

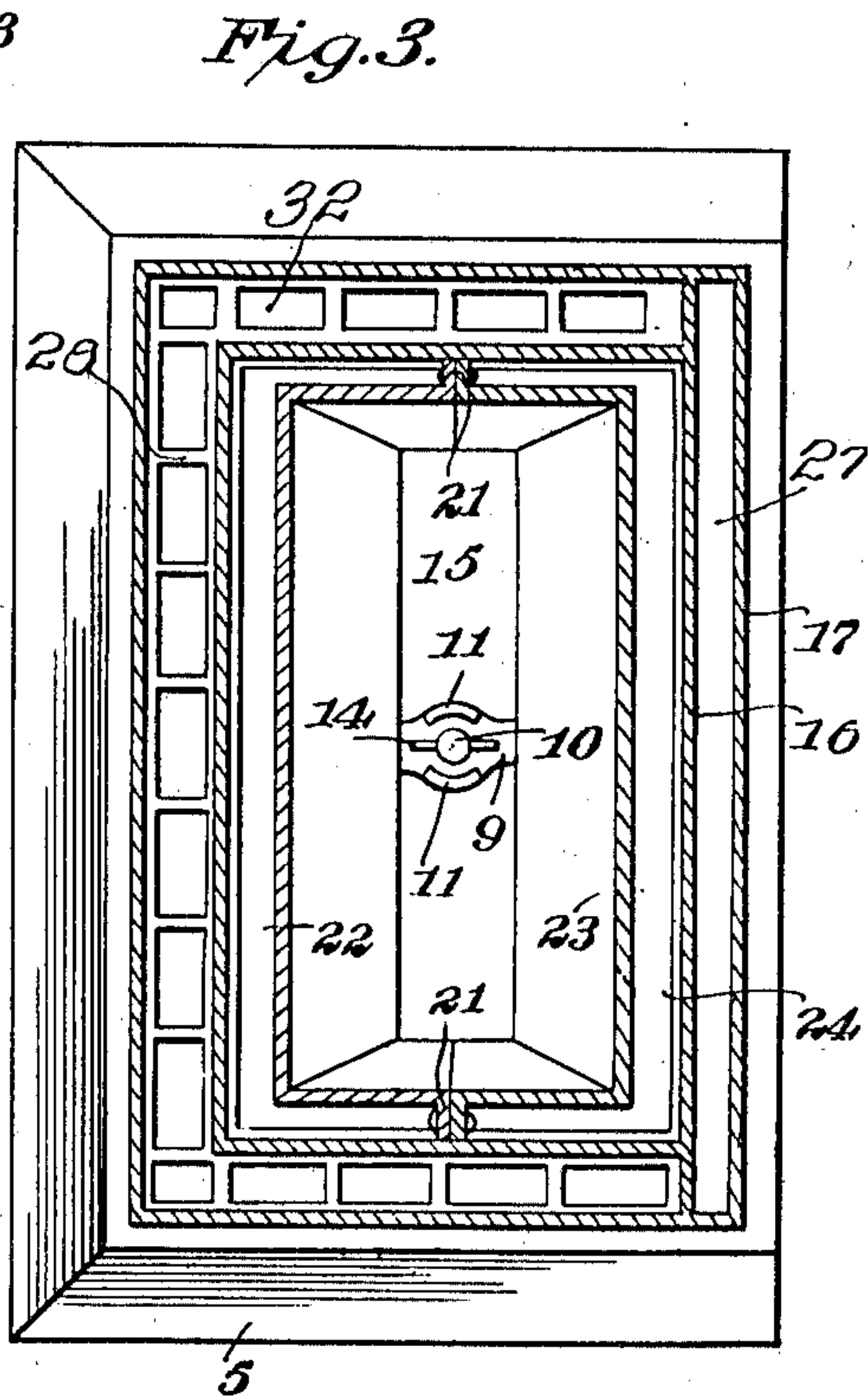
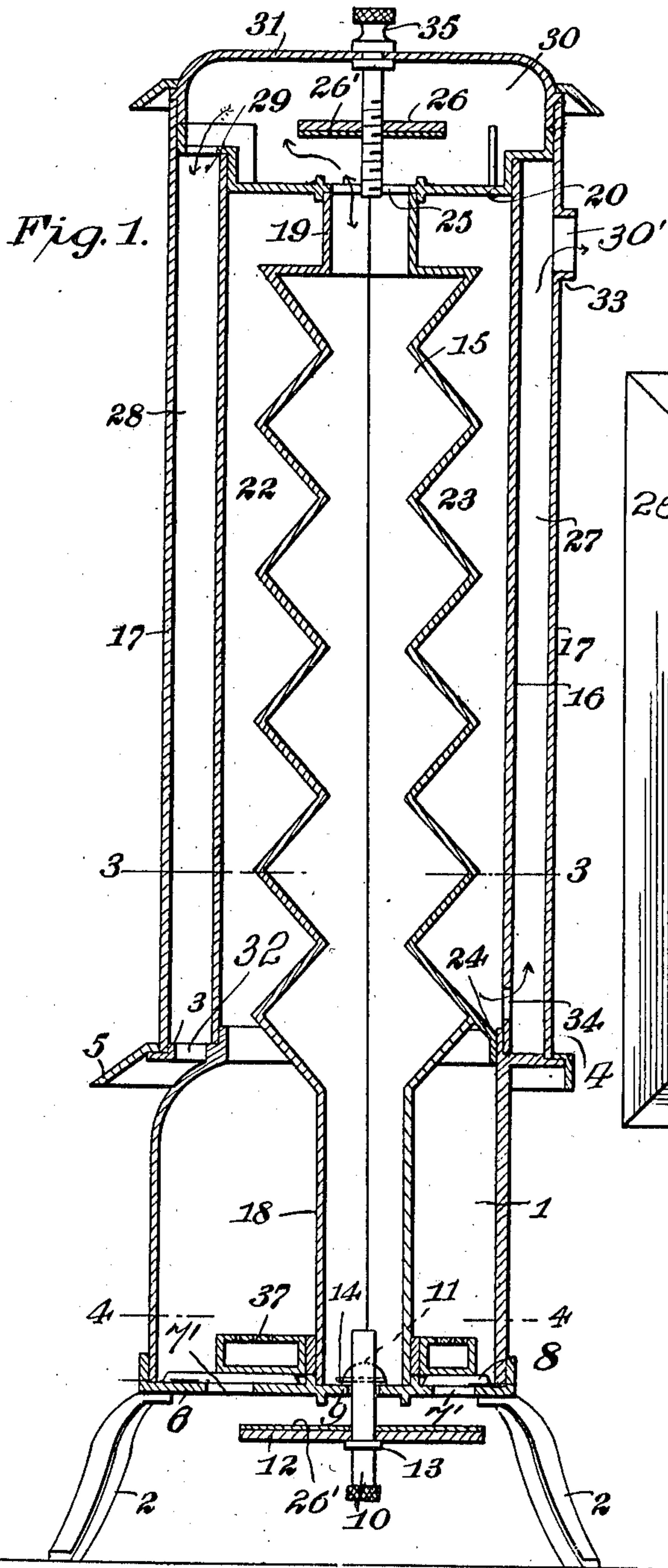
C. E. DE FORREST.  
HEATER.

