

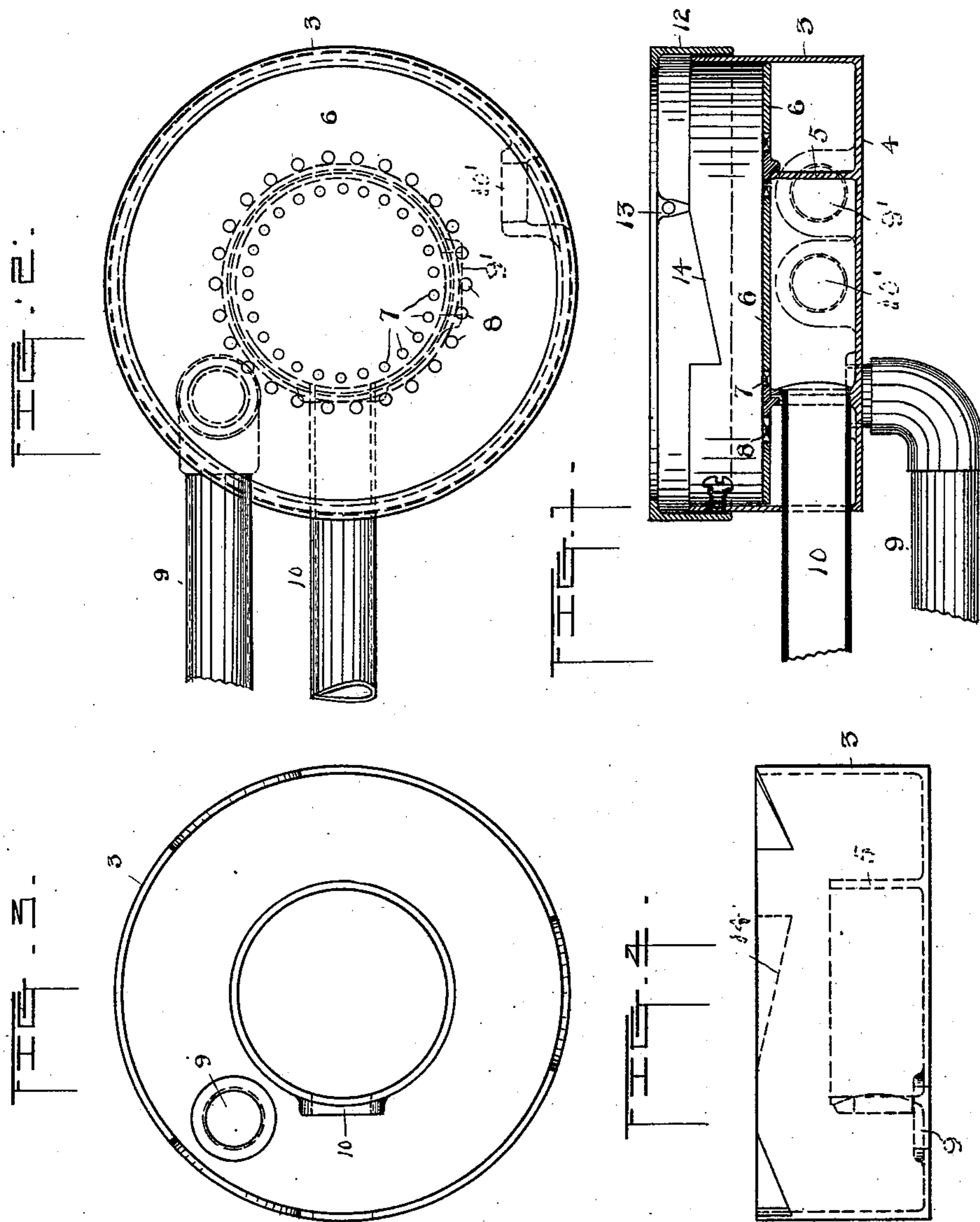
(No Model.)

