June 29, 1954 M. A. VIKRE 2,682,077

HINGE STRUCTURE

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Fig. 1

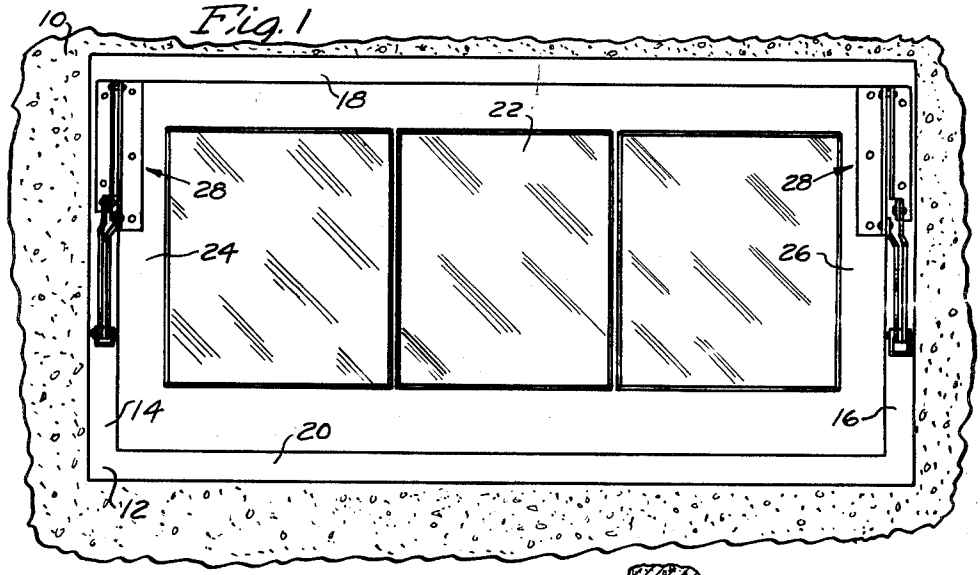


Fig. 3

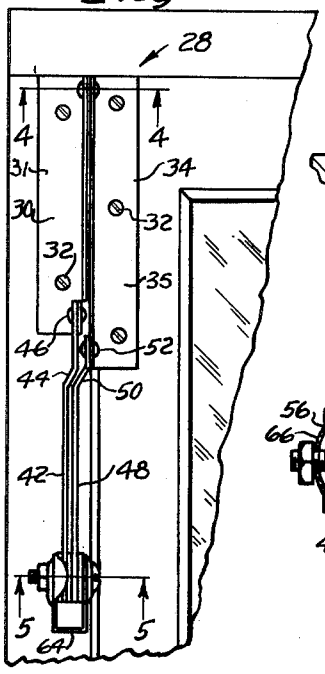


Fig. 4

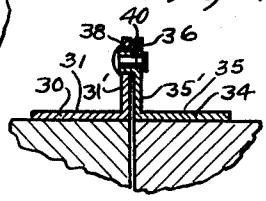


Fig. 2

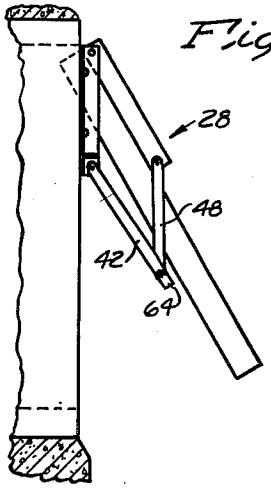


Fig. 5

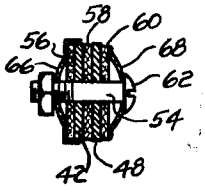


Fig. 6

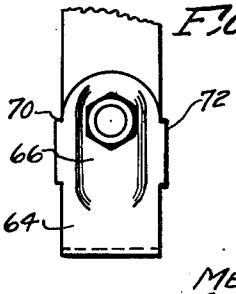
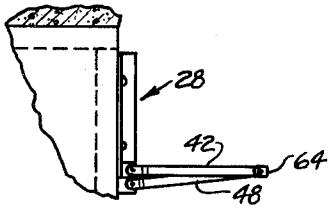


Fig. 7



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HINGE STRUCTURE

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5 Claims. (Cl. 16—140)

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My invention relates to a hinge structure. In general it relates to a hinge structure such as is customarily used between a closure and its supporting frame, such as a basement window which is arcuately moved with respect to its surrounding frame. The particular purpose of the hinge structure in addition to supporting the window for movement with respect to the frame, is to provide a means for holding the window in any one of a plurality of selected positions relative to the frame.

