Oct. 18, 1927. 1,646,307

W. A. MOFFAT

FIREPLACE CONSTRUCTION

Original Filed Jan. 4, 1924 3 Sheets-Sheet 1

Fig. 1.

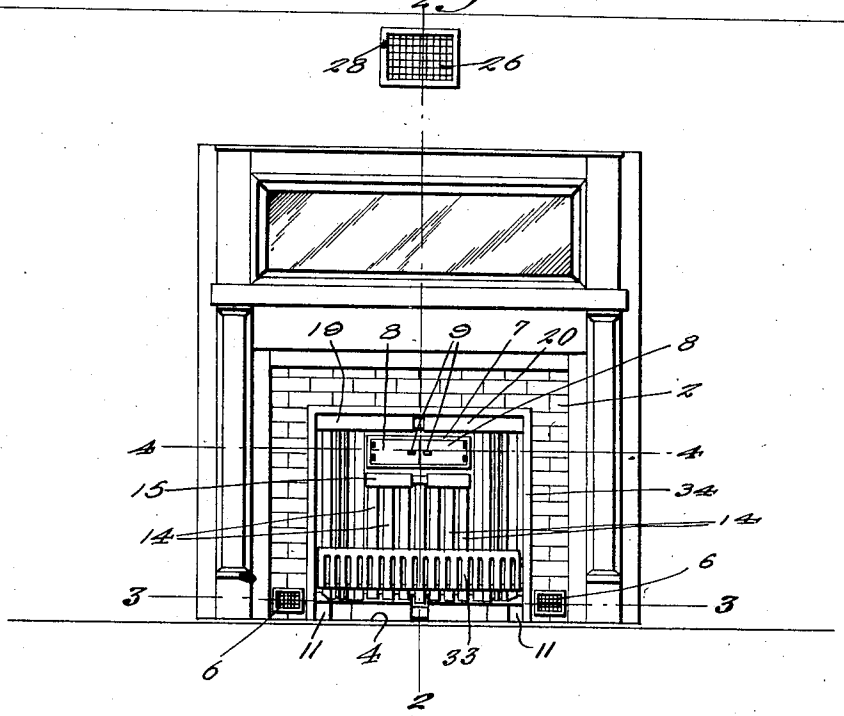


Fig. 3.

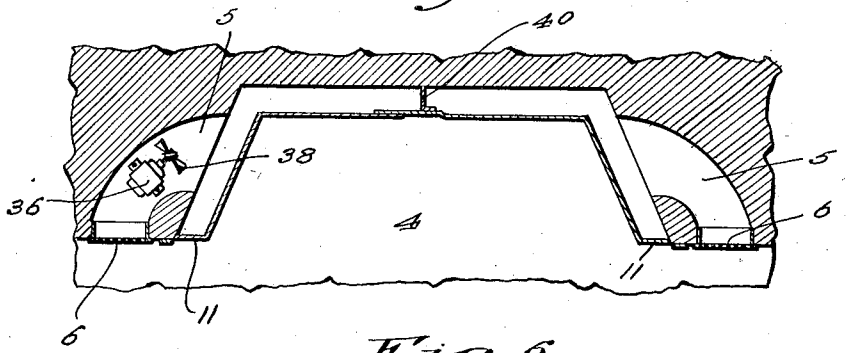
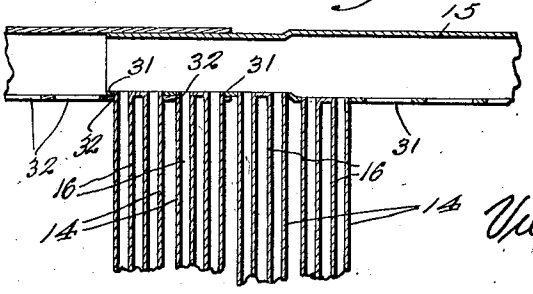


Fig. 6.



Witnesses
R. Q. Thomas

Inventor
W. A. Moffat
Victor J. Evans
Attorney

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W. A. MOFFAT

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Fig. 2.

