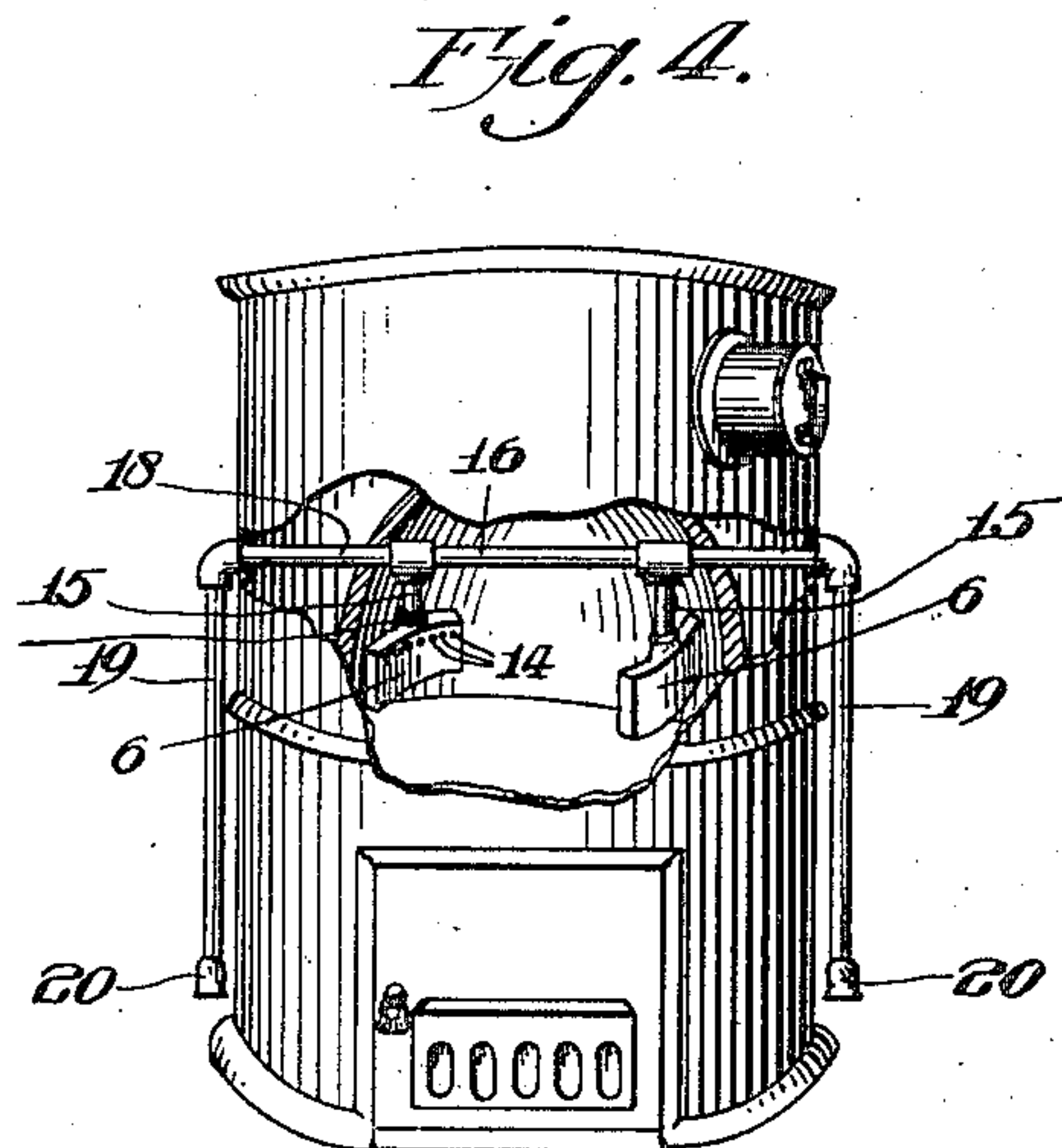
