

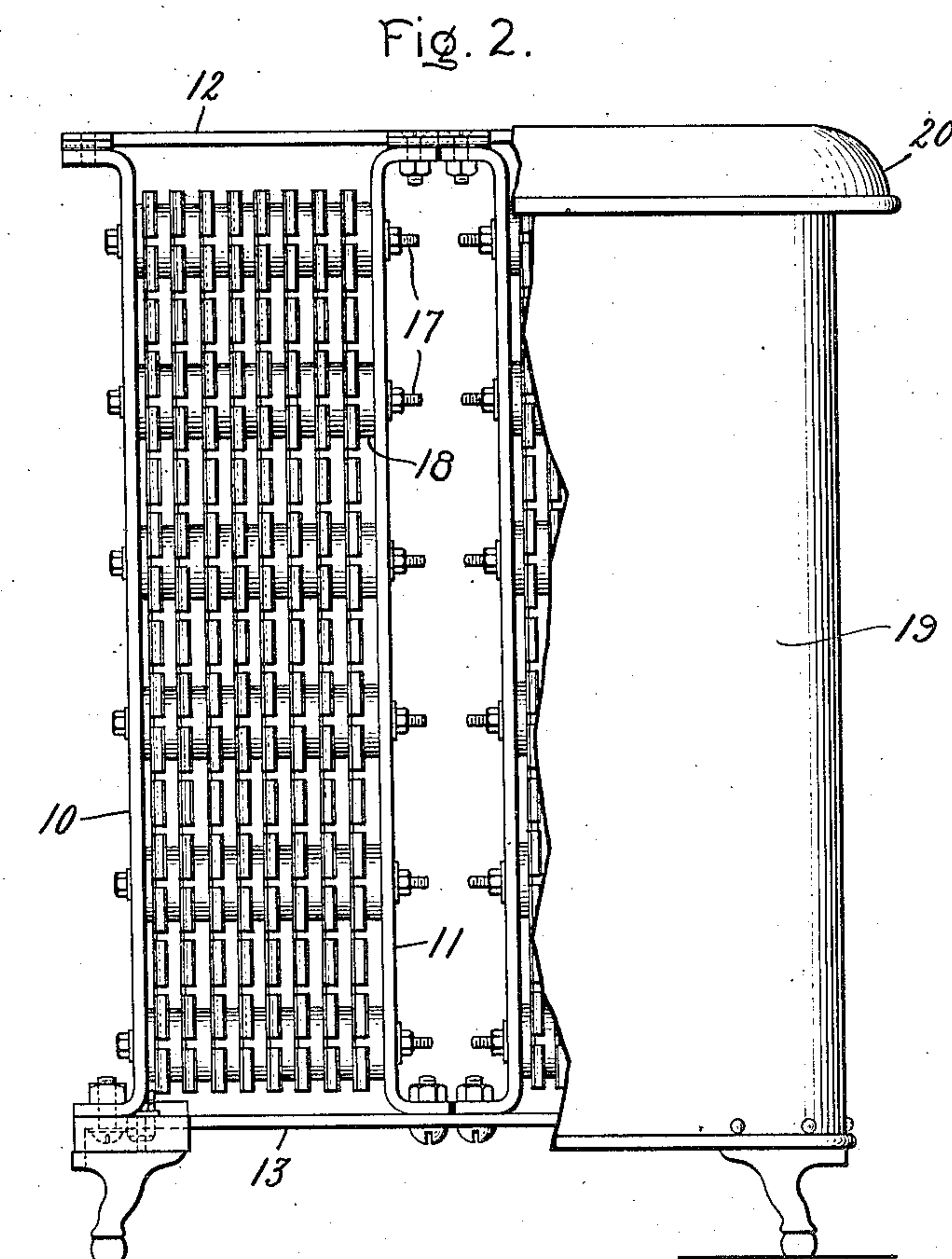
