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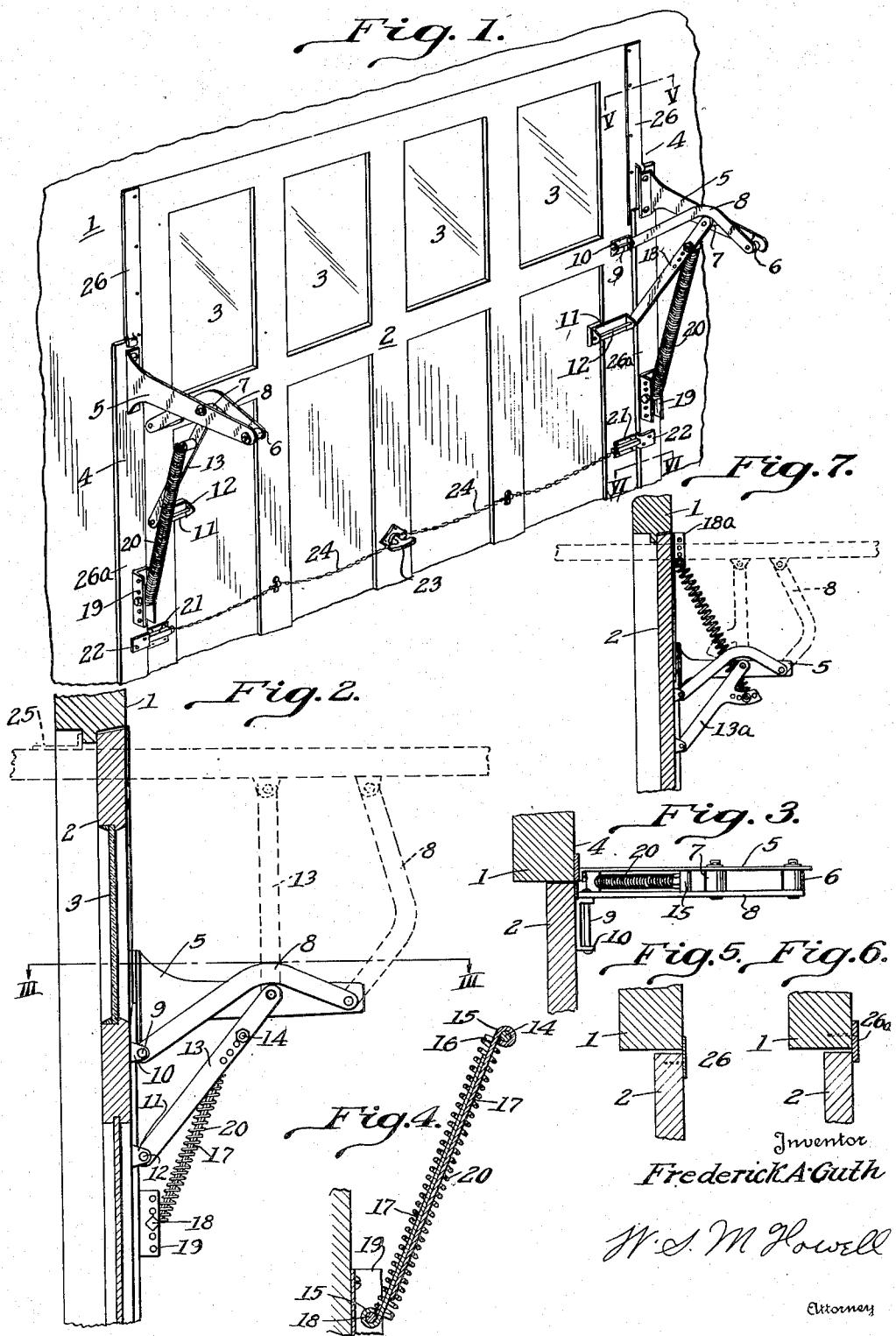
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SWINGING CLOSURE MOUNTING