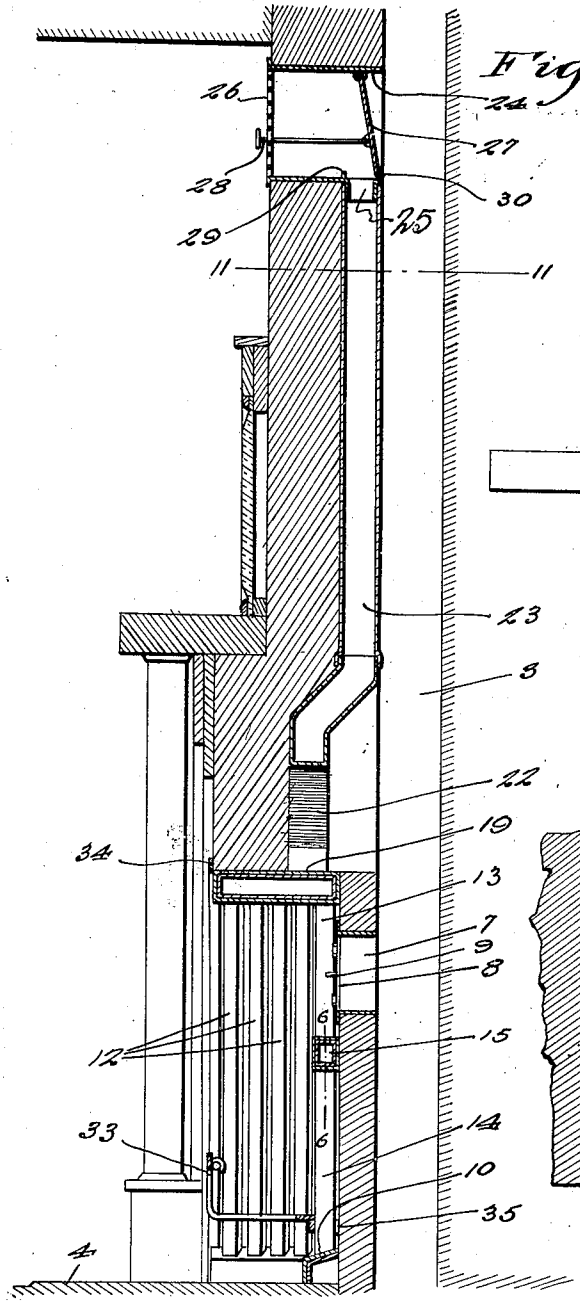


Fig. 12.

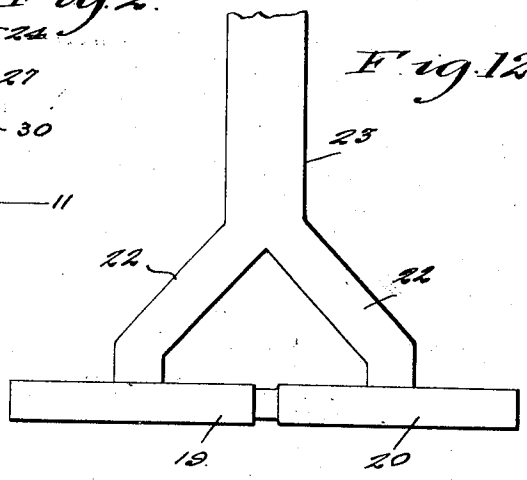
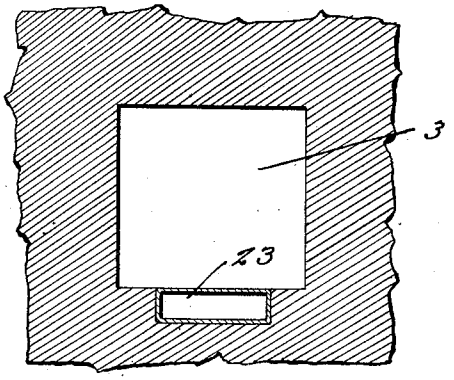


Fig. 11.



Witnesses

R. A. Thomas

Inventor

W. A. Moffat

Victor J. Evans

Attorney

Oct. 18, 1927. 1,646,307

W. A. MOFFAT

FIREPLACE CONSTRUCTION

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Fig. 7.