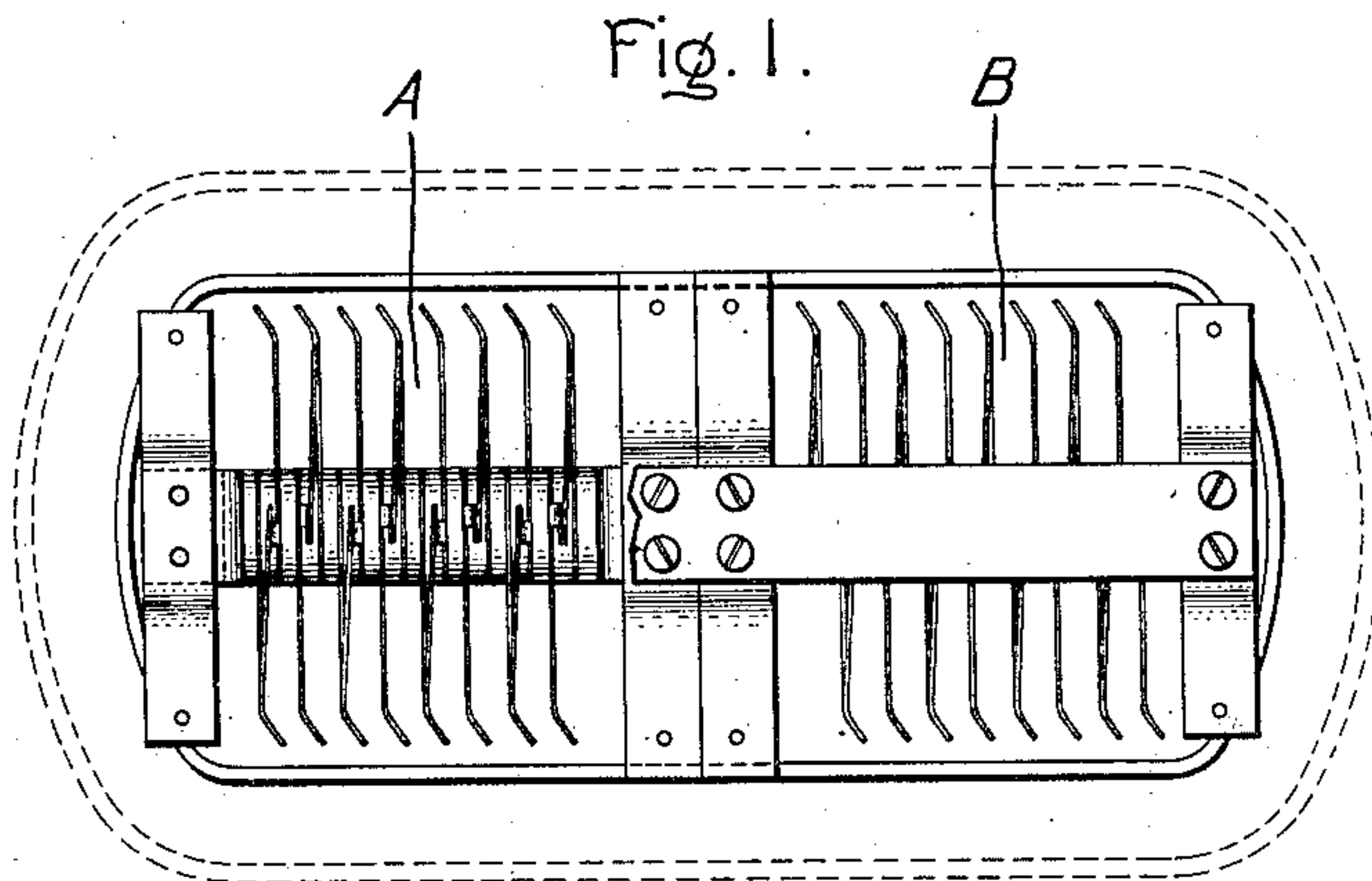
No. 896,297.

