No. 672,844. Patented Apr. 23, 1901.

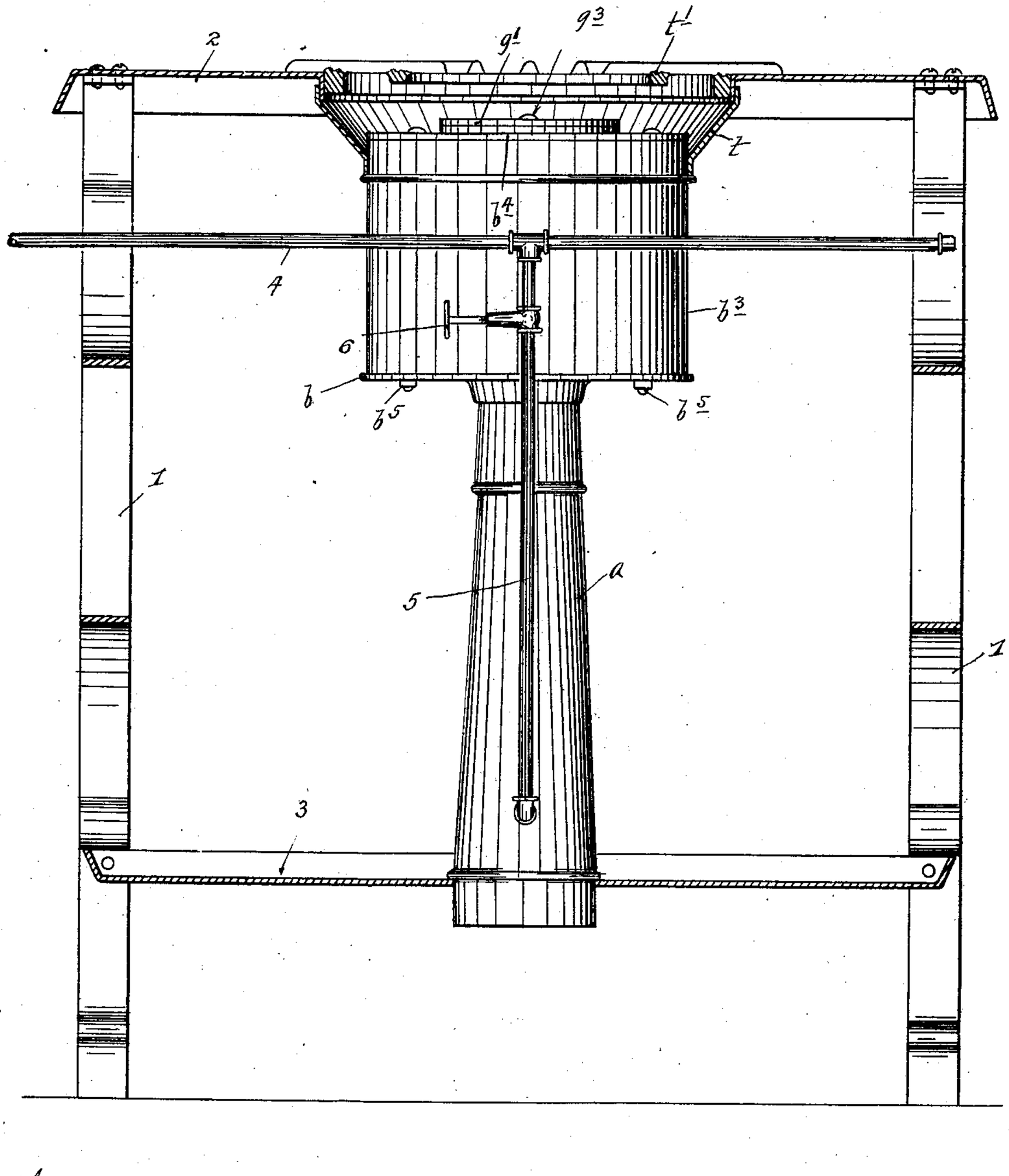
C. M. STROUD.

GAS STOVE.

(Application filed Apr. 7, 1900. Renewed Mar. 5, 1901.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.



