July 2, 1940. W. W. STUMPF 2,206,708

HINGE

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Fig. 2.

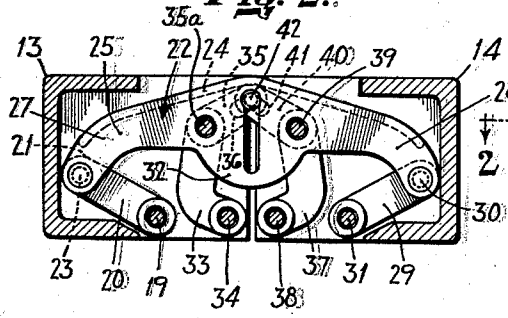


Fig. 1.

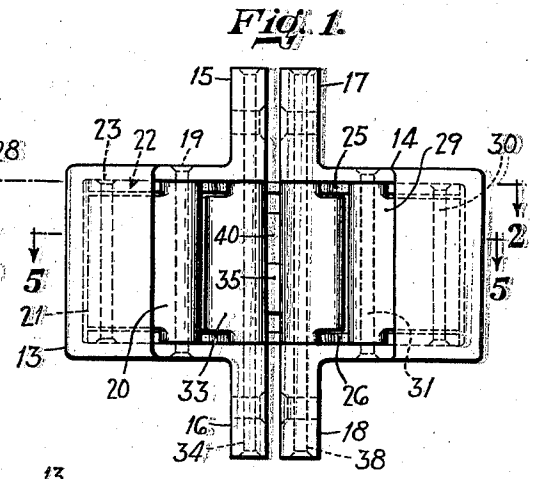
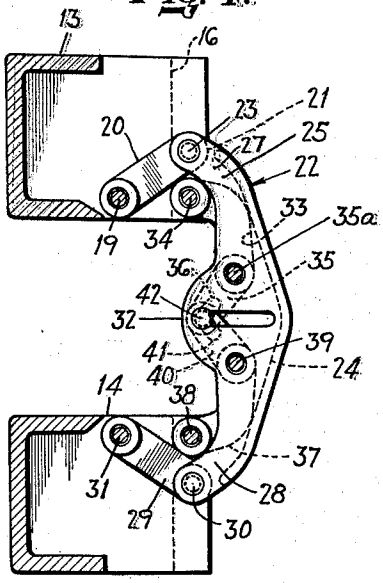


Fig. 4.



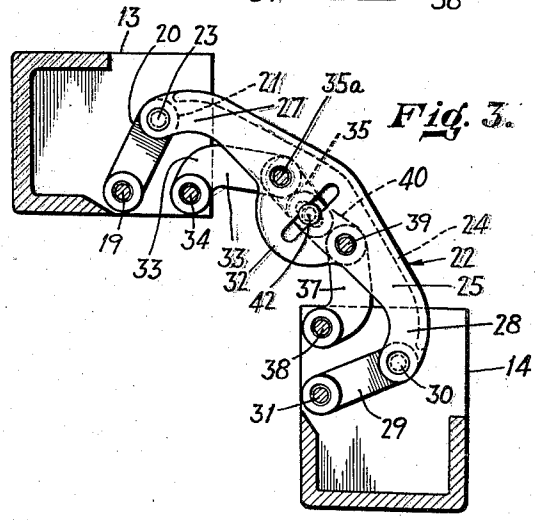


Fig. 3.

Fig. 6.

