

Sept. 15, 1942.

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2,296,144

HINGE ASSEMBLY

Filed Jan. 10, 1942

2 Sheets-Sheet 1

Fig. 1.

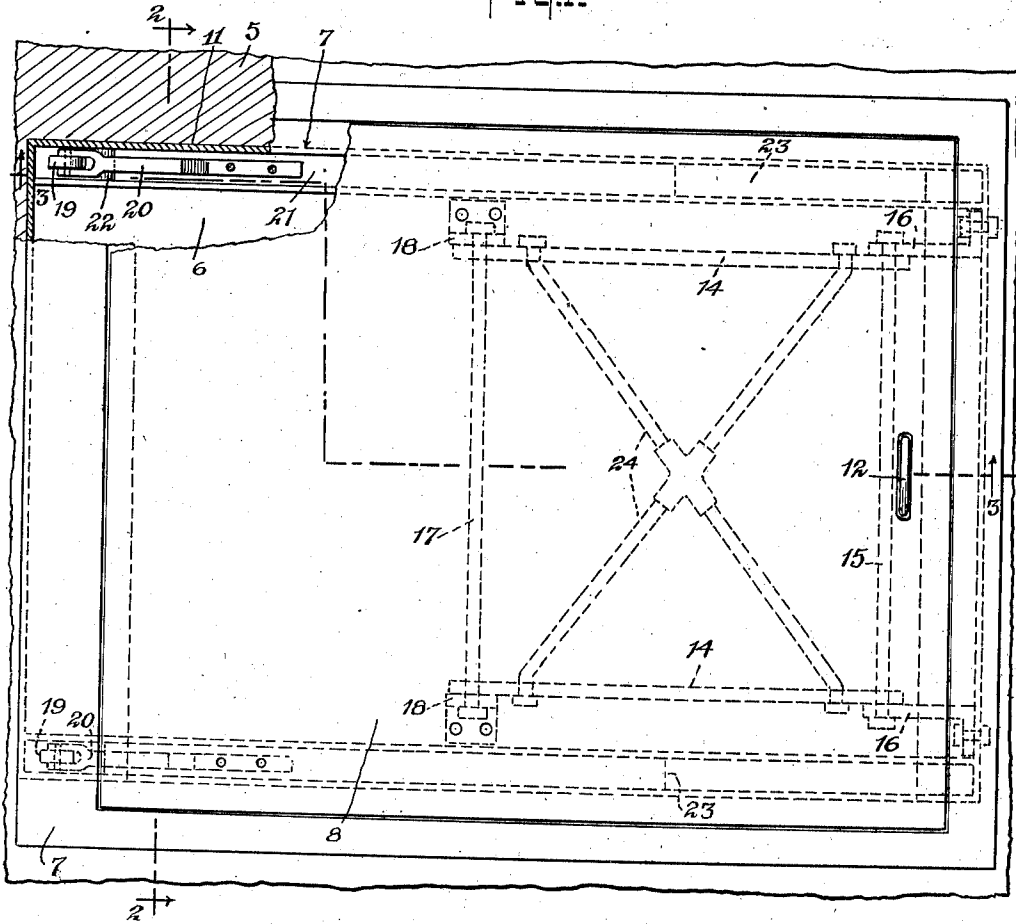
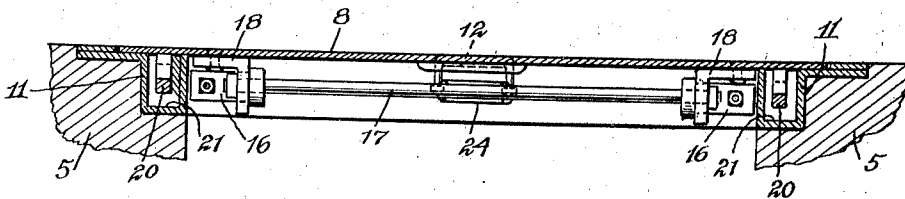


Fig. 2.



