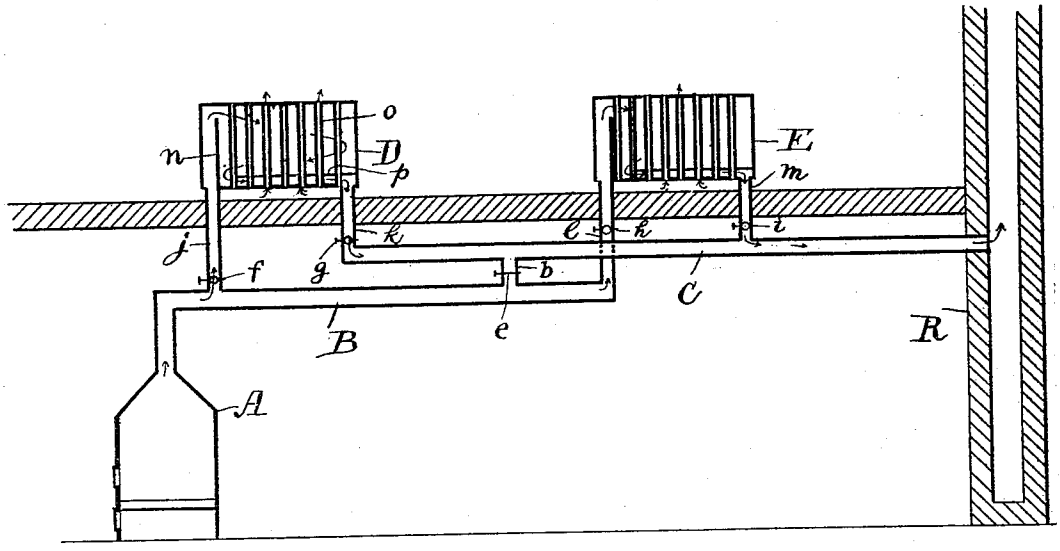
No. 623,138. Patented Apr. 18, 1899.

C. H. CROCKER.

HEATING APPARATUS.

(Application filed Jan. 15, 1898.)

(No Model.)



Witnesses:
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UNITED STATES PATENT OFFICE.

CHARLES H. CROCKER, OF PORTLAND, MAINE.

HEATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 623,138, dated April 18, 1899.

Application filed January 15, 1898. Serial No. 666,757. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. CROCKER, a citizen of the United States of America, and a resident of Portland, county of Cumberland, State of Maine, have invented certain new and useful Improvements in Heating Apparatus, of which the following is a specification.

My invention relates to heating apparatus to be attached to any desired form of stove or furnace for the purpose of saving and utilizing the heat which is now ordinarily allowed to go to waste up the chimney.

It is a well-known fact that a large proportion of the heat of stoves, hot-air furnaces, steam and hot-water heaters, and the like now commonly used, passes out of the smoke-flue and goes up the chimney and is consequently wasted. It has always been commonly supposed that it was necessary to have the products of combustion pass into the chimney more or less heated in order to create draft enough to run the stove or furnace. While it has been common to place radiating-drums or radiators in the line of the smoke-flue and in connection therewith, I am not aware that this has been done in such a manner as to make a practically complete system. According to my present invention I connect the smoke-flue of any stove or furnace with one or more radiators, so that the products of combustion shall pass through them, so arranging the flues or pipes that a direct connection can be made with the chimney when the fire is started or shaken down to prevent the filling of the radiator with sediment and permitting the gases to pass through the radiators when the fire is well started.

A further feature of my invention consists of connecting a plurality of radiators with a main supply-pipe, which carries the products of combustion from the heater by means of branches in a manner similar to the way in which steam and hot water is used, discharging the products of combustion after they have passed through the radiators in a similar manner into the chimney.

A further feature of my invention is the construction of a special radiator adapted to the hot-air circulation.

I illustrate my invention by means of the accompanying drawing, which shows a diagram of a heating system constructed in accordance with my invention.

A is the heater, which may be a simple stove, furnace, hot-water or steam heater, and R is the chimney.

The products of combustion are carried off in the usual way by a pipe or flue B, which I shall hereinafter designate as the "supply-pipe," because it supplies the radiators.

The heater is preferably in the cellar and the two radiators D and E herein shown are on the first floor, although they may be situated at any desired point or at any distance from the heater. The radiator D is supplied by a branch pipe *j* from the pipe B and the radiator E by a branch *l* in the same manner as steam or hot-water heating. After passing through the radiators the gases and products of combustion are led by pipes K and M into the discharge-pipe C, which enters the chimney. The radiators are constructed with vertical tubes O, and the heated gases circulate around the tubes. A vertical diaphragm *n* carries the incoming gases to a point near the top of the radiator and the discharge or exhaust leaves the radiator from the opposite end at the bottom. A horizontal diaphragm *p* extends from the outlet end near the bottom to a point near the inlet end, so that the gases have to return to a point near where they come in before they pass along beneath the diaphragm *p* to the discharge-pipe. Thus a complete circulation is obtained and the heated gases brought in contact with all parts of the radiator.

Dampers or shut-offs *f*, *g*, *h*, and I are provided for the pipes *j*, *k*, *c*, and *m*, respectively, so that the gases can be turned either on both radiators or shut off from both.

When a fire is first started or when it is shaken down, it is desirable to send the gases and smoke straight up the chimney to avoid filling the radiators with dust and soot. A connection is provided by which the pipe B is connected directly with the pipe C when desired, a shut-off *e* being provided for closing this connection.

I have here shown two radiators, but any number may be used and connected in the manner here shown, or one or more radiators may be connected with the stovepipe of any

stove or furnace instead of using a special heater, as here shown, thus utilizing the heat that now goes to waste up the chimney.

I have found from experience that radiators enough may be placed on any smoke-flue to extract practically all the heat, leaving the pipe cold where it enters the chimney, and yet a good and sufficient draft will be created for burning the fuel in the stove.

My invention may, as before pointed out, be used as a separate system, relying on the radiators to extract practically all the heat, or it can be used as auxiliary to any of the present systems. In the former case if the heater is in the cellar or a room where heat is not desired it will be jacketed with insulating material to hold in the heat.

I have found from experience that the system can be used in the same manner as steam or hot water, except that it is not necessary to return the pipes to the heater.

I claim—

1. A smoke-flue radiator consisting of a chamber or drum having a series of vertical tubes passing therethrough, an inlet in the lower portion at one end of the chamber, a vertical wall extending from the inner edge of the opening to a point adjacent the top of the chamber, an outlet-opening in the lower portion of the chamber opposite the inlet-opening, a horizontal partition extending from the wall of the chamber immediately above the outlet-opening forward to a point adjacent to the vertical wall, and dampered pipes communicating with the openings, substantially as described.

2. In a heating apparatus, the combination with a stove of two radiators, a smoke-pipe having direct independent connections with the radiators at one end and having valves at or near the radiators, an independent escape-pipe leading from the opposite ends of the radiators into the chimney, valves in the escape-pipe at or near the radiators, a connection *b* between the smoke-pipe and escape-pipe and a cut-off valve in the connection, substantially as described.

Signed by me, at Portland, this 10th day of January, 1898.

CHARLES H. CROCKER.

Witnesses:
S. W. BATES,
F. H. COLLEY.