(No Model.)

3 Sheets—Sheet 1.

K. WEHSE.

STOVE.

No. 384,300.

Patented June 12, 1888.

Fig. 2.

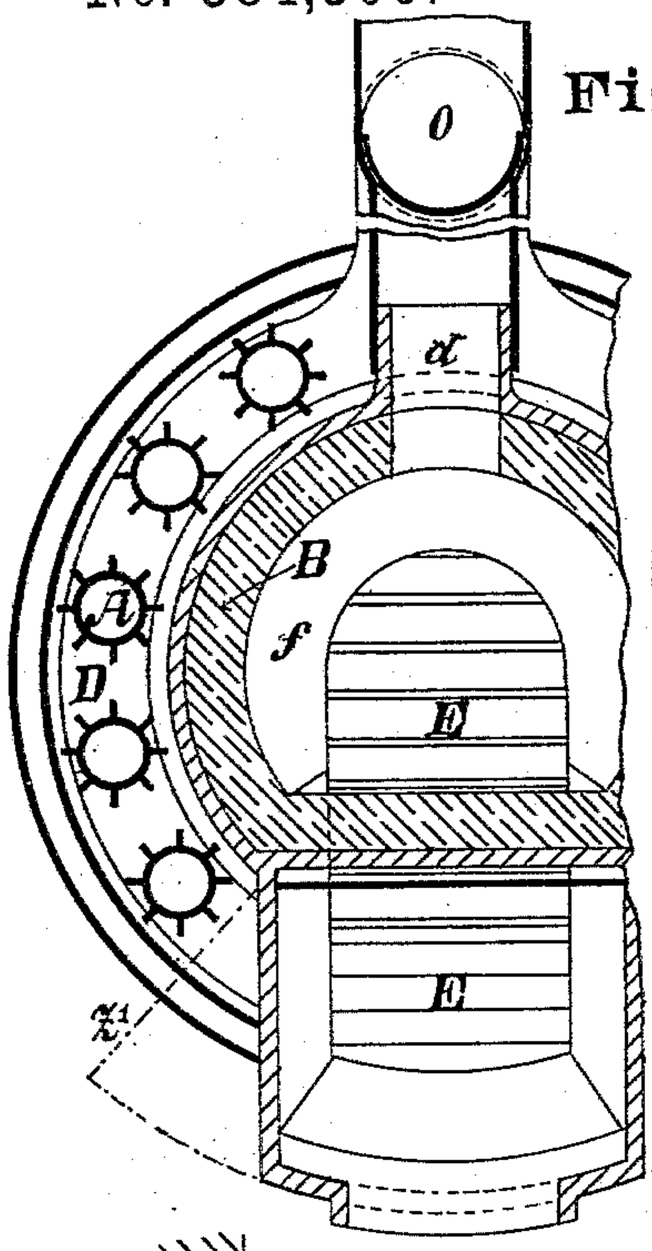
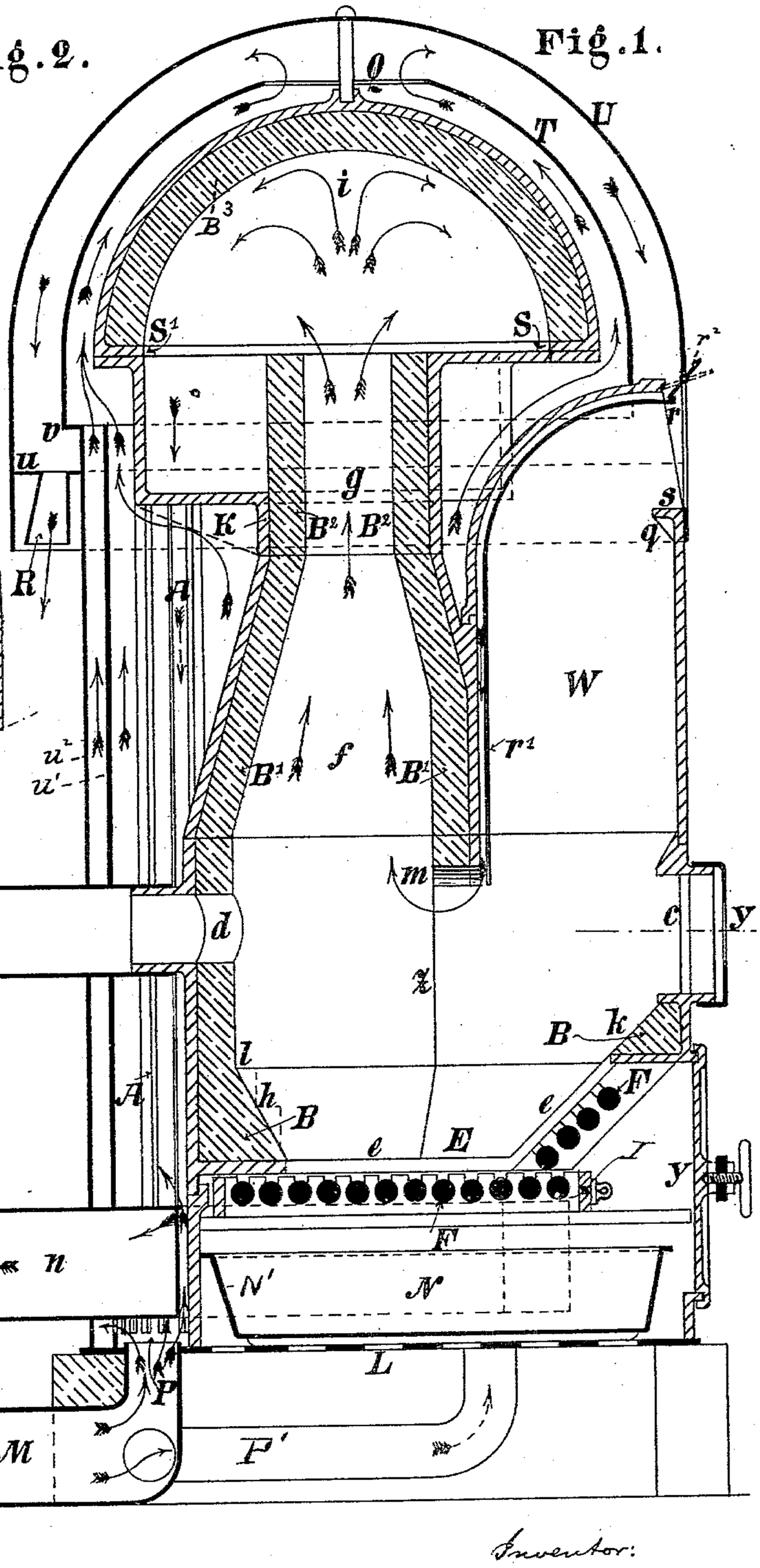


