

No. 648,259.

J. L. HOLLINGSWORTH.

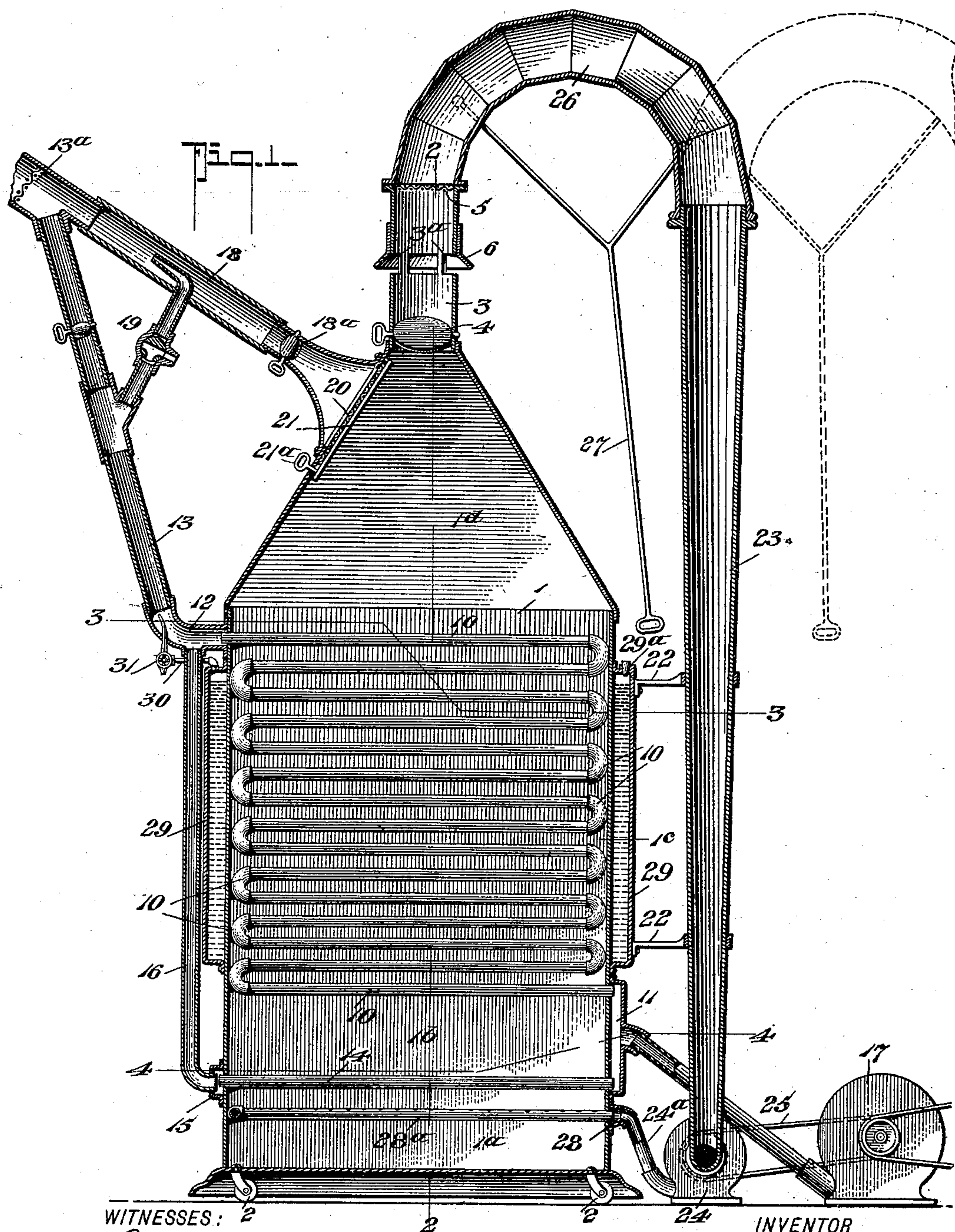
Patented Apr. 24, 1900.

HEATER.

(Application filed Aug. 23, 1899.)

(No Model.)

