No. 653,820. Patented July 17, 1900.

J. P. SCHAFFER.

HOT AIR FURNACE.

(Application filed Aug. 31, 1898.)

(No Model.) 2 Sheets—Sheet 1

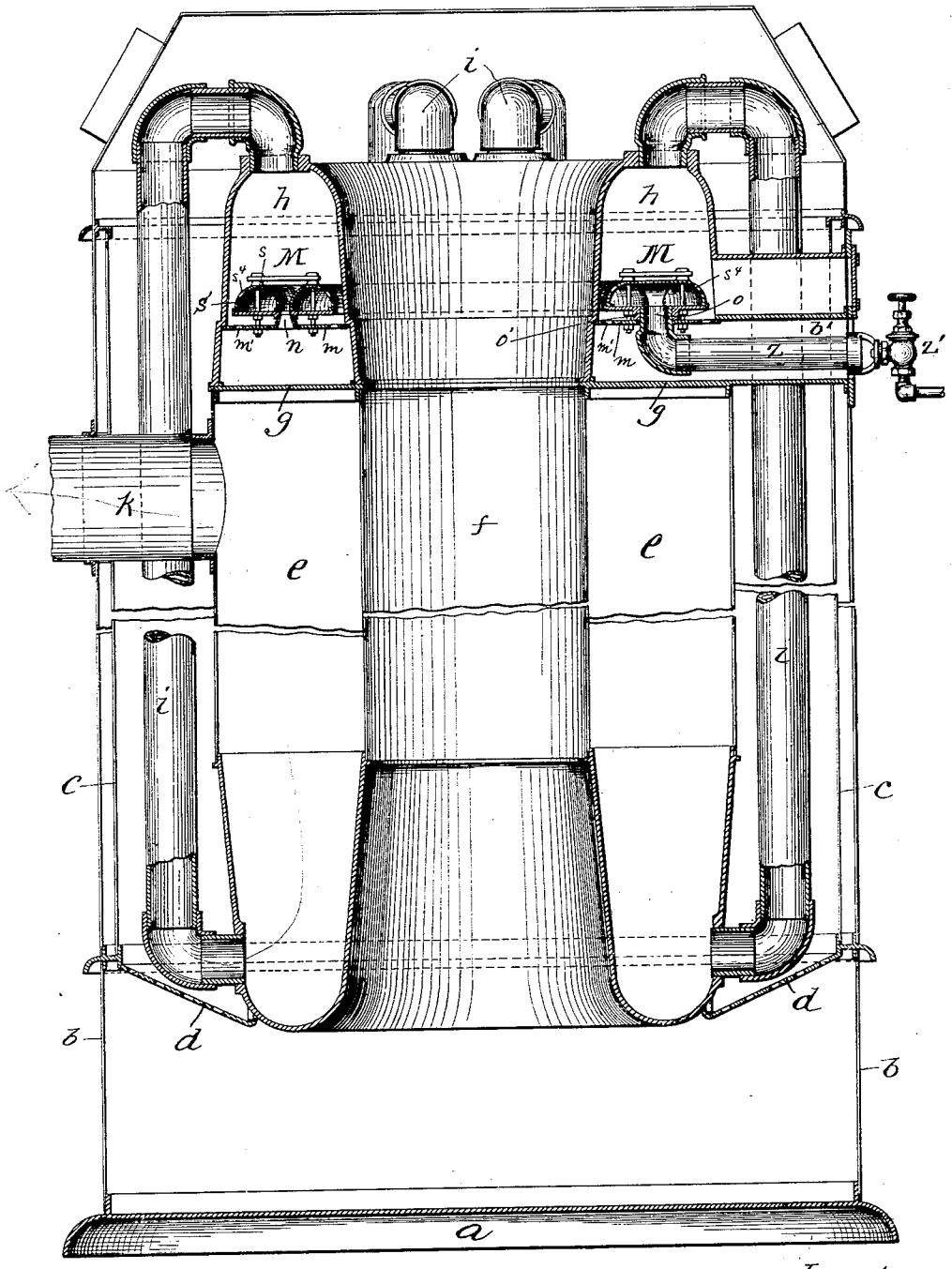


Fig. 1.

