UNITED STATES PATENT OFFICE

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DOOR-OPERATING DEVICE FOR STOVES AND FURNACES

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This invention relates to means for controlling the opening and closing of doors, such, for example, as stove doors and more particularly to heating stoves, such as are enclosed within a casing where operation of the fuel doors is made difficult on account of the heated condition they are in, due to the fire within the stove.

The present invention has for its objects to provide simple, efficient and reliable means for opening and closing doors, which are pivotally mounted upon heating stoves, by operated foot pedals.

Another object of my invention is to provide doors having means for covering the space between the lower door and the fire chamber so that no ashes can fall through onto the floor.

Still another object of my invention is to provide means to compensate for the expansion and contraction of that portion of the doors which is in close contact with the heat.

Various other objects and advantages will become apparent as the description proceeds.

My invention consists in the parts and in the construction, combination, location and arrangement of parts as herein set forth and claimed.

In the drawings:

Fig. 1 is a front elevation, partly in section, of a heating stove embodying the invention;

Fig. 2 is a perspective view thereof, the stove appearing in broken lines;

Fig. 3 is an enlarged fragmentary vertical section of the smoke screen or baffle plate and one of the upper door hinges taken on a plane corresponding to line 3—3 of Fig. 1;

Fig. 4 is an enlarged fragmentary vertical section of one of the lower door hinges taken on line 4—4 of Fig. 1;

Fig. 5 is an enlarged fragmentary vertical section taken on a plane corresponding to line 5—5 of Fig. 1 with a portion of the lower door shown in open position;

Fig. 6 is an enlarged plan view, partly in section, of the foot operating pedals with a fragmentary portion of the stove base shown in connection therewith;

Fig. 7 is a vertical section taken on a plane corresponding to line 7—7 of Fig. 6.

Fig. 8 is a vertical section on the line 8—8 of Fig. 1 showing the doors in closed position;

Fig. 9 is a similar view showing the doors in open position;

Fig. 10 is a detail view of the smoke screen; and

Fig. 11 is a detail view of the sliding plate looking at the bottom side thereof; and

Fig. 12 is a fragmentary side elevation showing the doors in closed position and the means for connecting same.

In the embodiment of my invention as illustrated and which shows a preferred construction I provide a heating stove comprising base 1, ash-pit 2, and fire chamber 3. The fire chamber 3 consists of upper section 4 and lower section 4a. These parts may be of the usual and well-known construction and the upper section 4 is provided with opening 5. The invention lies in the construction of the upper door 6 and lower door 7, the manner in which they are opened and closed, the sliding plate 8, which covers the space between the lower door 7 and the lower edge 9 of opening 5, as clearly shown in Figs. 5 and 9, and in the other features as claimed. The upper door 6 is provided with lug extensions 10 at its top which are provided with holes 10a adapted to receive pivot shaft 11. Removable lugs 12, securely fixed to shelf 13 of upper section 4 by bolts 14 and nuts 15 (Fig. 3), are also provided with holes 12a for the purpose of receiving the ends of shaft 11.

As clearly shown in Fig. 1, the upper door 6 is provided with upwardly extended arm 16 and forwardly extended arm 17 and lower door 7 is provided with rearwardly extending arm 18. Arm 18 is pivotally connected to the upper end of rod 19 as by machine bolt 20, and arm 17 is connected to arm 18 by link 21, said link being pivotally attached to said arms by machine bolts 22.

Short horizontal studs 23 are preferably cast integral with lower door 7 and are pivotally mounted relative to upper section 4 between the sets of bearing lugs 24 and 25, respectively.
The lower door 7 is provided with recesses or pockets 26, which receive the ends of lugs 24 when said door is in the opened position, as shown in Fig. 5. Sliding plate 8 is made in two parts, namely: 8a and 8b, as clearly shown in Fig. 11. The under part 8b of sliding plate 8 is provided with integral extended journals 27 (Fig. 11) which are adapted to be rotatably held within upper section 4 by lugs 28 cast integral with said section 4, as clearly shown in Figs. 5, 8 and 9, respectively. Socket 29, formed within under part 8b of plate 8 is adapted to receive downwardly extending projections 30, formed integral with lower door 7 when said lower door is in closed position against upper section 4, as shown in Fig. 8. Thus the sliding plate is prevented from dropping rearwardly into the fire chamber when the doors 6 and 7 are in the closed position (Fig. 8) but when the doors are in open position, as shown in Fig. 9, the projection 30 is disengaged from within socket 29, whereupon, if desired, the sliding plate 8 may be removed.

