Nov. 19, 1963 R. M. PETERSON ETAL 3,111,098

INCINERATOR CHARGING DOOR

Filed Sept. 5, 1961

3 Sheets-Sheet 1

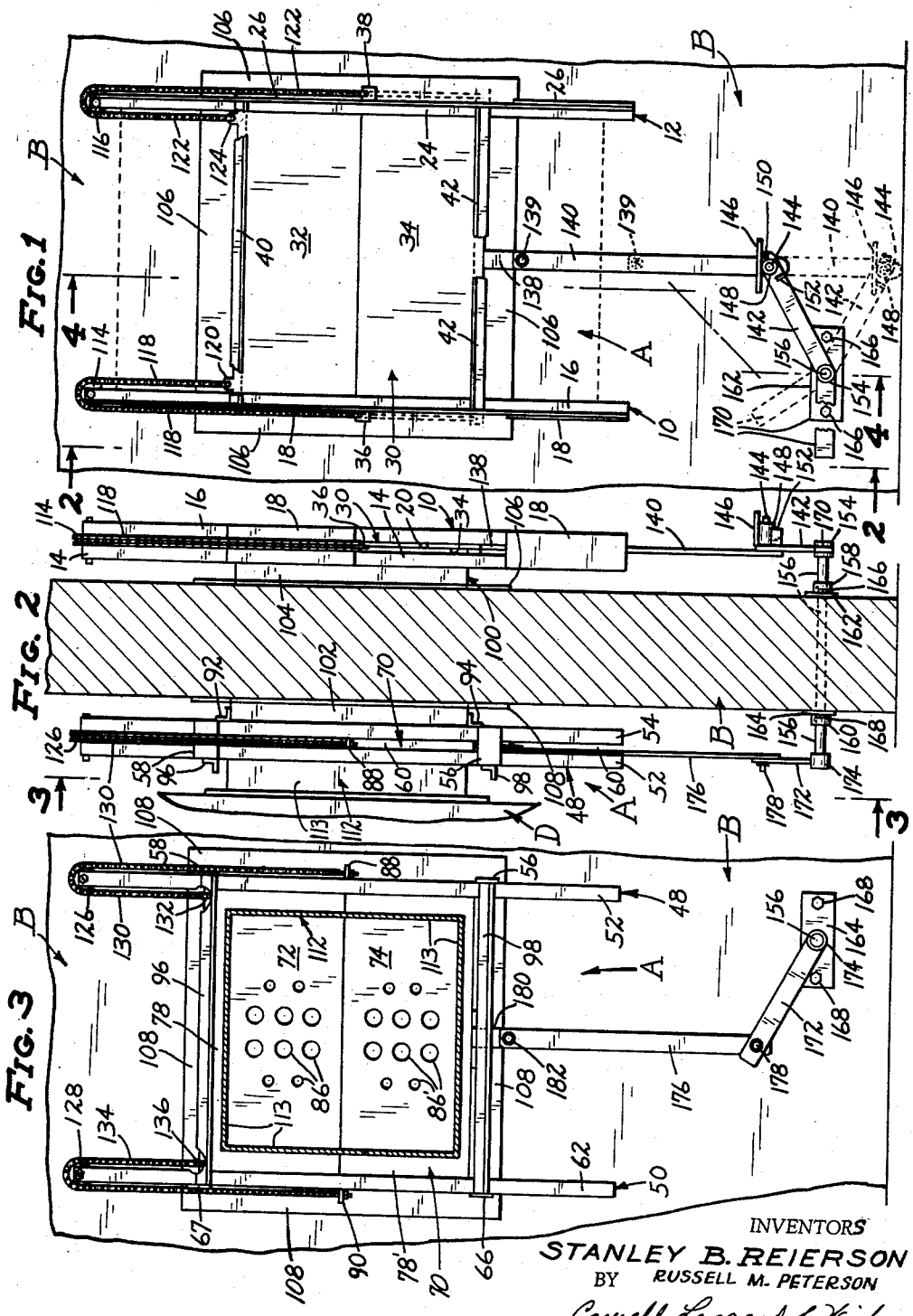


FIG. 1

