D. S. COLE.

IGNITING APPARATUS.

APPLICATION FILED MAY 10, 1907.

951,724. Patented Mar. 8, 1910.

2 SHEETS—SHEET 1.

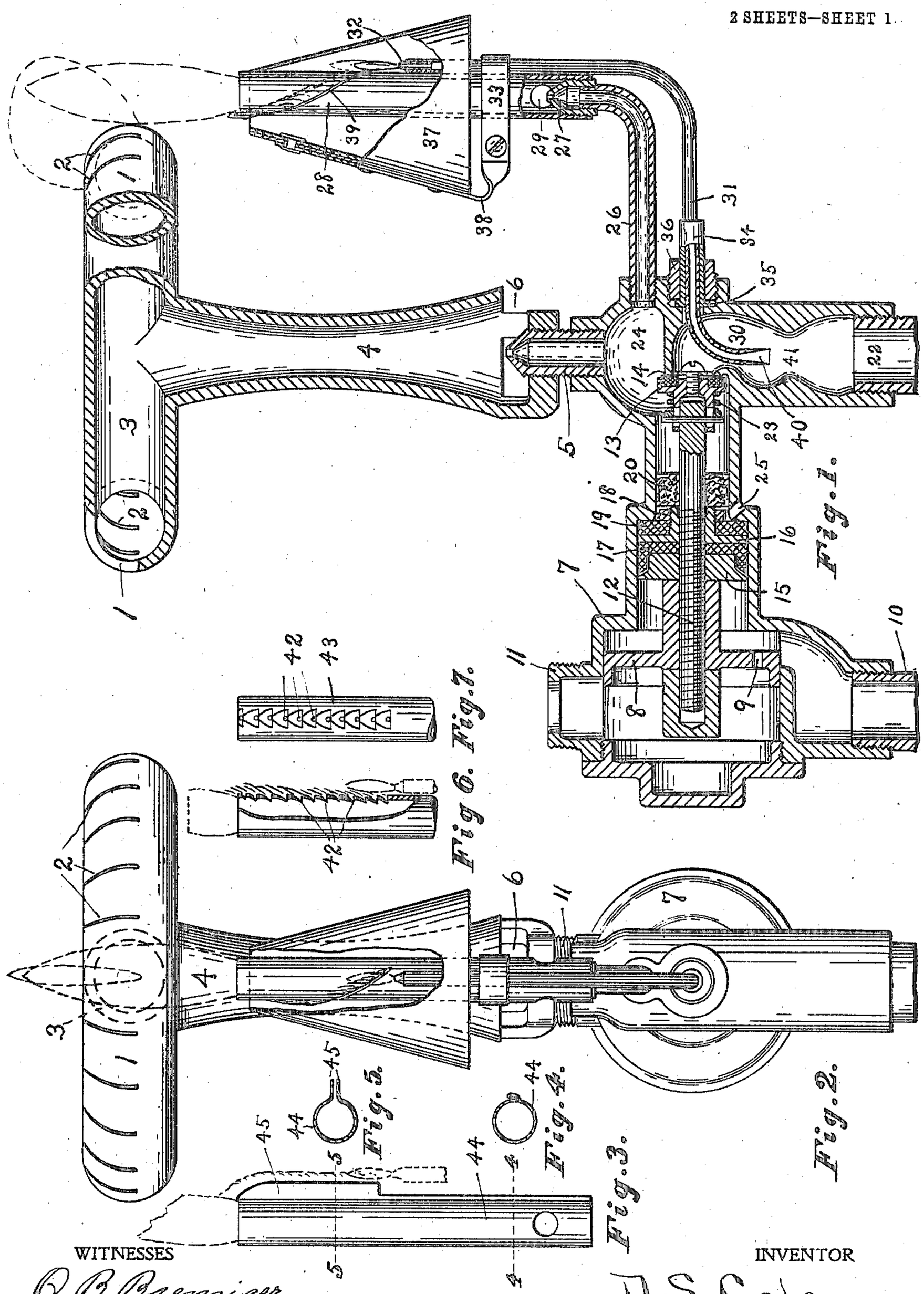

Fig. 1.

Fig. 6. Fig. 7.

Fig. 5. Fig. 4. Fig. 3. Fig. 2.