APPLICATION FILED JAN. 19, 1909.

969,749.

Patented Sept. 6, 1910.

3 SHEETS—SHEET 1.



Witnesses

Inventor  
C. E. De Forrest,

J. M. Fallin  
W. H. Anderson

364

A. H. Macy, Attorneys.

C. E. DE FORREST.  
HEATER.

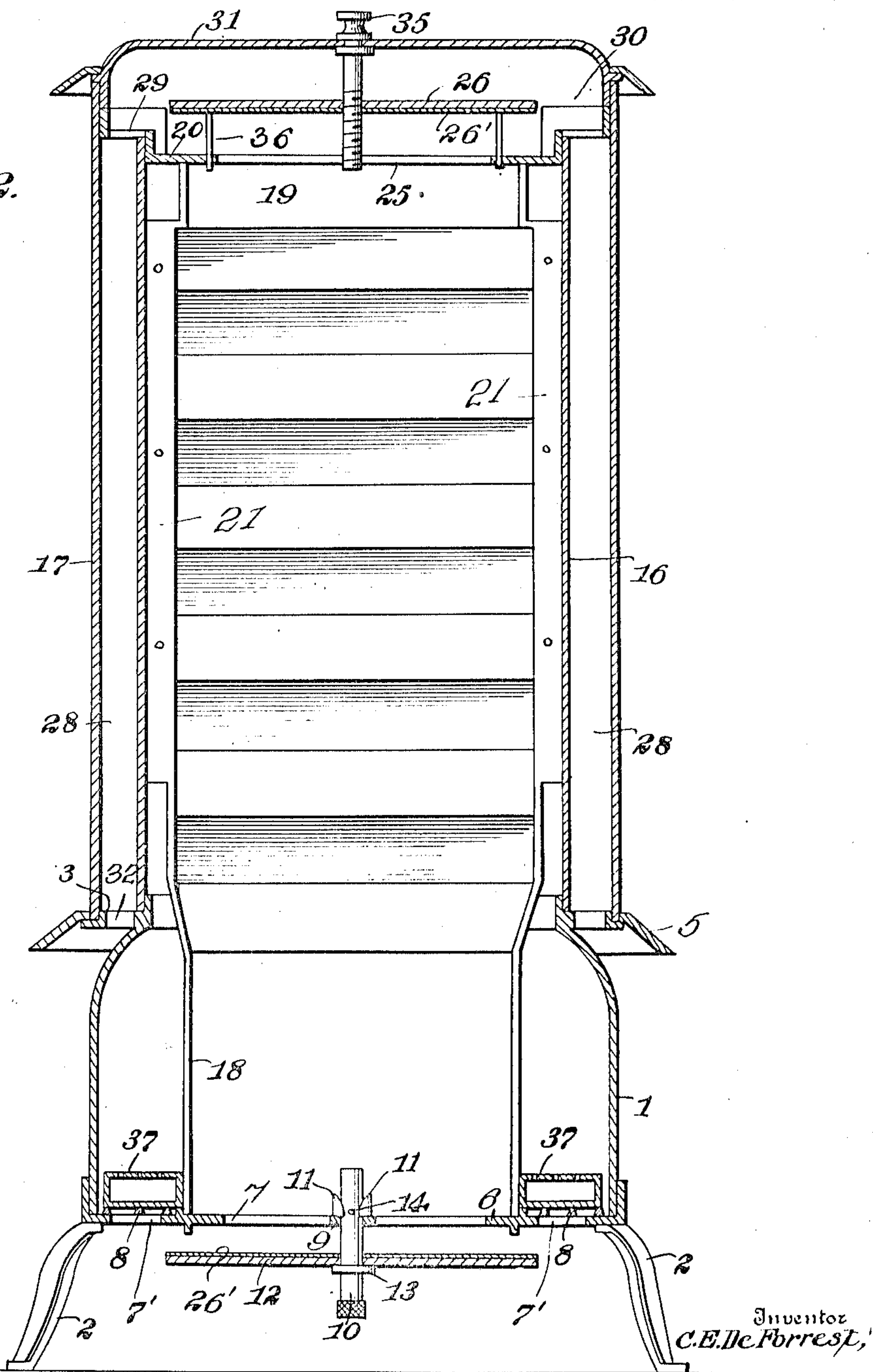
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3 SHEETS—SHEET 2.

