

STAY

This invention relates to a stay that can be used for swingably fitting a lid to a cabinet or the like.

Fig. 6 of the accompanying drawings illustrates a conventional stay having a very simple structure. It comprises a pair of arms a, a' articulately connected with each other at their one ends by means of a shaft b that functions as axis of rotation so that the arms can rotate relative to each other. Such a stay may be fitted to a cabinet c and a plate lid d to make the lid d swingable and capable of being held at a given open position by firmly attaching metal fitting members e, f, respectively swingably connected to the other ends of the arms a, a' respectively to the inner surface of a side panel c' of the cabinet c and the inner surface d' of the lid d by means of respective screws g..., h....

A conventional stay as described above has a drawback

that the operation for fitting it to a cabinet and a lid is very cumbersome and time consuming because the arms a, a' can constitute obstacles when the metal fitting members e, f are respectively fitted to the cabinet c and the lid d with screws as the arms a, a' and the metal fitting members e, f have been connected to form a unit and that the stay can not be accurately positioned for fitting and consequently its function as well as its effectiveness can be deteriorated.

Fig. 7 illustrates a conventional stay provided with a damper. While such a stay also comprises a pair of arms a, a' articulately connected with each other at their one ends by means of a shaft b that functions as axis of rotation so that the arms can rotate relative to each other, the other end of the arm a is normally connected with a movable shaft provided at the center of the damper i. The lid d is fitted to the cabinet c by using such a stay in such a manner that the lid d becomes swingable and capable of being held at a given open position by firmly fitting a metal fitting members f swingably attached to the other end of the arm a' and a metal fitting member (not shown) attached to the main body i' of the damper i respectively to the inner surface d' of the lid d and the inner surface of a side panel c' of the cabinet c by means of h....

With a known stay having a damper as described above, the efficiency of transmitting power to rotate the movable shaft j by way of the arm a that moves as the lid d is being opened or closed is significantly low and the operation of opening or closing the lid gives a very heavy feeling to the operator since the arm a is firmly fitted to the movable shaft j located at the center of the damper i. Moreover, the arms a, a' can be undesirably rotated relative to each other around the axis of rotation when the weight of the lid is significant because the arms are connected only by the shaft b that functions as axis of rotation so that the lid d can eventually be no longer held to its open position. If a damper having a large damping effect is used to avoid this problem, then the operation of opening and closing the lid can become even more heavier.

In accordance with this invention there is provided a stay comprising first and second arms having respective ends articulately coupled together and their other ends having respective first and second metal fitting members for fitting respectively to a side panel and a lid of a cabinet, the stay further comprising a damper which has a body integrally formed with an eccentric section from which the first arm projects, the damper having a rotatable shaft removably coupled to said first metal fitting member, and an adjuster screw which is screw-threaded into the main body of the damper and arranged to abut a retaining section of said first metal fitting to limit the angle to which the cabinet lid can be opened.

When this stay is used, the first metal fitting member can be fitted in a preselected position on the inner surface of either the lid or one of the side panels of the cabinet, e.g. by means of screws, and thereafter the rotatable shaft of the damper is securely coupled with that metal fitting member so that the damper is supported by that metal fitting member.

When one end of the stay is rigidly fitted to the inner surface of, for instance, a side panel of the cabinet, the metal fitting member for the other end is fitted to the inner surface of the lid e.g. with screws to make the lid swingable relative to the cabinet.

When the lid fitted to the cabinet is gradually opened by turning the former, the turning effort applied to the lid is transmitted to the eccentric section of the damper main body by way of the arms so that the main body is rotated around its shaft.

When the lid is turned by a predetermined angle, the tip of the screw driven into the eccentric section of the damper main body abuts the retaining member of said metal fitting member to block the lid against any further rotary movement and keep it at a position where the angle is maintained.

The angle formed by the lid and the horizontal side line of the cabinet can be altered by moving back or forth the screw in the eccentric section of the damper main body, while the angle can also be modified by adjusting the angle of the retaining member when the metal fitting member is rigidly fitted to the inner surface of a side panel of the cabinet to provide an easy angle regulating capability for the cabinet and lid using a stay according to the invention.

[Embodiment]

Now the present invention will be described in greater detail by referring to the accompanying drawings which illustrate a preferred embodiment of the invention.

Brief Description of the Drawings

Fig. 1 is an exploded perspective view of a portion of a stay according to the invention.

Figs. 2(a) and 2(b) are two different front views of one of the metal fitting members of the embodiment illustrating how its components are coupled together.

Figs. 3(a) and 3(b) respectively show a front view of the other metal fitting member and that of the oil damper of the embodiment.

Figs. 4 and 5 respectively show a side view of the cabinet and the lid provided with the embodiment and a front view of the cabinet with the lid retained in a open position.

Figs. 6 and 7 respectively show a conventional stay and a conventional stay having a damper.

