

Jan. 13, 1959

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 SPRING-URGED HINGE CONSTRUCTION FOR
 DOORS, COVERS AND THE LIKE
 Filed Dec. 15, 1954

2,867,841

FIG. 1.

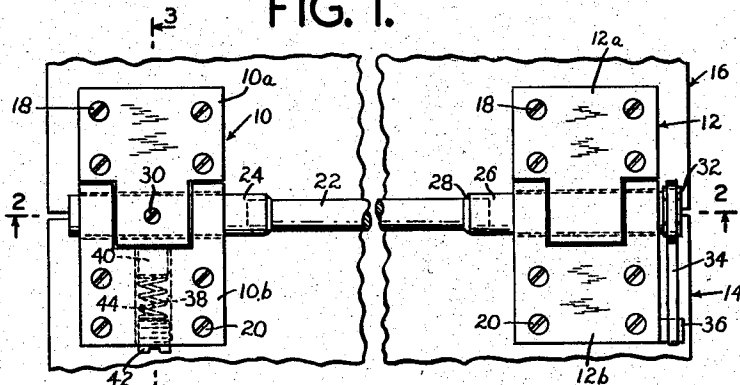


FIG. 2.

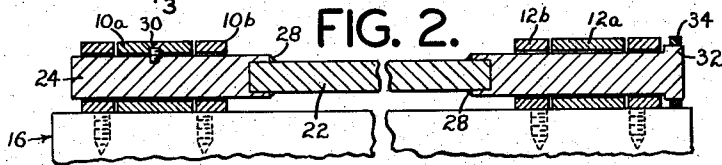


FIG. 3.

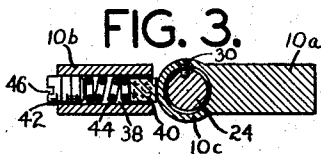


FIG. 4.

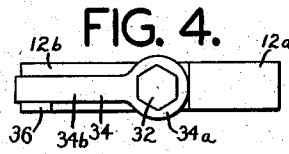


FIG. 5.

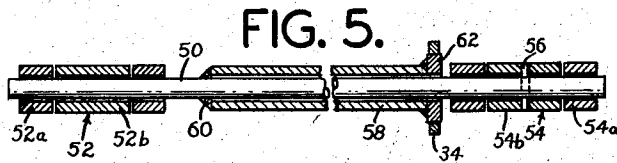


FIG. 6.

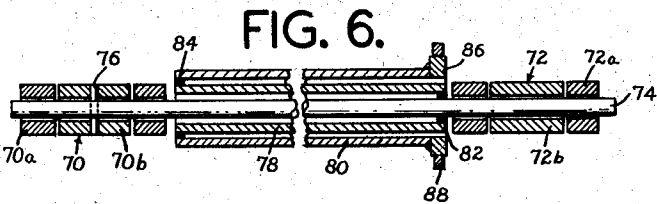
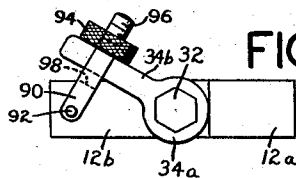


FIG. 4A.



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SPRING-URGED HINGE CONSTRUCTION FOR DOORS, COVERS AND THE LIKE

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Application December 15, 1954, Serial No. 475,490

2 Claims. (Cl. 16—180)

This invention relates to a spring-urged hinge construction for doors, covers and the like.

It is the principal object of this invention to provide an improvement over previously constructed spring-urged hinges in which the pintle and the spring are one and the same member and designated "torsion rod" or "torsion pintle." This principle is susceptible of several variations. For example, a single rod may be provided to serve as a common pintle for two or more hinges. It is assumed that one hinge plate of each hinge is secured to a cover or the like and the other hinge plate of each hinge is secured to a stationary structure such as a box or trunk or the like. Such being the case, one end of the rod is secured to one of the hinge plates on the cover and the other end of the rod is secured to one of the hinge plates on the box. Consequently, when the cover is pivoted on said rod serving as a pintle, the rod is caused to twist about its own longitudinal axis. Its resistance to such twisting action constitutes its spring influence upon the hinges and the cover. The rod may be biased in either direction, that is, either to assist in the opening of the cover or to resist opening thereof. In the one case, the rod would serve as a counter-balance to help support the weight of the cover and to help maintain it in open position or to swing it to such position. In the second case, the rod would serve as a spring closure member for the cover, urging it into closed position and tending to retain it in such position.

