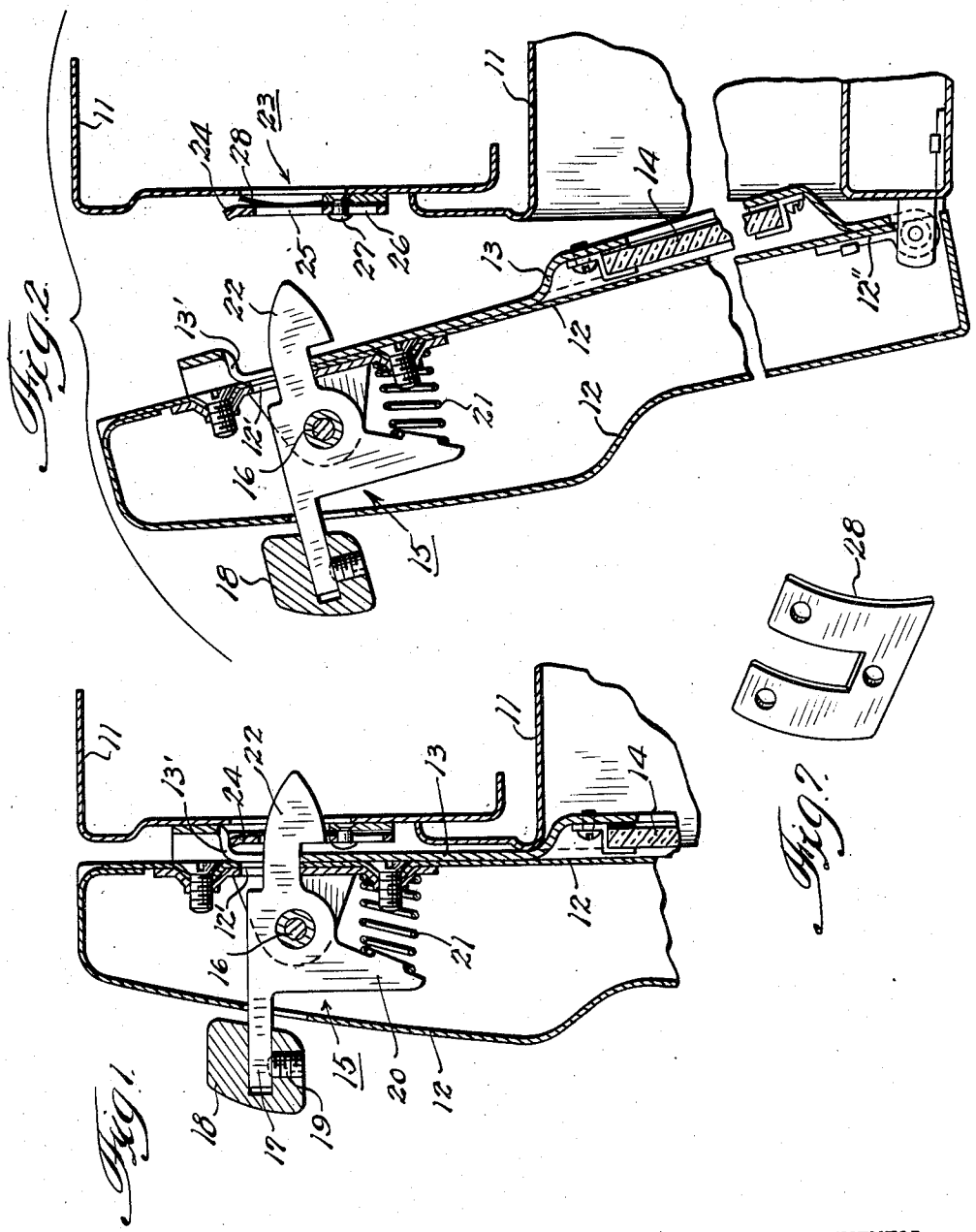
Nov. 11, 1958 R. M. HADLEY 2,859,744

DOUBLE DOOR CONSTRUCTION AND LATCH MECHANISM

Filed Feb. 18, 1955 2 Sheets-Sheet 1



