2 Sheets—Sheet 1.

E. FOOTE, Jr.

Regulating the Heat of Stoves.

No. 2,636. Patented May 26, 1842.

Fig. 1

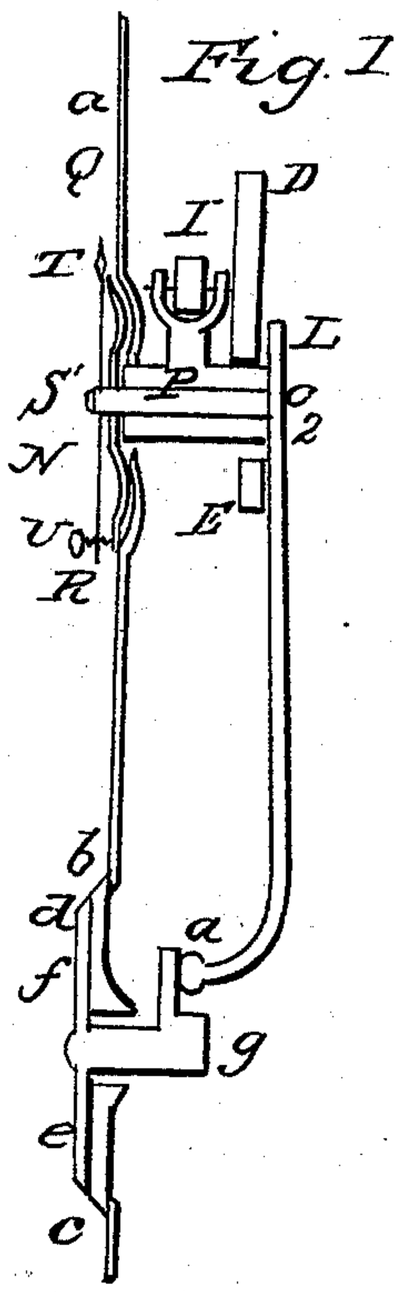

Fig. 2

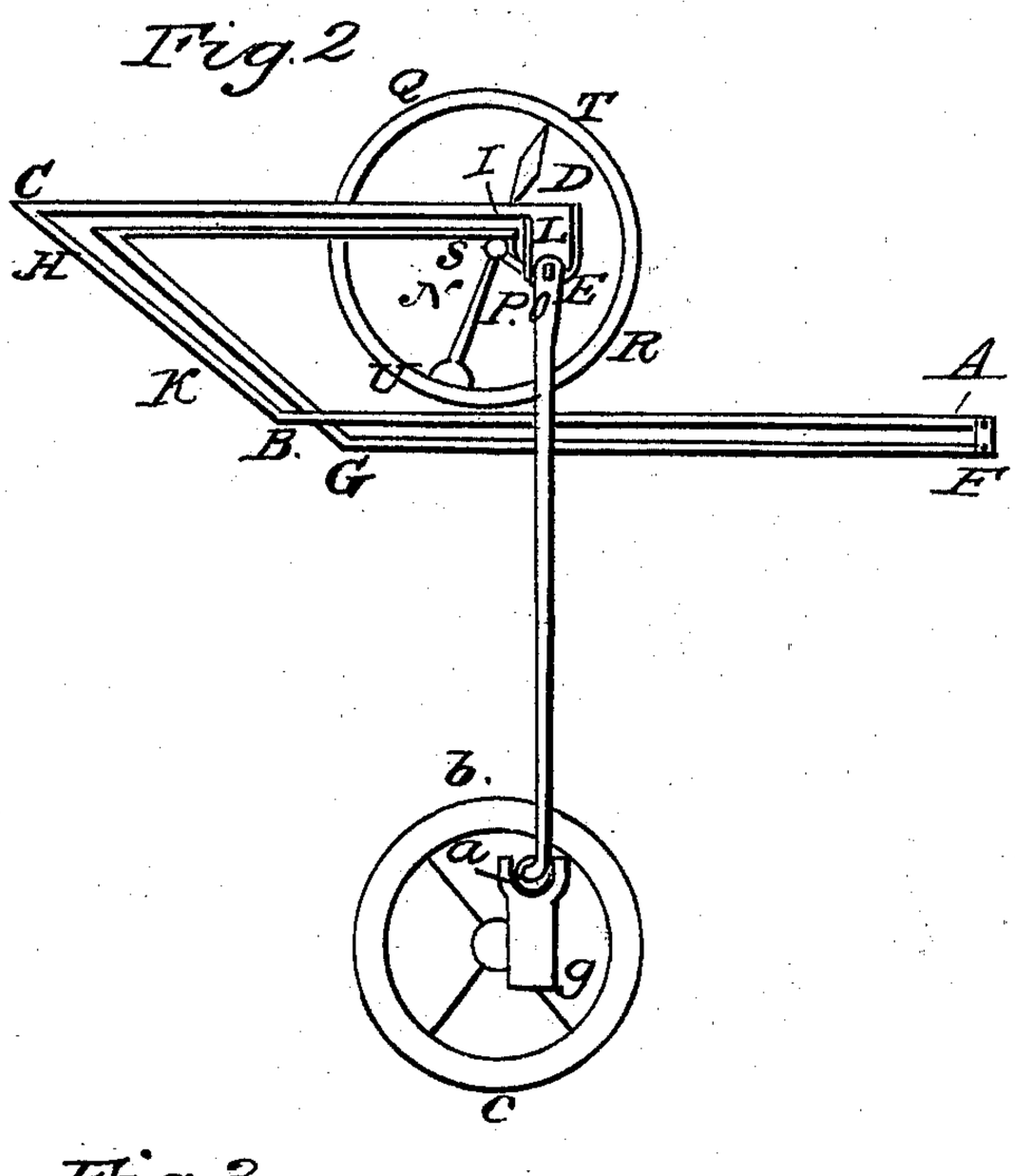

Fig. 3.

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2 Sheets—Sheet 2.