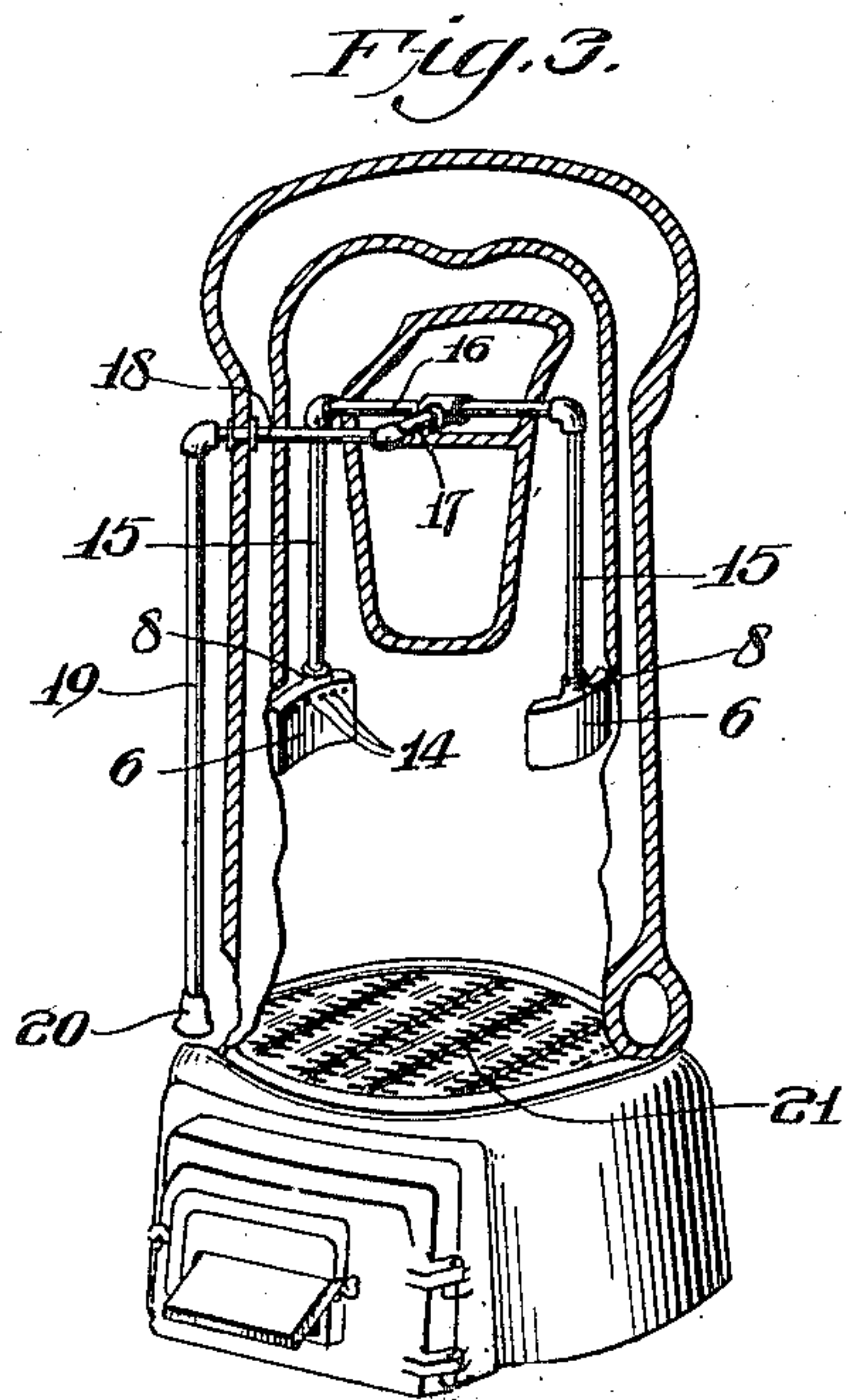