FIG. 2

FIG. 3

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FIG. 4

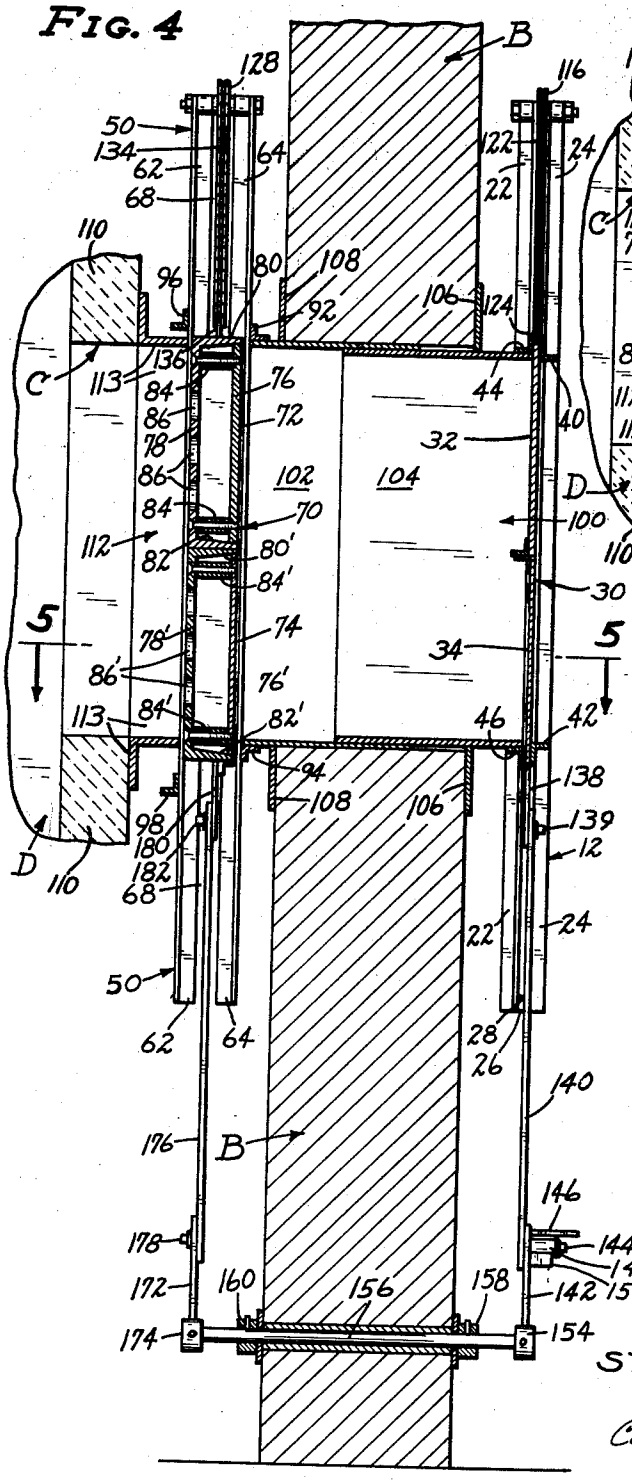
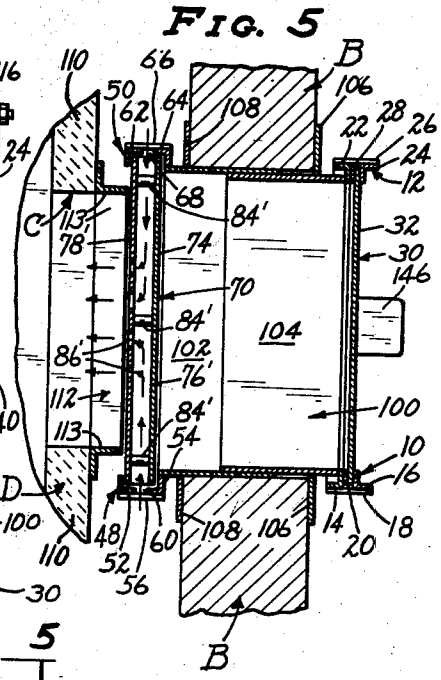


