Jan. 16, 1934. G. W. HEGEL 1,944,082

DOOR MECHANISM

Filed May 17, 1930

Fig. 1.

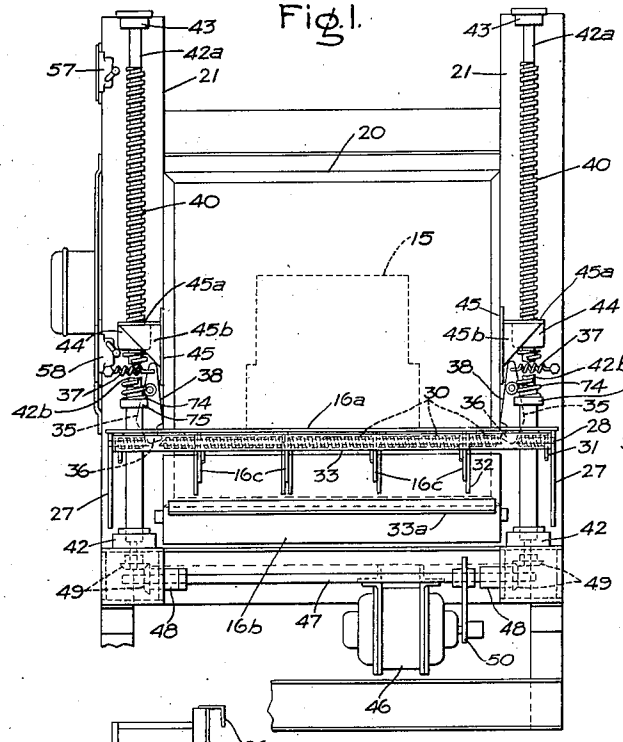


Fig. 2.

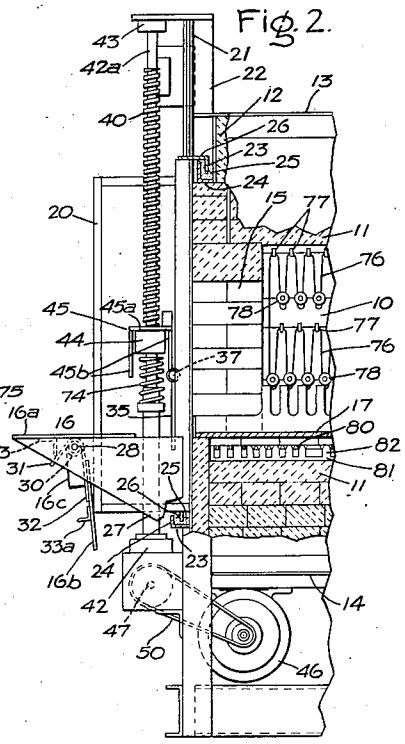


Fig. 3.