PATENTED AUG. 18, 1908.

E. M. HEWLETT.  
ELECTRIC HEATER.

APPLICATION FILED APR. 27, 1907.

3 SHEETS—SHEET 1.



Witnesses:

*George W. Tilden.*  
*J. Ellis Allen*

Inventor:

Edward M. Hewlett,  
by *Albert H. Davis*  
Att'y.

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3 SHEETS—SHEET 2.

Fig. 3.

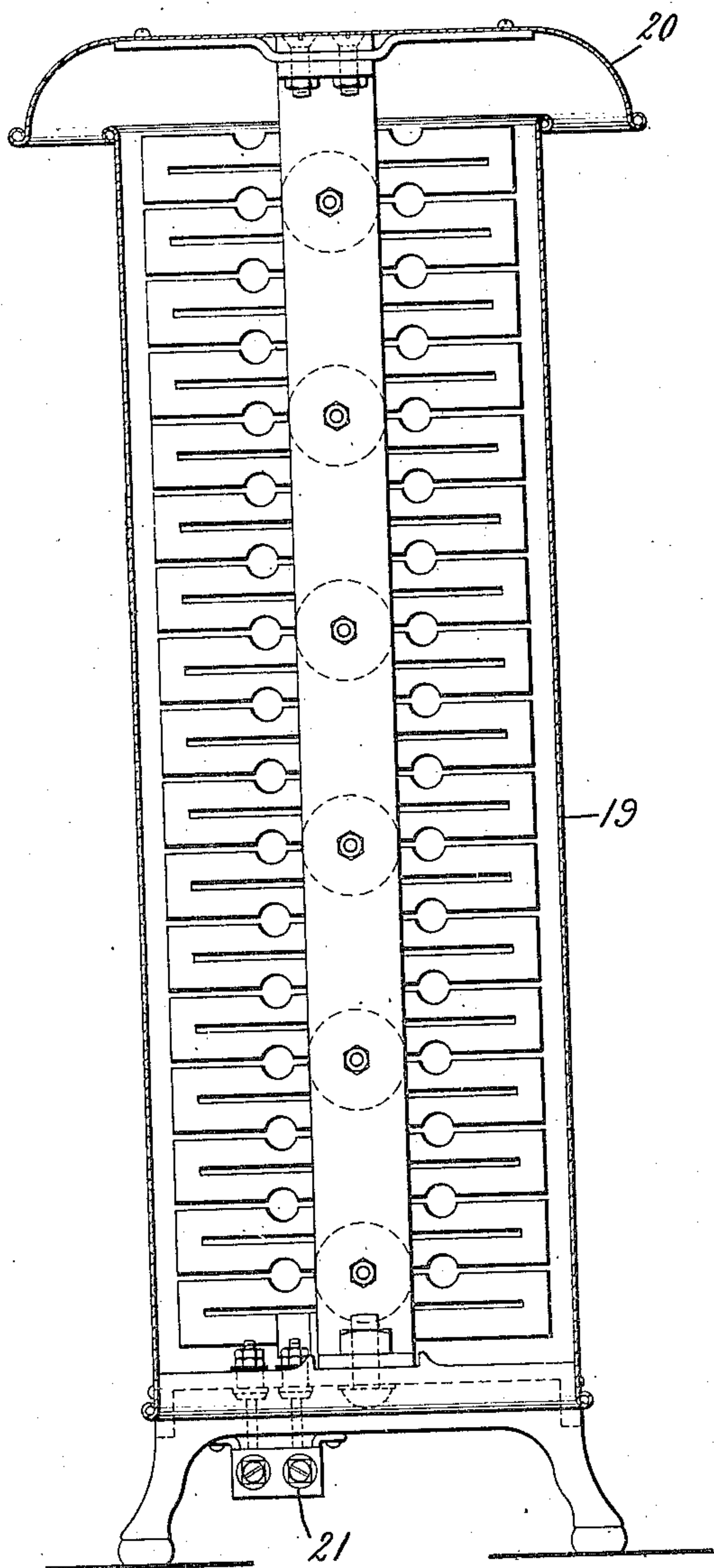


Fig. 4.

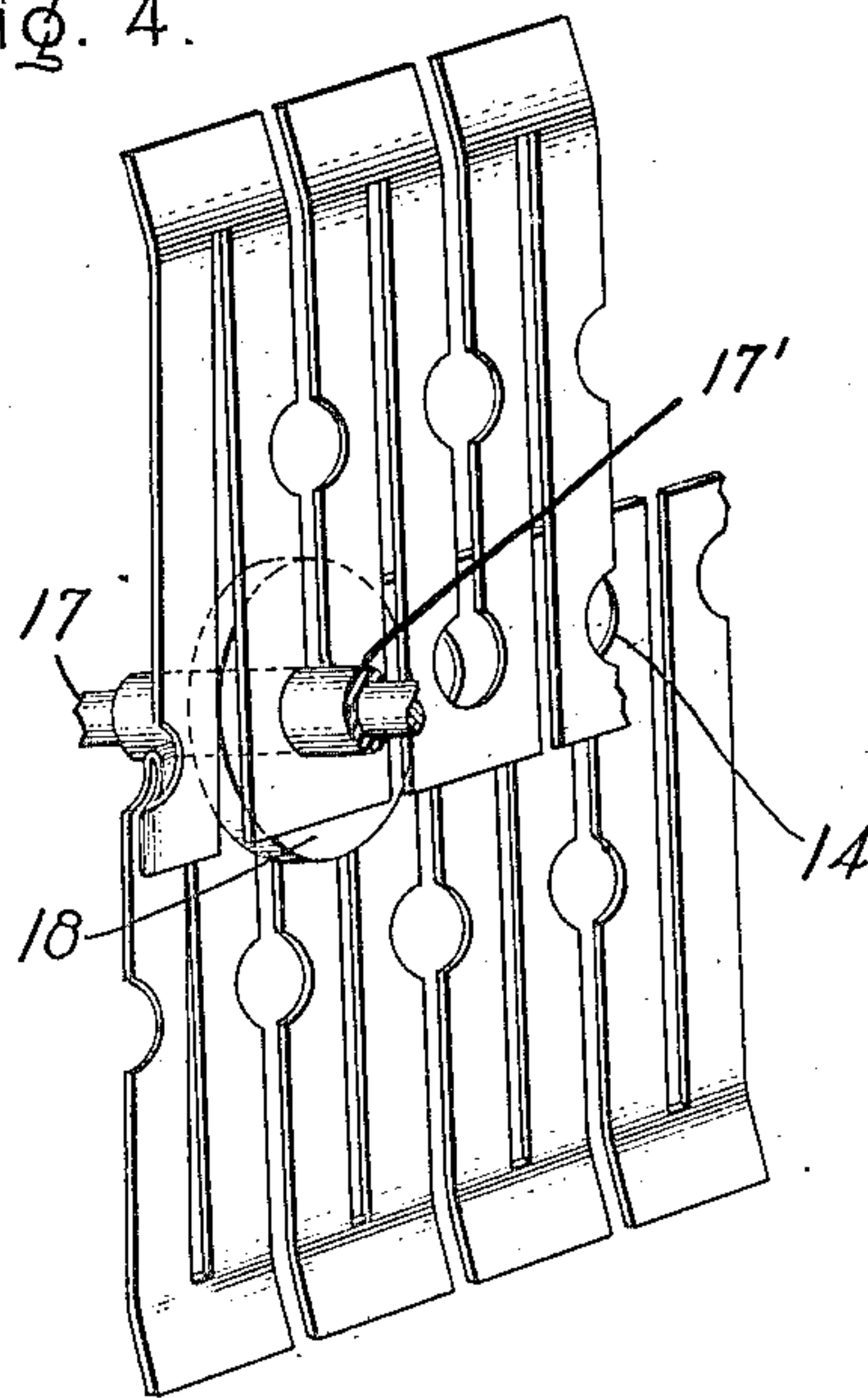


Fig. 5.