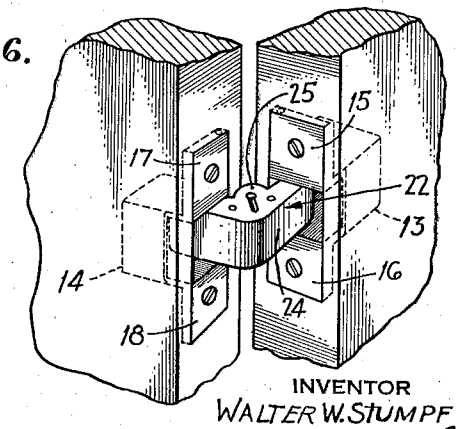
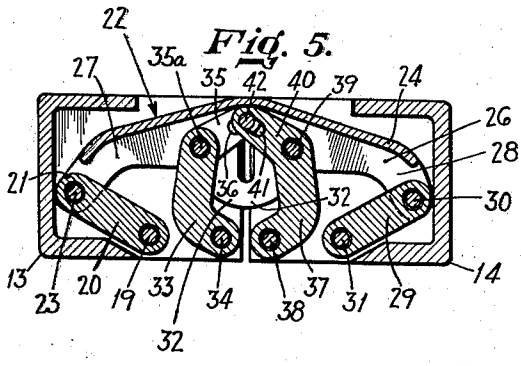


Fig. 5.



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Fig. 7.

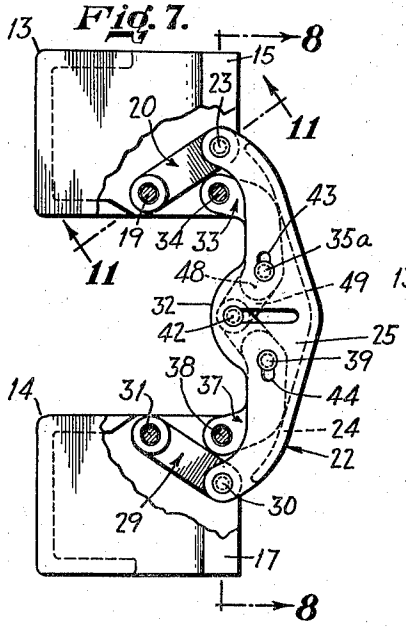


Fig. 8.

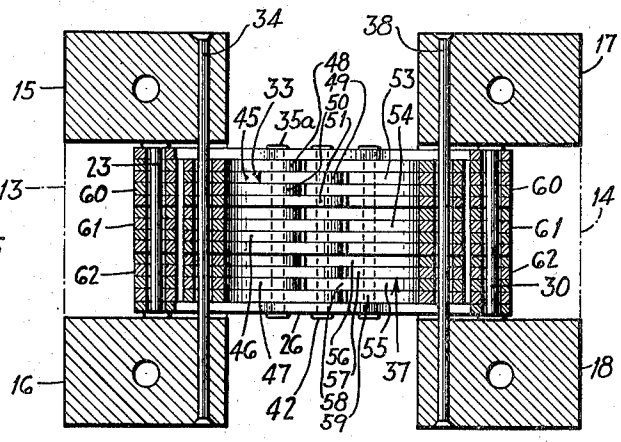


Fig. 9.

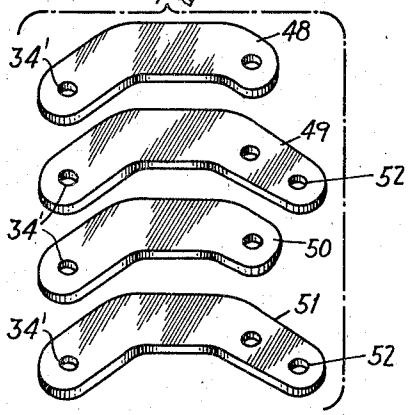


Fig. 10.

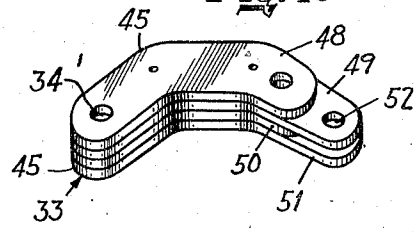
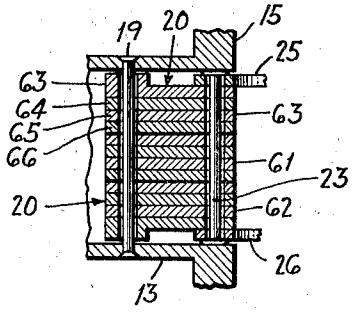


Fig. 11.