4 Sheets—Sheet 1.

F. W. ROBERTSHAW & J. M. COOPER.  
GAS STOVE.

No. 539,546.

Patented May 21, 1895.



Witnesses:

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Arch. M. Catlin.

Inventors.

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John M. Cooper  
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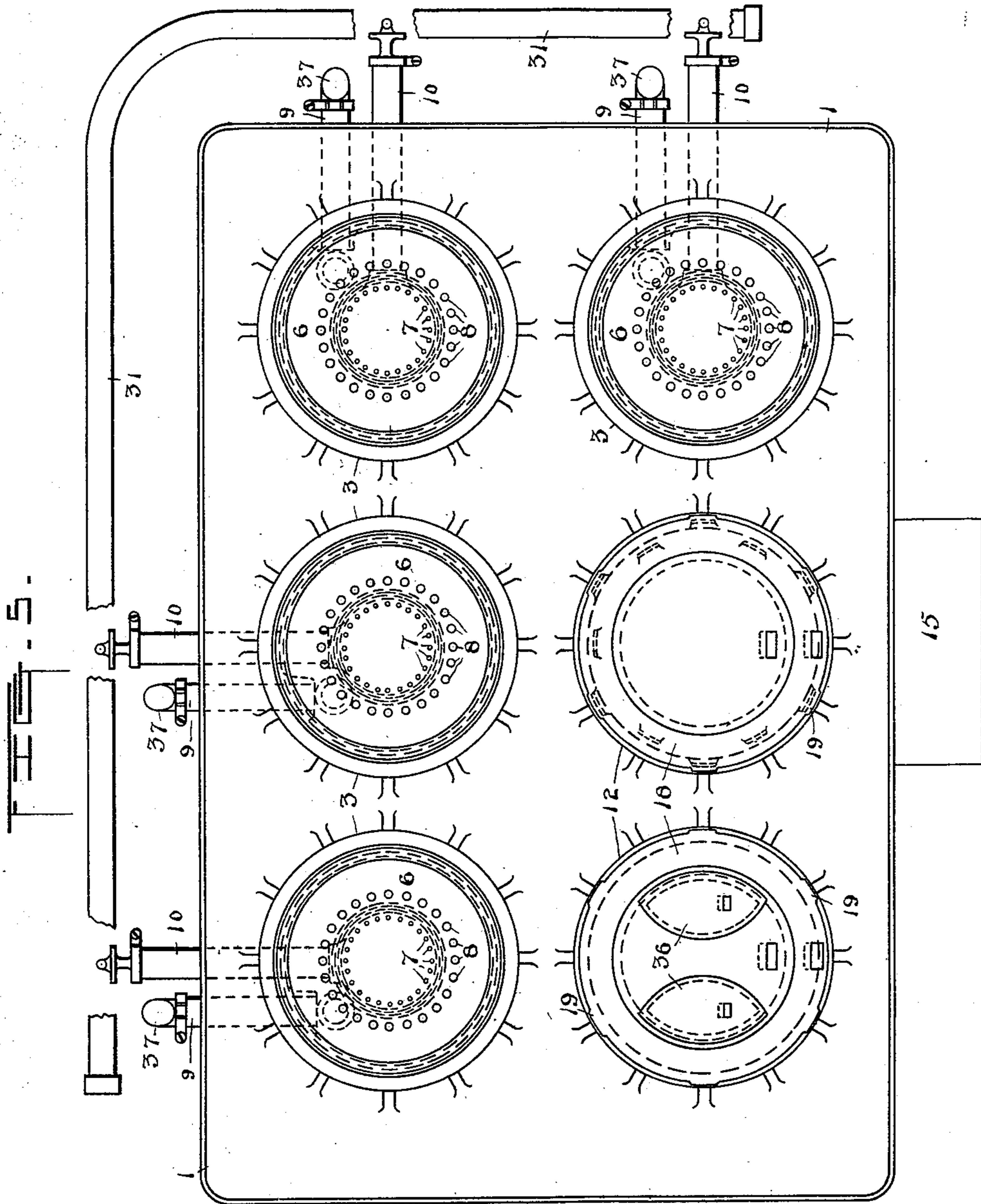
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