May 26, 1936. J. F. WINN, JR 2,042,084

AUTOMATIC DOOR GUIDING MECHANISM

Filed Feb. 5, 1935 2 Sheets-Sheet 1

Fig. 1.

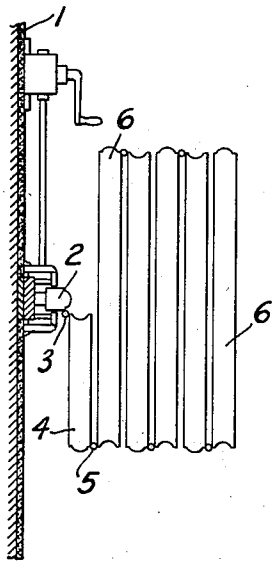


Fig. 2.

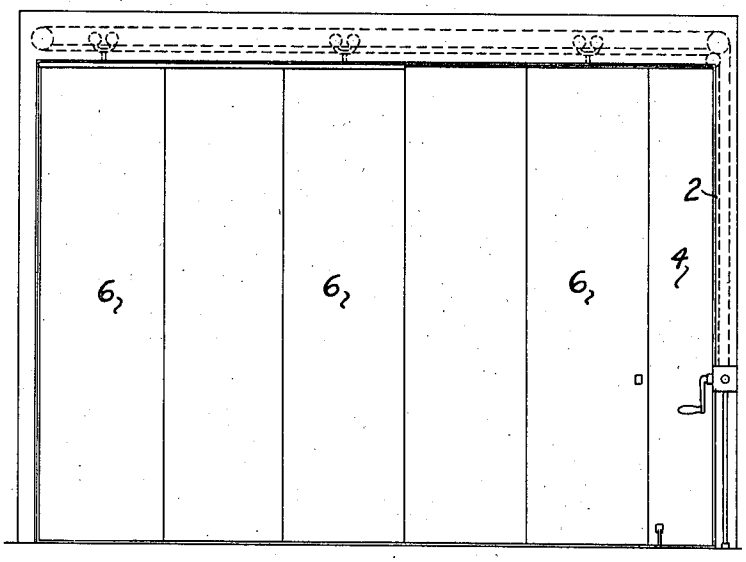


Fig. 3.

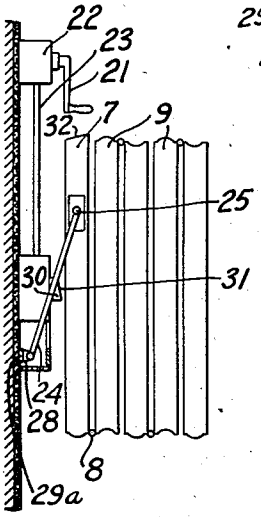
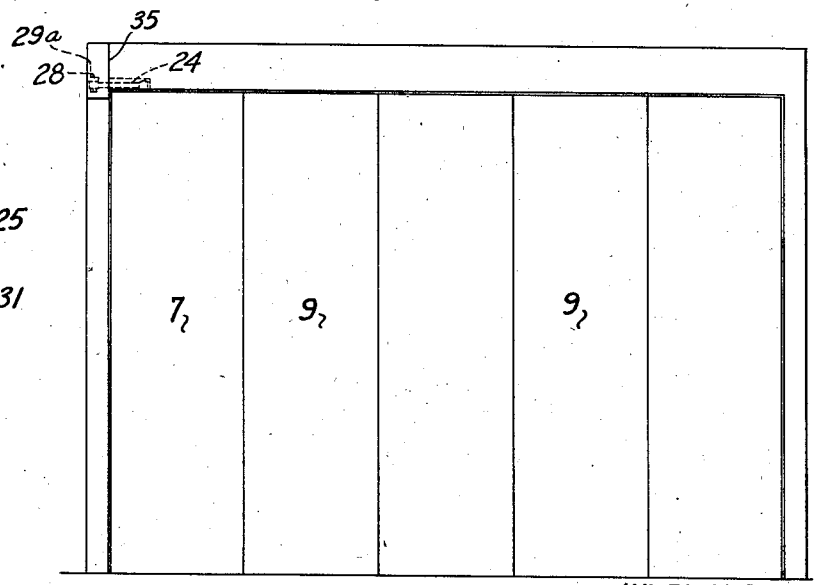


Fig. 4.



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Fig. 5.

