Nov. 26, 1929. A. R. ROSS 1,737,176

OVEN DOOR

Filed Dec. 21, 1922

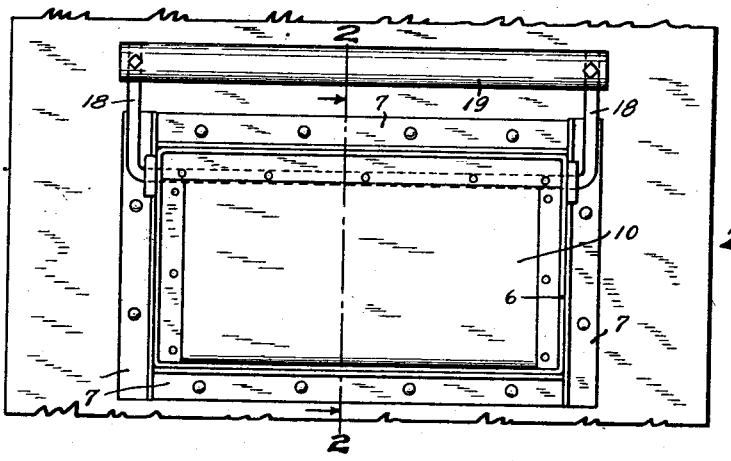


Fig. 1

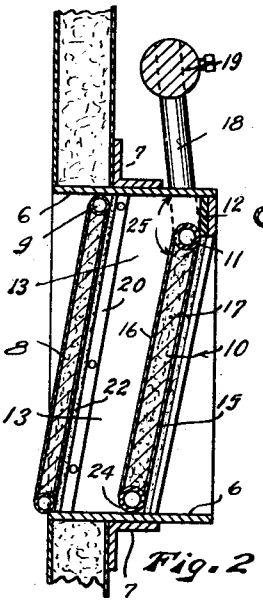


Fig. 2

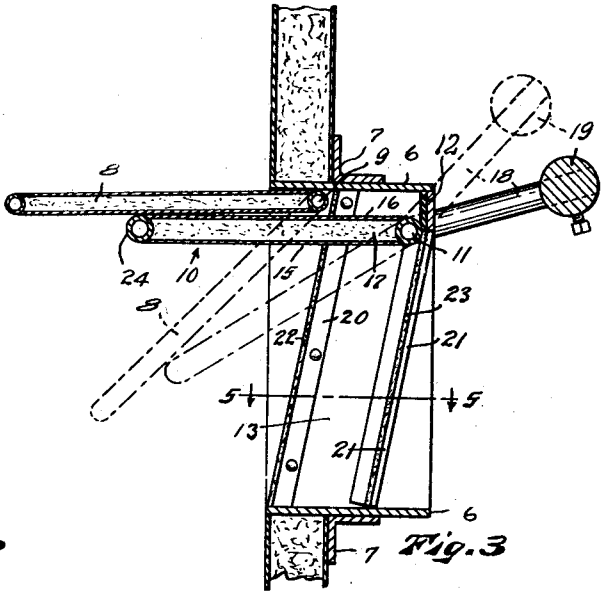


Fig. 3

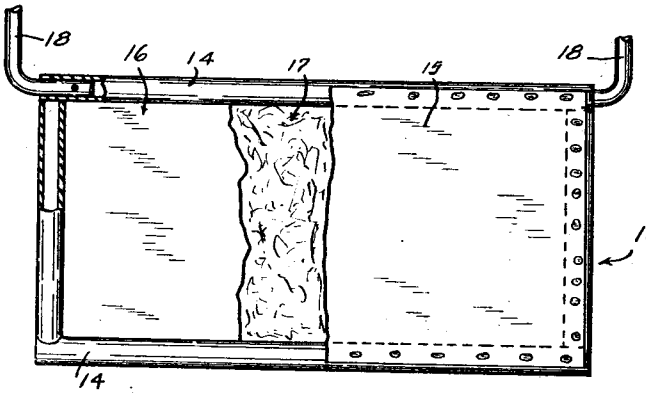


Fig. 4

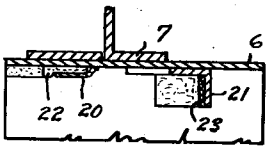


Fig. 5

INVENTOR
Allen R. Ross
BY
G. Wright Arnold
ATTORNEY

Patented Nov. 26, 1929 1,737,176

UNITED STATES PATENT OFFICE

ALLEN R. ROSS, OF SEATTLE, WASHINGTON

OVEN DOOR

Application filed December 21, 1922. Serial No. 608,315.