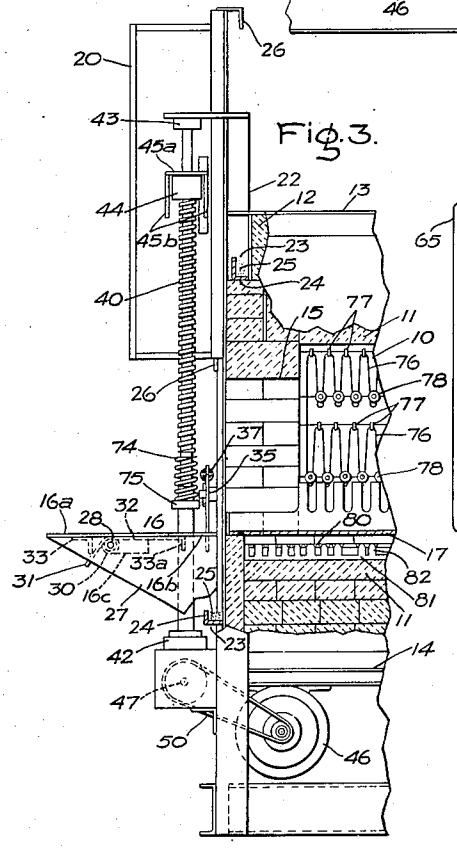
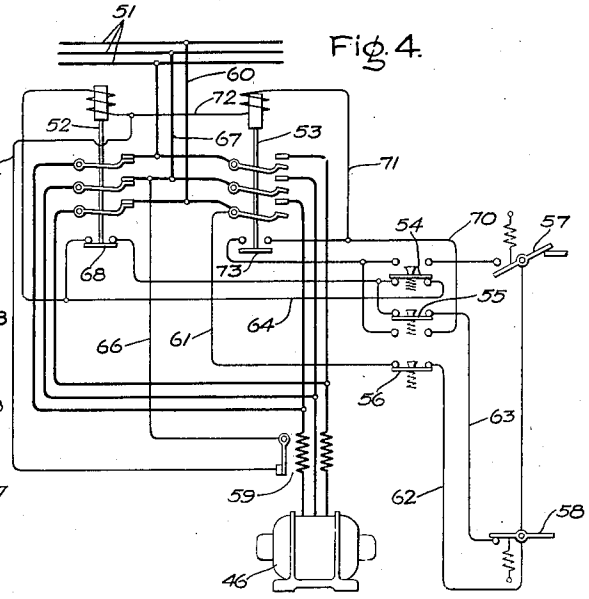


Fig. 4.



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UNITED STATES PATENT OFFICE

1,944,082

DOOR MECHANISM

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Application May 17, 1930. Serial No. 453,372

14 Claims. (Cl. 263—10)

My invention relates to door mechanisms, more particularly to door mechanisms for furnaces and the like, and has for its object the provision of an improved mechanism of this character.

More specifically, my invention relates to door mechanisms for electric furnaces wherein an opening is provided in the front or other suitable wall of the furnace in order to provide for communication with the heating chamber. It is the usual practice to provide furnaces of this character with a door movable in a vertical direction from the closed to the open position and vice versa. Some difficulty has been experienced with these furnaces because of the thermal losses occurring at the door provided to close the furnace opening. Frequently these door losses were sufficiently great to effect a reduction in the temperature at the front of the furnace which, of course, resulted in unequal temperature conditions in the heating chamber. In those furnaces wherein a work or loading shelf is provided before the furnace opening it has been very difficult to thermally insulate the door, particularly at its lower end. Various arrangements have been used in an effort to overcome this difficulty. For instance, a greater concentration of heat has been provided at the front portion of the heating chamber than in its rear portion so as to compensate for the thermal loss occurring at the door.

In carrying my invention into effect in one form thereof, I provide the furnace opening with a door having an area considerably greater than the area of the opening so that when the door is closed a considerable overlap is provided between the door and the furnace wall portion surrounding the opening. This overlap serves to thermally seal the furnace opening when the door is closed. I also provide means for supporting the work or loading shelf so that it can be moved away from its working position to permit the lower portion of the door to move beyond the threshold of the furnace opening so that the door can be lowered to its fully closed position and thereby establish the thermal seal about the opening.

I have further provided a simple and reliable operating means for the door. In carrying out this part of my invention, I provide the door with an operable connection between the door actuating means and the door so that the door can be moved positively to its open position but is disconnected from the actuating means in event of an obstruction to its closing movement.

For a more complete understanding of my invention reference should be had to the accompanying drawing in which Fig. 1 is a front elevation of an electric furnace embodying my invention; Fig. 2 is a fragmentary side elevation illustrating the furnace door in its closed position, and having parts in section so as to illustrate certain structural details; Fig. 3 is a view similar to Fig. 2 but illustrating the furnace door in its open position; and Fig. 4 illustrates in diagrammatic form a system of control provided for the door operating motor.