It will be understood that the longer the torsion rod, the smaller is the strain upon it as the result of being twisted to a given extent or degree. Since a cover has a given length, it is clear that the torsion rod used thereon would not normally exceed such length. Nonetheless, it has been found possible to increase or compound the effective length of the rod by inserting it into a tube and securing one end of the tube to the corresponding end of the rod while leaving the opposite ends of both the tube and the rod free. The free end of the rod would be secured to one of the hinge plates of the hinge situated at that end, and the free end of the tube would be secured to the other hinge plate of said hinge. Consequently, the twisting action which would take place between the free ends of the tube and rod when the hinge plates are pivoted relative to each other would be spread or distributed both through the rod and through the tube. This would reduce the strain upon the rod by putting some of the strain upon the tube.

It is accordingly a second principal object of this invention to provide a compound torsion member between the hinge plates of a given hinge, said compound torsion member consisting of an inner torsion rod and an outer torsion tube, one end of said rod and the corresponding end of said tube being secured to each other and being secured at their opposite ends to the opposing hinge plates of a given hinge.

It will further be understood that this method of increasing or compounding the effective length of the torsion rod may be extended by using a plurality of torsion

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tubes in conjunction with a single torsion rod. Thus, one end of the rod would be secured to the corresponding end of the first tube. The opposite end of the first tube would be secured to the adjacent end of a second tube. The opposite end of the second tube would be secured to a hinge plate on a cover (or box) and the opposite end of the torsion rod would be secured to a hinge plate on the box (or cover). This process may continue with the use of any number of inter-connected torsion tubes.

It is accordingly another important object of this invention to provide a hinge construction in which compound torsion members are provided to exert a spring action between opposing hinge plates.

The invention is illustrated in the accompanying drawing in which:

Fig. 1 is a fragmentary view of a box having a hinged cover and a pair of hinges joined by means of a torsion rod in accordance with this invention.

Fig. 2 is a longitudinal section through the two hinges and through the torsion rod, taken on the line 2—2 of Fig. 1.

Fig. 3 is a section taken on the line 3—3 of Fig. 1.

Fig. 4 is an end view of said torsion rod and one of the hinges to which it is connected, showing the adjustment member thereon which adjust the tension of said rod by providing for greater or lesser twisting action thereon.

Fig. 4A is a view similar to that of Fig. 4 showing the use of a screw adjustment to actuate and control said adjustment member.

Fig. 5 is a longitudinal section showing a pair of hinges provided with a compound torsion member in accordance with this invention.

Fig. 6 is another longitudinal section showing the further compounded torsion member installed in a pair of hinges.

Referring now to the first form of this invention and to Figs. 1 to 4 inclusive, it will be observed that a pair of hinges 10 and 12 respectively are mounted on a box 14 and a cover 16 for said box. Hinge plates 10a and 12a of hinges 10 and 12 are secured to the cover 16 by means of screws 18. Hinge plates 10b and 12b of hinges 10 and 12 are secured to box 14 by means of screws 20.

A torsion rod 22 is provided between the two hinges. Should this torsion rod be too small in diameter for the purposes herein stated, it may be found desirable to secure to the ends of said torsion rod a pair of rods 24 and 26 of somewhat larger diameter. As Fig. 2 shows, registering holes are formed in the facing ends of said rods 24 and 26 to receive the ends of torsion rod 22 and these three rods are firmly secured to each other by means of welds 28 or other suitable means.

It will be observed that rod 24, which is simply an enlarged extension of torsion rod 22, serves as the pintle in hinge 10, and that rod 26, which is also, in effect, an extension of torsion rod 22, serves as the pintle in hinge 12. Both hinge plates 10a and 10b are mounted on extension rod 24, hinge plate 10a being fixed thereto by means of set screw 30 and hinge plate 10b being free to pivot on said extension rod 24 relative to said rod and to said hinge plate 10a. A somewhat similar arrangement, complicated slightly by an adjustment feature, obtains with respect to hinge 12 and extension rod 26. Both hinge plates 12a and 12b are mounted on extension rod 26 and both are free to pivot relative to said extension rod and relative to each other, save for the adjustment members which prevent such relative movement between hinge plate 12a and said extension rod 26.