WITNESSES

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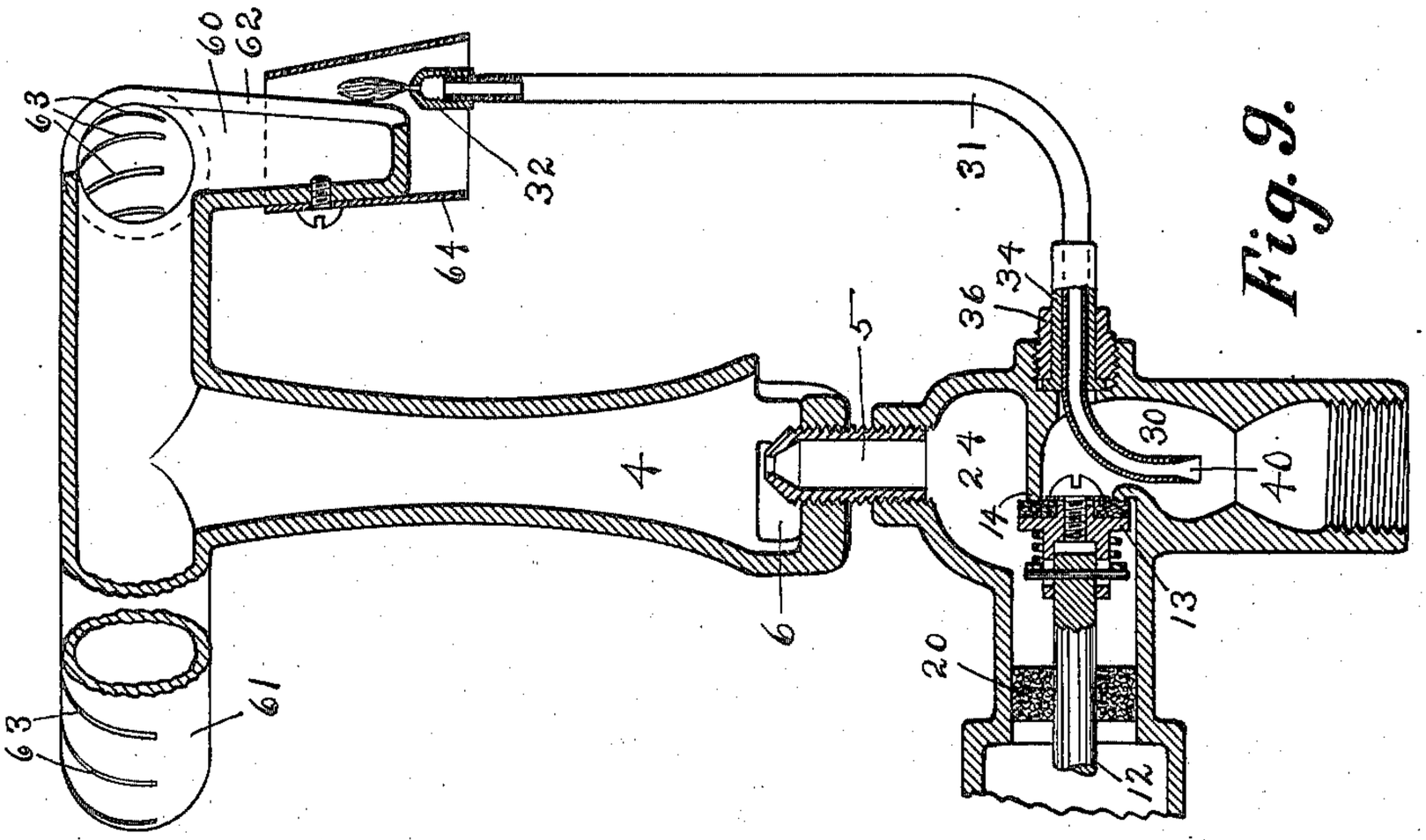

Fig. 9.

