P. MITCHELL.

Heating Apparatus.

No. 32,639. Patented June 25, 1861.

Fig. 1.

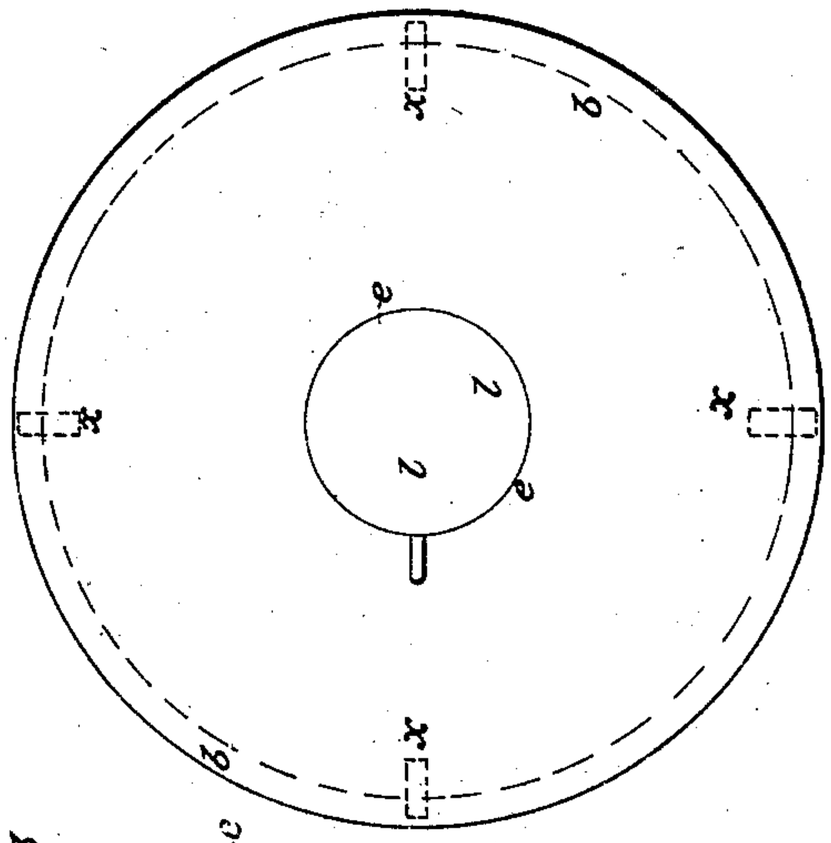


Fig. 3.

