Jan. 2, 1934. T. J. CORNWELL ET AL 1,942,203

FURNACE RADIATOR

Filed March 30, 1932

Fig. 1.

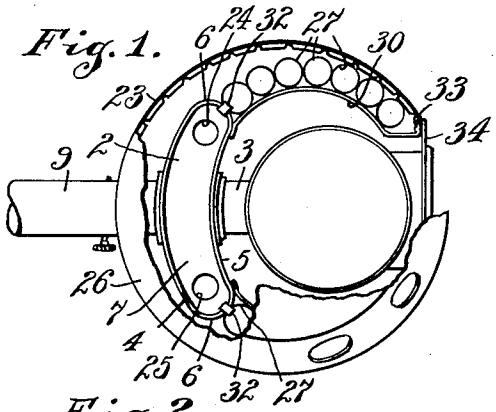


Fig. 3.

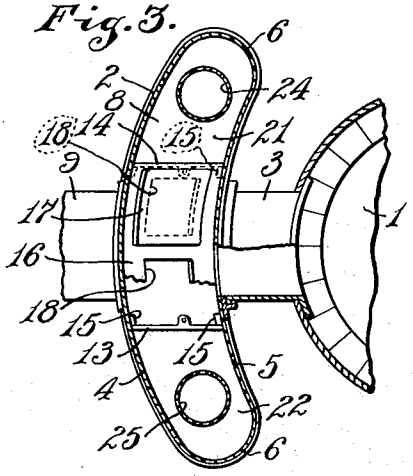


Fig. 2.

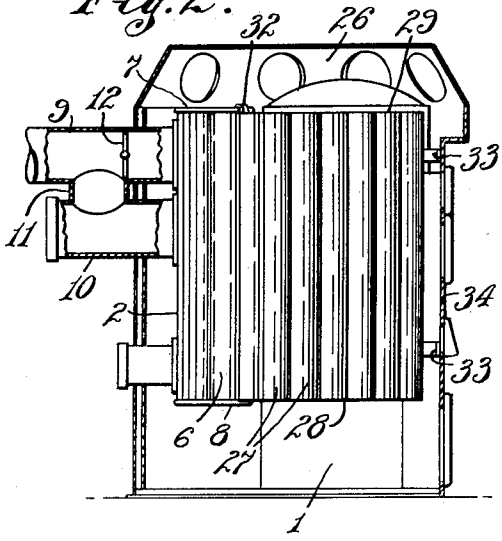


Fig. 4.

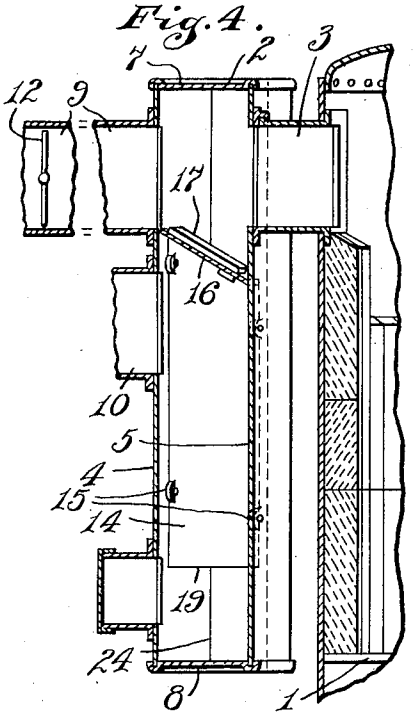
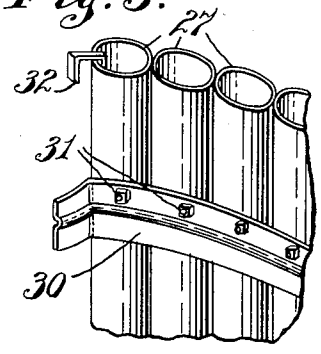


Fig. 5.



INVENTORS
Turley J. Cornwell and
BY John R. Strahlendorf,
Hood & Hahn.
ATTORNEYS

Patented Jan. 2, 1934 1,942,203

UNITED STATES PATENT OFFICE

1,942,203

FURNACE RADIATOR

Turley J. Cornwell and John R. Strahlendorf,
Indianapolis, Ind.

