J. KOENIG.

HEAT ECONOMIZER.

APPLICATION FILED FEB. 5, 1918.

1,292,615.

Patented Jan. 28, 1919.

2 SHEETS—SHEET 1.

Fig. 1.

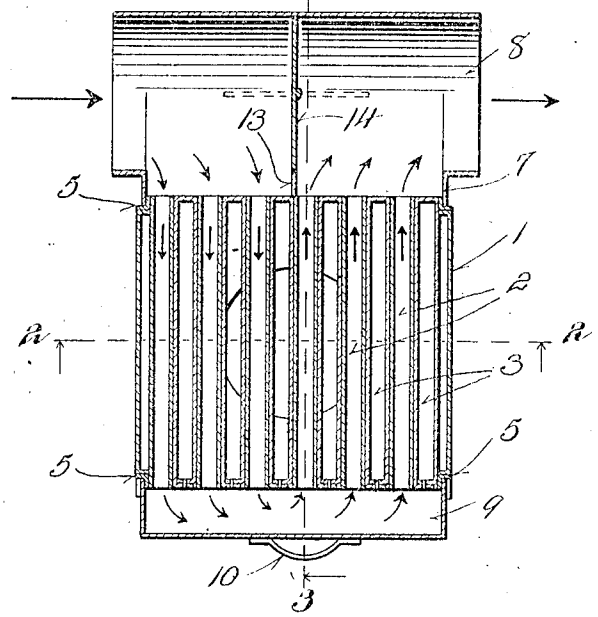
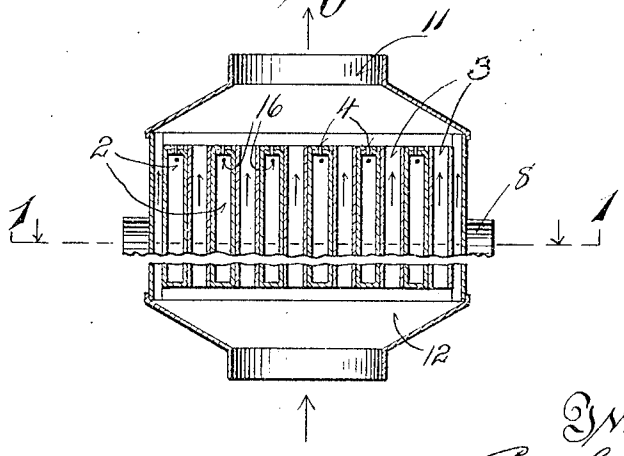


Fig. 2.



Witness

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2 SHEETS—SHEET 2.

Fig. 3.

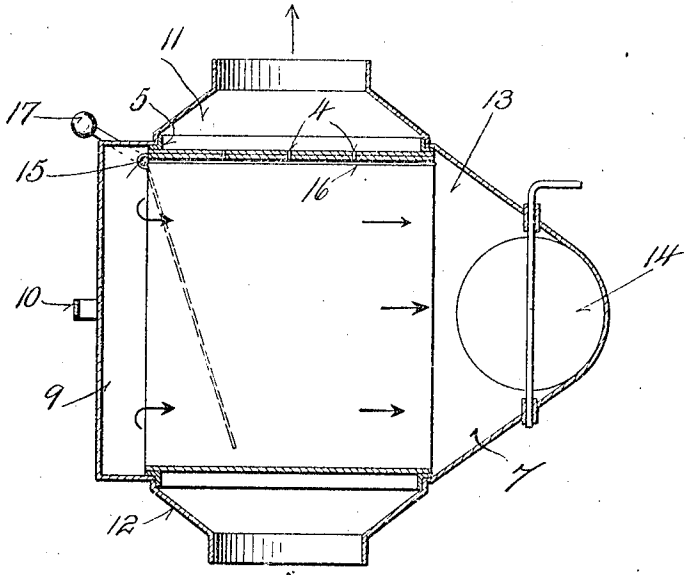


Fig. 4.

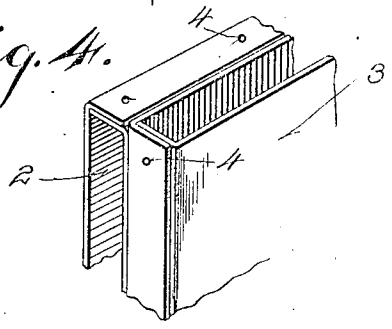
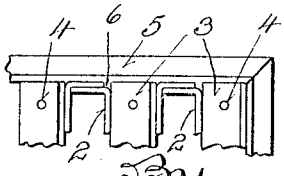


Fig. 5.