Filed April 21, 1937

2 Sheets-Sheet 1



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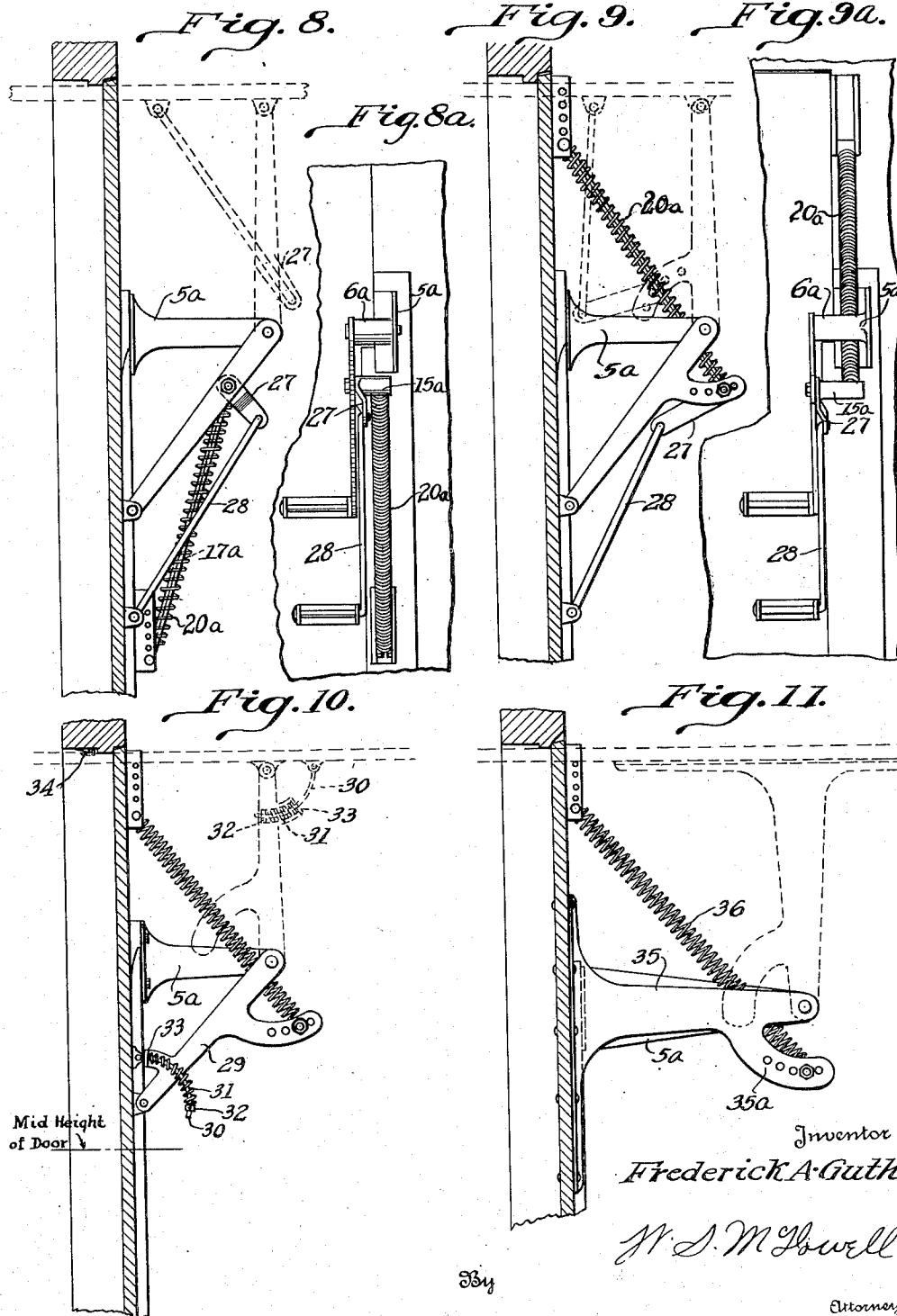
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UNITED STATES PATENT OFFICE

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SWINGING CLOSURE MOUNTING

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10 Claims. (Cl. 20—16)

This invention relates to hinge mountings for swinging doors of the type used in connection with garages, shops, airplane hangars and similar structures.

5 The primary object of the invention is the provision of a hinge mounting which will permit the door to be opened to an overhead position without the use of trackways and other associated hardware.

10 Another object of this invention is the provision of hinge mountings which will support a one piece door in such a manner that it may be caused to assume a horizontal position at the head of a doorway with the minimum amount of effort on the part of the operator.