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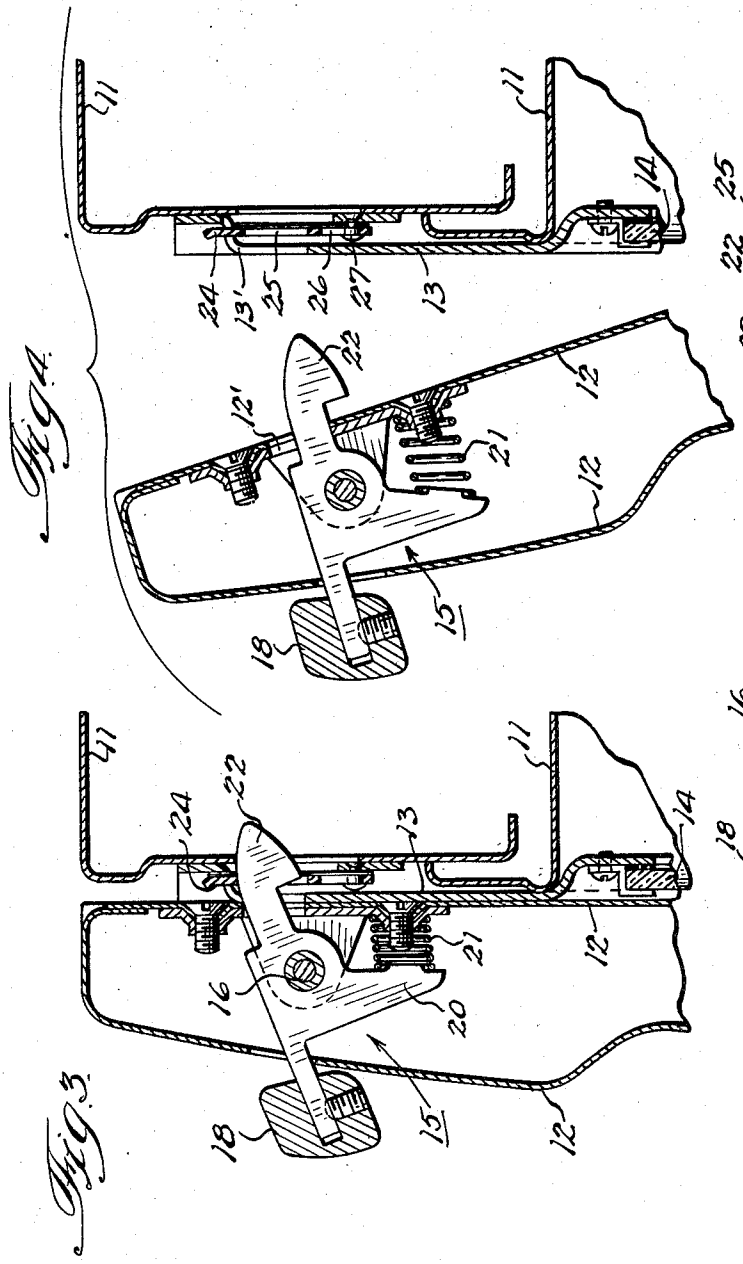


Fig. 4.

Fig. 3.

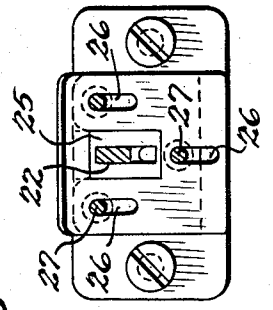


Fig. 6.

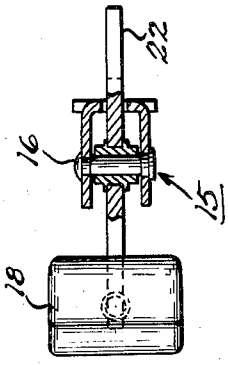


Fig. 5.