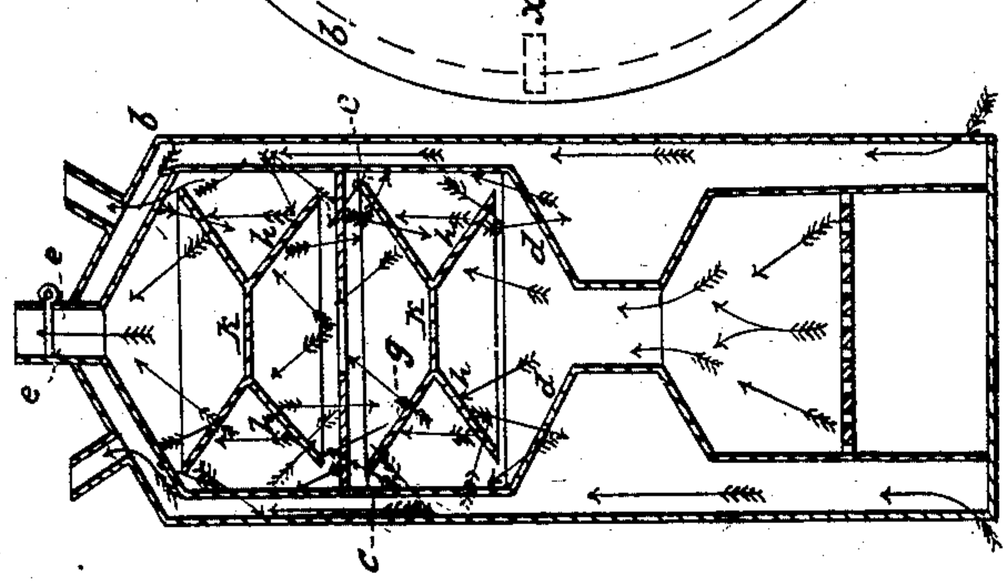
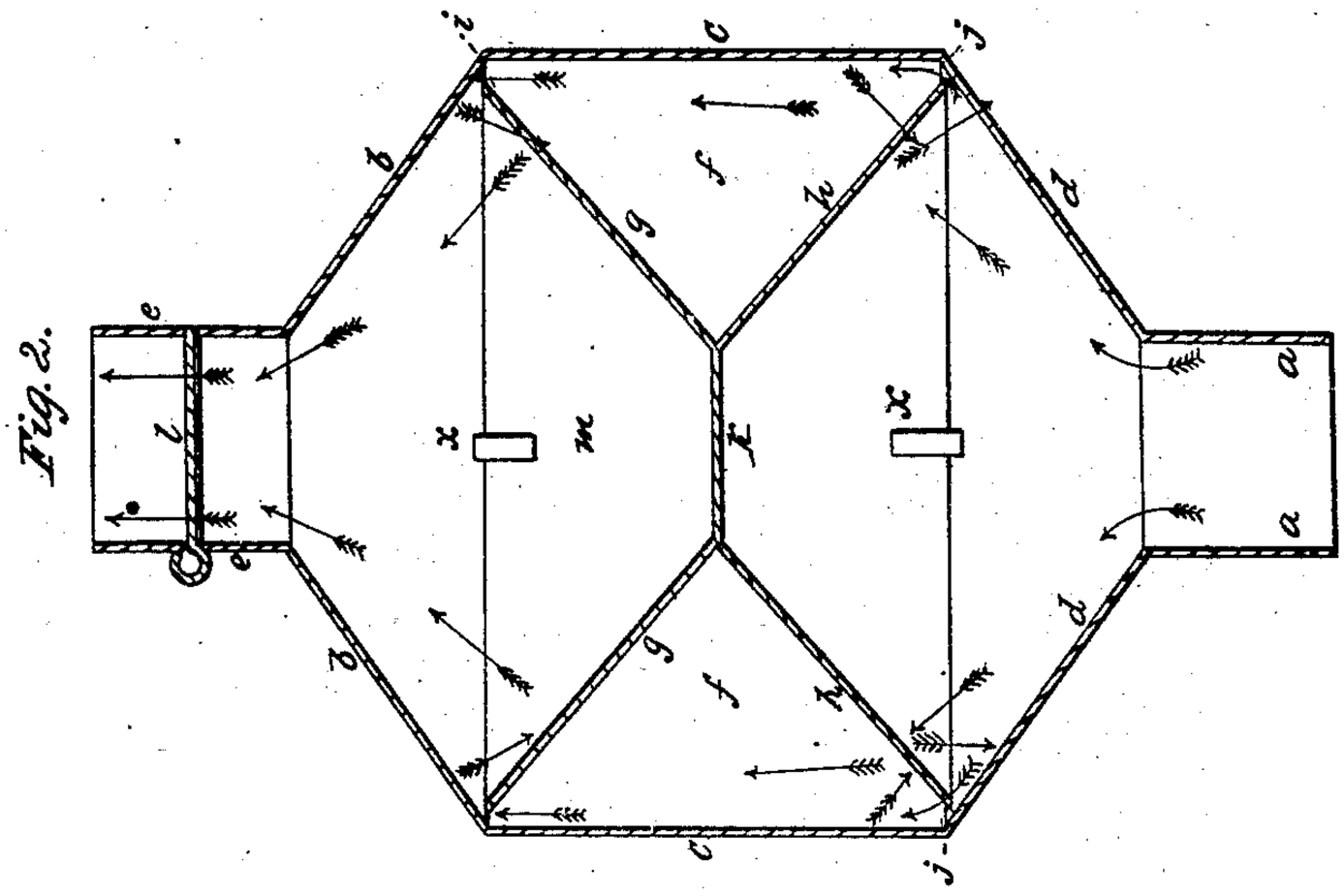


Fig. 2.



Witnesses:

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UNITED STATES PATENT OFFICE.

PORTER MITCHELL, OF GREENFIELD, MASSACHUSETTS.

HEATING APPARATUS.

Specification of Letters Patent No. 32,639, dated June 25, 1861.

To all whom it may concern:

Be it known that I, PORTER MITCHELL, of Greenfield, in the county of Franklin and State of Massachusetts, have invented certain new and useful Improvements in Heating Apparatus; and that the following description, taken in connection with the accompanying drawings, hereinafter referred to, forms a full and exact specification of the same, wherein I have set forth the nature and principles of my said improvements, by which my invention may be distinguished from all others of a similar class, together with such parts as I claim and desire to have secured to me by Letters Patent.

The figures of the accompanying plate of drawings represent my improvements.

Figure 1 is a plan or top view. Fig. 2 is a central vertical section.

In stoves, furnaces, and all the various kinds of heating apparatus as heretofore constructed, a large portion of the products of combustion, must necessarily—owing partly to the directness of communication between the fire-chamber and the exit flue—pass off in an unconsumed state to the chimney, in the shape of smoke, gases, &c., from which the entire heating properties have not been extracted, and are consequently lost.