It will be noted in Fig. 4 that the outside end of extension rod 26 is provided with a hexagon-shaped portion 32 which is adapted to receive a wrench-shaped

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tension-adjusting member 34. This adjusting member has a socket portion 34a which is hexagon-shaped to receive the hexagon-shaped portion 32 of said extension rod 26. Said adjusting member 34 is also provided with a shank portion 34b which is engageable with a lug or flange 36 on hinge plate 12b. This lug or flange is angle shaped to serve as a keeper for shank 34b of said adjusting member 34. It may be made integral with hinge plate 12b or it may be secured thereto by conventional means.

It will be understood that adjusting member 34 locks extension rod 26 to hinge plate 12b which is secured to box 14. It has above been stated that set screw 30 locks extension rod 24 to hinge plate 10a which is secured to cover 16. Consequently, one end of the torsion rod is, in effect, fixed to box 14 and the opposite end is affixed, in effect, to cover 16. When the cover is pivoted relative to the box, the torsion rod is thereby caused to twist or untwist, depending upon how it is set. Attention is directed to the use of the adjusting member 34 to adjust the tension in the torsion rod. This may be done, for example, by swinging cover 16 with its hinge plates 10a and 12a in clockwise direction relative to box 14 (as viewed in Fig. 4) or by swinging box 14 and its hinge plates 10b and 12b in counterclockwise direction relative to cover 16, and then adjusting the position of adjusting member 34 on hexagonal portion 32 so as to bring its shank 34b into engagement with keeper 36. Counterclockwise movement of cover 16 relative to the box 14 or clockwise movement of said box 14 relative to said cover 16 will now encounter torsional resistance by the torsion rod.

It may be found desirable to apply a damping or snubbing action to resist the torque of the torsion rod and a device to accomplish this result is shown in Figs. 1 and 3. It will be observed that a hole 38 is provided in hinge plate 10b in perpendicular relation to the longitudinal axis of extension rod 24. At the inner end of said hole 38 is a fiber plug 40 or the like which engages the tubular portion 10c of hinge plate 10a. At the opposite end of hole 38 are screw threads which receive a screw threaded plug 42 and between said screw threaded plug and said fiber plug is a coiled compression spring 44. The compression spring exerts spring pressure upon fiber plug 40 and causes said fiber plug to bear tightly against hinge plate 10a. The tension of spring 44 may be varied by turning the screw plug 42 in conventional manner, as by a screw driver engaging a slot 46 in said screw plug 42.

Turning now to Fig. 5 and to the compound torsion member therein shown, it will be observed that a torsion rod 50 is provided as a pintle for hinges 52 and 54. Both hinge plates 52a and 52b of hinge 52 are free to pivot on said torsion rod 50. Hinge plate 54a is also free to pivot on said torsion rod but hinge plate 54b is fixed to said rod by means of a pin 56.

A torsion tube 58 is mounted upon torsion rod 50. One end of said torsion tube is fixed to the torsion rod adjacent hinge 52 by means of a weld 60 or any other suitable means. The opposite end of the torsion tube is provided with a hexagon-shaped portion or member 62 which is welded or otherwise secured thereto. This hexagon-shaped member is adapted to receive a wrench or adjusting member similar to adjusting wrench 34 and hinge plate 54a is provided with means similar to keeper 36 to engage the shank of said adjusting wrench. It will be observed from the foregoing, therefore, that one end of torsion rod 50 is fixed to hinge plate 54b and the opposite end of said torsion rod, functioning through torsion tube 58, is adjustably fixed to hinge plate 54a. Since one of these hinge plates would be secured to a box or the like and the other hinge plate would be secured to the cover of such box, it is clear that a twisting action will take place both in the torsion rod and in the torsion tube when said hinge plates 54a and 54b and said box and

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cover to which they are secured are pivoted relative to each other.

