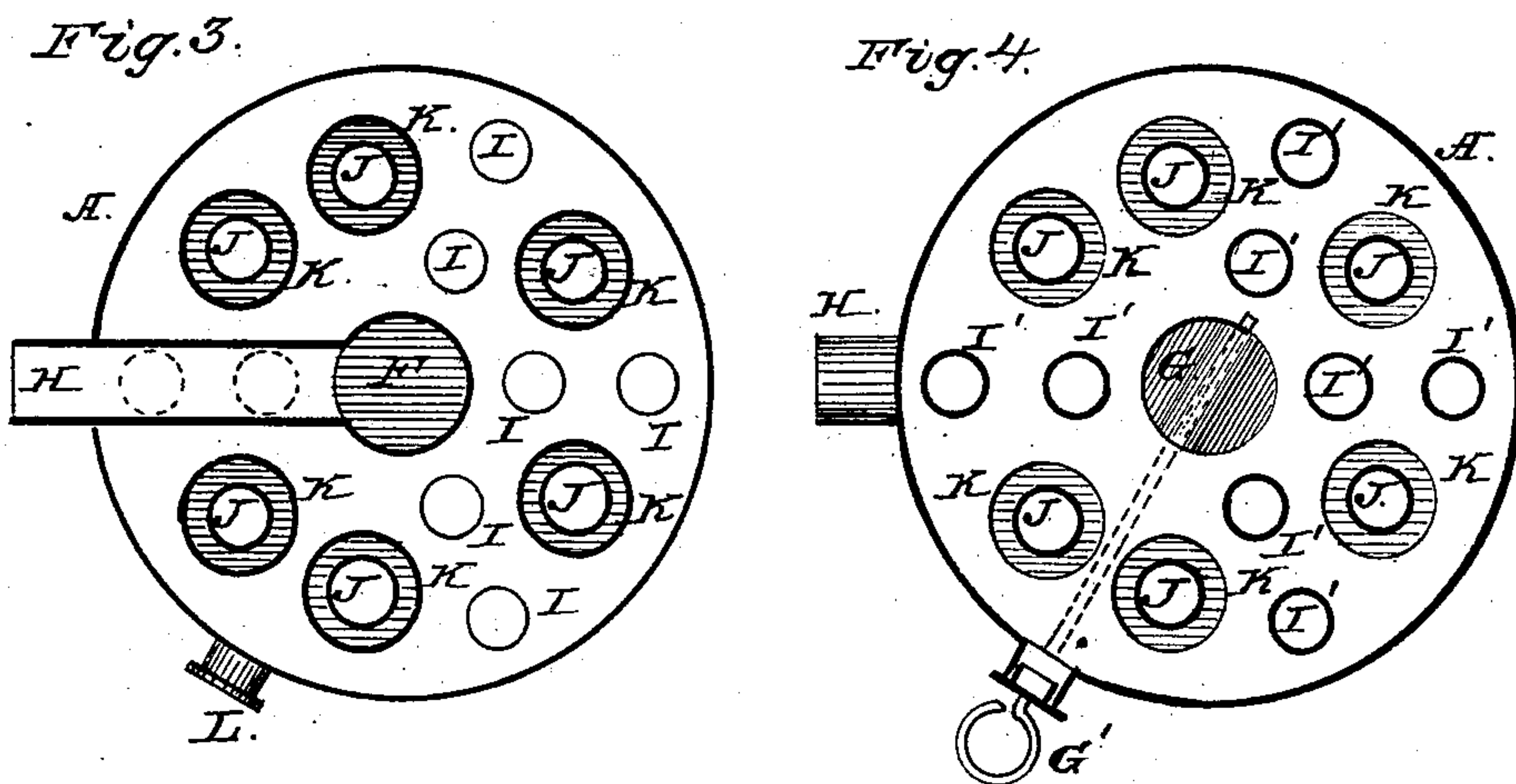