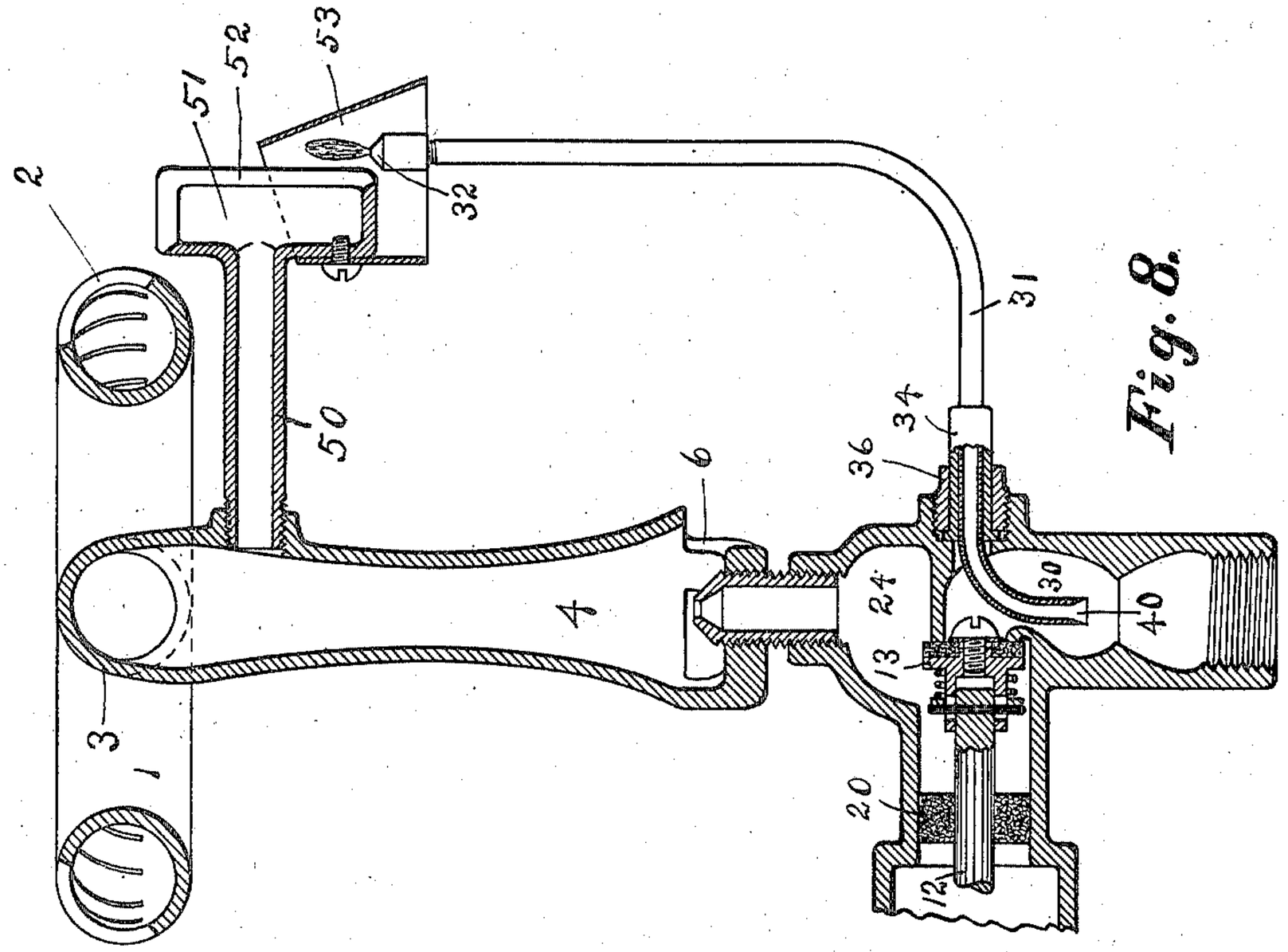

Fig. 8.

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UNITED STATES PATENT OFFICE.

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IGNITING APPARATUS.

951,724. Specification of Letters Patent. Patented Mar. 8, 1910.

Application filed May 10, 1907. Serial No. 372,863.

To all whom it may concern:

Be it known that I, DWIGHT S. COLE, a citizen of the United States, and a resident of Detroit, in the county of Wayne and State of Michigan, have invented a new and Improved Igniting Apparatus, of which the following is a specification.

This invention relates to devices for igniting gas burners, and the object of my improvements are:—to provide an efficient and constantly burning pilot light and igniter that shall consume a minimum of gas when the burner or burners which it ignites are not in operation; to provide means whereby the constantly burning pilot light shall be so protected that it will not be extinguished by currents of gas or air or by the "back puff" when the main burner is extinguished; and to provide the commonly employed flame-carrying ignition tubes for large burners with an auxiliary constantly burning pilot light of such small size that the normal consumption of gas will be very small.

My invention consists in the combination of a large gas burner, an igniting burner, and a constantly burning pilot light for the igniting burner.

It also consists in the novel construction whereby the igniter is adapted to receive the flame from the pilot light.

It also consists in the novel construction of the connection between the burners and the gas main, whereby a temporarily increased blast of gas is provided for the pilot light when it ignites the igniting burner.

It further consists in a novel protection for the flame of the pilot light.

In the accompanying drawings, Figure 1 is a central vertical cross section of my improved igniting apparatus in connection with a ring burner. Fig. 2 is a side view of the same. Fig. 3 is a Bunsen tube which may be substituted for that shown in Figs. 1 and 2. Figs. 4 and 5 are cross sections respectively on the lines 4—4 and 5—5 of Fig. 3. Figs. 6 and 7 are views of another form of Bunsen tube. Figs. 8 and 9 are central vertical cross sections of two other forms of burners with igniters and pilot lights.