Fig. 1.



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(No Model.) 3 Sheets—Sheet 2.

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Fig. 5.

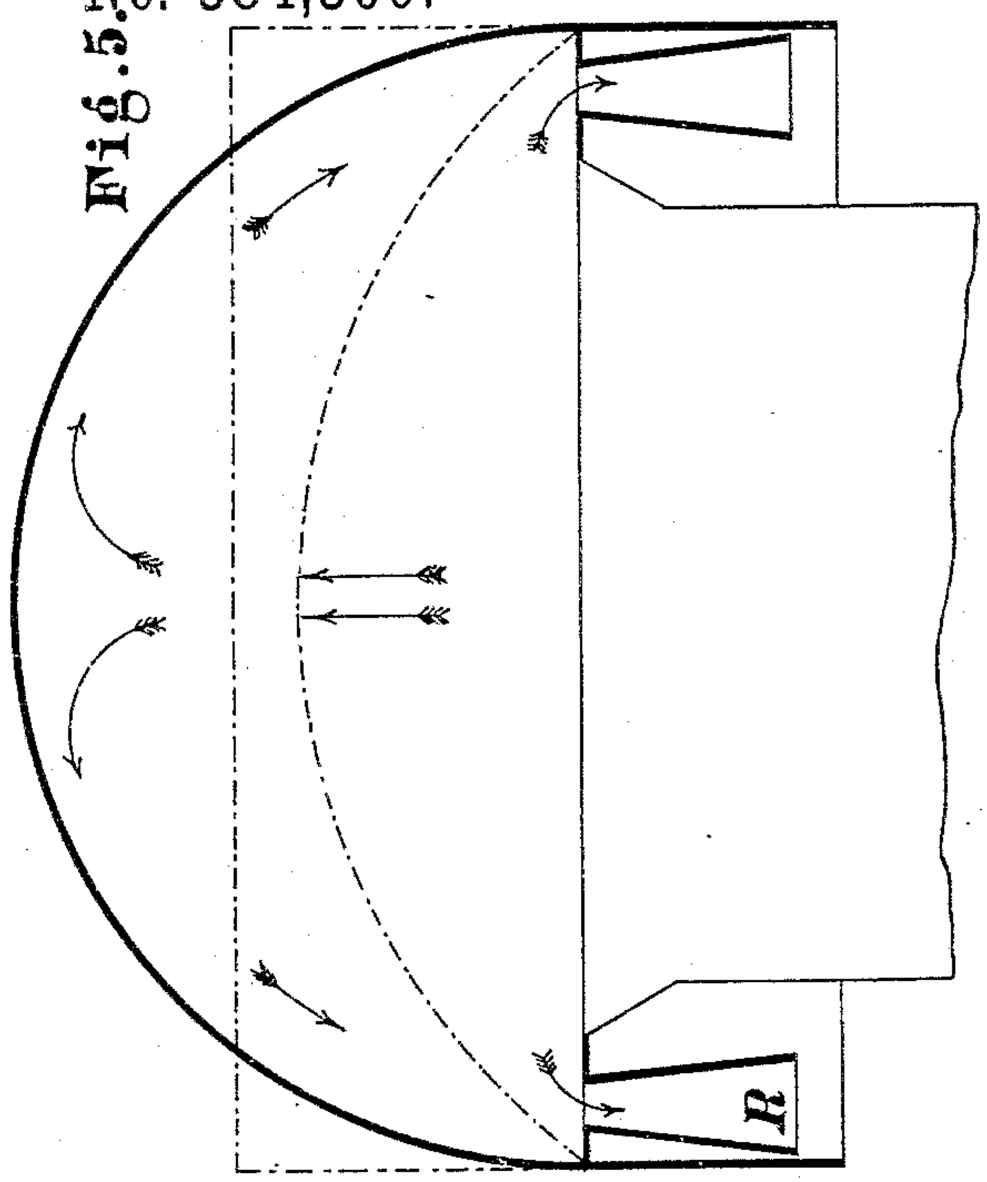


Fig. 6.

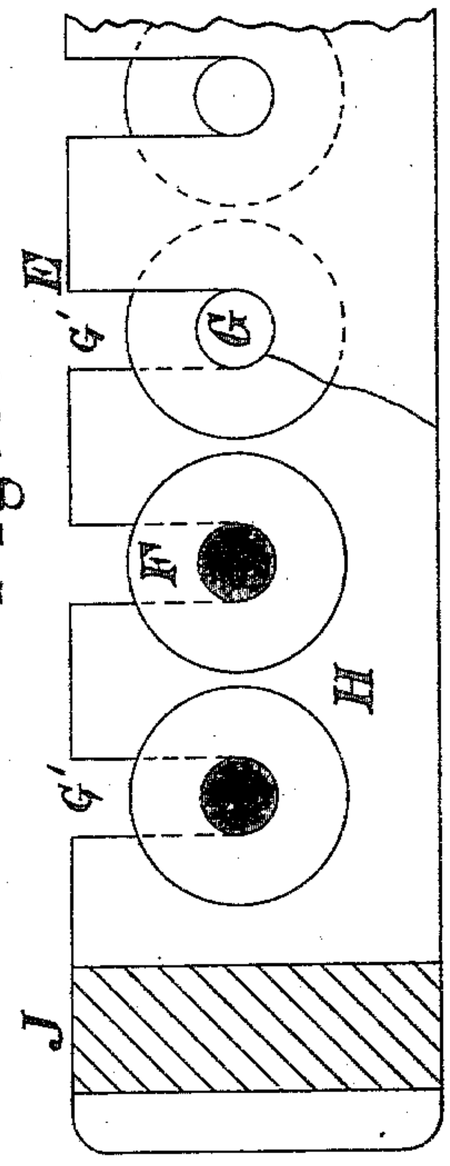


Fig. 3.

