No. 676,180. Patented June 11, 1901.

A. ELMENDORF.

HEATING DEVICE.

(Application filed Aug. 11, 1900.)

(No Model.)

Fig. 1.

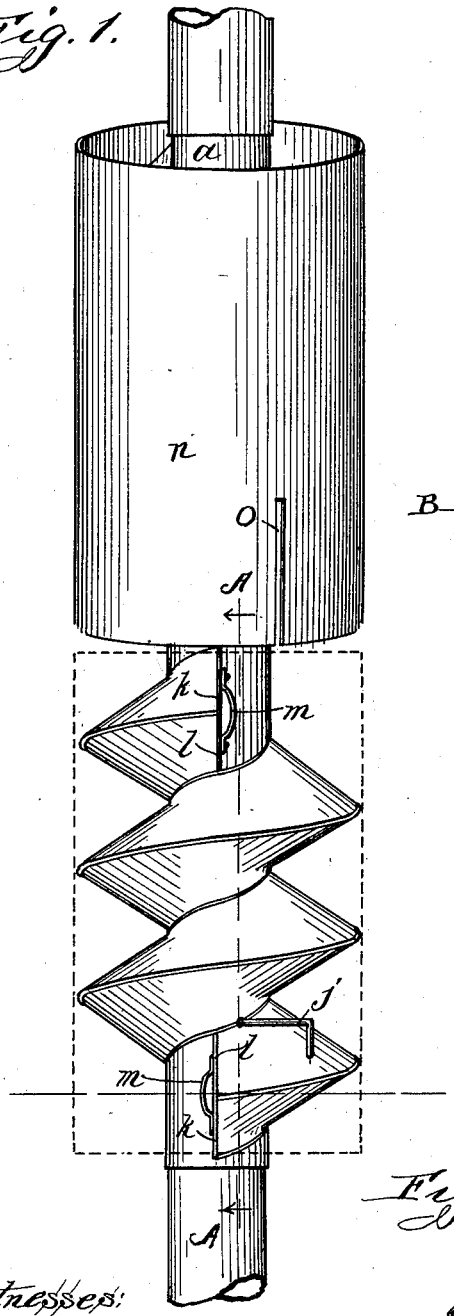


Fig. 2.

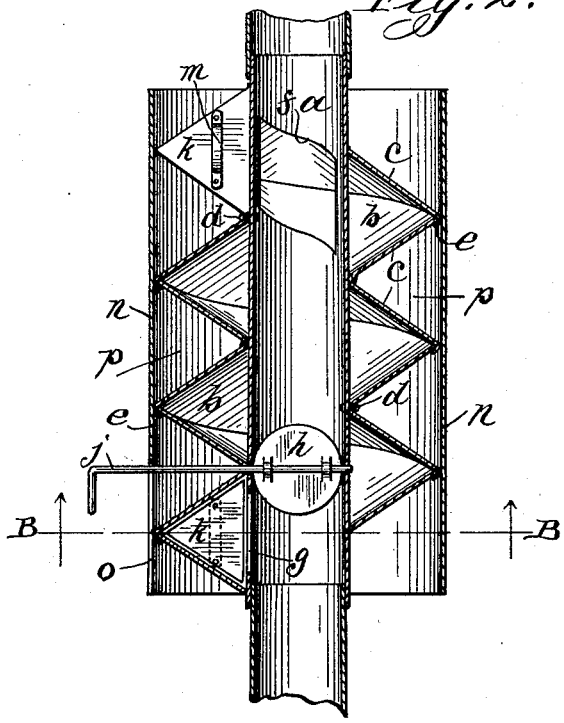


Fig. 3.

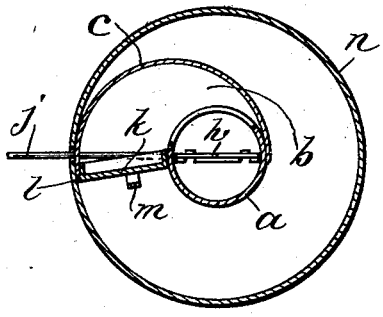
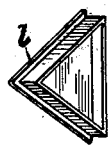


Fig. 4.



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UNITED STATES PATENT OFFICE.

ALBERT ELMENDORF, OF CHICAGO, ILLINOIS.

HEATING DEVICE.

SPECIFICATION forming part of Letters Patent No. 676,180, dated June 11, 1901.

Application filed August 11, 1900. Serial No. 26,619. (No model.)

To all whom it may concern:

Be it known that I, ALBERT ELMENDORF, a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Heating Devices, of which the following is a specification.