My invention relates to the art of baking oven doors.

In baking ovens it is necessary that the heat developed be conserved in every way possible for economical operation. Particularly is this true when electricity is employed as the source of the heat, otherwise the cost of operation is prohibitive or very seriously reduces the otherwise possible profit. Ordinarily in the ovens as hereto designed and used, the door becomes very hot and renders the position of the operator very uncomfortable; that is, the operator whose duty it is to supply to and remove from the oven the articles to be baked. A primary object of my invention is to provide an oven door of such design that it will afford efficient insulation against the escape of the heated air in the oven compartment.

Again it is important that the construction be of such design that the door can be manufactured on a large scale, or production basis, at a minimum cost. Moreover, the great heat encountered by the oven doors tends to warp them so that they permit the escape of the heat and this holds true when even the distortion is of small degree. A primary purpose of my invention is to provide an oven door of such design and construction that it can be most economically manufactured and yet embodying such principles of construction that it will efficiently resist any such distorting effect of the heat.

In providing a counterweight for the oven door, room must be provided in which this weight may operate, and if this room is secured by merely building out the front of the oven with a metal frame, the difficulty of too great an escape of the heat would ordinarily be encountered as there would be nothing but the thin wall of the said frame. If this extra room is secured by recessing the oven wall, either a sacrifice of oven capacity or insulation is the result. Also such solutions involve a complex construction which unduly increases the cost. A primary object of my invention is to provide an oven door of economical construction with a counterweight without sacrificing either oven capacity or insulation.

Furthermore, it is important that the baking oven door be capable of maintaining its position at different degrees of opening. In some instances, as when pies or cookies are being baked, it is only necessary to open the oven door to a small extent, and when bread or high cakes are being baked, then it is necessary for the door to swing open widely and in all cases continue in said degree of open position, as desired by the operator. That is, the heat is prevented from escaping by an undue opening of the door if the article being baked does not require a large opening. A primary object of my invention is to provide an oven door which will be capable of maintaining itself in such degree of open position as the operator may desire; that is, the degree of opening may be suited to the article being baked.

Finally it is the object of my invention to provide an oven door which will combine all of the above named advantages and objects in one construction.

The above mentioned general objects of my invention, together with others inherent in the same, are attained by the mechanism illustrated in the following drawings, the same being merely a preferred exemplary form of embodiment of my invention, throughout which drawings like reference numerals indicate like parts:

Figure 1 is a view in front elevation of an oven door embodying my invention;

Fig. 2 is a view in cross section on dotted line 2, 2 of Fig. 1;

Fig. 3 is a view in cross section showing the swinging members constituting the door in full open position and also in half-way open position as indicated by the members shown in dotted line;

Fig. 4 is a view of one of the swinging members illustrating the construction of the same, showing a portion of the sheet metal covering torn away to disclose the tubular frame construction and the heat insulating material disposed between the metal facings covering said tubular frame; and

Fig. 5 is a view in cross section on dotted line 5, 5 of Fig. 3 of one end portion of the oven door frame.

The oven door opening is provided with a frame 6 of suitable form as herein shown of rectangular form. This is preferably supported in place by angle iron reinforcing members 7. An inner swinging member 8 is pivotally mounted at 9 to said frame 6. An outer swinging member 10 is similarly pivotally mounted at 11 to a downwardly projecting part 12 of said frame 6, said outer swinging member being in spaced relation to the swinging member 8 whereby is provided a recess 13 beneath the doors when the doors are in closed position.

The swinging members are similarly constructed, having preferably a tubular frame 14, over which sheet metal facings 15 and 16 are provided, preferably by spot welding the same to said frame. In between said sheet metal facings 15 and 16, insulating material 17 is disposed.

The solid rod 18 is caused to extend through the upper tubular frame member and on the ends of this rod 18 is provided a counterweight 19 of suitable magnitude.

On the side walls of the frame are provided buffeting strips 20 and 21, on the face of which strips is preferably provided an asbestos strip 22 and 23 which materially aids in producing a tight fit between the swinging members and the side strips. A tight fit is provided between the bottom portion of the oven door frame and the swinging member, owing to the fact that the edge 24 of the swinging member 10 is circular in form, (the corresponding lower edge of swinging member 8 is likewise preferably of circular form); and furthermore, the swinging members are of such relative size as respects the frame and so pivotally mounted as to cause them to hang diagonally in said frame when in closed position.