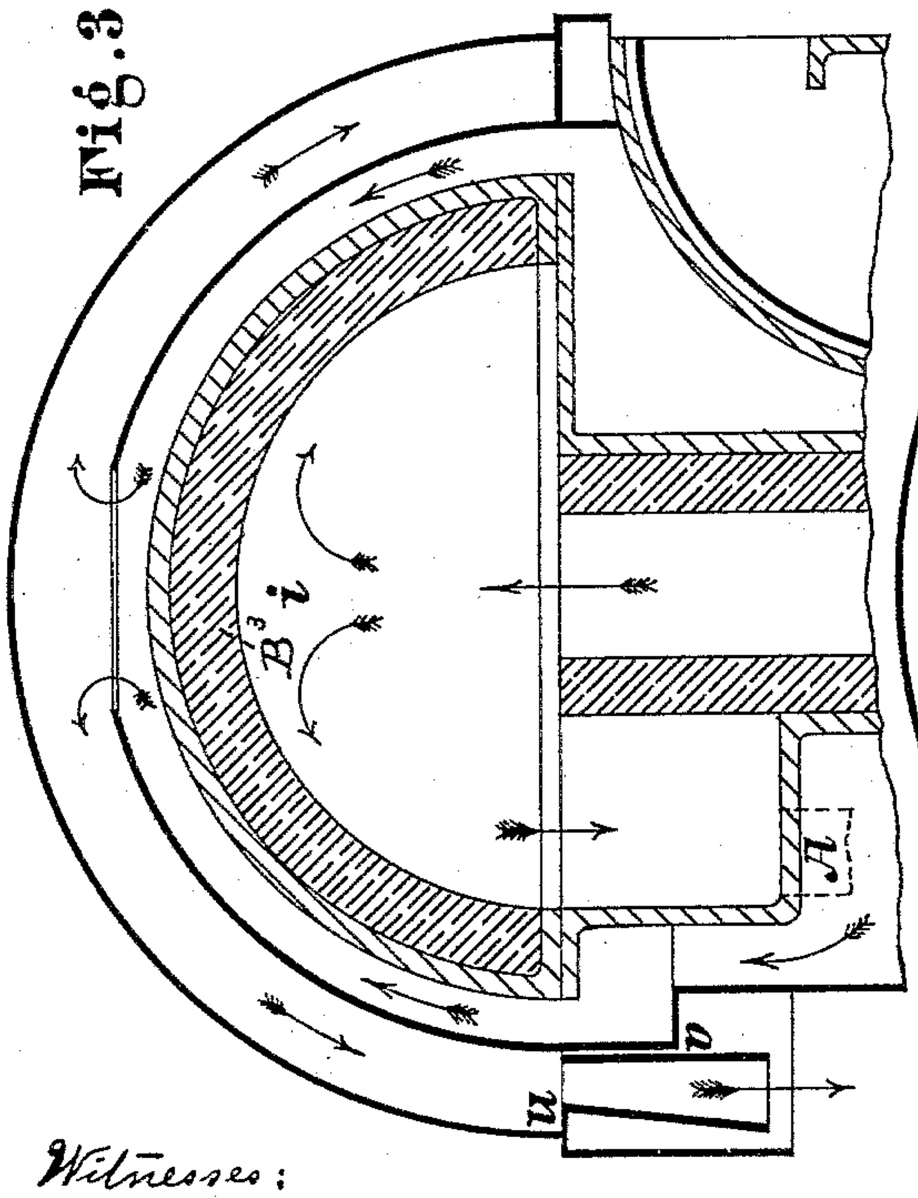
