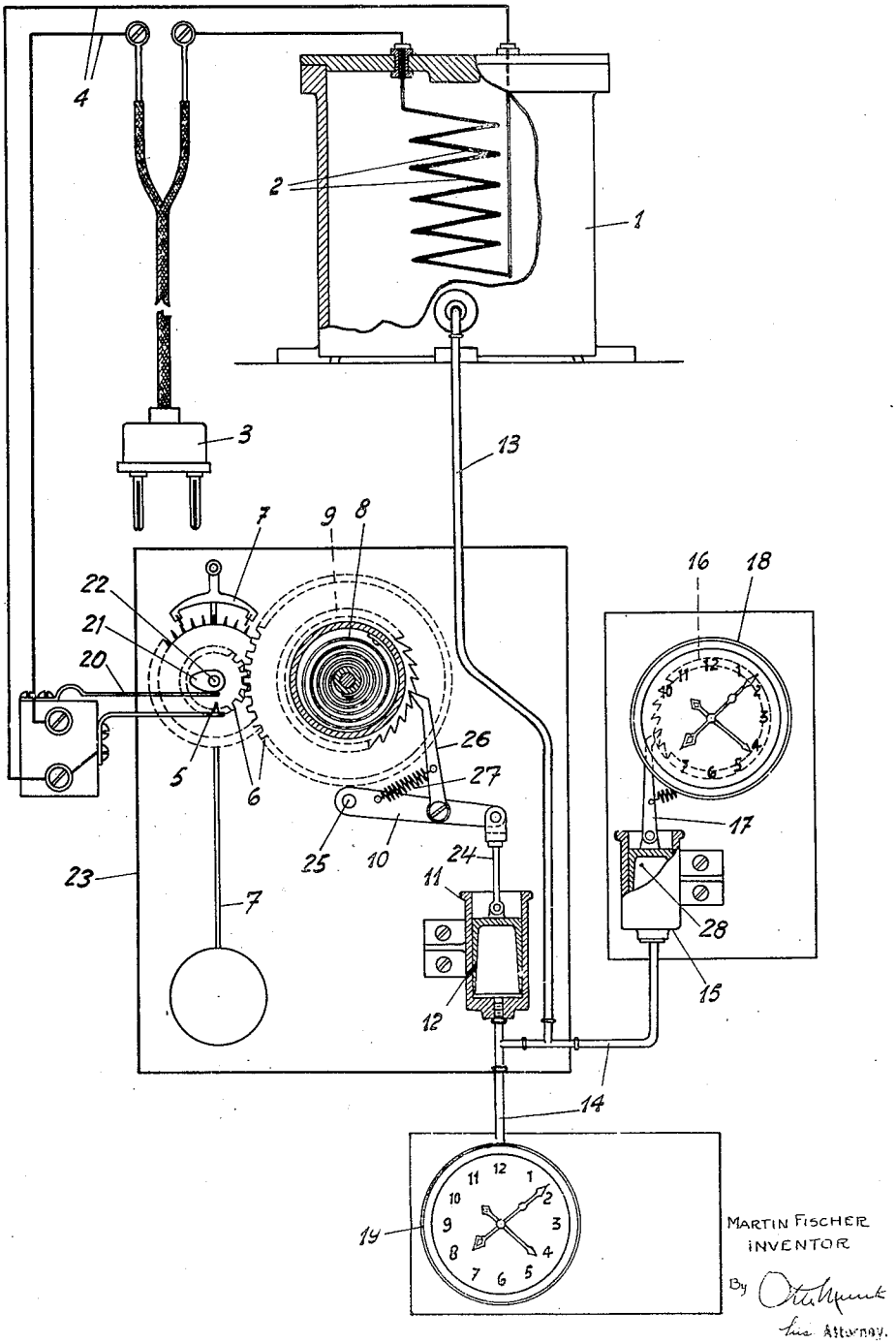
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PNEUMATIC ACTUATING DEVICE

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PNEUMATIC ACTUATING DEVICE

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The invention relates to electrical actuating systems adapted to actuate clocks or other controlling mechanisms.

The object of the invention is to effect the actuation electro-pneumatically and this result is obtained by switching a heating body into an electric circuit at regular time intervals and for determined periods of time by means of a clock. The heating body is mounted in a closed container from which air pipes lead to the separate apparatus, clocks, and so forth to be actuated. When the heating body is switched in the air in the container is heated. The air expands and the air pressure wave thus produced is transmitted by the said pipes to the apparatus to be actuated. The latter are actuated by suitable actuating mechanism in accordance with the magnitude and number of air pressure waves.

In the drawing is illustrated diagrammatically one form of construction of the subject of the invention.