The mode of operation of an oven door embodying my invention is as follows:

The doors being pivoted at 9 and 11 results in the spaced relationship forming thereby the recess 13. This recess 13 constitutes a wall of dead air, which functions efficiently as an insulating medium against the escape of heat by induction through the swinging members. The tubular frame work affords an exceptionally high degree of stiffness to the swinging member which renders it capable of overcoming the distorting effect due to the high heat of the oven. This frame is preferably constructed by electrically welding the parts together. By having the frame of tubular construction, a necessary thickness is secured for the door between the sheet metal covering 15 and 16 in which space is preferably disposed any known heat insulating material. Moreover, the tubular form of the frame member provides just the necessary form for the insertion of the rod 18, which performs the double function of affording a pivoting means for the swinging member and also the function of mounting for the counterweight 19. At least, the rod 18 performs this second function in the case of the outer swinging door 10.

While it is necessary that the door have a high degree of stiffness and be capable of resisting distortion by the heat, nevertheless, it must not be excessive in weight as the said swinging members are normally manually operated.

The pivot member 11 is preferably disposed in a plane beneath that of pivot point 9. The counterweight 19 is of a size and is mounted at such distance from the pivot point 11 as to not interfere with the oven door for the compartment immediately above and yet capable of developing such moment of force as will balance the weight of the two swinging members 10 and 8. It will be noted that the upper portions of the rod 18, on which the counterweight 19 is mounted, do not lie in the plane of the swinging member, but form an obtuse angle 25. In this wise, the effect of the counterweight to open the door is avoided, when the door is in closed position, and by having the center of the counterweight move to a point that lies in a plane back of the vertical plane through the pivot point 11, causes said counterweight to operate to hold the swinging member 10 in closed position.

It is obvious that in moving the swinging members 8 and 10 into open position that first the swinging member 10 is moved upwardly until it engages the swinging member 8. At first the engagement, by swinging member 10 with the swinging member 8, is not very far removed from the lower edge of said swinging member 8. Obviously the distance from said engaging point to the pivot point 9 constitutes a relatively long lever arm so that initially the swinging member 8 does not require a great deal of effort in moving the same upward. However, as the opening continues, the engagement of swinging member 10 with swinging member 8 moves towards pivot point 9; that is, the lever arm shortens and nearly the full weight of swinging member 8 comes upon the swinging member 10 so that the effort required in opening or maintaining in open position is increased. It will be noted that the effort resulting by the action of gravity upon the counterweight is made to correspond with the increased demand as immediately set forth. As the counterweight moves forward of the vertical plane through the pivot point 11, the moment of force is gradually increased so that the increased effort is supplied and there results a balancing of the moments of force on the pivot point 11. In this wise the doors are caused to maintain the degree of openness to which they may be actuated by the operator whether the said degree of openness be partial or entire.

Obviously, changes may be made in the forms, dimensions and arrangement of the parts of my invention, without departing from the principle thereof, the above setting forth only a preferred form of embodiment.

I claim:

1. An oven door embodying a frame; an inner and an outer swinging member pivotally mounted in said frame at such a spaced distance that a wall of insulating air is provided between said members in closed position and the two members are in engaging relation when moved into open position; and a counterweight mounted upon one of said swinging members whereby, when said member is moved into open position, it will maintain both of said swinging members in open positions.

2. An oven door embodying a frame; an inner and an outer swinging member pivotally mounted in said frame at such a spaced distance that a wall of insulating air is provided between said members in closed position and the two members are in engaging relation when moved into open position; buffeting means secured to said frame at each end of said swinging members and engaged by said members when the same are in closed position, and a counterweight mounted upon one of said swinging members whereby, when said member is moved into open position, it will maintain both of said swinging members in open position.

3. An oven door embodying a frame; an inner and an outer swinging member pivotally mounted in said frame at such a spaced distance that a wall of insulating air is provided between said members in closed position and the two members are in engaging relation when moved into open position, and said members being of a size greater than the opening they are intended to close in said frame, that is they hang diagonally in said frame whereby a door, close-fitting along its lower edge is provided; and a counterweight mounted upon one of said swinging members whereby, when said member is moved into open position, it will maintain both of said swinging members in open position.