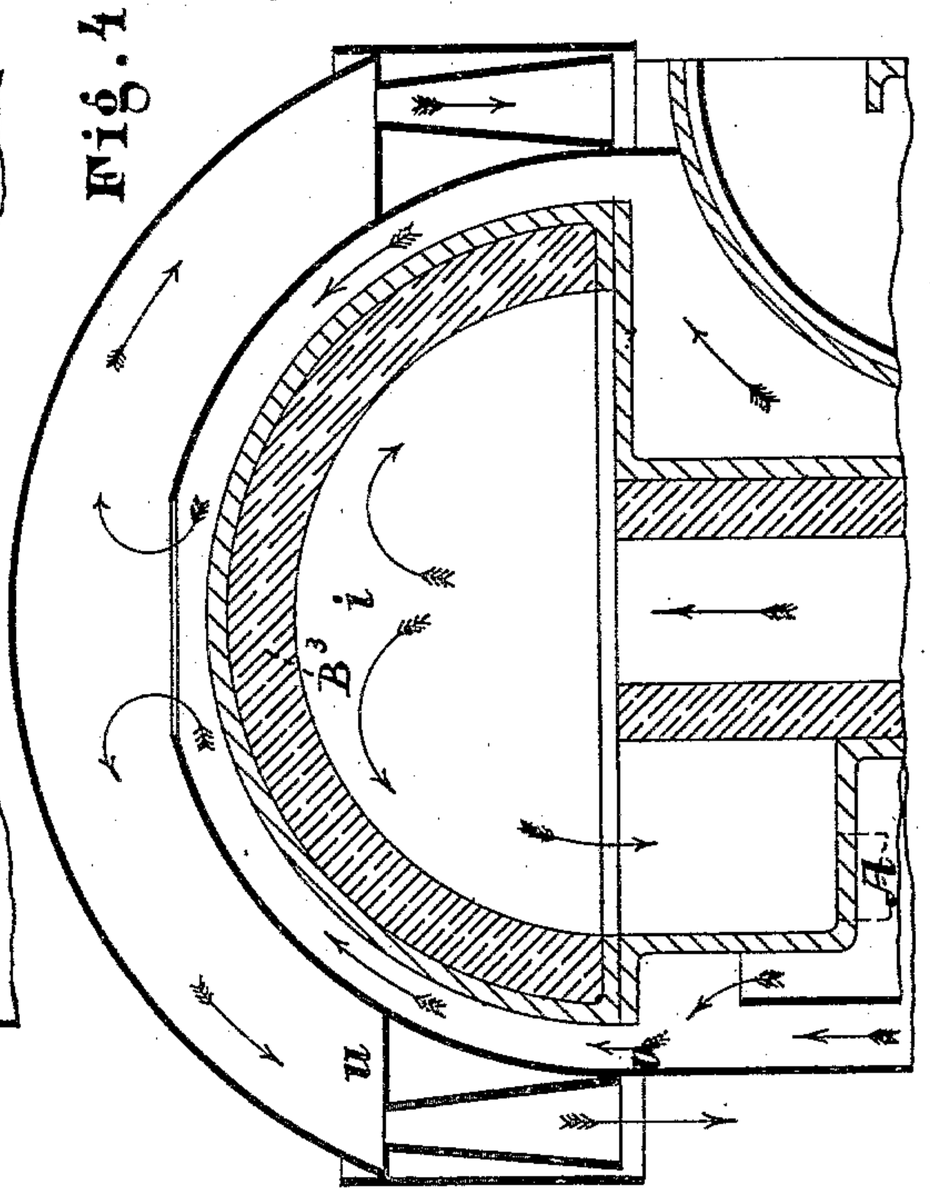


