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F. R. ECK

2,733,476

TORSION HINGE

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FIG. 1.

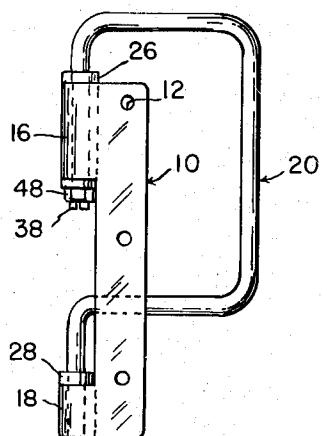


FIG. 2. FIG. 6

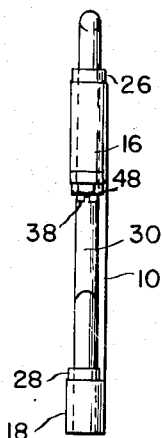
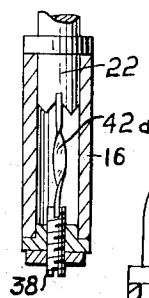


FIG. 5.

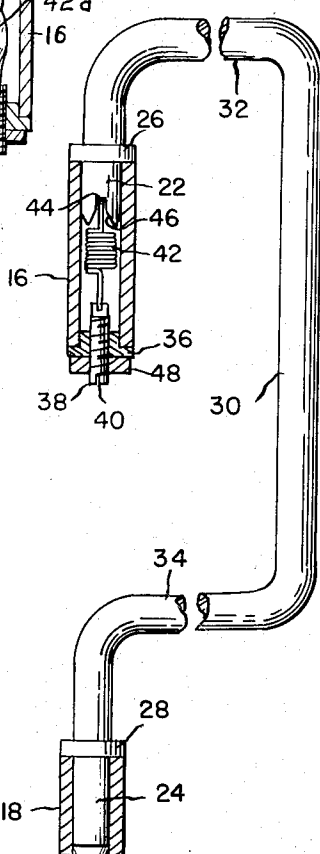


FIG. 3.

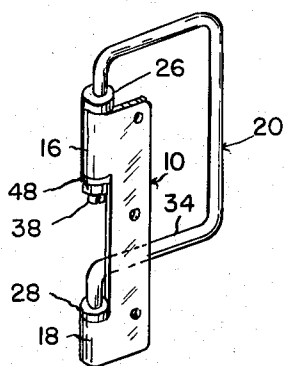
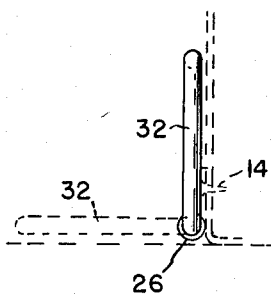


FIG. 4.



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TORSION HINGE

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5 Claims. (Cl. 16—180)

The present invention relates to a torsion hinge and more particularly to a torsion hinge characterized by its simplicity, the cheapness with which it may be produced, and its efficiency in operation.

The present invention is a continuation-in-part of my prior copending application Serial No. 194,227, filed November 6, 1950, entitled "Swinging Refrigerator Shelf," now Patent 2,658,811 dated November 10, 1953.

It is an object of the present invention to provide a torsion hinge comprising a pair of parts hinged together, one of said parts comprising a flat plate having end portions thereof shaped to provide aligned tubular sockets or hinge journals, the other part comprising a length of heavy wire having its opposite ends shaped to provide aligned hinge pin portions extending in the same direction and adapted to be received within said sockets.

It is a further object of the present invention to provide a torsion hinge as described in the preceding paragraph, in which a torsion spring is provided in one of said sockets and has one end fixedly associated with the socket and the other end secured against rotation with respect to the adjacent end of the hinge portion.

Other objects and features of the invention will become apparent as the description proceeds, especially when taken in conjunction with the accompanying drawing, wherein:

Figure 1 is a front elevation of a hinge constructed in accordance with the present invention.

Figure 2 is a side elevational view of the hinge shown in Figure 1 as seen from the left.

Figure 3 is a perspective view of the hinge.

Figure 4 is a plan view of the hinge indicating the position of associated structure in dotted lines.

Figure 5 is an enlarged elevational view of the hinge with parts broken away and with parts in section.

Figure 6 is a fragmentary section similar to Figure 5 showing a modified spring construction.

Referring now to the drawing, the hinge comprises a pair of pivotally associated parts, one of which comprises a flat mounting plate 10 provided with openings 12 for the reception of screws 14 for mounting the plate to a wall or similar supporting surface. At its opposite ends the plate 10 is provided with laterally extending ears which are bent to form tubular sockets or hinge journals 16 and 18. For a purpose presently to be described, the upper socket 16 is of greater vertical extent than the lower socket.

The other hinge part 20 comprises a wire element having its opposite ends shaped to provide hinge pin portions 22 and 24. The hinge pin portions 22 and 24 are spaced apart and are in axial alignment. Directly above the hinge pin portion 22 is a collar 26 and a similar collar 28 is provided directly above the hinge pin portion 24.

The hinge pin portions 22 and 24 are interconnected by an offset open loop comprising a vertical portion 30 and horizontal portions 32 and 34.

It will be observed that the horizontal loop portion 34

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of the wire hinge part 20 is located intermediate hinge journals or sockets 16 and 18 in position to abut an intermediate portion of the plate 10 so as to limit swinging movement between the hinge parts in one direction.