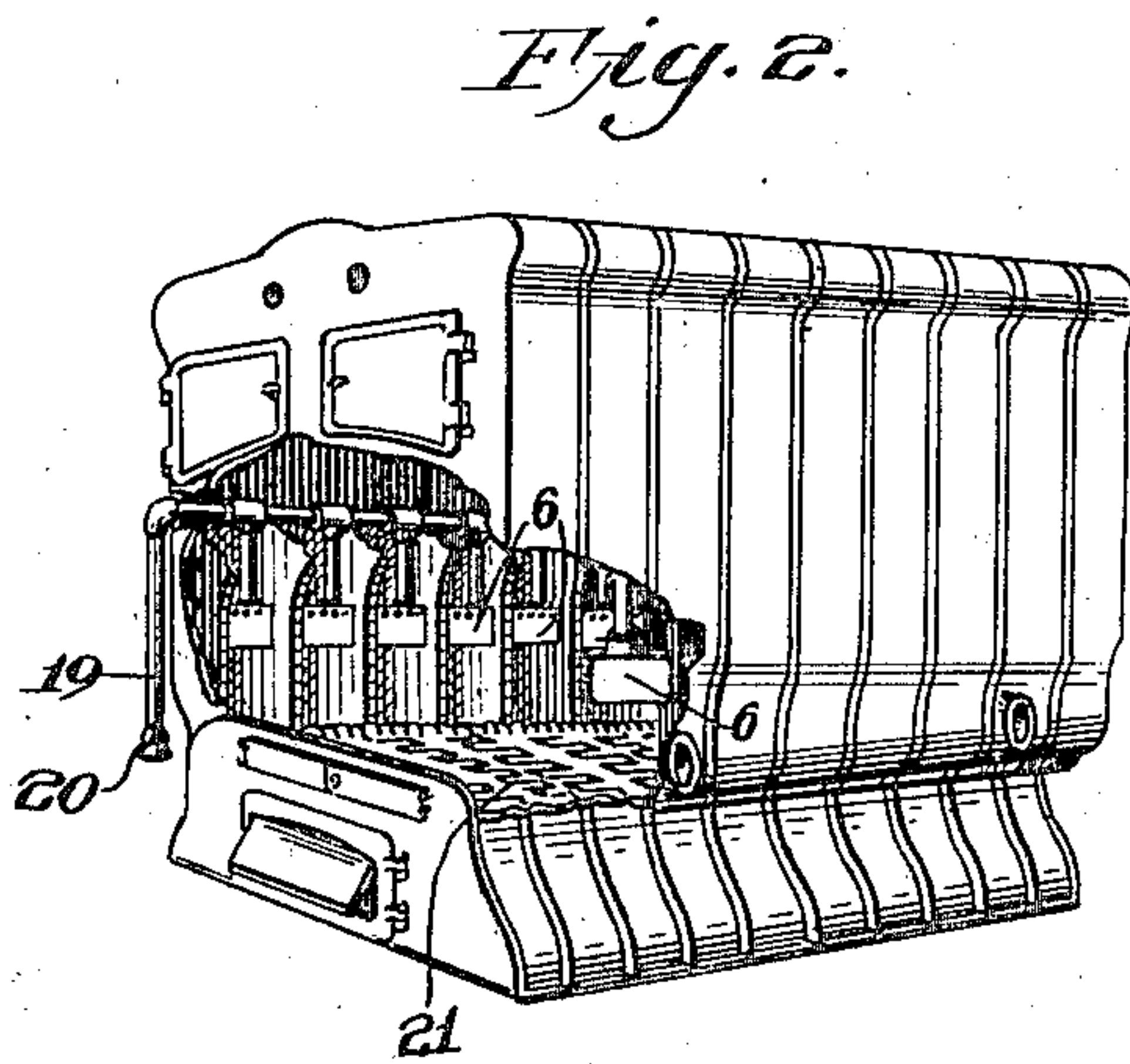