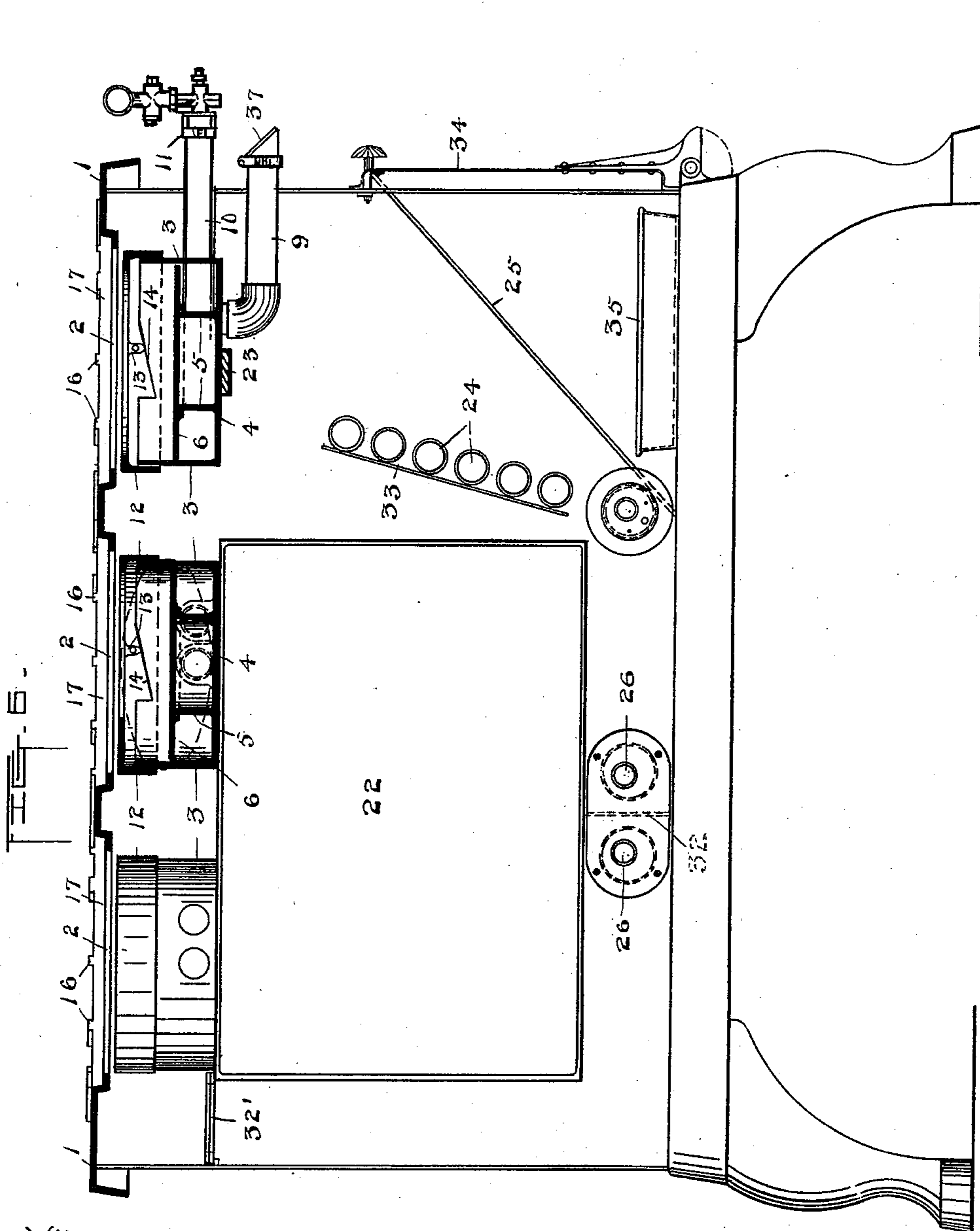
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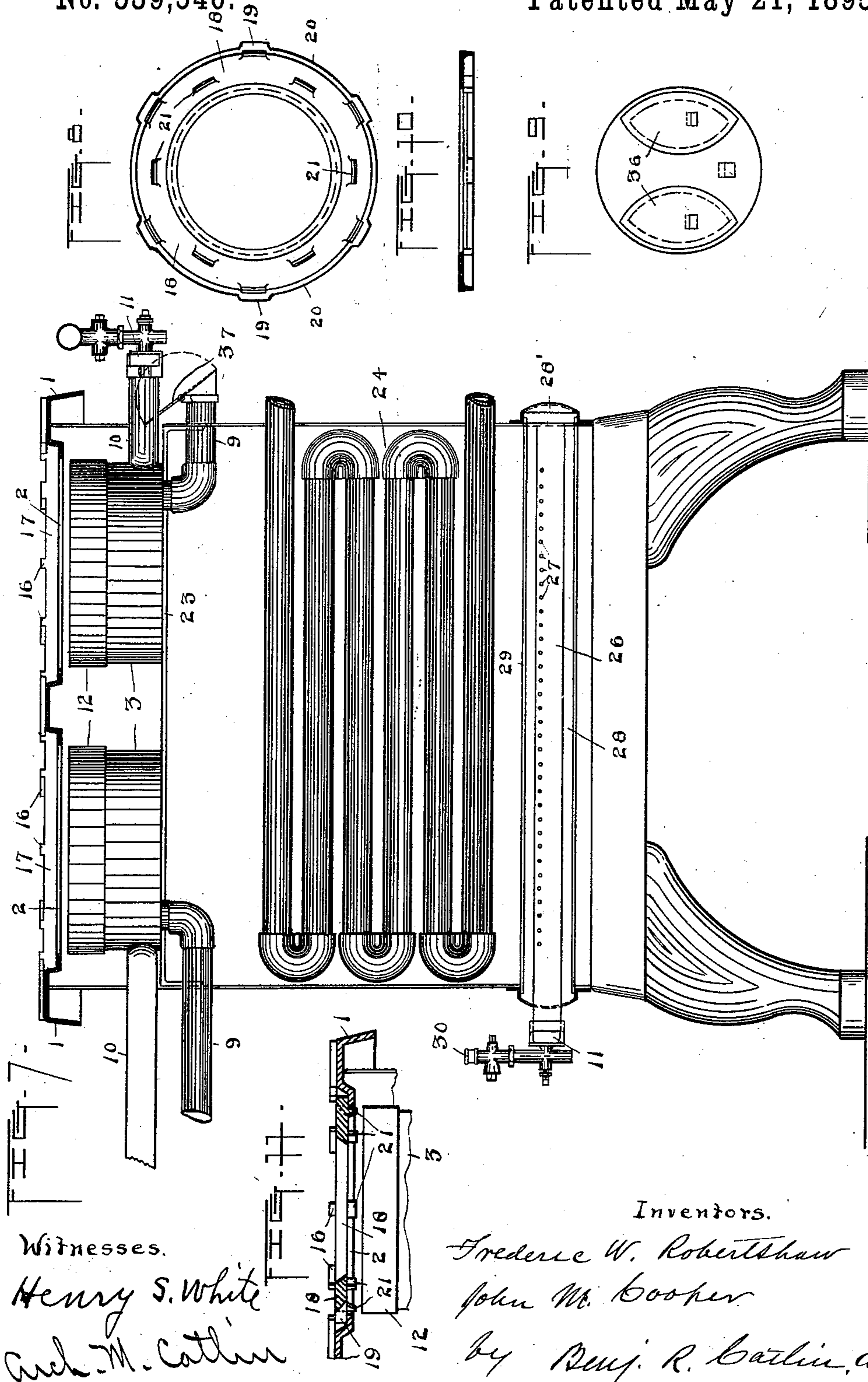
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# UNITED STATES PATENT OFFICE.