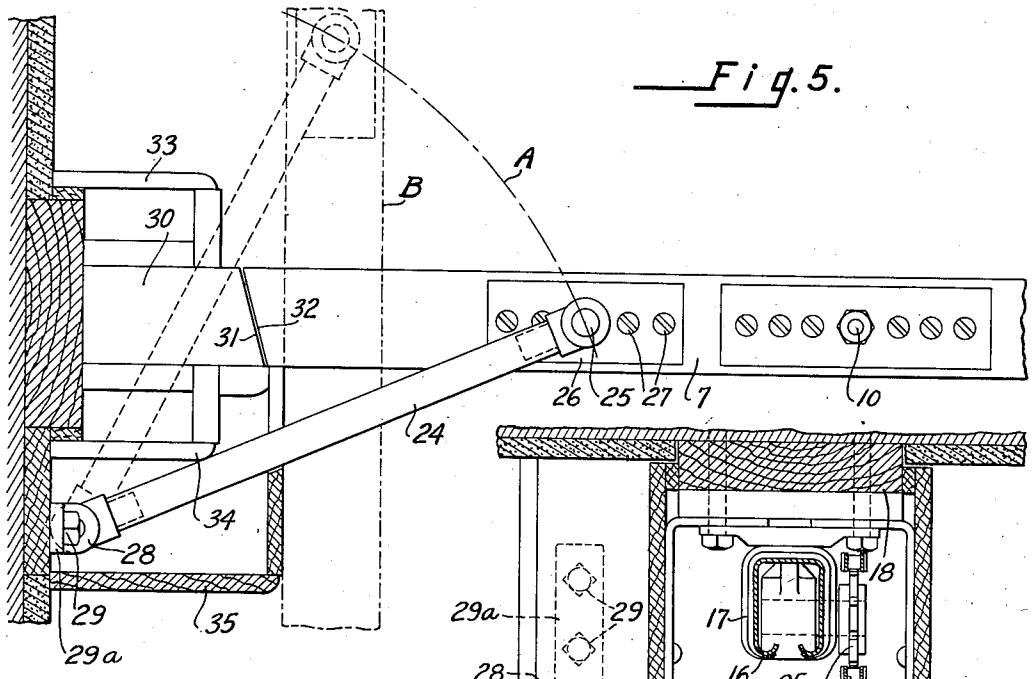


Fig. 7.

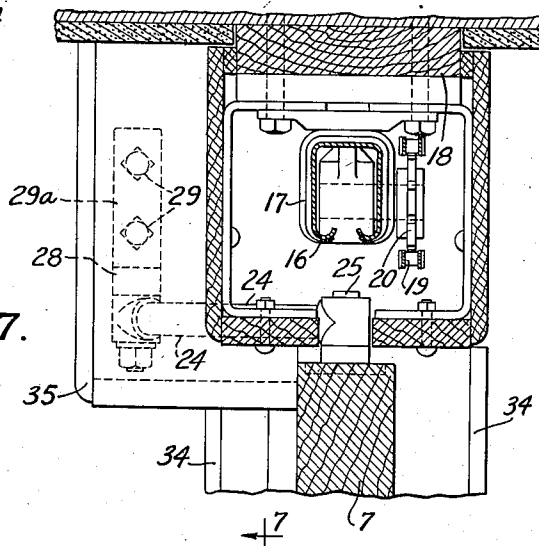
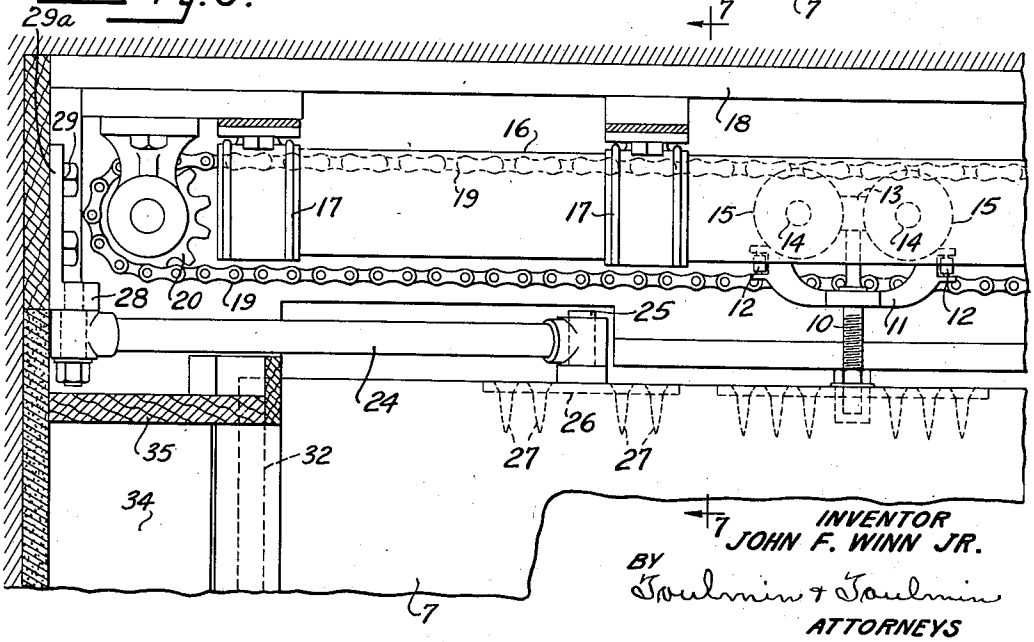