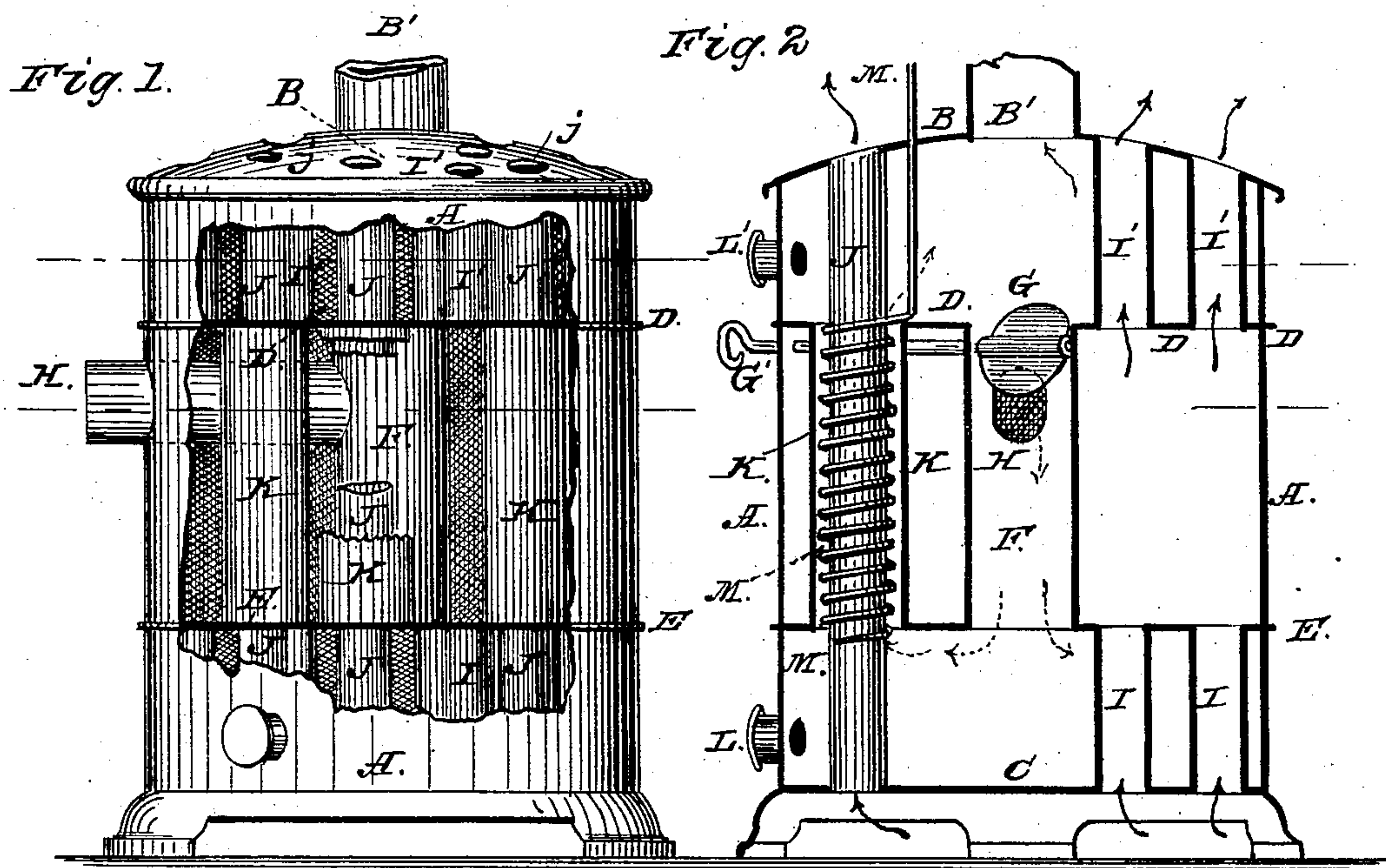