As illustrated in Figs. 1 through 5, a pair of arms 1, 2 are articulately connected with each other at their one ends by means of a shaft 3 so that they can turn relative to each other around the shaft 3.

The arm 1 of the pair of arms 1, 2 is extending from the main body 4a of a damper 4, which is rotatably sup-

ported by a metal fitting member 5.

More specifically, as illustrated in Fig. 3, the rotatable shaft 4b of the damper 4 has a square through bore 4c running therethrough, into which a square shaft 5a projecting from the metal fitting member 5 is removably fitted, while a setscrew 6 is driven into a tapped hole 5b bored from an end of said square shaft 5a in such a manner that the main body 4a of said damper 4 is rotatably supported by the metal fitting member 5 and consequently the plate lid is kept to its open position by the resistance of the damper.

An eccentric section 4d radially projecting from the main body 4a of the damper 4 is integrally formed with the damper 4 and the arm 1 is fitted into a lateral hole 4e bored in said eccentric section 4d so that consequently the arm 1 is further outwardly extending from the eccentric section 4d.

On the other hand, as shown in Figs. 1 and 2, the other end of the arm 2 is provided with a metal fitting member 7, which is constituted by a metal joint 7a and a metal fixture 7b, of which the metal joint 7a is rotatably fitted to said other end of the arm 2 by means of a rotary shaft 8 such as pin.

In this embodiment, said metal joint 7a is realized in the form of a thick plate provided with a connector 9

projecting perpendicularly to the main surface of said metal joint 7a from the central area of one of its lateral sides.

Said connector 9 has a circular middle portion 9a having a relatively large diameter and a pair of engaging projections 9b, 9b symmetrically arranged and connected to said middle portion 9a.

Said metal fixture 7b designed to receive said connector 9 is realized in the form of an oblong thick plate having a central bore 10 into which the connector is engagedly fitted.

More specifically, said bore 10 comprises a smaller bore 10a for receiving the circular middle portion 9a of the connector 9, a pair of slits 10b, 10b symmetrically and radially extending from said smaller bore in the axial direction for respectively receiving the engaging projections 9b, 9b and a larger bore 10c having a diameter large enough to removably and rotatably accommodate said connector 9, said larger bore 10c being coaxial with said smaller bore 10a and said smaller bore 10a combined with said axial slits 10b, 10b being capable of removably receiving said connector 9.

With such an arrangement, when said connector 9 is introduced into said bore 10 with said axial slits 10b, 10b respectively aligned with said projections 9b, 9b, the

connector 9 comes to be engaged with the combination of the smaller bore 10a and the slits 10b, 10b as illustrated in Fig. 2(a). If, under this condition, the metal joint 7a is rotated either clockwise or counterclockwise as indicated by arrows k, k' by a certain angle (90° in the case of Fig. 2(a)), the projections 9b, 9b are circularly moved to the respective positions so that they abut the bottom 10d of the larger bore 10c and the metal joint 7a, which is now axially aligned with the metal fixture 9b, is securely held by the metal fixture 9b and unable to come off.

If, on the contrary, the metal joint 7a is rotated until the projections 9b, 9b are aligned with the slits 10b, 10b, it can be separated from the metal fixture 7b.

It may be needless to say that the arrangement of a metal joint 7a and a metal fixture 7b for removably connecting them is not limited to that of the present embodiment and a number of different modifications and alternatives may be conceivable for it. For instance, they may be removably connected together by means of a combination of a bolt and a nut or a combination of a ball-shaped projection and a slitted elastic spherical chamber for receiving the projection.

For swingably and retainably fitting a hinged plate lid 12 to a cabinet 11 by using a stay having a configura-

tion as described above, the metal fixture 7b is rigidly fitted to the inner surface of the plate lid 12 in advance in a desired direction by means of screws 13..., the rotary shaft 8 is fitted into the central bore 10 as in the above embodiment and then the metal fixture 7b is securely connected with the metal joint 7a by rotating the latter.

Thereafter, the metal fitting member 5 is rigidly fitted to the inner surface of a lateral plate 11a of the cabinet 11 by means of screws 14..., the square shaft 5a is fitted into the square through bore 4c of the movable shaft 4b and setscrew 6 is driven into the square shaft 5a to complete the operation of fitting the plate lid 12 to the cabinet 11.

While the connector 9 is arranged on the metal joint 7a and the central bore 10 is formed on the metal fixture 7b in the above embodiment, conversely the connector 9 may be arranged on the metal fixture 7b and the central bore 10 may be formed on the metal joint 7a.