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DOUBLE DOOR CONSTRUCTION AND LATCH MECHANISM

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Application February 18, 1955, Serial No. 489,039

6 Claims. (Cl. 126—197)

This invention relates to a double door construction and a latch mechanism therefor and it is an object of this invention to provide improved apparatus of that character.

In various applications it is desirable to provide a double door for an opening in a cabinet. One such application is in the oven door of a stove. In the latter case it has been found difficult to provide a satisfactory glass panel in a single door for an oven. This has resulted in the production of some ovens with double doors, the outer door being solid and the inner door being provided with a glass panel to permit inspection of the interior of the oven without permitting the hot air to escape therefrom.

In accordance with one embodiment of the invention latch means are provided which permit the opening of both the inner and outer door in a single motion and alternatively permit opening of the outer door only, the inner door remaining in closed position. In essence this latch mechanism alternatively secures the inner door to the door frame and to the outer door. When the inner door is secured to the door frame the inner door remains closed when the outer door is opened, and when the inner door is secured to the outer door both doors are, of course, opened simultaneously and with a single movement. By securing the inner door to the door frame when it is desired to open only the outer door, the inner door remains securely and tightly closed without the necessity of its being biased toward closed position.

Accordingly, it is another object of the invention to provide an improved double door construction and latch mechanism therefor which permits alternative latching of the inner door to the door frame and to the outer door.

It is another object of the invention to provide an improved double door construction and latch mechanism therefor which permits selective opening of both doors or of just the outer door, the inner door being secured in closed position when just the outer door is to be opened.

It is another object of the invention to provide an improved latch mechanism for application to a double door system.

It is another object of the invention to provide improved apparatus having the characteristics described above while being simple, reliable, efficient and economical to manufacture.

This invention, together with further objects and advantages thereof, will best be understood by reference to the following description taken in connection with the accompanying drawings, and its scope will be pointed out in the appended claims.

In the drawings, in which like parts are designated by like reference numerals,

Figure 1 is a cross-sectional elevational view of one embodiment of the invention, both doors being closed and the latch mechanism being in its normal position.

Fig. 2 is a similar view showing both doors opened.

Fig. 3 is a view similar to Figure 1 but showing the latch mechanism in its actuated position.

Fig. 4 is a similar view showing only the outer door opened.

Fig. 5 is a plan view of a portion of the latch mechanism shown in Figure 1.

Fig. 6 is a front elevational view of that portion of the latch mechanism which is mounted on the door frame of Figs. 1–4.

Figure 7 is a perspective view of one element of the latch apparatus seen in Fig. 6.

As indicated above, one practical application of apparatus constructed in accordance with the present invention is to ovens where a solid outer door and a glass panelled inner door are frequently employed. It is to be understood, however, that the apparatus constructed in accordance with the present invention may be useful in numerous other applications where double doors are employed.

In the embodiment of the invention disclosed in the drawings, a cabinet, for example an oven **11**, is provided with an outer door **12** and an inner door **13**. The outer door is of a hollow double-walled metal construction while the inner door **13** comprises a single wall having a glass panel **14** forming a part thereof. The purpose of the glass panel **14** is, of course, to permit inspection of the interior of the oven without permitting the escape of hot air therefrom. When the oven door is to be opened to provide access to the interior of the oven, it is desirable that both the inner and outer doors be opened as a unit. On the other hand, if the operator wishes to inspect the interior of the oven, it is desirable that only the outer door be opened and that the inner door be maintained securely and tightly shut. It is the purpose of the latch mechanism, shown in the drawings, to accomplish these functions with a minimum of operation.

The embodiment of the invention disclosed in the drawings includes a latch bolt **15** pivotally mounted through a pin **16** on the outer door **12**. The latch bolt includes an arm **17** extending through a slot in the outer wall of the outer door **12**, a suitable pad **18** being secured to the arm **17** as by the set screw **19**. The pad **18** provides a convenient and comfortable surface for contact by the operator's fingers or thumb.

