

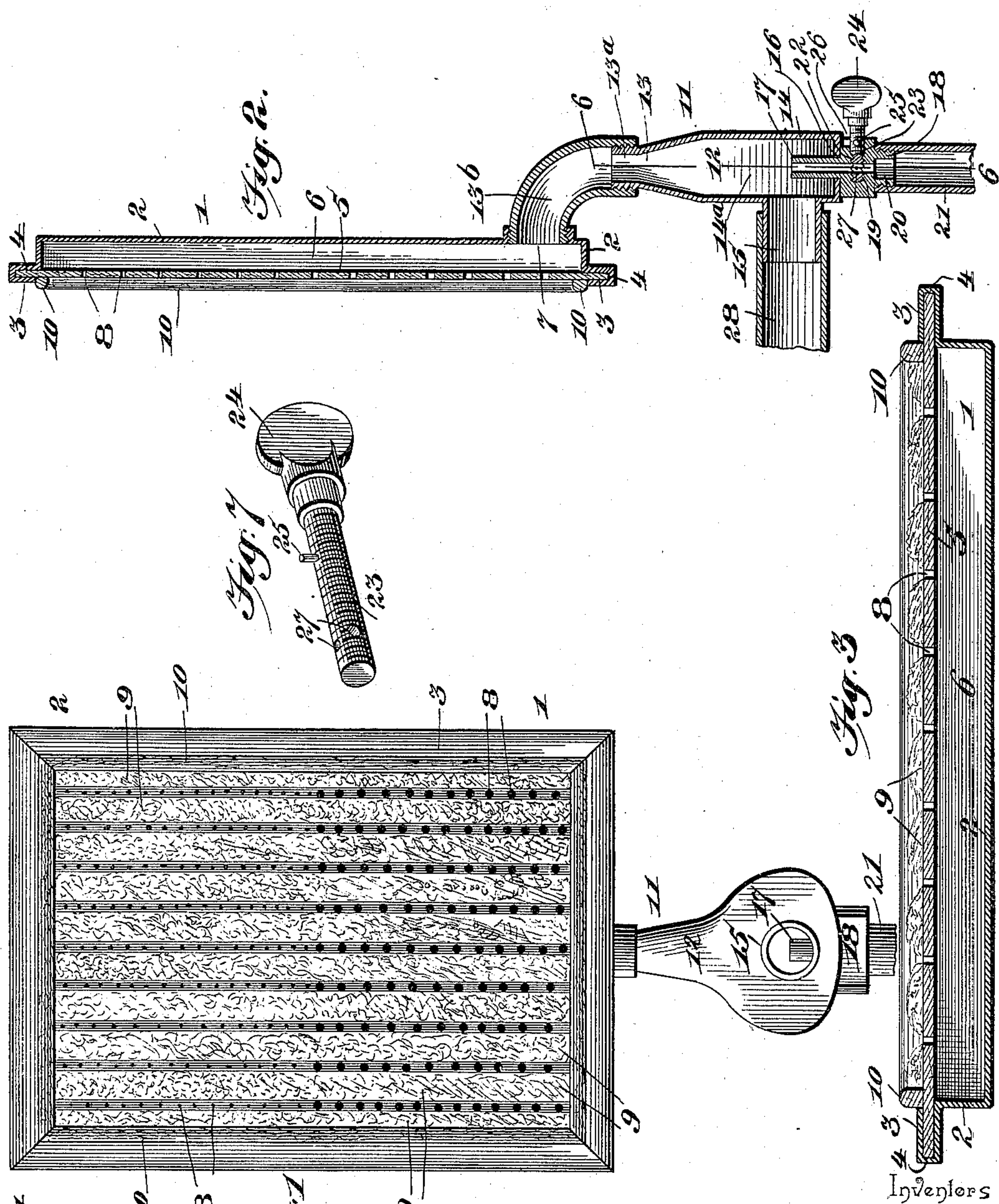
(No Model.)