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UNITED STATES PATENT OFFICE

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HINGE

Walter W. Stumpf, Maplewood, N. J.

Application August 13, 1938, Serial No. 224,695

4 Claims. (Cl. 16—166)

This invention relates to hinges and more particularly to concealed hinges for doors and the like wherein a great amount of throw is desired.

In devices of this general type where the hinges are designed to throw the edge of the door away from the door jamb previous to the present invention a very small amount of throw in proportion to the width of the hinge was given and the movable parts were generally constructed so as to slide within a housing which caused a great amount of wear and allowed the door with which a hinge cooperated to sag.

It is among the objects of my invention to provide a structure in which all movable parts are pivotally mounted, devoid of sliding contacts and wear is reduced to a minimum and through which construction a great amount of throw in proportion to the width of the hinge is provided and which will result in a stronger, more durable structure and will prevent the sagging of a door.

One of the objects of my invention is to provide a concealed hinge structure in which the throw of the hinge is very great in proportion to the width of the hinge.

Another object of my invention is to provide a hinge in which the movable parts are not slidable but are pivotally mounted so that wear is reduced.

Other objects will appear or become obvious from a consideration of the detailed description which follows taken in conjunction with the accompanying drawings.

The hinge of the present invention is designed to give a greater throw between the edge of a door and the jamb, particularly where a moulding between the edge of the door and the jamb must be cleared.

The hinge device of my present invention consists of two mounting members each taking the form of a housing one of which is adapted to be fastened into a door jamb and the other to be fastened into a door. The two mounting members are connected so that they may swing away and toward one another, through a main link having a top and bottom flange portion. The ends of the main link are pivotally mounted on relatively short throw links which are pivotally connected with the respective mounting members. Guide links are provided, one pivotally mounted on each mounting member, and connected to the central portion of the main link. Each guide link is pivotally mounted in relation to one another by an offset portion through which a pivot pin is inserted and the pivot pin also cooperates with a transverse slot in the flange portion of the main link.

It will be understood, however, that the invention is not restricted to this exact disclosure, but is susceptible to such changes and modifications which are within the scope and purview of the appended claims.

Referring to the accompanying drawings—

Figure 1 is an elevational view of the device, the hinge being in its closed position;

Figure 2 is a plan view taken on the line 2—2 of Figure 1;

Figure 3 is a plan view of the hinge opened 90°;

Figure 4 is a plan view showing the hinge opened 180°;

Figure 5 is a plan view of the device taken on the line 5—5 of Figure 1;

Figure 6 is a perspective view showing the hinge mounted in relation to a door and door jamb;

Figure 7 is a plan view of an alternative embodiment of the present device using laminated links.

Figure 8 is an elevation view of the embodiment of the present invention shown in Figure 7 taken on the line 8—8 of Figure 7, showing the use of laminated links.

Figure 9 is an exploded view of one of said links of Figure 8;

Figure 10 is a perspective view of one of the laminated links of Figure 8; and

Figure 11 is a sectional view taken on the line 11—11 of Figure 7 showing the grouping of links and their pivoting in relation to the housing.

The hinge of the present invention consists of two mounting members 13 and 14, the mounting member 13 having projections 15 and 16 and the member 14 having projections 17 and 18 said projections being adapted to receive screws through which the respective housings are fastened to the door and door jamb.

For purposes of description, it will be assumed that the member 13 will be mounted in the door jamb and the mounting member 14 will be mounted in the door.

Pivotally mounted on a pin at 19 the pin being fixed in the housing 13 is a throw link 20 one end 21 of which is pivoted to a main link 22 at 23.

The main link, generally indicated at 22, consists of a body portion 24 having a top flange 25 and a bottom flange 26. The end 27 of the link 22 is slightly offset and is pivoted to the throw link 20, as aforesaid, at 23.

The opposite end 28 of the main link 22 is also offset and is pivoted to a throw link 29 at 30.