The sliding plate 8 is preferably made in two parts, 8a and 8b with a loose fit between said parts to compensate for expansion and contraction of the metal, thus avoiding excessive warping of the sliding plate which might result if the sliding plate were made in one piece only. With this construction if the part 8b warps, due to excessive heat, it can be replaced by a new part 8b instead of replacing the entire sliding plate 8, thereby resulting in considerable economy.

The lower end of rod 19 is passed through hole 31 in base 1 (see Figs. 1, 2 and 6) and foot pedal 32 is attached thereto beneath said base 1 by suitable fastening means as, for example, bolt and nut 33. Said foot pedal 32 is provided with horizontally disposed arm 34, which arm engages the inner end of foot pedal 35 for the reason clearly pointed out hereinafter under "operation."

Foot pedal 35 is pivotally mounted upon bolt 36, carried by lugs 37, said lugs being preferably cast integral with the underside 1a of base 1.

As shown in Fig. 10, I provide a grille smoke curtain 38 having bearing lugs 39 cast integral therewith and provided with holes 40. Lugs 41, formed on the inner surface of shelf 13, are provided with holes 42 (Figs. 9 and 8).

To pivotally attach the grille smoke curtain 38 beneath shelf 18, simply align holes 40 of lugs 39 with holes 42 of lugs 41 and insert a pivot shaft 43, as shown in Figs. 3, 8 or 9, respectively. Normally the grille smoke curtain 38 will hang in the position shown by full lines in Fig. 3 (thus closing off the upper portion of the opening 5) but when it is desired to add fuel, such as large lumps of coal to the fire, said curtain 38 may be easily pushed or swung rearwardly upon shaft 43 (by contact of the fuel) to the position indicated by dotted lines in Fig. 3, or full lines, as shown in Fig. 9. This grille smoke curtain serves to prevent smoke from passing out into the room through opening 5 when the doors 6 and 7, respectively, are opened.

It will also be noticed that the grille smoke curtain 38 is provided with a plurality of slots 38s. These slots permit a better view of the fire to the person firing the stove when the doors 6 and 7 are opened. The fingers or ribs 38s of the grille smoke curtain 38 are preferably T-shaped in cross section for strength and also to prevent warping due to their exposure to the heat within the fire chamber. The construction of the baffle or curtain 38 with spaced apart fingers permits of contraction and expansion and avoids warping of the baffle.

Operation.—When doors 6 and 7 are closed against upper section 4, thus closing the opening 5, the foot pedals 32 and 33, respectively, will be in the position shown by full lines in Figs. 1 and 2.

To open the doors 6 and 7, simply press downwardly on foot pedal 32. As foot pedal 32 is rigidly attached to rod 19, said rod will also be moved downwardly which, in turn, draws downwardly on arm 16 of door 6 and as the pivotal connection between the upper end of said rod 19 and arm 16 is off center with the pivot shaft 11, said door 6 will be drawn upwardly to the position shown in Fig. 9. Link 21, pivotally connected to doors 6 and 7, in turn, opens lower door 7 simultaneously with upper door 6. As the lower door 7 is opened the sliding plate 8 covers the space or "gap" 44 left between said door and the lower edge 9 of opening 5 (Figs. 5 and 9).

On the downward movement of foot pedal 32, arm 34 thereof is brought into contact with the inner end 33s of foot pedal 33 and moves said pedal 33 from the angular position shown by full lines in Fig. 1 to the dotted position (same figure) thus "setting" said foot pedal 35, ready to be operated.

Due to the weight of sliding plate 8 the doors 6 and 7 remain open after the operation of foot pedal 32 until foot pedal 35 is pushed downwardly, thereby closing the doors 6 and 7 as follows:

When the foot pedal 35 is pushed downwardly from the position shown by dotted lines in Fig. 1 to the position shown by full lines (same figure, or Fig. 2) the inner end 33s of foot pedal 32 will thereby raise said arm 34, foot pedal 32, rod 19 and arm 16, respectively, which, in turn, closes door 7 simultaneously with door 6 through arms 17 and 18 and link 21, respectively.

It will readily be seen from the foregoing description, taken in connection with the accompanying drawings, that the opening and closing of doors 6 and 7 is easily accom-
plished by simply pressing downward, by the foot, on pedal 32 or 35 as the case may be. To open the doors 6 and 7, simply press downward on foot pedal 32. To close said doors simply press downward on foot pedal 35.

An advantage of this invention over prior constructions is that handling of the hot doors 6 and 7 by the hands is eliminated. This prevents burning of the hands, which is often the case with hand-operated stove doors.

