March 19, 1935. C. M. BREED 1,994,748

BURNER CONSTRUCTION

Filed June 25, 1934

Fig. 1.

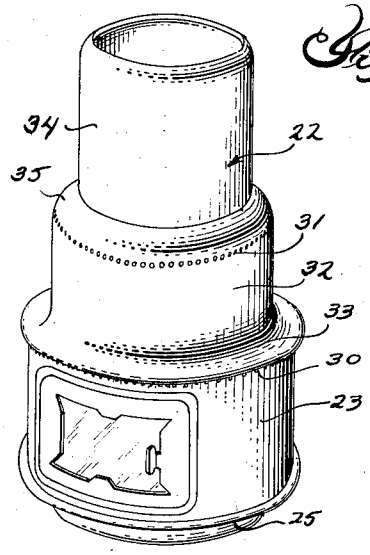



Fig. 3.

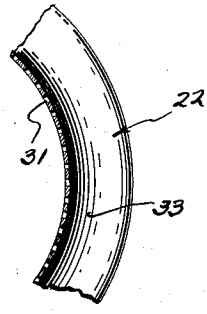



Fig. 4.

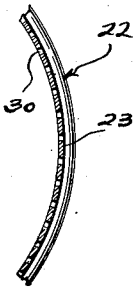
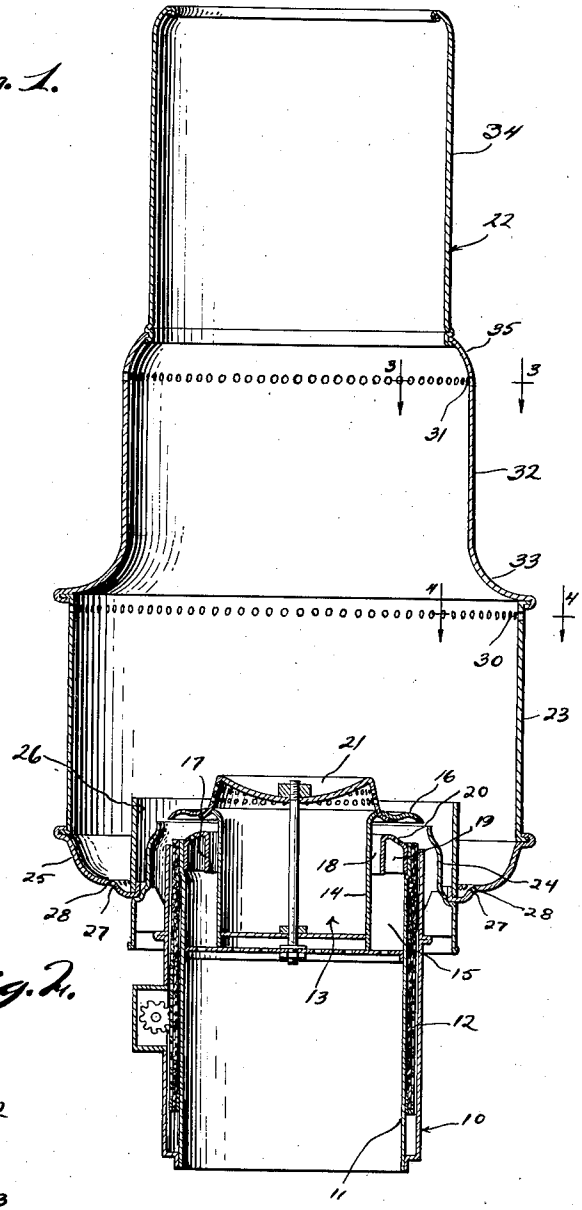



Fig. 2.




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Patented Mar. 19, 1935 1,994,748

# UNITED STATES PATENT OFFICE

1,994,748

## BURNER CONSTRUCTION

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Application June 25, 1934, Serial No. 732,364

6 Claims. (Cl. 158—94)

This invention relates to heating devices of the character embodying burners relying upon combustion for operation, and has as one of its principal objects to increase the efficiency of such devices by improving combustion control.

It is well established that in heating devices of the character set forth above, the efficiency of operation and the ability of such devices to produce maximum heat depends largely upon combustion control, or in other words, the height of flame capable of being effected in the burner chimney, without accumulating soot depends upon the efficiency of combustion within the chimney. To this end the present invention contemplates a heater having a burner chimney constructed in such a manner that the main air stream flowing upwardly therethrough is confined substantially to the central portion of the chimney and serves to effectively draw air into the chimney through suitable openings formed in the side walls of the chimney at points spaced longitudinally of the latter. Supplying air to the space within the chimney, in the manner previously set forth, replenishes the oxygen in the main air stream at different elevations and this is important, since it not only greatly increases combustion efficiency, but also permits higher flames to be utilized without sacrificing economy.