Application March 30, 1932. Serial No. 601,896

4 Claims. (Cl. 126—99)

This invention relates to improvements in furnaces, particularly furnaces of the hot-air type for household heating. It has for one of its objects the provision of an improved form of radiator, mounted within the furnace jacket and so constructed that an increased length of travel of the hot gases will be caused before passing to the chimney, and so arranged that the damper controlling this travel of gases will, when closed, not be subjected to the extreme heating influence of the gases to thereby become warped or twisted.

Another object of the invention is to provide in the deflecting structure heat resisting material at the point where the hot gases impinge upon the deflecting member so that, this deflecting member will not only have an increased length of life but may be readily renewed when desired.

Another object of the invention is to provide means for increasing the velocity of the air from the bottom towards the top of the furnace jacket whereby increased efficiency of the furnace may be produced.

Fig. 1 is a plan view of a furnace embodying our invention, the casing being broken away;

Fig. 2 is a side elevation partly in section;

Fig. 3 is a horizontal section of the radiator;

Fig. 4 is a longitudinal section of the radiator; and

Fig. 5 is a perspective view of the air flues.

In the embodiment of the invention illustrated the firepot 1 may be of any of the approved designs and this firepot near its top communicates with the radiator 2 by means of a smoke flue 3. The radiator is preferably arcuate in shape comprising the front and back curved plates 4 and 5 connected at their ends by rounded portions 6 and this structure is covered by top and bottom plates 7 and 8. The top rear portion of the radiator communicates with the smoke pipe 9 leading to the chimney. In addition to this smoke flue there is also provided a secondary smoke flue 10 arranged beneath the flue 9 and communicating therewith by means of the vertical flue 11. The smoke flue 9 has mounted therein and preferably at a point some distance from the radiator, even to the extent of being outside of the furnace jacket a damper 12. The radiator is divided into two passageways or branches for the passage of smoke and gases therethrough by means of a pair of walls 13 and 14. These may be made integral with the front and back walls 4 and 5 of the radiator although we prefer to form these walls 13 and 14 of castings, separate from the radiator, and bolt or otherwise secure the same by means of lugs 15 on the front and rear edges of the walls. The top edges of the walls are inclined downwardly from back to front and support a cover plate 16, which in turn is covered by fire-brick plate members 17. In order to hold these members in position the top plate 16 is provided with recesses or openings 18 adapted to receive the fire-bricks, which bricks at their upper edges are provided with flanges resting on the plate 16. The bottom edges 19 of the two divider plates 13 and 14 stop short of the bottom of the radiator and flue 10 communicates with the space between the walls 13 and 14.

In operation when the furnace is initially fired, that is when fresh coal is thrown into the firepot, a more or less powerful draft is desired in order to carry off the products of combustion rather quickly and to assist in the quick ignition of the fuel. Therefore, the damper 12 is opened and a direct path of travel is provided from the top of the firepot to the chimney through the flue 3 and through the smoke flue 9. After the fuel has been fairly well ignited it is desirable that the combustion gases have a longer travel before passing into the smoke flue or chimney and therefore the damper 12 will be closed. With the damper 12 closed the products of combustion impinging upon the fire-brick members 17 will be deflected sidewise and will pass down on either side of the walls 13 and 14 through the flues 21 and 22 in the radiator. These products of combustion thence pass beneath the bottom edges 19 of the walls 13 and 14 and then upwardly through the flue 10 and by means of the connection 11 into the smoke pipe and, it will be noted, beyond the damper 12. By this increased travel there is given a greater chance for the heat to be transmitted to the radiator and therefore into the heating chamber of the furnace formed by the outer casing 23. These gases will also be given an opportunity to be thoroughly consumed before passing into the smoke flue or chimney.

By reason of the fact that at the point where the gases enter the radiator they impinge on a fire-brick surface, the deflecting surface is highly resistant to the deteriorating effect of the heat of these gases and also after this fire-brick surface becomes heated it becomes almost incandescent, thereby assisting in the ignition of the unburned gases passing out from the firepot.

Furthermore, it will be noted that the damper 12 is placed, when closed, out of the path of travel of the products of combustion and hot gases so that it remains comparatively cool and will not become collapsed or burned out by these gases.