My invention relates to a novel heating-drum to be used in connection with furnaces, stovepipes, or any other apparatus furnishing a heated fluid, such as hot air, smoke, or other products of combustion; and it consists, primarily, of a pipe or other passageway, which I call a "direct conduit," which has a preferably coiled helical pipe, which I call the "indirect conduit," surrounding it and an arrangement of valves or dampers and apertures by which the heated fluid may be permitted to pass directly through the central pipe or direct conduit without being delayed, so as to permit the absorption and radiation of but a small portion of the heat, or by which the fluid may be compelled to pass through the helically-coiled pipe or indirect conduit, thereby delaying its passage until a large percentage of the heat is absorbed and radiated into the room or casing in which it may be placed. I may also employ in connection with this apparatus a drum inclosing the outer pipe, and in case a helically-coiled pipe is employed, as shown, forming a complementary helical channel through which a current of air will ascend, becoming heated in its passage and which heated air might be carried off by pipes, so as to deliver it at any desired place.

In order to more fully disclose the nature of my invention I annex hereto a sheet of drawings, in which the same reference characters are used to designate identical parts in all the figures, of which—

Figure 1 is a side elevation of the complete apparatus with the drum lifted up, so as to show the coil in elevation. Fig. 2 is a section on the line A A of Fig. 1. Fig. 3 is a section on the line B B of Fig. 1, and Fig. 4 is a perspective view of one of the caps employed in connection with the apparatus.

To illustrate my invention in its simplest form, I have shown it as connected to or taking the place of a joint of stovepipe, acting as a drum, although it will be understood that it might be applied directly to the fire-box of a hot-air furnace, so as to be employed in heating the air to be delivered by a system of pipes to a dwelling or other building in which it is employed.

The central pipe *a*, which in the form shown constitutes the direct conduit, may be of the general shape and size of a joint of stovepipe, its ends being shaped so as to fit in between two ordinary sections of stovepipe, as clearly shown in Fig. 2. In the form shown I surround this pipe *a* with a helically-coiled pipe or channel *b*, which is conveniently constructed of annular metallic strips *c*, which have their inner edges secured to the pipe *a* by the bolts *d* and which have their outer edges connected by lapping the edge of one over the other, as shown at *e*. While I preferably construct this indirect conduit *b* in this manner, it will be understood that it might be made of a single piece, or, indeed, might be formed integral with the pipe *a*. I have also shown the channel *b* as in the form of an equilateral triangle in cross-section, although it will be understood that any other form desired might be employed. Just within the upper and lower ends of the channel *b* I form the apertures *f* and *g*, respectively, in the sides of the pipe *a*, which apertures permit the smoke and other products of combustion to enter the channel *b* at *g* and to emerge at *f* if the direct channel through the pipe *a* is closed or obstructed. To control this, I place the circular valve or damper *h* in the pipe *a*, preferably just above the aperture *g*, and provide it with the handle *j*, projecting beyond the channel *b*, for adjusting it in any desired position. It will be readily apparent that when the valve *h* is turned to its vertical position, as seen in Fig. 2, so as to leave the pipe *a* practically unobstructed, the smoke or other products of combustion, or whatever the gaseous source of heat may be, will pass directly and rapidly up through the pipe *a*, so that very little of the heat will be absorbed and radiated into the apartment. On the other hand, when the valve *h* is turned so as to close the pipe *a* the smoke, &c., must pass through the tortuous course of the channel *b*, and thereby passing over a greater surface and necessarily consuming more time in passing a very much greater portion of the heat

will be absorbed and radiated from the sheets *c*, constituting the outer portions of the channels *b*, thus serving to heat the apartment in which it is located. In order that the channel may be readily cleaned whenever it is necessary, I make the end pieces of the channel *b* in the form of removable caps *k*, which are of triangular shape, so as to fit snugly in the ends of the channel *b* and have the flanges *l* to prevent their being inserted too far and also the handles *m*, by which they can be grasped when it is desired to withdraw them.

In connection with the apparatus hitherto described I preferably employ the cylindrical drum *n*, which is preferably made of sheet metal and of a size to fit snugly over the channel *b*, it extending substantially the length of the channel and conveniently resting on the stem of the handle *j*, it being notched, as shown at *o*, to permit its descending to the position shown in dotted lines in Fig. 1 and in section in Fig. 2. When desired, as for cleaning out the channel *b*, this drum *n* can be lifted to the full-line position shown in Fig. 1, where it supports itself upon the top of the channel *b*. The caps *k* can be removed, and a ball or other weight attached to a string or wire can be placed in the other end of the channel *b* and will slide down through the channel and out the other end, so that any desired cleaning apparatus or material can be attached to the string, and thus drawn through the channel. When the drum *n* is in place, it will be seen that there is really a complementary channel *p* formed outside of the channel *b*, and the cold air entering said channel at the bottom will emerge from the the top as it is heated, and it will be apparent that I might close the top of the drum *n* and open a pipe into it to conduct off the heated air to any desired place.

