

(No Model.)

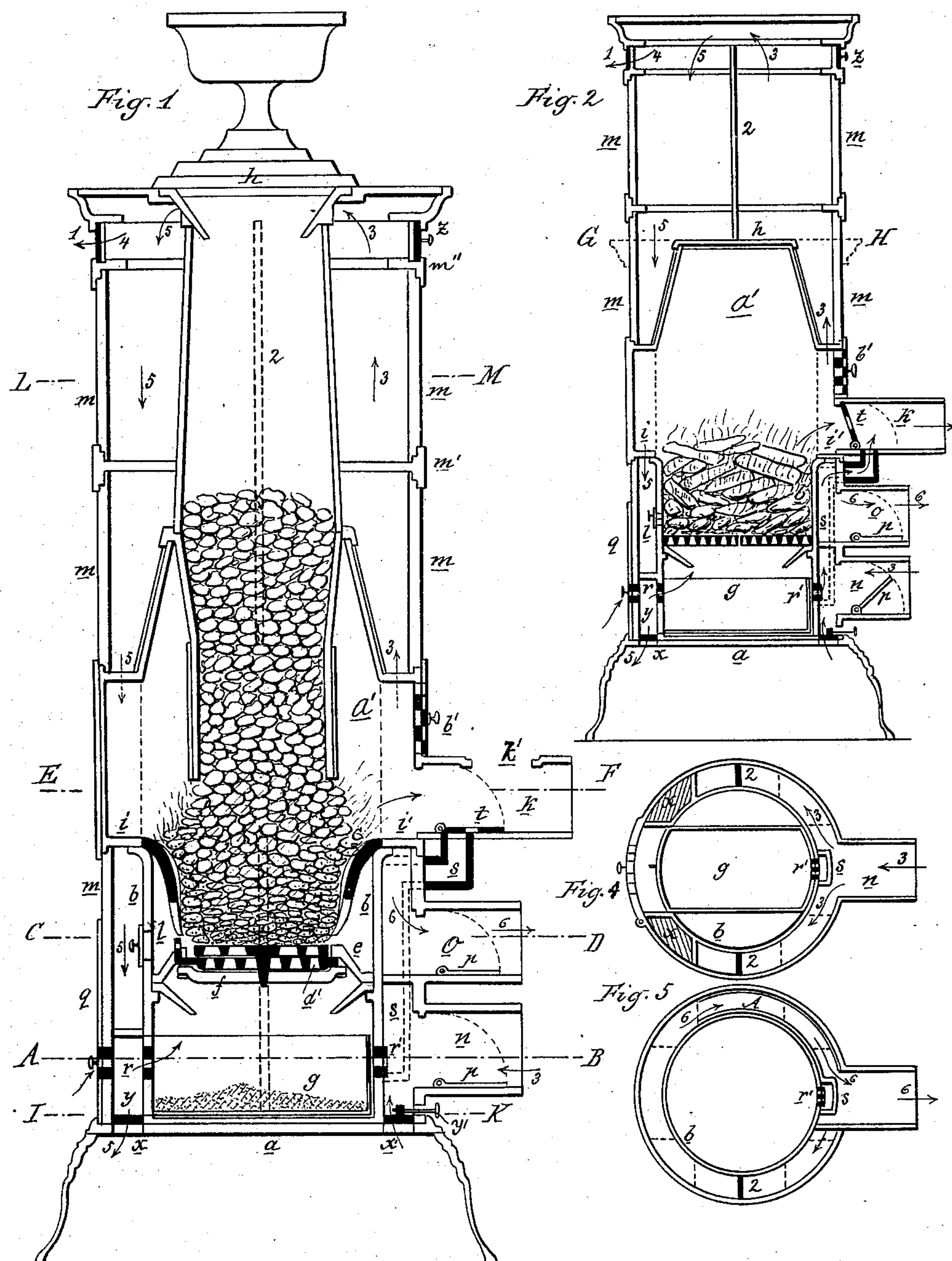
2 Sheets—Sheet 1.

