

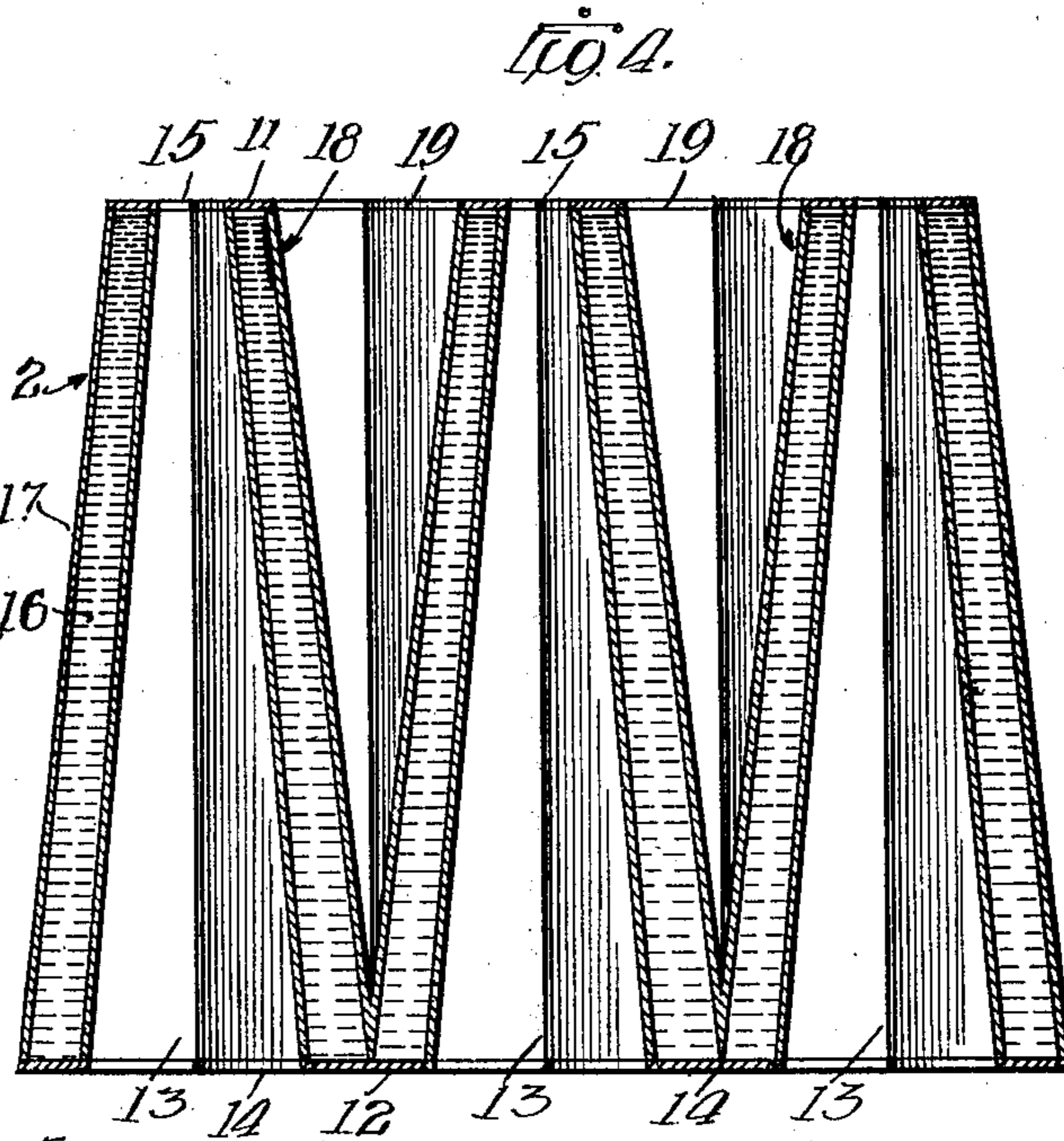