Fig. 6.



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UNITED STATES PATENT OFFICE

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AUTOMATIC DOOR GUIDING MECHANISM

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Application February 5, 1935, Serial No. 5,096

13 Claims. (Cl. 20—20)

My invention relates to swinging doors, and particularly to doors having a plurality of separate leaves hinged to one another on the margins, and adapted when extended to form a complete partition or closure for a door opening.

In particular, it is the object of my invention to provide a means of guiding the door adjacent the door jamb in such a manner that it may be pivotally supported with respect to but not connected with the door jamb so far as the pivotal support is concerned, but in its extended position will engage with the door jamb to form a tight closure. By this arrangement I am enabled to provide a neat, tight closure of the door as a partition in connection with a wall without the use of movable door jamb or door trim members and inclosures.

Heretofore it has been a serious problem, in connection with doors of this character, to provide a means of pivotally supporting the doors, and particularly arranging the doors when in folded position with respect to the door jamb, and of arranging the inner door with respect to the door jamb when the doors are extended because when the inner door was pivoted to the door jamb the doors were thrown to one side of the door jamb when in folded position, or complicated arrangements were necessary with respect to the trim and the door jamb.

It is the object of this invention to provide, in connection with a door or doors suspended from a movable trolley traveling in a suitable track above the door or supported upon a movable caster in a track below the door, an automatic guiding arm which has for its primary object the provision of mechanism for guiding the door and controlling it from a closed position to an open position approximately at an angle of 90 degrees with respect to the original closed position.

It is an object to avoid the use of a half door hinged to the door jamb, where the folding action is desired. The use of the half door necessitates a manual operation to completely close the half door and its adjacent door, and conversely, it is also necessary to manually break or start the folding action at this point.

The present invention has as its object a door-control mechanism which provides means for positively guiding the door from one position to another, such positions being at right angles to one another, and the door is so arranged that a portion of the door width extends to both sides of the original center line position of the door.

It is a further object of this invention to provide means for automatically guiding the first door of a series of hinged doors into an open or folded position in such a manner that all succeeding doors hinged to the first door will fold adjacent the first door, when the partition of doors is moved in a direction toward the folding jamb.

It is a further object to provide means for automatically guiding the first door adjacent the jamb from an open to a closed position when the partition is moved into a closed position.

Referring to the drawings:

Figure 1 is a plan view of a folding door of the prior art.

Figure 2 is a front elevation of the door of the prior art.

Figure 3 is a plan view of the door of this invention.

Figure 4 is a front elevation of the door of this invention.

Figure 5 is a detail plan view of the door of this invention, and its method of guiding and support and its method of alignment with the door jamb.

Figure 6 is an elevation of the guiding mechanism at the top of one of the doors of this invention, showing the method of support of the door. The side frame has been removed to disclose the concealed supporting and guiding mechanism.

Figure 7 is a section on the line 7—7 of Figure 6, showing the top of the door and the trim in section, and showing in elevation, when the door is in closed position, the guiding mechanism.

Prior art

In order that the marked advantages of the present invention may be understood, there has been illustrated in Figures 1 and 2 one of the typical prior-art structures, which represents one of the best advances prior to the present invention.