3 Sheets—Sheet 1.



WITNESSES:

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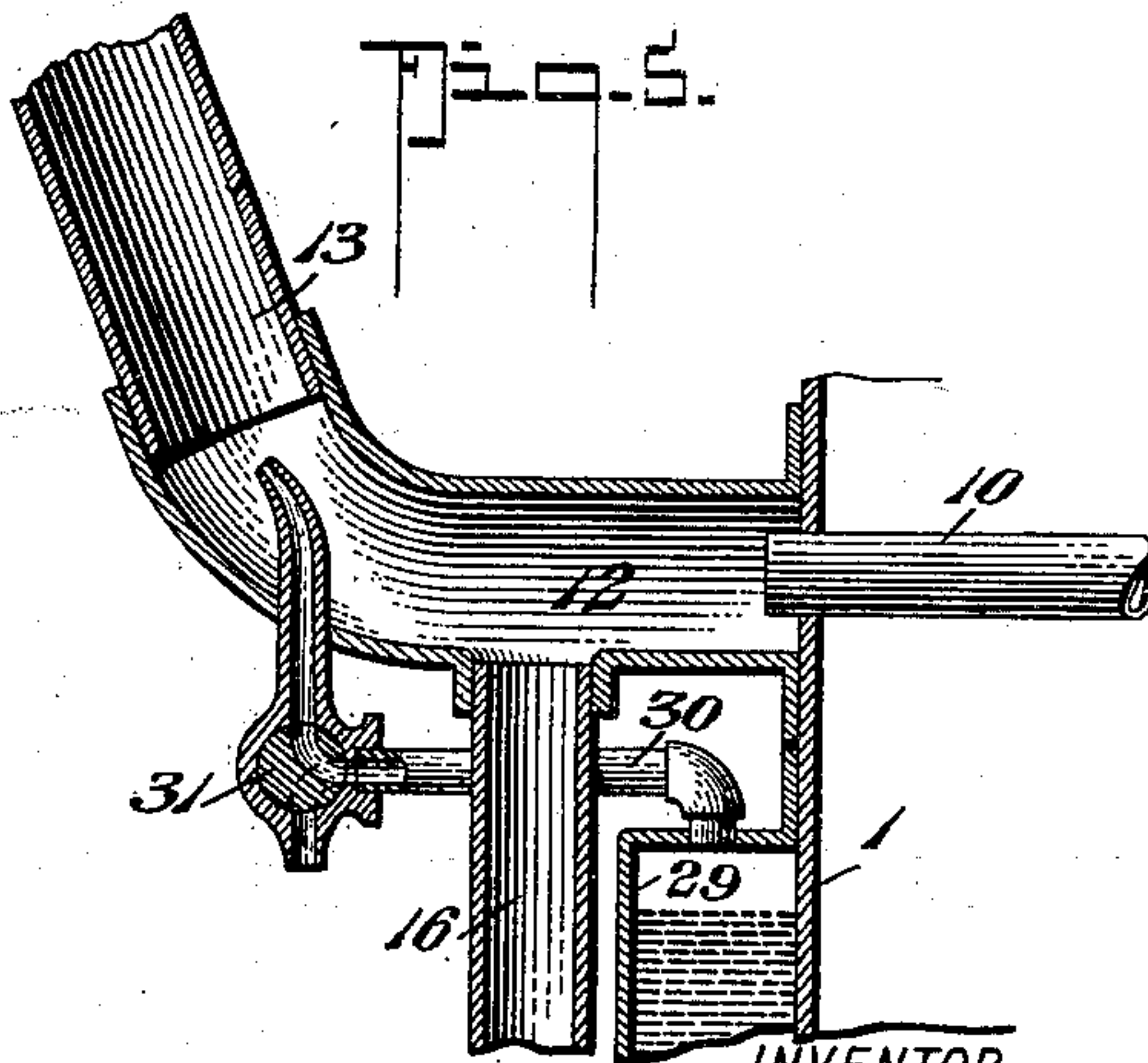
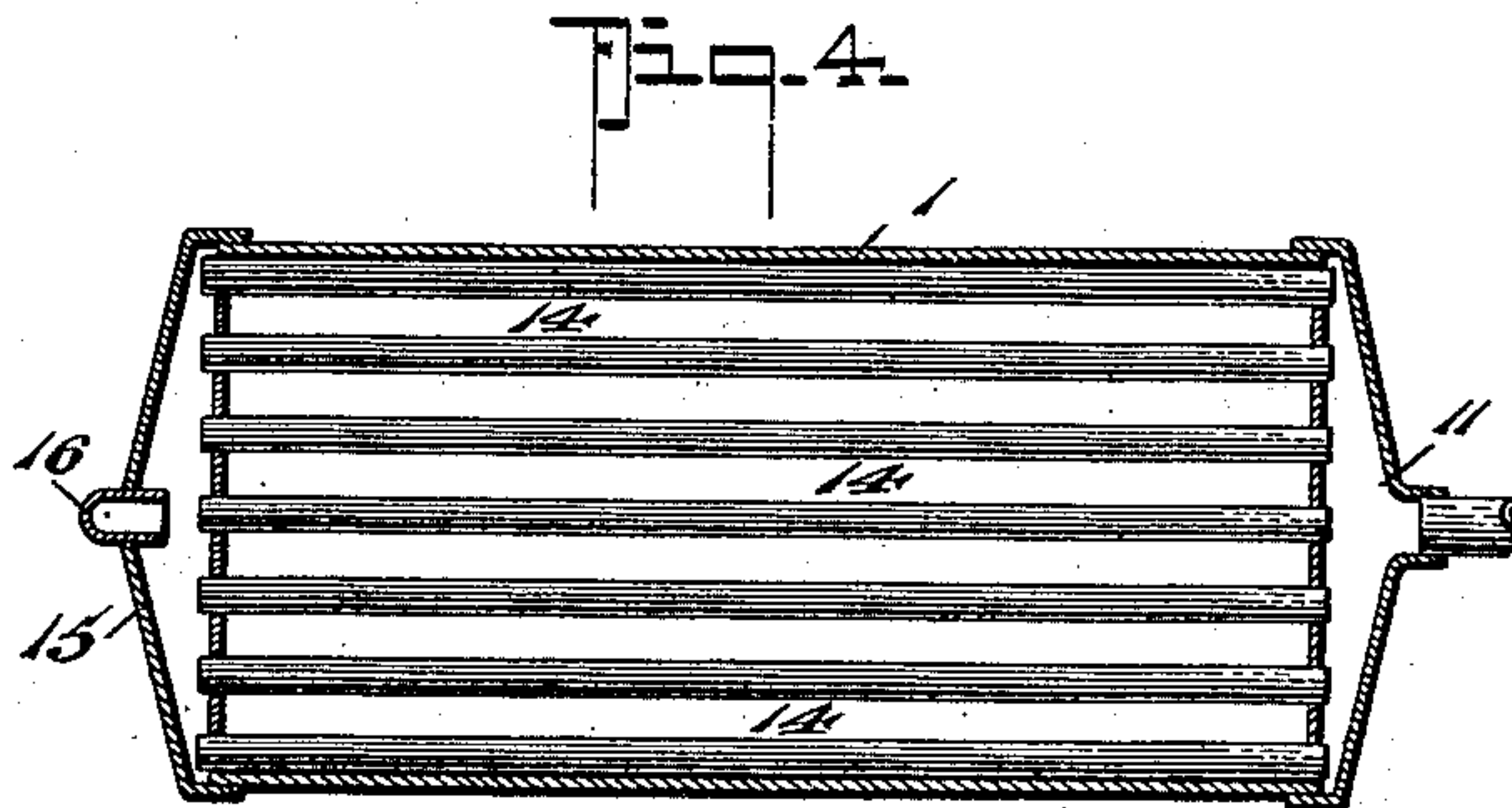
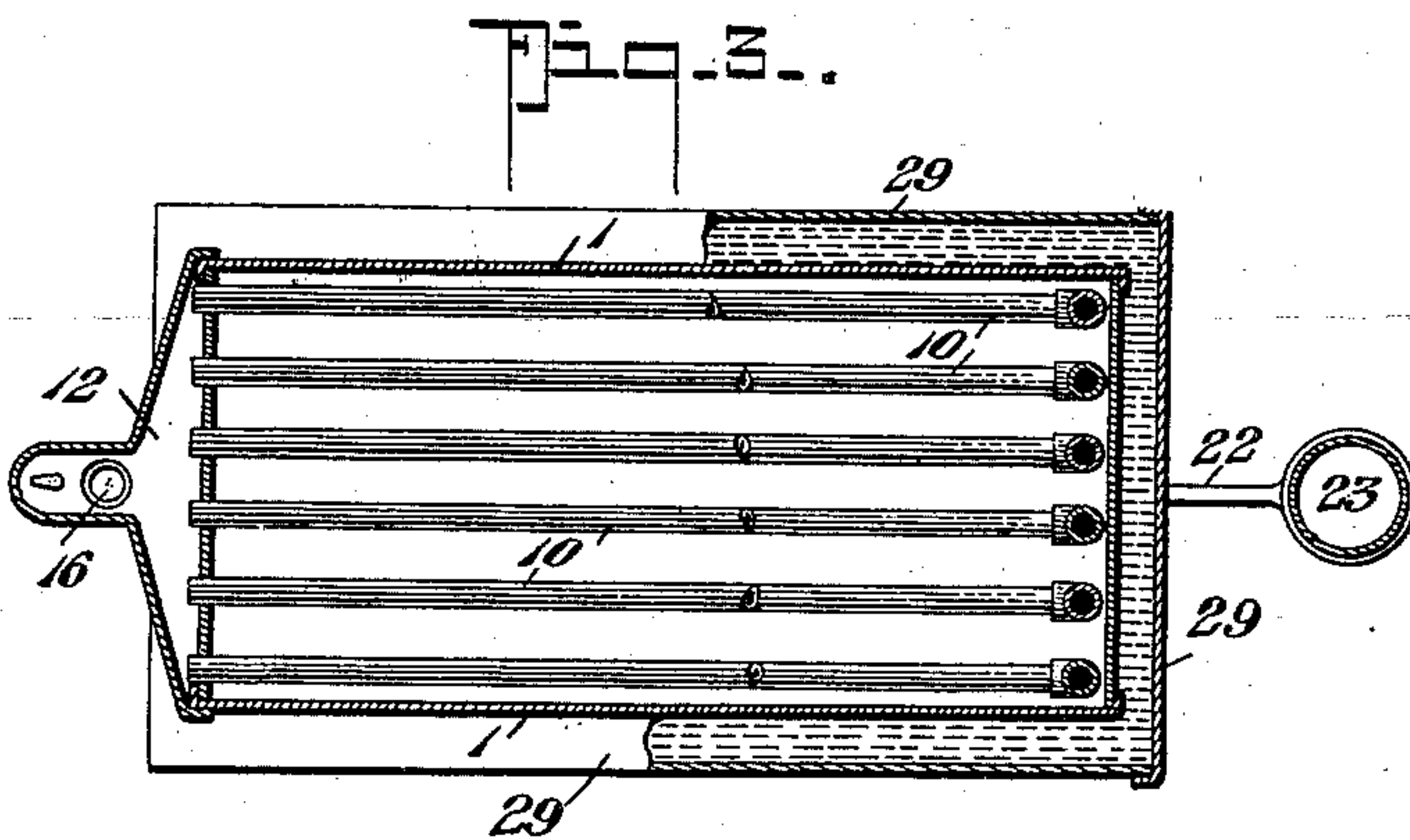