P. O. ELTERICH.

STOVE.

No. 291,011.

Patented Dec. 25, 1883.



Attest:
J. Paul Mayer
C. Scully

Inventor:
P. Otto Elterich
per Albrecht Edward Barthel
Atty

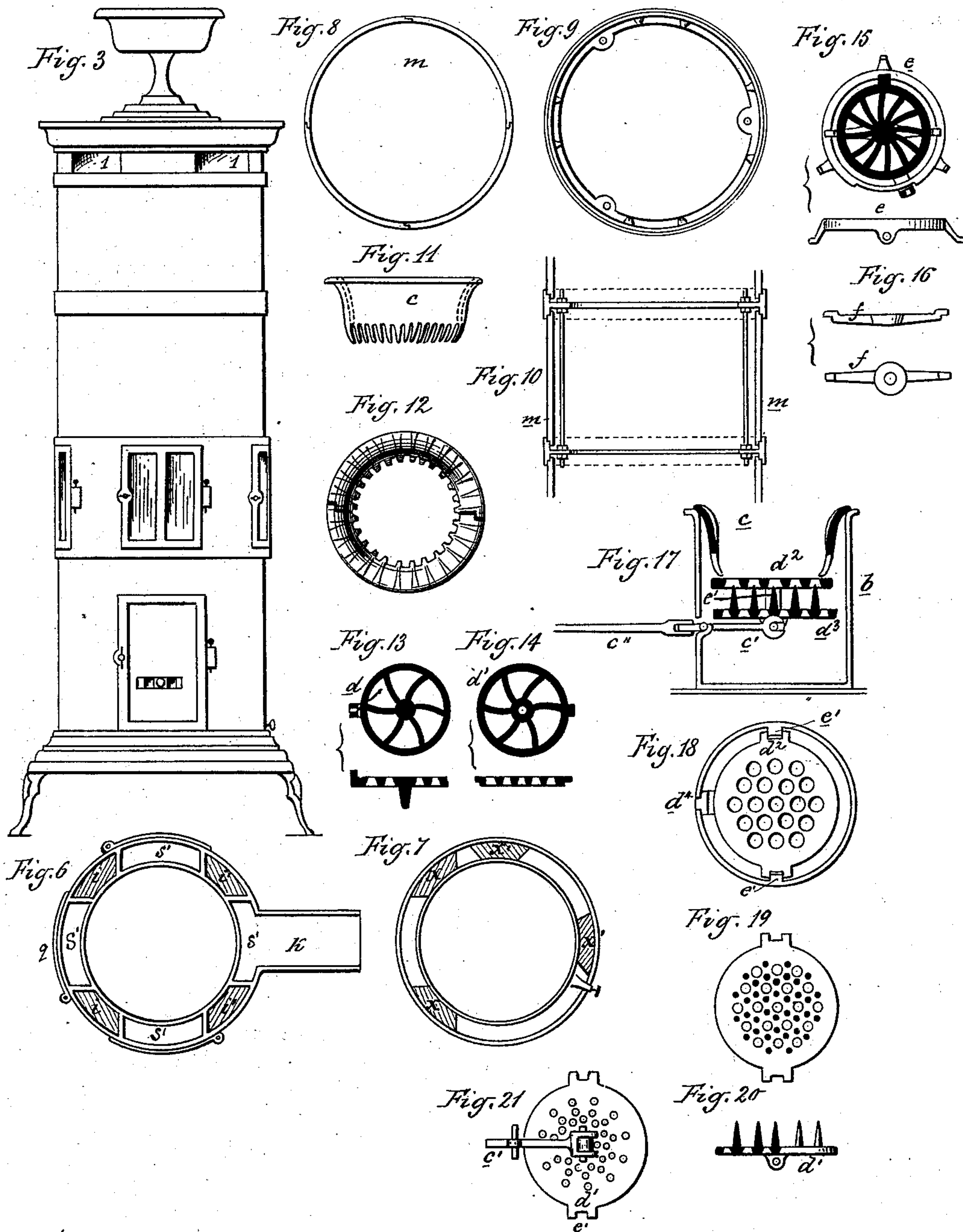
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UNITED STATES PATENT OFFICE.