The wall 1 is provided with a door jamb member 2 to which is hinged at 3 a half door 4. This half door is hinged at 5 to an adjacent full section door leaf 6. Any number of such sections 6 are alternately hinged to one another, as indicated.

In the first place, this door when it is to be opened necessitates manual breaking or partially opening the partition before the doors may be folded by exerting force at a point near the line of hinges between the half door and its adjacent full door. The use of the half door is required to insure the proper folding and unfolding movements of such a partition. The use of the half door necessitates the manual breaking or starting of the folding action. The half door also destroys the symmetry of the partition when closed.

The present invention

The present invention has the advantage of eliminating the half door and substituting a full door. It eliminates the manual operation to fully close or open the partition of doors. It provides a true symmetry of appearance because all doors are of equal width. The guiding arm may be so constructed as to support the weight of the door when used both at the top and bottom. The disadvantages of the movable folding door jamb are eliminated and the complete pivotal connection of the door with the door jamb is eliminated.

Referring to the drawings showing the invention, in Figures 3 to 7, the numeral **7** designates a full door leaf to which is attached at **8** other full door leaves **9**. There may be any number and of the same width. These door leaves are supported at their tops by a trolley upon a track that runs overhead and is concealed in a ceiling trim. This trolley consists of a stem **10** having a yoke **11**, carrying vertical guide rollers **12**. The stem is supported from a carriage **13** having axles **14** and provided with wheels **15** that ride in the track **16**. This track is supported in hangers **17** from the ceiling **18**. The trolley may be actuated in either direction in the track by the chain **19**, which is mounted on the chain sprockets **20**. This chain may be actuated from a suitable source of power, such as by a crank **21**, through the gear box **22** and shaft **23**. This forms no part of the present invention.

The door **7** is guided in its movement by the guide arm **24**, which is pivoted to the top of the door **7** by the pivot pin **25**, that is mounted in the plate **26** fastened to the top of the door by screws **27**. The inner end of the arm **24** is pivoted upon the bracket **28** bolted at **29**, either to the ceiling trim or to the wall. It will be noted that this arm lies above the door and within the ceiling trim box so it is completely concealed. The point of mounting the plate **26** is remote from the edge of the door, and the point of mounting the plate **29a** is remote from the center of the jamb, designated in this case **30**. The jamb **30** is provided with an angular face **31** adapted to engage with a corresponding face **32** on the door **7**. The casing **33** and the casing **34** on either side of the door jamb need not be disturbed. The ceiling trim box **35** is adapted to inclose the plate **29a** and that portion of the arm **24** adjacent thereto.

As indicated in dotted lines in Figure 5, the movement of the door **7** from a position where it is distributed half on one side of the jamb **30** and half on the other side, to the position where it is in line with the door jamb **30**, is an easy movement and when it is effected there is a complete, tight closure between the door jamb, its surrounding trim and the door.

Operation

Thus it will be seen that a full door **7** is provided adjacent the jamb **30** but in no way connected to it. The controlling arm **24** mounted upon the bracket or pintle **28** has its free end pivoted on top of the door at **25**. When pressure is exerted at the edge of the door opposite the jamb this force is transmitted to the arm **24**. Since the arm **24** is pivoted at **28** it cannot move except through an arc with a radius equal to the length of the arm **24**. The angle formed by the position of the arm with the center line of the door causes the pintle point **25** to describe an arc marked A, which carries the portion of the door between the trolley **13** and the jamb **30** to a position shown by B, at right angles to the original position. The arm **24** then assumes the position as shown and the remaining portion of the door width then lies on the opposite side of the original center line, as indicated. The succeeding doors hinged to the door **7**, then assume the position shown in Figure 3.

When the lead door of the partition is pulled outwardly the remaining doors unfold in sequence, and the closing arm **24** guides the last door **7** into a true center-line position with the remaining doors. The force causing the partition to move open or close may be either manual pressure, crank mechanism or motor power.

It will be understood that I desire to comprehend within my invention such modifications as may be embraced within my claims and the scope of my invention.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In combination in a door, of a plurality of equal size door leaves hinged to one another at their alternate edges, means for suspending said doors on their center lines equi-distant from the end of each leaf, whereby when the doors are extended they will be aligned on the center line and when they are folded they will be equally disposed on either side of the center line, and means to guide one of the leaves, said guiding means being pivotally connected to a leaf adjacent one end of the door at a point removed from the edge of the door and pivoted at its other end to an adjacent support disposed to one side of said center line.