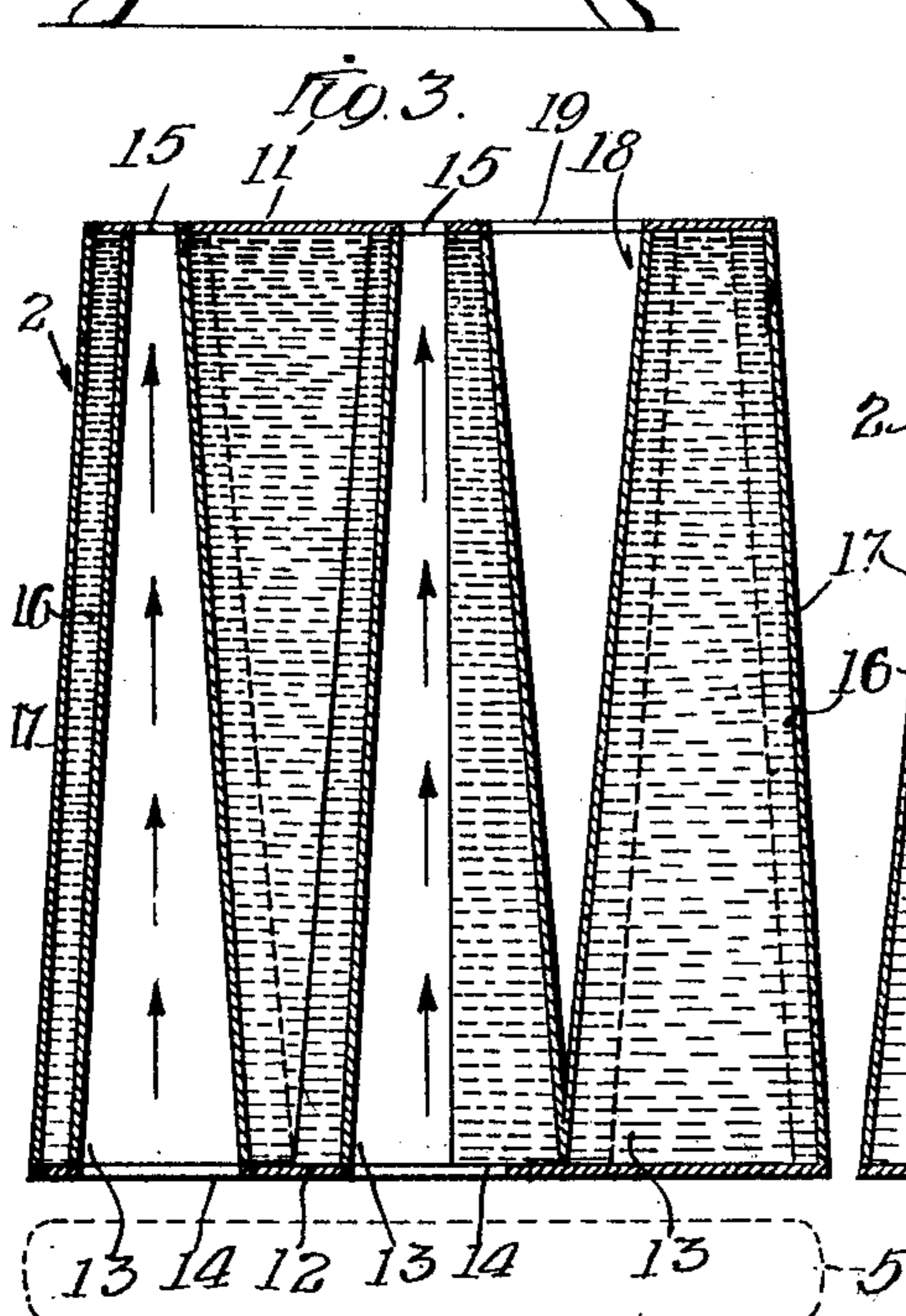
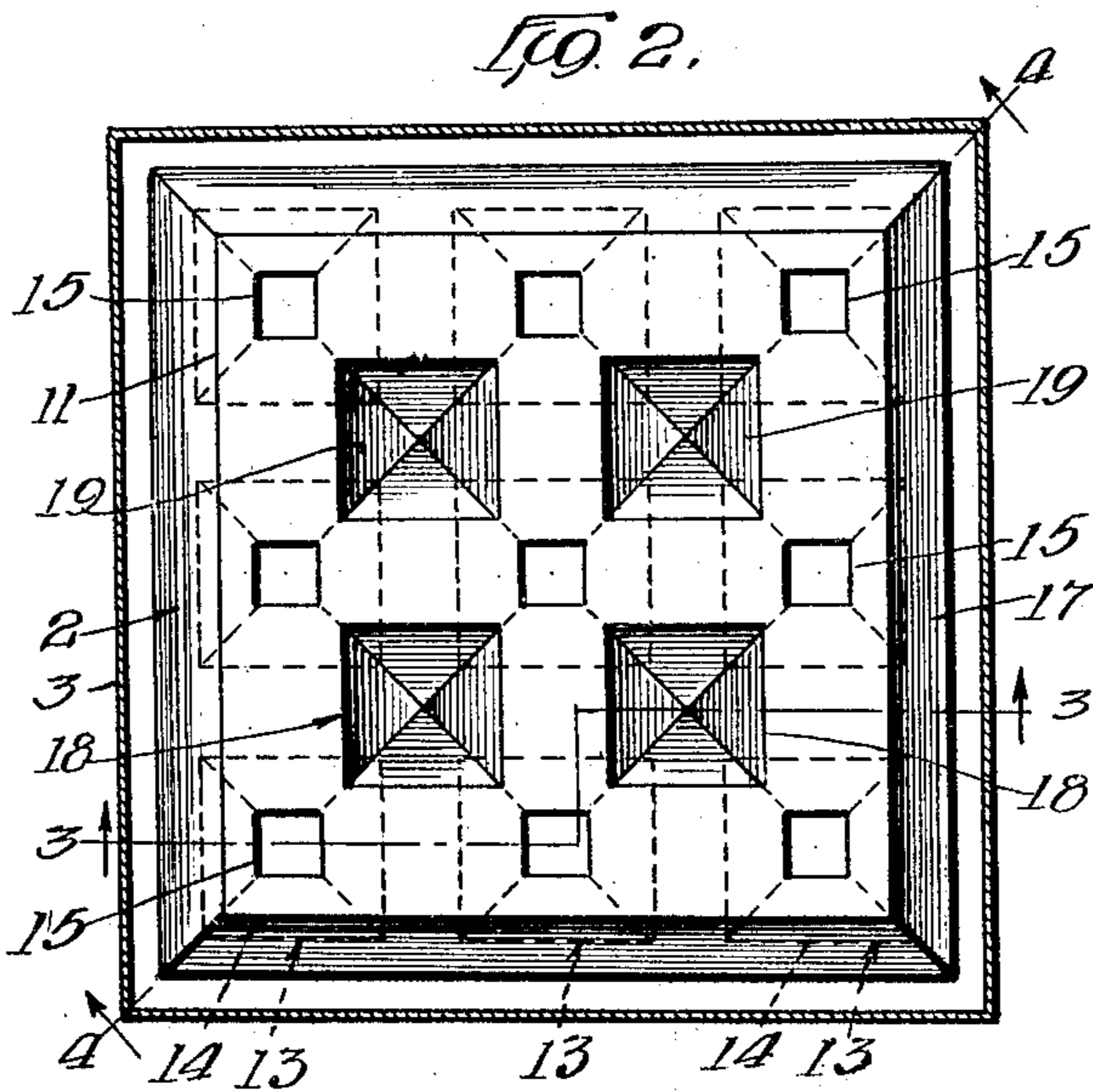