Fig. 4.



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(No Model.) 3 Sheets—Sheet 3.

K. WEHSE.

STOVE.

No. 384,300. Patented June 12, 1888.

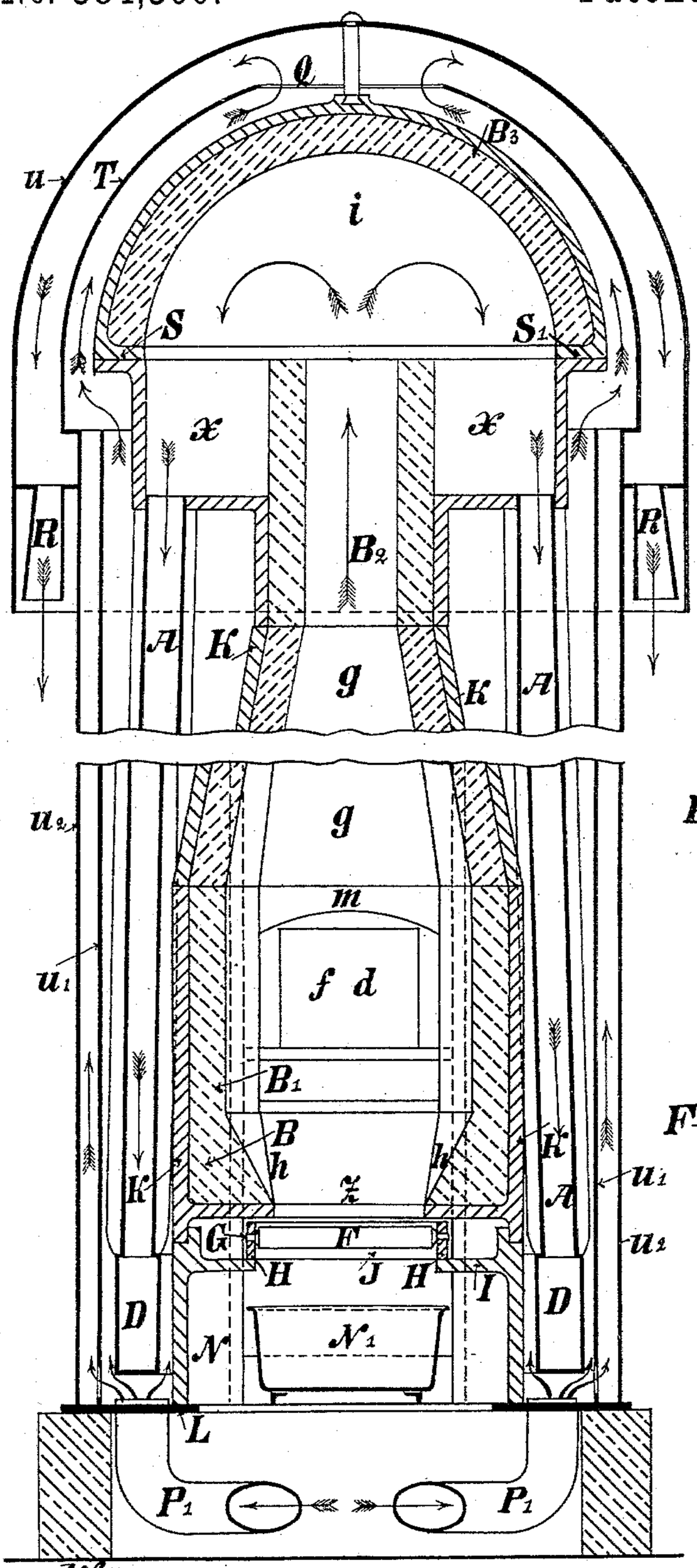


Fig. 7.