In the usual construction of windows of the type referred to, it is customary to provide a pair of ordinary hinges which are connected between the upper edge of the window and an adjacent surface of the frame to permit the window to be arcuately moved in an inward direction. To support the window in an open position, it is customary to provide a swivel hook generally mounted on the window and which is engageable with a screw eye or staple fastened on a basement rafter above the window in the path of its arcuate movement so that the window may be hooked in a fully open position. Such arrangements, of course, make no provision for securing the window in any intermediate position between open and closed positions and, therefore, it becomes necessary to supply some form of prop when an intermediate position is desired.

In the present invention I have provided an improved type of window hardware in the form of a hinge structure which is adapted for mounting on the window and window frame, and includes means for holding the window in any one of a number of selected positions ranging from fully opened to fully closed positions. The hinge structure consists of a pair of brackets which are intended to be fastened with the usual wood screws or bolts to the sides of the window and the window frame. These brackets are interconnected at their upper end to form a hinge. A pair of links are pivotally connected to the brackets at the ends opposite the hinge, and these links are in turn at their other ends connected to each other so that they move in unison with the brackets when the window is opened. At the ends where the links are joined to each other, suitable frictional means are provided between their co-acting surfaces and a resilient means is provided to bias the co-acting surfaces toward each other to resist movement and thereby hold the window in any position to which it is selectively moved. Moreover, when the window is in a closed position, the links may, if desired, be rotated on their pivotal connections with their brackets so as to form a means of locking the window in a substantially closed position.

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An object of the invention is to provide a hinge for basement windows and the like, composed of a pair of right angle hinge plates that are pivoted to each other at similar ends and which at their other ends carry pivotally mounted links that normally extend in prolongation of the hinge plates when the window is closed, said links being pivotally joined to each other at their outer ends, together with frictional means associated with a pivoted end of each of the links that resist movement of the links.

Another object is to provide in combination with a window structure which is arcuately moved to an open position with respect to its surrounding frame, a hinge composed of four linear members which are pivotally joined to each other in such a manner as to provide a free movement on one pivot and a restricted movement on another pivot, which latter pivot is effective to hold the window in any selected position to which it has been moved.

Another object is to provide a locking hinge for basement windows and the like, composed of a pair of hinge plates that are pivotally connected to each other at similar ends and which at their other ends carry pivotally mounted links that normally extend in prolongation of the hinge plates when the window is closed, said links being pivotally connected to each other at their outer ends by a unitary pivot, said links when rotated at their inner ends at right angles to the hinge plates forming a lock between the hinge plates when the window is in a closed position with respect to its surrounding casement.

A further object is to provide in a hinge, which includes a pair of links joined by a connecting pivot, a frictional means between the links to resist pivotal movement, and a resilient spring for binding the links against the frictional means.

Other and further objects may become apparent from the following specification and claims, and in the appended drawing, in which:

Fig. 1 is a front elevation of a basement window assembly to which the present invention is applied;

Fig. 2 is an end elevation of the window in a partially open position;

Fig. 3 is an enlargement in front elevation of a fragmentary portion of the structure shown in Fig. 1;

Fig. 4 is a detail view taken on line 4—4 of Fig. 3;

Fig. 5 is a detail view taken on line 5—5 of Fig. 3;

Fig. 6 is a side elevation of a portion of the structure shown in Figs. 3 and 5; and,

Fig. 7 is a side elevation of a basement window

with the present invention being used as a means of locking the window in a substantially closed position.