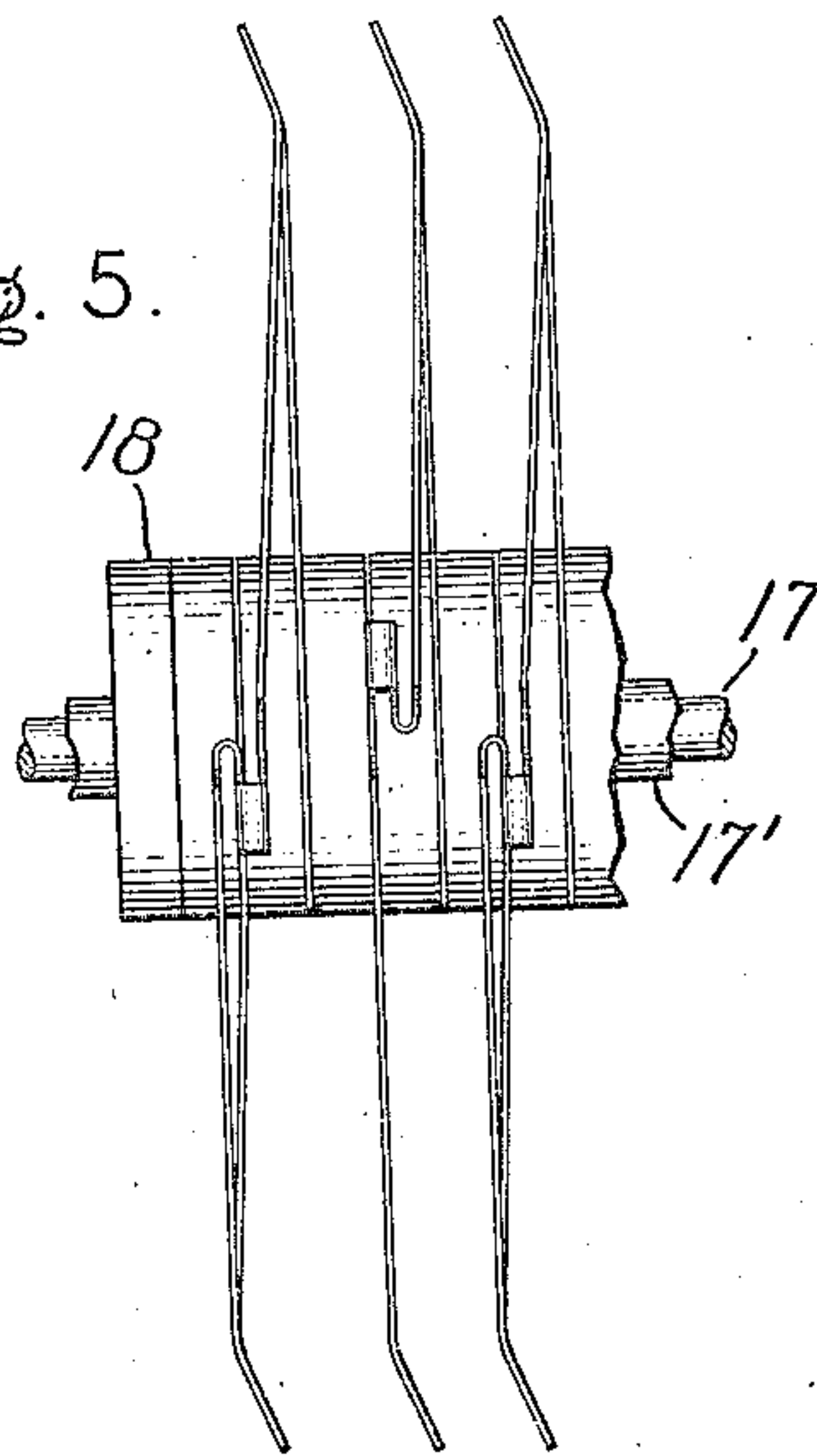
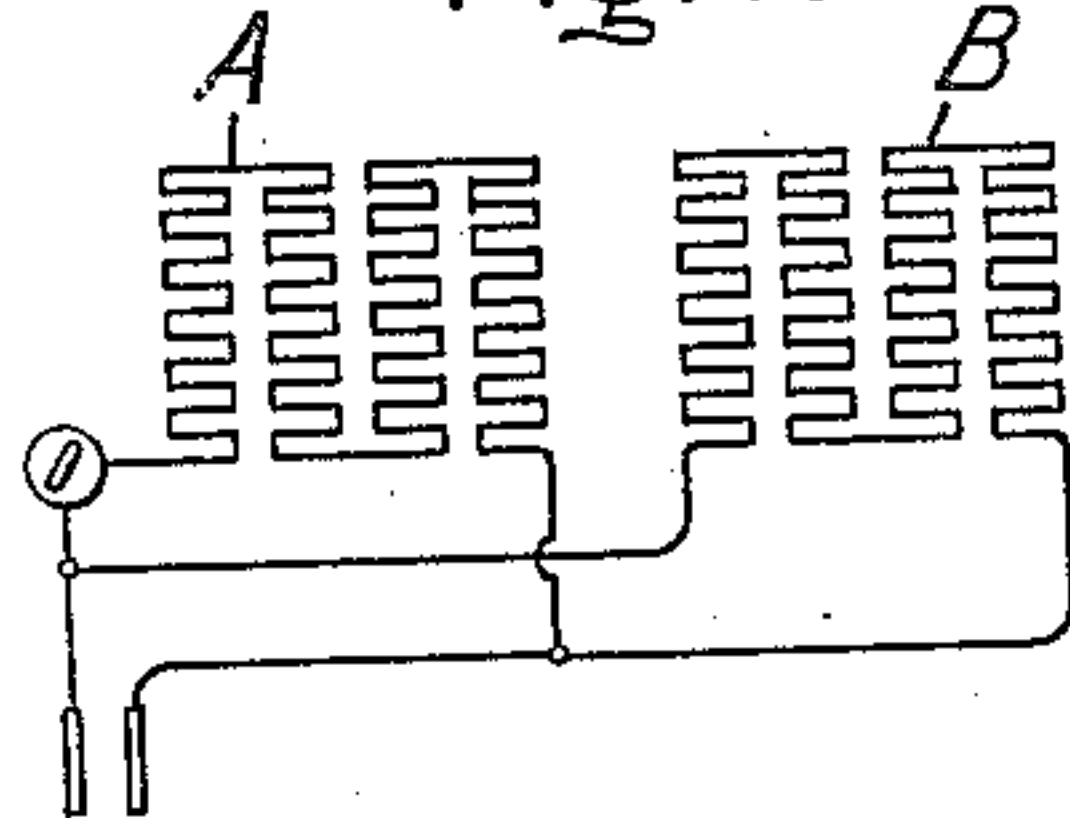