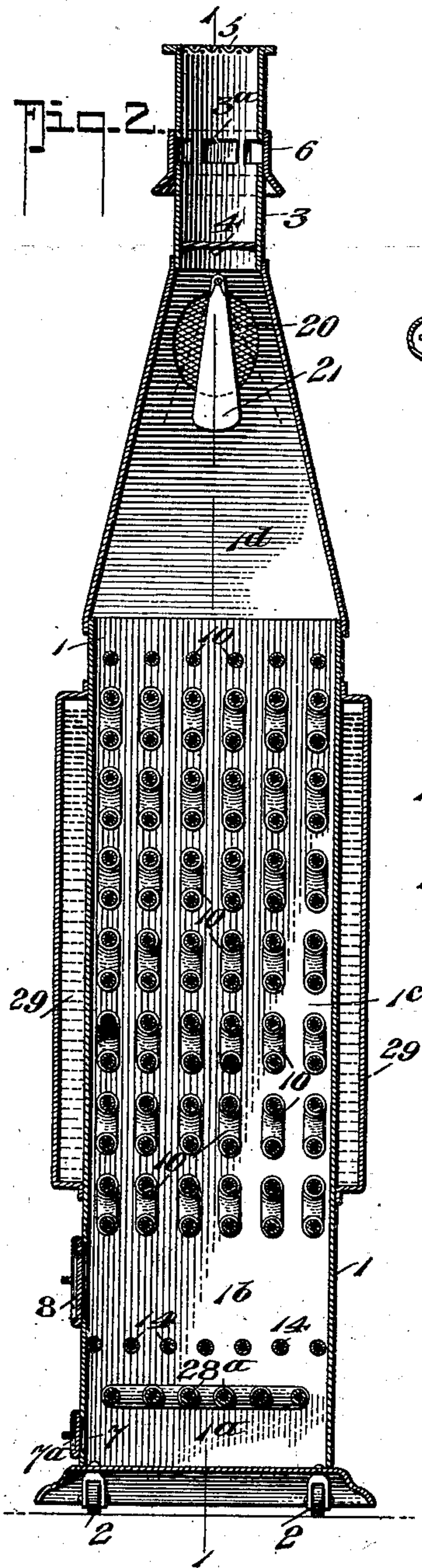
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