2 Sheets—Sheet 1.

T. E. & P. F. McCAFFREY.
GAS BURNING APPARATUS.

No. 598,737.

Patented Feb. 8, 1898.



Witnesses

H. G. Dietrich
S. T. Houghton

By their Attorneys,

Thomas E. McCaffrey
Peter F. McCaffrey

C. A. Snow & Co.

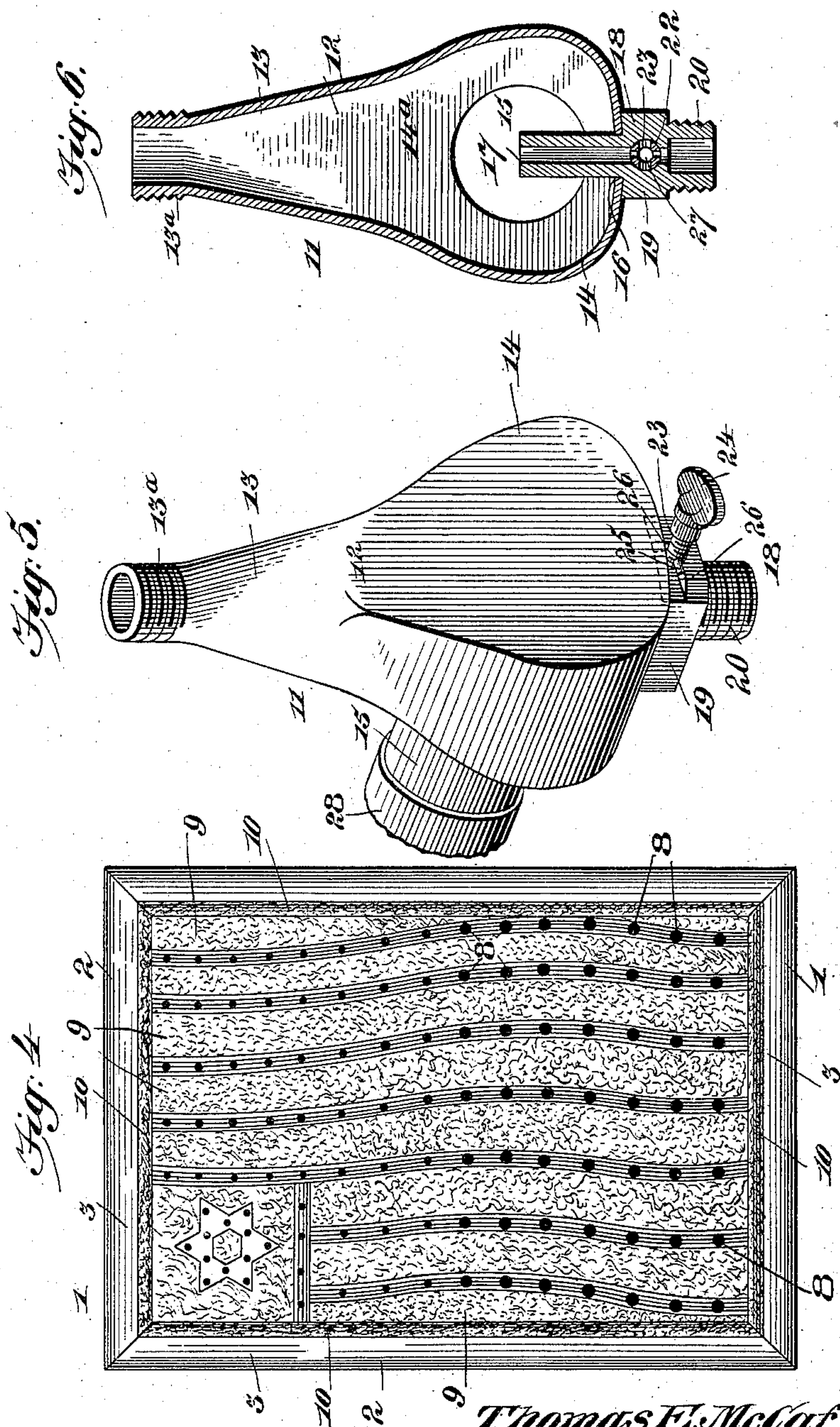
(No Model.)