The latch bolt **15** also includes a downwardly extending arm **20** which engages a coil spring **21**, the latter being in compression between the arm **20** and the inner wall of the outer door **12**. It will be seen that the spring **20** biases the latch bolt **15** in a clockwise direction, as viewed in Figs. 1–4.

Finally, the latch bolt **15** includes an inwardly extending hook **22**, this hook extending through an opening **12'** in the inner wall of the outer door and through an opening **13'** in the inner door.

Mounted on the oven **11** is a latch mechanism **23**. This mechanism includes a sliding latch bolt **24**. As may be seen best in Fig. 6, the sliding latch bolt **24** has an opening **25** therein for receiving the hook **22** of the pivotal latch bolt **15**. The sliding latch bolt **24** also has three slots **26**, through which pass rivets or screws **27**. The fasteners **27** are headed, as seen in Figs. 1–4 whereby they hold the sliding latch bolt **24** securely, but loosely, to the oven. The slots **26** permit vertical sliding movement of the latch bolt, and a spring **28**, best seen in Fig. 7, is arranged between the sliding latch bolt **24** and the oven, whereby the sliding latch bolt is frictionally maintained in either of its two operating positions.

It will be noted in Figs. 1–4 that the inner door **13** is bent near the upper edge thereof and that the opening **13'** therein extends into the short horizontal portion of the inner door produced by this bend. The sliding latch bolt **24** is arranged to slide upwardly through the opening **13'** and engage the fixed keeper element which is the uppermost portion of the inner door **13**, as is readily seen

in Figs. 3 and 4. When the sliding latch bolt **24** is in this position, the inner door **13** is held shut. When the sliding latch bolt **24** is moved to its lower position, as seen in Figs. 1 and 2, it no longer engages the inner door **13**, whereby the latter is free to swing open.

When the hook **22** of the pivotal latch bolt **15** extends through the opening **13'** in the inner door **13** and the pivotal latch bolt is released so that the spring **21** may force the latch bolt in a clockwise direction, the hook **22** is in position to engage the inner door **13**, all as is readily seen in Figs. 1 and 2.

When the hook **22** extends through the opening **13'** in the inner door and is allowed to pivot in a clockwise direction, it also actuates the sliding latch bolt **24**. In Fig. 3 it will be seen that the lowermost portion of the hook **22** is arranged immediately above and is adapted to abut the lower central portion of sliding latch bolt **24**. Accordingly, when the handle **18** of the pivotal latch bolt **15** is released, the spring **21** not only pivots the latch bolt **15** in a clockwise direction to a position to engage the inner door, but also moves the slidable latch bolt downwardly to the position illustrated in Fig. 1 in which it is disengaged from the inner door.

Furthermore, when the pivotal latch bolt **15** is manually moved in a counter-clockwise direction, from the position of Fig. 1 to the position of Fig. 3, disconnecting the outer door from the inner door, the upper edge of the hook **22** engages the upper central portion of the sliding latch bolt **24** and raises it, to secure the inner door to the oven.

Preferably the outer door **12** is biased by sprnigs or by counterweights toward its closed position, as is conventional in oven doors. The inner door **13** requires no biasing since it is always secured to either the outer door **12** or the oven **11**.

The operation of the above-described modification of the invention may best be described starting with the position illustrated in Fig. 1. In this position the sliding latch bolt **24** is in its lower position in which it is disengaged from the inner door **13**. The hook **22** extends through the opening **13'** and is in its lower position in which it is engaged with the inner door. If the outer door is now opened, the inner door will be pulled along with the outer door, as illustrated in Fig. 2. Access is thereby provided to the interior of the oven. When the doors are again closed, the hook **22** moves through the opening **25** in the sliding latch bolt **24** without operation of any parts; all parts are thereby returned to the position of Fig. 1.