FIG. 5



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FIG. 6

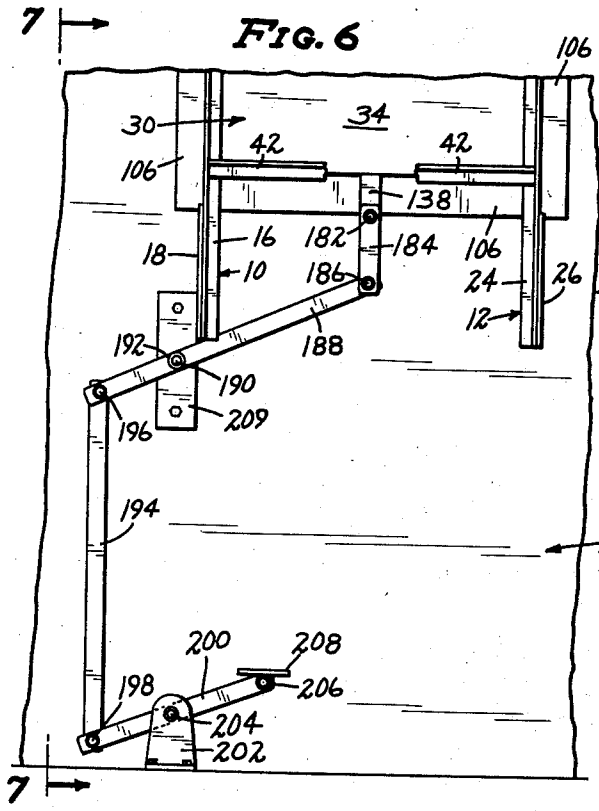


FIG. 7

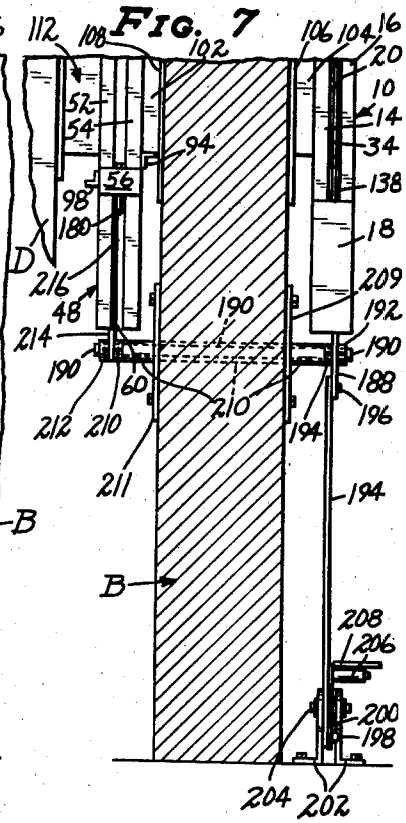
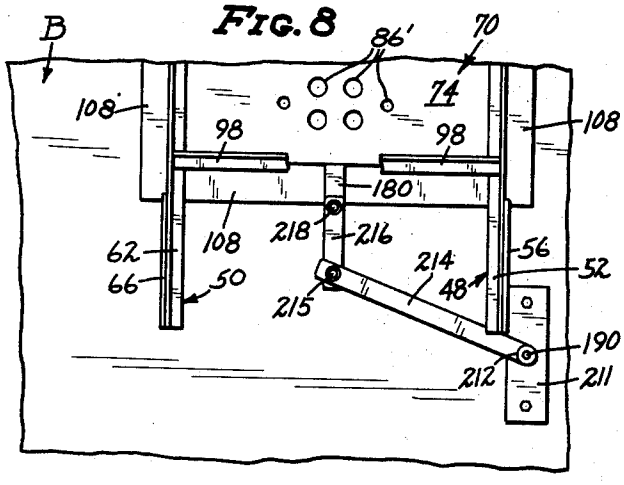