To make use of these products, unconsumed in the fire chamber, so as to cause their entire destruction and obtain all the heat that can possibly be derived from them, so that comparatively but very little can escape to the chimney, is the object of the present invention and which my improved apparatus effectually accomplishes.

My improvements consist in attaching to the exit flue of a stove, furnace, &c., or of the fire chamber thereof, a metallic drum, within which are arranged two or more inclined shelves, or metallic plates, placed at such an angle with regard to each other, and so located with respect to the interior surface of the drum, or exterior casing, and to the currents of heat and unconsumed products of combustion arising from the fire-chamber, as to cause the said currents of heat, &c., instead of, as heretofore, passing directly to the chimney—to be reflected back and forth between the surfaces of the inclined shelves, and the inner surface of the drum or casing, thereby producing a reverberatory action of the currents of heat, and retaining them until the products of combustion are entirely consumed by coming in contact with the inclined shelves or plates, which, by their constant exposure to and reflection of heat become intensely hot. The great advantage gained by this arrangement in the economy of fuel, and in the additional heating effects produced will be at once apparent, and moreover the extreme rarefaction of the currents of gas, &c., within the drum in consequence of the concentration of heat therein, materially increases the draft of the stove or furnace.

a in the drawings represents the exit flue or smoke pipe of the ordinary stoves, furnaces, &c.

b c d is a metallic drum, the center or body *c* of which is of a cylindrical form and the upper and lower ends *b* and *d* respectively of the shape of a cone and inverted cone.

e is the exit pipe of the drum attached to the top cone *b* of the same.

In the chamber *f* of the cylindrical portion *c* of the drum *a* are secured shelves or plates *g* and *h* and so arranged as to form an acute angle with each other near the center or axis of the drum. Between the edges of the shelves *g* and *h* and the cylindrical body *c* are spaces *i* and *j*.

k is a damper placed at the junction of the plates or shelves *g* and *h*, the object of which will be hereinafter alluded to.

l is a damper placed in the exit flue *e* of the drum *b c d*, by the opening or shutting of which the communication of the fire with the chimney can be established or not as may be desired.

The damper *k* being closed, that is, so as to prevent the products of combustion, currents of heat &c., from passing directly to the chimney flue, the currents of heat are made to reverberate from one plate to another of the metallic drum until all the smoke is consumed when they are allowed to pass out at the chimney or exit flue *e*.

The passage of the currents of heat, &c., from the fire chamber to the exit flue *e* is represented by red arrows in the drawings and is as follows: The smoke, currents of heat, &c., having left the fire chamber of the stove or furnace, impinge against the shelf *h*, from which they are reflected to the inclined side or inverted cone *d* of the drum and thus being reflected and passed back and forth from the said shelf *h* and side *d* finally pass off through the space *j* between the end of the shelf *h* and the side *d* into that portion of the chamber *f* as is included between

the shelves *g* and *h*. In the portion of the chamber *f* including as described between the sleeves *g* and *h* the currents of heat, &c., are continually made to be reflected from the one to the other until they pass off from the said chamber through the space *i*, into the chamber *m* above the shelf *g* and between the same and cone *b*, where the same reaction and reflection again takes place as has been above described, all the currents of heat, &c., finally passing out at the chimney or exit flue of the drum.

When it is desired to check or stop the reaction or reflection of the currents of heat, &c., in the metallic drum *b c d*, the damper *k* may be opened, which establishes a direct communication with the exit flue *e* of the same and also for the purpose of kindling the fire, it will be evident that it is indispensable in order to establish and maintain a good draft.

From the foregoing description it will be seen that the unconsumed products of combustion gases, &c., that escape from the fire-chamber or the exit flue of the stove or furnace will be retained a sufficient length of time in the drum *b c d* and so acted upon while there as to cause their entire destruction or sufficiently so as to extract all their effective heat, the inclined shelves *g* and *h* being so arranged with regard to and so acting in connection with the interior surfaces of the exterior casing as to keep up a reverberatory action of the heated currents long enough for the purpose and yet allow the passage upward of a portion of the same for the purpose of producing the necessary draft or for repeating the reflections.

It will be evident that the angles which the inclined shelves or plates *g* and *h* make with each other and with the casing *b c d* may be varied at pleasure and that by increasing the height of the casing accordingly the number of inclined shelves or reflectors may be indefinitely added to as may be deemed necessary.

The spaces *i* and *j* are determined by means of stays *x* riveted or otherwise fastened to the periphery of the shelves.

Having thus described my improvement and the manner in which the same is or may be carried into effect, I shall state my claim as follows:

The combination with and arrangement in relation to each and every pair of deflectors of a damper whereby direct communication of the fire-chamber with the exit flue may be established or not at pleasure.

PORTER MITCHELL.

Witnesses:

APOLLO ROOT,

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