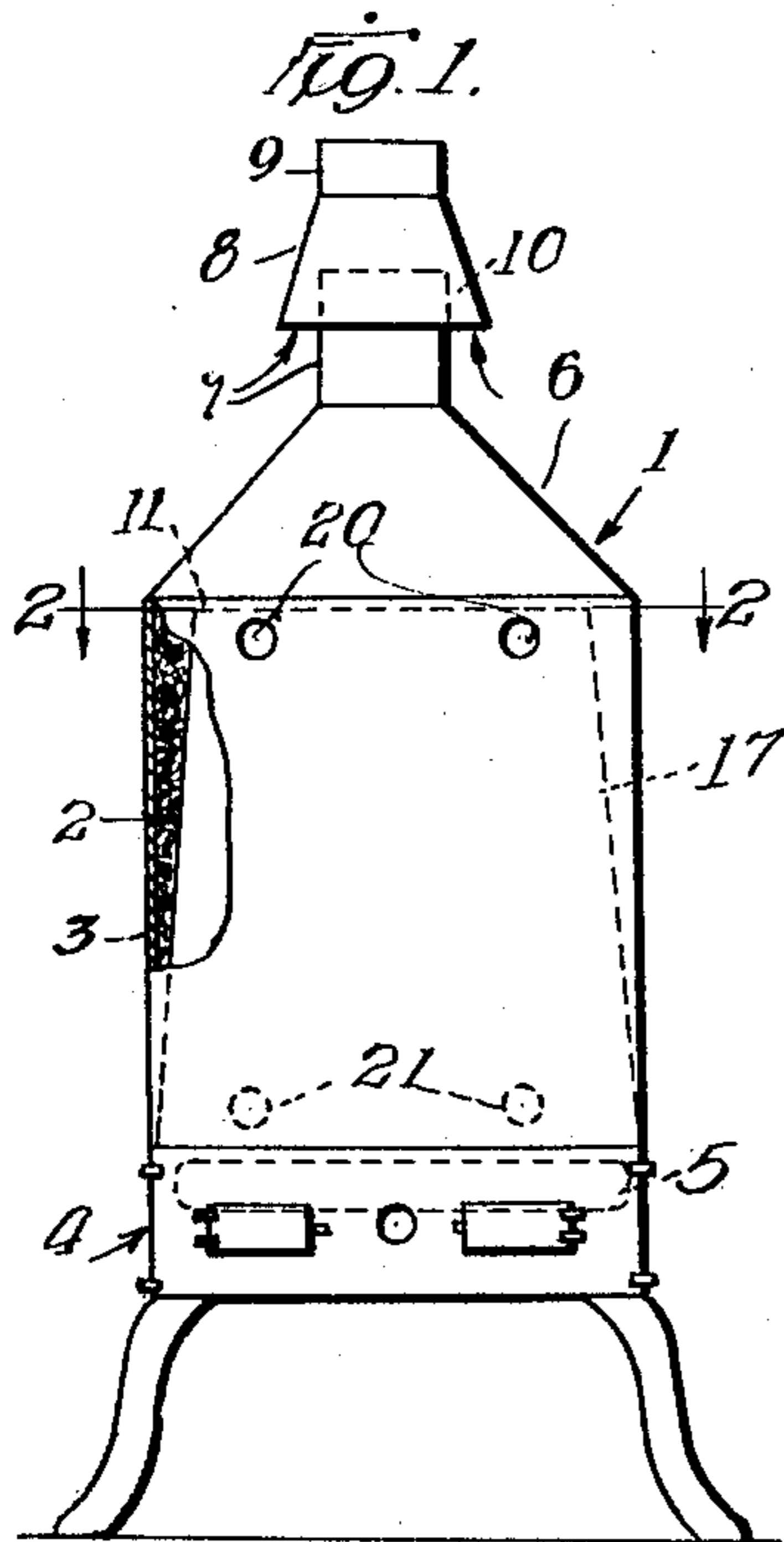
Nov. 3, 1931.

