

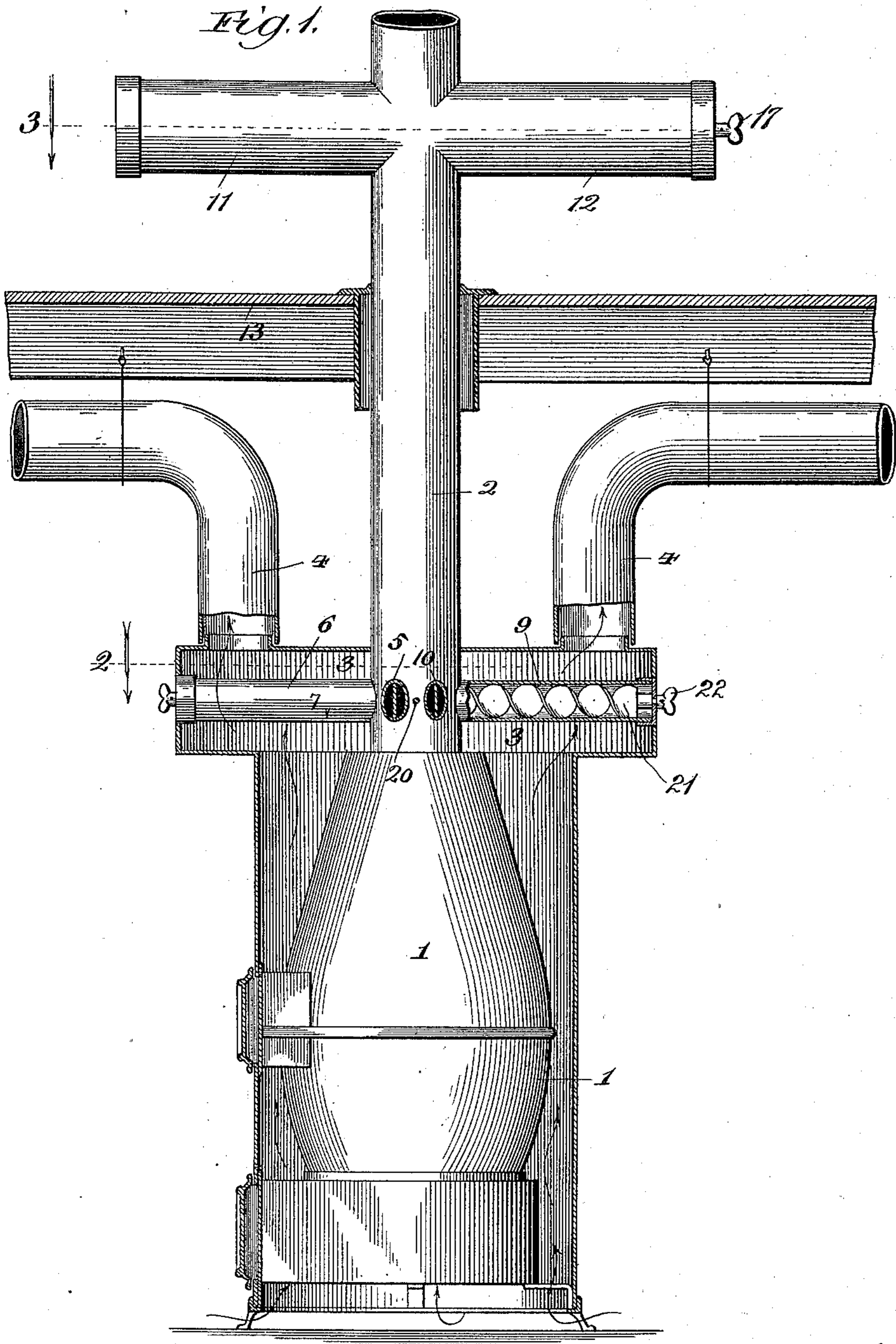
(No Model.)

2 Sheets—Sheet 1.

A. ELMENDORF.
HEATING DEVICE.

No. 600,909.

Patented Mar. 22, 1898.



Witnesses:
Edw. C. Gaylord,
John S. Ketchum

Inventor:
Albert Elmendorf,
By *Samuel E. Gibben.*
Atty.