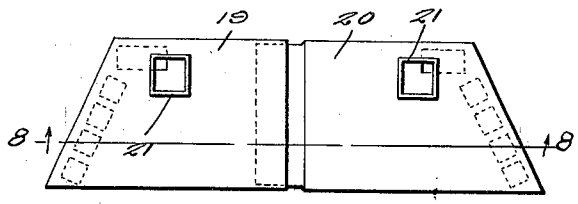


Fig. 10.

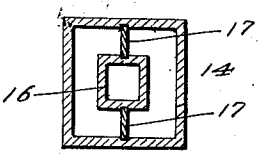


Fig. 8.

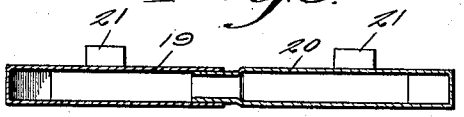


Fig. 9.

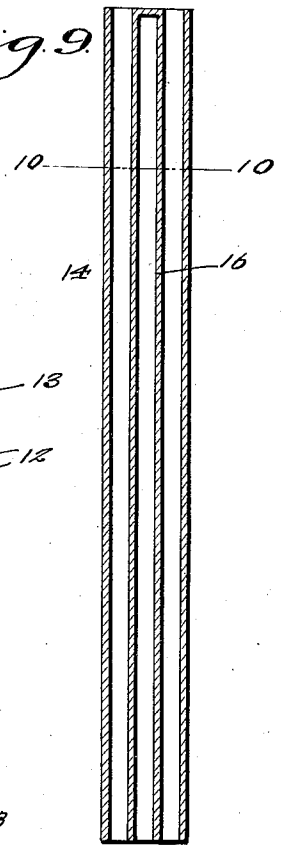


Fig. 4.

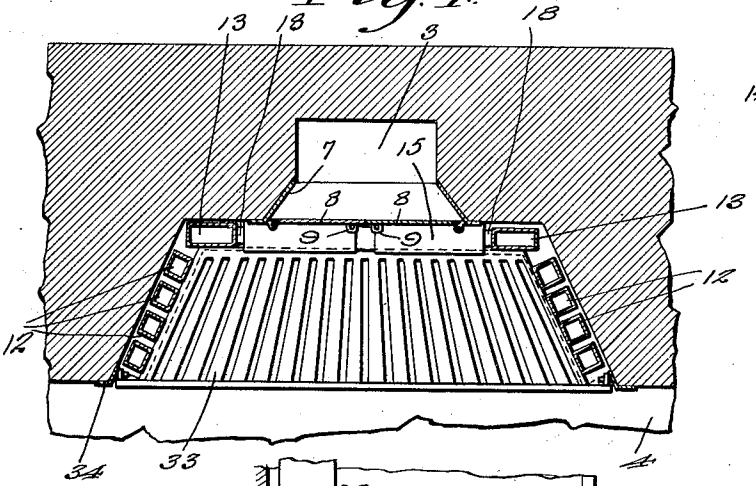
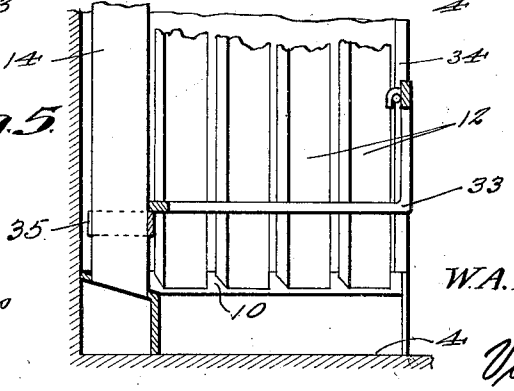


Fig. 5.



Witnesses
R. G. Thomas

Inventor
W. A. Moffat
Victor J. Evans
Attorney

Patented Oct. 18, 1927. 1,646,307

UNITED STATES PATENT OFFICE.

WALTER A. MOFFAT, OF MERIDIAN, MISSISSIPPI.

FIREPLACE CONSTRUCTION.

Application filed January 4, 1924, Serial No. 684,398. Renewed March 16, 1927.