WITNESSES

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2 Sheets-Sheet 2

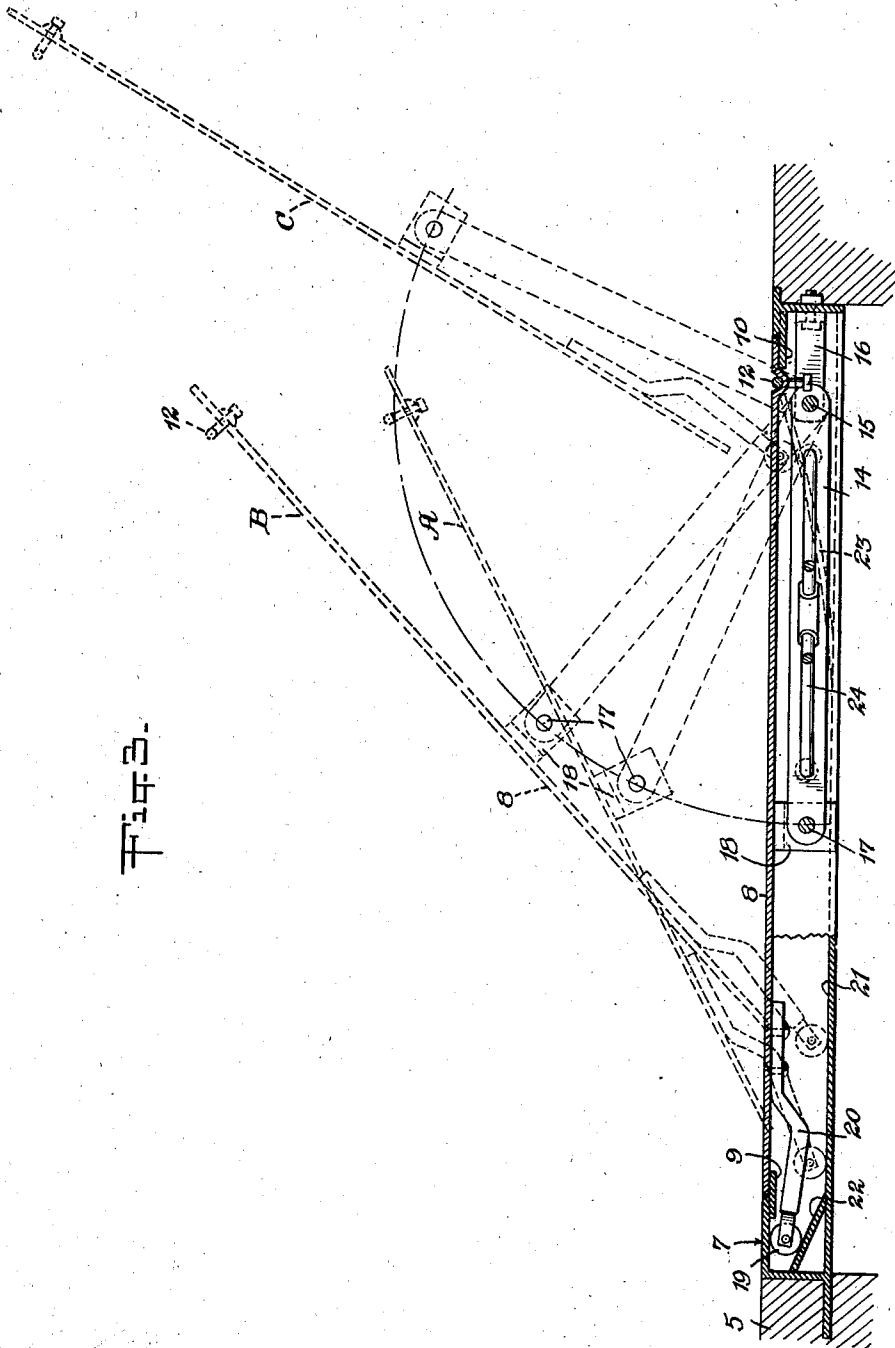


FIG. 3.