FREDERICK W. ROBERTSHAW, OF PITTSBURG, AND JOHN M. COOPER, OF  
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## GAS-STOVE.

SPECIFICATION forming part of Letters Patent No. 539,546, dated May 21, 1895.

Application filed September 29, 1894. Serial No. 524,524. (No model.)

*To all whom it may concern:*

Be it known that we, FREDERICK W. ROBERTSHAW, a resident of Pittsburg, and JOHN M. COOPER, a resident of Bellevue, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Gas-Stoves; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

The invention relates to gas stoves and burners therefor, and has for its object to increase their efficiency and economy; and it consists in the construction hereinafter described and particularly pointed out.

In the accompanying drawings, Figure 1 is a vertical section of a gas-burner. Fig. 2 is a plan of the same. Fig. 3 is also a plan of the same, the top ring and the air and gas inlet pipes and interior plate being omitted. Fig. 4 is a side elevation of the construction shown in Fig. 3. Fig. 5 is a plan of the stove, partly in section. Fig. 6 is a partial longitudinal section. Fig. 7 is a partial transverse section, but shows a modified arrangement of gas and air inlets. Fig. 8 is a bottom plan of a lid and ring. Fig. 9 is a plan of a modified form of lid. Fig. 10 is a section of the same, and Fig. 11 is a partial section showing the lid and ring represented in Fig. 8 seated over a hole in the stove-top.

The stove top 1 is provided preferably with six holes 2 and with four burners each inclosed within a cylindrical casing 3 constitute an important part of the improvement, and particularly in the combinations hereinafter pointed out. The casing has a bottom 4 and an interior concentric cup or receptacle formed by a ring 5 seated on said bottom which cup with its inlet and exits constitutes a burner. This interior ring is covered and the casing 3 horizontally divided by a plate 6 which fills the casing horizontally and divides it into two approximately equal chambers. The plate has two circles of concentric rings of perforations 7 and 8 to permit mingled air and gas to pass up from within ring 5 and to permit air to ascend from the annular space outside said ring. An inlet pipe 9 admits air to said annular space and an inlet

pipe 10 having an air and gas mixer 11 admits mingled air and gas to the space within the ring 5. The gas mingled with air rising through the inner perforations 7 being ignited and further supplied with air admitted through the exterior perforations 8 burns with a clear flame and produces an intense heat which is in part absorbed by the partition plate or floor 6 which in turn conducts it to the air and gas in the chambers below it whereby they are preheated.

The air, and the air and gas inlet pipes, may be connected, the former to the bottom of the casing and the latter to the side of the burner as shown in full lines in Figs. 1 and 2 or both may be laterally connected one with the burner casing and one with the burner; means for so doing being indicated at 9' and 10' in said figures and all these inlets may be used though one pair will ordinarily be found sufficient.

The upper part of each burner casing 3 is provided with a flanged ring 12 adjustably secured thereto by a screw or otherwise and supported on the top of the casing by means of lugs 13. The wall of said casing is provided with inclines 14, their form and arrangement being such that the flanged ring 12 can be supported at different elevations by means of the lugs 13 which can be moved up or down said inclines as found desirable for the required adjustment.

By the means just described the size of the combustion chamber of the burner can be varied at pleasure, but a more important object of the construction depends upon the co-operation of the burner casing and the stove top as will next be described.

The stove has a draft pipe and a collar to support such pipe as indicated at 15. By this means air will be drawn down through the openings in the stove top.

16 denotes ribs cast on the stove top and adapted to support pans of large size slightly above the surface whereby narrow openings are afforded beneath them for the admission of air at and near the top of the ring. A similar purpose may be effected when a pan or like utensil is not in use and whether the ribs 16 be provided or not by providing a stove hole ring 18 with supporting projections 19

on its periphery whereby openings 20 are left between said projections and adjacent the wall of the pot hole.

