PATENT SPECIFICATION

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COMPLETE SPECIFICATION.

A New or Improved Pneumatic Clock Installation.

I, MARTIN FISCHER, Engineer, a citizen of the Swiss Republic, of 59, Rieterstrasse, Zurich, Switzerland, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to a pneumatic clock installation in which the winding of a spring driving gear as well as the advance of auxiliary clocks is effected pneumatically. The novel feature consists in the master clock closing the circuit through a heater which is mounted in an hermetically sealed container. The master clock maintains the circuit closed for a short but definite time with a current flowing therethrough of such strength as to produce rapid heating of the heater, and therefore of the air in the sealed container. The temperature of the heater is rapidly raised and produces a powerful expansion of the air. The air pressure wave thus produced is transmitted through piping to pistons of cylinders, to diaphragms, bellows etc. which are arranged in the interior of auxiliary clocks and adapted for moving the same. Pistons may operate for instance the winding mechanism in the master clock, and in the auxiliary clocks the hands motion work. As soon as the circuit is broken the heater and the air quickly cool down and the pistons, diaphragms etc. of the master clock and of the auxiliary clocks return to their initial position. The circuit is closed at exactly defined time intervals and remains closed for a given period of time, for instance every minute for 10—20 seconds. The size of the container and the size of the heater depend on the size of the installation. Practical experience has shown that pipes with a relatively very small inside diameter, for instance with 1 to 3 m/m. inside cross section can transmit the pressure wave to the relatively large distances required in the case of clock installations.

A construction of an installation is diagrammatically shown by way of example in the accompanying drawing.

In a metal container 1 which can be closed in an air tight manner, is mounted a heater 2 which is constituted by metal wire wound on insulating material. The wire is capable of being connected to the electric light circuit by means of a plug 3. In the circuit of the heater is mounted a switch 4, 5 which can be opened and closed by a clock. The contact 5 disposed in the master clock is closed by means of a cam 20 secured to the spindle of the escape wheel for instance every minute for a few seconds and then opened again. The master clock has a spring driven wheel 9 with main spring 8 and drives the escape wheel spindle and therefore the cam 20, in well known manner by means of the gear wheel 6. The running of the clock is regulated in the well known manner. For winding, the spring 8 is provided with a ratchet gear 10 actuated by a piston 12 which is mounted with slight play in a cylinder 11. The cylinder 11 is connected by means of a pipe 13 to the container 1. To the pipe 13 are connected, by means of pipes 14, auxiliary clocks 18, 19, each auxiliary clock has a cylinder 15 in which a piston is mounted with a slight play. This piston acts by means of a pawl 17 on a ratchet wheel 16 by means of which the hands are moved by a suitable wheel gear. The pistons of the cylinders 11, 15 may be balanced In any case they are made very light and have sufficient play to enable increases of pressure caused by fluctuations of temperature, to be balanced in the piping. When the circuit through the heater 2 is

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closed, the latter will be quickly heated, and therefore the air in the container 1 will also be heated and will expand and produce in the pipe 13 an air pressure wave which will be transmitted to the cylinders 11, 15. The expanding air will move the piston 12 in the cylinder 11 thus, by means of the ratchet gear 10, winding the main spring 8 of the spring driven wheel 9 to the extent of one tooth of the ratchet wheel and in that way will keep the master clock going. In the cylinders 15 the air pressure wave will move the piston and therefore the ratchet gear 17, so that the auxiliary clocks will be advanced. As soon as the circuit is broken the heater and therefore the air will quickly cool down and a contraction will take place. The pistons will return to their initial position and bring the ratchet gears 10, 17 back again to the initial position in order that at the next closing of the circuit they may be in position to repeat the cycle of operations described. The container 1 may if desired be provided with a valve for the purpose of introducing fresh air into it.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A pneumatic clock installation in which the advancing of the auxiliary clocks is effected pneumatically, characterised by the provision of a closed container or vessel with an electric heater mounted in the same for the intermittent production of compressed air, the said heater being switched into an electric circuit at determined time intervals by a master clock in order to enable the air in it to be heated and displaced, for the purpose of effecting by the pressure differences thus produced the winding of the master clock spring and also the advance of the auxiliary clocks.

