Nov. 23, 1926. 1,607,691

N. J. RUSSELL

FUEL SAVING DEVICE FOR FURNACES

Filed Oct. 23, 1924

Fig. 1.

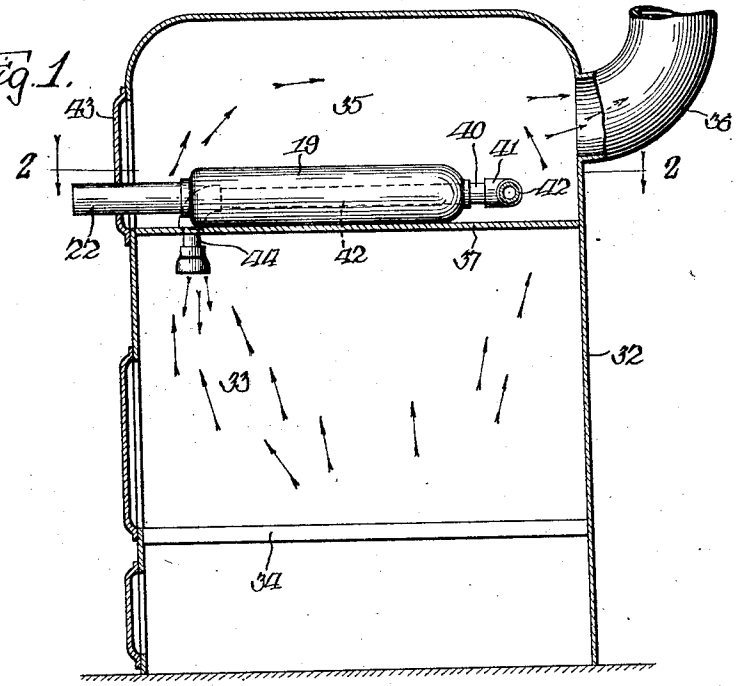


Fig. 2.

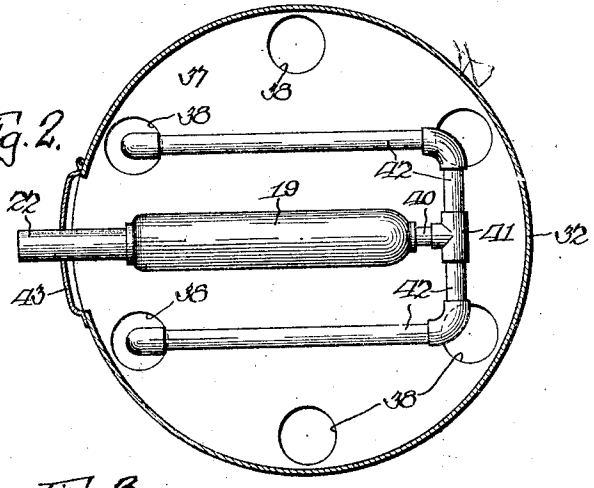
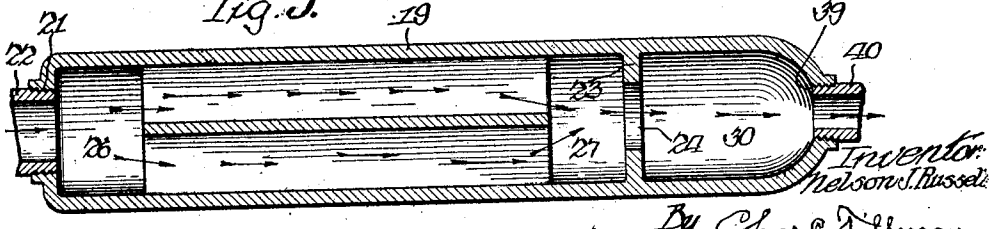


Fig. 3.



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UNITED STATES PATENT OFFICE.

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FUEL-SAVING DEVICE FOR FURNACES.

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This invention relates, generally, to furnaces or heating apparatus, but has particular relation to devices or attachments employed for feeding air thereto, and while it is more especially intended for use in connection with that type of furnaces known as boiler furnaces, wherein a boiler having a plurality of spaced flues for the passage of flames, heat and gases from the fire pot or box is employed, and while it is herein shown in the drawings and will be hereinafter described in connection with such furnaces, yet it will be understood that it is not my desire to be limited in its use to any specific form or type of furnaces, but that it may be employed in conjunction with any kind of a heater or furnace, with which it may be found applicable or practical, without departing from the essence or spirit of the invention.

The principal or general object of the invention is, the provision of certain improvements and devices applicable to or used in connection with certain parts, conduits or compartments of furnaces or heaters, but more particularly to boiler flues or fire flues of furnaces, for augmenting the effective power of fuel for heating purposes, and also for generation of steam.

More specifically, the object of the invention is to provide a device for automatically admitting, heating, directing and discharging atmospheric air into furnaces in such a manner that the supply of air to the furnace will, through the instrumentality of the device, be heated to a high degree of temperature, and in such a condition discharged, delivered, directed, and distributed in the furnace in a counter-current or counter-currents with respect to the current or currents emanating in and emitted from the fire box or pot thereof, to commingle with the combustible and volatile gases arising or issuing from the burning fuel, where said heated air and oxygen will be utilized to increase from a given amount of fuel, the combustion of combustible gases, or of the free carbon released during the burning of such fuel, thereby avoiding to a marked degree the formation of smoke, yet attaining a maximum amount of heat units from the fuel.