The throw link 29 is in turn pivoted to the housing 14 at 31. The flanges 25 and 26 of the main link 22 are widened at the center portion thereof as shown at 32 and have a slot cut transversely in the enlarged center portion 32 in each flange 25 and 26.

A guide link 33 is pivoted at 34 in the housing 13 the other end of said guide link being pivoted to the main link 22 at 35A. The guide link 33 has an extension 35 through which is cut a slot 36.

A guide link 37, similar to guide link 33 is pivotally mounted at 38 in the housing 14 the other end of said guide link being pivoted to the main link 22 at 39. The guide link 37 has an extension 40 in which there is a slot 41. The extensions 35 and 40 are of a length that the slots 36 and 41 are in cooperative relation to one another so a pin 42 may be inserted through said slots and the transverse slots in the flanges 25 and 26.

The guide links 33 and 37 not only serve as a guide for the smooth and even opening and closing of the hinge of the present invention but also act as a support for the main link 22 in respect to the mounting members 13 and 14.

The slots 36 and 41 in the extensions 35 and 40 will prevent any binding between the guide links and the mounting members 13 and 14, the slot in the flanges 25 and 26 guiding the pin 32 in its movement during the opening and closing of a hinge.

As will be understood, the slots 36 and 41 need not necessarily be in the extensions 35 and 40, as shown in the preferred embodiment of the invention, to take up lost motion and prevent binding in the opening and closing of the hinge.

Slots 43 and 44 may be cut in the flanges 25 and 26, as shown in Figure 7, so that the pivots 35A and 39 may have movement in relation to the main link 22 and prevent any binding between said link and the guide links 33 and 37, the guide links having holes the same size as the pivots 35A and 39.

In the embodiment of the invention shown in Figures 7, 8, 9, 10 and 11 the guide links 33 and 37 are constructed of laminated strips each of said links preferably consisting of three laminated sections each of which are constructed of four strips. The guide link 33 is constructed of three laminated sections 45, 46 and 47 each of said sections being constructed of four strips 48, 49, 50 and 51 which are spot welded together to give greater strength. The strips 49 and 51 are of a length greater than the strips 48 and 50 and have holes 52 drilled in the end thereof. Holes for pivots 34 and 35A are also drilled in the laminated sections so that the same may pivot in a like manner to the first embodiment described.

The guide link 37 is constructed similarly to the guide link 33 having three laminated sections 53, 54 and 55 which are constructed of four strips 56, 57, 58 and 59. These strips, as well as the sections 53, 54 and 55 are preferably spot welded to give added strength. The strips 56 and 58 are of a greater length than the strips 57 and 59 and have holes drilled through the ends thereof. Pivot holes for the pivots 38 and 39 are also drilled in each laminated section so that the guide link may pivot in the same manner as in the embodiment first described.

The sections 45, 46 and 47 of the guide link 33 cooperate with the sections 53, 54 and 55 of the guide link 37, the strip 56 of the section 53 overlapping the strip 49 of the section 45 of the guide link 33. The strip 58 of section 53 is fitted between links 49 and 51 of link 33. The pivot 42 is placed through the holes 52 in the end of the strips so that the guide links 33 and 37 may pivot in relation to one another through the holes 52 in the end of the strip.

The throw links 20 and 29 may also be constructed of strips preferably grouped in three laminated sections 60, 61 and 62 each constructed of four strips 63, 64, 65 and 66.

Holes are drilled in the laminated sections of the throw links to accommodate the pivots 19 and 23 in the throw link 20 and pivots 30 and 31 in the throw link 29.

The laminated construction is used for the throw links 20 and 29 and the guide links 33 and 37 to provide a stronger construction.

In the operation of the hinge the mounting member 13 is countersunk into a door jamb and the mounting member 14 is likewise countersunk into a door. When the door is in a shut position, the parts of the hinge are in the position shown in Figure 2.