FIG. 8



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INCINERATOR CHARGING DOOR

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Filed Sept. 5, 1961, Ser. No. 135,947
6 Claims. (Cl. 110—18)

The invention relates broadly to an incinerator generally located outside a structure but communicating therewith and more particularly to an improvement in the charging door of the incinerator which allows the operator to remain inside the structure while putting material into the incinerator with a mnmum of effort requred to open the door.

Charging doors for incinerators lined with refractory material tend to crack up from the slamming of the same during the charging operation of the incinerator and steel lined doors present the problem of warping and becoming inoperative due to the high internal temperatures in the incinerator to which the door is exposed. In addition, a single incinerator door for the entire door opening requires extended movement of the mechanism for the single door to clear the opening which is objectionable.

It is an object to provide a charging door including a set of split fire door sections between the incinerator and the building wall and a set of split feed doors located inside the building, both sets of door sections being readily and simultaneously opened by depressing a single foot pedal and closed by gravity when the operator removes pressure on the pedal.

It is a further object to provide a fire door having means for allowing air to pass therethrough and enter the incinerator fire box to aid in combustion. This feature also allows warming of the air entering the fire box and prevents deterioration of the fire door generally resulting from slamming and high temperatures.

It will not be here attempted to set forth and indicate all of the various objects and advantages incident to the invention, but other objects and advantages will be referred to in or else will become apparent from that which follows.

The invention will appear more clearly from the following detailed description when taken in connection with the accompanying drawings, showing by way of example a preferred embodiment of the inventive idea wherein like numerals refer to like parts throughout.

In the drawings forming part of this application:

FIGURE 1 is a front elevational view of an incinerator charging door embodying the invention with only a portion of the body of the incinerator being shown.

FIGURE 2 is a sectional view on the line 2—2 of FIGURE 1.

FIGURE 3 is a sectional view on the line 3—3 of FIGURE 2.

FIGURE 4 is a sectional view on the line 4—4 of FIGURE 1.

FIGURE 5 is a sectional view on the line 5—5 of FIGURE 4.

FIGURE 6 is a front elevational view of a further embodiment of the door opening and closing mechanism with only a portion of the charging door and incinerator body shown.

FIGURE 7 is a sectional view on the line 7—7 of FIGURE 6.

FIGURE 8 is a rear elevational view of a portion of the door opening and closing mechanism.

Referring to the drawings in detail, the incinerator charging door A includes the pair of vertically spaced front angle iron supports 10 and 12. The front support 10 includes the angle members 14 and 16 which are

secured in spaced relation by means of the connector plates 18 to form the channel 20. The front support 12 includes the angle members 22 and 24 which are secured in spaced relation by means of the connector plates 26 to form the channel 28.

The feed door 30 is composed of the upper half section 32 and the lower half section 34, and the sections are slidably mounted in the channels 20 and 28. The upper half section 32 is made slightly thicker and consequently heavier to induce closing.

The lower door section 34 has formed on the upper ends thereof and extending horizontally therefrom, the ears 36 and 38 which extend outwardly through the channels 20 and 28. The front vertical supports 10 and 12 are held in position by the front horizontal braces 40 and 42 and the rear horizontal braces 44 and 45.

Further provided are the rear vertical spaced supports 48 and 50. The rear support 48 includes the angle members 52 and 54 which are secured in spaced relation by means of the connector plates 56 and 58 to form the channel 60. The rear support 50 includes the angle members 62 and 64 which are secured together in spaced relation by means of the connector plates 66 and 67 to form the channel 68.