Another and important object of the invention is the provision of a device for the just above mentioned purposes, and of the said characteristics, which, by reason of its construction and arrangement of its parts is adapted for effective use in flue equipped or boiler furnaces, as well as in many furnaces or heaters which do not employ flues, strictly speaking, but have compartments or portions equivalent thereto with which the device co-operates in a somewhat similar manner.

Still another object is the provision of an air heating and discharging device, which, when used in a flue will not prevent the same functioning, and will admit of the use of a relatively large pipe for the supply of air thereto.

Other objects and advantages of the invention will be disclosed in the following description and explanation, which will be more readily understood when read in conjunction with the accompanying drawings, in which embodiments of which the invention is susceptible are illustrated, it being understood that changes and modifications may be resorted to without departing from the spirit of the invention, so long as they fall within the scope of the appended claims forming a part hereof.

In the accompanying drawing—

Fig. 1 is a central sectional view of a hot air furnace or heater showing the same equipped with one form of the fuel saving device.

Fig. 2 is a plan sectional view taken on line 2—2 of Fig. 1, and

Fig 3 is a longitudinal sectional view of the casing of the device.

In the drawings is shown a certain form of construction of the air feeding casing as well as of the furnace or heater casing, which latter casing 32 represents that of a hot air heater having a firebox 33, a grate 34 below the same, and a dome-shaped compartment or conduit 35 in its upper portion from which leads an outlet pipe or flue 36 for the discharge of smoke. The floor 37 of the conduit 35 is provided as usual with a number of ports or openings 38 for the passage of heat, gases and the like from the firebox 33, into the dome-shaped cavity or compartment 35 which is considered as a conduit as previously termed. The fuel saving or air heating device used in connection with this type of furnace or heater consists of an elongated casing 19 provided at its inlet end with a screw threaded opening 21 of a somewhat smaller diameter than the diameter of the body of said casing, into which is screwed or threaded one end of an air inlet

or intake pipe 22 which may lead through any portion of the furnace casing for the intake of external or atmospheric air. Near the end of casing 19, opposite its inlet end, the casing is provided with a transversely disposed partition 23 which has a centrally disposed opening 24 of about the same size or diameter as that of the air inlet pipe. Between the partition 23 and the inlet end of the casing 19 said casing is provided with longitudinally extended partitions or plates 25 which intersect each other and contact at their outer edges with the casing 19 or may be joined integrally therewith. These plates or partitions terminate at their ends some distance from the intake end of the casing 19 and from the partition 23, thus forming unobstructed chambers 26 and 27. The discharging end of the casing is contracted uniformly around its longitudinal axis and provided with an outlet 39 in which is located one end of a short discharge pipe 40 to which is connected a T-coupling 41 to each end of which is connected a branch pipe 42 which may extend to and above a pair of the openings or ports 38 in the floor 37 of the conduit 35, but in the present instance are shown as extending to and directly above the pair of such openings 38 located near the cleanout door 43 for said conduit. Each of the free ends of the branch pipes 42 is equipped with a reducing and expanding nozzle 44, see Fig. 1, extended through the openings 38 a slight distance below the floor 37 of the conduit 35 and are employed to direct and spread the heated air discharged from the air feeding casing 19 in a direction counter to that of the heat drafts or currents issuing from the lower portion of the firebox 33 of the furnace heater. The inlet pipe 22 of the air feeding casing may be extended through the cleanout door 43 of the conduit 35 or through the wall or casing of said conduit at any suitable point as is desired.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent is—

1. The combination, with a furnace having a firebox with a wall forming a roof thereon and a combustion chamber above said roof, flues connecting said firebox with said chamber, air conducting means resting on the top of said roof and provided with an air intake pipe which has its opening outwardly of the furnace and which leads into said conducting means, and means leading from said conducting means through a flue and discharging preheated air into said firebox.

2. The combination, with a furnace having a firebox and a combustion chamber with a wall there-between, and flues in said wall connecting said firebox with said combustion chamber, of an air-feeding casing supported on top of said wall and having an inlet pipe extending beyond the furnace into the atmosphere, and a discharge pipe leading from said casing down through one of said flues into said firebox and provided with means at its end for spreading and discharging pre-heated air into the said firebox to thoroughly mingle with the heat currents in said firebox.

3. The combination, with a furnace having a firebox with a wall forming a roof thereon, a combustion chamber above said wall and having a dome-shaped top thereover, a flue arranged in said wall for the passage of heat currents from the firebox to said chamber, a cleanout door providing access to said flues and to said combustion chamber, of an air feeding casing over said wall and having an air intake pipe extending through said cleanout door and communicating with the atmosphere, said casing being provided with a discharge pipe extending through the flue, and means at the end of said pipe for spreading and exposing all the air from said casing to the heat currents before said currents enter the flue.

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