S. M. ALLEN.

Air Tight Stove.

No. 2,427. Patented Jan'y 17, 1842.

Fig: 1.

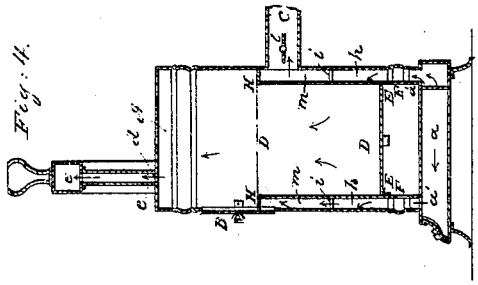


Fig: 3.

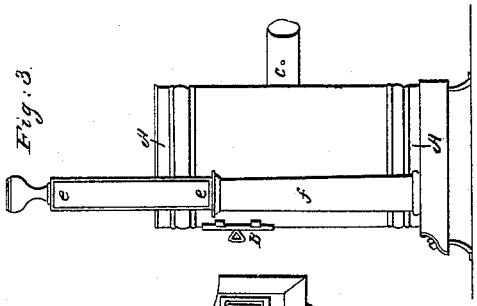


Fig: 2

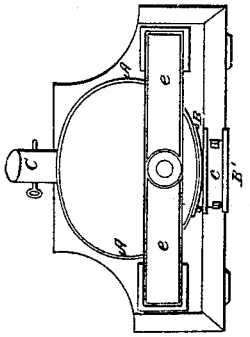


Fig: 4.

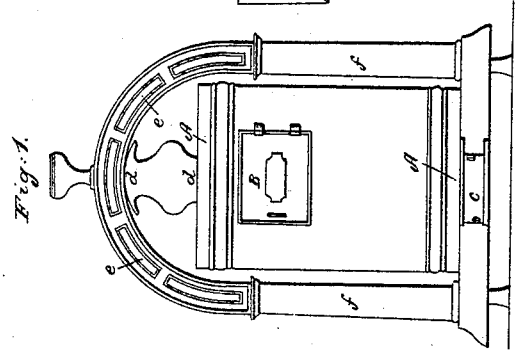


Fig: 7.

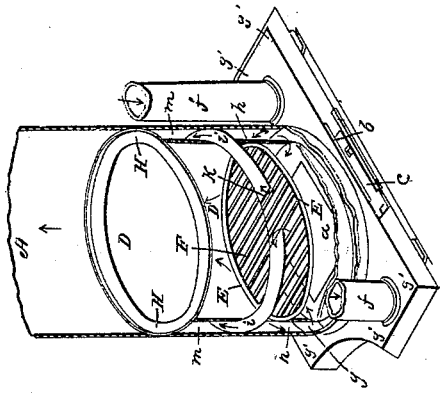


Fig: 6.

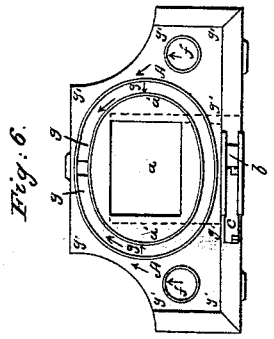
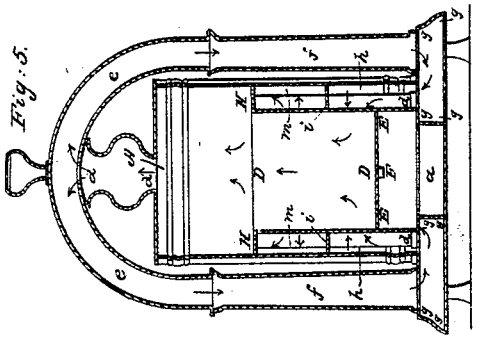


Fig: 5.



UNITED STATES PATENT OFFICE.

STEPHEN M. ALLEN, OF BOSTON, MASSACHUSETTS.

CONSTRUCTION OF AIR-TIGHT STOVES.

Specification of Letters Patent No. 2,427, dated January 17, 1842.

To all whom it may concern:

Be it known that I, STEPHEN M. ALLEN, of Boston, in the county of Suffolk and State of Massachusetts, have invented new and useful Improvements in Stoves for Burning Anthracite or other Fuel, and that the following is a full and exact description of the same, and the said description, taken in connection with the accompanying drawings hereinafter referred to, composes my specification, setting forth the principles of my invention by which it may be distinguished from others of a like character and such parts or combinations as I claim and for which I solicit an exclusive right to be secured to me for fourteen years by Letters Patent.

Figure 1, represents a front elevation of my improved stove. Fig. 2, is a top view. Fig. 3 a side elevation. Fig. 4, is a transverse vertical section on the line A′, B′, Fig. 2. Fig. 5, is a vertical section through both columns and the arched flue above the same. Fig. 6, is a top view of the base with the body of the stove removed therefrom, which serves to exhibit the ash box, and arrangement of flues about the same. Fig. 7, is an isometrical drawing or skeleton representation of the stove and its interior.