The fire door 70 includes the upper door section 72 and the lower door section 74. The upper section 72 includes the outer plate portion 76, the inner cast iron portion 78, and the upper and lower side portions 80 and 82, respectively, all of which are connected in spaced relation by means of the bolt-equipped sleeves 84 to form the hollow upper door section 72. The inner plate 78 of the section 72 is formed with a multiplicity of holes 86. The lower fire door section 74 is identical to the upper section and the corresponding parts are numbered with the same number but including a prime designation. However upper portion 72 is thicker than lower portion 74 and consequently heavier to induce closing. It will be seen that the fire door sections are hollow and do not have any vertical end walls, the purpose of which will be set out hereinafter. The vertical ends of the upper and lower fire door sections slide vertically within the angle members making up the supports 48 and 50. The lower fire door section 74 has secured to the outer upper ends the ears 88 and 90 which extend outwardly through the channels 60 and 68, respectively. The rear vertical supports 48 and 50 are braced by the front horizontal braces 92 and 94 and also the rear horizontal braces 96 and 98.

The numeral 100 designates an adjustable rectangular sleeve or throat which is made up of the half portions 102 and 104, the latter extending into the former for adjustment according to the width of the wall B. Secured to the sleeve 100 are the front and rear frame members 106 and 108, respectively, which fit flush up against the wall B.

The letter C indicates a typical opening in the wall 110 of the incinerator body D and mounted adjacent the opening C is the rectangular frame 112 composed of angle members 113 the opening of which coincides with the opening C and the opening formed by the fire door sections 72 and 74 when open and further is in alignment with the sleeve 100.

Further provided is the sprocket 114 rotatably mounted on the upper end of the front vertical support 10 between the angle members 16 and 18 within the channel 20 formed thereby. A further sprocket 116 is rotatably mounted on the upper end of the front vertical support 12 between the angle members 22 and 24 within the channel 28 formed thereby. A roller chain 118 is secured at its upper end to the upper edge of the upper feed door half section 32 as at 120 and is positioned upwardly and over the sprocket 114 and downwardly where the lower end of the chain is secured to the ear 36 of the lower half

section 34 of the feed door. A roller chain 122 is secured at its upper end to the upper edge of the upper feed door half section 32 as at 124 and is positioned upwardly and over the sprocket 116 and downwardly where the lower end of the chain is secured to the ear 38 of the lower half section of the feed door.

The numeral 126 designates a sprocket which is rotatably mounted on the upper end of the rear vertical support 48 between the angle members 52 and 58 and within the channel 60 formed thereby. A similar sprocket 128 is mounted on the upper end of the rear vertical support 50 between the angle members 62 and 64 and within the channel 68 formed thereby. A roller chain 130 is secured at its upper end to the upper edge of the fire door upper half section 72 as at 132 and is positioned upwardly and over the sprocket 126 and downwardly where the lower end of the chain is secured to the ear 88 of the lower fire door half section 74. A roller chain 134 secured at its upper end to the upper edge of the upper half fire door 72 as at 136 and is positioned upwardly and over the sprocket 128 and downwardly with the lower end of the chain secured to the ear 90 of the lower fire door half section 74.

Secured to the lower edge of the feed door section 34 is the connector 138 and pivotally connected as at 139 to the lower end of the connector is the pedal arm 140.

The lower end of the pedal arm 140 is pivotally connected to the upper end of the first door pivot arm 142 by means of the pin 144. Further provided is the foot pedal 146 which is secured to the bushing 148 mounted on the pin 144. The door pivot arm 142 has formed thereon the upper stop 150 and the lower stop 152, the stop 150 being engaged by the pedal 146 as pressure is exerted on the pedal and the stop 152 engaged at the lowermost point of travel of the pedal. The lower end of the arm 142 is connected to the collar 154 which is secured to the shaft 156. The shaft 156 is positioned by means of the stops 158 and 160 positioned on each side of the structure wall B, the stops being mounted on the plates 162 and 164 secured to the sides of the wall B by the bolts 166 and 168, respectively. A counter-weight arm 170 is connected to the collar 154 to aid in the automatic closing of the doors.

