



955,598.

Patented Apr. 19, 1910.

2 SHEETS—SHEET 2.

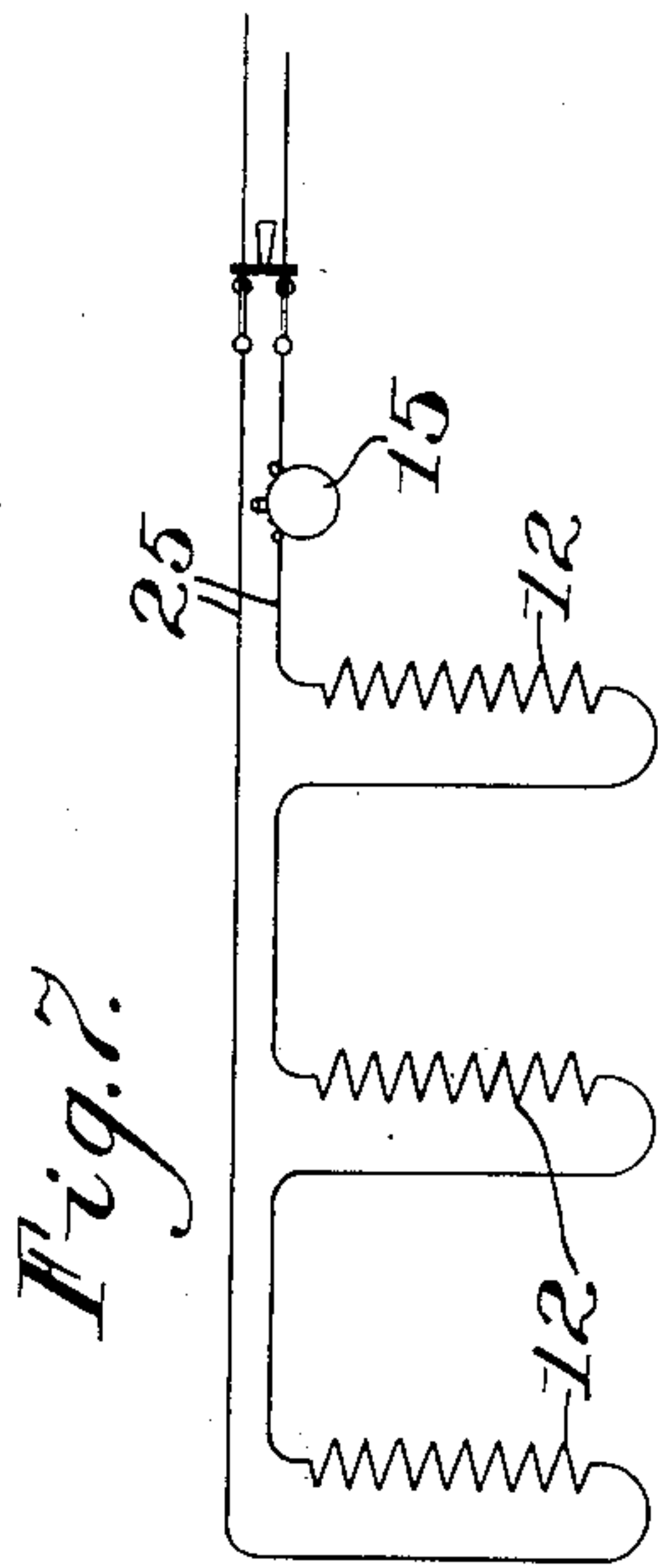
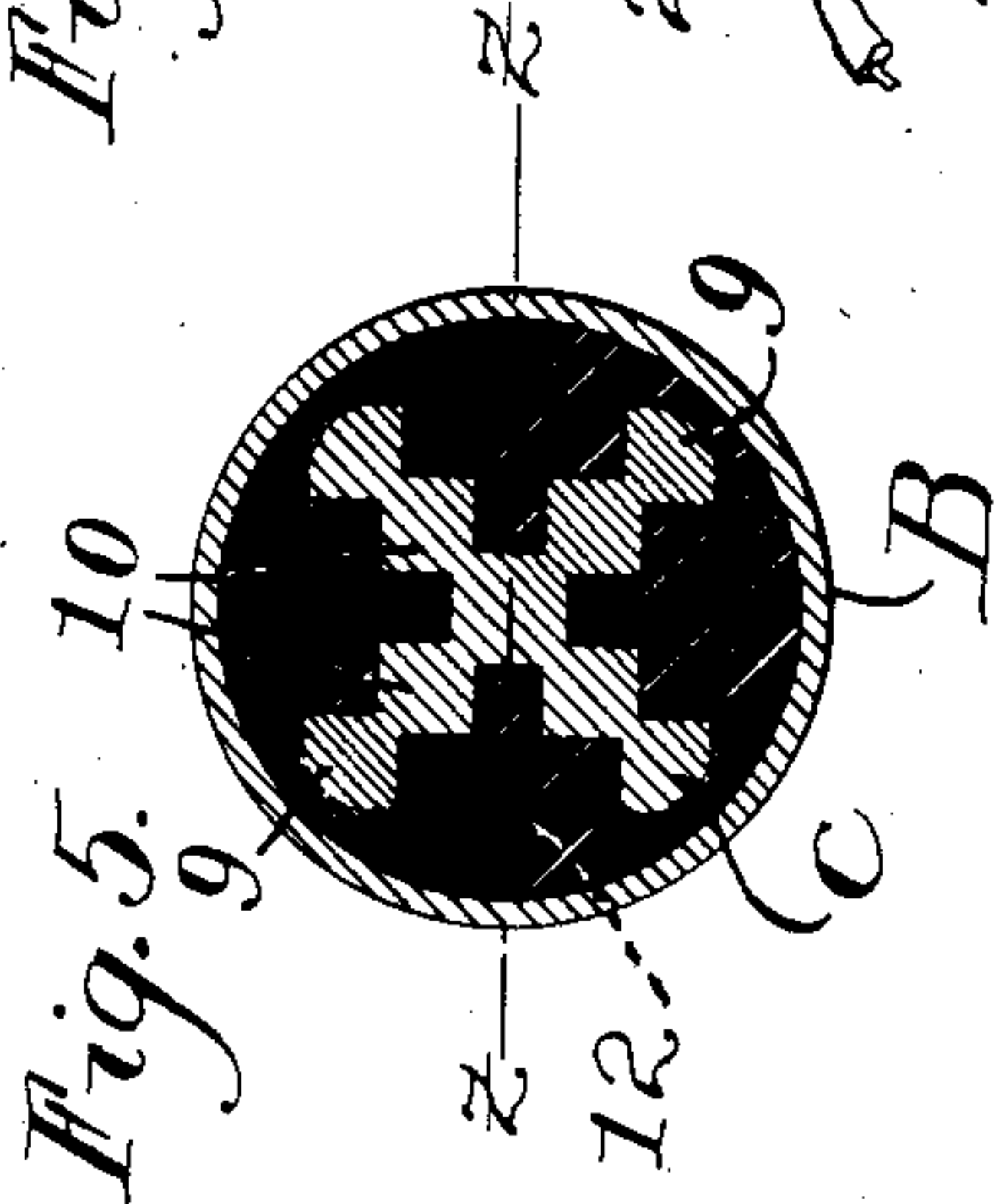