In a container 1, provided with rigid walls, there is mounted an effectively insulated heating wire coil 2. The heating wires can be connected by a plug 3 to any electrical circuit, for example the lighting circuit. In the circuit 4 in which the heating wire coil 2 and the plug 3 are included, there is also included a switch 5. The latter is provided with a resilient tongue 20 adapted to be pressed against a stationary contact 5 by a cam 21 so as to close the circuit through the heating wire coil 2. The cam 21 is mounted on the shaft 22 of a clockwork 23 regulated by a pendulum 7. During the operation of the clockwork the circuit 4 is closed at regular intervals of time and kept closed for a definite period of time so that the air in the container 1 is heated. In consequence of the heating the air expands. To the container 1 there is connected a pipe 13 of comparatively small bore through which the air pressure wave produced in the container 1 is transmitted. The pipe 13 is connected by branch pipes 14 to two cylinders 11 and 15. In the cylinder 11 is provided a very easily movable piston 12. This is hinged by a link 24 to an actuating arm 10. The latter is pivotally mounted on a bolt 25 of the clockwork 23. On the actuating arm is provided an actuating pawl 26 which is held in engagement with the teeth of an actuating wheel 9 by means of a spring 27. The actuating wheel 9 is provided on the spring drum 8 of the clockwork 23 in such a manner that when actuating the wheel 9 by means of the pawl 26 the clockwork spring is wound in the known manner. When the spring unwinds it drives the clockwork with the wheel gears not shown in the drawing, known per se. The spring of the clockwork 23 is therefore automatically rewound so that a winding of the clock is not necessary. To the pipe 13 auxiliary clocks 18, 19 are connected by the branch pipes 14. Each clock 18, 19 is provided with an actuating wheel 16 connected to the hands, moving over a dial by wheel gears (not shown in the drawing) in such a manner that the auxiliary clocks are actuated in accordance with the movement of the master clock 23 and indicate the correct time. The wheel 16 is actuated by a pawl 17 hinged to a piston 28. The piston 28 is arranged to be easily movable in the cylinder 15 connected to the pipe 13 by the pipe 14. The actuation of the auxiliary clocks 18, 19 and the winding of the master clock 23 may be effected, for example, every minute. In this case the cam 21 would make a complete revolution every minute so that each minute the circuit 4 is closed once and an air pressure wave is transmitted through the pipe 13 to the cylinders 11 and 15. As soon as the circuit 4 is opened, a rapid cooling of the container 1 takes place. Air again flows out of the cylinders 11, 15 back to the container 1. The pistons 12 and 28 are returned to their initial position by the external air pressure.

What I claim is:—

1. In a thermo-pneumatic motor, a hermetically sealed chamber provided with unyielding walls, an expansible air in said chamber, an electric heating device in said chamber, mechanism at a relatively remote point for controlling the operation of said heating device in a predetermined inermittent manner, means adjacent to said mech-

anism and operable by the expanding air whenever said heating device functions for controlling said mechanism, and a conduit extending from said chamber to said means to transmit said expanding air to said means.

2. In a thermo-pneumatic motor, a hermetically sealed chamber provided with unyielding walls, an expansible air in said chamber, an electric heating device in said chamber, a conduit communicating with said chamber and into which the air may expand when said heating device is operated, and mechanism at a relatively remote point operable by the air expanding through said conduit for controlling the operation of said heating device.

3. In a thermo-pneumatic motor, a hermetically sealed chamber provided with unyielding walls, an expansible air in said chamber, an electric heating device in said chamber, clock mechanism for controlling the operation of said heating device in a predetermined intermittent manner, and means operable by the expanding air whenever said heating device functions for controlling said clock mechanism.

4. In a thermo-pneumatic motor, a hermetically sealed chamber provided with unyielding walls, an expansible air in said chamber, an electric heating device in said chamber, clock mechanism for controlling the operation of said heating device in a predetermined intermittent manner, and means operable by the expanding air whenever said heating device functions for controlling said clock mechanism, said last-named means including a conduit having unyielding walls and extending from said chamber to said clock mechanism.

5. In a thermo-pneumatic motor, a hermetically sealed chamber provided with unyielding walls, an expansible air in said chamber, an electric heating device in said chamber, clock mechanism for controlling the operation of said heating device in a predetermined intermittent manner, and means operable by the expanding air whenever said heating device functions for controlling said clock mechanism, said last-named means including a pawl and ratchet arrangement, a cylinder, a piston in the latter and operatively associated with said pawl and ratchet arrangement, and a conduit extending from said chamber to said cylinder to direct said expanding air against the piston to actuate the latter.

6. In a thermo-pneumatic motor, a hermetically sealed chamber provided with unyielding walls, an expansible air in said chamber, an electric heating device in said chamber, clock mechanism for controlling the operation of said heating device in a predetermined intermittent manner, and means operable by the expanding air whenever said heating device functions for controlling said clock mechanism, said last-named means including a cylinder, a piston in the latter, a pawl carried by said piston, a ratchet actuated by said pawl, and a conduit extending from said chamber to said cylinder to direct said expanding air against the piston to actuate the latter.

7. In a thermo-pneumatic motor, a hermetically sealed chamber provided with unyielding walls, an expansible air in said chamber, an electric heating device in said chamber, an electric circuit for said device, clock mechanism for controlling said circuit at predetermined intermittent times to operate said heating device accordingly, and means operable by the expanding air whenever said heating device functions for controlling said clock mechanism.

8. In a thermo-pneumatic motor, a hermetically sealed chamber provided with unyielding walls, an expansible air in said chamber, an electric heating device in said chamber, an electric circuit for said device and including a switch, clock mechanism at a relatively remote point for intermittently actuating said switch in a predetermined manner to control the operation of said heating device accordingly, and means operable by the expanding air whenever said heating device functions for controlling said clock mechanism.

9. In a thermo-pneumatic motor, a hermetically sealed chamber provided with unyielding walls, an expansible air in said chamber, an electric heating device in said chamber, an electric circuit for said device and including a switch, clock mechanism at a relatively remote point for intermittently actuating said switch in a predetermined manner to control the operation of said heating device accordingly, and means operable by the expanding air whenever said heating device functions for controlling said clock mechanism, said last-named means including a cylinder, a piston therein, and a conduit extending from said chamber to said cylinder and directing said expanding air against the piston to actuate the latter.

In testimony whereof I affix my signature.

MARTIN FISCHER.