15 A further object resides in the employment of springs to furnish power to counterbalance the weight of the door in all of its positions of movement.

20 A still further object of the invention is the employment of a pair of levers at each side of the door, one lever of each pair being a power lever and the other levers being controlling levers.

25 Further objects will be apparent from the following description taken in connection with the accompanying drawings in which:

Fig. 1 is a perspective view of the inside of a door provided with the hinge mechanism constructed in accordance with the present invention;

30 Fig. 2 is a vertical sectional view through the upper portion of the door in a closed position, the open position of the hinge levers and the door being indicated by dotted lines;

35 Fig. 3 is a horizontal sectional view through one side of the door and its associated frame, the plane of the section being indicated by the broken line III—III of Fig. 2;

40 Fig. 4 is a longitudinal section taken through one of the springs and the mounting therefor used in connection with the hinge mechanism;

Fig. 5 is a detail horizontal section taken on the plane indicated by the line V—V of Fig. 1;

45 Fig. 6 is a similar view on the plane indicated by the line VI—VI of Fig. 1;

Fig. 7 is a vertical section through a door provided with the hinge mechanism and shows the use of a tension spring to counterbalance the weight of the door.

50 Fig. 8 is a similar view of a door employing a modified type of hinge mounting;

Fig. 8a is a rear elevation of the hinge mounting shown in Fig. 8;

55 Fig. 9 illustrates the use of a tension spring with the type of hinge mounting shown in Fig. 8;

Fig. 9a is a rear elevation of the mechanism shown in Fig. 9;

Figs. 10 and 11 are vertical sections showing modified types of hinge mountings.

Referring more particularly to the drawings, the preferred form of the invention has been illustrated in Figs. 1 to 7 inclusive. In the drawings, the numeral 1 designates the framework of the building surrounding the opening which is adapted to be closed by the one piece door 2. The door 2 may be of solid construction or, as illustrated, may be provided with light transmitting panels 3.

To provide for the support of the door 2, the side members 4 of the frame intermediate of their height have secured thereto bracket members 5 which extend into the building and have their inner ends equipped with bearings 6. Intermediate of its length, each bracket member is also provided with a bearing 7. At the bearing 6, each bracket member has pivoted thereto the inner end of a control lever 8 which at its outer end is pivotally united with the door 2 by means of a pin 9 passing through out-turned ears on a fulcrum plate 10. The control levers 8 are bent intermediate their ends to clear the bearings 7 when the door is in a closed position.

A second set of fulcrum plates 11 is secured to the door at a point below the plates 10 and the plates 11 have pivoted thereto by means of pins 12, the lower ends of a pair of power levers 13. The levers 13 are pivotally secured to the bracket members 5 at the bearings 7. At a point adjacent the upper end of the lever 13 is secured a stud 14 about which is pivoted the socketed end 35 of a spring support 15. The support 15 includes an abutment 16 and a prong 17 which slides against a similar portion of an inverted spring support pivoted in connection with the door frame by a pin 18 passing through a channel shaped member 19 carried by the door frame. The channel members 18 and the power levers 13 are provided with a plurality of holes for the reception of the pin 18 and the stud 14 in order to vary the resisting force of compression type 45 coil springs 20 which surround the prongs 17 of the spring supporting members.

The door and its frame may be provided with cooperating locks and plates 21 and 22 to act to hold the former in its position of closure. A central actuating handle 23 is carried by the door and is connected to the sliding bolts of the locks 21 by means of flexible chains 24. The actuating handle, if desired, may be provided with an extension which extends through the door to enable 55

the operator to actuate the locks from the exterior of the building.

In the operation of opening the door, the locks are unlatched and the lower end of the door moved outwardly, this motion causes the door to swing about the bearings 6 and 7, the upper portion of the door swinging into the building. As the movement of the door continues, the lower end will swing upward until the door assumes a horizontal position at the top of the doorway. As indicated by the dotted lines in Fig. 2, an angle plate 25 carried by the outer side of the door will engage the frame to prevent continued inward movement of the door. The weight of the door is counterbalanced by the springs 28 so that a minimum amount of effort on the part of the operator is required. As the door is closed, the springs are compressed to assist in raising the door on the next operation. When the door approaches its vertical position, the stud which supports the upper end of the spring, is almost positioned in a plane passing through the pivot 7 and the lower spring supporting pin 18. This provides for a reduced amount of compression of the springs and permits the weight of the door to hold it in a closed position. When the door is opened the lower end is moved outward to swing the stud away from the above mentioned plane enough to permit the compressed spring to operate.