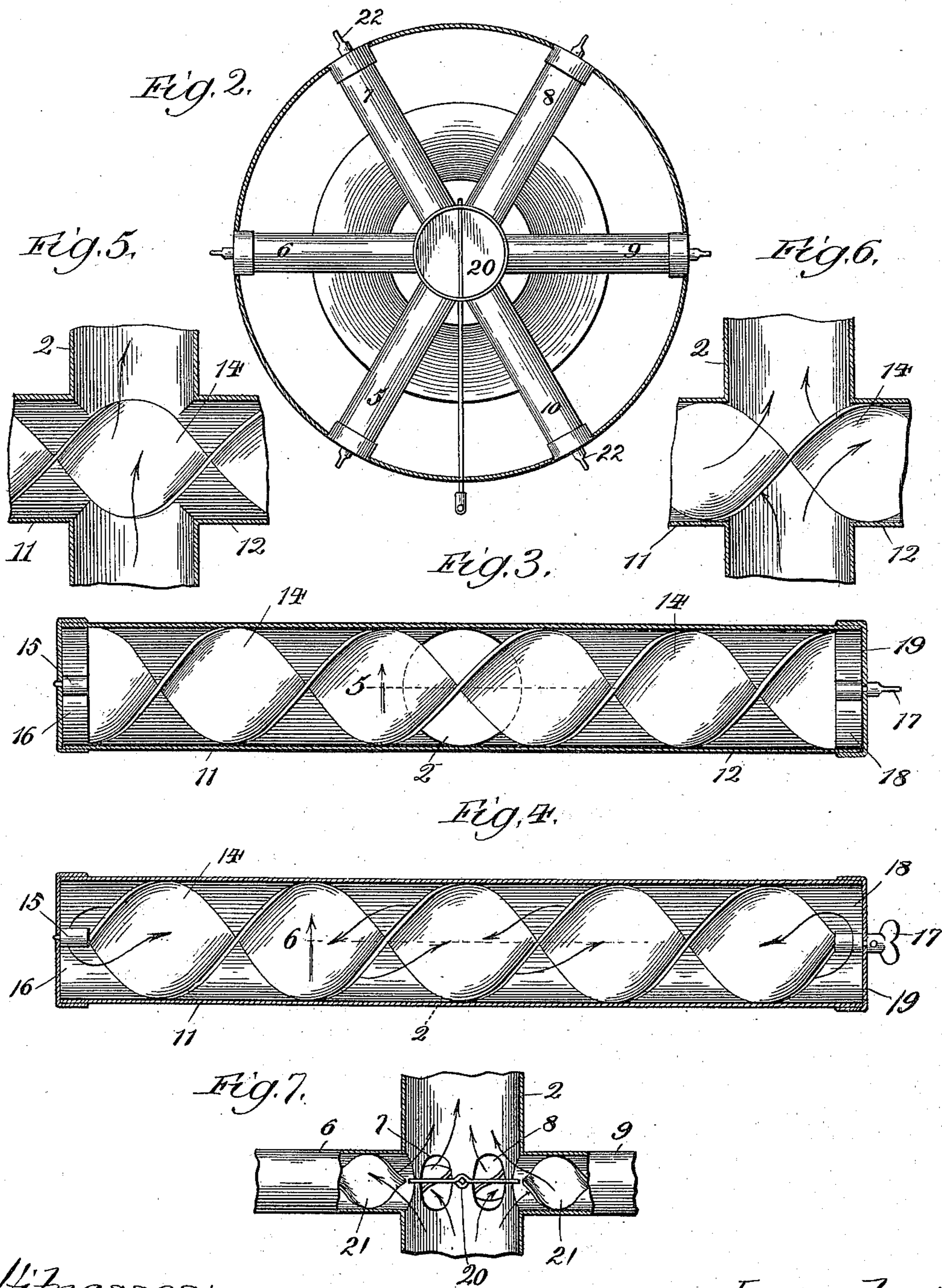
(No Model.)

2 Sheets—Sheet 2.

A. ELMENDORF.
HEATING DEVICE.

No. 600,909.

Patented Mar. 22, 1898.



Witnesses:
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L. S. Allen

Inventor:
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UNITED STATES PATENT OFFICE.

ALBERT ELMENDORF, OF CHICAGO, ILLINOIS, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, OF TWO-THIRDS TO EVERETT H. REXFORD, OF BLUE ISLAND, ILLINOIS.

HEATING DEVICE.

SPECIFICATION forming part of Letters Patent No. 600,909, dated March 22, 1898.

Application filed September 27, 1897. Serial No. 653,139. (No model.)

To all whom it may concern:

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

My invention has relation to heating devices; and its object is to produce a novel heating-drum or radiator to be used in connection with furnaces or as a part thereof, and in connection with stovepipes and for other analogous purposes. In fact, the device is applicable to and intended to be used in connection with any source of heat in order to utilize and radiate the heat to its fullest extent for usual heating purposes.