Fig. 10.



Witnesses:

*George W. Tilden*  
*J. Ellis Allen*

Inventor:

Edward M. Hewlett,

by *Alfred Davis*  
Att'y.

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3 SHEETS—SHEET 3.

Fig. 6

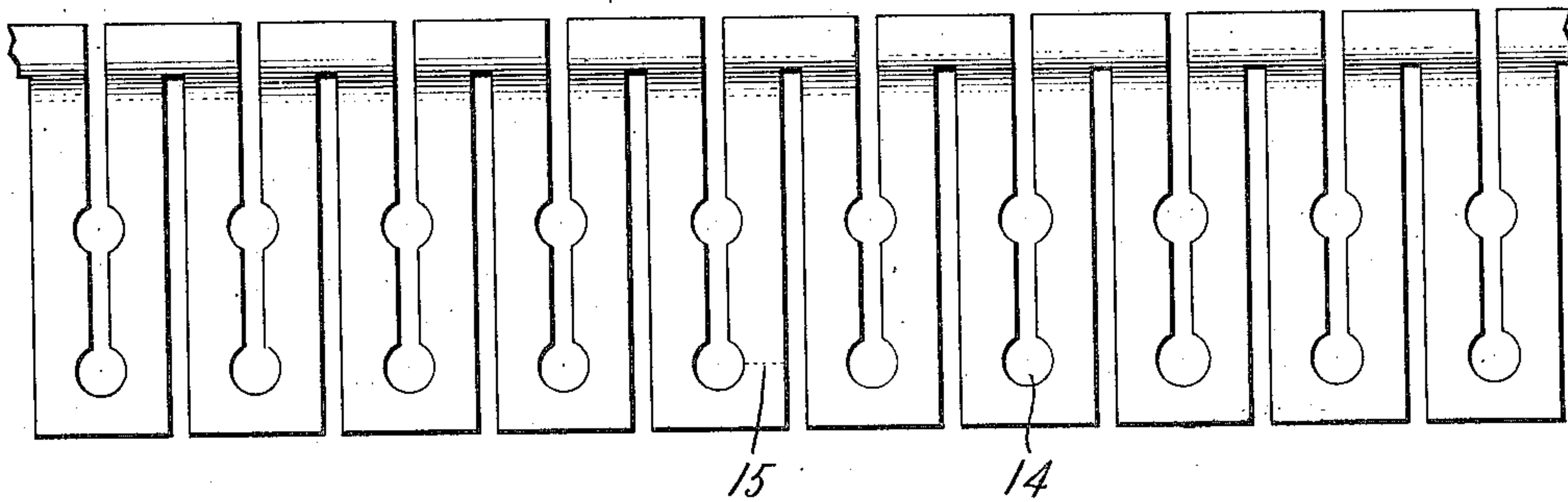


Fig. 7

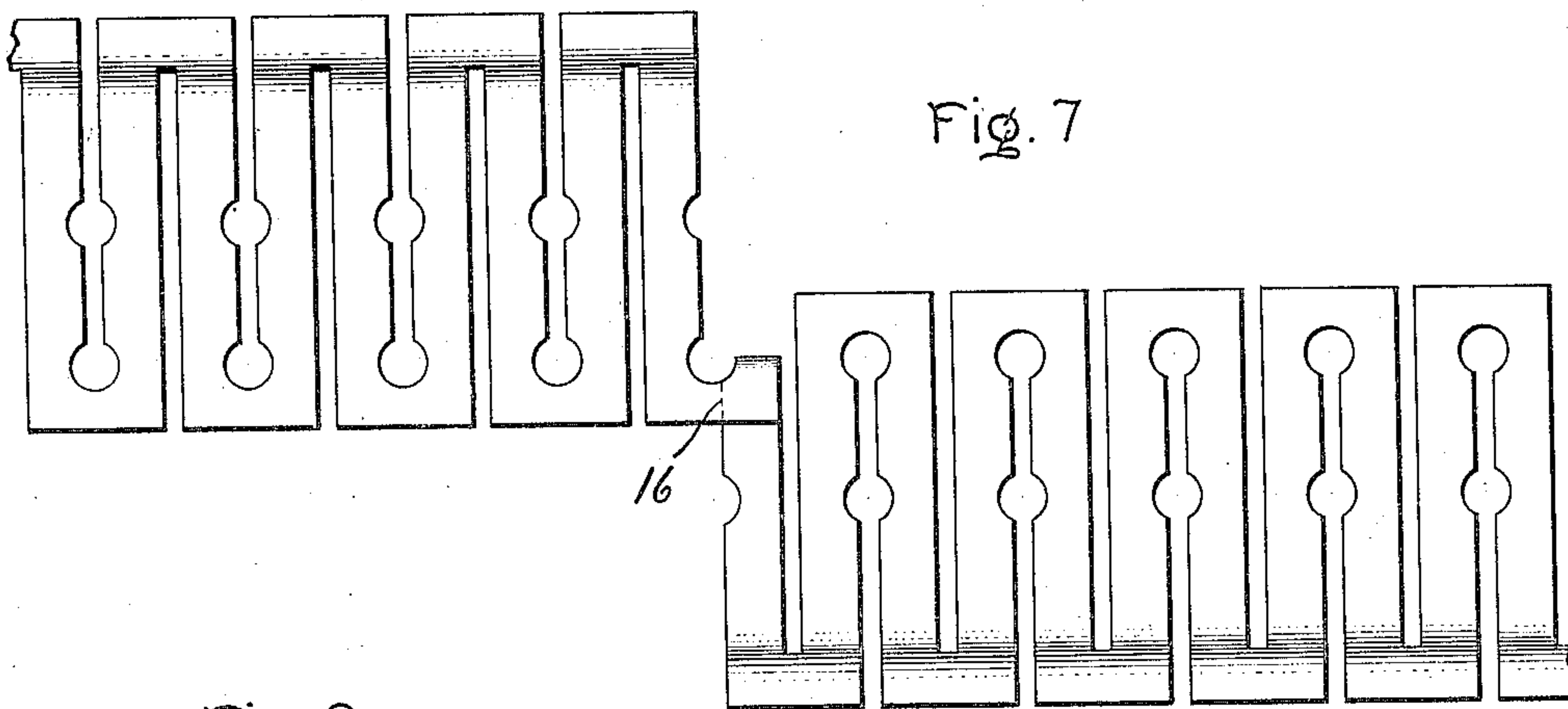


Fig. 9.