Fig 2.



Inventor  
C. E. De Forrest,

Witnesses

J. Mable Tallin.  
W. T. W. W. W.

By

H. A. M. M. M., Attorneys.

C. E. DE FORREST.  
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3 SHEETS—SHEET 3.

Fig. 4.

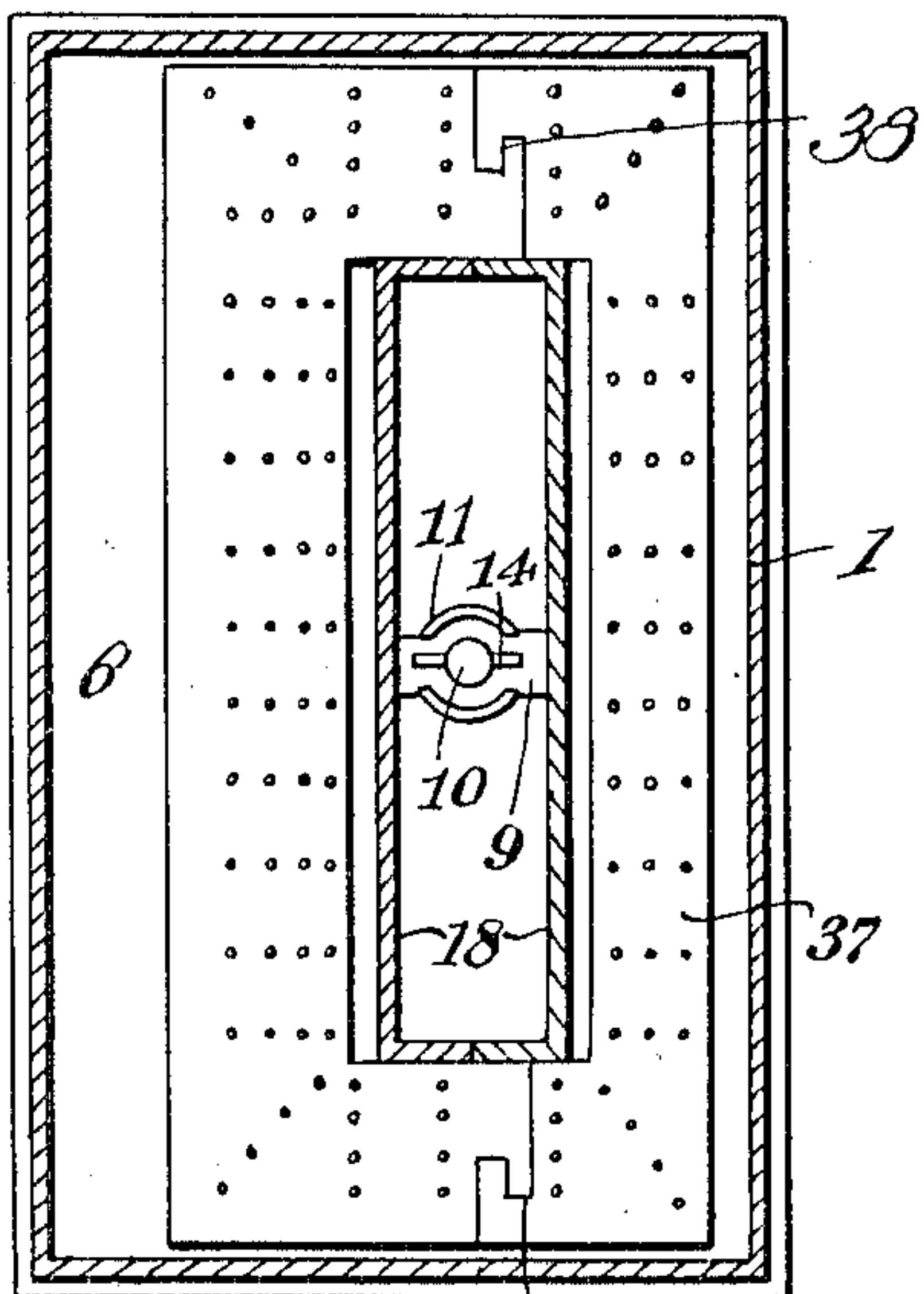


Fig. 5.

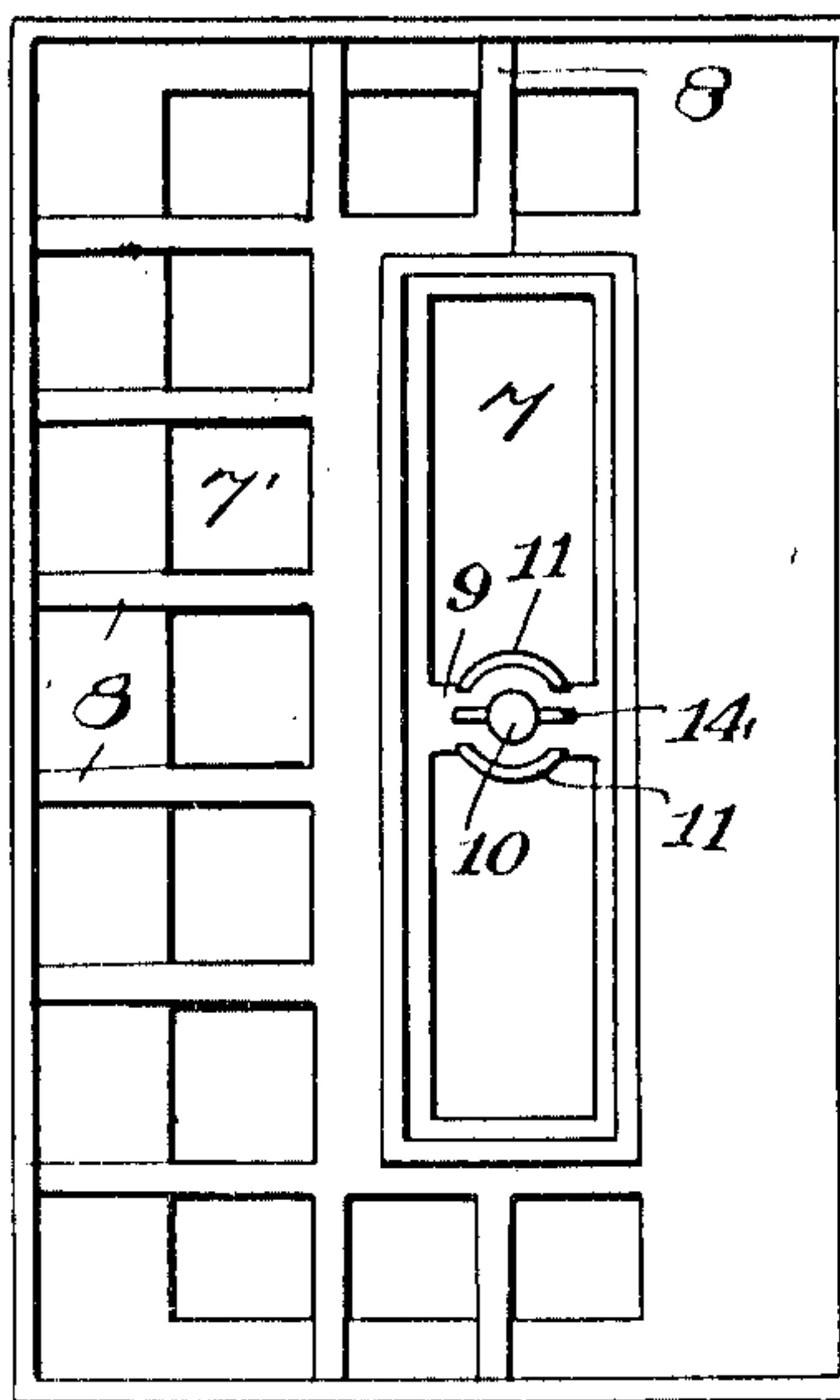


Fig. 6.