In the drawings, Figure 1 is a sectional elevation of a furnace with my device applied and showing also the smoke-pipe passing through a floor and having my device arranged in connection with such pipe to form an auxiliary heating-drum; Fig. 2, an enlarged sectional plan on line 2 of Fig. 1; Fig. 3, a sectional plan on line 3 of Fig. 1, showing another form of the spiral diaphragm or partition in position to permit direct draft; Fig. 4, a similar view, except that the spiral diaphragm has been turned to close the direct draft; Figs. 5 and 6, enlarged sectional elevations on lines 5 and 6 of Figs. 3 and 4, respectively; and Fig. 7, a sectional elevation on line 7 of Fig. 1.

For the purpose of illustrating my invention I have shown it applied to an ordinary heating-furnace and have also on the smoke pipe or flue of the same furnace shown the method of its application to ordinary stovepipes, &c. It will be understood, therefore, that I do not confine myself to the use of my invention to furnaces, nor to stovepipes, nor to the particular arrangement shown in Fig. 1. It will also be understood that the invention is applicable to any style of furnace.

As shown in Fig. 1, the furnace has any suitable fire-pot 1, communicating with a smoke pipe or flue 2. The furnace may also be provided with a heating-drum 3 and the usual heating-pipes 4. Within the drum the smoke-pipe is provided with a series or plurality of

radially-extending branch pipes 5, 6, 7, 8, 9, and 10, constituting heating-drums or radiators. The number of the drums may be increased or decreased, as desired. These pipes or drums are closed at their outer ends, but communicate at their inner open ends with the smoke-pipe. The outer ends of these pipes preferably pass through the furnace-casing and are removable to permit of the easy cleaning of the heating-drums or branch pipes.

Each of the radial pipes of the furnace is provided with a spiral diaphragm or partition 21. This diaphragm does not extend clear to the closed outer end of the pipes or drums, but leaves a small space or chamber at such end. All the diaphragms are preferably rotatable and also preferably removable. These pipes or radiators and also the partitions may be made of any desired size, and the proportions of all the pipes, &c., may be varied as desired. It is also obvious that the partition may have any desired contour so long as the desired object is subserved.

The diaphragms extend only to the smoke-pipe, and the heated gases, &c., are caused to be deflected into the series of radial drums by means of an ordinary damper 20, which, when turned to close the smoke-flue, lies substantially along the central axis of the drums and divides the open end of such drums. When the damper is thus turned—that is, to horizontal position, Fig. 7—it will deflect the smoke, heated gases, &c., into the radial drums and cause them to pass outward and backward therethrough after traversing the end chambers before they can get above the damper. Fig. 7 by means of the arrows clearly illustrates the direction taken by the gases, &c., in this operation. The damper, when horizontal, and the spiral partition approach so closely that the heated gases, &c., must traverse the spiral chambers in the heating-drums or branch pipes when the partition is properly turned and it is impossible for the gases, &c., to pass around the edges of the damper. The outer ends of these drums preferably project through the shell of the heating-drum, and they are also prefer-

ably removable for cleaning purposes. Handles 22 are provided for turning the spiral diaphragms, as desired.

It is apparent that the amount of radiating-surface can be governed by turning the different diaphragms to certain positions, causing all or a portion only of the radial drums to be utilized. Furthermore, it is obvious that any desired number of these radial drums may be employed and that they may be arranged in any desired position—vertical, horizontal, or otherwise.

The two oppositely-arranged heating-drums, such as 11 and 12, which may communicate with the smoke-pipe above a floor 13, may each be provided with spiral partitions similar to those in the radial drums, or a single spiral partition, such as 14, extending across the flue, as shown in Figs. 3 and 4, may be used. This partition at one end bears against an inwardly-projecting piece 15, so as to form a chamber at that end, or any other means may be employed to provide such end chamber. An end chamber 18 is also formed in a suitable manner in the other drum at its end, which is closed by a cap 19, which is removable, so that the diaphragm can be withdrawn, at which operation the drums can also be cleaned. A handle 17 extends extraneous of the cap for rotating the diaphragm, as desired.

When the diaphragm is turned as shown in Figs. 3 and 5, the direct draft is open; but when turned as shown in Figs. 4 and 6 an indirect draft is made. The heated gases, &c., strike against the middle portion of the diaphragm and are deflected to either side, following one side of the spiral outwardly, then entering the end chambers 16 and 18, and then traveling backward on the reverse side of the spiral toward the smoke-flue, whereupon the gases, &c., will be free to continue upward through the smoke-flue. As in the case of the other construction shown, the heated gases, &c., are thus given an indirect path through a heating-drum or radiator device, and the blades of the screw-like diaphragm deflect such gases, &c., against the walls of the drum or conduit in both the outward and return travel, and thus most of the heat thereof is absorbed and utilized.