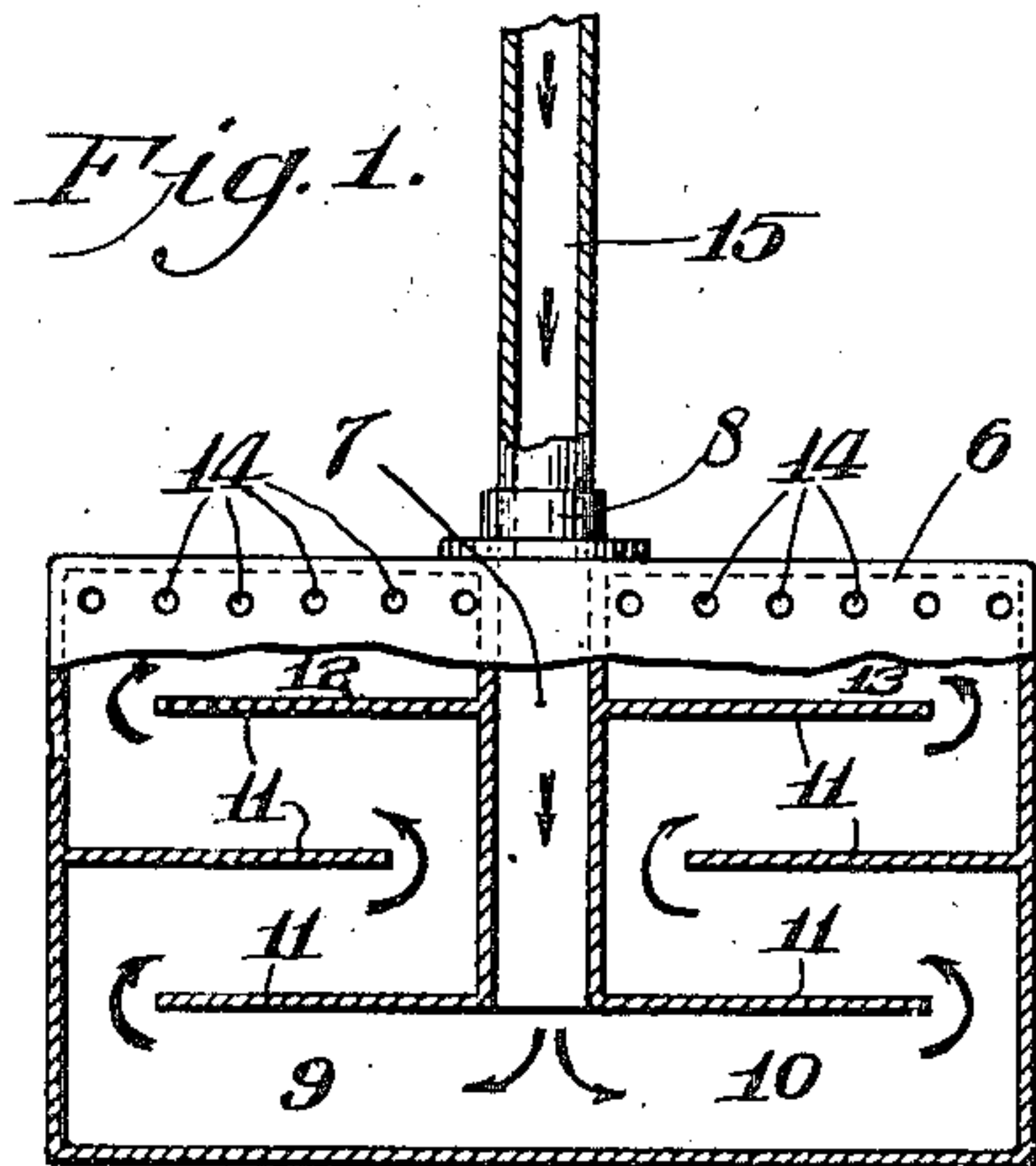