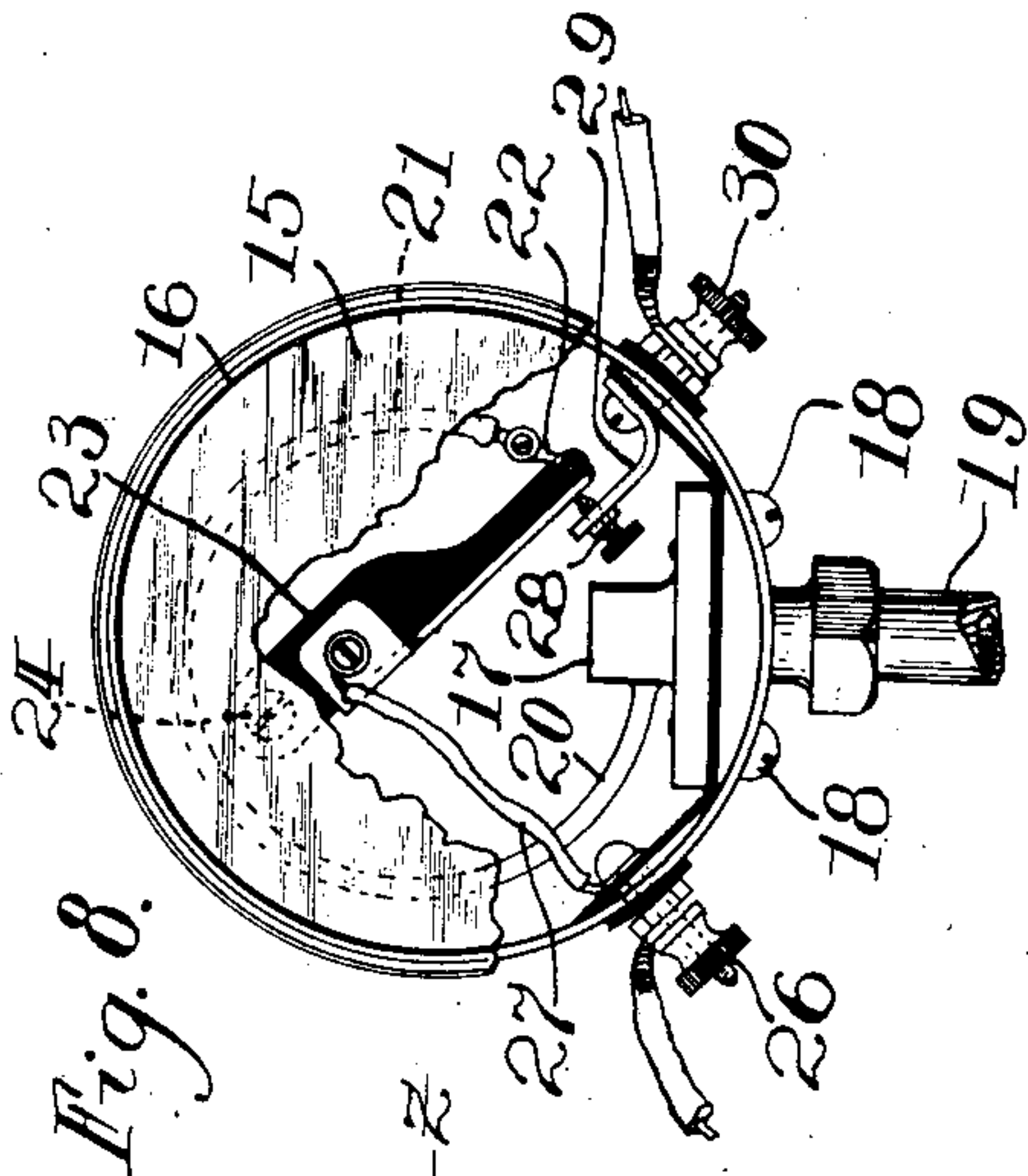