2 Sheets—Sheet 2.

T. E. & P. F. McCAFFREY.
GAS BURNING APPARATUS.

No. 598,737.

Patented Feb. 8, 1898.



Witnesses
H. G. Dieterich
L. P. Hochmeyer

Inventors
Thomas E. McCaffrey
Peter F. McCaffrey
By *their* Attorneys.
C. A. Snow & Co.

UNITED STATES PATENT OFFICE.

THOMAS EDWARD McCAFFREY AND PETER FRANCIS McCAFFREY, OF
ALLEGHENY, PENNSYLVANIA.

GAS-BURNING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 598,737, dated February 8, 1898.

Application filed December 17, 1896. Serial No. 616,092. (No model.)

To all whom it may concern:

Be it known that we, THOMAS EDWARD McCAFFREY and PETER FRANCIS McCAFFREY, citizens of the United States, residing at Allegheny, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Gas-Burning Apparatus, of which the following is a specification.

This invention relates to gas-burning apparatus; and it has for its object to provide a new and useful apparatus of this character designed for use in connection with stoves, furnaces, open fireplaces, or wherever similar apparatus is employed.

To this end the invention primarily contemplates a novel construction of gas-burner and gas-mixer which when used together or separately insure a thorough mixing and combustion of the gas, whereby a maximum amount of heat is obtained from the burning thereof, while at the same time a minimum pressure of gas only is required to secure the results noted.

With these and other objects in view, which will readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination, and arrangement of parts hereinafter more fully described, illustrated, and claimed.

In the drawings, Figure 1 is a plan view of a gas-burner constructed in accordance with this invention. Fig. 2 is a vertical longitudinal sectional view thereof, including the mixer therewith. Fig. 3 is an enlarged transverse sectional view of the burner proper. Fig. 4 is a plan view of the burner, showing a modified or different artistic design for the face thereof. Fig. 5 is a detail in perspective of the gas-mixer. Fig. 6 is an enlarged vertical sectional view thereof on the line 6 6 of Fig. 2. Fig. 7 is a detail in perspective of the valve-pin of the regulator-valve.

Referring to the accompanying drawings, the numeral 1 designates the gas-burner proper of the apparatus, which may be constructed in a size or shape to adapt the same for use as the burner of a stove, furnace, open fireplace, or wherever similar burners are employed. In the present invention the burner 1 is intended always to be used in a vertical

position for insuring the attainment of the results contemplated, and said burner essentially comprises a metallic gas-receiving box 2, made of galvanized iron or other suitable sheet metal. The metallic gas-receiving box is illustrated in the drawings as being constructed in a rectangular shape and is provided with offset peripheral flanges 3, that are bent inward to form the grooves 4 for receiving the edges of a flat horizontal face-board 5, made of asbestos or other suitable material of a similar character. The solid asbestos face-board 5, by being secured to the box in the manner described, covers the open side of the box and incloses between the same and the closed side of the box an interior gas-chamber 6, which receives a charge of mixed gas and air through the side inlet-opening 7, preferably piercing the box 2 near or at its lower end.

The solid asbestos face-board 5 of the burner is pierced with vertical rows of gas orifices or openings 8, which rows extend longitudinally of the box from top to bottom thereof, so that there will be a natural upward draft of the gas irrespective of the pressure thereof. It is important that the gas orifices or openings 8 be arranged in spaced vertical rows in order that the flame on the face of the burner will follow such rows and make a continuous sheet of flame to insure a maximum amount of heat being given off from the burner by the burning of the gas.