Another advantage of this invention is that the doors 6 and 7 may be opened or closed with one foot, thus leaving both hands of the operator free to manipulate the shovel when adding fuel to the fire.

Still another advantage of this invention is the manner in which the sliding plate 8 covers the "gap" 44 between the lower door 7 and the lower fire chamber 3 when said door is in open position, thereby preventing any ashes, soot or coal from falling through onto the floor when adding fuel to the fire or when opening or closing the doors.

While I have shown one embodiment of my invention, it will be understood that certain changes and modifications can be made without departing from the scope or spirit thereof, as defined in the claims.

What I claim as new and desire to secure by Letters Patent is:

1. In combination, a pair of stove doors comprising an upper and lower door, a link pivotally connecting said doors with each other, a rod pivotally connected to the upper end of said doors, a foot pedal attached to the lower end of said rod for opening said doors, a weighted plate slidably mounted relative to the lower of said doors and adapted to exert inward pressure upon said lower door when the latter is in closed position and for exerting downward pressure on said lower door, which in turn exerts upward pressure upon the upper door through said link when said doors are in the closed position, and a foot pedal combined with said first-mentioned foot pedal for closing said doors.

2. The combination, as specified in claim 1, wherein the weighted plate serves a double purpose, in so far as it holds the doors open and also serves to close the gap between the lower of said doors and the frame upon which they are pivotally mounted.

3. In combination, a pair of stove doors comprising an upper and lower door, a foot control device for opening and closing said doors, comprising, a link, one end of which is pivotally attached to the upper of said doors and the other end of which is pivotally attached to the lower of said doors whereby said doors are required to open and close in unison, an arm integrally formed with the upper door, a rod pivotally connected to said arm, a foot-pedal attached to the lower end of said rod and having a horizontally disposed lug, a second foot pedal adapted to be set in operative position by said lug, and a weighted plate carried by said lower door whereby when said first-mentioned foot pedal is depressed said doors will be opened in unison and held open by said weighted plate and whereby when said second-mentioned foot pedal is depressed, said doors will be closed in unison and held closed by said plate.

4. In combination, a pair of stove doors comprising an upper and lower door, a foot control device for opening and closing said doors comprising an arm fixed to the upper of said doors, a rod pivotally attached to said arm and slidably received and guided by the stove base near its lower end, a foot pedal attached to the lower end of said rod, a link pivotally connected to each of said doors, and a weighted sliding plate supported by the lower of said doors adapted to hold said doors in open or closed position, depending upon the position of said foot pedal.

5. The combination, as specified in claim 4, wherein the weighted sliding plate includes means for preventing its falling within the stove when the doors are in closed position comprising a socket in said plate, a projection formed on the inner side of said lower door and adapted to be received by said socket when said door is in closed position, said plate also serving to cover the gap or space between the lower door and the stove frame.

6. In combination, a pair of stove doors comprising an upper and lower door, a frame provided with an opening therein, said doors pivoted to said frame and adapted to close said opening, a link pivotally connecting said doors with each other, a pair of foot pedals, means connecting said foot pedals with the upper of said doors, whereby when depressing one of said pedals, said doors are adapted to be opened in unison and whereby when the other of said pedals is depressed said doors are adapted to be closed in unison and a weighted plate associated with said lower door whereby said doors are held open or closed depending upon the position of said foot pedals.

7. In combination, a pair of stove doors comprising an upper and lower door, a frame provided with an opening therein, said doors pivotally mounted upon said frame and adapted to close said opening, means pivotally connected to said doors whereby they are required to move in unison, means operable by foot pressure and connected to one of said doors whereby both of said doors may be opened or closed when desired, and slidable means within the lower door adapted to hold said door in open and closed positions, respectively.

8. A door operating device for stoves and furnaces comprising, in combination, a door.
casing, a pair of doors mounted to close against said casing and comprising an upper and lower door, means associated with the lower door whereby the joint between said door and casing is covered, weighted means for holding said doors open, and foot pressure means for closing said doors, means operable by foot pressure to open said doors in unison when desired.

9. In a stove or furnace having an opening for the reception of fuel and having a pair of doors adapted to close said opening, a pivotally mounted slotted baffle adapted to project downwardly and outwardly to partly close said opening and adapted to swing inwardly under pressure of the fuel being inserted into the stove, substantially as set forth and for the purposes specified.

10. A pivotally mounted baffle, as specified in claim 9, having a series of spaced apart fingers formed substantially T-shaped in cross-section, for clearer visibility.

11. In means of the character described, a sliding plate comprising two parts loosely connected together whereby one plate may move longitudinally and laterally relative to the other plate to compensate for contraction and expansion of the metal.

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