Witnesses:
Harry Kilgore.
Robert Otto

Inventor:
Charles M. Stroud
By his Attorneys
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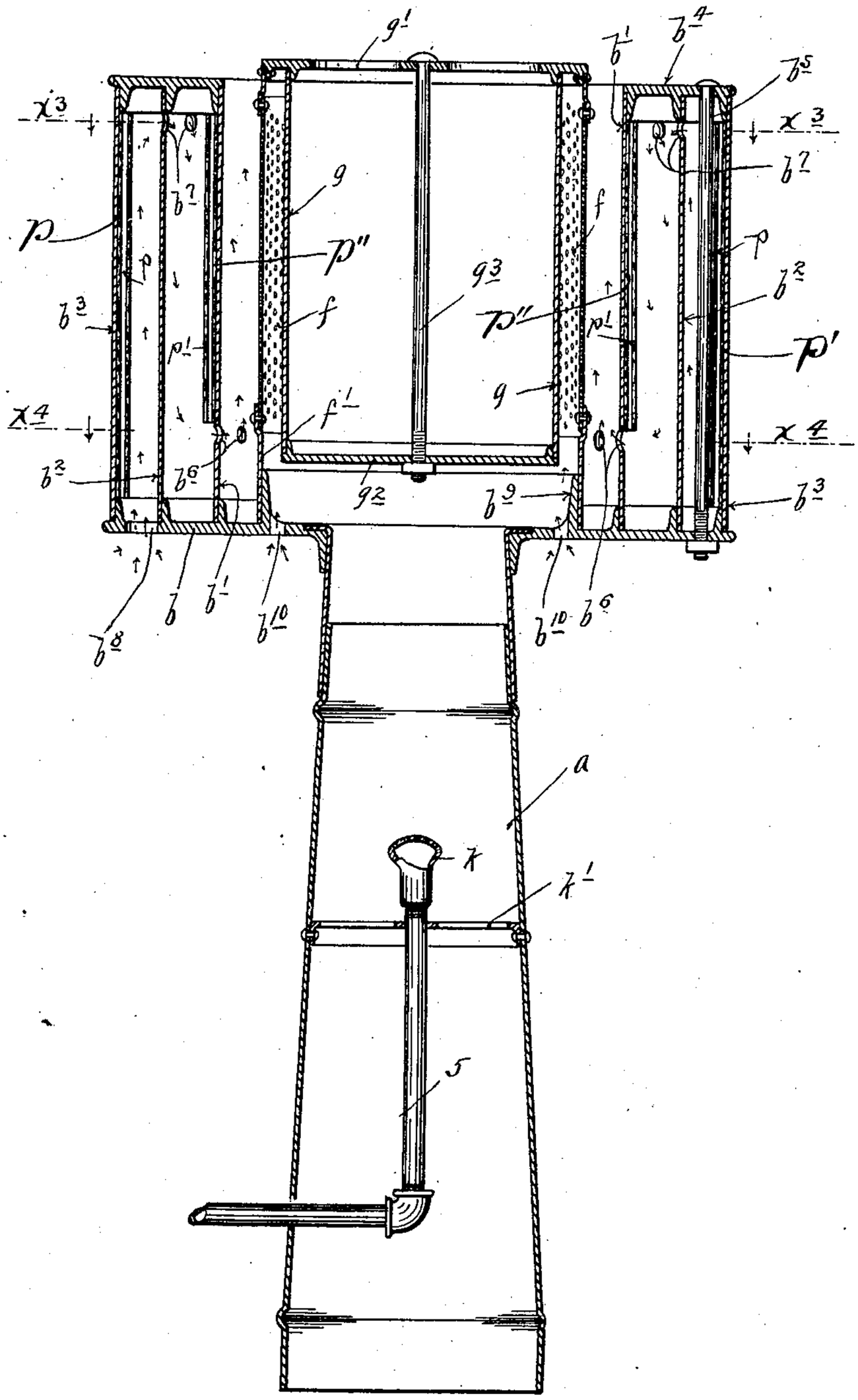
3 Sheets—Sheet 2.

Fig. 2.



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(No Model.) 3 Sheets—Sheet 3.

Fig. 3.