Referring to the drawing, I have shown my invention in one form as applied to an electric furnace provided with a front opening therein, the door provided for this opening being mounted to move in a vertical direction from the closed to the open position and vice versa. As shown, the electric furnace comprises a heating chamber 10 defined by suitable heat refractory walls, these walls, as shown, comprising an inner lining 11 of a suitable heat refractory material, such as fire clay, and an outer lining 12 of brickwork formed from a suitable heat insulating material, such as diatomaceous earth. Preferably and as shown, an outer metallic casing 13 will be provided for the furnace walls. If desired the furnace walls may be supported upon a suitable structural framework 14.

The front wall of the furnace is provided with an opening 15 which serves to provide communication with the heating chamber 10 so that work may be placed in or taken out from the heating chamber, a suitable loading or work shelf 16 being provided to facilitate the placing of the work in or the removal of the work from the heating chamber. As shown, a suitable hearth plate 17 is mounted in the bottom of the heating chamber and is substantially flush with the threshold of the opening 15.

A suitable heat insulated door 20 is provided for the opening 15 and as shown is mounted before the opening so that it is movable vertically from its closed to its open position and vice versa. Preferably, the door will be provided with suitable vertically disposed metallic guides 21 mounted on opposite sides of the furnace opening, the door being provided with suitable slides (not shown) which in the assembled furnace are received by the guide members 21. These guides 21 are supported by suitable column-like members 22 which preferably will be formed from some suitable metallic material such as steel. It will be understood that the guides 21 will be positioned with respect to the front wall of the furnace so that the door will be fitted closely to this wall.

In order to thermally seal the front end of the

furnace, the door is proportioned to have an area considerably larger than the front opening 15 so that when it is in its closed position as shown in Figs. 1 and 2 a considerable overlap will be provided between the furnace walls surrounding the opening 15 and the door. This overlap will be sufficiently large to effectively insulate the entire front of the furnace and thereby will considerably reduce the door losses. I have found that this overlap provides for a substantial equalization of temperature throughout the heating chamber. In order to more effectively seal the opening 15 when the door is in its closed position, I have provided auxiliary thermal seals 23 at the top and bottom edges of the door. As shown, each of these seals comprises a trough 24 in which sand 25 or some similar material is placed, the top and bottom portions of the door being provided with suitable sealing members 26 which are received in the sand provided in the associated troughs when the door is in its closed position.

It will be observed that since the lower edge of the door projects a considerable distance beyond the level of the hearth when the door is in its closed position, suitable means must be provided for removing the shelf 16 from the path of the door in order to provide for its closing movement. To this end, I have provided the shelf 16 with two portions, one a fixed portion 16*a*, which as shown is fixably secured to suitable supporting brackets 27 disposed on opposite sides of the path of movement of the door so that it is substantially flush with the level of the hearth 17, and the other, a movable portion 16*b*. The shelf portion 16*a* preferably will have a U-shape, the body of this portion being spaced with respect to the front wall of the furnace, and its legs being positioned on opposite sides of the path of the door so that the body together with its legs embrace the door when it is in its closed position (see Figs. 1 and 2). This arrangement provides for a free and unobstructed movement of the door either to its open or to its closed position. The other portion 16*b* of the shelf is mounted so that it can be moved to a position substantially flush with the portion 16*a* and with the hearth 17 and thereby establish an unbroken working surface for the shelf, or so that it may be moved to a position remote from its flush position so as to permit the door to move to its completely closed position.

