

PATENT SPECIFICATION

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DRAWINGS ATTACHED

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(54) HINGE

(71) I, YOSHITAKA NAKANISHI, a Japanese citizen, of 12-9, 5-chome, Yawata, Ichikawa-shi, Chiba-ken, Japan, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a hinge for use with doors in houses, buildings, on pieces of furniture, and other articles.

A door hinge equipped with swinging leaves or wings is well known. Such a common hinge is used widely because of its simple construction and convenience in rotating or swinging the door in a secure and smooth manner.

However, the conventional door hinge needs a separate lock to prevent intruders from opening the door because it lacks a locking device so as to immovably fix the rotating and swinging operation.

According to the present invention there is provided a hinge comprising two mutually complementing leaves each leaf having at least one tubular member secured to a side edge thereof, a pintle inserted into apertures of the tubular members for connecting the leaves together, means for securing one of the leaves non-rotatably to the pintle, a slot provided in the tubular member or at least one of the tubular members of the other leaf and a slot provided in the pintle, and a latch engageable with both slots for locking the leaves non-rotatably together.

The invention also provides a door hinge comprising two mutually complementing leaves, each leaf having at least one tubular member secured to a side edge thereof, a pintle inserted into apertures of said tubular members for connecting said leaves together, slots provided on the or one of the tubular members of one leaf and on the or one of the tubular members of the other leaf respectively, and a latch engaging with both slots for locking the leaves non-rotatably together.

Two embodiments of the hinge according to

the invention are described below with reference to the accompanying drawings, in which

Figure 1 is a perspective view of a first embodiment of hinge.

Figure 2 is a front elevation of a hinge of Figure 1, showing the pintle parts in section.

Figure 3 is a cross section of the hinge in a closed position, taken along the line III—III of Figure 2.

Figure 4 is an enlarged perpendicular section of the hinge of Figure 1, showing a modified form of the latch parts.

Figure 5 is a perspective view of a second embodiment of door hinge, showing a modified locking device.

Figure 6 is a perspective exploded view of the hinge of Figure 5.

Figure 7 is a front elevation of a hinge leaf of Figure 5, showing the pintle parts in section.

Figure 8 is similar to Figure 7 but with certain modifications.

In Figures 1 to 4, the hinge leaf assembly consists of two leaves 1 and 2. The leaf 1 has a hub or journal 3 on one of its sides while the other leaf 2 similarly has another hub or journal 4 on one of its sides. The hubs interlock alternately with each other like a dovetail joint. A pintle or shaft 5 is inserted into the combined hubs, so that the hinge leaf can rotate freely on the pintle.

Slots 6 and 7 are formed in the inner face of the hub 3 and in the outer face of the pintle 5. A latch 8 is located slidably in the slot 6, and suitable slidable insertion of a latch 8 into said slots makes the hinge leaves immovable or movable. The hinge leaves can be rendered immovable either when the hinge corresponds to the closed position or some other position depending on the relative locations of the slots in the hub and pintle.

The latch 8 is provided with a bolt 9 and a knob 10 integral therewith. The bolt 9 passes through a hole 11 in the wall of the hub 3, the hole 11 being smaller in diameter than the slot 6, while the knob 10 is located

outside the same hub 3. The slots 6 and 7 are so spaced and interrelated with each other that the latch 8 can be removed entirely from the slot 7 into the slot 6, releasing the locking condition between the hub 3 and the pintle 5, or can be brought to a position where it occupies part of each of the two slots to lock the door hinge. The position of the latch 8 is controlled by pushing the knob 10 in or out as required.

Consequently, when this hinge unit is applied to a door, it will function as an ordinary door hinge while the knob is pulled out, but when it is necessary to lock the hinge in one's absence or during the night, a simple locking can be brought about by the mere act of pushing the knob.

The bolt 9, whose end is screwed into the latch 8, may be modified in a number of ways. One such way is shown in Figure 4. The hub 3 possesses a screw-threaded hole 15 into which a latch element 17 is screwed. The hole 11 in the latch element 17 is screw-threaded to enable the bolt 9 to be screwed through the hole.

For better fitting between the bolt 9 and the hole 11, a boss 12 is provided at the periphery of the hole.

Two pins 13 pass through the hub 4 of the leaf 2 and the pintle 5 to immovably fix them together. The slots 6 and 7 of the other hub 3 and the pintle are positioned so as to face each other when the hinge leaves are closed.