2. A pneumatic clock installation substantially as hereinbefore described with reference to the accompanying drawings.

Dated this 23rd day of March, 1927.

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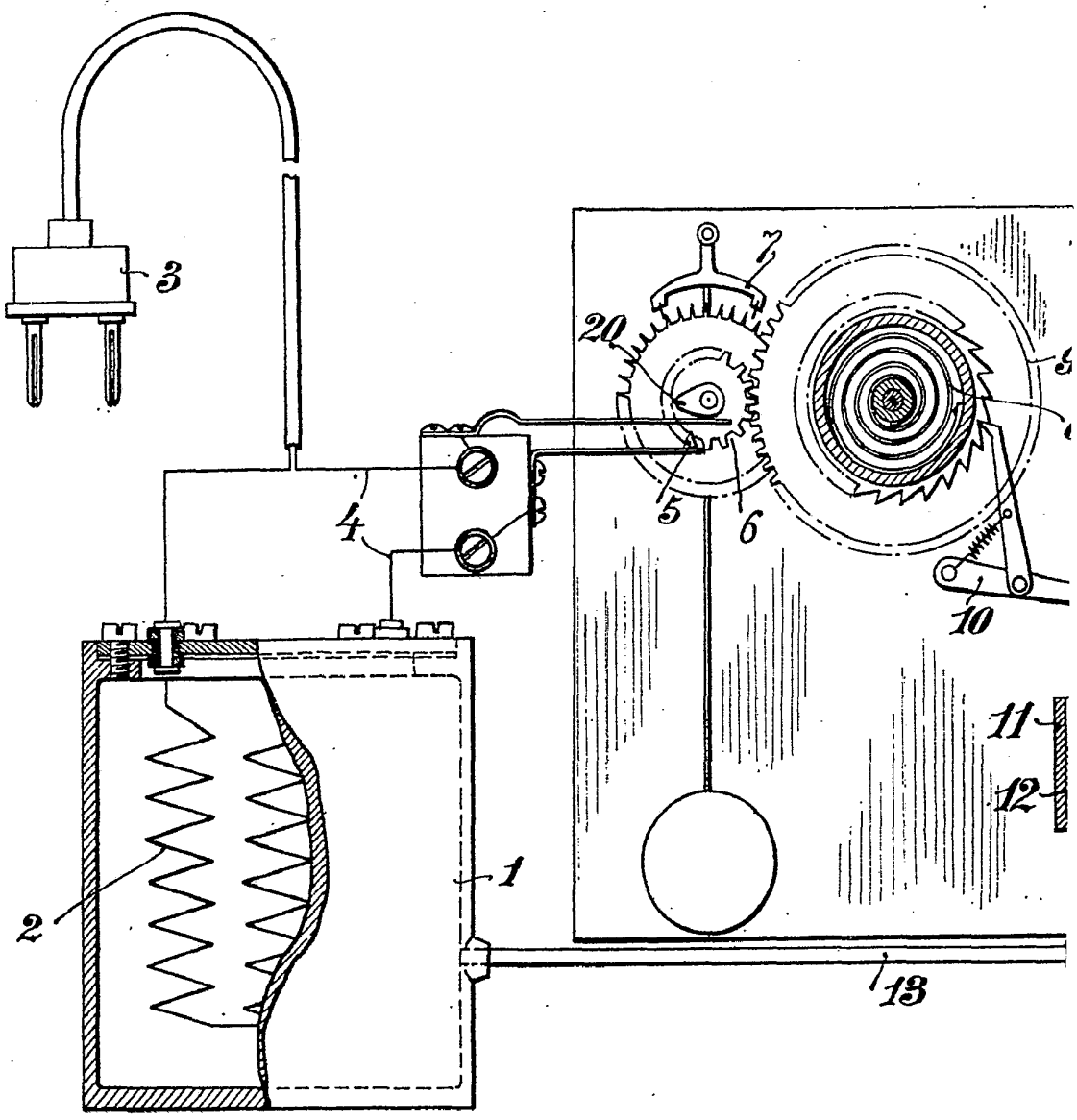