G. VAN DAAM.
PREHEATING DEVICE.
APPLICATION FILED MAR. 27, 1914.

1,155,113.

Patented Sept. 28, 1915.



WITNESSES:
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UNITED STATES PATENT OFFICE.

GERRIT VAN DAAM, OF BUFFALO, NEW YORK.

PREHEATING DEVICE.

1,155,113.

Specification of Letters Patent.

Patented Sept. 28, 1915.

Application filed March 27, 1914. Serial No. 827,659.

To all whom it may concern:

Be it known that I, GERRIT VAN DAAM, a citizen of the United States, residing at Buffalo, in the county of Erie, State of New York, have invented a new and useful Preheating Device, of which the following is a specification.

My invention relates to improvements in delivering pre-heated air to the combustion chambers of hot air heaters and hot water heaters and the like.

The object is to provide extremely simple and durable means for insuring a constant supply of highly heated fresh air to the combustion chamber at a point above the fuel bed where the gases arising therefrom and which have a tendency to escape may be commingled therewith and their complete combustion insured.

Referring to the drawings, which illustrate merely by way of example, a suitable embodiment of my invention—Figure 1 is a view in part section and part elevation of the pre-heating element. Fig. 2 is a perspective view, parts broken away, of a sectional boiler showing the application of a plurality of such pre-heating elements thereto. Fig. 3 is a part elevation and part sectional view of a small water heater showing a pair of said pre-heating elements applied thereto. Fig. 4 is an elevation, part broken away, of a usual domestic hot air furnace with a pair of said pre-heating elements applied thereto.

Similar numerals refer to similar parts throughout the several views.

The heating element 6 is an integral structure made by the process known as cored casting, that is, it is made in a single piece without plates or bolts, which tend to become distorted when subjected to hot temperatures. This structure 6 is so cast as to be provided with a vertically extending channel 7 delivering from the nozzle 8 and 10 at the bottom of said element 6. These channels 9 and 10 deliver through zig-zag passages formed by the staggered partitions 11 to the horizontal channels or chambers 12 and 13 at the top of the heating element 6. These chambers 12 and 13 are provided with the discharge air vents 14 which are horizontally arranged close to the upper margin of said element 6.

A conductor pipe 15 is connected with the nozzle 8 and leads, by any suitable exten-

sions such as 16, 17, 18 and 19, to an air intake nozzle 20 located outside the furnace and below the level of the fuel bed, or preferably approximate the level of the grate 21. The elements 6 are supported by the conductor pipes 15 which in turn are supported by the branches connected therewith which rest upon the interior walls forming partitions between flues and water compartments of the hot water furnaces as in Figs. 2 and 3, or these elements may hang and be supported by the single cross pipe 18 passing entirely through the hot air furnace as in Fig. 4, connected with the two downwardly extending intake pipes 19. The advantage of such an arrangement is that the heating element 6 may be placed at any required distance above the fuel bed depending upon the nature of the furnace and of the results desired to be gained. For example in the hot water furnace where the water is a decided cooling factor, the heating elements may be placed close to the fuel bed, whereas in a hot air furnace it may be desirable to have the heating elements elevated somewhat from the fuel bed.

The advantage of having the fresh air from the outside of the furnace delivered directly to the bottom of the heating elements, is a distinct one, in that this cool incoming air serves to counteract in a measure or carry off the intense heat communicated to the bottom of the element 6 which is nearest the fire. It consequently follows that the maximum heat is delivered to said air as it passes up the tortuous channels about the staggered partitions 11 to the distributing chambers 12 and 13. Hence it follows that the greatest efficiency of air heating is secured by this arrangement with a minimum danger of injury to the element itself.

Reference is made to copending application Serial No. 827,658, filed March 27, 1914, which shows a pre-heating element having an interior arrangement similar to that shown and described herein.

What I claim is:—

1. In combination with a combustion chamber of a furnace, an air heating element, an air conductor projecting into the combustion chamber and having a depending extension delivering to and suspending the air heating element above the level of the fuel bed, said air heating element comprising a chambered body having at its top, air discharging means to the combus-

tion chamber and connection with the air conductor, said element provided with a channel in line with said depending conductor extension and leading directly there-
5 from to the bottom of the element, and tortuous channels communicating with said first mentioned channel and leading there-
from to the air discharge.

2. In combination with a combustion
10 chamber of a furnace, an air heating element, an air conductor leading from a point outside the furnace with an intake below the level of the fuel bed, said conductor
leading into the furnace at a point above
15 the fuel bed supported directly at a plurality of points by the walls of the furnace and having a depending extension deliver-

ing to and suspending the air heating element, said air heating element consisting
of an integral cored casting having connec- 20
tion at its top with the air conductor and provided with a channel in line with said depending conductor extension and leading
directly therefrom to the bottom of said
element, and tortuous channels leading from 25
said channel to distributing chambers at the top of said element, said chambers provided with air vents discharging into the combustion chamber of the furnace.

GERRIT VAN DAAM.

Witnesses:

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