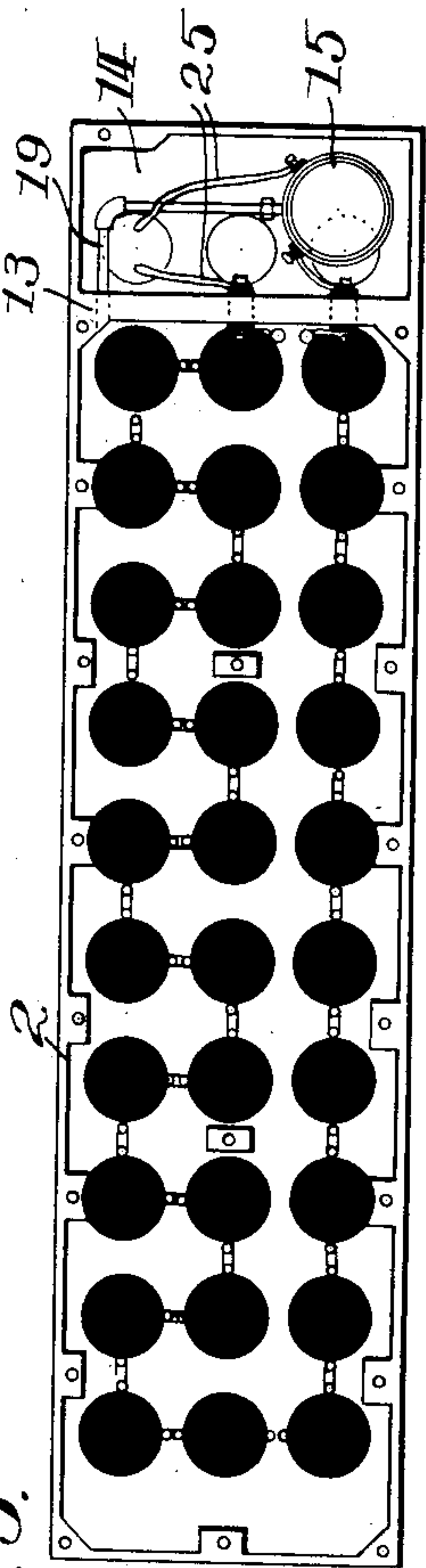
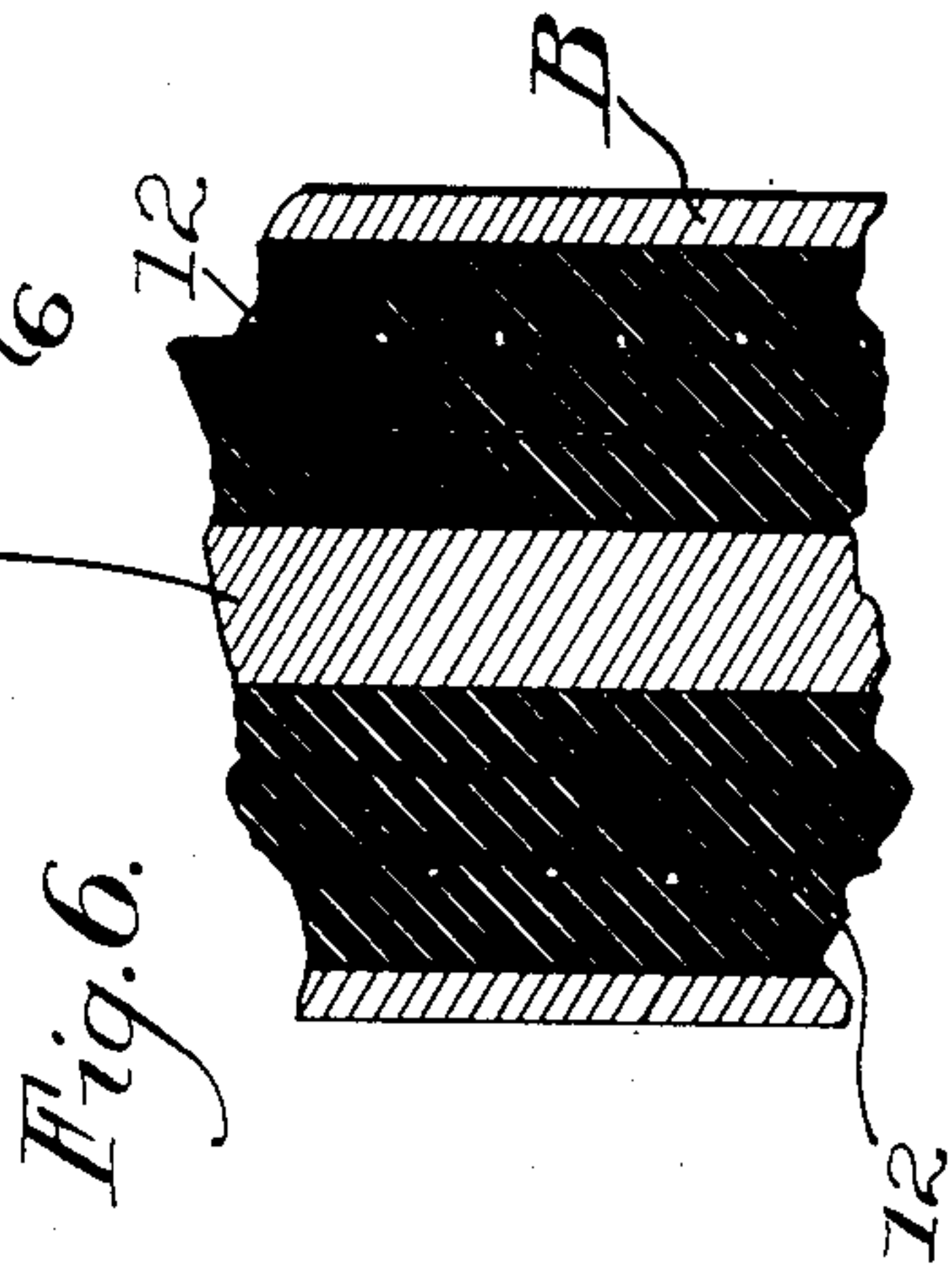