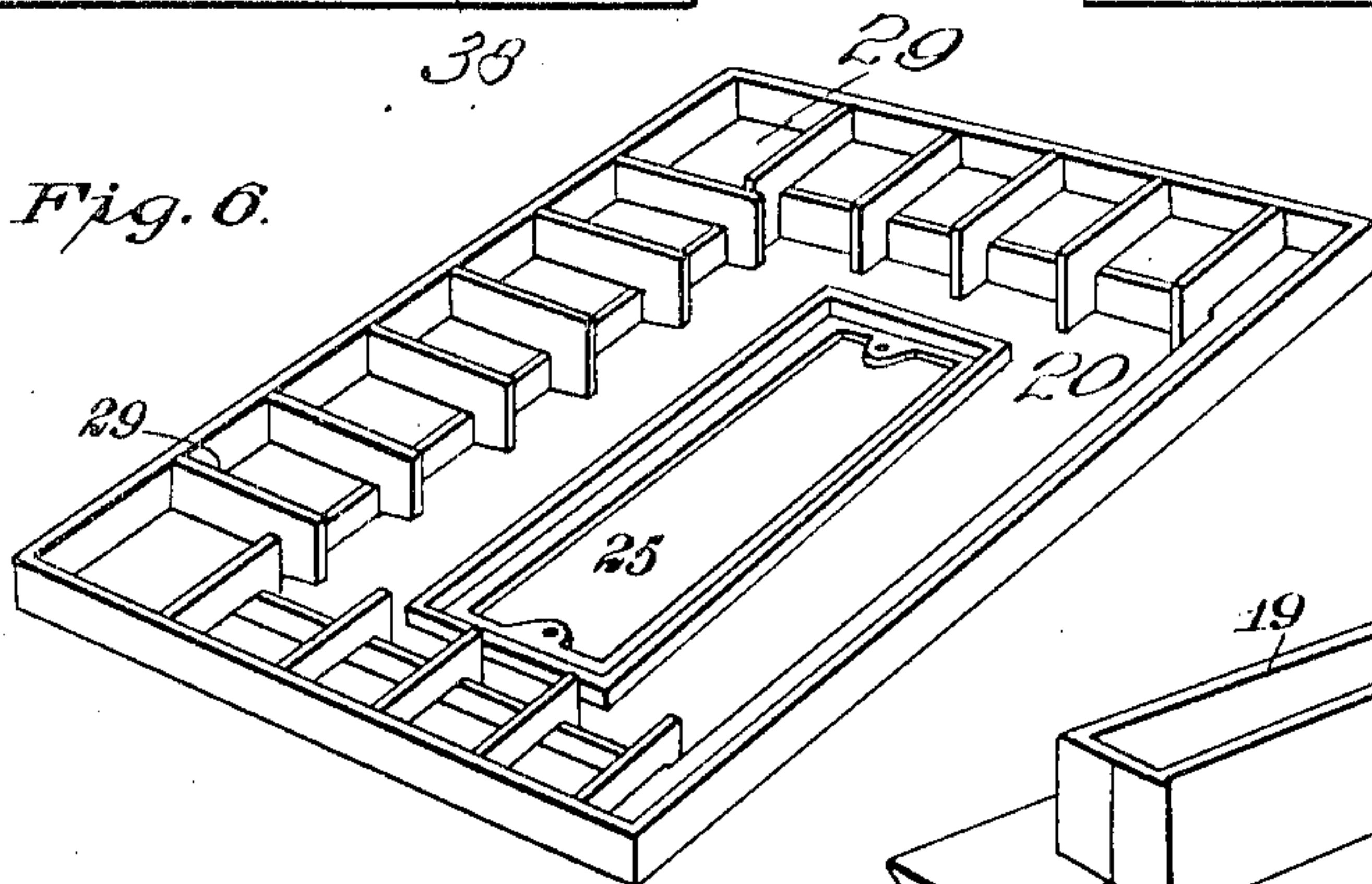
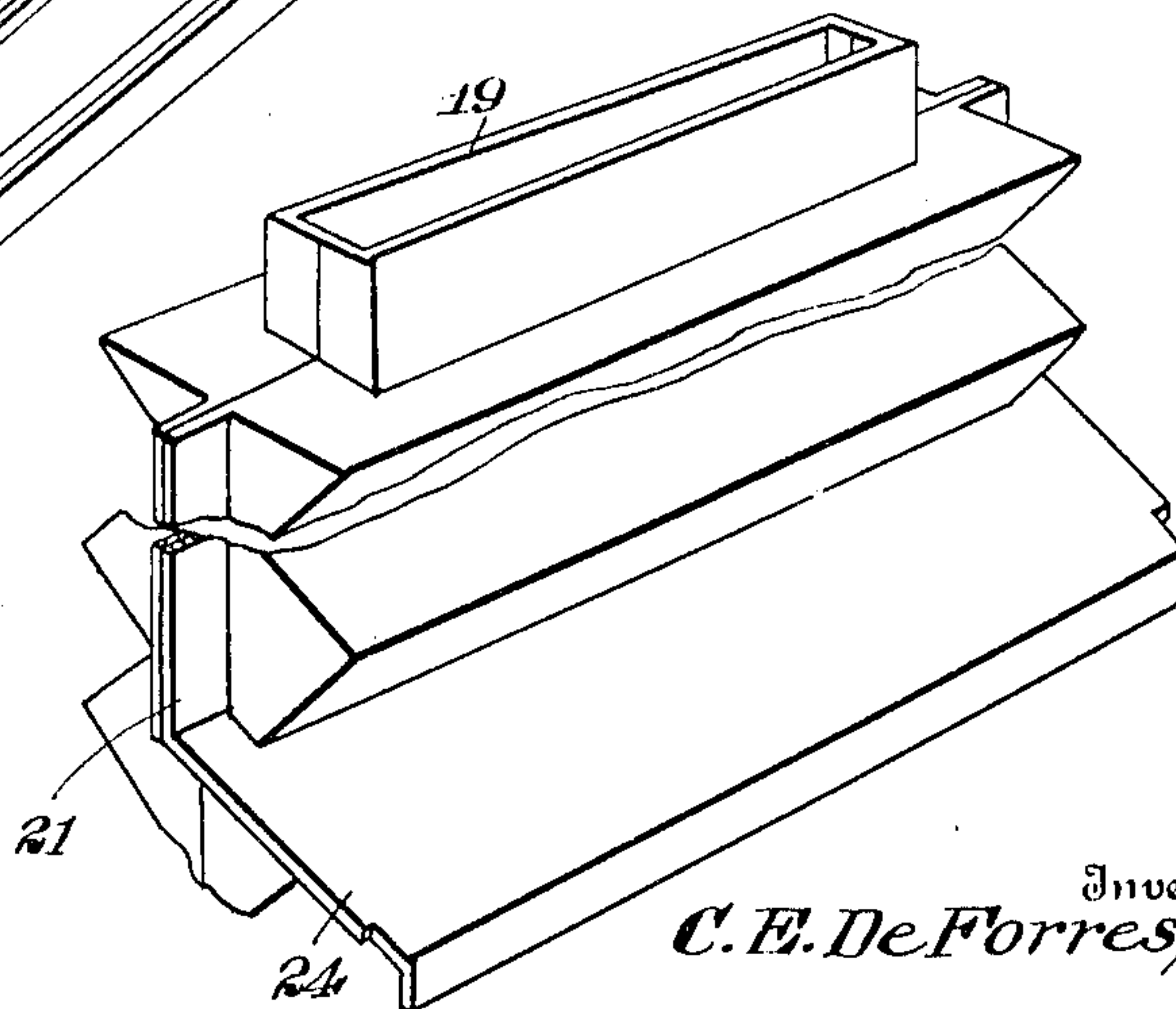