In order to increase the radiating effect of the radiator 2, tubular passageways, for the air to be heated, 24 and 25 are provided through the radiator from top to bottom whereby the cold air entering the heating chamber at the bottom and passing up through these tubular passages becomes heated before it passes into the bonnet 26 of the furnace casing. These flues materially increase the velocity of the air and serve to increase the bonnet pressure adding to the efficiency of the structure.

In addition to the above flues, we provide a plurality of air flues 27, on each side of the firepot, the lower ends 28 of which are above the bottom of the furnace casing and the upper ends 29 are about at the bottom of the bonnet. These flues very materially increase the velocity of the air bonnet pressure which in turn increases the velocity of the hot air through the heat conducting flues. Furthermore by the provision of these tubular flue members, the hot air is caused to be more rapidly passed through the furnace casing as a result of the increased velocity therethrough and there is less heat wasted through the furnace casing.

We preferably so construct these tubular flues that they constitute a unitary structure which may be readily mounted within the furnace casing. To this end we provide a plurality of tubular structures as 27 which may be made of galvanized pipe of suitable diameter and these tubular members are connected together by means of a transversely extending brace or connector member 30, each tube being connected to the brace by bolts 31 or other suitable connecting device. The tubular flue adjacent the radiator 2 is provided at its upper end with a hook 32 whereby it may be hung upon the upper edge of the radiator. The front end of the bracing member 30 lies adjacent the front portion of the casing at the point 33 and may be bolted or otherwise secured at this point, being preferably secured to the front casting plate 34 so that, the flue units may be hung in position prior to the assembly of the casing.

We claim the following:

1. A radiator for hot air furnaces comprising an airtight casing including front and rear spaced apart walls, said front wall near its top having an opening connected by a smoke flue with the firepot of the furnace, said rear wall having an opening in alignment with said front wall opening and connected by a smoke flue with the chimney, vertical partitions extending between said front and back walls to divide the casing into two side and a center passageways, said vertical dividing walls at their tops ending below said openings and at their bottoms ending above the bottom of the radiator, a cover for said center passageway inclined downwardly from back to front, from a point in alignment with the bottom of the chimney smoke flue opening, and a damper for controlling the passage of products of combustion through said chimney smoke flue opening located out of the direct line of passageway of the products of combustion when the damper is closed, said center passageway having an opening in the rear wall communicating with the chimney smoke flue.

2. A radiator for hot air furnaces comprising an air-tight casing including front and back spaced apart walls, said casing near its top having an opening in the front wall communicating with the firepot of the furnace and an opening in its rear wall in alignment with said front wall opening connected to the chimney smoke flue, vertical partitions extending between said front and back walls to divide the casing into two side and a center passageways, a closure for said center passageway formed of firebrick and inclined downwardly and forwardly from a point approximately in line with the bottom of the chimney smoke flue, and a damper for controlling the passage of the products of combustion through said smoke flue opening located out of the line of travel of the products of combustion, when the damper is closed, said center passageway having an opening in the rear wall of the radiator communicating with the chimney smoke flue.

3. A radiator for hot air furnaces comprising an air tight casing including front and back spaced apart walls, said casing near its top having an opening in its front wall communicating with the firepot of the furnace and an opening in its rear wall in alignment with the front wall opening communicating with the chimney smoke flue, vertical partitions extending between said front and back walls to divide the casing into two side and a center passageways, a closure for the center passageway extending across the top thereof and inclined from back to front, and located below the bottom of the smoke flue opening, and a damper located in the chimney smoke flue for controlling the passage of the products of combustion through said rear opening, said center passageway having an opening in the rear wall of the casing communicating with the chimney smoke flue.

4. A radiator for hot air furnaces comprising an air tight casing including front and back spaced apart walls, said casing near its top having an opening in its front wall communicating with the firepot of the furnace and an opening in its rear wall in alignment with its front wall opening connected with the smoke flue for the chimney, vertical partitions extending between said front and back walls to divide the casing into two side and a center passageways, a closure for the center passageway comprising a cover member formed of fire-brick supported on the tops of the vertical walls and inclined downwardly from back to front, said cover being below the bottom of the smoke flue openings, and a damper for controlling the passageway of the products of combustion through said rear wall opening located in the chimney smoke flue, said center passageway having an opening in the rear wall of the casing communicating with the chimney smoke flue.

TURLEY J. CORNWELL.
JOHN R. STRAHLENDORF.