It should be noted that, in the above embodiment, the arm 1 is axially slidably fitted into said lateral hole 4e and the arm 1 is provided with a fitting aperture 1a

running through the arm 1 in the direction perpendicular to the axis of the arm 1 and having an axially oblong contour, while said eccentric section 4d is provided with a tapped through bore 4d running approximately perpendicular to the lateral hole 4e for receiving an adjuster screw 15 designed for adjusting the angle by which the plate lid is opened, said adjuster screw 15 being also running through the fitting aperture 1a so that the arm is rigidly fitted to the eccentric section 4d of the main body 4a of the damper by means of a fitting screw (not shown) in such a manner that the length of the arm 1 can be adjusted within a limit defined by the effective width of the fitting aperture 1a.

On the other hand, the metal fitting member 5 is roughly realized in the form of a disc whose periphery coincides with a circle drawn around the square shaft 5a. Said metal fitting member 5 is provided with a pair of circular screw holes 5c, 5c arranged symmetrically relative to the square shaft 5a and another pair of oblong screw holes 5d, 5d running along the periphery of the metal fitting member 5 for tentatively fitting the member 5 in order to adjust its angular position as well as a holder section 5e which is integrally formed with the member 5 and radially projecting from the periphery of the main body of the member to abut the front end of said

adjuster screw 15.

Thus, said adjuster screw 15 and said retaining member 5e form a retainer for keeping the plate lid at an open position separated from the cabinet by a desired angle.

Besides, the damper 4 is provided with another adjuster screw 16 at its eccentric section 4d for adjusting its damping force.

Said arm 2 has an inner hollow area 2a for accommodating a compression spring 17, by means of which a slider member 18 located in said arm 2 is axially slidably biased toward the metal joint 7a. The semispherical front end portion of the slider member 18 slidably abuts the rounded peripheral surface 19 of the metal joint 7a.

A recess 20 is formed at an appropriate location of said rounded peripheral surface 19, or a part of said rounded peripheral surface 19 that comes to directly face said slider member 18 when the plate lid 12 is opened by the desired angle in order to releasably lock the slider member 18.

Therefore, when the plate lid 12 is opened by the desired angle, said recess 20 comes to be engaged with said slider member 18 so that the plate lid 12 is held to that open position by the retainer constituted by said screw 15 and said retaining member 5e.

For swingably and retainably fitting a hinged plate lid 12 to a cabinet 11 by using a stay having a damper as described above, the metal fixture 7b is rigidly fitted to the inner surface of the plate lid 12 in advance in a desired direction by means of screws 13..., the rotary shaft 8 is fitted into the central bore 10 as in the above embodiment and then the metal fixture 7b is securely connected with the metal joint 7a by rotating the latter.

Thereafter, the metal fitting member 5 is rigidly fitted to the inner surface of a lateral plate 11a of the cabinet 11 by means of screws 14..., the square shaft 5a is fitted into the square through bore 4c of the rotatable shaft 4b and setscrew 6 is driven into the square shaft 5a to complete the operation of fitting the plate lid 12 to the cabinet 11.

The stay which has been described can be fitted to a cabinet without any difficulty so that the lid may be opened by a desired angle and kept there until it is closed by simply attaching the metal fixture of one of its fitting member onto the lid for coupling the metal fixture and the corresponding metal joint and thereafter affixing the other metal fitting member to the side wall, for example, of the cabinet. Therefore, arms and other

components of the stay will not constitute any obstacles when one of the metal fitting members is attached to the lid while the components remain in a loose state and consequently the operation of fitting the stay can be carried out quickly and accurately.

When the stay is fitted to a cabinet so that the lid may be opened by a desired angle and kept there until it is closed, said desired angle is defined by the retaining member of one of the metal fitting member and the adjuster screw when they abut on each other and can be modified by revolving said adjuster screw. Moreover, with a stay the turning effort applied to the lid is effectively transmitted to the damper as it reaches the eccentric section of the damper in the first place by way of a pair of arms so that the lid can be opened or closed smoothly with a minimum effort. Besides, since said desired angle of opening of the lid is defined by said adjuster screw and said retaining section, the arms may be articulately connected simply by means of a pin to achieve a structural simplicity of the stay. Said retaining mechanism is realized with ease by arranging said adjuster screw and said retaining section respectively on the eccentric section of the damper main body and the metal fitting member.



CLAIMS

(1) A stay comprising first and second arms having respective ends articulately coupled together and their other ends having respective first and second metal fitting members for fitting respectively to a side panel and a lid of a cabinet, the stay further comprising a damper which has a body integrally formed with an eccentric section from which the first arm projects, the damper having a rotatable shaft removably coupled to said first metal fitting member, and an adjuster screw which is screw-threaded into the main body of the damper and arranged to abut a retaining section of said first metal fitting to limit the angle to which the cabinet lid can be opened.

(2) A stay as claimed in claim 1, in which the second metal fitting is removably coupled to a metal joint pivoted to the respective end of said second arm.

(3) A stay substantially as herein described with reference to Figures 1 to 5 of the accompanying drawings.