Referring now to the several views of the drawing, the invention will be described in detail. Referring particularly to Fig. 1, is disclosed in fragmentary portion, a wall structure 10 in which is mounted a rectangular window frame generally indicated at 12 and composed of vertically extending side portions 14 and 16 which are secured to horizontally extending upper and lower members 18 and 20 to form a hollow square. Within the interior of frame 12 is a conventional closure or window 22, having end portions 24 and 26 which coincide with portions 14 and 16 of the window frame 12. The window 22 is supported for movement relative to the frame 12 by a pair of hinge structures indicated generally at 28.

Referring now to Fig. 3, the hinge structure 28 will be described in detail. A first bracket 30 having right angle arms 31 and 31' is secured to member 14 by conventional screws 32 passing through the arm 31. A second bracket 34 having arms 35 and 35' is secured to member 24 of the window 22 by conventional screws 32 passing through the arm 35. It will be noted in Fig. 3 that bracket 34 is of greater length than bracket 30.

Referring now to Fig. 4, the bracket 34 at its upper end has a tubular projection 36 extending from the upstanding arm 35' which penetrates an aperture 38 in the upstanding arm 31' of bracket 30. The projection 36 may be formed by stamping an aperture in member 35', but the over-all length of the projection 36 is just such that it will penetrate the aperture 38 and extend slightly beyond the outer surface of arm 31' to form a bearing surface on which the brackets may rotate. A rivet 40 or any other form of conventional fastening means passes through the tubular projection 36 to bind the two brackets 30 and 34 together at their upper ends. However, since the projection 36 extends beyond the outer surface of arm 31', the pivotal connecting rivet 40 engages this outer surface rather than the outer surface of arm 31', to thereby avoid binding the two brackets together.

A first link 42 which is shown as being angularly bent at 44, is pivotally joined to the lower extremity of the upstanding arm 31 of bracket 30 by a conventional pivotal connector 46. A second link 48 which is shown as being angularly bent at 50, is joined to the lower extremity of the upstanding arm 35' of bracket 34 by conventional pivotal connector 52. For all practical purposes the pivotal connectors 46 and 52 may be rivets, but they loosely join the upper ends of the links 42 and 48 to the respective brackets in such a manner as not to bind the links to the bracket members. The links 42 and 48 are shown in the drawing as being as long or longer than brackets 30, 34, but they may be shortened if desired.

Referring now to Figs. 5 and 6, the two links 42, 48 are provided with a central aperture 54 which extends transversely through the links. Three fibre washers 56, 58 and 60 are disposed on either side, and between the lower ends of the links 42, 48 to form frictional surfaces on either side of each link. A conventional bolt 62 extends through the aperture 54 of the several links and through the centers of the washers to loosely bind the assembly together. Fibre washer 56 may be eliminated if desired because the major frictional action takes place on either or both sides of link 48.

Referring now to Figs. 3, 5 and 6, a resilient member 64 of generally U-shaped configuration is provided to bind the links 42, 48 and the washers together to create friction between the lower ends of the links 42, 48. The member 64 has indentations 66 and 68 impressed into its upper end surfaces to give resilience to the structure. A pair of ears 70 and 72 are formed on one side of member 64 to embrace the side surfaces of the outer link 42, as is clearly evident in Figs. 3, 5 and 6, to prevent rotation of member 64 with respect to the ends of the links. It should be noted that the resilient member 64 is held in place by the bolt 62.

Referring now to Fig. 2 is shown the position in which the hinge structure 28 takes when the window is rotated away from the frame. The actual hinging effect takes place on the projections 36 to avoid any binding action by the rivet 40 between the brackets 30 and 34. As the window is moved in the direction of an open position, it will be noted that link 48 is parallel to bracket 30 and link 42 is parallel to bracket 34. The window may be rotated until the lower surface of member 64 engages the outer edge of link 48 so that the links cannot form an over center locking device. This is important otherwise if the links locked over center it would be necessary to grasp and pull the individual links to break the over center locking action. The window will be held in any position to which it is manually moved by the frictionl effect of the several washers, and particularly by washers 58 and 60 between the lower ends of the links 42, 48 and the head of the bolt 62. However, to firmly bind the several members together, the resilient member 64 is provided on the lower ends of the links and will have an effect of biasing the frictional washers with sufficient pressure to hold the window at any position to which it is set.