A further advantageous feature of this invention which contributes materially to effectively drawing air into the chimney through the openings in the side walls thereof resides in the provision of means at the lower end of the chimney permitting air to flow into the chimney at points spaced inwardly from the side walls of the chimney and causing this air to be directed toward the center of the chimney. Thus the air flowing upwardly through the chimney from the lower end thereof is prevented from hugging the side walls of the chimney and interfering with the passage of air into the chimney through the openings provided therein for this purpose. As a matter of fact confining the main air stream to the central portion of the chimney actually accentuates the entrance of air into the chimney, since it acts to draw the air through the openings.

A still further object of this invention consists in reducing the diameter of the chimney directly above the openings through the side walls thereof, so as to provide annular shoulders or baffles above these openings operable to not only direct the air passing through the openings toward the central or main air stream passing upwardly through the chimney, but to also assist in confining the main air stream to the central portion of the chimney, and in addition to insure against any possibility of the air in the main stream flowing directly across the openings in the sides of the chimney.

The foregoing, as well as other objects, will be made more apparent as this description proceeds especially when considered in connection with the accompanying drawing, wherein:

Figure 1 is a perspective view featuring a chimney constructed in accordance with this invention;

Figure 2 is a longitudinal sectional view through the chimney shown in Figure 1, and also through a portion of a burner with which the specific chimney illustrated herein is adapted to be used;

Figures 3 and 4 are respectively cross-sectional views taken substantially on the lines 3—3 and 4—4 respectively of Figure 2.

For the purpose of illustration, I have shown my improved chimney construction as employed in association with an oil burner of the wick type, although it will be apparent as this description proceeds, that the invention is applicable to burners of various different types.

While the particular construction of the wick oil burner forms no part of the present invention and does not effect the operation of the chimney, per se, nevertheless, the specific burner shown herein is preferred, since it has been found that the combination of the advantageous features of this burner with the high degree of performance of the chimney, to be fully hereinafter described, results in a heater possessing maximum efficiency.

The specific construction of wick oil burner illustrated in Figure 2, and the advantageous results attributed to this construction are described in detail in my Patent No. 1,966,282, issued July 10, 1934. In view of the fact that the above identified patent contains a complete description of the burner featured herein, it is believed unnecessary to complicate this specification with a detailed description of the burner. Briefly, however, the burner comprises a casing 10 and a wick tube 11 concentrically arranged within the wick tube and cooperating therewith to form a space therebetween for the wick 12. Also arranged within the wick tube is a flame spreader 13 having an annular body portion 14 of substantially less diameter than the wick tube, and cooperating with the latter to form an annular vertically extending air passage 15. The flame spreader may be secured in assembled relation with the wick tube in the manner shown

in Figure 2, with the upper end thereof projecting above the corresponding end of the wick tube, and provided with an annular horizontally disposed flange 16 extending laterally outwardly from the flame spreader body above the wick tube. Also located within the upper end of the wick tube is a baffle 17 of inverted substantially U-shaped cross section having the outer flange sleeved within the upper end of the wick tube and having the inner flange dividing the space 15 into inner and outer air passages 18 and 19 respectively.

With the construction as thus far described, it will be noted that air flowing through the innermost passage 18 is directed by the flange 16 laterally outwardly above the baffle, while the air flowing through the outermost passage 19 is received within the baffle and is directed by suitable openings 20 through the baffle laterally outwardly adjacent the upper end of the wick tube. Also air is permitted to flow upwardly through the flame spreader and this air is directed laterally outwardly above the flange 16 by a suitable apertured cap 21 secured to the upper end of the flame spreader. In addition, provision is made for directing air flowing upwardly at the outer side of the burner casing 10 inwardly adjacent the upper end of the wick tube and this is accomplished by a burner collar 24 surrounding the casing and secured thereto. The above construction insures maximum combustion control at the burner, and for this reason the latter is particularly applicable to my improved chimney construction about to be described.

The chimney is designated generally herein by the reference character 22 and comprises a tubular portion 23 at the lower end thereof surrounding the burner collar 24 and secured thereto in the manner clearly shown in Figure 2. Referring now more in detail to the particular construction of the chimney, it will be noted that the lower end of the chimney is provided with an inwardly extending annular flange portion 25 having an annular flange 26 extending vertically upwardly from the inner edge thereof and having a circumferentially extending series of openings 27 therethrough adjacent the flange to provide for the passage of air upwardly through the chimney. The series of openings 27 are spaced a substantial distance inwardly from the side walls of the tubular portion 23 and the portion of the flange 25 through which these openings are formed is bent as at 28 so that the air passing through the openings 27 is directed inwardly toward the longitudinal center line of the chimney, instead of toward the side walls of the latter. Thus the column of air flowing through the chimney 22 is, in effect, confined to the central portion of the chimney, or in other words, is prevented from hugging the side walls of the chimney during passage therethrough. Attention may also be called to the fact, at this point, that the side walls of the burner are substantially parallel since such a construction minimizes the tendency for the air flowing upwardly through the chimney to hug the inner surfaces of the side walls thereof.