While I have herein in the specification and claims spoken of a "smoke-pipe," I wish it understood that I do not limit myself to the use of such pipe, as it is obvious that my invention will work in connection with any suitable source of heat which it is desired to radiate. Such term is therefore used with this understanding and as having this scope and meaning.

By the use of my invention the greatest amount of heat obtainable is utilized and radiated by a means which is simple and reliable and which can be regulated to suit requirements. Furthermore, my device may be applied to the many different kinds of furnaces, to all kinds of stoves and the like which are

now in use, and can also be applied to furnaces, stoves, &c., when manufactured.

Although I have described more or less precise forms and details of construction, I do not intend to be understood as limiting myself thereto, as I contemplate changes in form, proportion of parts, and the substitution of equivalents as circumstances may suggest or render expedient. Furthermore, I do not limit myself to the applications shown for illustration of my invention or to those specifically named, as I contemplate using my invention wherever applicable.

I do not herein claim the species shown in Figs. 3, 4, 5, and 6, but have reserved and claimed the same in an application filed by me on December 27, 1897, Serial No. 663,612.

While I have herein shown and described my invention as applied to heaters and have so entitled the same, it will be understood that the same is applicable for other purposes—as, for instance, it may be employed as a radiator device in which other fluids than heated air and the like may be passed. In fact, my invention is designed as a radiator for any fluids at any temperature, so that such analogous uses are contemplated and covered by my claims, though the parts of the heater may be specified, but only for convenience.

I claim—

1. The combination of a chamber or drum open at one end and closed at its other end, and a rotatable spiral diaphragm within such chamber or drum, whereby fluids will pass along one side of the spiral diaphragm and will then pass in a reverse direction along the reverse side of such diaphragm.

2. The combination of a pipe or the like, a branch pipe communicating therewith at one end and closed at its other end and a spiral form of partition within such branch pipe and extending toward the closed end thereof but leaving a space or chamber thereat whereby fluids will pass along one side of the partition into the end chamber of the branch pipe and thence backward along the reverse side to the pipe, such partition being both rotatable and removable.

3. The combination with a pipe or the like, of a cylinder communicating with said pipe but closed at one end, and a removable spiral diaphragm arranged therein, said cylinder having an end removable with the diaphragm.

4. In a heating device, the combination, with a smoke-pipe or the like, of a cylinder forming a branch of such pipe, a rotatable spiral diaphragm therein of the same size as the cylinder and forming a chamber at the closed end thereof and means for closing the direct passage through the smoke-pipe and deflecting it into the cylinder.

5. In a heating device, the combination with a smoke-flue or the like, a branch pipe leading therefrom, and closed at its outer end, a rotatable spiral diaphragm in such branch pipe and a damper in the flue for interrupt-

ing the direct draft and deflecting the heat, smoke, &c., through the branch pipe.

6. In a heating device, the combination with a smoke-flue or the like, of a plurality of branch pipes extending therefrom, a rotatable spiral diaphragm in each branch pipe and a damper in the flue, the damper in one position permitting a direct draft and in another position deflecting the heat, smoke, &c., into the several branch pipes and causing the same to travel to the farther end of the branch pipes and thence back to the flue and above the damper.

7. In a heating device, the combination with a smoke-flue or the like, of a plurality of branch pipes or heating-drums communicating with such flue at their inner ends, removable caps at their outer ends, a removable rotatable spiral diaphragm in each of said branch pipes and a damper in the smoke-flue for closing the direct draft and causing an indirect draft through the branch pipes or heating-drums.

8. In a heating device, the combination with a smoke-flue or the like, of a plurality of branch pipes or heating-drums communicating with such flue at their inner ends, a casing surrounding such pipes to form a hot-

air chamber, the outer closed ends of the pipes extending through the casing, a rotatable spiral diaphragm in each of said branch pipes but not extending to the outer end of the pipes but having a chamber or space thereat, a handle extraneous of the closed end of each pipe and casing and connected to each diaphragm for rotating it and a damper in the smoke-flue closing the direct draft and causing an indirect draft through the branch pipes.

9. In a heating device, the combination with a smoke-flue or the like, of a plurality of radially-extending branch pipes leading therefrom but closed at their outer ends, a removable spiral diaphragm located in each branch pipe but leaving a small space or chamber at the outer end of each branch pipe, and a damper in the flue for deflecting the heat, smoke, &c., into the branch pipes and causing it to circulate spirally to the end chamber and thence back to the flue above the damper, the outer ends of each branch pipe being removable with the diaphragm.

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Witnesses:

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