In Fig. 1 of the drawings the rows of gas orifices or openings 8 are illustrated as extending on straight longitudinal lines from top to bottom of the burner, with the adjacent rows disposed in parallel planes; but it will of course be understood that these rows of orifices or openings 8 may be changed in form, as illustrated in Fig. 4 of the drawings, to produce different artistic designs, such as squares, stars, flags, and the like; but in all forms of the burner the separate rows of orifices must maintain a vertical direction from top to bottom of the box.

Whatever may be the design formed by the vertical rows of gas orifices or openings 8, there is employed in connection with these orifices or openings a facing of asbestos fiber

9, which is pasted or otherwise suitably secured on the upper side of the face-board 5 in longitudinal vertical rows extending along each side of each vertical row of gas orifices 5 or openings 8. By reason of arranging the asbestos fiber 9 in rows at each side of each vertical row of gas orifices or openings 8 a narrow continuous valley or crevice is formed between the adjacent rows of fiber, which insures an ignition of the gas over the entire face of the face-board and also creates a tendency to draw the gas to the surface, so that every particle thereof within the chamber 6 will be ignited even after the flow of gas has been cut off from the burner. The flame, by reason of being permitted to naturally rise and follow the valleys and crevices without impediment, will necessarily create an appreciable draft or suction of sufficient intensity to provide for drawing the gas to the surface in the manner just explained.

To complete the burner, a sealing bead or strip 10, of asbestos, may be fitted at the joint connection between the flanges 3 and the edges of the board 5 to prevent leakage of gas at such point.

The flame naturally follows the vertical valleys or crevices on the face of the burner, and to secure the best results the gas orifices or openings 8, embraced in the lower portion of the face-board from its lower end a distance upward to or near the transverse center thereof, are of a larger size than the remainder of such orifices or openings in the upper portion of the board, this formation of different-sized orifices or openings and the special relation thereof insuring the even burning of the gas over the entire surface, as the gas naturally rises and the pressure on the smaller holes is compensated for by the freer escape of the gas through the larger holes.

In connection with the vertically-disposed burner proper, 1, and the inlet-opening 7 thereof is employed a special form of gas-mixer 11. The gas-mixer 11 essentially comprises a tubular mixer-casing 12, designed to be disposed in a vertical position while in use and formed with an upper tapering discharge-neck 13, provided with an exteriorly-threaded terminal 13^a, which may be fitted directly in the inlet-opening 7 of the burner proper or have a separate nipple or pipe connection 13^b with such opening; but in either event it will be observed that there is no connection fitting inside of the neck 13 and which would naturally form an obstruction to retard the free upward ascent of the mixed gas into the burner, as is the case in some forms of gas burning and mixing apparatus.

The tubular mixing-casing 12 of the mixer 11 is formed with a laterally enlarged and rounded base portion 14, inclosing an interior mixing-chamber 14^a, and from one of the flat sides of which base portion 14 is projected an offstanding air-inlet neck 15, while in the bottom of said base portion 14, below the plane of the neck 15, is formed a gas-inlet opening

16, which receives therein the feed-nozzle 17 of a regulator-valve 18. The regulator-valve 18 is provided with a tubular valve-body 19, having the nozzle 17 and formed at its lower side with a threaded neck 20, having a connection with an ordinary gas-supply pipe 21 and in communication with the nozzle 17. The valve body or casing 19 has formed therein a transverse threaded pin-opening 22, intersecting the passage through the body and accommodating for movement therein an exteriorly-threaded regulating valve-pin 23, formed at its outer end with a thumb-piece 24 for manipulating the same and provided intermediate of its ends with a stop-stud 25, playing between the stop-shoulders 26 at one side of the body 19 and serving to limit the turning of the pin in either direction. The said valve-pin 23 is provided in the same circular plane with gas-ports 27, of different sizes, which are brought into use according to the pressure of the gas, and it will be observed that when the valve-pin is turned in one direction to carry its stop-stud against one of the shoulders 26 one of the gas-ports 27 will be thrown into alinement with the bore of the valve-body, and vice versa, thereby providing simple and efficient means for regulating the pressure of gas admitted to the mixing-chamber 14^a of the casing 12. It will be obvious that the valve-pin may be formed with a ground stem instead of being threaded, if so desired.