As shown, this shelf portion 16*b* is movably secured to the shelf portion 16*a* by means of supporting arms 16*c* which are welded or otherwise suitably secured to the portion 16*b* and are pivotally connected to a suitable pin 28 that extends transversely of the portion 16*a* and throughout substantially its length. The movable portion 16*b* is biased to its flush position (Fig. 3) by means of a plurality of spring members 30 each of which comprises a number of convolutions wrapped about the pin 28 and having projecting end portions 31 and 32, the portion 31 being in engagement with a suitable stop member 33 provided on the fixed portion 16*a* of the shelf, while the other portion 32 engages the movable shelf portion 16*b*. It will be observed by reason of this arrangement that the forces exerted by the springs 30 always tend to move the movable shelf into its position flush with the portion 16*a* so as to establish a complete working surface for the shelf. It will also be observed that when the shelf portion 16*b* has been moved to its flush position, the arms 16*c* engage the under surface of the fixed portion 16*a* so as to prevent further upward movement of the movable portion. While I have shown spring means 30 for biasing the movable shelf portion 16*b* to its flush position, it will be understood that any other suitable biasing means, such as weights suitably connected with the movable portion, may be provided for this purpose. The stop member 33 which is of angular formation serves to strengthen the shelf portion 16*a*; a similar member 33*a* extends transversely of the portion 16*b* so as to enhance its strength.

It will be observed that the resilient biasing means 30 provided for the shelf portion 16*b* permits this portion to be moved to its remote position by the downward movement of the door. Thus, as the door is being lowered to its closed position, its lower edge will engage the movable portion 16*b* of the shelf and move it to its remote position as shown in Fig. 2, the U-shaped fixed portion 16*a* receiving the door in its downward movement. It will also be observed that when the door is being raised to its open position the shelf will be established automatically by means of the spring biasing means, the upward movement of the door, of course, permitting the shelf portion 16*b* to be moved to its flush position.

The movable shelf portion 16*b* is positively locked in its shelf establishing position by means of a pair of latch members 35 pivotally mounted on opposite sides of the furnace opening. It will be observed that each of these latch members is provided with a hook portion 36 at its lower end; and that this end is biased inwardly toward the furnace opening by means of a tension spring 37 so as to cause the hook to engage the adjacent end edge of the movable shelf portion when it is moved to its flush position by means of the springs 30. It will be understood that weights or other suitable means may be used to bias the latches to their locking positions. Each latch member is also provided with a cam-like surface 38 which is engaged by the lower edge of the door in its downward movement so as to move the hook portions 36 out of engagement with the movable shelf portion. Thus, the door in its downward movement automatically unlocks the movable shelf portion and also moves it to its remote position so as to permit the door to move to its fully closed position.

I provide suitable means for automatically operating the door to its open and closed positions. It will be observed that by reason of the comparatively large area of the door, more specifically because of its comparatively long length, it is necessary that the door operating mechanism have a rather high lifting range. In order to provide a lifting mechanism which will move the door completely to its open position and which will not require a considerable amount of overhead space, as would many of the door operating mechanisms heretofore generally used, I have placed on opposite sides of the door a pair of vertically disposed operating screws 40. It will be observed that these screws are positioned in substantially parallel relation with each other and with the line of movement of the door. The lower ends of these screws are secured by suitable thrust bearings 42, while their upper ends are secured against lateral movement by means of suitable bearings 43 which are mechanically supported by means of the columns 22. Upon each screw 40 is threaded an operating member 44 shown as a nut. The door is mechanically

connected to these nuts by means of a pair of brackets 45 which are bolted or otherwise suitably secured to the door. It will be observed that each bracket has a portion 45a projecting laterally from the door in a horizontal direction so as to rest upon the associated operating member or nut, and with a pair of portions 45b projecting laterally from the door in a vertical direction so as to receive the associated nut between them and thereby prevent its rotation on its operating screw. It will also be observed that by reason of this arrangement an upward movement of the nuts effected by the proper rotation of the screw members will cause the brackets 45, together with the door which is secured thereto, to move in an upward direction, while if the nuts be moved downwardly by the opposite rotation of the screws the door will be allowed to close under the influence of gravity.