Further provided is the second door pivot arm 172, the lower end of which is secured to the collar 174 which is secured to the outer end of the shaft 156. The upper end of the pivot arm 172 is pivotally connected to the lower end of the second pedal arm 176 by means of the pin 178. The upper end of the second pedal arm 176 is pivotally connected to the lower end of the rear connector 180 by means of the pin 182. The upper end of the connector 180 is secured to the lower edge of the lower half section 74 of the fire door 70. Thus, by depressing the pedal 146 located inside the structure the fire door 70 and the feed door 30 are simultaneously opened as will be more fully described in detail hereinafter.

As heretofore pointed out the hollow fire door sections 72 and 74 are open at the sides or ends, particularly FIGURE 5, and outside air enters the sides of the door sections, circulates against the entire area of the door, and out the openings 86 and 86' thereof into the incinerator D. The passage of air through the sections of the fire door is shown by the small arrows in FIGURE 5. The construction of the fire door 70 including the passage of air therethrough for cooling, provides a door which is cooled thereby and does not crack and has long life. In addition, the passage of air through the door 70 has a warming effect on the air before it enters the incinerator D.

Operation

The door construction A operates as follows:

The operator depresses the foot pedal 146 which lowers the pedal arm 140 thereby lowering the lower feed door section 34. As the door section 34 is lowered, the roller chains 118 and 122 are pulled downwardly thereby drawing the upper feed door half section 32 upwardly into an open position. Simultaneously with the above action the pedal arm 176 is drawn downwardly through the shaft 156 and arm 172 which in turn draws the fire door half section 74 downwardly. As the door half section 74 is drawn downwardly, the roller chains 130 and 134 are pulled downwardly thereby drawing the upper fire door section 72 upwardly into an open position. As a result of the above the opening C of the incinerator D is entirely accessible for depositing material in the incinerator D. When it is desired to close the doors 30 and 70, the operator merely releases pressure on the pedal 146 and due to gravity the doors return to the closed position shown in FIGURES 1–3. Positive closing of the doors is accomplished by the upper half door section 32 being heavier than the lower half section 34 as hereinbefore described and illustrated in FIGURE 4, and upper door section 72 of the fire door 70 being heavier than lower door section 74.

In FIGURES 6–8 is illustrated a further embodiment of the mechanism for opening the doors 30 and 70. The doors, mechanisms and supports therefor are identical with those in FIGURES 1–5.

In FIGURE 6 is found the connector 138 shown also in FIGURES 1–5. Pivotally connected to the lower end of the connector 138 by means of the pin 182 is the short link 184 and pivotally connected at its upper end to the link 184 by means of the pin 186 is the arm 188. Further provided is the shaft 190 which extends through the wall B, and secured to the outer end of the shaft 190 by means of set screws are the collars 192 and 194. The front arm 188 is secured to the collar 192 and is pivotally mounted on the shaft 190 intermediate its ends. The outer free end of the arm 188 is pivotally connected to the upper end of the vertical arm 194 by means of the pin 196. The lower end of the vertical arm 194 is pivotally connected by means of the pin 198 to the outer end of the pedal arm 200. The pedal arm 200 is pivotally mounted intermediate its length to the vertical support 202 by means of the short shaft 204. Pivotally mounted on the inner free end of the pedal arm 200 by means of the bearing 206 is the foot pedal 208.

The sleeve bearing 210 is mounted in the wall B by means of plates 209 and 211 and the same mounts the shaft 190. Secured to the inner end of the shaft 190 are the pair of collars 210 and 212, and the lower end of the inner arm 214 is secured to the collar 212. The upper end of the inner arm 214 is pivotally connected by means of the pin 215 to the lower end of the inner short link 216, and the upper end of the link 216 is pivotally connected by means of the pin 218 to the rear connector 180 which is connected to the lower edge of the fire door half section 74 as described. In operation, the operator depresses pedal 206 which pivots arm 200 thereby raising vertical arm 194 and through arm 188 the shaft 190 is rotated. Also, the short link 184 is moved downwardly thereby drawing half door section 34 downwardly, and through the chains 114 and 122 the upper half door section is raised. At the same time the shaft 190 moves the inner arm 214 downwardly thereby drawing the rear link 216 down, and as a result the lower half section 74 of the fire door is lowered. As a result of the half section 74 being lowered the upper half section 72 is raised through the chains 130 and 134 hereinbefore described.