Referring now to Fig. 7, the links 42, 48 have been moved away from their normally vertical position in prolongation of the bracket 30 and 34 by rotation on their respective pivots 46, 52. When the links have been rotated in this manner they serve as a substantial locking means to prevent rotation of the window on the pivotal connecting rivet 40.

My invention is defined in the terms of the appended claims.

I claim:

1. A window hinge, comprising a pair of brackets each formed of right angle arms, said brackets adapted to be oppositely supported on one of their arms on adjacent portions of a window and its surrounding frame with the outstanding arm of each of the brackets extending in side-by-side relation to each other at the junction of the window and the frame, pivotal means extending transversely between similar ends of each of the outstanding arms of the brackets and forming a rotative support between the window and the frame, a pair of links each pivotally connected to the opposite end of each of said brackets and normally extending in prolongation of the outstanding arms when the window is closed, pivotal means joining the outer free ends of the links to each other, and frictional means operatively associated with a pivoted end of one of said links for resisting movement of said link.

2. A window hinge, comprising a pair of hinge

plates formed of right angle arms, said plates being adapted to be alternately mounted on adjacent portions of a window and its surrounding frame with one arm of each of the plates normally extending outwardly and in side-by-side relation with each other at the junction of the window and the frame, a pivot extending transversely between the upper ends of the opposing outwardly extending arms and forming a rotative support between the frame and the window, a pair of links each pivotally joined at one end to the lower end of each of the outwardly extending arms and normally extending in prolongation of said arms, pivotal means joining the outer free ends of the links to each other, and frictional means cooperable with the last named pivotal means and also with the inner coacting surfaces of the outer pivoted ends of the links to resist movement between the outer ends of the links and hold the window in any position in the path of its movement relative to the frame.

3. A window hinge, comprising a pair of brackets formed of right angle arms adapted to be alternately mounted on adjacent portions of a window and its surrounding frame with one arm of each of the brackets extending outwardly and in side-by-side relation to each other at the junction of the window and the frame, pivotal means extending transversely between the upper ends of said last named arms and forming a rotative support for the window, a pair of links each pivotally connected to the lower end of each of said brackets and normally extending in prolongation of the outwardly extending arms of the brackets when the window is closed, pivotal means joining the outer free ends of the links to each other, frictional means between the outer pivoted ends of the links to resist relative movement between the links, and a U-shaped spring extending around the outer ends of the links and cooperable with said last named pivotal means for laterally biasing the outer ends of the links against the frictional means.

4. A window hinge, comprising a pair of brackets formed of right angle arms and adapted to be alternately mounted on adjacent portions of a window and its frame with one arm of each of the brackets extending in side-by-side relation to each other and at right angles to the frame and the window, pivotal means extending

transversely between the upper ends of said last named arms to provide pivotal movement of the window with respect to the frame, a pair of links each pivotally connected at its inner end to the lower end of each of said brackets, and a unitary pivot joining the outer ends of said links to each other, said links normally extending in prolongation of the outwardly extending arms of the brackets when the window is closed, said links when rotated on their inner ends forming a lock between the window and the frame.

5. A hinge, comprising a pair of brackets formed of right angle arms, one arm of each of said brackets extending outwardly in side-by-side relationship with an arm of the other bracket, one of said brackets having an aperture extending transversely through the upper end of one of said outwardly extending arms, a tubular projection formed on outwardly extending arm of the other bracket and penetrating the aperture in the first named arm forming a bearing surface between said brackets, fastening means extending through said projection and engaging the ends thereof for locking said brackets together for free movement relative to each other, a pair of links each pivotally connected to one of said arms at an end opposite the bearing surface, pivotal means joining the outer free ends of said links, frictional means cooperable with the last named pivotal means and also with the inner coacting surfaces of the outer pivoted ends of the links, and a U-shaped spring extending around the outer ends of the links independent of said links and cooperable with said last named pivotal means for biasing said links against the frictional means.

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