Fig. 8.

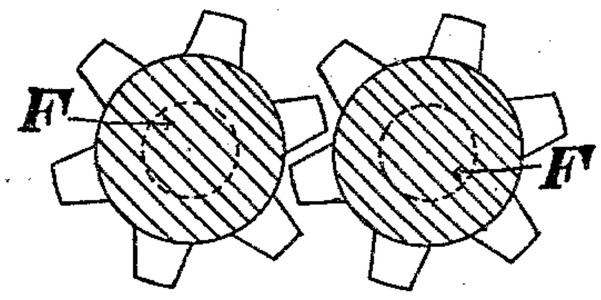
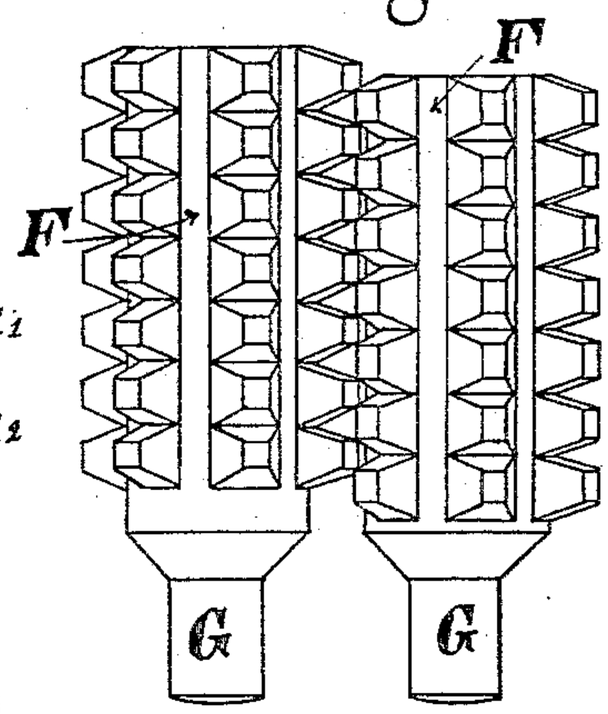


Fig. 9.



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William Partington.

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per Roeder & Briesen.
Atty.

UNITED STATES PATENT OFFICE.

KARL WEHSE, OF LANDECK BATH, SILESIA, GERMANY.

STOVE.

SPECIFICATION forming part of Letters Patent No. 384,300, dated June 12, 1888.

Application filed June 10, 1886. Serial No. 204,698. (No model.)

To all whom it may concern:

Be it known that I, KARL WEHSE, a resident of Landeck Bath, Silesia, Germany, have invented a new and Improved Stove, of which the following is a specification.

The stove which forms the object of the present invention contains various improvements over the stoves now in use.

The invention consists in the features of construction hereinafter more fully pointed out.

In the accompanying drawings, Figure 1 represents a vertical section; Fig. 2, a partial horizontal section on line *x y*, Fig. 1. Figs. 3, 4, and 5 represent modifications of the cupola or top part of the stove. Fig. 6 represents the frame for supporting the grate-bars on an enlarged scale. Fig. 7 represents a vertical section at right angle to Fig. 1. Fig. 8 shows a cross-section, and Fig. 9 a plan, of the grate-bars, on an enlarged scale.

The hearth consists of the fire-pot Z and the feed-tube W, which communicate in the lower part of the stove.

c is the fire-door opening, N the ash-pit, and E the grate-bars, with cylindrical bars F, (in the drawings a grate in two sections, partly horizontal, partly inclined, is shown,) which serve exclusively as an entrance for the combustion-air from the ash-pit N and for raking the fire.

d is an opening at the back of the stove, which corresponds with the opening *c*, so that their axes will be in the same horizontal line. It serves for the escape of smoke while lighting the fire, and that the smoke and combustion-gases may arrive and pass directly to the chimney. They produce a warm-air current and give to the chimney a sufficient draft, and prevent an interruption in the escape of the products of combustion. The chimney is placed with this opening in such a position that the same can be seen through the front opening, *c*, of the stove, to facilitate the cleaning of the same.

The fire-pot Z is at the inside entirely covered with fire-clay or its equivalent, B. This lining extends for the entire vertical and conical section of the heating-tube *f*, and continues on into the cylindrical tube *g*. The cupola or calotte *i* is also lined with fire-clay. This lining of fire-clay, in general of equal thickness, is increased a little at those places which are exposed to the strongest heat—that is to say, on the circumference of the opening of the grate E. In Fig. 1 this increased thickness of the lining is shown at *h* and *k*.