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UNITED STATES PATENT OFFICE.

JOSEPH KOENIG, OF TWO RIVERS, WISCONSIN.

HEAT-ECONOMIZER.

1,292,615. Specification of Letters Patent. Patented Jan. 28, 1919.

Application filed February 5, 1918. Serial No. 215,499.

To all whom it may concern:

Be it known that I, JOSEPH KOENIG, a citizen of the United States, and resident of Two Rivers, in the county of Manitowoc and State of Wisconsin, have invented certain new and useful Improvements in Heat-Economizers; and I do hereby declare that the following is a full, clear, and exact description thereof.

This invention relates to new and useful improvements in hot air heaters, particularly those which are adapted to be used in connection with furnaces and stoves of ordinary construction.

In practically all furnaces there is more or less heat wasted inasmuch as the hot gases pass out through the chimney before they can completely give up their heat units. By this invention I have endeavored to eliminate or reduce to a considerable extent this heat wastage, this being accomplished by inserting a supplemental heater between the furnace, stove and the like and the chimney with which it is connected.

A minor object of the invention is to provide a heater of this character which can be inexpensively manufactured of sheet metal and installed without material changes in any furnace or stove flue or smoke pipe.

A further minor object is to provide a simply constructed means for thoroughly cleaning the heater of soot and other deposits.

With these and other objects in view the invention resides in the novel features of construction, combination and arrangement of parts which will be hereinafter more particularly described and claimed and shown in the drawings, wherein:

Figure 1 represents a horizontal sectional view taken on the plane of the line 1—1 of Fig. 2.

Fig. 2 is a vertical sectional view on the plane of the line 2—2 of Fig. 1.

Fig. 3 is a similar view on the plane of the line 3—3 of Fig. 1.

Fig. 4 is a detail fragmentary perspective view of two of the flue members, and

Fig. 5 is a detail fragmentary plan view of the end portions of several of the flue members and the angle-metal band used to connect the same.

Owing to the fact that my improved heater is adapted for use in connection with various types of furnaces and stoves and the smoke pipes thereof, the same has not been shown applied to any particular type thereof.

The device consists of a casing 1 formed of a plurality of flue members 2 and 3 which are arranged in two series. Each of the flue members is formed from a single sheet of material, such as sheet metal, bent upon itself into substantially rectangular formation, the free end portions being engaged with each other and riveted as at 4. The opposite ends of each flue member are open to provide an unobstructed passage-way therethrough.

The series formed in the flue members 2, the individual units of which alternate with the flue members of the other series, have their passage-ways extending horizontally through the casing 1; the passage-ways of the other flue members 3 extend vertically. One of the series of flue members is designed to have hot gases pass therethrough on their way from the furnace or stove to the chimney, and the other series is designed to receive air to be heated by the warmth of said gases.

The flue members forming the two series are held together in abutting relation and disposed side by side by means of a pair of bands 5 which are extended around opposite ends thereof, said bands being preferably formed of angle-metal and welded by one flange to the adjacent portions of the flue members 2 and 3 as shown at 6 in Fig. 5. By thus welding the parts together communication between the adjacent flue members is absolutely prevented. The angle-metal bands are also adapted to form seats to receive the edges of the casing attaching portion 7 of a pipe section 8 and the edges of a hood 9.

The pipe section 8 is adapted to be inserted in the furnace flue or smoke pipe and therefore its end portions are substantially cylindrical. The cylindrical portion has an opening, to the edges of which the attaching portion 7 is secured. The open ends of the flue members 2 communicate with the pipe section 8 as shown in Fig. 1.

The hood 9 is disposed at the opposite end of the casing 1 from the part to which the pipe section is attached and is adapted to provide communication between the sev-

eral flue members 2. Said hood is in the shape of a substantially rectangular cover or pan of shallow depth and is detachably secured by means of any suitable catches to one of the angle-metal bands 5. A handle 10 formed on one wall of the hood permits the same to be readily lifted from the casing for a purpose which will be hereinafter particularly set forth.