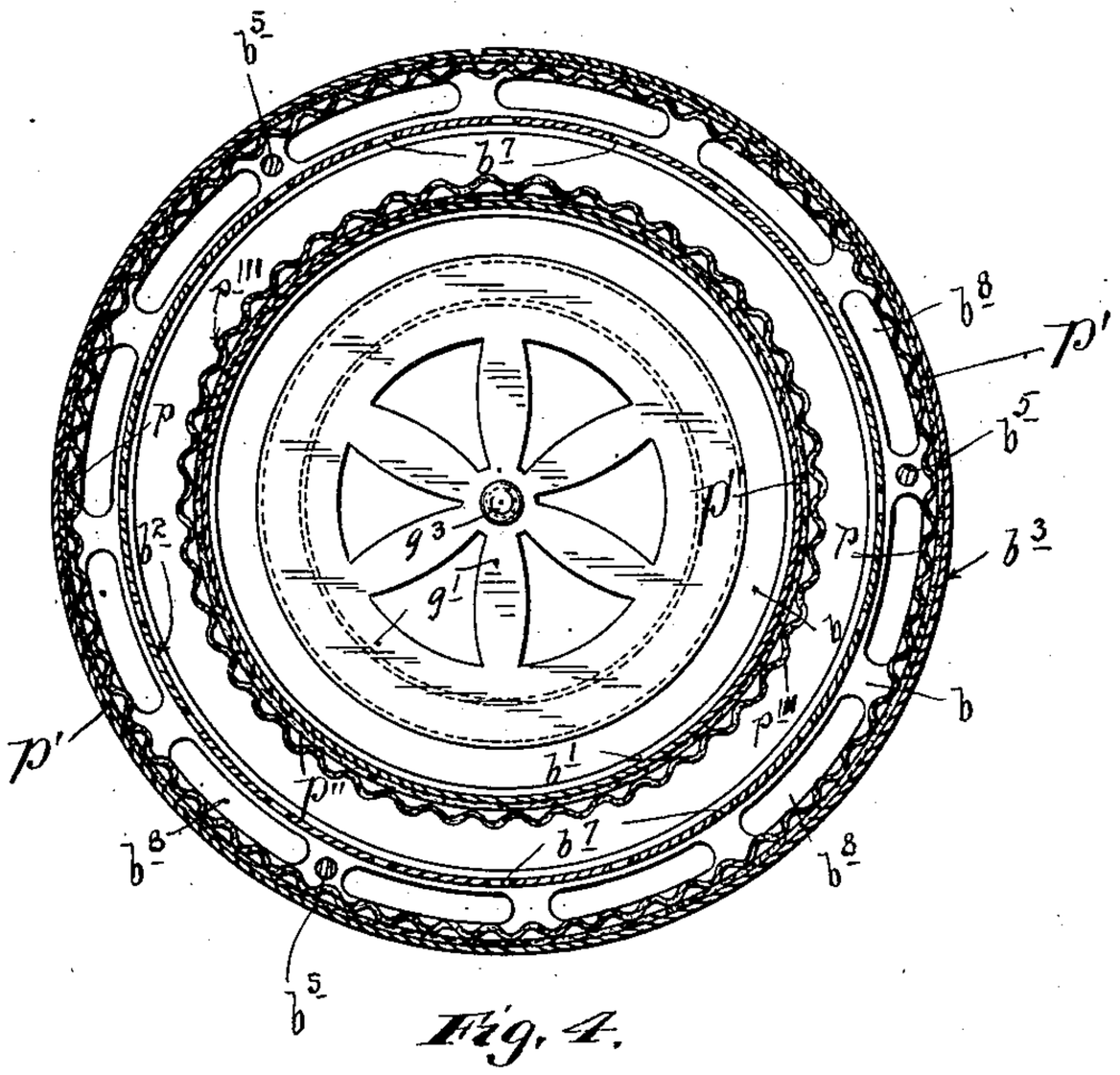

Fig. 4.

