S. C. HAYS.

FUEL SAVING DEVICE.

APPLICATION FILED SEPT. 29, 1917.

1,260,378. Patented Mar. 26, 1918.

Fig. 1.

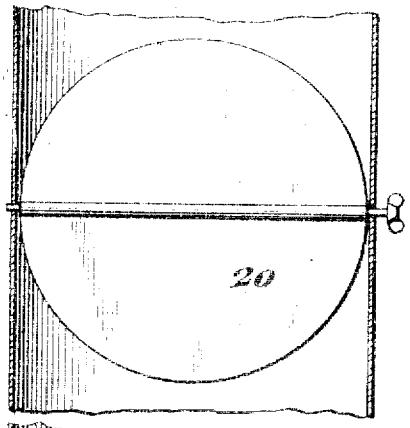
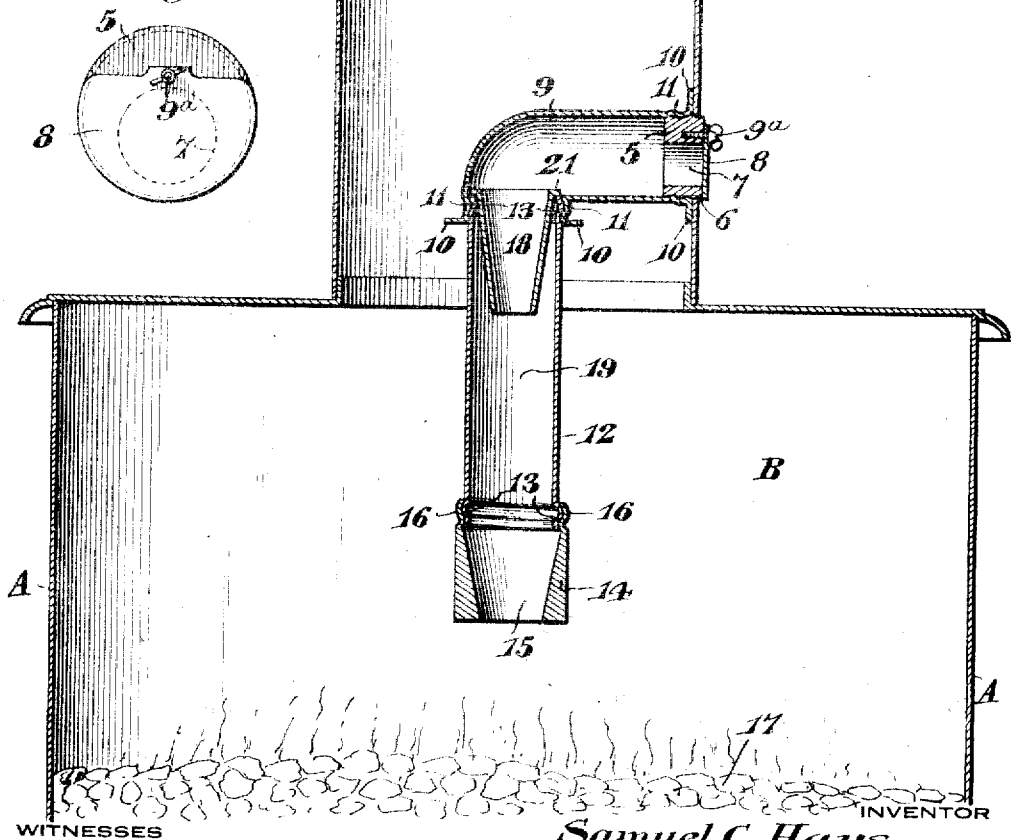


Fig. 2.



WITNESSES

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FUEL-SAVING DEVICE.

1,260,378. Specification of Letters Patent. Patented Mar. 26, 1918.

Application filed September 29, 1917. Serial No. 194,001.

To all whom it may concern:

Be it known that I, SAMUEL C. HAYS, a citizen of the United States, residing at Franklin, in the county of Venango and State of Pennsylvania, have invented a new and useful Fuel-Saving Device, of which the following is a specification.

The invention relates to a fuel saving device for a stove, furnace, boiler or the like, and more particularly to the class of air inlet and preheater attachments for heating systems.

The primary object of the invention is the provision of an attachment of this character, wherein atmospheric air is admitted into the combustion chamber of a stove, furnace or the like, for the preheating of said air to promote combustion, with minimum consumption of fuel, irrespective of the questionable high or low grade or quality of the same.

Another object of the invention is the provision of an attachment of this character wherein maximum saving will be had in the utilization of fuel and a more steady fire attained with resultant perfect combustion and maximum heating quality, the unspent gases will be burned, and the enormous waste of heat checked, which heretofore has escaped through the chimney or flue.