P. OTTO ELTERICH, OF NUREMBERG, BAVARIA, GERMANY.

STOVE.

SPECIFICATION forming part of Letters Patent No. 291,011, dated December 25, 1883.

Application filed March 13, 1882. Renewed August 15, 1883. (No model.) Patented in Belgium February 12, 1881, No. 53,835; in Russia February 28, 1881, No. 2,683; in England March 24, 1881, No. 1,327; in Italy March 31, 1881, No. 5,058; in France April 4, 1881, No. 141,117; in Austria-Hungary April 22, 1881, No. 573, and No. 593, and in Sweden July 9, 1881.

To all whom it may concern:

Be it known that I, P. OTTO ELTERICH, of Nuremberg, in the Kingdom of Bavaria, one of the States of the German Empire, have invented an Improvement in Stoves, of which the following is a specification.

The nature of my invention relates to that class of stoves wherein direct and indirect heating are combined; and the improvement consists in the construction, arrangement, and combination of parts, as more fully hereinafter described and claimed.

In the drawings which form a part of this specification, Figure 1 is a vertical central section of my improved stove when designed for burning coal or coke. Fig. 2 is a vertical central section of a modification of the stove when designed for wood or peat fuel; Fig. 3, elevation of stove, with the hot-air exits on top of stove open; Fig. 4, section on line A B, Fig. 1; Fig. 5, section on line C D; Fig. 6, section on line E F; Fig. 7, section on line I K; Fig. 8, section of stove-mantel on line L M; Fig. 9, plan of ring for connecting mantel-sections; Fig. 10, vertical central section through portion of mantel, showing manner of connection; Fig. 11, side view of fire-pot; Fig. 12, plan view of fire-pot; Fig. 13, upper grate, with section thereof; Fig. 14, lower grate, with section thereof; Fig. 15, plan view of fire-grates and ring-support, together with a detached view of the latter, separate; Fig. 16, lower grate-support detached, in plan and elevation; Fig. 17, vertical section of a modification of the grate when designed for soft caking coal. Fig. 18 is a plan view of upper grate shown in Fig. 17. Fig. 19 is a plan view of lower grate shown in Fig. 17. Fig. 20 is a side elevation of lower grate in Fig. 17. Fig. 21 is a bottom view of the same.

The stove proper is made of cast-iron, and forms, with its magazine, a complete heating apparatus for itself, and consists of the cast-iron bottom plate, *a*, on which is supported the cylinder *b*, in which are seated the fire pot *c* and ring-support *e*, which latter supports grates *d* and *d'* on a support, *f*, all as shown in Figs. 1, 15, and 16. Under the grate is the usual ash-pit, *g*.

Immediately above the fire-pot is the com-

bustion-chamber, which is greatly enlarged, so as to form on the exterior a large heating-surface. This enlarged combustion-chamber is vertically traversed by the four flues *i i' i'' i'''*. (See Fig. 6.) The flues *i' i''* on the back side of the stove are for the circulation of cold air, while the front flues *i i'* give passage to the heated air. The four flues *i i' i'' i'''* form between them four niches, *s' s' s' s'*, Fig. 6, three of which are provided on the outside with mica doors, Fig. 3, while the fourth one on the back side of the stove forms the opening into the smoke-flue *k*. The lower cylinder, *b*, allows access to the grates by means of a small door, *l*, which is situated back of the door *q* in the cylindrical outside mantel, *m*, of the stove, Fig. 1. This mantel *m* rests upon the same base, *a*, with the stove, and may be of porcelain, clay, or iron.