This mechanical connection provided between the door and its operating screws is an important feature of my invention in that it provides for a freedom of movement of the operating mechanism from the door in a downward direction. Therefore, this mechanical connection serves as a safety feature; thus, if the door for any reason be blocked in its downward movement as by means of some material being left in the line of movement of the door, the operating mechanism would not jam since the door would be supported by the obstructing member, while the nuts would simply move downwardly on the screws away from the door supporting brackets. Moreover, this mechanical connection between the door and the nuts 44 provides for irregularities in the movement of the door and also for its thermal expansion and contraction. This is effected by the provision of suitable clearance between the brackets 45 and the operating members 44. It will be understood that the door guides 21 will be positioned relative to the door so as to permit a limited lateral movement of the door, and thereby provide for its thermal expansion and contraction.

The screws 40 are operated by means of a suitable electric motor 46 which as shown is mounted beneath the furnace on the structural supporting framework 14. This motor is mechanically connected with each of the screws 40 by means of a counter-shaft 47 positioned laterally beneath the furnace and supported on the framework by means of suitable bearings 48. This counter-shaft is mechanically connected at its ends to the screws 40 by means of suitable bevel gears 49. As shown, the electric motor 46 is mechanically connected with the counter-shaft 47 by means of a chain drive 50.

Preferably, although not necessarily so, the electric motor 46 will be of the alternating current type. In Fig. 4, I have shown diagrammatically a system of control whereby the motor 46 may be automatically controlled by means of a simple push button station. The motor 46 is electrically supplied by means of a suitable alternating current source 51 to which it may be connected by means of a pair of controlling contactors 52 and 53, the contactor 52 being provided to complete an energizing circuit for the motor to close the door, while the contactor 53 serves to complete an energizing circuit for the motor to open the door. The energizing circuit for the contactor 52 is controlled by means of a closing push button 54, while the energizing circuit for the contactor 53 is controlled by means of an opening push button 55. The push button station further comprises a stop button 56. Suitable limit switches 57 and 58 are provided at the upper and lower limits of the door's motion so as to deenergize the motor when the door has been moved to its fully open or fully closed position. Although I have shown the limit switches to be operated by the nuts 44, it will be understood that they may be actuated by any suitable movable portion of the mechanism. Thus, for example, the door itself may be employed to operate these switches. A suitable overload relay 59 is provided for the motor.

The operation of this portion of the mechanism is as follows: Assume that the door has been moved to its fully open position (Fig. 3) so that the upper limit switch 57 has been moved to its open position (Fig. 4) to deenergize the operating motor; and further that it be desired to close the door. In order to cause the door to move to its closed position it is merely necessary to momentarily depress the closing push button 54. It will be observed that when this push button is depressed so as to close its lower set of contacts an energizing circuit for the closing contactor 52 will be completed from the upper conductor of the alternating current supply source 51 through the conductor 60, the conductor 61, the stop push button 56, the conductor 62, the lower limit switch 58 which will have been allowed to close when the door was being moved to its open position, the conductor 63, the closed upper contacts of the opening push button 55, the closed lower contacts of the push button 54, which will be in its depressed position, the conductor 64, the operating coil of the closing contactor 52, the conductor 65, the overload relay 59, the conductor 66 and thence through the conductor 67 to the middle conductor of the alternating current supply source 51. The closing contactor 52 closes in response to the completion of this circuit and in closing establishes a holding circuit for itself through the interlock 68, after which the push button 54 may be released. The contactor 52 in closing also completes an energizing circuit for the motor 46 to move the door to its closed position. The door in moving to its closed position will allow the upper limit switch 57 to close, and when it has reached its lower limit of movement will cause the lower limit switch 58 to open and thereby deenergize the motor.