The ring 18 is in use seated upon the flange or shelf surrounding the hole 2 and its edge is beveled at 20' to enlarge the air inlet.

It is obvious that the operation of the supporting projections 19 is the same whether the pot hole cover or lid is made entire or consists of central and annular parts. Air is drawn from above the top of the stove down through the openings 20 situated in the plane of the stove top and at the edge of the pot hole and there unites with the products of combustion issuing from the combustion chamber at the narrow exit at the top of the burner casing.

We are aware that a supplemental stove having a pot hole entirely closed by a lid or lid and ring and having air inlets in its side walls and a burner all above the main stove top and adapted to sit in a pot hole is not new, and we are also aware that a ring has been furnished on its upper surface with ribs to provide air inlets when a vessel was supported on said ribs. Our improvement differs in that air inlets are provided at the edge of the pot hole or at the exterior edge of the lid or lid ring the burner being situated within the stove and being of such size and so arranged that the air enters just at the exit from the casing, the construction being such that the whole pot hole can be utilized to radiate heat against a vessel seated above the same.

Each burner is supplied with air by a distinct conduit 9 leading to the annular space between the ring 5 and casing 3 allowing a sufficient quantity of air to pass through the inlets and around the flame of said burner for complete combustion. The burner is also protected by its casing from counter currents or changes of draft such as are occasioned in ordinary stoves by the removal of a lid. The comparatively small exit over the top of the adjustable ring 12 practically excludes all air currents except those provided for by the means described and reduces to a minimum the effect of irregular and counter currents caused by such changes as the removal of lids or vessels from the pot holes, every burner being thus made practically independent. The ring 18 is provided on its under side with ribs or projections 21 adapted to check and divide the currents of burning gases to insure more perfect combustion.

As the suitable and thorough mingling of air and gas is essential to combustion and as such mingling is favored by passing them together in a narrow sheet through openings adapted for the purpose our burners and their adjustable rings are placed in close proximity to the stove top, and to obviate the objection to this which would exist in an ordinary gas stove we provide a draft outlet in a plane below the top whereby the flames though playing close under it are not allowed to escape through said top.

We provide the burners each with the adjustable rings 12 to enable the distance between the said rings and stove top to be varied in order to afford means for a nice adjustment to insure thorough combustion close to said top and in contact with vessels or irons seated thereon. This distance between the ring and stove top will in practice be varied according to the quality of the gas, the strength of the draft and other conditions effecting combustion. It will in general be made so small that the flame and products will issue in a narrow sheet approximately all around the rim of the ring notwithstanding the tendency of the draft to one side or the other according to the situation of the exit from the stove.

Though the burners above described are specially adapted for heating vessels seated on the stove top considerable heat will necessarily be radiated and conducted downward. By this means the top of the oven will be heated. In the stove illustrated two burners rest upon and are supported by the oven, and two are supported by a strap or bar 23 made fast to the side of the stove.

The burners above described could be used to heat the bottom of the oven and a water coil 24 and a roasting or toasting grid 25, but we prefer to employ a gas burner tube 26 having burner perforations 27 and an air casing 28 with a slot or row of perforations 29 adjacent to said perforations of the gas pipe. The air casing is open at each end and is supported by flanged heads or caps 28' whereby the air and gas tubes are held in proper relation and are supported from the stove wall.

The gas tube 26 has an air and gas mixer 11 of any suitable form and 30 is a pipe which may connect with any gas holder or main, such as a belt gas pipe 31, adapted to convey gas from a holder or a system of gas pipes to all of the burners. The branch gas pipes are supplied with cut off cocks as usual. The air inlet pipes have valves or dampers 37.