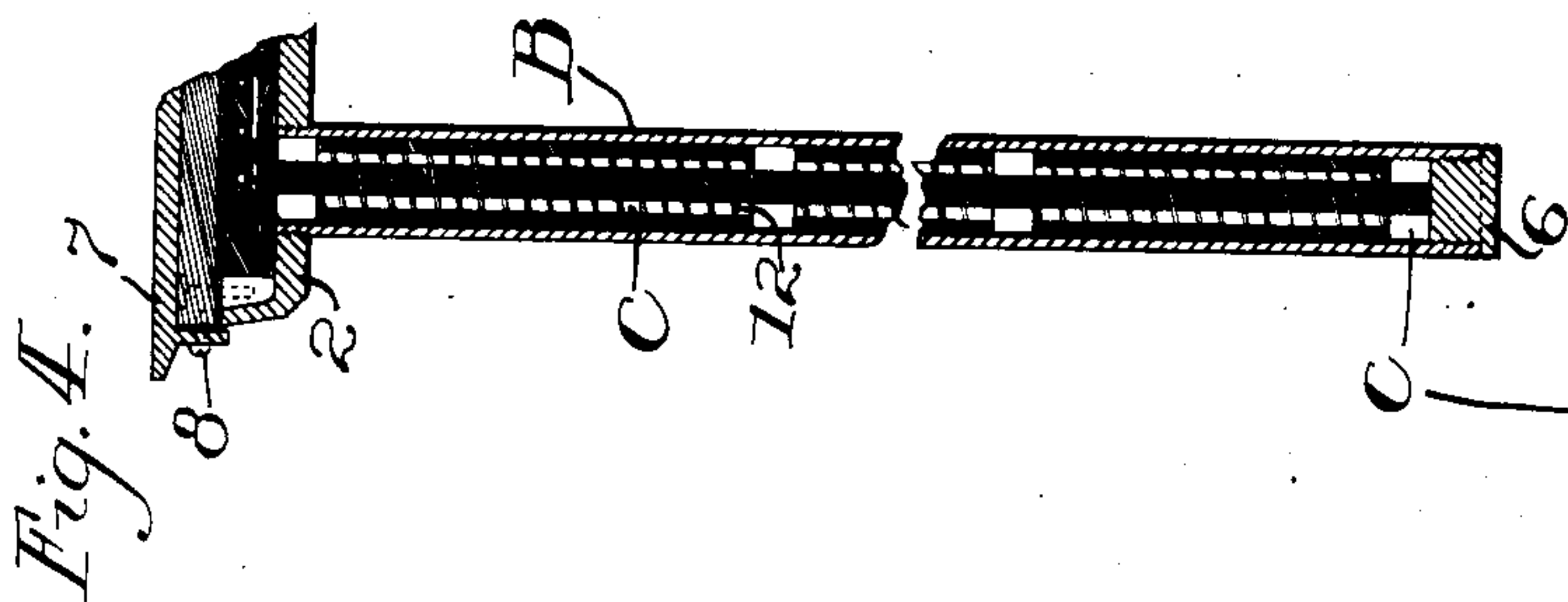