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HINGE ASSEMBLY

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3 Claims. (Cl. 94—36)

This invention relates to an improved hinge assembly.

It is an object of the present invention to provide an improved hinge assembly which may be used in connection with any type of device or structure, such as a door, window, cover, panel, ladders, stairs, grills, chutes, fixtures, base members, supports or the like, which it is desired to hingedly connect to another device. My hinge assembly may also be used to support any object so that it can be moved from a concealed position to an operative position and also for supporting machinery and equipment in a manner that it can be readily moved between horizontal and vertical positions.

A further object is the provision of a hinge assembly which may be used with a door or a slab in such a manner that all of the mechanism thereof is concealed on the undersurface of the door or slab whereby the outer surface of the door or slab may be flush with the surrounding support, and at the same time a minimum amount of clearance is required between the door or slab and the opening.

Another object is the provision of an improved hinge assembly which readily lends itself to the use of springs or counterweights for counterbalancing the weight of the door or other device supported by the hinge assembly thereby facilitating the movement of the door against the force of gravity and cushioning the movement of the door in the other direction.

A further object is the provision of an improved hinge assembly which is so arranged and constructed as to minimize the force required to open or close a door, window, cover, panel, or the like connected to the hinge assembly.

Another object is the provision of an improved hinge assembly of relatively simple inexpensive but, nevertheless, rugged construction, which will operate over a long period of time with comparative freedom from wear.

Other objects will be apparent from the following detailed description of the drawings, in which—

Fig. 1 is a top plan view, partially fragmentary, of a door having a hinge assembly embodying my invention;

Fig. 2 is a cross-sectional view in the direction of the arrows on the line 2—2 of Fig. 1; and

Fig. 3 is a longitudinal sectional view in the direction of the arrows on the line 3—3 of Fig. 1.

For the sake of convenience, in the accompanying drawings I have illustrated my improved hinge assembly in association with a door, such

as a side walk door. However, as previously stated, it should be understood that I do not intend to limit my invention to a hinge assembly for a door, and my invention is equally applicable to windows, cover members, panels, or other devices which are hingedly connected to a support.

In the accompanying drawings the supporting structure is indicated by the numeral 5, and it is formed with an aperture 6 around which I provide a frame structure, indicated generally as 7, which is suitably embedded in, or mounted on, the supporting structure, as shown. A door or cover 8, which is adapted to close the aperture 6, rests upon the ledges 9 and 10 at the two ends of the frame and upon the channel bars 11 on the two sides of the frame when in closed position. A suitable handle 12 may be provided whereby the door or cover may be readily opened and closed.

It should be understood that the door and supporting structure described above is merely intended as illustrative of one type of device to which my hinge assembly may be applied, and I do not intend that my invention should be limited to this specific structure.

Applied to the door or cover is my improved hinge assembly whereby the door may be shifted in a predetermined path between open and closed positions with a minimum of effort or force. My hinge assembly comprises generally a member pivotally connected at one point to the supporting structure and at another point to an intermediate portion of the undersurface of the door or cover. Adjacent one end of the door or cover, and on the supporting structure, I also may provide interengaging guide means. Due to this arrangement, the door or cover is caused to shift through a predetermined path between open and closed positions with a minimum of effort or force.

The specific arrangement shown in the accompanying drawings comprises a pair of links 14 pivotally connected at one end as by means of shaft 15 to a pair of brackets 16 which project inwardly from the one end of the frame member, and are fixedly mounted thereon. The brackets 16 preferably project outwardly beyond the end of ledge 10 so as to permit the door and links 14 as assume the position shown in dotted lines at C in Fig. 3. The outer end of links 14 are pivotally connected as by means of shaft 17 to a pair of brackets 18 projecting downwardly from the undersurface of the door or cover 8 at a point intermediate the two ends. In this

connection the brackets 18 are preferably connected to the door or cover at the center or at a point between the center and the left hand end, as viewed in Figs. 1 and 3. This arrangement permits the door, cover or other device to be opened to a maximum degree, as shown in dotted lines at C in Fig. 3. The links may be suitably braced and reinforced by the cross arms 24, as shown.