4. An oven door embodying a frame; an inner and an outer swinging member pivotally mounted in said frame at such a spaced distance that a wall of insulating air is provided between said members in closed position and the two members are in engaging relation when moved into open position, and said members being of a size greater than the opening they are intended to close in said frame, that is, they hang diagonally in said frame whereby a door, close-fitting along its lower edge is provided; and a counterweight mounted upon one of said swinging members whereby, when said member is moved into open postion, it will maintain both of said swinging members in open positions, said counterweight having its center of mass in a vertical plane passing between the pivot points of said swinging members when said members are in closed position.

5. An oven door embodying a frame; and an inner and an outer swinging member in spaced relation when in closed position, whereby a wall of insulating air is provided therebetween said members being pivotally suspended by their upper edges in said frame and disposed to swing inwardly, and one of said members being in a plane when closed, which plane forms an angle other than 90 degrees with the floor of said frame.

6. An oven door embodying a frame; an inner and an outer swinging member pivotally mounted in said frame in spaced relation, the pivot point of the outer swinging member being in a lower plane than the pivot point of the inner swinging member; and a counterweight mounted upon the outer swinging member whereby, by reason of said arrangement of said pivot points and said spaced relation of the swinging members, the moments of force developed on the pivot point of the outer door are caused to be so nearly balanced that the door continues in open position at various degrees of openness.

7. An oven door embodying a frame; an inner and an outer swinging member pivotally mounted in said frame at such a spaced distance that a wall of insulating air is provided between said members in closed position and the two members are in engaging relation when moved into open position; and a counterweight operatively disposed with respect to one of said members, whereby when said member is moved into open position, it will maintain both of said swinging members in open position.

8. An oven door embodying a frame; an inner and an outer swinging member mounted independently of each other throughout their length in said frame, said members being in spaced relation when closed whereby a wall of insulating air is provided therebetween; and means operatively disposed with respect to one of said members whereby when said member is moved into open position it will maintain such member in open position and such member in turn will be caused to engage the other swinging member and maintain it in open position.

9. An oven door embodying a frame, said frame projecting beyond the face of the oven; an inner and an outer swinging member pivotally mounted in said frame at such a spaced distance that a wall of insulating air is provided between said members in closed position and the two members are in engaging relation when moved into open position; supporting members mounted on one of said swinging members; and a counterweight operatively disposed on said supporting members, said counterweight functioning as

a handle for said oven door, whereby when said member is moved into open position, it will maintain both of said swinging members in open position, and when in closed position, said counterweight will be in spaced relation to the face of said oven.

10. An oven door embodying an inner and an outer swinging member mounted independently of each other throughout their length, suspended by their upper edges in said frame and disposed to swing inwardly, said members being in spaced relation when closed and in direct engaging position one with the other when one of said members is actuated into open position.

11. An oven door embodying a frame; an inner and an outer swinging member pivotally mounted in said frame at such a spaced distance that a wall of insulating air is provided therebetween when said members are in closed position, said members being in direct engaging position one with the other when one of said members is moved into open position and said members being of a size greater than the opening they are intended to close in said frame, whereby a door close fitting along its lower edge is provided.

12. An oven door structure comprising a door frame, an inner and on outer door pivotally supported in said door frame, and means for positively swinging one of said doors from open to closed position, or the reverse, the other door being positioned to be contacted by the first door as the latter swings open to be moved into fully open position thereby, and to swing shut by gravity as the first door moves towards closed position.

13. An oven door structure comprising a door frame, an inner and an outer door spaced at all points when in closed position, and both pivotally supported at their upper edges from said door frame, means for swinging the outer door, the inner door being positioned adjacent to the outer door to be engaged and opened thereby as the outer door swings open, and to swing shut by gravity as the outer door moves towards closed position, and in closed position to lie with its lower edge in contact with said door frame.

14. An oven door structure comprising a door frame, an inner and an outer door spaced from each other when in fully closed position, and both pivotally supported from said door frame above their centers of gravity to swing inwards, means for positively swinging the outer door, the inner door being free to swing downward into closed position by gravity, and positioned to be engaged by the outer door in opening to be swung open thereby.

15. An oven door structure comprising a door frame including an inwardly directed sleeve, a door pivotally supported from said frame by its upper edge, and adapted to come to rest by gravity with its lower edge engaging the lower surface of said sleeve, and laterally directed flanges projecting from the sides of said sleeve to engage and seal the side edges of said door when in closed position.

In witness whereof, I hereunto subscribe my name this 18th day of November, A. D. 1922.

ALLEN R. ROSS.