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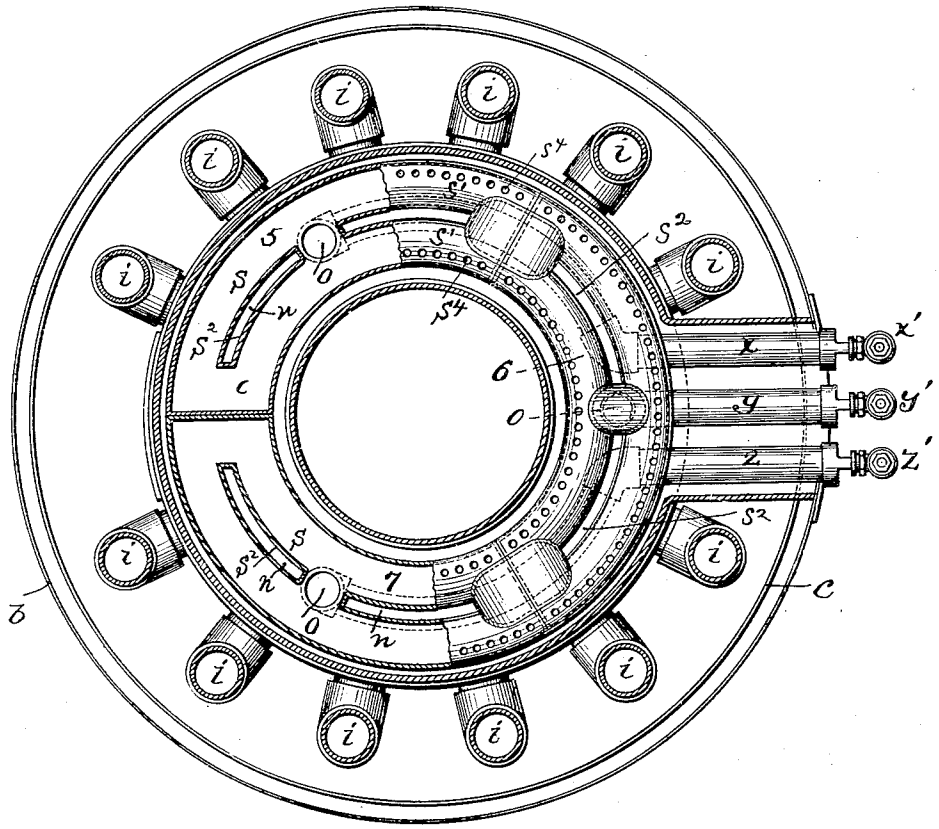


Fig. 2.

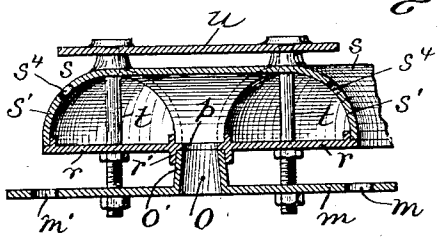


Fig. 3.

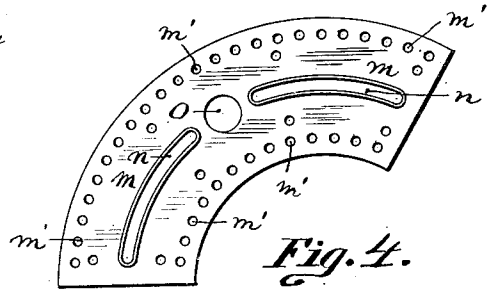


Fig. 4.

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UNITED STATES PATENT OFFICE.

JOHN P. SCHAFFER, OF PITTSBURG, PENNSYLVANIA.

HOT-AIR FURNACE.

SPECIFICATION forming part of Letters Patent No. 653,820, dated July 17, 1900.

Application filed August 31, 1898. Serial No. 689,944. (No model.)

To all whom it may concern:

Be it known that I, JOHN P. SCHAFFER, a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Hot-Air Furnaces; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to hot-air furnaces, its object being to provide a furnace in which gaseous fuel is so employed as to produce a maximum of heat with a minimum consumption of gas.

To these ends my invention comprises the novel features hereinafter claimed.

To enable others skilled in the art to make and use my invention, I will describe the same more fully, referring to the accompanying drawings, in which—

Figure 1 is a vertical elevation in section of my improved furnace. Fig. 2 is a cross-section thereof. Fig. 3 is an enlarged sectional view of the burner. Fig. 4 is a view of the bottom plate of the burner.

Like characters of reference indicate like parts in each view.

In the drawings the letter *a* represents a suitable base for supporting the cylindrical casing *b* of the furnace, which may be formed of metal plates suitably joined together. Suitably supported within the casing *b* is the inner shell *c*, having the perforated bottom plate *d*. Supported within the shell *c* is the annular heating-chamber *e*, said chamber having the central air-passage *f* extending through it. The upper end of the annular chamber *e* is separated from the lower portion by the plate *g*, said plate forming the upper combustion-chamber *h*, within which the burner is located. Pipes *i* lead from the upper chamber *h* to the lower chamber *e*, whereby said chambers are brought into communication with each other. There are a series of these pipes *i* and any number may be employed. The escape-flue *k* leads from the annular chamber *e*, at the upper end thereof.