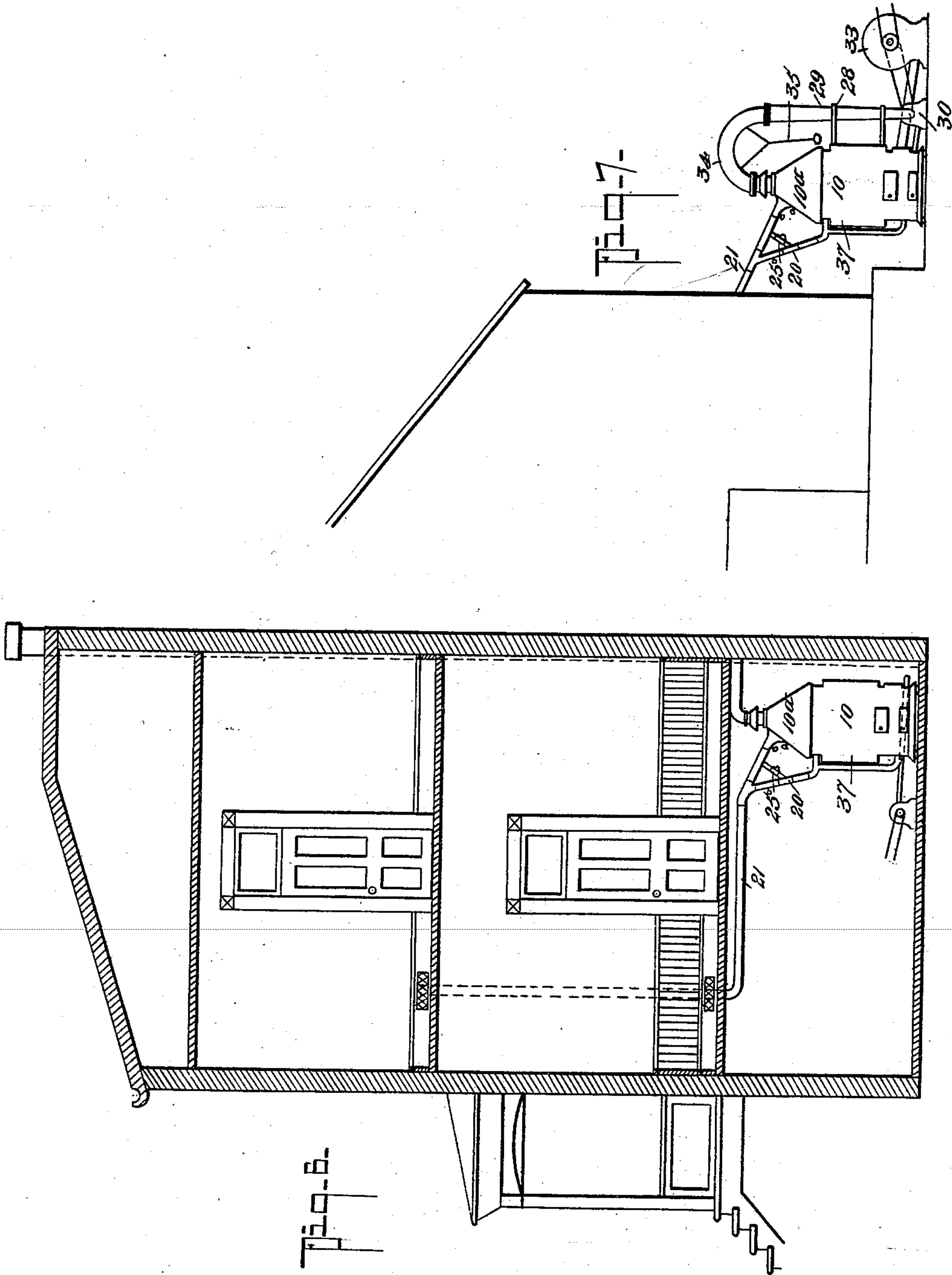
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3 Sheets—Sheet 3.