The feed-nozzle 17 of the regulator-valve is of such a length that its upper end will project within the casing 12 to a point approximately opposite the longitudinal center of the air-inlet neck 15 of the mixer-casing, so that the air passing into the chamber 14^a will strike the gas and cause the same to whirl around and around within the mixer-casing before entering the burner, thereby thoroughly mixing the gas and air and insuring a perfect combustion. The offstanding air-inlet neck 15 of the mixer-casing receives on the exterior surface thereof a supplemental air-supply pipe 28, having a tight sliding fit on the neck 15, so as not to reduce the area of the inlet-opening for air into the mixer, and extending outside of the stove, furnace, or other place where the mixer is located, so as to feed an even quantity of air to the mixer at all times.

In the operation of the apparatus it will be obvious that the manner of combining the air with the gas will not permit the currents of air to break a light flow of gas, while at the same time a very low pressure of gas will throw sufficient air into the burner to give perfect combustion, and in the event of the gas suddenly becoming too low the valve-pin of the regulator-valve is manipulated so as to uncover the largest port therein. As the mixture of gas and air from the mixer passes into the burner the vertical disposition of the rows of gas orifices or openings 8 in connection with the continuous valleys over each

row of said orifices or openings will create an upward draft or suction, causing every particle of gas to pass through the face-board and to become ignited over the entire surface or face thereof. By reason of this upward draft of the gas all of the gas within the burner will burn before the flame becomes extinguished after a cutting off of the supply of gas, thereby obviating the objections to the flashing out of the flame the moment the gas-valve is shut off, as is the case in many forms of burners. Another feature of importance in this connection is the fact that no appreciable pressure of gas is needed to force the same through the burner to the point of ignition.

Other advantages will readily appear to those skilled in the art without further description, and it will be understood that changes in the form, proportion, and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

Having thus described the invention, what is claimed, and desired to be secured by Letters Patent, is—

1. A gas-burner comprising a gas-receiving box having its entire interior area forming a gas-chamber, a face-board fitted over the open side of the box to inclose the gas-chamber thereof and pierced with a multiplicity of gas orifices or openings arranged in vertical rows extending from top to bottom of the box, and continuous longitudinal rows of asbestos fiber secured on the outer surface of the face-board at each side of each vertical row of gas orifices or openings to produce between the adjacent rows of fibers narrow continuous valleys or crevices, open throughout their entire lengths to permit the flame

to freely rise and follow the same, substantially as set forth.

2. A gas-burner, comprising a gas-receiving box having a vertical face-board provided along its outer surface with a series of narrow continuous valleys or crevices extending from top to bottom thereof and open throughout their entire length to permit the flame to freely rise and follow the same, and vertical rows of gas-orifices piercing the face-board and opening into the valleys or crevices thereof, the orifices in the lower portion of the board being larger than the remaining orifices thereabove to compensate for the pressure of gas on the smaller orifices, substantially as set forth.

3. In a gas-burning apparatus, the combination with the burner, of a gas-mixer comprising a tubular casing formed with an upper tapering discharge-neck and a lateral enlarged rounded base portion having in its bottom a single gas-inlet opening, and a lateral air-inlet neck at one of its flat sides above the plane of the gas-inlet and disposed at right angles to the latter, said air-inlet neck lying directly opposite the flat imperforate side of the casing, and a valve-body carrying a regulating-valve and provided with a gas-feed nozzle projected through the gas-inlet opening above the plane of the bottom of the casing and having its upper end arranged approximately opposite the center of the air-inlet, substantially as set forth.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in the presence of two witnesses.

THOMAS EDWARD McCAFFREY.
PETER FRANCIS McCAFFREY.

Witnesses:

LILLIE V. J. BERNY,
CHAS. R. WEITERSHAUSEN.