Fig. 3.

Fig. 8.

Fig. 5.

Fig. 6.

Fig. 7.

Witnesses:  
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# UNITED STATES PATENT OFFICE.

ROYAL LARES, OF ST. PAUL PARK, MINNESOTA.

ELECTRICAL HEATER.

955,598.

Specification of Letters Patent. Patented Apr. 19, 1910.

Application filed April 6, 1909. Serial No. 488,206.

*To all whom it may concern:*

Be it known that I, ROYAL LARES, a citizen of the United States, residing at St. Paul Park, in the State of Minnesota, have invented a new and useful Improvement in Electrical Heaters, of which the following is a specification.

My invention relates to improvements in electrical heaters and more particularly to that class in which an electrical resistance conductor is employed for transforming the electrical energy into heat and to improved means for insulating said conductor and radiating the heat therefrom.

In addition to providing the above features of construction, my invention includes an automatic regulator which is adapted to prevent an excessive amount of heat being produced in the radiator.

In the accompanying drawings forming part of this specification Figure 1 is a side elevation of my invention; Fig. 2 is an end elevation; Fig. 3 is a plan view, the cover of the radiator being removed; Fig. 4 is a vertical section of one of the radiator tubes a portion of the top of the radiator to which said tube is connected being also shown in section; Fig. 5 is a cross section of one of the radiator tubes; Fig. 6 is a vertical section of a portion of one of the radiator tubes, said section being taken on the plane Z—Z, as indicated in Fig. 5; Fig. 7 is a diagrammatic view of a circuit illustrating one way in which the coils are connected in the radiator and the automatic cutout included, and Fig. 8 is a plan of the automatic cutout a portion thereof being broken away to expose the interior construction to view.

In the drawings A represents one form of an inclosing radiator frame with which my invention is adapted to be used said frame as illustrated being composed of a fluid containing head 2 which is adapted to be supported upon standards 3 at each end. These standards may be secured to a support or floor by the screws 5 or other suitable fastening means. The head 2 has connected therewith a plurality of depending tubes B each of which is threaded to the head 2 and has at its lower end a threaded plug 6. The head 2 is provided with a suitable cap 7 secured thereon by means of the screws 8. All of the parts of said inclosing radiator frame are joined together to form an air tight inclosure which is adapted to be filled or nearly filled with a suitable electrical non-

conducting liquid for the purposes which will be hereinafter described. Contained in each electrical tube B is a suitable mount C for the electrical conductor, which as illustrated, is in the form of a frame having four corner pieces 9 which are joined together by diagonal webs 10. The lower and upper ends 9 of the cores are larger than the intermediate portions and serve to hold the cores with the electrical resistance conductor wound thereon, out of contact with the shell of the frame. The terminals or ends of the coils are brought up into the head of the radiator where they may be connected in series as illustrated in Fig. 7 or in any other manner as is customary and well known in the art to which this invention relates.

At one end of the chamber in the head is a transverse partition 13 forming a separate chamber 14 in which is located an electrical cutout 15. The main inclosing chamber with which the radiating tubes are connected is filled or nearly filled with paraffin oil or other suitable liquid or material which is adapted to act as an insulator for the electrical resistance conductor and to transmit heat produced by said conductor to the heat radiating surface of the radiator frame through intimate contact with said conductor. The cutout 15 is in the form of a shallow shell which is closed tightly by means of a cover 16. In this shell is mounted a hollow connector 17 which is supported by means of the screws 18 passing through the outer wall and shell. This connector is in communication with the main chamber of the radiator over the radiating tubes by means of the pipe 19 which passes through the wall 13. Rigidly supported upon the connector 17 is a curved spring tube 20 which also communicates with the main chamber through the connector 17 and pipe 19. The free end 21 of the curved tube is freely coupled by means of the link 22 with the free end of a swinging arm 23. This arm is pivotally mounted upon the screw 24 in the chamber of the cutout. The cutout is adapted to be included in one side of the circuit 25 which contains the coils 12. Said circuit passes through the binding post 26, conductor 27, arm 23, contact screw 28, support 29 for said contact screw and binding post 30. The two binding posts 26 and 30 are suitably insulated from the shell of the cutout so that the circuit is not in contact with the radiator. Normally the arm 23