To prevent the mantel *m* from cracking under the influence of heating or cooling, I construct it of sections, loosely joining each other, so that each part has room for expansion and contraction, no putty being used, as the mantel is nowhere directly exposed to the flame or gases of combustion.

In the lower back part of the stove are arranged the horizontal flues *n o*, leading into the space between the inner stove proper and the mantel *m*. The flue *n* admits cold air either from an adjoining room or from the outside. The flue *o* gives exit for heated air. Both flues are provided with regulating-dampers *p*. The mantel *m* has in its lower front portion the door *q*, which contains an air-register, *r*, for the inlet of air to the grates through a corresponding register in the cylinder *b*, while a register, *r'*, on the rear of cylinder *b* and opposite the register *r*, allows, by its connection through the flue *s* with the smoke-flue *k*, a short draft when it is desired to produce a slower combustion. The ash-pan is perforated at its rear side to permit of this operation.

The grates *d d'* rest upon each other, the upper one turning on its pintle on the lower one, which latter is stationary, Figs. 13, 14, 15. The cross-support *f*, which directly supports the grates, is pivotally secured to the ring-support *e*, so as to admit of dumping the grates.

The grates d and d' have corresponding wide meshes. The upper grate has the usual extension for shaking it with a handle introduced through the small door l . The lower grate is made stationary by having a small extension thereon seating itself in the ring-support. By turning the upper grate the meshes in the two larger openings for the passage of stones and clinkers into the ash-pit, while the dumping is effected in the usual way. The base-plate a has between the mantel m and the cylinder b four openings, $x x' x'$, (Fig. 7,) which correspond with the flues $i i$ and $i' i'$. These openings can be opened or closed at will by means of the ring y , Fig. 1, provided with a handle, y' , for rotating it.

On the upper part of the stove is located the ring z , which is provided with holes and allows the closing or disclosing of the openings $1 1$ for the exit of hot air. Two vertical flanges, $2 2$, divide the space between the inner and outer stove-shell in two parts or flues, which communicate near the top.

In practice, the fire being started as in an ordinary magazine coal-stove, the fresh air for the combustion is admitted at r through the registers, while the products of combustion find their exit through the flue k , regulated by the damper t . If a slow fire is desired, the damper t is opened a little, the register r partly closed and the register r' opened. Through the register b' , which is immediately above the smoke-flue k , cold air can be admitted directly over the fire, which will then burn slower, owing to the reduction of the draft, and the proper use of the two registers r and b' combined will allow a perfect regulation of the fire. The space a' , formed by the inclosed walls of the combustion-chamber, and, as in Fig. 1, by the walls of the magazine, or, as in Fig. 2, by the top plate, is located directly above the fire-pot, and as there is no exit for the products of combustion from said space, except at its lower level, the said space acts, during the operation of the stove, as a gas-collector for the combustible gases which may have escaped from the fuel partly or wholly unconsumed. As the space a' becomes filled these gases will overflow at the lower level, and pass into the flue k ; but if the register b' is open, they become mixed with atmospheric air before entering the flue k , and are rendered thereby combustible. The combustion of this mixture will take place as soon as it comes in contact, in the flue k , with the escaping products of combustion from the fire-pot. I thus produce in the flue k an intensely-hot and continuous gas-flame, which forms an additional source of heat besides the one obtained by direct combustion of the fuel; but to gain the benefit of my arrangement it is obvious that only a certain supply of air must be given to the fuel in the fire-pot. Therefore as soon as the same is well ignited, the air-supply thereto has to be partly shut off, so as to produce a certain quantity of combustible gases, which

are then burned in the above-described manner. Aside from the resulting economy in thus burning the fuel, I gain a decided advantage in the fact that the intensely-hot gas-flame which I produce in the flue k will also consume all the solid particles of carbon otherwise carried off by the products of combustion.