G. F. BIERBOWER

1,830,635

HEATING BOILER

Filed June 5, 1929



Witnesses:
Harry R. L. White.

Inventor:
Gesner F. Bierbower.
By Edward Fay Wilson
Attorney.

UNITED STATES PATENT OFFICE

GESNER F. BIERBOWER, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO LAFE T. BEST, OF CHICAGO, ILLINOIS

HEATING BOILER

Application filed June 5, 1929. Serial No. 368,688.

This invention relates to improvements in heating boilers and has special reference to boilers usually used for heating plants for dwellings which use hot water as the heat transmitting medium.

The object of the invention is to provide a boiler for the purpose, of maximum heat transmission capacity and of minimum size or dimensions and hence of relatively low cost.

A further object is to provide a boiler for the purpose mentioned which shall have a relatively small water capacity and a relatively large area for transmission of heat to the water.

A further object is to provide a boiler of simple construction and especially adapted for being made of plates joined by welding instead of riveting.

My invention resides in a boiler for the purpose mentioned, which is provided with a plurality of gas flues larger at their inlet than at their exit ends and tapered filler tubes spaced between the flues and having their larger ends adjacent to the smaller ends of the flues.

Another feature relates to the outer walls of the boiler, being tapered or inclined similarly to the tapering of the flues, which results in the minimizing of the water space.

Another feature relates to the preferred form of tubes which are square in cross-section, the boiler being also preferably square in cross-section, thus providing a form which is easy of construction.

The invention will be more readily understood by reference to the accompanying drawings forming part of the specification and in which:—

Fig. 1 is a front elevational view, partly broken away, of a boiler made in accordance with the invention;

Fig. 2 is a plan section on the line 2—2 of Fig. 1;

Fig. 3 is a vertical section on the broken line 3—3 of Fig. 2; and

Fig. 4 is a vertical sectional view on the line 4—4 of Fig. 2.