Fig. 7.



Witnesses

J. Mabelle Tallin  
W. R. Woodson

334

C. E. De Forrest, Inventor  
H. A. Macy, Attorneys.



# UNITED STATES PATENT OFFICE.

CHARLES E. DE FORREST, OF LIMA, OHIO, ASSIGNOR OF ONE-THIRD TO ELLIS E. JONES  
AND ONE-THIRD TO RUSSELL L. ARMSTRONG, OF LIMA, OHIO.

## HEATER.

969,749.

Specification of Letters Patent.

Patented Sept. 6, 1910.

Application filed January 19, 1909. Serial No. 473,203.

### *To all whom it may concern:*

Be it known that I, CHARLES E. DE FORREST, citizen of the United States, residing at Lima, in the county of Allen and State of Ohio, have invented certain new and useful Improvements in Heaters, of which the following is a specification.

The purpose of this invention is to supply a device for heating rooms, apartments and other quarters, designed either for abode or assemblage, which will utilize the fuel to the best possible advantage and insure a circulation and distribution of the heat.

A further purpose of the invention is to provide a heater of the type using fluid, as fuel either in the liquid or gaseous state, according to the type of burner employed.

The invention also has for its object to devise a heater of the variety aforesaid admitting of the burner being easily and quickly removed and again placed in position to meet existing conditions without necessitating separation or dismemberment of the body portion of the heater.

The invention also aims to supply a heater which is portable and capable of generating a maximum amount of caloric to be effectively used for raising the temperature of a room or other place desired to be heated.

For a full understanding of the invention and the merits thereof and also to acquire a knowledge of the details of construction and the means for effecting the result, reference is to be had to the following description and accompanying drawings, in which:

Figure 1 is a vertical transverse section of a heater constructed in accordance with and embodying the essential features of this invention; Fig. 2 is a central vertical sectional view looking toward the front of the stove; Fig. 3 is a horizontal section on the line 3—3 of Fig. 1; Fig. 4 is a horizontal section on the line 4—4 of Fig. 1; Fig. 5 is a top plan view of the base, the burner and super-structure being omitted; Fig. 6 is a detail perspective view of the upper plate retaining the several shafts or casings in place; Fig. 7 is a perspective view of the air-shaft, parts being broken away.

Corresponding and like parts are referred to in the following description and indicated

in all the views of the drawings by the same reference characters.