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Fig. 4

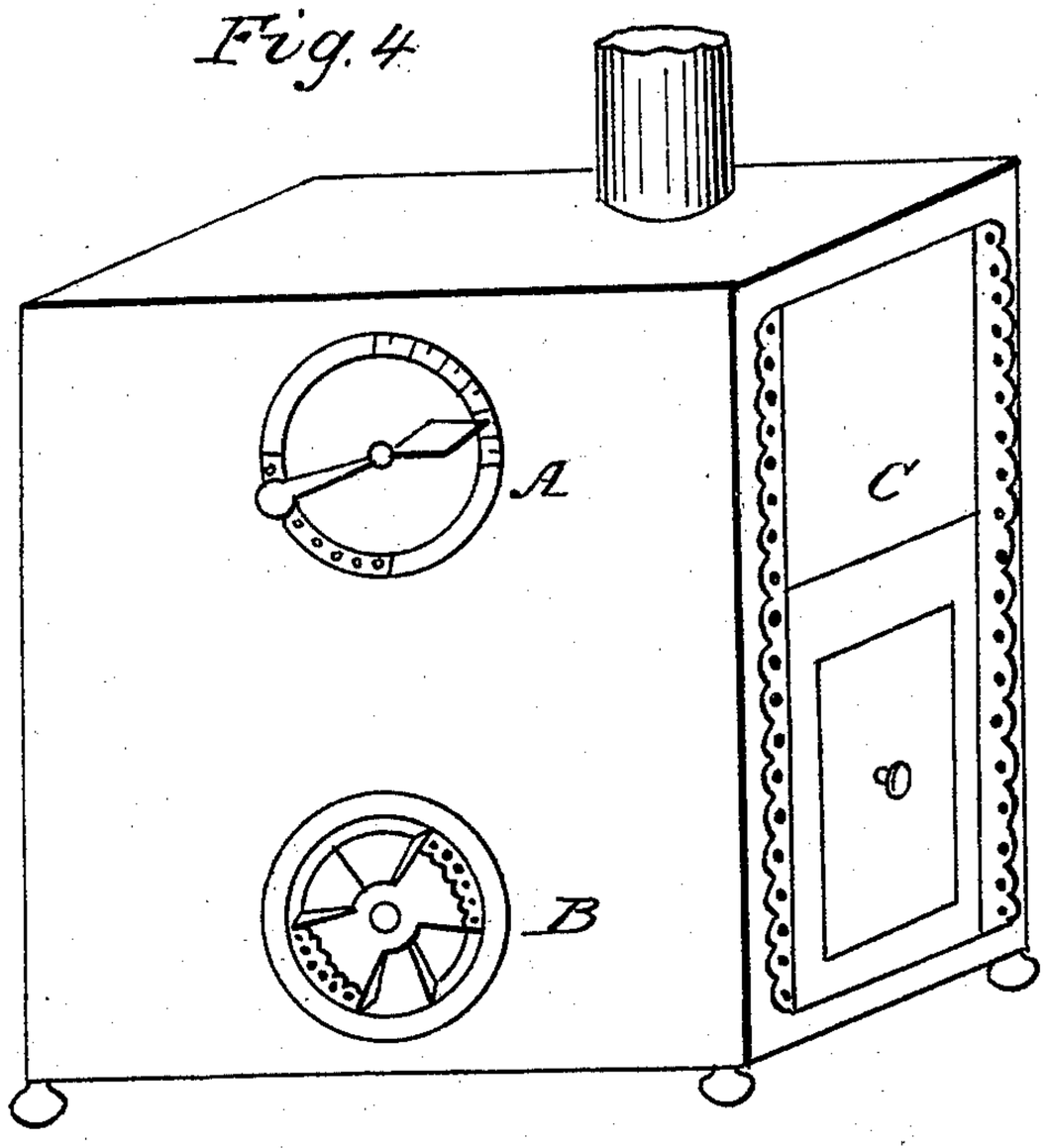
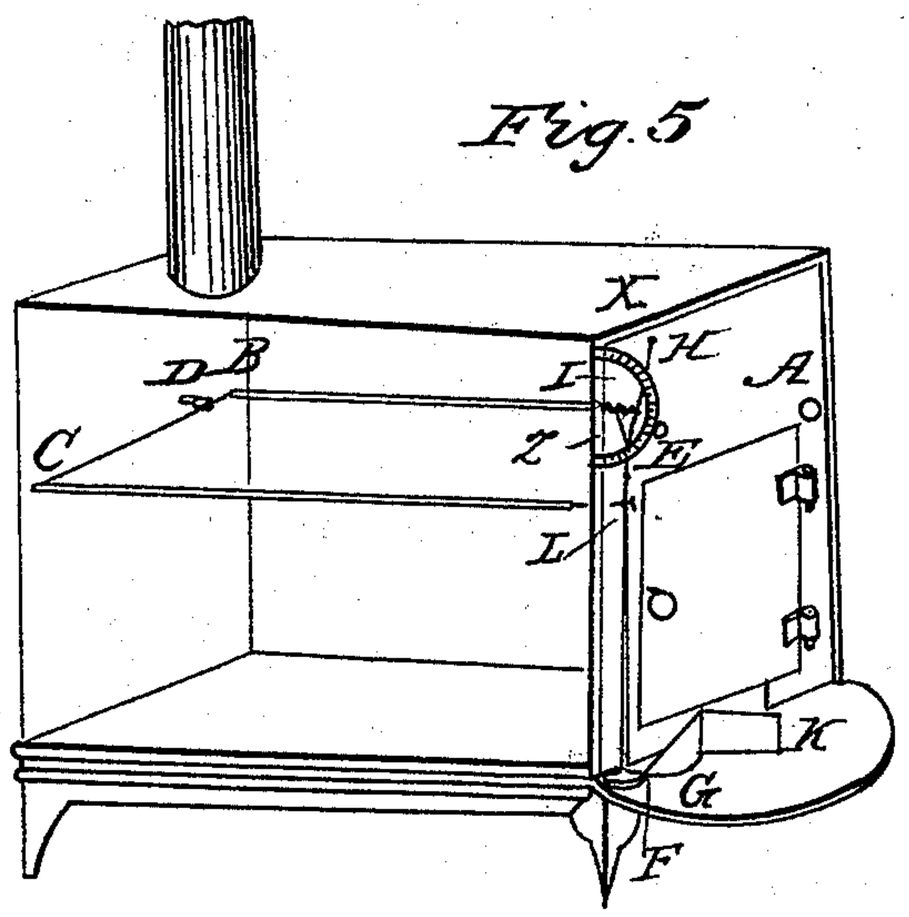


Fig. 5



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UNITED STATES PATENT OFFICE.

ELISHA FOOTE, JR., OF SENECA FALLS, NEW YORK.

REGULATING THE DRAFT OF STOVES.

Specification of Letters Patent No. 2,636, dated May 26, 1842.