Similar reference characters refer to like parts throughout the several views.

Constantly burning igniters for gas burners are usually of considerable size as they are usually placed near the gas openings of the main burners. In lighting and extinguishing a burner of the Bunsen type, there is a time when the mixture of air and gas becomes explosive and it often happens that the explosion of this mixture when the main flame is turned off, extinguishes both the main burner and the pilot light, if the pilot is small in size, and in close proximity to the large burner orifices. Adequately large constantly burning igniters or pilot lights for direct ignition consume a large amount of gas and are therefore a considerable constant expense.

In the drawings of my improved construction, which illustrate my invention in connection with a ring burner and large igniter, I have shown an automatic gas-regulating valve, which however forms no part of the invention herein claimed.

The main burner is formed of a tubular ring 1 provided with slots 2 for the escape of gas. The straight cross tube 3 connects at both ends with the ring, and also connects with the upright tube 4. This latter screws onto the nozzle 5 and is provided with the usual air openings 6. The nozzle screws into the body of the automatic valve.

In the construction shown, the supply of gas to the main burner is determined by the flow of water through the automatic valve, which in this case, is adapted for a water heating system, the water being heated as it is used. The body 7 of the valve has a bore for the piston 8, which piston has a small passage 9 through which the pressure in the pipe 11 may be maintained. The feed pipe 10 delivers water to the right of the piston 8, and if water is drawn off faster than can be supplied through the orifice 9, the pressure on the left of the piston being relieved, the piston will move to the left. The piston rod 12 carries a valve 13 at its right end, which valve is normally seated to close the gas passage to the burner 1. When the piston moves to the left, the valve 13 leaves its seat 14 and permits gas to flow to the burner. Metal washers 15 and 16 are screwed onto the piston rod 12 and between them is mounted a cup shaped leather washer 17. A ring 18 screws onto the hub of the washer 16 and secures the leather disk 19 in position. Any other suitable material may be substituted for the leather. These parts form a piston that prevents water from passing to the right. The ring 20 of cork or other suitable material, through which the piston rod is slidable, prevents the escape of gas. A small opening 25 is adapted to re-

lieve any pressure which may result from leakage. The valve is held on its seat by the pressure of the water against the washer 15 acting through the piston and the spring 23 in the manner shown in the drawings. This mechanism is of value as it obviates the danger of the valve opening because of a water hammer causing short jars in the water in the pipes. But a well defined lessening of the pressure in the system will cause the piston 8 to move sufficiently to open the gas passage. The gas main connects to the body of the valve by means of the pipe 22. A gas chamber 24 is formed in the body and into this the nozzle 5 opens. A pipe 26 also connects into this chamber and is adapted to conduct gas to the igniter. A Bunsen tip 27 is secured to the end of the pipe 26 and onto this may be secured the Bunsen tube 28 having air openings 29. The tube is so mounted that its flame will ignite the gas passing out of the slots 2 in the main burner.

Projecting into the chamber 30 is the pipe 31 of the constantly burning pilot light, which pipe is bent upward to lie against the tube 28 as shown, and is provided with a tip 32. A clamp 33 secures the pipe 31 to the tube 28. A sleeve 34, having a flange 35 is slipped onto the pipe 31 before it is bent and secured tightly thereon. A threaded sleeve 36 slips over this sleeve 34 and screws into a threaded chamber formed around the opening in the body of the valve and thus holds the parts in position. A shield 37 of mica, metal or other material is carried by the arm 38 extending upward from the ring 33, which shield contacts with the tube 28 just above the tip 32. This shield not only prevents the flame from the tip 32 being blown out by the wind and by explosions, but also sheds the CO_2 which will decend when the flame from tube 28 is extinguished, that is, it prevents the flame from the tip 32 being extinguished by the back draft of the igniter.

The tube 28 is provided with a spiral slot 39, which while wide enough to permit gas to pass through, is not wide enough to permit the passage of flame. When the valve 13 permits gas to pass through pipe 26, a portion will pass through the slot 39, which will be ignited from the small pilot light. The flame will travel up along this slot and ignite the gas at the top of the tube, the flame of which, in turn, will ignite the gas at the large burners. The tip 32 is so formed that its flame under ordinary conditions is quite minute. To strengthen the flame at the time it is to ignite the flame at the slot 39, the following construction is employed. The end 40 of the pipe 31 is flared so as to act as a funnel and the part 41 of the passage 30 is restricted to cause the flow of gas at this point to be accelerated when the valve 13 permits the gas to flow freely. As a result, a blast of gas against the funnel 40 causes the flame at the tip 32 to become much larger than before. Instead of a spiral slot 39 cut through the tube, I may form the tube with a series of minute holes 42 (Figs. 6 and 7) through which the gas may escape in sufficient quantity to carry a flame to the top of the tube 43. Or the tube may be formed of a sheet of metal rolled to form a tube 44 having a cross section such as shown in Fig. 4 at its lower end and a cross section as shown in Fig. 5 at its upper end. Gas can pass out through the fine slot between the flanges 45, and carry the flame upward, but the slot is too narrow to permit the flame to pass through.