Alternatively, a pin 13 may pass through the hub 3 to fix it to the pintle 5, in which case the latch 8 and the slots 6 and 7 should be provided to anchor the hub 4 to the pintle. Caps 14 are forced into the top and bottom of the pintle 5.

Another embodiment of this invention is shown in Figures 5 to 8.

Hubs 3 and 4 have slots 6a and 7a, respectively, adjacent to each other, and a latch 8a is located slidably so as to straddle the slots 6a and 7a. The latch 8a can be supported within the slots by shoulders 18 and 19 formed on both sides of the slots 6a and 7a, respectively, with a knob 20 protruding from the latch out of the surface of the hub. The knob may be pushed up or down to cause the latch to vertically slide through the slots 6a and 7a. When said latch straddles the slots 6a and 7a, the hinge leaves are prevented from turning, but if the latch is allowed to reside in the slot 6a only, the hinges are freed to rotate on the pintle as in the preceding embodiment.

Two such latches are preferably used, as illustrated, and Figure 7 shows a position in which the lower is locked and the upper is released. Two pintles 5 are used and the hub 3 is provided with a partition 21 located approximately in the middle thereof, while flat bearings 22 are provided on the top and bottom of the partition 21, each pintle having a pointed end 23 to facilitate the rotation of

the pintle 5 in contact with the flat bearings. A flat spring 24 is contained between each latch and its pintle so as to position the latch in an appropriate place between the slots 6a and 7a. The flat spring may be replaced by a ball as illustrated in Figure 8. In this the latch 8a has a recess or hole 25 into which are inserted a coil spring 26 and a ball 27 which in turn resiliently engage or disengage with annular grooves 28 and 29 formed on the pintle 5, whereby the above explained locking or releasing conditions are maintained.

The pin 13 binds the hub 4 with the pintle 5 by penetrating both of them, but the pin may be eliminated and the pintle may be loosely inserted into the hub.

The hinge provided by this invention is simple in structure and easy to manufacture, and is applicable for example to windows, containers and furniture (e.g. table).

WHAT I CLAIM IS:—

1. A hinge comprising two mutually complementing leaves, each leaf having at least one tubular member secured to a side edge thereof, a pintle inserted into apertures of the tubular members for connecting the leaves together, means for securing one of the leaves non-rotatably to the pintle, a slot provided in the tubular member or at least one of the tubular members of the other leaf and a slot provided in the pintle, and a latch engageable with both slots for locking the leaves non-rotatably together.

2. A hinge as claimed in claim 1 or 2 wherein one leaf has two tubular members, and the other leaf has one tubular member which is located between the leaves of the said one leaf.

3. A hinge as claimed in claim 1 or 2 wherein the tubular member slot is provided on the inner face of the tubular member.

4. A hinge as claimed in claim 2 or 3, wherein in the non-locking position the latch is located wholly inside the slot of the tubular member, being insertable into the other slot by movement of a bolt to which the latch is attached.

5. A hinge as claimed in claim 4, wherein the bolt passes through a hole in the tubular member which is smaller in diameter than the breadth of said slot, the end of the hole opening into the slot in the tubular member.

6. A hinge as claimed in claim 5, wherein the tubular member having the slot is provided with a boss in which the bolt is threadedly received.

7. A hinge comprising two mutually complementing leaves, each leaf having at least one tubular member secured to a side edge thereof, a pintle inserted into apertures of said tubular members for connecting said leaves together, slots provided on the or one of the tubular members of one leaf and on the or one of the tubular members of the other



outside the same hub 3. The slots 6 and 7 are so spaced and interrelated with each other that the latch 8 can be removed entirely from the slot 7 into the slot 6, releasing the locking condition between the hub 3 and the pintle 5, or can be brought to a position where it occupies part of each of the two slots to lock the door hinge. The position of the latch 8 is controlled by pushing the knob 10 in or out as required.

Consequently, when this hinge unit is applied to a door, it will function as an ordinary door hinge while the knob is pulled out, but when it is necessary to lock the hinge in one's absence or during the night, a simple locking can be brought about by the mere act of pushing the knob.

The bolt 9, whose end is screwed into the latch 8, may be modified in a number of ways. One such way is shown in Figure 4. The hub 3 possesses a screw-threaded hole 15 into which a latch element 17 is screwed. The hole 11 in the latch element 17 is screw-threaded to enable the bolt 9 to be screwed through the hole.

For better fitting between the bolt 9 and the hole 11, a boss 12 is provided at the periphery of the hole.