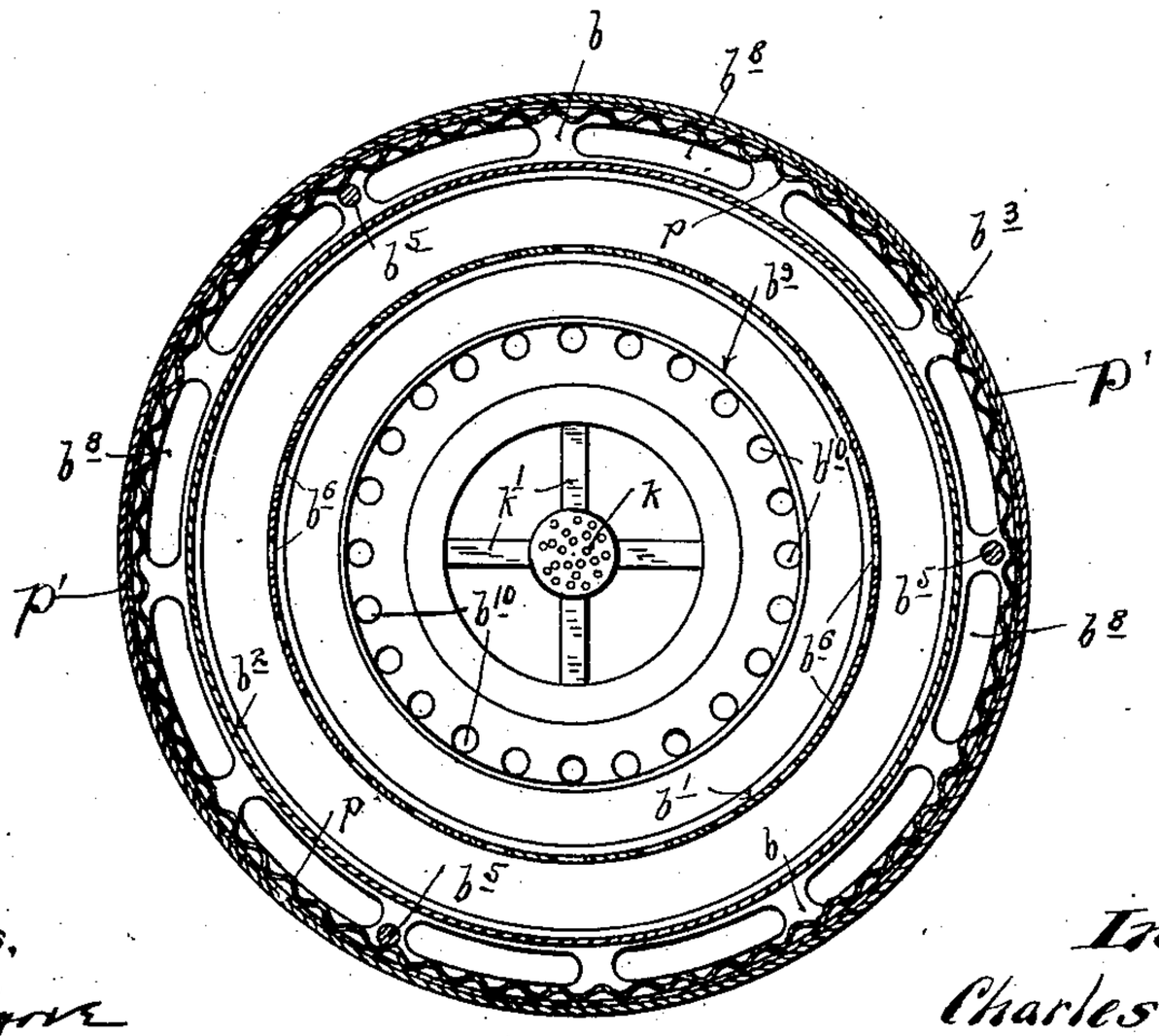

Fig. 5.

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UNITED STATES PATENT OFFICE.

CHARLES M. STROUD, OF HASTINGS, MINNESOTA, ASSIGNOR OF ONE-HALF TO ALBERT J. MURDOCK, OF MINNEAPOLIS, MINNESOTA.

GAS-STOVE.

SPECIFICATION forming part of Letters Patent No. 672,844, dated April 23, 1901.

Application filed April 7, 1900. Renewed March 5, 1901. Serial No. 51,391. (No model.)

To all whom it may concern:

Be it known that I, CHARLES M. STROUD, a citizen of the United States, residing at Hastings, in the county of Dakota and State of Minnesota, have invented certain new and useful Improvements in Gas-Stoves; and I 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 appertains to make and use the same.

My invention has for its object to provide an improved gas-burner especially adapted to burn acetylene gas for heating and cooking purposes; and to this end it consists of the novel devices and combinations of devices hereinafter described, and defined in the claims.

Hitherto great difficulty has been experienced in providing a burner which will burn acetylene gas with efficiency, or, in other words, which will obtain from the acetylene gas the proper amount of heat. Difficulty has also been experienced in providing a burner which will burn acetylene gas without frequent explosions of the gas in the burner. By my invention I remove these defects and provide a burner of high heating efficiency.