If it is now desired to open the outer door and leave the inner door closed, the handle or pad **18** is depressed, pivoting the latch bolt **15** in a counterclockwise direction against the action of the spring **21**. This raises the hook **22** so that it may pass freely through the opening **13'** in the inner door. At the same time the hook **22** moves the sliding latch bolt **24** upwardly so that it passes through the opening **13'** and engages the upper extremity of the inner door **13**, all as previously described and as shown in Fig. 3. Now when the outer door **12** is opened, the hook **22** passes freely past the inner door **13**, and the inner door is maintained securely in closed position by the sliding latch bolt **24**.

During the time that the outed door is open, the operator will logically release the handle **18**, whereby the spring **21** returns the pivotal latch bolt **15** to its normal position as illustrated in Fig. 4. After inspection of the interior of the oven through the glass panel **14** in the inner door **13**, the outer door may be returned manually or by means of a spring **12''** to its closed position without manual operation of the pivotal latch bolt **15**.

In this operation the lower sloping surface of the hook **22** rides upwardly over the edge of the inner door which defines the lower end of the slot **13'**, thereby forcing the pivotal latch bolt **15** to pivot in a counterclockwise direction against the action of the spring **21**. When the lip of the hook **22** passes beyond the inner door **13**, the spring **21** moves the pivotal latch bolt in a clockwise direction, returning it to its normal position. At the same time the hook **22** engages the edge of the sliding latch bolt **24** which defines the lower end of the slot **25** and forces the sliding latch bolt downwardly from the position of Figs. 3 and 4 to the position of Fig. 1. It should be noted that the spring **21** is preferably of sufficient strength to move the pivotal latch bolt in a clockwise direction and to move the sliding latch bolt in a downwardly direction against the frictional effect of the spring **28**.

Preferably a conventional, fixed oven door handle (not shown in the drawings) is provided on the outer surface of the outer door. This handle is preferably placed at the same level or slightly below the handle or pad **18**. With the fixed oven door handle and the movable handle **18** so arranged, the operator can perform any desired operation of the oven doors with one hand. For example, the operator can grasp the fixed handle with his fingers, and if he wishes to depress the handle **18** this can be done with the thumb of the same hand.

In the particular embodiment of the invention illustrated in the drawings and described above, movable latch elements are provided on the outed door and on the oven proper. Since the function of the over-all latch mechanism, and the essence of the present invention, is a double door arrangement and a cooperating latch mechanism which alternatively secures the inner door to either the outer door or the oven, it will readily be apparent that a single movable latch element might be mounted on the inner door and arranged to engage fixed or movable latch elements on the oven and on the outer door alternatively. While such an arrangement is practicable and falls within the scope of the invention, it is not the preferred arrangement, and hence it not described in detail herein.

As previously indicated, the present invention appears to have particular applicability to ovens, since in this application there is an established need of a double-door construction. However, it is to be understood that the invention is in no sense limited to application to ovens, as there are many other applications in which the use of a double-door arrangement might be desired.

While particular embodiments of the invention have been shown, it will be understood, of course, that the invention is not limited thereto since many modifications may be made, and it is, therefore, contemplated to cover by the appended claims any such modifications as fall within the true spirit and scope of the invention.

It will be apparent that the invention may be varied in its physical embodiments without departing from the spirit of the invention.

I claim:

1. In a double door construction for a cabinet comprising an inner door and an outer door, both for closing an opening in said cabinet, said doors being hinged to said cabinet adjacent the lower side of said opening and said outer door being biased toward closed position, an improved latch means for releasably connecting said inner door alternatively to said outer door and to said cabinet, said latch means comprising an element pivotally mounted on said outer door, a fixed keeper element on said inner door, and an element slidably mounted on said cabinet, said pivotable element and said slidable element each being movable between a latching and a released position with respect to said keeper element, said pivotable element being engageable with said slidable element when said doors are closed and being arranged to move said slidable element into said released position when said pivotable element moves into said latching position and to move said slidable element into said latching position when said pivotable element moves into said released position.