Fig. 6 shows a torsion device which is basically similar to that of Fig. 5 except that it includes the use of two torsion tubes instead of only one. More specifically, a hinge 70 is provided which consists of a hinge plate 70a and a second hinge plate 70b. A second hinge 72 is also provided, consisting of a hinge plate 72a and a second hinge plate 72b. A torsion rod 74 extends through all said hinge members. Only hinge plate 70b is fixed to said torsion rod, by means of pin 76, all of the other hinge plates being free to pivot on said torsion rod. It will be observed that a torsion tube 78 is mounted on torsion rod 74 and a second torsion tube 80 is mounted on said first torsion tube 78. A weld 82 secures one end of the first or inner torsion tube to the torsion rod adjacent hinge 72. A second weld 84 secures the opposite end of said first or inner torsion tube to one end of the second or outer torsion tube 80. The opposite end of said second or outer torsion tube 80 is provided with a hexagon-shaped portion 86, similar to hexagon portions 62 and 32 above mentioned. This hexagon-shaped portion 86 is adapted to receive an adjusting wrench 88 corresponding to adjusting wrench 34 above mentioned and means is provided on hinge plate 72a, corresponding to keeper 36, to hold said adjusting wrench 88 in engagement with said hinge plate 72a.

It will be understood that hinge plate 70b is attached to a box (or cover for said box) and hinge plate 72a is attached to said cover (or box). Since one end of torsion rod 74 is secured to hinge plate 70b and since the opposite end is attached, through torsion tubes 78 and 80 and adjusting member 88, to hinge plate 72a, it is clear that a torsion action will be provided between the box on the one hand and its cover on the other hand.

Fig. 4A provides means for a virtually micrometric adjustment of the torsion rod therein shown and also shown in Figs. 1, 2 and 4. Adjustment member 34b is provided with a socket portion 34a which engages the hexagonal portion 32 of the torsion rod or the torsion rod extension. A screw threaded member 90 is pivotally mounted by means of pin 92 or the like on hinge plate 12b. The longitudinal axis of pin 92 parallels the longitudinal axis of torsion rod 22 and its two extension pieces. A knurled nut 94 is threaded onto the threaded end 96 of said member 90. A slot 98 is provided in said member 90 to receive the adjustment member 34b. It is apparent that said adjustment member 34b will tend to swing in a clockwise direction as viewed in Fig. 4A under the torsional force exerted by the torsion rod. This will cause said adjustment member 34b to abut the knurled nut 94 which now serves as a stop member limiting such clockwise movement of said adjustment member. The knurled nut may be turned in one direction on the threaded end 96 of member 90 to move the adjusting member 34b in a counter-clockwise direction in order to increase the torsional force exerted by the torsion rod or it may be turned in the opposite direction to permit said adjustment member to move in a clockwise direction, thereby decreasing the torsional force which the torsion rod will exert. This adjustment feature can be employed to determine the position to which cover 16 on box 14 will open to within five degrees.

The foregoing illustrates preferred forms of this invention and it will be understood that these preferred forms may be modified and other forms may be provided within the broad spirit of the invention and the broad scope of the claims.

I claim:

1. A spring-urged hinge construction, comprising a pair of hinges, a torsion rod serving as a common pintle for said hinges, each hinge consisting of a pair of hinge plates, one of the hinge plates of one of said hinges being secured to one end of said torsion rod, a torsion tube mounted on said torsion rod, one end of said torsion

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tube being secured to the opposite end of said torsion rod, the opposite end of said torsion tube being secured to the other hinge plate of said last mentioned hinge, the torsion tube being adjustably secured to the hinge plate by means of a hexagon-shaped member secured to said torsion tube, an adjusting wrench connected to said hexagon-shaped member, and a keeper on said hinge plate which engages and holds said adjusting wrench.

2. A spring-urged hinge construction comprising a pair of hinges, a torsion rod serving as a common pintle for said hinges, each hinge consisting of a hinge plate on one side of said torsion rod and a hinge plate on the opposite side thereof, one end of said torsion rod being connected to one of the hinge plates on one side of the torsion rod, a torsion tube mounted on said torsion rod, one end of said torsion tube being secured to the opposite end

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of said torsion rod, the opposite end of said torsion tube being secured to a hinge plate on the opposite side of the torsion rod, said opposite end of the torsion tube being secured to said hinge plate on the said opposite side of the torsion rod by adjustable means comprising a wrench which is adjustably connected to said opposite end of the torsion tube and a keeper for said wrench which is connected to said last mentioned hinge plate.

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