A burner constructed in accordance with my invention and designed as part of a gas-stove is illustrated in the accompanying drawings, wherein like characters indicate like parts throughout the several views.

Figure 1 is a view, partly in side elevation and partly in vertical section, showing a gas-stove equipped with one of my improved burners. Fig. 2 is a vertical section taken centrally through the burner. Fig. 3 is a horizontal section on the line x^3 x^3 of Fig. 2, some parts being shown in elevation; and Fig. 4 is a horizontal section approximately on the line x^4 x^4 of Fig. 2, with some parts removed and some parts shown in elevation.

The numeral 1 indicates the side frames, the numeral 2 the top, the numeral 3 the bottom pan, and the numeral 4 the gas-supply pipe of the gas-stove, which parts are of the ordinary or any suitable construction. The gas-pipe 4 will of course lead from some suitable source of supply of acetylene gas.

The burner in its complete form illustrated in the drawings comprises a stack or leg a, which, as shown, is open at its lower end and extends through the pan 3 and opens at its upper end through the central sleeve portion of a flanged head b. The head b is provided with concentric annular flanges, to which concentric cylinders b', b^2, and b^3 are secured. An annular head b^4 is clamped to the upper ends of the cylinders b', b^2, and b^3, as shown, by means of long nutted bolts b^5. The cylinder b' is provided some little distance above its lower end with a series of air-passages b^6, and the cylinder b^2 is provided near its upper end with a series of air-passages b^7. The head b is slotted between the cylinders b^2 and b^3, as shown at b^8, to permit of the free passage of air upward between the said cylinders. Inward of the inner cylinder b is a cylindrical screen f, which, as shown, is formed by a perforate cylindrical sheet having an imperforate lower-end section f', which engages the head b and extends approximately to the height of the air-passages b^6 in the cylinder b' and loosely telescopes with an annular flange b^9 of the head b. Just inward of the perforate cylinder f or burner proper an imperforate cylinder g is concentrically held by a spider-like head g', the marginal portion of which closes the upper end of the chamber formed between the cylinders f and g. The lower end of the cylinder g is closed by a head g^2, which, as shown, is clamped thereto by a long nutted bolt g^3, passed also through the bracket g'. Immediately below the thin annular chamber formed between the burner or perforate cylinder f and the cylinder g the head b is provided with auxiliary air inlets or perforations b^{10}. The gas is delivered from the supply-pipe 4 through a branch pipe 5, having a valve 6 and extending at its lower end into the stack a and thence upward, where it is terminated in a gas-spraying nozzle k, the inner end of the pipe being supported within the stack by a spider-bracket k'. With this gas-burner the gas is burned under very low pressure, and it is admitted into the so-called "stack" a by opening the valve 6. Gas is thrown from the burner k in a plurality of small streams and is mixed to a considerable extent with the air in the stack. The gas, somewhat mixed with air, will pass upward through the stack and will strike the

head g^2 of the cylinder g, and this head, acting as a spreader, will deflect the gas radially into the annular channel formed between the cylinder g and the perforate screen or cylinder f. As this gas passes upward through the said annular channel it will be further charged with oxygen by air drawn in through the auxiliary air-inlets b^{10}, so that when it reaches the perforate surface of the cylinder or burner g it will be in proper condition to produce the most intense heat. The auxiliary air-inlet passages b^{10} are equally spaced, so that the air and gas will be evenly mixed and evenly distributed or spread out over the inner surface of the perforate cylinder. The combustion will take place on the outer surface of the perforate cylinder f, and the flame and products of combustion will pass upward through the chamber formed between the cylinders f and b'. This upward movement of the products of combustion creates a strong draft in the said annular chamber surrounding the cylinder or perforate screen f which not only intensifies the draft through the stack a and perforations b^{10}, but also produces a draft of air first upward through the perforations b^8 and annular chamber formed between the cylinders b^2 and b^3, thence through the perforations b^7 and downward through the annular chamber formed between the cylinders b' and b^2, and thence to the perforations b^6, where the said air commingles with the upwardly-moving draft and products of combustion or burning gases. To prevent too-rapid radiation of heat for a cook-stove, the outer cylinder b^3 is preferably lined with an endless sheet of corrugated asbestos paper, (indicated at p and shown as fixed to an asbestos-paper cylinder p',) and for the same reason the cylinder b' is provided with a similar covering of asbestos paper p''', fixed to an asbestos-paper cylinder p'', which, however, terminates above the perforations b^6. The air in passing, as thus described, from the air-inlet passages b^8 to the perforations b^6 will be quite highly heated, so that when this heated air commingles with the burning gases to supply the same with the final charge of oxygen the combustion is greatly intensified and made complete. Also by virtue of the above action heat which would otherwise be radiated laterally is used to heat the final charge of air to the combustion-chamber, and in this way the entire heat is directed upward.