2. In combination in a door, of a plurality of equal size door leaves hinged to one another at their alternate edges, means for suspending said doors on their center lines equi-distant from the end of each leaf, whereby when the doors are extended they will be aligned on the center line and when they are folded they will be equally disposed on either side of the center line, and means to guide one of the leaves, said guiding means being pivotally connected to a leaf adjacent one end of the door at a point removed from the edge of the door and pivoted at its other end to an adjacent support disposed to one side of said center line, the points of pivotal support of said guiding means being equally disposed on either side of said center line.

3. In combination in a folding door for use as a partition, a plurality of door leaves of equal width hinged to one another on their edges, means of supporting said doors for guiding the center points thereof on a straight line, and means pivotally connected to an end leaf of the door and to a point laterally spaced from the door jamb to guide its free end into alignment with the line of support of the door.

4. In combination in a folding door for use as a partition, a plurality of door leaves of equal width hinged to one another on their edges, means of supporting said doors for guiding the center points thereof on a straight line, means pivotally connected to an end leaf of the door and to a support spaced laterally of said line to guide its free end into alignment with the line of support of the door, and a door jamb independent of said folding door but engageable by the free end of the leaf adjacent thereto whereby a tight joint is formed therebetween when the door is closed.

5. In combination in a folding door for use as a partition, a plurality of door leaves of equal width hinged to one another on their edges, means of supporting said doors for guiding the center points thereof on a straight line, means pivotally connected to an end leaf of the door and to a point spaced laterally of said line to guide its free end into alignment with the line of support of the door, and a door jamb independent of said folding door but engageable by the free end of the leaf adjacent thereto, said door jamb being located in line with the plane of the doors when in their open position and half-way between the ends of the door and of the door leaves when in their folded position.

6. In combination, a plurality of door leaves hinged to one another on their edges, means to pivotally support said doors, and means to guide one of the end leaves of the doors with respect to a wall comprising a lever pivoted to the end leaf at one end and to the wall at the other end at a point laterally spaced from the line defined by the door when in closed position.

7. In combination, a plurality of door leaves hinged to one another on their edges, means to pivotally support said doors, and means to guide one of the end leaves of the doors with respect to a wall comprising a lever pivoted to the end leaf at one end and to the wall at the other end, said pivotal points being disposed when the door is in open position substantially equally on either side of the line defined by the door when in closed position.

8. In combination, a plurality of door leaves hinged to one another on their edges, means to pivotally support said doors, and means to guide one of the end leaves of the doors with respect to a wall comprising a lever pivoted to the end leaf at one end and to the wall at the other end, said pivotal points being disposed at a point remote from the edge of the door leaf and a point on the wall remote from the door jamb.

9. In combination, a plurality of door leaves hinged to one another on their edges, means to pivotally support said doors, means to guide one of the end leaves of the doors with respect to a wall comprising a lever pivoted to the end leaf at one end and to the wall at the other end, said pivotal points being disposed at a point remote from the edge of the door leaf and a point remote from the door jamb, and a door jamb having a tapered face and said door leaf having a correspondingly tapered face for engagement therewith when the door is closed.

10. In combination, a plurality of equal size door leaves, means to move said door leaves longitudinally and to support them for longitudinal and pivotal movements, and means to pivotally connect an end leaf of the door to a point adjacent the position of the door when open and laterally spaced from the plane of the leaf when closed, said door leaves being so arranged that when they are in their folded position they will be equally disposed on either side of the line they occupy when in their open position.

11. In combination, a door, a track, a trolley connected to the door mounted on the track, and a lever pivoted to the top of the door between the door top and the track and also pivoted to a support adjacent the free edge of the door but laterally disposed with respect to the door when it is closed.

12. In combination, a door, a track, a trolley connected to the door mounted on the track, a lever pivoted to the top of the door between the door top and the track and also pivoted to a support adjacent the free edge of the door but laterally disposed with respect to the door when it is closed, and a door jamb for limiting the movements of the door when it moves to its closed position.

13. In a door structure including a wall having a fixed jamb thereon and a plurality of hingedly connected leaves of equal width, one of which is adapted to cooperate, when closed, with said jamb to form a tight joint therewith, means for pivotally supporting and guiding said leaf comprising a lever pivoted at one end to the leaf at a point removed from the jamb-engaging side thereof, and pivoted at the other end to the wall independently of said jamb and at a point spaced therefrom.

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