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UNITED STATES PATENT OFFICE.

JAMES L. HOLLINGSWORTH, OF NEWBERN, TENNESSEE.

HEATER.

SPECIFICATION forming part of Letters Patent No. 648,259, dated April 24, 1900.

Application filed August 23, 1899. Serial No. 728,148. (No model.)

To all whom it may concern:

Be it known that I, JAMES L. HOLLINGSWORTH, residing at Newbern, in the county of Dyer and State of Tennessee, have invented certain new and useful Improvements in Heaters, of which the following is a specification.

This invention has for its purpose to provide an economical, simple, and easily-manipulated portable means capable of being used for heating and cooling houses and as a means for drying and curing tobacco and drying and ventilating grain, coffee, fruit, cottonseed, and other like perishable staples.

This invention in its general nature comprehends a portable fire-box of suitable height and width, having a natural draft-opening below the fire-box and an offtake arranged as ordinarily and having a supplemental offtake adapted to convey smoke to the drying-house or other points where it is desired to smoke or dry articles in bulk or separated, said main offtake and supplemental offtake or by-pass having suitable valves, whereby the draft and smoke outlet can be governed at will; and combined with the aforesaid construction of heater-body and offtakes is a series of continually-coiled air-pipes located within the fire-chamber, having their inlet end connecting with a common air-supply chamber in communication with a blower and their outlets held to discharge into a common pipe which discharges into the supplemental offtake.

My invention also comprehends certain novel features of construction including a water-jacket surrounding the heating-body, which has an offtake provided with a valve the adjustments of which cause the offtake to discharge either into the room to properly keep the atmosphere moist, and to discharge into the offtake or air-feed pipe for humidizing the tobacco-barn, and to case the tobacco after it has been cured by smoking and drying, the latter result of my invention being a particularly advantageous one, as by the use of my invention as a means for heating the tobacco-leaves, the tobacco can be instantly humidized after it has been properly smoked or dried, without waiting for a natural humidization of the atmosphere, as is necessary in the use of the ordinary farm tobacco-curing

barn, and while it is especially useful for such purpose the humidizer portion of my invention is also applicable for keeping the hot air moist that is disseminated into the various parts of the building when my invention is used as a hot-air heater alone.

This invention also embodies, in combination with the heater and its offtake proper, a conveniently attached and adjustable means adapted to be set to connect with the main draft or offtake and having for its purpose to provide a more perfect and increased combustion and a greater economy of fuel and also for commingling with the products of combustion atmospheric air in such a manner that the combined mass is mingled and discharged into the fire-chamber and consumed.

In its subordinate features this invention comprehends certain details and novel combinations of parts, all of which will hereinafter be fully described, and particularly pointed out in the claims, references being had to the accompanying drawings, in which—

Figure 1 is a vertical section of my improved heater, taken practically on the line 1 1 of Fig. 2. Fig. 2 is a similar view taken on the line 2 2 of Fig. 1. Fig. 3 is a horizontal section taken on the line 3 3 of Fig. 1. Fig. 4 is a horizontal section on the line 4 4 of Fig. 1. Fig. 5 is a detailed view illustrating the manner of connecting the water-space with the air-offtake. Fig. 6 is a diagrammatical view illustrating the manner of using my improvement as a hot-air furnace, and Fig. 7 is a diagrammatical view showing the manner of using my invention in connection with a tobacco-barn.

In the practical construction the heater is made of sheet or cast metal and comprises a rectangular-shaped body 1, mounted upon casters 2 2, whereby to facilitate the movement of the heater, especially when used for drying purposes. The heater-body 1, which in the simplest form, has a like shape throughout, embodies a lower or ash-pit compartment 1^a, a fire-pot 1^b, and a combustion-chamber 1^c, which merges with a supplemental combustion-chamber 1^d, that forms practically a continuation of the chamber 1^c, said chamber 1^d tapering conically toward the main offtake and draft pipe 3, which is provided with a cut-

off valve 4 and a spark-arrester diaphragm 5, said pipe also having air-inlets 3^a, the area of which is increased or diminished by an adjustable hood 6 for a purpose presently explained. The ash-pit has the usual draft-opening 7, closed by the door 7^a, and the fire-pot the usual feed-opening and door, (indicated by 8.)