The top and bottom of the casing 1 are provided respectively with an outlet 11 and an inlet 12, both of which communicate with the passage-ways through the series of flue members 3. The inlet 12 is connected with any suitable source of fresh air supply, while the outlet extends to a point to be heated by the air which relieves the hot gases of their heat while passing through the casing.

The hot gases from the furnace or stove are directed from the pipe section 8 through a portion of the flue members 2 by means of a partition wall 13 disposed in the pipe section and a valve or damper 14 also mounted therein. The arrows in Fig. 1 indicate the direction of flow of the hot gases. It will be noted from this figure that the heater may be rendered inoperative by moving the damper into dotted line position.

Sooner or later more or less soot will accumulate within the flue members 2 or will be deposited on the side walls thereof, therefore a cleaning mechanism is provided. This includes a preferably horizontally disposed rock shaft 15 extended across one open end of the flue members 2, a plurality of scraper plates 16 which project from the shaft 15, and a lever handle 17 connected with one end of the shaft. One of the scraper plates 16 is disposed in each of the flue members 2 and normally is engaged with the top thereof, it being held in this position by the weighted end of the handle 17. When the flue members are to be cleaned the shaft is rocked by means of the handle and the scraper plates oscillated within the passage-ways of said members; such oscillation obviously knocks the soot from the walls of the members on to the bottoms thereof. This loosened soot may be either blown from the flue members or scraped into the hood 9 when the same is open and disposed horizontally. Those portions of the flue surfaces which are not traversed by the scraper plates in their arcuate scraping movement may be readily engaged by a suitable manually wielded device to procure cleaning thereof.

From the foregoing description taken in connection with the accompanying drawings it will be seen that I have invented a very simply constructed supplemental heater which may be inexpensively manufactured and installed owing to the cheapness of the material as well as the manner of formation. Such a heater will greatly lessen the fuel consumption inasmuch as all of the heat derived from said fuel is utilized.

I claim:—

1. In a device of the class described, a casing having a series of passage-ways extending in one direction, and a second series of passage-ways extending in a cross direction, the ends of said passage-ways opening through the adjacent walls of the casing, a pipe section having an opening in one wall to receive one end of the casing, a partition wall dividing the pipe section into two parts, one portion of the first series of passage-ways communicating with the pipe section on one side of the partition wall, the other portion communicating therewith on the other side of said partition wall, a hood on the end of the casing opposite the connection of the pipe section therewith, said hood providing communication between the several passage-ways of the first series, an inlet into the casing, and an outlet from the casing, said inlet and outlet communicating with the second series of passage-ways.

2. In a device of the class described, a casing comprising a plurality of flue members disposed side by side in abutting relation, each of said members having a passage-way therethrough, the passage-ways in certain of the members extending in one direction, those in the others extending in a cross direction, a pipe section disposed over one end of the casing, certain of said passage-ways communicating therewith, a band of angle-material disposed around said members adjacent the opposite end of the casing, a hood disposed over the last mentioned end of the casing and having its edges engaged with said band, an inlet into the casing, and an outlet from the casing, said inlet and outlet communicating with certain other of the passage-ways in the flue members.

3. In a device of the class described, a casing comprising a plurality of flue members, each formed of a single sheet of material bent upon itself into rectangular shape, the opposite ends of each member being open to form an unobstructed passage-way, said members being disposed side by side in abutting relation, the open ends of the alternate members being disposed in the same position, a hood on one end of the casing, the passage-ways extending in one direction being in communication therewith, means for connecting the opposite end of the casing with a source of hot gas supply, an inlet into the casing, and an outlet from said casing, said inlet and outlet communicating with the passage-ways of the flue members which do not communicate with the hood.

4. In a device of the class described, a casing comprising a plurality of flue members disposed side by side in abutting relation, each of said members having a passage-

way therethrough, a rock shaft disposed at one end of the casing and across said passage-ways, a scraper rod extending from the shaft into each of said passage-ways, a handle lever on the end of the shaft to rock the latter and oscillate the scraper plates to remove soot from the passage-ways, an inlet into the casing, and an outlet communicating with said passage-ways.

In testimony that I claim the foregoing I have hereunto set my hand at Two Rivers, in the county of Manitowoc, and State of Wisconsin.

JOSEPH KOENIG.