In Figs. 8 and 9, the main tubes 4 have burner rings as before described. The pilot lights at the end of the tubes 31, and the automatic valves 13, are also similar to those shown in Fig. 1. The igniters shown in these two figures are of different construction. Instead of a separate pipe leading from the chamber 24 and independent mixers 27—29 the igniters are constructed as follows. In Fig. 8 a tube 50 is shown to connect to the main tube 4 and at its outer end is formed with a burner 51 having a vertical slot 52 through which the gas will issue when the valve 13 is opened. A shield 53 is secured to the burner 51 to protect the pilot light. When the valve 13 is opened, the gas will rush up through the tube 4 and into the burner ring 1. At the same time it will pass out through the tube 50 and through the slot 52 in the igniter burner 51, and will ignite from the pilot light. The flame will travel up along the slot 52 and jump to the slots 2 in the ring 1. In the structure shown in Fig. 9, the igniter burner 60 is formed as a tube depending from the main burner ring 61, the slot 62 permitting a stream of gas to issue near the pilot flame. When the valve 13 is opened, gas will rush up into the ring 61 and out through the slots 62 and 63, and will be ignited at the pilot flame. A shield 64 protects the pilot flame from being extinguished from the explosion caused by the shutting off of the gas.

Having now explained my improvements, what I claim as my invention and desire to secure by Letters Patent, is,—

1. The combination of a main burner, an igniting burner adjacent thereto and connected to the same source of gas supply, an automatic valve to control said supply, a feed connection to supply gas to said valve, said igniting burner being provided with a gas mixing tube having a narrow slot, and a constantly burning pilot light adjacent to the lower end of the slot, said pilot light being connected to the gas supply connection which is restricted adjacent the open-

ing of the pilot light pipe so as to accelerate the feed when the automatic valve opens.

2. The combination of a main burner, an igniting burner adjacent thereto and connected to the same source of gas supply, an automatic valve to control said supply, a feed connection to supply gas to said valve, said igniter being provided with a gas mixing tube having a narrow slot, and a constantly burning pilot light adjacent to the lower end of the slot.

3. In a gas burner, the combination of a feed pipe, a mixing tube connected to the same, and a constantly burning pilot light beside the mixing tube and so positioned that the flame will be below the upper end of said mixing tube, said tube having an aperture to permit the escape of the gas so it may be ignited by the pilot light and to transmit the flame from the pilot light to the top of the tube, and a valve to control the admission of gas to said tube.

4. The combination of a valve chamber having a restricted portion, a valve in said chamber above the restricted portion, a burner connected to said chamber above the valve, a pilot light, a tube connected to said light and extending into said chamber to a point between the valve and the restricted portion in such a manner that the rush of gas when the valve is opened will accelerate the flow in the pilot light tube.

5. The combination of a main burner and an igniting burner, a gas chamber, connections between the chamber and burners, a valve controlling the admission of gas to said connections, a pipe extending into said chamber below the valve and so bent that its open end meets the current of gas, a burner at the free end of said pipe adjacent to the igniting burner, said chamber being so formed that the opening of said valve will cause an accelerated flow of gas to said pilot light.

6. In a gas burner, the combination of a main burner in the form of a ring, an auxiliary burner adjacent thereto comprising a tube having a slot to permit the escape of gas, a constantly burning pilot light adjacent to the lower end of said slot, and a shield over the pilot light to prevent its extinction upon the igniting of the main burner.

7. In a gas burner, the combination of a ring shaped main burner, an igniting tube adjacent thereto and provided with a slot to permit the escape of gas through its side, a pilot light adjacent the lower end of the slot, and a valve to admit gas to the main burner and igniting tube.

8. In a gas burner, the combination of a main burner and an igniting tube provided with a longitudinal slot, a valve to admit gas to the same, a constantly burning pilot light at the lower end of the slot, and a shield over said pilot light to prevent its extinction by the explosion of the gas when the main burner ignites.

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

DWIGHT S. COLE.

Witnesses:
ELIZABETH M. BROWN,
EDWARD N. PAGELSEN.