In order to open the door it is merely necessary to depress the opening push button 55 so as to close its lower set of contacts. When this button is depressed an energizing circuit for the opening contactor 53 will be completed from the upper conductor of the alternating current supply source through the conductor 60, the conductor 61, the stop push button 56, the conductor 62, the closed upper limit switch 57, the closing push button 54, the lower contacts of the push button 55 which will have been bridged by the depression of this button, the conductor 70, the conductor 71, the operating coil for the opening contactor 53, the conductor 72, the conductor 65, the overload relay 59, the conductor 66 and thence through the conductor 67 to the middle conductor of the alternating current supply source. The contactor 53 in closing establishes a power circuit for the motor 46 to operate the door in an open direction, and also establishes a holding circuit for its operating coil by means of an interlock 73. The door upon being moved to its completely open position will open the upper limit switch 57 to deenergize the motor. It will be understood that after the motor has been ener-

gized to move the door either to its open or to its closed position it may be denergized by means of the stop button 56 so as to stop the door at any desired position within the limits of its movement.

I have provided suitable means for releasing the operating members or nuts 44 in the event the limit switches provided for deenergizing the motor fail for any reason. It will be observed that the upper and lower portions 42*a*, 42*b* of the screws 40 are not threaded and are reduced in diameter so that if the nuts 44 be moved in either direction beyond the threaded portions of their screws, they will be received by the reduced portions, after which it will be impossible for the screws to impart any further motion to the nuts, and consequently to the door. In other words, these screws will have been rendered ineffective to impart any further motion to the door until the nuts have been rethreaded. These reduced portions are positioned with respect to the limit switches so that normally the nuts will not ride off of the threaded portions of the screws, the motor being deenergized by the proper operation of the limit switches before such an operation can take place.

It will be understood that when the door has been moved to its completely closed position and the lower limit switch 58 has been opened so as to deenergize the motor it is possible that the motor and driving mechanism will continue to rotate by reason of the inertia of their parts so as to carry the operating members or nuts 44 beyond their lower limiting positions. It is possible that the driving mechanism at times will possess sufficient inertia to cause the nuts to ride off their threaded screw portions. In order to prevent this condition, I have provided suitable means for damping the door operating mechanism after the door has been moved to its fully closed position and the motor has been deenergized. To this end, I have provided suitable compression springs 74 surrounding the reduced portions 42*b* provided on the lower ends of the screws 40, and supported on the screws by means of suitable collars 75. It will be observed that these springs are of such a length that they will extend substantially throughout the full lenght of these lowered reduced sections, whereby in the event the operating mechanism continues to move by reason of its inertia, the nuts or operating members 44 will engage the upper ends of the compression springs which, of course, will then operate to retard further downward movement of the nuts. The springs in effect impose a load on the operating mechanism which will quickly bring the mechanism to rest, it being understood that the springs will have sufficient strength to bring the mechanism to rest before the nuts have moved a sufficient distance to ride off the threaded sections of the operating screws.

It will be understood that any suitable heating means may be provided for the heating chamber. I prefer, however, to use electrical heating elements which may be mounted along the sides of the heating chamber and also on its floor. As shown, suitable resistors 76 are mounted along the sides of the chamber 10, these resistors being suspended from suitable hooks 77 attached in any well-known manner to the furnace walls 11. Refractory spacing members 78 are also mounted on the furnace walls and are arranged to hold the convolutions of the resistors in the proper spaced relation. Mounted in the bottom of the heating chamber under the hearth plate 17 are other resistors 80 preferably formed into a plurality of parallel lengths (not shown). Each heating resistor 80 is supported upon a suitably refractory spacing member 81 which rests on the floor of the heating chamber and which is provided with suitable recesses 82 in which the convolutions of the resistors are kept in proper spaced relation. It will be understood that both the resistors 76 and 80 will be formed from any suitable heat resisting material such as nickel chromium alloy. It will also be understood that suitable connections will be made to these resistors in any well-known manner with a suitable source of electrical supply.