My improvements are in that class of invention denominated "air tight stoves," and consist in causing the smoke, hot air and heated products of combustion from the fire box, which have not been entirely consumed, to again come in contact with the red hot surface of the fire box, and also, (by my peculiar arrangement of flues), to keep them thus in contact until the process of consumption is completed, and all the heat they are capable of yielding, is reduced therefrom.

In the drawings A A is the sheet iron casing of the stove of cylindroidal form as shown in Figs. 1, 2, 3, 4, 5, 6, 7, said casing having a door at B in front and a discharge pipe C at the back, communicating with a chimney or the open air.

D D is the fire box made of cast iron or other suitable material and of similar shape to the casing A A, but whose conjugate and transverse diameters are somewhat shorter than those of the casing. The fire box has a grating E resting on proper supports F, F, F, &c., projecting from the inside of the box, and rests at its bottom on the base or hearth G G shutting in the projecting rim *a′ a′* Fig. 4, 5, 6. The top of the fire box, (which is above the top of the discharge pipe C), has a rim or ledge H H which fits closely to the inside of the casing. The ash pan *a*, is situated in the hollow base or hearth H H directly beneath the fire box, and is a separate apartment in the hearth, having an opening only in front, as seen at *b* Figs. 6, 7, which may be increased diminished or entirely closed at pleasure by means of a sliding door C Figs. 1, 2, 6, 7.

From the top of the casing a pipe or conducting flue *d d*, leads to the arched flue *e e*, arranged over the top of the stove, and resting on the hollow columns *f f* arranged each side of the casing, which likewise serve as flues, and communicate with two flue spaces *g g g g*, &c., *g g g g*, &c., shown in Figs. 5 and 6, on each side of the ash pan. These two flue spaces continue round to the back of the ash pan forming one apartment, which is connected or communicates with the space or flue *h h* Figs. 4, 5, 7, between the fire box and the casing, which space extends to a rim or ledge *i i* fitting closely to the inner surface of the casing, and extending entirely around the fire box, with the exception of the opening *k k* in front, which communicates with the space *m m* between this rim and that on the top of the stove before described, and shown at H H Figs. 4, 5. 7.

In order to kindle the coal or fuel in the fire box, the sliding door *c* in the ash pan should be opened, and the circular valve or damper *l*, in the discharge pipe *c* should be turned so that the surface will be horizontal. This arrangement creates a strong draft, and soon causes the fuel to burn sufficiently to permit the draft to be diminished or entirely shut off. The hot air, smoke and heated products of combustion which rise from the fire box, pass through the pipe or conducting flue *d d*, into the arched flue *e*, *e*, above the stove: then dividing and passing to the right or left, (as denoted by small arrows in Fig. 5), and descending through the columns *f*, *f*, they arrive at and fill the apartment or flue spaces *g g g*, &c., *g g g*, &c., about the ash pan. In passing through the flues above mentioned, it will be apparent that the heated products of combustion impart a portion of their heat to the metallic surfaces they come in contact with, and through them to the atmosphere of the

room. From the flues or space about the ash-pan, the smoke and heated products before mentioned, (circulating around through the same as indicated by the small arrows Fig. 6, use and pass into the first flue space between the fire box and exterior casing of the stove, extending upward as far as the rim or ledge *i i;* thence it passes upward through the opening *k* in the rim at the front of the box into the upper flue between the box and the casing as shown by the arrows in Fig. 7, and after passing round or circulating through this flue space, whatever is not consumed may pass off in gas or smoke, through the opening that may be left in the discharge pipe.

It will be seen that by my peculiar arrangement of flues between the fire box and casing, in combination with those which conduct the smoke &c., from the fire box, that the products of combustion which are not consumed are brought effectually (and more so than ever before), into contact with the red hot surface of the fire box and are thoroughly burnt, until all the heat they are capable of yielding is extracted from them, and imparted through the metal composing the casing to the air of the room. Again by bringing the heated products of combustion thus into contact with the outer surface of the fire box (in lieu of cold air), and thereby assisting in heating said box. The process of combustion is much facilitated, and the supply of oxygen by the admission of the atmosphere is rendered almost entirely unnecessary and the valves by which the draft is derived may be entirely closed and still the process of comsumption goes on.

Having thus described my improvements, I shall claim as my invention—

1. The arrangement of two flues between the fire box and casing of an air tight stove, (formed by the rims arranged around the fire box as described), communicating with each other by an opening in the lower rim at the front of the stove, for the purpose of causing the smoke, and heated products of combustion, to traverse twice around the red hot fire chambers, so that they may be effectually consumed, and all the heat they are capable of yielding may be derived from them; and also for the purpose of facilitating the process of combustion in the fire box as above set forth.

2. And I also claim, the combination of the flues above mentioned, with the system of flues which conduct to the same, from the top of the stove, consisting of the flue pipe *d d*, and the arched and column flues, and those about the ash pan, the whole being arranged and operating substantially as above specified.

In testimony that the foregoing is a true description of my said invention and improvement I have hereto set my signature this twenty fourth day of March in the year eighteen hundred and forty one.

STEPHEN M. ALLEN.

Witnesses:
EZRA LINCOLN, Jr.,
JOHN NOBLE.