The prongs 17 positioned within the coil springs 28 prevent the latter from flexing out of place when they are compressed.

As illustrated in Figs. 5 and 6, both the door and frame are provided with trim strips 26 and 26a to close the cracks around the door. At the lower portion of the door below the brackets 5, the trim strip 26a will be secured to the frame while above this point, the strip 26 will be secured to the door because at this point, the doorway must be fully as wide as the widest part of the door to permit the same to move therethrough.

When it is desired to employ tension type of coil springs, the channel members 18a must be positioned at a point on the frame adjacent the top of the doorway as illustrated in Fig. 7. It is also necessary when using this type of spring to form the power lever 13a with a lateral extension to receive the spring supporting stud in order to have the stud positioned as close to a plane passing through the upper end of the spring and the pivot for the power lever as possible.

In the form of invention illustrated in Figs. 8 to 9a inclusive, the bracket member 5a is provided with only a single bearing 6a. The power lever is connected at one end with the bracket at the bearing 6a and with the door at its other end. As in the preferred form of the invention, use is made of power springs 20a and spring supports 15a. At the point of attachment of the spring support 15a to the power lever, the former is provided with a short, laterally extending, rigidly attached plate 27 to the outer end of which is connected a control link 28. The link 28 is also connected at its lower end with the door at a point below where the power lever connects. When the door is moved to an open position, as shown by dotted lines on Fig. 8, downward movement of the outer end of the door will be precluded because the prong 11a, rigidly carried by the spring support 15a, is positioned inside the spring 20a and will prevent any change of position on the part of the plate 27.

The use of this type of hinge mounting with tension springs is illustrated in Figs. 9 and 9a.

In this form, as in the form shown in Fig. 7, the power lever is formed with a lateral extension to which the spring supporting stud is attached. This mounting places the spring as close to the pivot on the bracket as possible to permit the weight of the door to hold the same in a closed position.

In Figs. 10 and 11, use is made of a bracket having a single pivot and a single lever connecting the pivot of the bracket with the door. In Fig. 10, one end of the lever 29 is connected with the bracket while the other end is pivoted to the door. Above the point of connection of the lever with the door, the latter is provided with an arcuate bar 30 around which is positioned a compression coil spring 31. A collar 32 secured to the free end of the bar 30 prevents the spring from being displaced and causes it to press against a flange 33 formed on the lever and through which the bar 30 passes. When the door is moved to an open position, the lever 29 assumes a perpendicular position thereto which causes the flange 33 to compress the spring 31. The force of the spring will then tend to turn the door about the upper end of the lever which will result in holding the outer end in an elevated position. If desired, the top of the door frame may be provided with lock keepers 34 which cooperate with angle plates secured to the outer side of the door to assist in holding the door in an open position.

In Fig. 11, the lever 35 is pivoted at one end to the stationary bracket and at the other end is formed with a large flange which is rigidly secured to the door. A lateral extension 35a on the lever 35 carries a stud to which one end of a tension spring 36 connects. The spring is connected at its other end to a channel bar secured to the door frame adjacent the top of the door. When the door is swung to an open position, it pivots about the center of attachment of the lever 35 with the bracket. The spring assists in raising the door and holding the same in an open position.

In this form of the invention, as in each of the forms shown and described, when the door is closed the spring lies in a position close to a plane passing through the pivoted point of the power lever and the point of attachment of the spring to the door frame. This renders the force of the spring inactive until the lower end of the door is moved outward when the door is being opened.

While I have shown and described several modifications of my invention, nevertheless, it will be understood that further changes may be made in the construction thereof without departing from the spirit and scope of the invention as set forth in the following claims.

What is claimed is:

1. A hinge mechanism for a door comprising a bracket member formed for attachment to the door frame, bearing means provided upon said bracket member, a power lever pivoted at one end to said bracket member and to the door at the other end, spring means pivotally connected at one end to the door frame in spaced relation to said bracket member and at the other end to said power lever adjacent its pivotal connection with said bracket, and a control link pivotally connected with said door and said bracket.