### Heating Drum.

Patented April 19, 1870.



Witnesses

H. F. Thiers  
Saml E Jones

*Inventor*

C. W. Servoss  
Per Attorney  
Thos. Sprague



# United States Patent Office.

CHARLES W. SERVOSS, OF CHICAGO, ILLINOIS.

Letters Patent No. 102,053, dated April 19, 1870.

## IMPROVEMENT IN HEATING-DRUMS.

The Schedule referred to in these Letters Patent and making part of the same.

### To whom it may concern:

Be it known that I, CHARLES W. SERVOSS, of Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Heat-radiating Drums; and do declare that the following is a true and accurate description thereof, reference being had to the accompanying drawings and to the letters of reference marked thereon, and being a part of this specification, in which—

Figure 1 is an elevation of my radiator, with parts of the shell broken away, to show the interior construction.

Figure 2 is a vertical section of the same.

Figure 3 is a horizontal section through *xx*.

Figure 4 is the same through the line *yy*.

Like letters indicate like parts in each figure.

The nature of this invention relates to an improved construction of heat-radiators, for utilizing the waste heat of the smoke and gases of combustion, after the same have left the stove or furnace, between which and the flue or chimney this improvement is designed to be interposed.

It consists in the peculiar arrangement of a series of air-pipes and passages within a shell or drum divided into three or more compartments, and in a novel arrangement of annular smoke-pipes therein, by means of which the heated gases are caused to pass through pipes surrounded by cold air entering the shell from the bottom, each smoke-pipe having an inner air-tube passing up through it, thereby extracting the greatest possible amount of heat from each column of smoke and gas, which heat is radiated outwardly and inwardly to the currents of air passing around the exterior and within the inner tubes in the central compartment, whence they are discharged through tubes leading up through the upper compartments, where said tubes are surrounded by the heated gases, and the air passing through them is still further heated.

Also, in a device for cleaning the soot adhering to the walls of the smoke-passages, the whole arranged and operating as more fully hereinafter set forth.

In the drawings—

A represents a cylindrical sheet-metal case, provided with top and bottom heads B and C.

It is further provided with diaphragms, D and E, dividing it into three compartments.

The top head is provided with a flanged central opening B', through which the smoke issues into the smoke-pipe leading to the chimney.

F is a reversible flue extending through both diaphragms, and is provided at its upper end with a suitable valve or damper, G, rotated by a shaft, G', to which it is secured, and which extends through the outer casing for that purpose.

H is the smoke-duct leading from the stove or furnace into the flue F.

When a direct draught is required, as in starting a fire, the damper may be turned so as to permit products of combustion to pass directly up from the flue F, through opening B' above it, into the smoke-pipes, but, when turned so as to close the upper end of the flue, the gases of combustion pass down into the lower compartment.

The lower diaphragm and bottom head are perforated with a series of openings opposite each other, which are connected by short tubes I, through which currents of cold air are drawn from under the device into the central compartment.

The top head and upper diaphragms are perforated in like manner, and are provided with similar tubes I', through which the air is discharged from the central compartment into the apartment in which the device is located.

J is another series of air-tubes, passing entirely through the top and bottom heads.

In their central or middle portion of their length they are surrounded by the smoke-pipes K, which connect and extend through both diaphragms, leaving an annular space between them and the tubes they inclose.

As this space is difficult of access, and in the consumption of bituminous coal it is desirable to have some means of removing the soot, should any accumulate on the walls of the tubes, for this purpose, when the device is put together, I place in the annular passage a wire, M, coiled in spiral form about each tube J, and leave a straight end projecting up through a small aperture in the top head.

By raising and lowering the wire the soot adhering to the tube is readily dislodged, and falls into the lower compartment, whence it may be readily removed through the hand-hole L, a similar hand-hole, L', and plate being provided to give access to the upper chamber.

When the damper in the flue is closed, the gases of combustion are reverted into the lower compartment, where the volume is subdivided by the short tubes I, on its way to the smoke-pipes K, heating on its way the column of air passing through the tubes into the central compartment. Passing up the smoke-pipes to the upper compartment, the heated gases are deprived of the greater portion of their caloric, which is radiated inwardly to the air passing up through the long tubes, and outwardly to the air contained in the central compartment, and lastly, in the upper compartment they surround all the air-tubes, and impart to them as much of the small remaining portion of their caloric as is possible without interfering with the upward draught to such an extent that combustion in the stove is injuriously retarded.

As shown in the drawings, the radiator may be placed at one side of the stove or furnace, but, if more

convenient to place it on top, the lower head is provided with a central opening, which the smoke-pipe from the furnace enters, discharging its gases of combustion directly into the lower compartment.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The construction and arrangement within the shell A of the heads B C, diaphragms D E, revertible flue F, damper G, and smoke-duct H, the air-tubes I

I' and J, and annular smoke-pipes K, operating in the manner and for the purpose set forth.

2. The spiral wire soot-cleaner M, when employed in the manner and for the purpose set forth.

CHARLES W. SERVOSS.

Witnesses:

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SAML. E. JONES.