The inner faces of the partitions of the fire-pot are arranged in a vertical manner of a form represented in Fig. 2. They pass from the circular section of the fire-pot to the rectangular form of the feed-tube.

m is a low cross-wall, Fig. 1, the lower part forming an arch, which supports and maintains the fire-clay lining B′ of the vertical partition of the feed-tube and of the conical part of the stove. It serves also to augment the durability and solidity of the partitions forming the oven in general. Besides this it has for its purpose to form a prolongation of the general partition toward the bottom, and it enters the fire-pot, so that the fuel cannot fall toward the base of the cone. The layer of the fuel will, therefore, remain always so small in the fire-pot that the combustible is brought into contact with so much of air that it oxidizes in the best possible way. The arch *m* prevents also the entrance of any combustible into the escape-flue *d*. Besides the consideration for the solidity of the parts of the stove, this form has been chosen to facilitate the better examination, through the opening *c*, of the escaping-flue *d p*.

The gases, smoke, and combustion rise from the fire-pot Z into the prolongated conical flue *f*, and from there through the cylindrical flue of fire-clay *g* into the calotte or cupola *i*, which serves as a reflector. From this latter the gases go in a reversed way and descend vertically toward the lower part of the heating apparatus through a number of flues, A, with vertical outer ribs, into a circular flue, D, which surrounds the ash-pit. From here the gases pass into the flue *n*, from where they flow, passing through the back part of the stove, into the flues *o* to the height of the back opening, *d*, of the fire-pot, and enter finally into the flue *p*, which connects directly with the chimney.

The fire-grate E consists either of cylindrical bars F, as shown in Figs. 1 and 6, or of bars provided with teeth around their circumference, as shown in Figs. 8 and 9, placed in a horizontal and inclined position.

The ends of the bars F are reduced to form

journals G. These journals rest in the bars or frame H, provided with slots G′ to receive the journal G. These bars are supported by cross-pieces I, or other suitable frame-work. The surface of the grate-bars F may be made smooth, as shown in Figs. 1 and 6; but the same can also be provided with noses or projections of a dovetail form, as shown in Figs. 8 and 9, and so placed that those of one bar come between the projections of the adjoining bars, so that these bars while raking the fire will turn without interfering with the adjoining bars.

The object of the projections is to scrape off the drosses which will be attached to them by a strong fire. The ends of the bars are made slightly conical at the end to reduce the friction while turning against the supports.

The isolation of the grate from the walls of the stove renders it possible for the free admission of the combustion air to the fuel around the space between the grate and the walls of the stove, and by this arrangement the sides of the fire-place are protected from the heat of the fire.

The circular bars facilitate the fall of small particles of ashes and dross between the same, because they have no flat face upon which such particles could remain.

The feeding-tube W is placed vertically in front of the conical fire-flue *f*. It is composed of a straight rear and of two straight side walls, the latter being joined in front to the curved body of the stove. The rear wall is curved forwardly at its upper end, as shown. If it is desired to increase the capacity of the feed-tube, the side walls may be turned outward, so as to diverge toward the front, as indicated by the dotted lines *Z′* in Fig. 2.

Parallel and outside of the back of the feed-tube W a plate, *r′*, is placed about one centimeter distance, which begins on the upper edge of the feed-tube at *r* and reaches down to the combustion-chamber at *m*. It extends the entire breadth of the back partition of the feed-tube, and is held in place by means of pins or studs fast to the back wall of the feed-tube, and protects the same against any pressure exerted by the fuel while being introduced through the opening or door of the feed-tube. This sheet covers also the small transversal arched wall *m* and corresponds at its lower end in shape with the arch of the wall *m*.

This metallic sheet *r′* has for its purpose that air can enter and pass through the space thus created to the combustion-chamber under the arch *m*. The air enters here partially warmed, and so produces, mixed with the smoke and the products of combustion, the smoke burning or consuming. The entrance of this passage at *r* is provided with a valve, r^2, or similar arrangement, serving as a regulator for the admission of air. (See Fig. 1.) The air on its entrance at *r* into this flue has a high temperature, because it is taken directly from the radiated heat of the stove, and it would be yet warmer if it could be drawn directly from the hot-air outlet R of the cupola. This warm air passes through the flue, and is still further heated by radiating heat of the inner funnel, *f*. The opening or door of the feed-tube is hermetically closed, and remains open only during the operation of filling. The valve at *r* serves for the regulation of the air admission, and is entirely independent of the door of the filling-tube.

The heating-funnel consists of the conical-shaped fire-flue *f* and the upper cylindrical flue, *g*. It forms one of the essential parts of the stove, besides the reversed air-current and the grate.