A further object of the invention is the provision of an attachment of this character which is simple in construction, readily and easily installed in a smoke pipe, or chimney for a stove, furnace or the like, thoroughly reliable and efficient in its operation, as it assures preheated atmospheric air or heated oxygen laden air to comingle with the products of combustion to assure perfect combustion for the complete burning of waste gases, and also one which is inexpensive in manufacture.

The invention will be best understood from a consideration of the following detailed description, taken in connection with the accompanying drawing, forming part of this specification, with the further understanding that while the drawing shows the practical form of the invention, the latter is not confined to any strict conformity with the showing of the drawings, but may be changed and modified, so long as such changes and modifications come within the scope of the appended claims.

In the accompanying drawings:—

Figure 1, is a fragmentary vertical sectional view through a fire box and chimney, showing the attachment in sectional elevation, constructed in accordance with the invention applied.

Fig. 2, is a plan view of the air inlet plug and pivoted shutter.

Similar reference characters indicate corresponding parts throughout the several views in the drawings.

Referring to the drawing in detail, A designates a portion of the fire box, B the combustion chamber, and C the smoke pipe or chimney of a stove, which are of any ordinary well known construction, the same being shown merely to illustrate the application of the attachment constructed in a manner hereinafter fully described.

The attachment is equally adaptable for use in a furnace, boiler or the like, and in fact, in any air heating system.

The air inlet and preheating attachment comprises a circular plug or disk 5, preferably made from metal, having a peripheral screw thread 6, for the tapping of the same into a suitable hole formed in the smoke pipe or chimney C, the plug or disk being provided with an air inlet port or hole 7, which is adapted to be closed by means of a shutter or closure plate 8, pivoted for swinging movement upon a winged screw 9^a, engaged in the plug or disk 5, above the port or hole 7 therein. Detachably engaged on the inner end of the plug or disk 5, after the same has been tapped or mounted in the smoke pipe or chimney C, is an elbow pipe section 9, which is formed at its ends with annular flanges 10, and screw threads 11, the flange 10 at one end being designed to abut or contact with the inner face of the smoke pipe or chimney C, concentrically of the plug or disk 5, while the adjacent screw thread 11, detachably secures the elbow pipe section to said plug or disk. The opposite end of the elbow pipe section 9 is located approximately central of the smoke pipe or chimney C, and is directed downwardly toward the combustion chamber in the fire box A of the stove.

Detachably engaged in the free end of the elbow pipe section 9, is one end of a straight pipe section 12, which extends downwardly into the combustion chamber B, the section 12, being formed with opposite threaded ends 13, one being screwed into the threaded end 11 of the elbow pipe section 9, while detachably screwed on to the other end of

said pipe section 12, is a nozzle 14, which is formed with a downwardly tapered passage 15, while the external diameter of said nozzle 14, is uniform in cross section, thereby gradually thickening the wall thereof from the inner to its outer end, the inner end being formed with a screw thread 16, for the detachable engagement thereof with the lower end of the pipe section 12. The nozzle is located at a point slightly elevated over the bed of fuel 17, within the fire box A, and the thickened wall of said nozzle 14, assures longevity thereto, to withstand the heat and flame from the fuel when burnt within the fire box.

Located within the straight pipe section 12, and resting upon the end thereof connected with the elbow pipe section 9, is an inverted substantially conical shaped nipple 18, which constitutes an inner baffle for the air admitted through the port or hole 7, and the elbow pipe section 9, and this nipple 18, with the nozzle 14, form a pocket within the straight pipe section 12, to constitute a preheating chamber 19, for the incoming air, so that said air will be preheated prior to the admission thereof into the combustion chamber B, through the nozzle 14, for commingling with the unspent gases therein to assure perfect combustion and the burning of the gases, which ordinarily escape through the smoke pipe or chimney C, without the stove.

By the adjustment of the shutter 8, the size of the port or hole 7, is regulated, thereby varying the admission of air through the attachment to the combustion chamber B, interiorly of the stove.

Arranged within the smoke pipe or chimney C, at the desired point thereof, is the usual damper 20, which can be manually turned to regulate or shut off the draft through said smoke pipe or chimney.