To all to whom it may concern:

Be it known that I, ELISHA FOOTE, Jr., of Seneca Falls, in the county of Seneca and State of New York, have invented a new and useful Mode of Regulating the Heat of Stoves and other Structures for Fires; and I do hereby declare that the following is a full and exact description.

My plan makes the stove or other structure in which it may be used regulate its own heat and this is effected by applying the expansive and contracting power of a metallic rod by different degrees of heat to the damper of the stove by which the admission of air thereto is governed so that when the heat shall rise above any required degree the expansion shall close such damper and when it shall fall below such degree the contraction shall open it and thus keep a uniform heat of the requisite intensity. Considerable variety may exist in the mode of application and it may be varied to suit particular circumstances. I have constructed two stoves and applied the regulator as follows:

Figure 5 represents a common box stove the front side of which is supposed to be removed.

A B is a brass rod attached firmly at A to the front of the stove by a shoulder on the inside and a nut and screw on the outside. It is not necessarily of brass but the use of that metal will probably be found the most practicable. It is best made by rolling sheet brass into a rod, so that it shall have two or three thicknesses and be from one to three inches in diameter. The end at B is made flat and rabbeted to the short arm of the lever B C so as to make a close joint therewith. B C is made of iron and of sufficient strength to be inflexible. It turns on its fulcrum at D which is made fast to the back of the stove by a nut and screw and riveted to B C. C L is another brass rod similar in its construction to A B and attached to the long arm of B C in the same manner. The end at L projects through the front of the stove and is attached by a rivet to another lever E F.

G K is the damper by which the admission of air to the stove is governed. It is bent so that the hinge at G may stand out a little in front of the stove and give room for the play of the stem F G. The hinge is made in the common form and the stem is merely a projection or extension of the damper. The end of the stem at F is made round and fits into a hole made in the lever E F so as to move easily therein. The lever E F should be of sufficient size and strength to be inflexible and is attached to its fulcrum at E by a rivet so as to make a joint therewith.

H E is an iron rod. It is attached at H to the stove in any manner that will make it firm and should either have a joint at H or should be flexible at that point so that the end E which constitutes the fulcrum to E F may be raised or depressed. At I is a screw the head of which is made fast to but turns in the front plate of the stove. The thread of the screw passes through the rod H E and by turning the screw the end of the rod E may be raised or depressed at pleasure. It is manifest that the expansion of the brass rods pressing against the lever E F will close the damper and their contraction will open it. If the fulcrum E be raised it will require a greater degree of expansion or in other words a higher degree of heat to close the damper. If it be depressed a lower degree will close it. A pointer I, O, is made fast to the head of the screw, so as to turn when the screw turns and show how much the fulcrum E has been raised or depressed in a half revolution of the screw and it having been found by experiment with a common thermometer how much the heat of the stove is raised or depressed by moving the pointer a given distance a scale is made and marked upon the front plate of the stove as at X O Z with as many different degrees of heat as it may be desired to vary the temperature of the stove, and the pointer being placed at any particular degree of heat the stove will maintain the same with great accuracy, for should the heat rise above the point the expansion of the brass rods will close the damper and check it, or should it fall below the point their contraction will open the damper and let in the full draft of air. It is desirable to make the stove as nearly air tight as possible and the door and damper should both closely fit and I usually put into the stove more fuel than would be necessary in an open stove and have the same constantly held in check by the damper.

The other and more perfect although more expensive mode of applying the regulator is represented by Fig. 4 which is an external view of the stove showing the

face or scale on which the different degrees of heat are marked and the pointer at A, and the damper at B and the door at C.

Figs. 1, 2, and 3, are different views of the machinery in which the same letters represent the same parts in each. Fig. 1 is a sectional view made through the front of the stove. Fig. 2 is a perspective view from the back and Fig. 3, a perspective view from the front of the stove.

A B C D E is a frame of cast iron made to support the brass rods and other machinery and to which they are attached. This stove is made of sheet iron and a more substantial support than that would make for the rods becomes necessary. In a cast iron stove the frame could probably be dispensed with, suitable projections being cast upon the plate to which to attach the machinery. The frame is made fast to the inside and the top of the stove by screws passing through the top of the stove and entering the frame. The part A B Figs. 2 and 3, is attached to the back part of the stove, immediately under the flue—B C at one of the ends and C D at the front—the whole of sufficient strength to be inflexible. At A a little projection or extra thickness is made to which the brass rod F B is firmly riveted. At K another projection is made which constitutes the fulcrum to the lever G H. A hole is made or left in the projection through which the lever passes and is held by a rivet, so as to turn easily and yet be perfectly firm.