makes contact with the contact screw 28 but when the insulating liquid in the radiator expands the pressure which it produces owing to the inclosing radiator frame being  
 5 air-tight causes the curved arm 20 of the cutout to swing out and tend to straighten owing to the expansion of the liquid within when it rises in temperature. In this manner, the switch arm 23 is thrown out of con-  
 10 tact with the screw 28 and the circuit of the radiator automatically opened. To reduce corrosion and decomposition of the electrical contact parts of the cutout, the cutout chamber is filled with paraffin oil or other  
 15 suitable non-conducting liquid which reduces arcing of the current between the contact parts of the switch.

In operation, the electrical insulating heat conducting material being in intimate contact with the electrical resistance conductor, quickly and efficiently transmits heat which is generated by said heat conductor to the surface of the inclosing radiator frame from whence it is radiated through the atmos-  
 20 sphere. The expansion owing to the rise of temperature of said insulating liquid also causes the cutout to automatically open should the radiator reach a dangerously high degree of temperature thus preventing  
 30 the hazard of the radiator frame bursting. By providing this safety means for cutting out the circuit in case of undue rise of temperature within, the heat conducting liquid is prevented from evaporating which would  
 35 occur if the radiator was not hermetically sealed as described and the resistance wire which generates the heat is thus prevented from oxidizing by contact with air.

In accordance with the patent statutes, I  
 40 have described the principles of operation of my invention together with apparatus which I now consider to represent the best embodiment thereof but I desire to have it understood that the construction shown is only  
 45 illustrative and that the invention can be carried out by other means and applied to uses other than those above set forth within the scope of the following claims.

Having described my invention, what I  
 50 claim as new and desire to protect by Letters Patent is:

1. A device of the class set forth, comprising, in combination, an inclosing radiator frame, a core within said frame, an elec-  
 55 trical resistance conductor upon said core, a combined electrical insulating and heat conducting liquid between said core and frame, and a circuit opener included with said conductor and associated with said  
 60 liquid, said opener being provided with

means for cutting out said conductor by the expansive force of said liquid due to its rise in temperature.

2. An electrical heater, comprising, in combination, an inclosing radiator frame, a  
 65 core within said frame, an electrical insulating liquid between said core and frame and an electrical resistance conductor wound upon said core, said liquid acting as a medium in intimate contact with said conduc-  
 70 tor core and frame to transmit heat.

3. An electrical heater, comprising, in combination, a radiator frame having a hollow head and depending tubes from said head, means for supporting said frame in  
 75 upright position, an electrical insulating core in one of said tubes, an electrical resistance conductor upon said core, an electrical insulating liquid hermetically sealed within said frame and covering the conduc-  
 80 tor on said core to transmit heat from the conductor to said frame, and a circuit opener connected with said conductor and having a switch and a curved tube connected with said liquid and adapted to move  
 85 and open said switch by the expansion of said liquid due to rise of temperature.

4. An electrical heater, comprising, in combination, an inclosing radiator frame having a hollow head from which depend a  
 90 plurality of tubes, insulating cores erected in said tubes, an electrical resistance conductor wrapped upon said cores, a heat conducting electrical insulating substance filling said radiator in intimate contact with  
 95 said resistance conductor and the walls of said tubes and an electrical cutout in circuit with said electrical resistance conductor controlled by the expansive force of said  
 100 heat conducting electrical insulating material to open said circuit should the radiator reach a dangerously high degree of temperature.

5. A device of the class set forth, comprising, in combination, an inclosing radiator  
 105 frame, an insulating core within said frame, an electrical resistance conductor upon said core, a combined electrical insulating and heat conducting liquid between said core and frame and a cutout in circuit  
 110 with said conductor adapted to open said circuit when said radiator reaches an excessive degree of temperature.

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

ROYAL LARES.

Witnesses:

H. L. FISCHER,  
 F. G. BRADBURY.