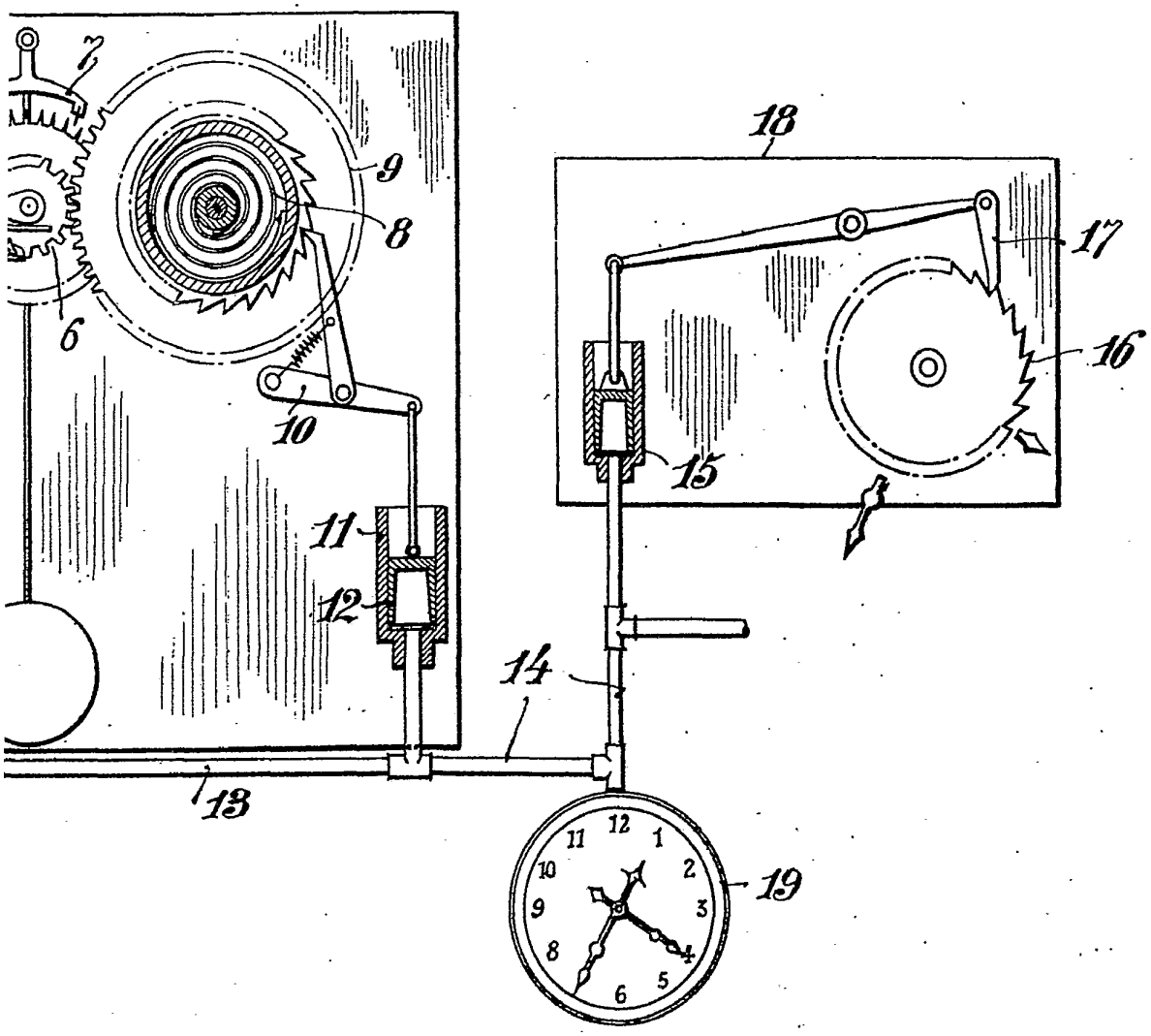

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