The ordinary open grate fireplace in dwellings is more ornamental than useful as a heating device, inasmuch as the major portion of the heat units pass through the chimney flue and are lost, while the built-in construction prevents the proper radiation of heat throughout the room in which the fireplace is installed. Therefore, it may be considered the primary object of this invention to associate a hot air heating system with an open fireplace, said system being of such construction that the units of heat usually lost through the chimney flue will be utilized, and wherein the heated air will be redirected into the room in which the fireplace is located as well as into various other rooms of a dwelling so that an even volume of heat throughout the several rooms will be attained.

It is also my purpose to provide a hot air heating system in connection with an open fireplace that is adjustable, whereby the apparatus may be arranged in fireplaces of varying widths or sizes, and also by virtue of such adjustability the expansion and contraction of the apparatus incident to changes in temperature is provided for so that danger of breakage of parts and the liability of gases from the fire passing into the system will be effectively overcome.

I further propose to provide a hot air system in connection with an open fireplace in which the heat units from the fire will circulate entirely around the heat conductor tubes between the heads or drums of the device so that all of said surfaces will be heated proportionately by the heat from the fire in the fire box which is utilized in heating the system, thereby greatly augmenting the area of said heating surfaces as compared to previous constructions.

A still further object is the arrangement of cores in all or in certain of the tubes between the heads or drums of the system to diminish the air space therein and to decrease the volume of air passing therethrough which will have the effect of raising the temperature of the air thus delivered to a register, in a manner which cannot be accomplished by pipes not provided with cores.

A still further object is the production of a hot air heating system for open fireplaces of such construction as to offer the largest possible heating surface to the flames from the fire in the fire box so that a maximum amount of heat is thus obtained and redirected into the room in which the fireplace is located or into other rooms associated with the system.

A still further object is the production of a hot air heating system for open fireplaces that will not clog by soot and ashes from the fire box or grate, and in which the draft between the fireplace and chimney flue may be conveniently regulated, and being further provided with means to deliver the heated air up the flue when not required for heating the rooms, thereby eliminating the possibility of overheating the surfaces exposed to the heat of combustion which would occur were not such contingency provided for.

With the foregoing objects in view and others which will present themselves as the nature of the invention is better understood, reference is to be had to the drawings which accompany and which form part of this application.

In the drawings:—

Figure 1 is an elevation of a room provided with an open fireplace embodying the improvement.

Figure 2 is a sectional view on an enlarged scale and approximately on the line 2—2 of Figure 1.

Figure 3 is a sectional view on the line 3—3 of Figure 1.

Figure 4 is a sectional view on the line 4—4 of Figure 1.

Figure 5 is a fragmentary transverse sectional view to illustrate more clearly the construction of the cold air conducting head or drum, and the manner in which the grate basket is supported.

Figure 6 is an approximately central longitudinal sectional view approximately on the line 6—6 of Figure 2.

Figure 7 is a top plan view of the upper drum or header of the system.

Figure 8 is a sectional view approximately on the line 8—8 of Figure 7.

Figure 9 is a central longitudinal sectional view through one of the heat conductor tubes provided with the core.

Figure 10 is a sectional view on the line 10—10 of Figure 9.

Figure 11 is a sectional view on the line 11—11 of Figure 2.

Figure 12 is a front elevation of the upper head or drum with the flue pipes connected to the sections thereof.

The wall of a room provided with the

improvement is indicated by the numeral 1, in Figure 1 of the drawings. In the room there is an open fireplace 2 of the ordinary construction. The chimney flue for the fireplace is clearly illustrated in Figure 2 of the drawings and is indicated by the numeral 3. The fireplace may be of any ordinary construction and in the showing of the drawings, the same having angle side walls. The hearth for the fireplace is indicated, for distinction, by the numeral 4, and in Figure 3 of the drawings it will be seen that I have provided curved air passages 5 between the masonry facing of the fireplace and the angle side walls thereof. The air passages 5 are located just above the hearth 4 or, if desired, the same may have their lower walls in a line with the hearth. The air passages 5 have their outer portions partly closed by grating 6.

The rear wall of the fireplace, at a suitable distance below the top thereof has an opening therethrough that communicates with the flue 3. In this opening there is received a metal frame 7 that preferably has its outer edges flanged. The outer face of the frame 7 has hingedly secured thereto draft doors 8 respectively. The doors 8 are loosely associated with the frame, that is, there is not a tight joint between these elements so that gases from the fire in the grate or fire box will escape into the flue. Each door is provided on its outer face with an eye 9, and these eyes are designed to be engaged by the angle end of a poker or like instrument for sustaining the doors open or partly open to regulate the draft for the fire in the grate. When installations are made in old constructions, the frame 7 may be clamped to the framework of the system in a convenient manner, as shown in the drawings.