10 indicates a series of continuously-coiled pipes, the coils of which are arranged in horizontal rows and extend the full width of the combustion-chamber, the lower legs of the series being disposed just over and forming, as it were, the crown of the fire-pot, while the upper ends of said series of pipes terminate at the base of the upper or supplemental combustion-chamber, as clearly illustrated in Fig. 1. The lower or inlet ends of the pipes 10 project through the side of body 1 and communicate with an air-duct 11, common to all of the pipes 10, while the upper ends of said pipes discharge into a collecting-space 12, with which the air-conveyer flue 13 connects.

14 indicates a series of air-pipes which form the bottom or grate of the fire-pot, and these pipes project at one end into the air-duct 11 and at the other end into a duct 15, having an offtake 16, that discharges into the collecting-duct 12.

17 indicates a blower placed conveniently near the heater and driven by electric or other mechanical means, the delivery-pipe of which discharges into the duct 11.

18 indicates a smoke-flue that connects with the combustion-chamber 1^a at a point below the valve of its main offtake-pipe. The flue 18 merges with the air-conveyer pipe 13, the two being continued in a distributing-pipe 13^a, which in practice has its end constructed to receive any suitable coupling member, whereby it can be conveniently and detachably joined with the distributing-flue that carries the air through the house to the registers in the several compartments or with the main receiving-flue of a tobacco-curing barn or other drying house or bin.

19 indicates a valved air-pipe that connects with the flue 13 and has its discharge projected into the smoke-flue 18, the same acting as an injector, and is designed for increasing the draft in said flue 18 when the parts are adjusted to cause the smoke to pass into the said flue 18. The flue 18 has a cut-off valve 18^a, and over its entrant end is placed a spark-arrester screen 20.

21 indicates a clearer-blade held to be operated from the outside by a handle 21^a, the purpose of which is to clear the screen 20 of ash or other adhering particles.

At one side the heater-body has projecting brackets 22, in which is fixedly held a downwardly-tapering pipe 23, the lower end of which is so formed as to be conveniently connected with a blower 24, which may be belted to the blower 17 or separately driven by any suitable power, it being understood that when it is arranged to be driven by the shaft of

blower 17 it can be readily disconnected and held inert by slipping the belt 25.

On the upper end of the pipe 23 is pivotally supported an elbow 26, which is arranged to swing in a horizontal plane and has a suitable pendent handle 27 connected with it, whereby it can be conveniently swung over to connect with the upper end of the main or natural draft-pipe 3 or be disconnected therefrom, as desired.

The blower 24 has its outlet-pipe 24^a connected with an air-space 28, with which one end of a series of perforated pipes 28^a communicate and which are horizontally disposed below the grate-pipes, they being arranged to discharge up between the said grate-pipes, as clearly shown in Fig. 2.

By providing the heater with a means for creating a forced draft such as described the capacity of the heater is increased at will, this being essential for domestic heating in case of extreme cold weather, and particularly so when the heater is used for drying purposes, where the heat-volume must be under easy control and capable of being quickly increased or diminished as the character of the articles to be dried may make necessary.

By providing the main flue with air-inlets, which can be readily regulated to permit the ingress of an increased or diminished amount of air, it is manifest that the carbonaceous portion of the products of combustion will be thoroughly mixed with the oxygen, and the said products drawn down under a forced draft, and discharged up into the fire-pot and all waste fuel thereby utilized.

29 indicates a closed jacket surrounding the body 1, which forms a water-space having a feed-opening 29^a in the top and an outlet and with which a pipe 30 connects. This pipe discharges into the air-offtake pipe 13 and is provided with a two-way valve 31.

The object in providing the heater with the external water-space and connecting it with the air-offtake is to provide a humidizing means which can be utilized to humidize the atmosphere of the room heated by direct radiation from the heater, as also the hot air that passes therefrom. Thus by turning the valve 31 in one direction the clean or moist air from the fluid-space can be discharged into the atmosphere, as indicated in Fig. 5, or, if desired, the steam can be discharged directly into the hot-air flue, and thereby humidize the hot air.

By providing a humidizing means as described, my invention is rendered also especially useful in the treatment of tobacco, as the moisture from the water-space can be utilized for cooling and moistening cold air, which may be driven through the pipe-coils.