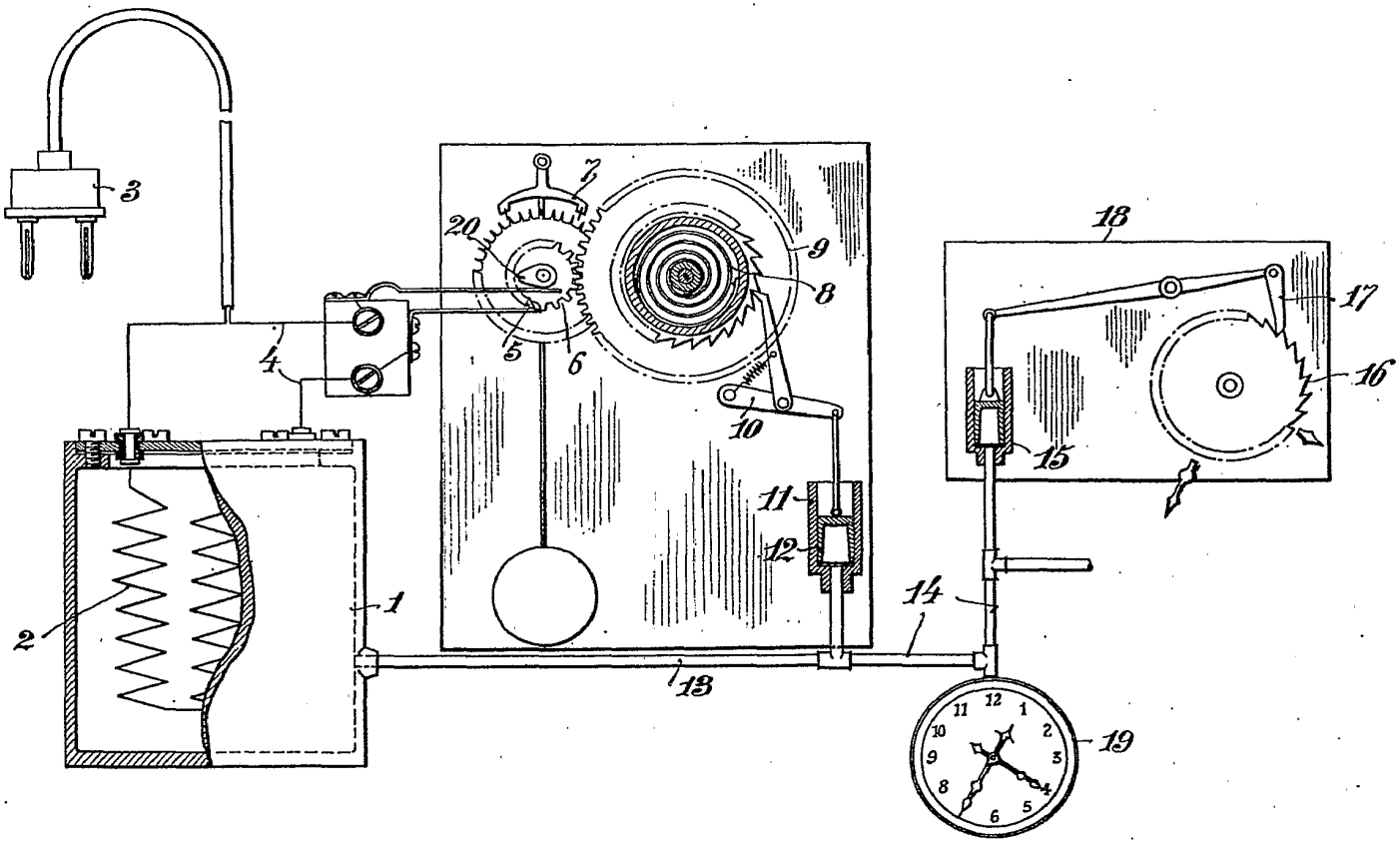

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