The burner M is located in the annular chamber *h* and is constructed in the following manner: The annular bottom plate *m* has the slots *n* formed therein for the passage of air, and a central opening *o*, surrounded by the flange *o'*, through which the mingled gas and air passes to the combustion-chambers of the burner. This opening *o* coincides with the opening *p* in the bottom plate *r*. This bottom plate has the flanges *r'* formed thereon, which engage with the flange *o'* surrounding the opening *o* of the plate *m*. The body portion of the burner M is composed of the casting *s*, which has the semicircular portions *s'*, with the slots s^2 formed between said semicircular portions to allow air to pass up between the same. These slots coincide with the slots *n* in the plate *m*. The burner is made in sections and the segmental parts are arranged to form a complete circle.

When the body portion of the burner has been adjusted onto the plate *r*, the flanges *r'* in said plate will guide the body portion into position thereon, and the bolts *t*, passing through said plate *r* and the body portion, will act to secure said body portion to the plate *r*.

A baffle-plate *u* is secured to the top of the burner, bolts *t* passing down through said plate and burner and through the bottom plate *m*. By tightening the nuts at the lower end of the bolts *t* the parts of the burner can be securely fixed with relation to each other. The openings s^4 are the gas-outlets.

As stated above, the segments of the burner form a complete circle, and there is a separate gas-supply pipe leading to each segment of the circle. Accordingly there are the gas-supply pipes *x*, *y*, and *z*, controlled by suitable valves *x' y' z'*, respectively, said pipes being located in the opening *b'* in the walls of the furnace, so that the air and gas are properly mixed before they enter the combustion-chamber of the burner. The pipe *x* leads to the segment 5, the pipe *y* to the segment 6, and the pipe *z* to the segment 7.

When the furnace is in operation, the gas and air enter the pipes *x*, *y*, and *z*, provided it is desired to employ all the segments of the burner, and pass up through the opening *o* in the plate *m*, through the opening *p*, into the semicircular chambers of the burner. The gas and air being thoroughly mixed are ignited at the openings s^4 in the burner, and the baffle-plate *u* acts to deflect the course of the gases to each side. The hot gases then pass up through the chamber *h* into the pipes

i and down the pipes *i* and up into the annular chamber *e*, whence they escape by the flue *k*. In case it is desired only to use two of the segments of the burner the gas may be turned off from one of the inlet-pipes, such as *x*, whereupon only two of the segments of the burner will be in operation, or only one may be employed, if desired. In this manner it is very easy to regulate the heat of the furnace and reduce the amount of gas consumed.

By having the burner arranged in the upper part of the furnace in the manner shown the heat of the gases, which pass down through the pipes *i* and up into the annular chamber *e*, acts on the burner, tending to heat it up, and thus provide for the more thorough combustion of the gases in the burner. The entering air and gas are also heated, being directly above the highly-heated chamber *e*. The air entering the opening *b'* passes in and around the burner up through the slots s^2, furnishing quantities of heated air. Air also passes up through the openings *m'* in the plate *m* and around the outside of the burner. Air also passes up through the perforated plate *d* and around the hot pipes *i*, as well as up through the central passage *f*.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A heating-furnace, comprising a suitable casing, an inclosed annular shell, closed at its top and bottom and having a partition near its upper end forming a combustion-chamber above and a heating-chamber below the same, an annular burner located in the combustion-chamber, pipes leading from the upper portion of the combustion-chamber to the lower portion of the heating-chamber and an escape-flue leading from the heating-chamber adjacent to the partition, substantially as set forth.

2. A heating-furnace, comprising a suitable casing, a double-tube shell forming an annular space between adjacent walls, a partition dividing said space into a short combustion-chamber above and a long, supplemental heating-chamber below the same, a burner located in said combustion-chamber, pipes leading from the upper portion of said combustion-chamber to the lower portion of the heating-chamber and an escape-flue at the upper end of the heating-chamber, substantially as set forth.

3. A heating-furnace comprising a casing, an inclosed annular shell divided near its upper end by a partition into a combustion-chamber and a heating-chamber and forming an inner and an outer air-circulating chamber, a plurality of pipes extending from the top of the combustion-chamber through the outer air-chamber to the bottom of the heating-chamber, a burner in the combustion-chamber and an escape-flue at the upper end of the heating-chamber, substantially as set forth.

In testimony whereof I, the said JOHN P. SCHAFFER, have hereunto set my hand.

JOHN P. SCHAFFER.

Witnesses:

ROBT. B. TOTTEN,

LINDSAY DE B. LITTLE.