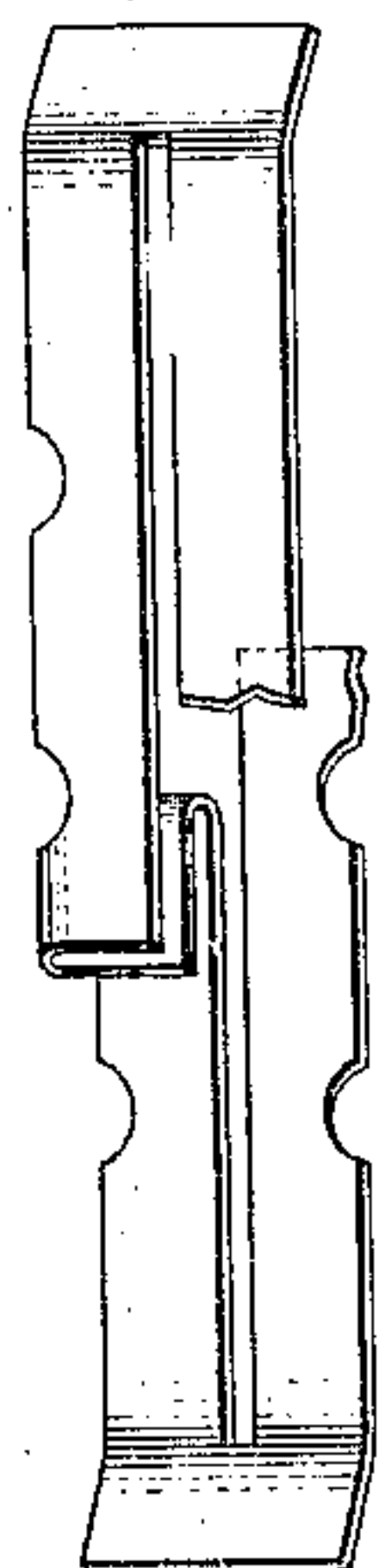
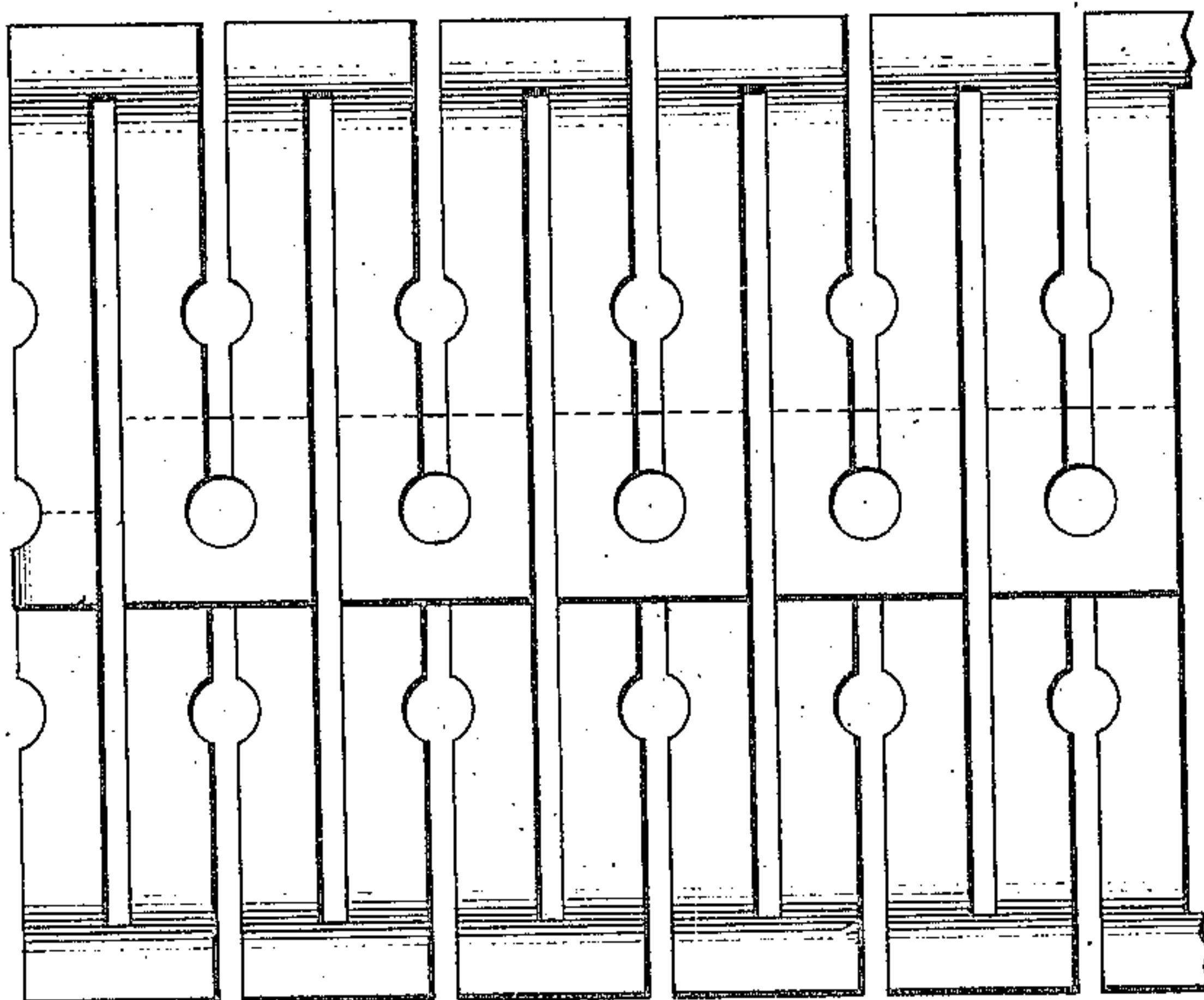


Fig. 8.



Witnesses:  
*George H. Tilden*  
*J. Ellis Allen*

Inventor:  
Edward M. Hewlett,  
by *Albert H. Davis*  
Att'y.



# UNITED STATES PATENT OFFICE.

EDWARD M. HEWLETT, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

## ELECTRIC HEATER.

No. 896,297.

Specification of Letters Patent.

Patented Aug. 18, 1908.

Application filed April 27, 1907. Serial No. 370,591.

*To all whom it may concern:*

Be it known that I, EDWARD M. HEWLETT, a citizen of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Electric Heaters, of which the following is a specification.

This invention relates to resistance devices for electric circuits and has for its object the provision of a device of this character which is of a simple and durable construction and at the same time thoroughly reliable and efficient.

My invention relates more specifically to resistance devices for use in electric heaters or the like although certain phases of my invention are capable of a wider application.

One of the objects of my invention is to provide an electric atmospheric heater or radiator, which is intended to be operated at a relatively low heat and can be brought up to its working temperature in a comparatively short time.

Another object of my invention is to produce an electric heater which may be constructed at a very low cost, the parts being almost entirely of sheet metal and the resistance elements themselves being punchings which may be easily assembled and durably constructed.

Other objects of my invention will appear in the course of the following specification in which I have set forth my invention in a specific form for purposes of illustration.

My invention further consists in the features of construction and in the arrangement and combination of elements hereinafter set forth and particularly pointed out in the claims annexed hereto.

In the drawings in which I have shown one form of my invention, Figure 1 is a plan view of my heater with the top removed; Fig. 2 is a side elevation of the same with a portion of the inclosing casing broken away; Fig. 3 is a central sectional elevation of the heater; Figs. 4 and 5 show the resistance unit in detail; Figs. 6, 7, 8 and 9 show the process of forming the resistance unit; and Fig. 10 is a diagram of the circuits.