In carrying out my invention, I make use of an upper head or drum constructed of telescopic sections, and a lower head or cold air conducting duct which is also constructed of telescopic sections. The sections of the lower head or duct embody inner straight portions having angle ends to conform to the angle sides of the fireplace, the top flanges of the said sections being inclined upwardly, as indicated by the numeral 10. By this construction it will be observed that ashes or dust accumulating on the top of the lower air conducting duct or head may be readily removed therefrom. The side members of the lower duct or head have their ends closed, as indicated by the numeral 11 in Figure 3 of the drawings, while the confronting ends of the said sections are telescopically received one in the other, as disclosed in the said Figure 3. The sides of the lower drum are provided, on their upper inclined faces with closely related equi-distantly spaced air conductor tubes 12. In the showing of the drawings, these tubes are substantially rectangular in cross section, but the same may be of other cross sectional contour. The tubes are spaced from contact with the side walls of the fireplace so that the heat units from the fire will circulate entirely around the said tubes. The inner or longitudinal members of the lower header, adjacent to or at their juncture with their sides are provided with similar tubes 13. These tubes are of greater cross sectional diameter than the tubes 12 and consequently of greater area so that the heated air passing through the side tubes, and through auxiliary tubes associated with the inner tubes 13 will be approximately equal.

The spaced tubes 13 leave a comparatively wide space at the rear of the system which is necessary because of the position of the damper doors 8. This space is substantially filled by short tubes 14 connected to the lower header and to the telescopic sections of an auxiliary header 15 arranged below the doors 8. The tubes 14 have arranged therein hollow cores 16, open at their lower ends and closed at their tops, and spaced centrally in the tubes 14 by means 17 (Figure 10). By this arrangement it will be seen that the air space through the tubes 14 is diminished so that the volume of air passing through the said tubes is materially decreased and the temperature increased. The outer ends of the auxiliary header have pipe connections 18 with the tubes 13, so that the heated air passing through the short or auxiliary tubes 14 and the auxiliary header will be directed into the tubes 13.

The upper header or heat receiving drum is constructed of two telescopically associated sections 19 and 20 respectively. The upper drum is of a size to fill the space at the top of the fireplace and is provided with suitable openings that receive therein the upper ends of the tubes 12 and 13. The sections 19 and 20 are each provided, on its upper face with an opening surrounded by a collar 21 and slipped over or secured to these collars there are the straight ends at the angle lower portions 22 of a heat conducting pipe 23.

In the showing of the drawings, the heat conducting pipe is received through a passage in the chimney breast and terminates below the ceiling of the room 1. I desire to emphasize the fact that there may be associated with the pipe 13 other pipes that lead to various rooms in the dwelling. The room 1 provided with the heat conductor pipes has an opening communicating with the flue 3 and in this opening there is a casing 24 having an opening surrounded by a depending sleeve 25 that is received in the upper end of the heat conducting pipe 23. The outer face of the casing 24 is in the nature of a grating 26. The casing and

the grating forming the face thereof provide a register for conducting heated air into the room 1.

Hinged at the top of the open casing 24, adjacent to the inner end thereof, there is a damper valve 27. This valve is operated by a rod 28 that passes through the grating 26. The movement of the valve 27 is limited in two directions by stop elements 29 and 30. When the heat is to be conducted into the room 1 the valve is in the position illustrated in Figure 2 of the drawings. When there is too much heat in the room the rod 28 is operated to swing the damper valve against the stop 29, which permits the heat from the fireplace to flow through the pipe 23 into the flue 3.

By constructing the drums or headers of telescopic sections, it will be apparent that the improvement may be readily positioned in fireplaces of different widths. Such adjustment, however, will require a greater or less number of the short tubes 14, and to provide for this the cold air conducting duct and the auxiliary head 15 have their confronting faces at their telescopically associated portions provided with spaced openings, indicated in Figure 6, by the numerals 31 and 32 respectively. The openings are so arranged that those in the male telescopic portion will accurately register with those in the female telescopic portion when the sections are adjusted toward or away from each other, so that the short or auxiliary tubes 14 may be inserted in the said openings or removed therefrom to properly fill the space between the tubes 13.