With the construction herein shown and described it will be seen that I have devised an extremely-simple mechanism by which the amount of radiation can be controlled as desired and one that is extremely effective for heating purposes. Furthermore, it will be seen that the indirect channel, while extremely compact, is yet so designed that it can be easily constructed and easily cleaned.

While I have shown my invention as embodied in the form which I at present consider best adapted for carrying out its purposes, it will be understood that it is capable of modifications and that I do not desire to be limited in the interpretation of the following claims, except as may be necessitated by the state of the prior art.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a heating device of the class described, the combination, with a direct conduit of an indirect conduit surrounding the direct conduit and closed at both ends except for apertures communicating therewith at top and bottom, the direct conduit forming a portion of the walls of the indirect conduit, a damper or valve in the direct conduit and a drum surrounding both conduits.

2. In a heating device of the class described, the combination with the direct conduit, of the indirect conduit surrounding the direct conduit, having a portion of the walls thereof formed by the direct conduit, and having a tortuous passage therethrough, such indirect conduit in longitudinal section consisting of a series of triangles whose bases are on the direct conduit and are end to end, apertures opening through the walls of the direct conduit into the indirect conduit at the upper and lower ends thereof, and a valve in said direct conduit between said apertures by which the heated fluid may be permitted to pass through said direct conduit or forced to pass through said indirect conduit, substantially as and for the purpose described.

3. In a heating device of the class described, the combination, with a direct conduit of an indirect conduit extending substantially helically around the direct conduit and communicating therewith, a valve or damper in the direct conduit and a removable drum surrounding both conduits with its inner surface substantially in contact with the outer surface of the indirect conduit whereby an indirect passage of air occurs in the drum as well as an indirect passage of gases, &c., in the indirect conduit.

4. In a heating device of the class described, the combination with the direct conduit, consisting of the circular pipe, of the indirect conduit surrounding the direct conduit and consisting of a helical pipe having a cross-section in the form of an equilateral triangle with its base against the inner pipe, the bases of the triangles occupying the entire outer surface of the direct conduit, apertures at the top and bottom of the inner pipe opening into the indirect conduit, and a valve in said pipe between the apertures by which the heated fluid may be permitted to pass through the central pipe or forced to pass through the helical pipe.

5. In a heating device of the class described, the combination with the direct conduit, of the indirect conduit surrounding the direct conduit and consisting of a helical pipe, removable caps in the ends of said helical pipe, apertures connecting said pipes at their upper and lower ends, and a valve in the direct conduit by which the heated fluid may be permitted to pass through said direct conduit or forced to pass through the indirect conduit.

6. In a heating device of the class described, the combination with the direct conduit, of the indirect conduit adjacent the direct conduit and having a tortuous passage therethrough, such indirect conduit in longitudinal section consisting of a series of triangles whose bases are on the direct conduit and are end to end, apertures connecting said conduits at their ends, a drum surrounding the indirect conduit, and a valve in the direct

conduit by which the heated fluid may be permitted to pass through said direct conduit or forced to pass through said indirect conduit, substantially as and for the purpose described.

7. In a heating device of the class described, the combination with the direct conduit, of the indirect conduit surrounding the direct conduit and consisting of a helical pipe, apertures connecting the ends of said conduits, a drum surrounding the helical pipe and having a longitudinal channel *b*, a valve in the direct conduit by which the heated fluid may be permitted to pass through said direct conduit or forced to pass through said indirect conduit and a handle for the valve received by such channel in the drum.

8. In a heating device of the class described, the combination with the direct conduit consisting of the circular pipe *a*, of the indirect conduit surrounding the direct conduit and consisting of the helical channel *b*, apertures *f* and *g* in the pipe *a* connecting the two conduits, the drum *n* surrounding the conduit *t* and forming the complementary channel *p*, said drum having the channel *b*, and the valve *h* located in the pipe *a* and having a handle received by the channel *b*, substantially as and for the purpose described.

9. In a heating device of the class described, the combination with the direct conduit, of the indirect conduit, surrounding the direct conduit and consisting of a helical pipe, removable caps in the ends of said helical pipe, apertures connecting said pipes at their upper and lower ends, a valve in the direct conduit by which the heated fluid may be permitted to pass through said direct conduit or forced to pass through the indirect conduit, and a removable drum securing both conduits, substantially as described.

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