Referring to the drawings for a further understanding of my device, it can be seen that the radiator or heater is formed in two divisions A and B having a central opening between them. The construction of the two sections of the heater is identical, and con-

sists of vertical parallel bars 10 and 11 having oppositely flanged ends secured between the top and bottom strips 12 and 13. These bars constitute the framework to which the resistance units are secured. The resistance unit is formed from a strip of resistance metal bent back and forth on itself between the supporting bars of the framework. The strip is preferably in a zigzag or grid-shaped form as shown in Fig. 6. It is made in the continuous strip shown preferably by punching from sheet metal, the perforations being formed along one edge for purposes hereinafter described. I have also shown the edge opposite the perforations as bent at a slight angle. In adapting this resistance grid to a radiator I bend or fold it back and forth upon itself so that it lies in parallel sections.

In order to get the most efficient distribution of heat and a highly desirable construction, the sections of the strip are arranged on opposite sides of a central support. To arrange the strip so that the sections may be mounted on the central support I bend it back on itself so that one edge is adjacent to or overlaps upon itself while the other edge lies on both sides of the overlapping line, i. e., when the strip is bent back on itself the holes or perforations 14 along the edge come opposite or into register with each other in the overlapping sections thereby providing a convenient method of securing the sections in place. The strip is bent back on itself in this way by two steps or bendings. At the point where it is desired to bend the strip it is first bent across one of the ends of the grids or line 15 through an angle of  $180^\circ$  so that the sections are in the relative positions shown in Fig. 7. It is then bent along the line 16, through  $180^\circ$  in the direction at right angles to the plane of the first bending so that the sections will be as shown in Figs. 8 and 9. The strip may be bent back and forth upon itself in this way so as to make as many sections as is desirable. In the present instance the strip is bent back and forth so as to make eight parallel portions each composed of two sections of the strip. The strip after it is bent in this form is mounted between the bars 10 and 11 by means of the rods 17 arranged so as to pass through the perforations 14 in the strip. An insulating sleeve 17' separates the rod 17 from the strip. There are shown six of these bars engaging the strip



throughout its length. For spacing the adjacent overlapping edges of the strips apart, I provide insulating washers 18 of porcelain or the like which are adapted to fit over the end of the rod.

As shown in the drawing the washer is inserted on the rod between the overlapping ends of the strips and the whole is made solid preferably by nuts on the ends of the rods. A metallic casing, 19 surrounds the resistance units and is left open at the top and bottom while a hood 20 is raised a short distance above the casing and bent down in the form shown so as to allow the heat to pass up through the bottom of the casing and then deflect downward and outward.

The two divisions of the heater A and B may be arranged so as to get different degrees of heat either by connecting them in parallel circuits as shown in Fig. 10 or in any desired manner so as to get any regulation of heat required. Electrical connections to the radiator are preferably at the bottom as shown at 21, although any desired method of connecting the device can be resorted to without departing from the spirit of my invention.

It will be seen that I have produced a very novel and efficient heater which will come up to its working temperature in a comparatively short time in a very simple manner, the resistance unit being formed of a continuous strip. It requires very little labor in its construction and will stand rough usage without injury.

Various modifications both as to the radiator itself and the form of the resistance unit will suggest themselves to those skilled in the art all of which I consider is within the spirit of my invention in so far as they fall within the scope of the claims annexed hereto.

What I claim as new and desire to secure by Letters Patent of the United States, is,—

1. An electric heater comprising a central support and a plurality of parallel grid-shaped resistance strips secured thereto and extending in opposite directions therefrom.
2. An electric heater comprising a central support and a plurality of parallel grid-shaped resistance strips arranged in rows on

opposite sides of said support and secured thereto.

3. An electric heater comprising a continuous grid-shaped resistance strip folded back and forth upon itself in parallel sections, and means for supporting the said sections.

4. An electric heater comprising a central support and a continuous grid-shaped resistance strip secured thereto and bent back and forth on opposite sides of said support in parallel sections.

5. An electric heater comprising a central support and a plurality of parallel grid-shaped resistance strips arranged in rows and secured on opposite sides of said support, the opposite strips being cross connected alternately at their opposite ends.

6. A resistance unit comprising a flexible grid-shaped resistance strip folded so that one edge overlaps itself and the other edge lies on both sides of the overlapping edges.

7. A resistance unit comprising a flexible grid-shaped resistance strip folded back and forth so that one edge overlaps itself and the other lies alternately on opposite sides of the overlapping edges.

8. An electric heater comprising a flexible grid-shaped resistance strip folded so that one edge overlaps itself and the other edge lies on both sides of the overlapping edges, and means for supporting and spacing the overlapping edges.

9. An electric heater comprising a resistance grid-shaped resistance strip folded back and forth so that one edge overlaps itself while the other edge lies on both sides of the overlapping edges, and means for supporting and spacing the overlapping edges.

10. An electric heater comprising a flexible grid-shaped resistance strip folded back and forth so that one edge overlaps itself while the other lies on both sides of the overlapping edges, a supporting rod extending transversely of said edges, and insulating washers thereon for spacing and securing the folds of the strips.

In witness whereof, I have hereunto set my hand this 25th day of April, 1907.

EDWARD M. HEWLETT.

Witnesses:

BENJAMIN B. HULL,  
HELEN ORFORD.