When my improvement is set up for heating purposes as illustrated diagrammatically in Fig. 6, to render the same operative, fire is built on the tubular grate-bars, the valve in the main offtake-pipe is opened, and the valve in the smoke-flue that connects with the air

offtake is closed. Air is then forced through the pipes within the heater, which in its passage therethrough becomes heated and passes off through the flue 13 and is disseminated into the various branch pipes.

To humidize the hot air, it is only necessary to turn the valve that governs the escape of the vapor from the jacket 29 to discharge it into the hot-air offtakes.

While especially advantageous as a heater in cold weather, it is obvious that without any change of parts whatever my improved means will as readily serve to cool the house in summer, as cold air passed through the pipes can be as readily disseminated as the hot air, and while I have not so illustrated same, it is obvious that the air-offtake may be passed through an ice-box or other cold-storage, whereby to cool it before it passes into the room.

For curing tobacco, drying grain, &c., my invention is particularly useful. In curing tobacco or other smoking process the valve in the main offtake is closed and the valve to the supplemental smoke-outlet is opened. In this form the air driven through the pipe-coils is not only heated, but also serves, together with the smoke, as a drying means, it also acting as a means for creating a positive and uniform draft through the supplemental smoke-flue, which operation is augmented by the valved jet-pipe that enters the said smoke-flue near its entrant end.

By providing the swinging section-pipe member, it is obvious that, should it at any time be desired to create a quick and powerful combustion, the main-flue valve can be opened, and a suction-blast secured, which also serves as a means for consuming the products of combustion, this being particularly desirable when the device is used to generate hot air for heating or drying purposes. When used for heating tobacco, as indicated diagrammatically in Fig. 7, after the tobacco has been smoked and hot-air dried the fire can be quickly banked or drawn, and cold air, moistened by reason of the escape of the vapor in the water-jacket 29, can be quickly charged into the barn and the tobacco fixed by proper humidization without necessarily waiting for a natural humidization of the atmosphere, as is ordinarily the case.

When it is desired to utilize the heater as a smoke-drier alone, the air-supply can be stopped or the flue 13 cut off by shifting its valve to a closed position.

By arranging the air-circulating pipes as described, it is manifest that any one set of pipes can be removed in case of burning out or becoming otherwise disabled, without disconnecting any of the remaining sets, it being obvious that the openings to the air-spaces 11 and 12 which the removed set engaged

with can be plugged up and communication between the combustion-chamber and the spaces 11 and 12 thereby cut off.

The swinging pipe-section and the coacting parts that constitute the smoke-return devices form a part of my heater in its most complete construction, and they have therefore been described and illustrated in this application. Such parts, however, are not herein claimed, as they form the subject-matter of another application filed by me January 9, 1900, Serial No. 906.

Having thus described my invention, what I claim and desire to secure by Letters Patent, is—

1. A heater comprising a combustion-chamber terminating in an ordinary offtake, and having a draft at the bottom; an external air-space 11, means for forcing air therein; a series of tubular pipes forming the grate, one end of said pipes communicating with the space 11; an air-collecting space 15, connected with the opposite ends of the grate-pipes; a series of horizontally-coiled pipes, independently and detachably held within the combustion-chamber, their inlet ends communicating with the air-space 11, a second air-space 12, into which the exit ends of the coiled pipes discharge; a pipe connecting the collecting-spaces 15 and 12, said space 12 having a valved offtake, all being arranged substantially as shown and described.

2. The combination with the heater-body, said body comprising an ash-pit; a combustion-chamber, said chamber terminating in a tapering top; and a valved offtake communicating with the top; of a series of air-circulating pipes held within the combustion-chamber; means for forcing air into one end of said pipes; a collecting-space for receiving the discharge from the pipes, said space having a valved offtake and a supplemental outlet connected with the said valved offtake and the combustion-chamber, substantially as shown and described.

3. The combination with the heater, the air-circulating pipes, a valved offtake communicating with the discharge end of the said pipes; the valved main smoke-offtake; the supplemental smoke-offtake, communicating with the air-offtake at a point beyond its valve; the water-jacket, said jacket having a vapor-outlet discharging into the air-offtake; a valved injector-pipe, connected to the air-offtake at a point between its valve and inlet, said injector discharging into the supplemental smoke-offtake, all being arranged substantially as shown and described.

JAMES L. HOLLINGSWORTH.

Witnesses:

Mrs. J. L. HOLLINGSWORTH,
FRED G. DIETERICH.