The heater comprises a fire box or combustion chamber 1 which may be of any size of construction and preferably mounted upon legs 2 of any design or pattern. The fire box is contracted at its upper end and provided with outer flanges 3 and a vertical flange 4, the flange 3 being rabbeted at its outer edge and supporting an apron 5, which acts both as a fender or guard and adds to the finish of the heater, since it may be ornamented in any way, either by relief work or by being plated, or by a combination of both. The bottom 6 of the fire box has a central opening 7 and both vertical and pendent flanges, as clearly indicated in the several views. A series of ribs 8 are formed upon the upper side of the bottom 6 and serve to strengthen the same and to hold the burner elevated, so that air may circulate beneath the burner to properly support combustion and equalize distribution of the heat. A cross piece 9 extends across the opening 7 and is provided at a central point with an opening to receive a pin 10. A cam 11 surrounds the opening of the cross piece and is placed upon the top side thereof and serves as a means to effect vertical movement of the pin 10. A plate 12 is located beneath the bottom 6 and adapted to close the opening 7 thereof, or to regulate the amount of air entering the heater. The pin 10 is mounted in the opening of the cross piece 9 and passes through an opening of the plate 12 and is formed with a shoulder 13 upon which the plate 12 rests. The lower end of the pin 10 is provided with a suitable finger piece to admit of turning the pin when required to effect vertical adjustment of the plate 12. A stop 14 near the upper end of the pin 10 rests upon the cam 11 and coöperates therewith to effect vertical movement of the pin 10 and plate 12 when said pin 10 is rotated. The bottom 6 is provided exterior to the large opening 7 with a series of smaller openings 7' for the ingress of air into the fire box or combustion chamber to insure proper working of the heater.

The body of the heater comprises an air-shaft 15 and inner and outer casings 16 and



17, the several parts being spaced. The lower portion of the air-shaft 15 passes through the fire box, as indicated most clearly in Figs. 1 and 2. The casings 16 and 17 terminate at their lower ends in the plane of the top of the fire box and are supported upon the outer flange 3. The lower end portion of the air-shaft 15 is contracted, as indicated at 18, and is of a length approximating the height of the fire box, the lower end of the contracted portion 18 surrounding the opening 7 of the bottom 6 fitting within the vertical flange surrounding the opening 7. The upper end portion of the air-shaft is similarly contracted, as indicated at 19, and makes close connection with the upper plate 20 which joins and properly spaces the parts 15, 16 and 17. Opposite walls of the air-shaft, as the front and back, are reversely bent to provide an extended heat radiating surface. The side walls of the air-shaft are preferably straight, since they are comparatively narrow. The air-shaft may be constructed in any manner and by preference is formed of similar sections which are jointed at their sides, the meeting edges being provided with outer flanges 21 which are fitted together and receive the securing means, such as rivets or bolts. The flanges 21 do not extend the entire length of the air-shaft, but terminate a distance from the upper and lower ends thereof and form in effect ribs which touch the side walls of the casing 16 and subdivide the space into two vertical passages, as indicated at 22 and 23 for a purpose presently to be explained. A flange 24 extends laterally and rearwardly from the lower rear portion of the air-shaft and is inclined from front to rear and closes the lower end of the rear passage 23. The flange 24 acts as a deflector and is preferably formed with the rear portion of the air-shaft as a part thereof.

The central portion of the upper plate 20 is formed with an opening 25 and upper and lower flanges surround said opening, the lower flange making connection with the upper contracted end 19 of the air-shaft and retaining the same in place. The upper flange surrounding the opening 25 forms a raised seat upon which a plate 26 is adapted to close. The outer portion of the plate 20 is stepped and receives the upper ends of the casings 16 and 17 which make close connection therewith. The middle portion of the plate 20 between the upper contracted end of the air-shaft and the upper end of the casing 16 is solid, so as to completely close the upper ends of the passages 22 and 23. The rear portion of the plate 20 extending over the space or duct 27 formed between the rear portions of the casings 16 and 17 is solid to close said space at its

upper end. The part of the plate 20 closing the space or duct 28 formed between the front and side walls of the casings 16 and 17 is provided with a series of openings 29 to establish connection between the said duct 28 and the intermediate chamber 30 inclosed by the top 31 fitted to the upper end of the heater. The space or duct 28 is closed at its lower end by the outer flange 3 in which a series of openings 32 are formed for the outflow of the heated air. An opening 30' is provided in the upper rear portion of the casing 17 and is surrounded by means of a collar 33 to which a stove-pipe may be fitted for carrying off the products of combustion resulting from the burner when the heater is in operation. An opening 34 is provided in the lower rear portion of the casing 16 and establishes connection between the lower ends of the passages 23 and 27. The lower end of the space or duct 27 is closed by the rear portion of the outer flange 3.

The top 31 is closed or made solid to completely inclose the intermediate chamber 30 and may be finished or ornamented in any way. A set screw 35 is mounted in the top 31 by means of a swivel joint and makes screw thread connection with the plate 26 to effect vertical adjustment thereof. The upper or projecting end of the set screw 35 may be ornamented in any way. The plate 26 is directed in its vertical movements by means of guide pins 36 which operate in openings 36' in the plate 20, the latter being formed with openings to receive said guide pins which project from the plate 26.