The grate basket, or fire box 33 is of the usual construction and may have its angle front provided with hooks to engage lugs on the sides of the frame 34 of the fireplace, but in order to support the bottom of the grate I secure around the tubes 13 straps or bands 35 upon which the inner corners of the grate rest. This construction is most clearly shown in Figure 5.

When the fire is first started in the grate the doors 8 are opened. The air from the room flows through the passages 5 into the air conducting duct and is directed therethrough through the tubes into the auxiliary header 15 and the upper header. The heated air from the upper header will pass through the heat conducting pipe 23 and through the register 26 and from thence directed into the room or rooms.

Under certain weather conditions, it may be found necessary to boost the atmospheric air from the room through the system, in which instance I arrange in one of the passages 5 an electric motor 36 having its shaft extending toward the cold air conductive duct and provided with a combined suction and force fan 38. When the air boosting means is employed, I arrange in the center of the rear passage of the cold air conducting duct a partition 40 which prevents the passage of forced air entirely around the duct and directs the same through the tubes on one side of the system into the upper header.

With my improvement, the air from the several tubes enters the headers 19 and 20 proportionately heated. The headers 19 and 20 are really in the nature of secondary heaters for such air, inasmuch as the same is subjected to the radiant heat from the fire in the grate. The headers also serve as baffles whereby a great amount of heat units directed thereagainst will be redirected into the room, so that a greater volume of heat will be delivered directly from the fireplace than can be obtained with the usual construction. The improvement may be easily installed in dwellings provided with fireplaces either after or during the course of erection. The system in no ways retards from the artistic appearance of the fireplace, and as a matter of fact, may add to the ornamentality thereof, and while I have herein set forth a satisfactory embodiment of my improvement as it now appears to me, I wish it understood that I am entitled to make such changes in construction, material, proportion, etc., as fairly fall within the scope of what I claim.

Manifestly, the greater pressure in than at the outside of the system will prevent smoke or gases from the fire entering the system.

Having described the invention, I claim:—

1. The combination of a fireplace and a hot air heating system associated therewith, said fireplace having an opening communicating with the smoke flue therefor, draft doors controlling the opening, a cold air conducting duct made up of angle members whose upper walls are inclined and which are adjustably associated, said duct conforming to the shape of the fireplace and resting on the hearth thereof, the fireplace having air passages communicating with the sides of the duct, a main header comprising telescopically associated hollow members arranged against the top wall of the fireplace, filling the same and conforming to the shape thereof, conductor tubes between the sides of the air duct and the ends of the header, other and larger tubes at the inner corners of the air duct and the header, an auxiliary header comprising telescopically associated sections disposed below the draft doors, auxiliary tubes between the inner portion of the air duct and the auxiliary header, pipe sections between the auxiliary header and the corner tubes, a heat conducting pipe connected with the first mentioned header, a register between the wall of the room and the flue of the fireplace with which said pipe connects, and a damper movable in said register for directing the heat through the register into

the room or for directing the heat into the flue.

2. The combination of a fireplace and a hot air heating system associated therewith, said fireplace having an opening communicating with the smoke flue therefor, draft doors controlling the opening, a cold air conducting duct made up of angle members whose upper walls are inclined and which are adjustably associated, said duct conforming to the shape of the fireplace and resting on the hearth thereof, the fireplace having air passages communicating with the sides of the duct, a main header comprising telescopically associated hollow members arranged against the top wall of the fireplace, filling the same and conforming to the shape thereof, conductor tubes between the sides of the air duct and the ends of the header, other and larger tubes at the inner corners of the air duct and the header, an auxiliary header comprising telescopically associated sections disposed below the draft doors, auxiliary tubes between the inner portion of the air duct and the auxiliary header, said duct and auxiliary header having their sections provided with openings for the reception of the auxiliary tubes whereby the number of such tubes may be increased or decreased in accordance with the adjustment of the duct and header sections.

In testimony whereof I affix my signature.

WALTER A. MOFFAT.