The air entering the attachment through the port or hole 7, strikes the baffle 18, and is deflected down under the same to within the chamber 19, and the burning products of combustion in escaping to the smoke pipe or chimney C, contact with and highly heat the chamber 19, thereby positively assuring the ingoing air being heated. The preheated air from the chamber 19, enters the combustion chamber B, through the nozzle 14, to be delivered to the top of the fuel, whence it disseminates and mixes with the liberated gases. The mixture of air and gas rising from the fuel effects a thorough mixing of a portion of the air from the chamber 19, with the result that the gases are subjected to and guided by various currents of heated air, and a perfect combustion is promoted and produced, with minimum consumption of fuel, and the assurance of maximum heat.

The damper 20, is properly adjusted to regulate the vacuum or suction within the combustion chamber B, in the stove for determining the inflow of atmospheric air through the attachment into said combustion chamber B, above the fuel bed 17, in the fire box A of said stove. The nipple 18, at its wide end is formed with an outturned flange 21, corresponding to the cross sectional size of the straight pipe section 12, to rest upon its end thereof engaged with the elbow pipe section 9, of the attachment, and in this manner, said nipple 18, is held supported within the straight pipe section of said attachment.

The attachment permits oxygen to flow into the combustion chamber, and there become heated, causing it to expand for comingling with the products of combustion to effect the burning of the unspent gases, with resultant saving in fuel, and perfect combustion.

From the foregoing, it is thought that the construction and manner of operation of the attachment will be clearly understood, and, therefore, a more extended explanation has been omitted.

What is claimed is:—

1. A device of the character described comprising an air inlet pipe adapted to be located within a smoke pipe to extend within the combustion chamber of a stove or furnace, a nozzle carried by one of the ends of the inlet pipe and extending to a point slightly above the fuel in said combustion chamber, a nipple located within the inlet pipe to provide a baffle coacting with the nozzle to form a preheating chamber in said inlet pipe, means on the smoke pipe for mounting the latter and connected to the other end of the inlet pipe, and means for closing the inlet end of said inlet pipe.

2. A device of the character described comprising an air inlet pipe adapted to be located within a smoke pipe to extend within the combustion chamber of a stove or furnace, a nozzle carried by one of the ends of the inlet pipe and extending to a point slightly above the fuel in said combustion chamber, a nipple located within the inlet pipe to provide a baffle coacting with the nozzle to form a preheating chamber in said inlet pipe, an inlet plug adapted for detachable engagement in the smoke pipe and connected to the other end of the inlet pipe, a closure member for the inlet in said plug, and means for holding the closure member in adjusted position to vary the inlet.

3. A device of the character described comprising an air inlet pipe adapted to be located within a smoke pipe to extend within the combustion chamber of a stove or furnace, a nozzle carried by one of the ends of the inlet pipe and extending to a point slightly above the fuel in said combustion chamber, a nipple located within the inlet pipe to provide a baffle coacting with the

nozzle to form a preheating chamber in said inlet pipe, an inlet plug adapted for detachable engagement in the smoke pipe and connected to the other end of the inlet pipe, a shutter for the inlet in said plug, and means for holding the shutter in adjusted position to vary the inlet, the nozzle being gradually thickened from the inner to its outer end.

4. A device of the character described comprising an air inlet pipe adapted to be located within the smoke pipe to extend within the combustion chamber of a stove or furnace, a nozzle carried by one of the ends of the inlet pipe and extending to a point slightly above the fuel in said combustion chamber, a nipple located within the inlet pipe to provide a baffle coacting with the nozzle to form a preheating chamber in said inlet pipe, an inlet plug adapted for detachable engagement in the smoke pipe and connected to the other end of the inlet pipe, a shutter for the inlet in said plug, means for holding the shutter in adjusted position to vary the inlet, the nozzle being gradually thickened from the inner to its outer end, and a flange on the inlet pipe end adjacent the plug to contact with the inner surface of the wall of the smoke pipe concentrically of said plug.

5. A device of the character described comprising an air inlet pipe adapted to be located within a smoke pipe to extend within the combustion chamber of a stove or furnace, a nozzle carried by one of the ends of the inlet pipe and extending to a point slightly above fuel in said combustion chamber, a nipple located within the inlet pipe to provide a baffle coacting with the nozzle to form a preheating chamber in said inlet pipe, an inlet plug adapted for detachable engagement in the smoke pipe and connected to the other end of the inlet pipe, a shutter for the inlet in said plug, means for holding the shutter in adjusted position to vary the inlet, the nozzle being gradually thickened from the inner to its outer end, a flange on the pipe end adjacent the plug to contact with the inner surface of the wall of the smoke pipe concentrically of said plug, and screw threads formed on the ends of the sections of the inlet pipe for detachably connecting the sections to each other, and also for the detachable connection of the plug and nozzle with the inlet pipe.