D E Figs. 1, 2, and 3, is a projection of the frame extending down within one or two inches of the front of the stove. It is bored at L^2, and holds one end of the shaft L $N^{1\,2}$, the other of which passes through and is held by the front of the stove as seen in Fig. 1. On L N and at about the middle of it is a projection I P from one to three inches in length, with two prongs at the tops within which the brass rod I H is held by a pivot so as to make a close joint with it. The brass rod and the lever G H are made in the same way and are attached to each other in the same manner as is described in the stove first mentioned. The effect of the expansion and contraction of the brass rods is to move the shaft L N back and forth by operating on the projection I P, and the ends in which it rests in the frame and in the front of the stove are turned so as to permit it to move easily therein.

Attached to the shaft on the outside of the stove is the face Q R on which the different degrees of heat are marked. Seen also in Fig. 4, at A. It is made solid with the shaft or is firmly attached to and turns with it. The shaft is made or bored hollow as represented in Fig. 1, so as to admit to pass through the center of it the pivot O S which is turned and made to fit and move easily within the shaft. At the end S is firmly attached the pointer T U, and at the end O is firmly attached the rod O^a which passing down the front side of the stove and within the same moves the damper when variations of heat change the lengths of the brass rods. The face may be made of brass or other material to suit the taste of the maker. It is usually made circular having on the upper side the different degrees of heat found and marked as first described and on the lower corresponding with the different degrees small holes into which a pin on the pointer at U may be inserted and connect the two. The pointer may be made of steel and polished, passing through the lower end of a screw at U in Fig. 1, on the end of which is the small pin fitted to enter the holes on the face. On the other end of the screw is a knob which serves as a handle to turn the pointer or to unscrew and detach the pointer from the face. If attached the brass rods effect and move the damper below; if detached they have no effect upon it.

The damper is made in the common form of two plates moving one upon the other with orifices in each so that in one position both shall be closed and in another both opened. The inside plate is represented by *b c*—seen wholly in Fig. 2, and partly in Fig. 3. It is made thicker near the center and is bored through as is represented in Fig. 1 to admit and hold the stem to the outside plate; *d e* represents the outside plate seen wholly in Fig. 3, partly closed. At *f g* is its stem attached to its center and passing through the inside plate. The faces to both should be ground or turned as well as the stem so as to move easily and closely one on the other. On the end of the stem at *g* is made or firmly attached the projection g^a which ends in two prongs as is shown in Fig. 2. The end of the rod O^a terminates as is seen at *a* in Figs. 1, and 2, in a circular plate of from one to two inches in diameter and fitted to move easily and closely within the two prongs to the stem of the damper. The object of this arrangement is that if for instance the closing of the damper should fail to check the heat the rod would be disconnected from the damper and pass on without injury to the machinery and when it returns it would catch the upper prong and connect itself again with the damper, or should a high heat be desired the damper may be set open and the rod at some distance from it so that it shall require a great degree of expansion before the rod would reach the damper to close it or should it be desired to change from a high to a low degree of heat, the damper may be closed and the rod set so that a great contraction will have to take

place before it will reach the damper to open it.

The rod O[a] should have sufficient width and strength to be inflexible. The stove governs its heat the same as the one first described.

What I claim as my invention and desire to secure by Letters Patent is—

1. The application of the expansive and contracting power of a metallic rod by different degrees of heat to open and close a damper which governs the admission of air into a stove or other structure in which it may be used by which a more perfect control over the heat is obtained than can be by a damper in the flue.

2. I also claim as my invention the mode above described of setting the heat of a stove at any requisite degree by which different degrees of expansion are required to open and close the damper.

3. I also claim the combination above described by which the regulation of the heat of a stove or other structure in which it may be used is effected and I also claim as my invention the mode above described of connecting the action of the metallic rods with the damper so that the same may be disconnected when the damper shall have closed and the heat shall continue to rise.

ELISHA FOOTE, JUN.

Witnesses:
ANSON ATWOOD,
J. H. GODDARD.