2. A hinge mechanism for a door comprising a bracket member formed for attachment to the door frame, bearing means provided upon said bracket member adjacent the outer end thereof,

5 a power lever pivoted at one end to said bracket member and at the other end to the door, spring means pivotally connected at one end to the door frame and to the power lever at the other end to exert an upward force thereon, and resilient means between said power lever and said door for resisting pivotal movement of the latter about the connection of the former therewith when said door is in an open position.

10 3. A hinge mechanism for a door comprising a bracket member formed for attachment to the door frame, bearing means provided upon said bracket member adjacent the outer end thereof, a power lever pivotally connected to said door and bracket member, said lever being provided with a lateral extension and a perforated lug, spring means secured at one end to the door frame and at the other to said lever extension, an arcuate rod secured to said door and projecting through said perforated lug, and a second spring surrounding said rod and pressing against the lug on said lever.

15 4. A hinge mechanism for a door comprising a bracket member formed for attachment to the door frame, bearing means provided upon said bracket member adjacent its outer end, a power lever pivoted to said bracket and to said door at a point below the horizontal plane of the bearing on said bracket, spring means secured at one end to the door frame and at the other end to said power lever at a point near its connection with the bracket, a plate pivoted to said power lever adjacent its connection with said spring, means carried in connection with said plate and cooperating with said spring means to resist change 20 of position of said plate, and a control link connecting the free end of said plate with said door.

25 5. A hinge mechanism for a door comprising a bracket member formed for attachment to a wall structure, bearing means provided upon said bracket member, a power lever pivoted to said bracket and to said door at a point below the horizontal level of said bearing, spring means secured at one end to said door frame and at the other end to said power lever adjacent its connection with said bracket, and a control lever pivoted to said bracket and to said door at a point above the connection of said power lever.

30 6. A hinge mechanism comprising a bracket member formed for attachment to a wall surface, a plurality of bearings provided upon said bracket, a power lever pivoted at one end to said bracket at the innermost bearing, the other end 35 of said lever being pivoted to said door at a point below the horizontal level of said bearing, a pivot stud secured to said power lever adjacent its connection with said bracket, a spring supporting member pivoted upon said stud, said supporting member being formed with a longitudinally

extending prong, a second similarly shaped supporting member pivoted in connection with the door frame in registration with said first mentioned supporting member, a compression type coil spring carried by said supporting members 5 and surrounding said prongs, and a control lever pivoted to said bracket at the outermost bearing and to the door at a point above the connection of said power lever.

7. A hinge mechanism comprising a bracket 10 member formed for attachment to a wall surface, a pair of horizontally spaced bearings provided upon said bracket, a power lever pivoted at one end to the bracket member at the innermost bearing and at the other end to a door at a point 15 below the horizontal level of said bearings, a compression spring secured at its lower end to the frame for said door below the point of connection of the power lever with said door, said spring being connected at its upper end with said 20 power lever at a point intermediate its ends, means provided in connection with said spring to prevent its buckling, and a control lever pivoted to the bracket at the outermost bearing and to the door at a point below the horizontal level of 25 said bearings and at a point above the connection of said power lever with said door.

8. In supporting means for trackless overhead type doors, a bracket attachable to a door frame, a power lever having one end pivotally secured 30 to the door frame and the other end secured to the door, and spring means pivotally connected at one end to the door frame in spaced relation from said bracket and at the opposite end to the power lever adjacent to its pivotal connection 35 with said bracket.

9. A hinge mounting for a door comprising a bracket member formed for attachment to a wall structure, a power lever pivoted to said bracket and to the door at a point below said bracket, 40 spring means secured at one end to the door frame and at the other end to said power lever adjacent its connection with said bracket, and a control lever pivoted at one end to said door above the connection of said power lever and at 45 the other end to said bracket at a point spaced a greater distance from the door than the pivot for said power lever.

10. A hinge mounting for a door comprising a bracket member formed for attachment to the 50 door frame, a power lever pivoted to said bracket and to the door at a point below the horizontal level of said bracket, a compression spring connected at one end to said power lever adjacent the point of connection with said bracket and 55 at the other end to the door frame, means for preventing buckling on the part of said spring, and a control lever connected at one end to said door and at the other end to said bracket.

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