While I have shown a particular embodiment of my invention, it will be understood, of course, that I do not wish to be limited thereto since many modifications may be made, and I, therefore, contemplate by the appended claims to cover any such modifications as fall within the true spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States, is,—

1. Door mechanism for furnaces and the like provided with walls forming a heating chamber having an opening therein that is provided with a threshold, comprising a door for closing said opening having an area substantially larger than the area of said opening so as to provide an overlap between said door and the wall portion below said threshold, a shelf, means movably supporting said shelf so that it can be moved to a working position before said opening substantially flush with said threshold or can be removed from said opening to permit said door to close and means operably associated with said shelf for moving it to its working position substantially flush with said threshold when said door is moved to any open position within its range of movement to provide access to said heating chamber.

2. Door mechanism for furnaces and the like provided with walls forming a heating chamber having a side door opening therein, comprising a door for said opening mounted for movement in a vertical direction from the closed to the open position and vice versa and proportioned to provide a considerable overlap between the wall portion surrounding said opening and said door when the latter is in its closed position so as to thermally seal said opening, a shelf, means movably mounting said shelf so that it can be moved to a working position before said opening substantially flush with the threshold of said opening and to a position remote from said working position, and means biasing said shelf to its working position flush with said threshold so that said shelf is moved to its working position when said door is moved vertically to any open position within its range of movement to provide access to said heating chamber.

3. Door mechanism for furnaces and the like provided with walls forming a chamber having an opening therein, comprising a door for said opening proportioned so that when it is in its position to close said opening, at least one edge of said door projects beyond the associated edge of said opening, a shelf movably supported so that it can be moved to a position substantially flush with said associated edge and so that it can be moved to a point remote therefrom to provide for the closing of said door, and spring means engaging said shelf so as to move it automatically to its flush position when said door is moved to its open position.

4. Door mechanism for furnaces and the like

provided with walls forming a heating chamber having a side opening therein, comprising a door for said opening mounted for vertical movement before said opening so that it can be raised to an open position and can be lowered to its closed position and proportioned to provide a considerable overlap between the wall portion surrounding said opening and said door when the latter is in its closed position so as to thermally seal said opening, a shelf movably mounted so that it can be moved to a working position before said opening and to a position remote from said working position, and resilient means biasing said shelf to its working position so that as said door is raised to its open position, said shelf is moved concurrently to its working position by said resilient means, said shelf being moved to its remote position against the bias of said resilient means by said door as it is being closed.

5. Door mechanism for furnaces and the like provided with walls forming a heating chamber having a side opening therein, comprising a door mounted for vertical movement before said opening so that it may be moved away from said opening to provide for communication therethrough and having a portion projecting beyond the hearth level of said opening, a shelf before said opening provided with a portion substantially flush with the hearth level of said opening and a portion pivotally secured to said first portion so that it can be moved to a position substantially flush with said first portion or to a position remote therefrom, means for moving said second portion to its flush position as said door is being moved to its open position, said means providing for the movement of said shelf to its remote position when said door is closed and means dependent upon the position of said door for locking said movable portion in its flush position before said opening.

6. Door mechanism for furnaces and the like provided with walls forming a heating chamber having a side opening therein, comprising a door for said opening mounted for vertical movement before said opening so that it can be raised to an open position and can be lowered to its closed position and proportioned to provide a considerable overlap between the wall portion surrounding said opening and said door when the latter is in its closed position so as to thermally seal said opening, a shelf before said opening comprising a fixed portion mounted on substantially the same level as the hearth of said furnace and in spaced relation with said opening so that said door can be moved between said portion and said opening, and a second portion movably mounted so that it can be moved to a position between said fixed portion and said opening to provide a substantially unbroken shelf working surface between said fixed portion and said opening and so that it can be moved to a position remote from said opening, means biasing said movable portion, so that as said door is raised to its open position, said shelf is automatically established, said biasing means providing for the movement of said movable portion to its remote position so as to permit said door to close, and means for locking said movable member in its shelf establishing position comprising means engaged by said door as it is being moved to its closed position arranged to render said locking means ineffective.