The invention is not to be understood as restricted to the details set forth since these may be modified within the scope of the appended claims without departing from the spirit and scope of the invention.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. In an incinerator, a fire box including a feed opening, front and rear support means, means for mounting said rear support means adjacent said feed opening, a fire door including upper and lower door sections slidably mounted on said rear support means, a feed door including upper and lower door sections slidably mounted on said front support means, sleeve means extending between

said fire door and said feed door each of said fire door sections having means for allowing air to pass through the same and outwardly thereof to said feed opening to supply warmed air to said fire box and cool said fire door, and means mounted on said front and rear support means for slidably raising and lowering said upper door sections of said fire door and said feed door simultaneously with the lowering and raising of said lower door sections of said feed door and said fire door.

2. In a charging door apparatus for an incinerator, an upper and a lower feed door section, an upper and a lower fire door section, means for slidably mounting said feed door sections and said fire door sections in spaced relation, sleeve means connecting said mounting means, lever means for slidably operating said feed door sections and said fire door sections simultaneously.

3. The apparatus of claim 2 in which each of said fire door sections is formed of front and rear spaced plate portions and top and bottom spaced plate portions with the ends of said door sections open, each of said rear plate portions having an opening formed therein communicating with the interior of said fire door sections whereby air entering the open ends of said sections passes therethrough and out said opening of each of said rear plate portions.

4. In a charging door for the feed opening of a wall of an incinerator positioned adjacent to and externally of the wall of a structure, a pair of front spaced vertical supports having channel means formed therein, a pair of rear spaced vertical supports having channel means formed therein, upper and lower feed door sections slidably mounted in said channel means of said front vertical supports, upper and lower fire door sections slidably mounted in said channel means of said rear vertical supports, chain means connecting said lower feed door with said upper feed door and passed over roller means mounted on said front vertical supports, chain means connecting said lower fire door section with said upper fire door section and passed over roller means mounted on said rear vertical supports, first lever means connecting said lower feed door section and said lower fire door section, second lever means connected to said first lever means for actuating said first lever means to simultaneously separate said feed door sections and said fire door sections, and sleeve means connected to said front and rear supports and coextensive with said fire door and said feed door.

5. In an incinerator, a fire box having a feed opening, front and rear support means, a fire door including upper and lower door sections slidably mounted on said rear support means, a feed door including upper and lower door sections slidably mounted on said front support means, sleeve means extending between said fire door and said feed door, each of said fire door sections including an inner plate portion and an outer plate portion connected by upper and lower side portions mounted in spaced relation to form a lateral air passageway between said inner and outer plate portions, said rear plate portion having opening means formed therein to allow air passing into said fire door section to pass into said fire box via said feed opening, means for raising said upper door sections of said fire door and said feed door simultaneously with the lowering of said lower door sections of said fire door and said feed door, and means for connecting said fire box feed opening coextensively with said fire door.

6. In an incinerator, a fire box having a feed opening, front and rear support means, a fire door including upper and lower door sections slidably mounted on said rear support means, a feed door including upper and lower door sections slidably mounted on said front support means, sleeve means extending between said fire door and said feed door, each of said fire door sections having means for the passage of air therethrough to said feed opening to supply warmed air to said fire box and cool said fire door sections, means for slidably raising and lowering said upper door sections of said fire door and said feed door simultaneously with the lowering and raising of said lower door sections of said fire door and feed door, and means for mounting said fire door coextensively with said fire box feed opening.

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