Two pins 13 pass through the hub 4 of the leaf 2 and the pintle 5 to immovably fix them together. The slots 6 and 7 of the other hub 3 and the pintle are positioned so as to face each other when the hinge leaves are closed.

Alternatively, a pin 13 may pass through the hub 3 to fix it to the pintle 5, in which case the latch 8 and the slots 6 and 7 should be provided to anchor the hub 4 to the pintle. Caps 14 are forced into the top and bottom of the pintle 5.

Another embodiment of this invention is shown in Figures 5 to 8.

Hubs 3 and 4 have slots 6a and 7a, respectively, adjacent to each other, and a latch 8a is located slidably so as to straddle the slots 6a and 7a. The latch 8a can be supported within the slots by shoulders 18 and 19 formed on both sides of the slots 6a and 7a, respectively, with a knob 20 protruding from the latch out of the surface of the hub. The knob may be pushed up or down to cause the latch to vertically slide through the slots 6a and 7a. When said latch straddles the slots 6a and 7a, the hinge leaves are prevented from turning, but if the latch is allowed to reside in the slot 6a only, the hinges are freed to rotate on the pintle as in the preceding embodiment.

Two such latches are preferably used, as illustrated, and Figure 7 shows a position in which the lower is locked and the upper is released. Two pintles 5 are used and the hub 3 is provided with a partition 21 located approximately in the middle thereof, while flat bearings 22 are provided on the top and bottom of the partition 21, each pintle having a pointed end 23 to facilitate the rotation of

the pintle 5 in contact with the flat bearings. A flat spring 24 is contained between each latch and its pintle so as to position the latch in an appropriate place between the slots 6a and 7a. The flat spring may be replaced by a ball as illustrated in Figure 8. In this the latch 8a has a recess or hole 25 into which are inserted a coil spring 26 and a ball 27 which in turn resiliently engage or disengage with annular grooves 28 and 29 formed on the pintle 5, whereby the above explained locking or releasing conditions are maintained.

The pin 13 binds the hub 4 with the pintle 5 by penetrating both of them, but the pin may be eliminated and the pintle may be loosely inserted into the hub.

The hinge provided by this invention is simple in structure and easy to manufacture, and is applicable for example to windows, containers and furniture (e.g. table).

WHAT I CLAIM IS:—

1. A hinge comprising two mutually complementing leaves, each leaf having at least one tubular member secured to a side edge thereof, a pintle inserted into apertures of the tubular members for connecting the leaves together, means for securing one of the leaves non-rotatably to the pintle, a slot provided in the tubular member or at least one of the tubular members of the other leaf and a slot provided in the pintle, and a latch engageable with both slots for locking the leaves non-rotatably together.

2. A hinge as claimed in claim 1 or 2 wherein one leaf has two tubular members, and the other leaf has one tubular member which is located between the leaves of the said one leaf.

3. A hinge as claimed in claim 1 or 2 wherein the tubular member slot is provided on the inner face of the tubular member.

4. A hinge as claimed in claim 2 or 3, wherein in the non-locking position the latch is located wholly inside the slot of the tubular member, being insertable into the other slot by movement of a bolt to which the latch is attached.

5. A hinge as claimed in claim 4, wherein the bolt passes through a hole in the tubular member which is smaller in diameter than the breadth of said slot, the end of the hole opening into the slot in the tubular member.

6. A hinge as claimed in claim 5, wherein the tubular member having the slot is provided with a boss in which the bolt is threadably received.

7. A hinge comprising two mutually complementing leaves, each leaf having at least one tubular member secured to a side edge thereof, a pintle inserted into apertures of said tubular members for connecting said leaves together, slots provided on the or one of the tubular members of one leaf and on the or one of the tubular members of the other



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leaf respectively, and a latch engaging with both slots for locking the leaves non-rotatably together.

5 8. A hinge as claimed in claim 7, further including shoulders which run parallel with the slots.

10 9. A hinge as claimed in claim 7 or 8, wherein the latch is shaped as a substantially flat piece or plate with a knob protruding from the upper face of the latch.

10. A hinge as claimed in any of the preceding claims, in which two pintles are used, the hub has a partition in its middle portion, the upper and lower faces of the said partition

15 being provided with flat bearings, and each

pintle has a pointed end in contact with the flat bearings.

11. A hinge as claimed in any preceding claim which is adapted to be locked in a position in which the leaves are closed.

12. A door hinge substantially as herein described with reference to the accompanying specification.

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