6. In a device of the character described the combination with a combustion chamber and a smoke pipe leading therefrom, of an externally threaded air inlet plug engaged in the wall of the smoke pipe, an elbow pipe section within the smoke pipe and having threaded ends, one end being detachably engaged with the threaded plug, a straight pipe section having threaded ends, one threaded end of said straight pipe section being detachably engaged in the other threaded end of the elbow pipe section, an inverted conical shaped nipple within the straight pipe section and resting on the end thereof engaged with the elbow pipe section, and a nozzle detachably threaded on the other threaded end of the straight pipe section and extending to a point slightly above the fuel bed within the combustion chamber.

7. In a device of the character described the combination with a combustion chamber and a smoke pipe leading therefrom, of an externally threaded inlet plug engaged in the wall of the smoke pipe, an elbow pipe section within the smoke pipe and having threaded ends, one end being detachably engaged with the threaded plug, a straight pipe section having threaded ends, one threaded end of said straight pipe section being detachably engaged in the other threaded end of the elbow pipe section, an inverted conical shaped nipple within the straight pipe section and resting on the end thereof engaged with the elbow pipe section, and a nozzle detachably threaded on the other threaded end of the straight pipe section and extending to a point slightly above the fuel bed within the combustion chamber, the said nozzle being gradually thickened from its inner end to the outer end thereof.

8. In a device of the character described the combination with a combustion chamber and a smoke pipe leading therefrom, of an externally threaded air inlet plug engaged in the wall of the smoke pipe and having threaded ends, one end being detachably engaged with the threaded plug, a straight pipe section having threaded ends, one threaded end of said straight pipe section being detachably engaged in the other threaded end of the elbow pipe section, an inverted conical shaped nipple within the straight pipe section and resting on the end thereof engaged with the elbow pipe section, a nozzle detachably threaded on the other threaded end of the straight pipe section and extending to a point slightly above the fuel bed within the combustion chamber, the said nozzle being gradually thickened from its inner end to the outer end thereof, and outturned annular flanges formed on the threaded ends of the elbow pipe section.

9. In a device of the character described the combination with a combustion chamber and a smoke pipe leading therefrom, of an externally threaded air inlet plug engaged in the wall of the smoke pipe and having threaded ends, one end being detachably engaged with the threaded plug, a straight pipe section having threaded ends, one threaded end of said straight pipe section being detachably engaged in the other threaded end of the elbow pipe section, an inverted conical shaped nipple within the straight pipe section and resting on the end

thereof engaged with the elbow pipe section, a nozzle detachably threaded on the other threaded end of the straight pipe section and extending to a point slightly above the fuel bed within the combustion chamber, the said nozzle being gradually thickened from its inner end to the outer end thereof, outturned annular flanges formed on the threaded ends of the elbow pipe section, and an adjustable shutter carried by the inlet plug for its inlet.

10. In a device of the character described the combination with a combustion chamber and a smoke pipe leading therefrom, of an externally threaded air inlet plug engaged in the wall of the smoke pipe and having threaded ends, one end being detachably engaged with the threaded plug, a straight pipe section having threaded ends, one threaded end of said straight pipe section being detachably engaged in the other threaded end of the elbow pipe section, an inverted conical shaped nipple within the straight pipe section and resting on the end thereof engaged with the elbow pipe section, a nozzle detachably threaded on the other threaded end of the straight pipe section and extending to a point slightly above the fuel bed within the combustion chamber, the said nozzle being gradually thickened from its inner end to the outer end thereof, outturned annular flanges formed on the threaded ends of the elbow pipe section, an adjustable shutter carried by the inlet plug for its inlet, and means for holding the shutter in its adjusted position.

11. In combination with the smokepipe and combustion chamber of a stove or furnace, an air inlet pipe in the form of an elbow having one end opening out at one side of the smoke pipe, means for closing the open end of the air inlet, a nozzle connected to the other end of the inlet pipe and extending down into the combustion chamber, and a tapered nipple located within the inlet pipe and coacting with the nozzle to form a preheating chamber in said inlet pipe.

12. A device of the character described comprising an air inlet pipe adapted to be located within a smoke pipe to extend within the combustion chamber of a stove or furnace, a nozzle carried by one of the ends of the inlet pipe and extending to a point slightly above the fuel in said combustion chamber, a nipple located within the inlet pipe to provide a baffle co-acting with the nozzle to form a preheating chamber in said inlet pipe, an inlet plug adapted for detachable engagement in the smoke pipe and connected to the other end of the inlet pipe, and a shutter for the inlet in said plug.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

SAMUEL C. HAYS.

Witnesses:
JOHN N. MARK,
E. M. SWYERS.