The so-called "spreading-drum," which in the construction illustrated includes the cylinder g and head g^2, forms a thin endless or annular gas-chamber immediately inward of the perforate screen or cylinder f. I have found in practice that an even and steady combustion will take place on the surface of the screen or perforate cylinder f with the thin annular chamber provided within the same, and, on the other hand, I have found that with the so-called "spreading-drum" removed, so as to leave a large chamber within the screen or perforate cylinder, the combustion will be uneven on the surface of the said screen, and, furthermore, that frequent explosions within the burner will take place, resulting either in blowing out the entire flame from the burner or in causing the flame to back up and burn within the stack a and in the vicinity of the burner k. Hence it will be understood that this annular chamber within the screen or perforate cylinder is of great importance.

The several important features above noted contribute to produce the most satisfactory results. I have found that with my improved burner a blue flame will be produced with very low gas-pressure, such as usually put upon gas for illuminating purposes. Experiments have also determined that this improved burner will for heating and cooking purposes burn acetylene gas economically. When the burner is applied for cooking purposes, as shown in Fig. 1, the outside cylinder b^3 is preferably provided with an annular top flange t, which projects upward for contact with the spider bracket t' of the stove.

For heating, as distinguished from cooking, purposes a drum or radiating-chamber would be placed over the burner.

It will of course be understood that the device above described is capable of considerable modification within the scope of my invention. The device while especially designed to burn acetylene gas economically and otherwise satisfactorily may, nevertheless, be used for burning other gases.

It will be understood that the so-called "cylinders" f, g, b', b^2, and b^3 might vary materially from true cylinders. However, they are preferably concentrically-positioned cylinders of rotation, for the reason that the most even distribution of the heat throughout the burner is thereby obtained.

What I claim, and desire to secure by Letters Patent of the United States, is as follows:

1. In a gas-burner, the combination with a spreading-drum with closed bottom, of a perforate screen surrounding said drum and spaced therefrom to form an attenuated gas-chamber, which chamber is closed at its top and open at its bottom, and a shield or plate surrounding said screen to form a combustion-chamber which is open at its top, substantially as described.

2. In a burner, the combination with a perforate cylinder or screen, of a spreading-drum spaced within said screen to form an attenuated gas-chamber, which chamber is closed at its top, an air and gas inlet below said drum, and a plurality of cylinders surrounding said screen to form a combustion-chamber and a series of concentric air-intake chambers with air-passages permitting the upward and downward passing of the air from the outer air-chamber to the combustion-chamber, substantially as described.

3. In a gas-burner, the combination with the perforate cylinder or screen f and the

spreading-drum g, g^2 forming therewith a gas-chamber open at its lower and closed at its upper end, of a central air and gas inlet opening below said drum, the auxiliary air-supply passages b^{10} opening through the bottom of the burner, and the cylinder or wall b' surrounding said screen f and forming a combustion-chamber that is closed at its lower and open at its upper end, substantially as described.

4. In a gas-burner, the combination with the head b having the air-passages b^8 and b^{10} and stack or tube opening centrally through the same, of a perforate cylinder or screen f extending outward of said air-passages b^{10}, the spreading-drum g, g^2, secured within said perforate cylinder or screen f, as described, the cylinders b' and b^2 with perforations b^6 and b^7, respectively, resting on said head b, the outer imperforate cylinder b^3 also resting on said head b, and the annular head b^4 closing the chambers formed between the cylinders b', b^2 and b^3, substantially as described.

5. The combination with the spreading-drum g with closed bottom g^2, of the screen f secured to said drum g by the head g', the stack a opening centrally through the head b, which head b is secured to the lower end of said screen, and the cylinder b' secured at its lower end to said head b to form a combustion-chamber outward of said screen, which combustion-chamber has auxiliary air-ports opening thereinto at its lower portion, substantially as described.

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

CHARLES M. STROUD.

Witnesses:
M. M. McGRORY,
F. D. MERCHANT.