As a door is opened, the mounting member 14, which is mounted in the door, is moved away from the member 13 mounted in the door jamb. The main link 22 moves from within the mounting members 13 and 14 pivoting on the throw links 20 and 29. The throw links 20 and 29 pivot in the housing 13 and 14 respectively. This action throws the door outwardly away from the jamb in an arc. The guide links 33 and 37, at the same time, turn on the pivots 34 and 38 in the mounting members 13 and 14 and move with the main link 22 on the pivots 35A and 39.

The movement of the guide links 33 and 37 is guided by the movement of the pin 42 in the slots in the flanges 25 and 26. Any binding effect may be compensated for by slots 36 and 41 in the extensions 35 and 40 of the guide links 33 and 37 respectively. Should it be desired the slots 36 and 41 may be dispensed with in the extensions 35 and 40 and straight holes substituted. In such an instance slots 43 and 44 may be placed about the pivots 35A and 39 respectively in the flanges 25 and 26 of the main link 22 so that the pivot pins may move therein in respect to the main link 22, as shown in Figure 7.

When the door is opened at 90°, the parts of the hinge are in the relationship shown in Figure 3 of the drawings.

In opening the door to 180° the main link continues to pivot on the guide link 20 which in turn pivots in relation to the mounting member 13 which throws the door away from the jamb. The guide link 33 turns on the pivot 34 and moves with the main link 22 on the pivot 35A guiding and supporting the main link.

At the same time the mounting member 14, to which the door is attached, pivots about pivots 30 and 31 until the door is parallel with the wall. The guide link 37 moves on the pivot 38 in the mounting member 14 and the pivot 39 in the main link 22. The parts of the hinge, when the door is opened 180°, assume the position shown in Figure 4 of the drawings.

It may be readily understood that the present invention can be adapted in different ways to accomplish the purpose set forth as well as other purposes and it is not my intention to limit this invention to the exact details of construction shown and described but rather to cover all equivalent structures as deferred by the scope of the following claims.

I claim:

1. In a hinge construction, a pair of mounting members adapted for attachment to a stationary member and a swingable member, respectively, connecting means for said mounting members, said means including a pair of throw links each pivoted to a respective mounting member, a main link pivoted at each end to said throw links and having a transverse slot; and a pair of guide links each pivoted at one end to a respective mounting member and pivotally guided for movement in said slot at the other end.

2. In a hinge construction, a pair of mounting members adapted for attachment to a stationary member and a swingable member, respectively, connecting means for said mounting members, said means including a pair of throw links each pivoted to a respective mounting member, a main link pivoted at each end to said throw links and having a transverse slot; and a pair of guide links each pivoted at one end to a respective mounting member and pivoted at the opposite end to said main link, said opposite end of each of said guide links having a slotted extension thereon, guiding means extending through and slidably engaging said transverse slot and said slot in the slotted extension of each of said guide links for pivotally guiding said guide links for movement in relation to said transverse slot.

3. In a hinge construction, a pair of mounting members adapted for attachment to a stationary member and a swingable member, respectively, connecting means for said mounting members, said means including a pair of throw links each pivoted to a respective mounting member, a main link pivoted at each end to said throw links and having therein a transverse slot and a pair of guide links each pivoted at one end to a respective mounting member and loosely pivoted at the opposite end to said main link, an extension on said opposite end of each of said guide links, and means for pivotally guiding said extensions in relation to said transverse slot when the guide members are reciprocated upon turning of the hinge.

4. In a hinge construction, a pair of mounting members adapted for attachment to a stationary member and a swingable member, respectively, connecting means for said mounting members, said means including a pair of throw links each pivoted to a respective mounting member, a main link pivoted at each end to said throw links and having therein a transverse slot and two longitudinal slots one on each side of said transverse slot; and a pair of guide links each pivoted at one end to a respective mounting member and pivotally mounted at the opposite end for movement in a respective longitudinal slot, an extension on said opposite end of each of said guide links, and means for pivotally guiding said extensions in relation to said transverse slot when the guide members are reciprocated upon turning of the hinge.

WALTER W. STUMPF.