In said drawings, 1 represents a boiler especially adapted for using gas as a fuel.

The boiler consists of the boiler proper 2 enclosed in a casing 3. The boiler 2 is supported on a base 4 which contains suitable burners 5. A hood 6 covers the boiler 2 and is provided with a gas escape nozzle 7 which projects into a coned nozzle 8 attached to a chimney pipe 9. Between the end of the nozzle 7 and the coned nozzle 8 is an air inlet opening 10 for preventing back drafts reaching the gas burner.

The present invention relates particularly to the boiler proper 2. This, as shown, is substantially square in horizontal section and is tapered vertically, being smaller at the top 11 than at its lower end 12. Leading from the bottom 12 of the boiler to the top 11 are tapered gas tubes or flues 13. In the form shown, these flues are square in horizontal section, and their large ends 14 are at the bottom and their small ends 15 are at the top.

The products of combustion rise through these flues, giving off their heat to the water 16 which surrounds the flues. As the gases rise through the flues and give off their heat, they reduce in volume, and the tubes 13 are tapered substantially in proportion to this shrinkage in volume of the gases.

As shown in the drawings, the outside walls 17 of the boiler are inclined substantially parallel with the adjacent sides of the flues. This is for the purpose of reducing the water space in the boiler and assists in the rapid heating of the contained water.

As a further means of reducing the volume of the contained water, hollow filler members 18 are provided which are tapered or coned similarly to the tubes 13 but are open at their large ends 19 only. These fillers are arranged in the spaces between the flues 13 and depend from the top end 11 of the boiler. They are also preferably square in horizontal cross-section and serve to reduce the water space in the boiler to relatively thin spaces of substantially uniform thickness between the tubes and fillers.

In making up the boiler 2, sheets of sheet metal are cut to proper dimensions and shapes to form the sides, top and bottom, and these plates are preferably joined by

welding the joints. The flues and fillers are similarly made up and welded into place so that when the boiler 2 is complete, its walls are of single and uniform thickness throughout.

The boiler 2 is provided near its top with outlet connections or nozzles 20 for the hot water and near the bottom, on the opposite side, with inlets 21 for the cold water.

As many modifications of the invention will readily suggest themselves to one skilled in the art, I do not limit or confine the invention to the specific details of construction and combination of parts herein shown and described.

I claim:

1. A boiler of the kind described, comprising a shell and heads, a plurality of tapered gas tubes connecting the heads and providing tapered gas flues through the boiler, and oppositely tapered hollow filler members arranged between the gas tubes and having their larger ends adjacent to the smaller ends of the gas tubes.

2. A boiler of the kind described, comprising a shell and heads, a plurality of tapered gas tubes connecting the heads and providing tapered gas flues through the boiler, oppositely tapered hollow filler members arranged between the gas tubes and having their larger ends adjacent to the smaller ends of the gas tubes; and the shell of the boiler being tapered similarly to the gas tubes.

3. A boiler of the kind described, comprising a shell and heads, a plurality of tapered gas tubes connecting the heads and providing tapered gas flues through the boiler, oppositely tapered hollow filler members arranged between the gas tubes and having their larger ends adjacent to the smaller ends of the gas tubes, and the shell of the boiler, the gas tubes and the fillers being all tapered on substantially the same angle.

4. A boiler of the kind described, comprising a shell and heads, a plurality of tapered gas tubes connecting the heads and providing tapered gas flues through the boiler, oppositely tapered hollow filler members arranged between the gas tubes and having their larger ends adjacent to the smaller ends of the gas tubes; the shell of the boiler, the gas tubes and the fillers all being polygonal in cross-section.

5. A boiler of the kind described, comprising a shell and heads, a plurality of tapered gas tubes connecting the heads and providing tapered gas flues through the boiler, oppositely tapered hollow filler members arranged between the gas tubes and having their larger ends adjacent to the smaller ends of the gas tubes, the shell of the boiler, the gas tubes and the fillers all being square in cross-section.

6. A boiler of the kind described, comprising a shell and heads, a plurality of tapered

gas tubes connecting the heads and providing tapered gas flues through the boiler, oppositely tapered hollow filler members arranged between the gas tubes and having their larger ends adjacent to the smaller ends of the gas tubes, the shell of the boiler, the tubes and the fillers having flat sides which lie in parallel planes.

In witness that I claim the foregoing as my invention, I affix my signature this 10 day of May, 1929.

GESNER F. BIERBOWER.