The combustion-gases rise to the top of calotte *i*, and pass from there in a compressed state along the interior of it, heating thus the calotte or cupola, which has on the inner side an entire lining of fire-clay, B^3. This cupola forms a hemisphere, the lower end of which is continued or extended in a cylinder of sheet-iron without fire-clay, which reaches downward some distance of the fire-brick cylinder B^2. On that part of its circumference where it meets the feeding-tube it is provided with a corresponding cut-out. This cylindrical prolongation of sheet-iron of the calotte is then beveled at a right angle, which joins the fire-brick cylinder B^2 and surrounds the latter like a concentric sleeve, and is continued downward, forming thus a cylinder, K, surrounding and supporting the fire-brick cylinders B^2 and B′. With the continuation of the cupola or reflector of the gases begins the indirect heating part of the stove, which is formed by a number of heating-tubes A, ribbed on their outside. (See Fig. 2.)

The heating-tubes are of cast-iron or sheet-iron, provided with longitudinally-placed radial ribs, which end in a horizontal annular channel or flue, D, Fig. 7. They are not placed on front and back on account of the feed-tube W and the smoke-flue *d* being placed there.

The channel or annular flue D is provided on its front where the ash-pan is placed with a suitable recess and reaches with its upper end about to the height of the horizontal grate, and extends downward to the bottom of the stove. It may be supported by a double T-iron attached to its bottom, and which rests upon a perforated plate, L, below the ash-pit. This flue D connects at the back of the stove with a flue, *n*. From the flue *n*, connecting with the annular channel D, rises flue *o* to the height of the flue for the direct escaping smoke, and is there connected with the horizontal flue *p*, which passes directly into the chimney.

The ash-pit N corresponds in shape with the form of the fire-pot, but is larger on its inside, not being provided with a fire-clay lining. Its front is provided with a door, *y*, which closes hermetically. It has such a depth that the ash-holder N′ has sufficient space for being placed under the grate and to be taken out easily.

All four sides of the ash-holder are inclined outwardly from the base, and for the purpose

that the sides of the ash-holder may not come against the walls of the ash-hole its upper edge is provided with horizontal projections. The ash-holder N′ is provided at the bottom with small projecting feet or bars, upon which it rests, to allow the free circulation of air through the plate L into the ash-pit and around the ash-holder.

To use the outer or atmospheric air for the circulation and combustion, this plate is entirely closed except three holes, which receive the tubes P P′ P′. Two of these tubes, P′, (only one is shown in the drawings in Fig. 1,) are connected to the plate at the side under the fire-grate, and the third, P, behind the ash-pit is connected with the surrounding casing. All three tubes are united to one pipe M, in which a valve, &c., M′, is arranged for regulating the amount of entering air.

For the circulation of air, two casings, U′ U², are provided, placed concentrically around the stove, resting upon an extension of plate L. The exterior U² serves at the same time as exterior casing of the stove. These casings rest upon an extension of the plate L, and are attached at the front to the side partitions of the feed-tube.

The air from the pipe P passes between these casings and between the inner casing, U′, and the fire-pot of the stove, as indicated by arrows, and is heated by said fire-pot and above the cupola or calotte *i* successively to a very high degree. This current of air passes then between the casing T and around the periphery of the cupola *i* toward the opening Q in top of the casing T, and passes then between the casings T U, escaping finally through openings R on the bottom of these casings into the compartment to be warmed.

In the pipe *o* a damper, *o′*, is provided, which closes the end of the flue *d*. When the fire is first ignited, this damper must be opened by turning the same to allow the combustion-gases and smoke to escape through the horizontal flue *d* directly into the chimney. When the fire is well lighted, the damper *o* is moved so as to close the passage *d*, when the smoke and gases are freed to pass through the flues *f*, *g*, and A, in the manner above described.

What I claim is—

The combination, in a furnace having the usual grate, fire-pot, direct and indirect flue-escapes, and ash-pot provided with air-inlets, of the feed-tube W, the air-feed located in the rear thereof and communicating with the fire-pot, the conical flue F, formed by the depending walls B′, and situated directly over the fire-pot, the direct flue *d*, in line with feed-door *c*, the indirect flue-escape, the flue *g*, forming a continuation of flue *f*, the cupola *i*, surmounting said flues and feed W, diving-flues in communication with said cupola, smoke-chamber D, surrounding the ash-pit and the indirect smoke-escape flue communicating with the latter, a double hot-air chamber formed by the casing T U U′ U² and opening Q, said chamber communicating at its lower end with air-supply pipe M, the pipe P, and the exit-pipe R, all operating substantially as and for the purpose set forth.

In testimony whereof I hereunto sign my name, in the presence of two subscribing witnesses, this 21st day of March, 1886.

KARL WEHSE.

Witnesses:
RICHARD KLAPPER,
AUGUST BOESE.