Confining the column of air flowing upwardly through the chimney to the central portion of the latter, or in other words, preventing the air from hugging the side walls of the chimney is desirable since it offers the possibility of effectively drawing additional air into the chimney through the two circumferentially extending series of openings 30 and 31 formed in the side walls of the chimney at vertically spaced points. This additional air supplied to the interior of the chimney is advantageous since it materially increases combustion efficiency and thereby permits higher flames to be utilized. In the present instance, air is supplied to the interior of the chimney a substantial distance above the series of openings 27 by forming the circumferentially extending series of openings 30 through the upper end of the tubular portion 23, and additional air is supplied to the interior ofthe chimney at a point spaced vertically above the series of openings 30 by the other circumferentially extending series of openings 31 formed through another portion 32 of the chimney adjacent the upper end of the latter portion. The portion 32 is of less diameter than the portion 23 and is permanently connected to the upper end of the latter portion by means of a curved outwardly extending flange 33. Inasmuch as the openings 30 are formed through the upper end of the portion 23, it necessarily follows that these openings are directly below the flange 33, and the contour of the latter is such as to direct the air flowing through the openings 30 upwardly and inwardly toward the center of the chimney.

Located above the portion 32 is still another tubular portion 34 having a diameter less than the diameter of the portion 32 and permanently connected to the upper end of this latter portion through the medium of a curved flanged portion 35. As shown in Figure 2, the flanged portion 35 is curved inwardly and upwardly from the series of openings 31 so that this flanged portion will also serve to direct air flowing through the openings 31 inwardly toward the center of the chimney. Thus it will be seen that in the specific embodiment of the invention shown in Figure 2, I have provided two series of openings through the side walls of the chimney spaced vertically from each other and from the series of openings 27 at the lower end of the chimney for supplying air to the space within the chimney at different elevations. This arrangement provides for supplying sufficient oxygen to the interior of the chimney to afford maximum combustion efficiency even though a relatively high flame is employed. It will further be apparent from the foregoing description that I have especially constructed the chimney so as to insure the maximum flow of air through the openings in the side walls of the chimney to the interior of the latter. In this connection, it may be pointed out that the stepped cross section of the chimney shown in Figure 2, not only provides the flanged portions 33 and 35 for directing the air inwardly toward the center of the chimney, but also assists in confining the column of air flowing upwardly through the chimney to the central portion of the latter.

Although only one specific embodiment of the invention has been shown and described herein, nevertheless, it is to be understood that various changes in construction may be resorted to without departing from the scope of this invention, and therefore, reservation is made to make such changes in the specific construction illustrated, as may come within the purview of the accompanying claims.

What I claim as my invention is:

1. In a heater, a burner, a chimney for the burner having substantially parallel side walls and having vertically spaced reduced portions successively decreasing in size, means at the lower end of the chimney permitting air to flow upwardly into the chimney, and means spaced above

the means aforesaid permitting additional air to flow into the chimney.

2. In a heater, a burner, a chimney for the burner having substantially parallel side walls and having vertically spaced reduced portions successively decreasing in size from the bottom to the top of the chimney, means at the lower end of the chimney operable to permit air to flow upwardly into the chimney and to direct this air toward the central portion of the chimney, and means supplying additional air into the chimney at points immediately below the shoulders formed by the reduced portions aforesaid of the chimney.

3. In a heater, a burner, a chimney for the burner having vertically spaced reduced portions successively smaller from the lower end of the chimney forming inwardly extending baffles and having openings through the sides below the baffles operable to supply air to the interior of the chimney.

4. In a heater, a burner, a chimney for the burner having vertically spaced reduced portions successively decreasing in size and having a series of air inlet openings in the side walls thereof located immediately below the shoulder formed by one of the reduced portions.

5. In a heater, a burner, a chimney for the burner having tubular portions successively decreasing in diameter from the bottom to the top of the chimney and having air inlet openings in the side walls thereof immediately below the shoulders formed by the reduced portions of the chimney whereby said shoulders act as baffles to direct the air flowing through the openings toward the center of the chimney.

6. In a heater, a burner, a chimney for the burner provided with tubular portions successively decreasing in size from the bottom to the top of the chimney and having parallel side walls, the walls of certain of the tubular portions having air inlet openings therethrough beneath the shoulders connecting the parallel walls to each other whereby said shoulders form baffles to direct the air flowing through the openings toward the center of the chimney.

CARROLL M. BREED.