7. Door mechanism for furnaces and the like provided with walls forming a heating chamber having a front opening therein, comprising a door before said opening mounted for vertical movement so that it can be moved to a position remote from said opening to provide for communication therethrough and can be returned to close said opening, said door being proportioned to provide a substantial thermal overlap between the furnace wall portion surrounding said opening and said door when said door is in its closed position, a work shelf before said opening comprising a stationary portion substantially flush with the hearth level of said furnace and spaced from said opening so as to permit said door to move to it closed position and a second portion pivotally secured to said first portion so that it can be moved to a position substantially flush with said first portion and with said hearth level or can be moved away from said flush position to provide for the closing movement of said door, resilient means operably associated with said pivoted portion so as to bias it to its flush position but providing for movement of said portion to its remote position by said door as said door is moved to its closed position, and a latch member biased to engage said pivoted portion when it is in its flush position so as to lock said portion in said flush position, said latch member being moved to disengage said pivoted shelf portion by said door as the latter is being moved to its closed position.

8. Door mechanism for furnaces and the like provided with walls forming a heating chamber having a side opening therein comprising a door for said opening mounted for movement in a vertical direction from the closed to the open position and vice versa and when closed having its lower end portion projecting beyond the hearth level of said opening, a shelf, means pivotally supporting said shelf so that it can be moved into the line of motion of said door to a working position in front of said opening and to a position remote from said working position so as to permit said door to be moved to its closed position, said door engaging said shelf when being moved to its closed position so as to move said shelf to its remote position, actuating means for said door and an operable connection between said actuating means and said door so that the door is moved positively to its open position, but is released from said actuating means in the event the motion of the door is impeded unduly by said shelf or by an obstacle on said shelf and in the door opening.

9. Door mechanism for furnaces and the like having an opening therein comprising a door for said opening, a shelf pivotally mounted before said opening so that it can be moved into the line of movement of said door to a position substantially flush with the threshold of said opening and to a position remote therefrom, said shelf being engaged by said door and moved to said remote position when said door is closed and means arranged to move said shelf to said flush position when said door is moved to any open position within its range of movement to provide access to said furnace.

10. Door mechanism for furnaces and the like having an opening therein comprising a door for said opening, a shelf, means mounting said shelf for movement between a working position substantially flush with the threshold of said opening and a position remote therefrom and resilient means biasing said door to said flush position, the shelf being moved from said flush position against the bias of said resilient means by said door as the door is being closed.

11. Door mechanism for furnaces and the like having an opening therein comprising a door for said opening, a shelf, means mounting said shelf for movement between a working position substantially flush with the threshold of said opening and a position remote therefrom and a latch member arranged to engage said shelf to lock it in said flush position and to be operated by said door when said door is being closed so as to release said shelf.

12. Door mechanism for furnaces and the like having an opening therein comprising a door for said opening, a shelf, means mounting said shelf for movement between a working position substantially flush with the threshold of said opening and a position remote therefrom, spring means arranged to move said shelf to said flush position and providing for the movement of said shelf from said flush position to said remote position and locking means arranged to hold said shelf in said flush position and provided with a member arranged to be engaged by said door as it is being closed so as to release said locking means.

13. Door mechanism for furnaces and the like having an opening therein comprising a door for said opening, a shelf, means before said opening pivotally mounting said shelf for movement into the line of movement of said door to a position substantially flush with the threshold of said opening and to a position remote therefrom, spring means engaging said shelf and biasing it to said flush position, and latching means for holding said shelf in said flush position, said latching means being engaged by said door when the latter is being moved to its closed position so as to release said shelf, the shelf being engaged by said door when it is thus moved to its closed position so as to be moved from said flush to said remote position.

14. Door mechanism for furnaces and the like having an opening therein comprising a door for said opening, a shelf, means movably supporting said shelf in a position in the line of movement of said door so that said shelf is engaged by said door and moved away from said position when the door is closed and spring means engaging said shelf to return it to said position when said door is opened.

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