The air circulation and ventilation are obtained in the following manner: Cold air will be drawn in through the inlet n as soon as the damper is opened, as the air in the flues $i' i'$ (which communicate with the opening n) gets highly heated and ascends, as shown by the arrows 3 in Fig. 1, until it arrives at the top of the stove, where it can be either let out at 4, through the openings $1 1$, or, by closing the same, conduct the air further on down through the flues $i i$ and out at the bottom through the openings $x x$, as shown by arrows marked 5 on Fig. 1. If it is desired to use the warmed air in another part of the house, the flue o is made to conduct the warm air thereto by closing the openings $x x$ in the bottom and openings $1 1$ in the top of the stove, when the air will flow into the flue o instead of, as before, out at the bottom at $x x$, (see Fig. 5,) where arrows 6 mark the flow of the warm air. This, as will readily be seen, causes the air to pass downward through the flues $i i$ into the space A , (see Fig. 5,) communicating with the flue o and out through said flue to be conducted where desired. If the openings $x' x'$ in the bottom plate, a , are opened, cold air from the room can be made to pass into the stove and circulate in the above-described manner.

It will be seen that the openings $x x$ and $x' x'$ are arranged on opposite sides of the partition 2. The smoke-flue k has an opening, k' , in the top to set a vessel in, filled with water, to produce the necessary moisture in the air.

In Fig. 2 a modification of the above-described stove is shown, so as to adapt it for wood or peat fuel. The magazine is here entirely omitted, also the fire-pot c , grates d and d' , and supports e and f , and there is substituted therefor an ordinary grate, (made in two halves for the purpose of easy introduction into the stove.) No other changes need be made. The circulation and ventilation are the same as in Fig. 1.

To adapt the stove for cooking purposes, the top is put at the height of the line $G H$, and provided with the necessary pot-holes.

In Figs. 8, 9, and 10 is shown the manner in which the sections of the outer mantel or shell are held together by means of a ring and screw-bolts.

In Figs. 17, 18, 19, 20, and 21 is shown a grate to be used in my stove for caking coal. The grates $d^2 d^3$ are held in position by the flanges e' on the shell b , which form a support for the upper grate, and serve as a guide to the lower. The circular stationary grate d^2 is provided with a series of round holes. The grate d^3 can be raised or lowered in the

guides *e'*, and is provided with a series of thorns on the upper surface, which can be made to enter the holes in the upper grate by lifting the lower grate with the lever *c'*, to which the handle *c''* forms an extension, the clinkers being allowed to fall in the ash-pit through holes between the thorns in the lower grate.

The fire-pot *c* is made in two half-sections for the purpose of being easily withdrawn through a door in the combustion-chamber, either for the purpose of introducing a new one or changing the stove into the modification shown in Fig. 2, thus saving in either case the trouble of taking the stove down.

I am aware of the patent of J. L. Mott, dated November 28, 1854, No. 11,999, and I do not claim the stove-sections having rabbeted edges, as shown in said patent, my invention differing therefrom in the use of separate rings to join the sections.

What I claim as my invention is—

1. In a stove, a combustion-chamber of the full or nearly the full diameter of the stove,

in combination with the flues *i' i'* and *i i*, passing through said combustion-chamber, and forming, respectively, part of the ascending and descending air-flues, substantially as described.

2. In a stove, the combination, with the base *a*, mantel *m*, and the large combustion-chamber, of the division-plate 2, the flues *i i'*, the inlets *n x' x'*, and the outlets 1, *x x*, and *o*, substantially as and for the purposes specified.

3. In a stove, the combination, with the combustion-chamber and a space above said chamber, of the division-plate 2, the flues *i' i i*, and means of communication, substantially as described, between said flues and the air-inlet and discharge openings, as and for the purpose specified.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

P. OTTO ELTERICH.

Witnesses:

WM. TROST,
A. REINECK.