Two burners such as just described may be situated centrally underneath the oven and separated by a plate 32 whereby the flames and products from them may be kept apart and drawn to opposite ends of the oven as indicated by arrows. 32 denotes a damper plate to regulate the amount of draft around the oven at one end. One of these long tubular burners is situated at the lower inner edge of the oven and near the bottom of the water coil or reservoir 24. 33 denotes a plate adapted to separate the current of ascending products from this burner and to compel a part of them to travel on the side of the coil adjacent the roasting grid. The latter is supported at its top by the door 34 which is hinged at its bottom to the stove. When the door is turned down the grid is lowered upon the drip pan 35. Upon the grid and drip pan being removed the space above can be used as a "warming closet."

The lid shown in Fig. 9 combined with a

ring such as 18 may be placed over any of the burners. Its ovoid sections 36 are removable and when removed the lid is very suitable for supporting irons or other articles to be heated and particularly in connection with the means for producing combustion near the stove top hereinbefore described.

Having thus described our invention, what we claim is—

10 1. In combination with the walls and top plate of a gas stove, the burner casing 3, the ring 5 situated within the casing, said ring and casing having a closed bottom, the cover 6 perforated within and without the area of the ring, the ring having an inlet for air and gas and the casing having an air inlet, means for supplying air and gas, the ring 12 forming an extension of the casing immediately below the top plate adjacent to a pot hole therein and made vertically adjustable to and from the edge of the hole to vary the passage between them, and a draft exit from the stove, all substantially as set forth whereby combustion can be produced immediately under the top plate and the exit of flame and products therefrom be regulated.

2. In a gas stove having an exit for products and a burner both below its top, said top being provided with a pot hole, and in combination, 30 the lid having ribs 21 in its bottom at or below the level of the top plate to divide and check the current of outgoing products from the burner, and a burner casing inclosing a combustion chamber provided with air and gas inlets and having its upper edge situated immediately beneath and near the stove top and directly under the lid, and means for supplying air and gas to the burner, substantially as set forth.

40 3. In a gas stove the combination of the stove top provided with a pot hole, the lid situated in said top and having ribs 21 in its bottom to divide and check the current of outgoing products, a burner casing situated immediately under and near the lid, said casing being approximately of the size of the pot hole, a ring 3 situated in the casing, a burner plate horizontally dividing the casing and covering said ring 5 and perforated both within and without the area of the ring, the casing and ring having a closed bottom, means for supplying air and gas to the interior of the ring,

means for supplying air to the space between it and the casing, and a ring 12 at the top of the casing made adjustable to and from the edge of the pot hole to vary its distance from the same and from the lid and its ribs, substantially as set forth. 55

4. In a gas stove the combination of the stove top having formed thereon ribs 16 situated above and around a stove top opening, a draft exit from the stove, and a gas burner casing inclosing a combustion chamber provided with air and gas inlets said casing and inclosed chamber being immediately below the pot hole and having dimensions in horizontal plane approximately those of said hole, whereby when said ribs support a pan over the burner hot air is drawn down to the upper edge of the burner casing at the exit from the same, substantially as set forth. 65 70

5. In a gas stove, the oven, a burner situated beneath it, the water pipe coil situated near the end of the oven, in an approximately vertical position, the plate 33 situated between the coil and oven and contiguous to the former, the burner situated immediately below the coil, and a draft exit near the stove top, whereby the products of combustion are drawn up on each side of the water pipe coil said plate serving to divide the products of the two burners substantially as set forth. 75 80

6. In combination in a gas stove, a closet, a burner situated near the rear of its bottom and extending across the closet parallel to the door, a toasting grid removable from said closet, and a drop door adapted when closed to support the grid in an approximately upright position adjacent to the path of outgoing products with its bottom resting against the burner and its top against the door said door when opened being also adapted either to support the grid in a horizontal position or to permit its removal to allow the door to be shut to close the warming closet, substantially as set forth. 85 90 95

In testimony whereof we have signed this specification in the presence of two subscribing witnesses.

FREDERICK W. ROBERTSHAW.  
JOHN M. COOPER.

Witnesses:

W. B. RIGDON,  
H. WEISKETTLE.