The burner 37 may be of any type using fluid as fuel, whether liquid or gaseous. The burner is preferably formed of sections which are connected by interlocking joints 38, thereby admitting of the burner being easily and readily removed from the heater or placed in position without requiring the heater to be taken apart. The burner occupies a position in the lower portion of the fire box and rests upon the ribs 8 provided upon the upper side of the bottom 6.

When the heater is in operation the hot air and products of combustion resulting from the burner 37 when lighted, pass upward into the fire box, thence through the space or passage 22 surrounding the front portion of the air-shaft, thence around the upper contracted end 19 of the air-shaft down through passage 23, through opening 34 into the space or duct 27, thence upward therethrough and out through the outlet 30' to be carried off by means of a smoke pipe, not shown, to a convenient point of discharge. By adjusting the plate 12 the amount of cold air entering the lower end of the air-shaft 15 may be regulated and



said air passing upward through the air-shaft is heated and passes out from the upper end of the air-shaft into the intermediate chamber 30 thence downward through the opening 29 into the duct 28 surrounding the front portion of the casing 16 and out through the opening 32 into the lower portion of the room, apartment or other place to be heated. It will be observed that by setting the plates 12 and 26, which are in effect dampers, a comparatively small amount of air may be admitted into the lower end of the air-shaft, which becoming heated is expanded before reaching the outlet at the upper end of the air-shaft and is further expanded by its passage through the duct 28. By closing the opening 7 air may be prevented from entering the air-shaft, thereby maintaining the heater in a warm condition for a comparatively great length of time after the burner has been closed. It will be observed that the burner is readily accessible by lifting the upper portion of the heater from the base or by removing the same through an opening provided in a side of the fire box, the sectional formation of the burner admitting of the separation of the parts, so as to clear the lower end portion of the air-shaft.

The seating faces of the plates 12 and 26 are provided with asbestos or like material 26' to insure a close fit when said plates are closed upon their respective seats. This obviates the necessity of grinding or filing.

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

1. A heater comprising a fire box, an air-shaft having its lower portion extended through the fire box, inner and outer casings surrounding the upper portion of the air-shaft and spaced therefrom and from each other, the space between the air-shaft and the inner casing being subdivided into vertical passages which are in communication at their upper ends, one of said passages having direct communication at its lower end with the fire box and the other being closed at its lower end and having direct communication with a portion of the space formed between the inner and outer casings.

2. A heater comprising a fire box, an air-shaft having its lower portion extended through the fire box, inner and outer casings surrounding the upper portion of the air-shaft and spaced therefrom and from each other, the space between the air-shaft and the inner casing being subdivided into vertical passages which are in communication at their upper ends, one of said passages having direct communication at its lower end with the fire box and the other being closed at its lower end and having direct

communication with a portion of the space formed between the inner and outer casings, 65 and the space between the inner and outer casings being subdivided, the portion having direct communication with the lower end of the space surrounding the air-shaft being provided at its upper end with an outlet and 70 the remaining portion having its upper end in communication with the upper portion of the air-shaft and having its lower portion in communication with the room or place in which the heater is situated to discharge the 75 heated air into the said room.

3. A heater comprising a fire box, an air-shaft having its lower portion extended through the fire box, inner and outer casings surrounding the upper portion of the 80 air-shaft and spaced therefrom and from each other, the space between the air-shaft and the inner casing being subdivided into vertical passages which are in communication at their upper ends, one of said pas- 85 sages having direct communication at its lower end with the fire box and the other being closed at its lower end and having direct communication with a portion of the space formed between the inner and outer 90 casings, and the space between the inner and outer casings being subdivided, the portion having direct communication with the lower end of the space surrounding the air-shaft being provided at its upper end with an out- 95 let and the remaining portion having its upper end in communication with the upper portion of the air-shaft and having its lower portion in communication with the room or place in which the heater is situated to dis- 100 charge the heated air into the said room, and a damper for regulating the communication between the upper portion of the air-shaft and the portion of the space between the inner and the outer casings having com- 105 munication therewith.

4. A heater comprising a firebox having a damper controlled opening in its bottom, an air shaft extending through said firebox and in communication at its lower end with the 110 damper controlled opening, casings spaced from each other and the air shaft, a transverse plate connecting the upper ends of the air shaft and casings and provided with a damper controlled opening in communica- 115 tion with the upper end of said air-shaft, a top plate fitted to said transverse plate and spaced from the latter to form an intermediate chamber, the space between the casings being divided vertically to form front and 120 rear ducts, one of which is closed at its opposite ends and provided with an intermediate outlet, the other duct being in communication with said intermediate chamber and with the interior of the room, said 125 transverse plate being provided with open-



ings leading into the duct having communication with the interior of the room, and means sub-dividing the space between the air-shaft and the inner casing into vertical  
5 passages which are in communication at their upper ends about the upper portion of the air-shaft, one of said passages having direct communication at its lower end with the firebox and the other passage having

direct communication at its lower end with the duct provided with said intermediate outlet.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES E. DE FORREST. [L. s.]

Witnesses:

R. L. ARMSTRONG,  
MELVIN C. LIGHT.