Due to the linked connection between the support and the door or cover, the portion of the door or cover which is connected to the links is caused to move through a predetermined path in the form of an arc, as shown in Fig. 3, when it is shifted between open and closed positions.

In order to guide the movement of the remainder of the door or cover, I may provide guide means on another portion thereof which are adapted to interengage with guide means on the supporting structure. The guide means are preferably located on the end of the door or cover opposite to the brackets 16, and in the present instance, they take the form of a pair of rollers 19, supported on the arms 20 which, in turn, are connected to the undersurface of the door or cover adjacent the two sides thereof and project beyond the ends, in the manner shown. The rollers ride in suitable guideways formed in the supporting structure which, in the present instance, take the form of the channels 21 in the channel bars 11 extending for substantially the full length of the opening 6.

To facilitate the opening of the door and to bring the center of radius for the end of the door nearer to the surface, I may provide the angularly disposed guide tracks 22 at the left hand of the guide channels, as shown in Fig. 3. These guide tracks slant downwardly from the end of the guide channel so that the force of gravity pulling downwardly on the left hand of the door or cover and on the rollers will help to initiate the opening of the door or cover. Similarly, at the right hand end of the guide channels, as viewed in Figs. 1 and 3, I may also provide angularly or arcuately disposed guide tracks 23 on which the rollers 19 ride when the door approaches fully open position. It will be seen that the guide tracks 23 help in the closing movement of the door.

In opening the door, the handle 12 is grasped and pulled upwardly with the result that the portion of the door which is connected to the end of the links 14 begins to move through the arc indicated in dotted lines in Fig. 3, and the guide rollers 19 begin to roll downwardly on the angularly disposed guide tracks 22 which, as stated above, help to initiate the opening movement. The rollers 19 and tracks 22, in conjunction with the links 14, serve not only to guide the door, but also to sustain the weight of the door in its movement to open and closed position and while

disposed in the open position. The door and hinge assembly pass through the successive stages indicated in dotted lines in Fig. 3, at A and B, until the fully open position, indicated at C, is reached. When it is desired to close the door, it is simply moved in a reverse direction and, as previously stated, the angularly disposed guide tracks 23 help to initiate the closing movement.

When in open position, the door is retained in the position indicated in dotted lines at C in Fig. 3, due to the fact that the arms 20 and guide rollers 19 are of sufficient weight to counter-weight, or counter-balance the opposite end of the door. An additional counter-weight may be applied to the left hand end of the door, as viewed in Figs. 1 and 3, if desired, and in certain instances, springs may be employed to retain the door in the indicated position when open.

It will thus be seen that I have provided an improved hinge assembly of relatively simple, inexpensive, but, nevertheless, rugged construction, and that the hinge assembly may be used in connection with doors, windows, covers, panels, or the like, so that they may be shifted in predetermined paths between open and closed positions, with the expenditure of a minimum amount of effort or force.

It should be understood that the hinge assembly may be used in connection with other types of doors, mounted in vertical, horizontal, or any desired positions, and may be employed in connection with entirely different types of construction, such as windows, covers, shiftable panels, or the like.

It will also be appreciated that, while I have shown one illustrative embodiment of my invention, that many modifications may be made therein without departing from the invention as set forth in the accompanying claims.

I claim:

1. The combination with a movable closure member, of guide means adjacent one end of the movable member, and a fixed guide track extending substantially the entire length of the opening controlled by said closure member, said track being cooperable with said guide means in the movement of the closure member to open and closed position, said track having an angularly disposed end portion to help initiate the movement of the closure member.

2. The combination as set forth in claim 1, wherein said angularly disposed end portion is at each end of the track to help initiate the movement of the closure member toward its open and closed position.

3. The combination as set forth in claim 1, wherein said guide means consists of arms on said closure member and rollers on said arms respectively which roll in contact with said track and angularly disposed end portion.

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