2. In a double door construction for a cabinet comprising an inner door and an outer door, both for closing an opening in said cabinet, said doors being hinged to said cabinet adjacent the lower side of said opening and said outer door being biased toward closed position, an improved latch means for releasably connecting said inner door alternatively to said outer door and to said cabinet, said latch means comprising an element pivotally mounted on said outer door, a fixed keeper element on said inner door, and an element slidably mounted on said cabinet, said pivotable element and said slidable element each being movable between a latching and a released position with respect to said keeper element, said pivotable element being engageable with said slidable element when said doors are closed and being arranged to move said slidable element into said released position when said pivotable element moves into said latching position and to move said slidable element into said latching position when said pivotable element moves into said released position, said pivotable element being biased toward said latching position.

3. In a double door construction for a cabinet comprising an inner door and an outer door both for closing and opening in said cabinet, said doors being hinged to said cabinet adjacent the lower side of said opening and said outer door being biased toward closed position, an improved latch means for connecting said inner door alternatively to said outer door and to said cabinet; said latch means comprising a fixed keeper mounted on said inner door, a first element mounted on the outer door and movable into and out of engagement with the keeper, a second element mounted on said cabinet and movable into and out of engagement with said keeper, said first element being engageable with said second element to effect movement thereof to the keeper engaging position, when said first element is moved to its keeper releasing position.

4. In a double door construction for a cabinet comprising an inner door and an outer door both for closing and opening in said cabinet, said doors being hinged to said cabinet adjacent the lower side of said opening and said outer door being biased toward closed position, an improved latch means for connecting said inner door alternatively to said outer door and to said cabinet; a keeper mounted on the inner door, a first element mounted on the outer door and movable into and out of engagement with said keeper, a second element mounted on said cabinet and movable into and out of engagement with said keeper, said first element being movable toward the keeper releasing position and being simultaneously engageable with said second element to effect movement thereof toward the keeper engaging position, spring means urging said first element toward its keeper engaging position.

5. In a double door construction for a cabinet comprising an inner door and an outer door both for closing and opening in said cabinet, said doors being hinged to said cabinet adjacent the lower side of said opening and said outer door being biased toward closed position, an improved latch means for connecting said inner door alternatively to said outer door and to said cabinet; a keeper mounted on the inner door, a first element mounted on the outer door and movable into and out of engagement with said keeper, a second element mounted on said cabinet and movable into and out of engagement with said keeper, said first element being engageable with said second element to effect movement of said second element into its keeper releasing position when said first element is moved to its keeper engaging position and to effect movement of said second element toward its keeper engaging position as said first element is moved toward its keeper releasing position and spring means urging said first element toward its keeper engaging position and thereby adapted to urge said second element toward its keeper releasing position.

6. In a double door construction for a cabinet comprising an inner door and an outer door both for closing and opening in said cabinet, said doors being hinged to said cabinet adjacent the lower side of said opening and said outer door being biased toward closed position, an improved latch means for connecting said inner door alternatively to said outer door and to said cabinet; a keeper mounted on said inner door, an element mounted on said outer door and pivotally movable between a keeper engaging and a keeper releasing position, said element having an inwardly extending hook-like arm for engaging said keeper and a lever-like handle for permitting manual movement of said bolt to its keeper-releasing position, spring means urging said element toward its keeper engaging position, a slidable element mounted on said cabinet and movable between a keeper engaging and a keeper releasing position, said pivotally movable element during movement to its keeper releasing position being adapted to engage said slidable element to effect movement thereof toward its keeper engaging position.

References Cited in the file of this patent

UNITED STATES PATENTS

40,465	Flansburgh	Nov. 3, 1863
192,521	Martin	June 26, 1877
237,827	Day et al.	Feb. 15, 1881
434,893	Scott	Aug. 19, 1890
543,454	Sievers	July 23, 1895
2,122,680	Dart	July 5, 1938
2,243,772	Peltier	May 27, 1941
2,309,049	Curtiss	Jan. 19, 1943