Means are provided for establishing torque between the hinge parts and this means is best seen in Figure 5. The lower end of the socket or hinge journal 16 has fixed therein an internally threaded bushing 36 in which is received a threaded screw 38 having a slot 40 at its lower or outer end for engagement with a screw driver and having means at its upper end for engagement with a torsion spring 42. Conveniently, the inner or upper end of the screw 38 may be slotted to receive a transversely extending end portion of the spring 42. Alternatively, the inner portion of the screw 38 may be provided with a through opening for receiving the transversely extending lower end of the spring 42.

The lower end of the hinge pin portion 22 is provided with a transversely extending slot 44. The upper portion of the slot 44, as clearly seen in Figure 5, has side walls which are parallel while the lower portion of the slot has inclined side walls 46 which diverge apart to receive the upper end of the spring 42 and to guide it into the parallel sided portion of the slot 44 when the hinge parts are assembled. If desired, a lock nut 48 may be associated with the screw 38. Obviously, the torque applied by the spring 42 between the hinge plate 10 and the hinge part 20 may be adjusted by rotation of the screw 38, the resulting axial advance or retraction of the screw having no appreciable effect. In other words, the screw is merely a means for adjusting the torque applied by the spring. While the spring 42 is illustrated as comprising a helical coil having end portions thereof extending transversely to the axis of the helix, it will of course be appreciated that the torsion spring could if desired, take other forms such for example as a flat or helically twisted leaf.

Such an arrangement is illustrated in Figure 6 where a flat spring 42a is shown as received within the bushing 16 and interconnecting the hinge pin portion 22 and the adjusting screw 38.

The present hinge is characterized by the extreme simplicity of its production. In producing the hinge the plate 10 is provided with flat transversely extending ears which are then bent to form tubular or cylindrical open ended sockets as illustrated. The wire part 20 is merely shaped to provide the hinge pin portions, collars 26 and 28 formed thereon by a suitable operation, and the end of one of the hinge pin portions notched to provide the spring receiving slot at its end.

While the hinge illustrated and described herein is capable of general application in the sense that any device which it is desired to mount for swinging movement may be secured to the hinge part 20, the hinge is particularly well adapted to support a swinging refrigerator shelf as illustrated and described in my prior copending application Serial No. 194,227 now Patent No. 2,658,811, dated November 10, 1953, of which the present application is a continuation-in-part.

The hinge part 20 and structure secured thereto may be separated from the hinge part 10 by the simple expedient of lifting the hinge part 20 vertically to withdraw the hinge pin portions 22 and 24 from the sockets 16 and 18 respectively. This will of course result in releasing any tension set up in the spring 42, but the hinge part 20 may be restored to operative relationship simply by inserting the hinge pin portions 22 and 24 in the respective sockets. This will automatically guide the upper end of the spring 42 into the transverse slot 44 of the hinge pin portion 22, and set up the required torque as determined by the adjustment of screw 38. The wide V-slot defined by inclined side walls 46 will guide the

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spring into the slot so that after once setting the torsion adjustment it will not need resetting each time the shelf is removed and replaced.

The drawing and the foregoing specification constitute a description of the improved torsion hinge in such full, clear, concise and exact terms as to enable any person skilled in the art to practice the invention, the scope of which is indicated by the appended claims.

What I claim as my invention is:

1. A torsion hinge comprising a pair of pivotally connected parts, one of said parts comprising a flat elongated plate having laterally extending ears at its top and bottom bent to provide vertically extending axially aligned hinge journals, the other part comprising a single wire element extending laterally from said hinge pin portions, the free end of one of said hinge pin portions having a transverse slot extending thereacross, the hinge journal into which said slotted end extends having an internally threaded bushing fixed in its lower end, a screw extending through said bushing, and a torsion spring in said journal having one end fixed to said screw for rotation thereby, the other end of said spring having a part non-rotatably received in the slot in said hinge pin portion.

2. A hinge as defined in claim 1 in which said wire element is provided with an integral outwardly extending collar spaced inwardly from one of said hinge pin portions and adapted to engage the end of the corresponding hinge journal.

3. A torsion hinge comprising a pair of pivotally connected parts, one of said parts comprising a plate having spaced ears adjacent one edge thereof bent to provide axially aligned spaced apart hinge journals, the other part comprising a single wire element having its opposite ends bent to form spaced hinge pin portions extending in the same direction and in axial alignment, the intermediate portions of said wire element extending laterally from said hinge portions, the free end of one of said hinge pin portions extending into one end of one of

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said hinge journals and having a transverse slot extending thereacross, said one hinge journal having at its other end a member carried thereby for angular adjustment about the axis of said journal, said member having a portion extending into said hinge journal, and a torsion spring in said journal having one end fixed to the portion of said member within said journal and its other end non-rotatably received in the slot in the free end of said one hinge pin portion, the other hinge pin portion being rotatably received in said other hinge journal.

4. A torsion hinge comprising a tubular journal, a hinge pin having an end portion extending into one end of said journal, the end portion of said pin having a transverse slot at the end thereof, a bushing fixed to the other end of said journal, a torsion spring within said journal having an end received in the slot at the end of said hinge pin within said journal, a spring adjusting element extending axially through said bushing into said journal and angularly adjustable about the axis of said journal, means connecting the inner end of said element to the adjacent end of said spring, and frictional means acting between said element and bushing to permit rotation of said element about the axis of said journal by forces applied to the outer end of said element to vary the effectiveness of said spring but to oppose rotation of said element with forces sufficient to prevent rotation thereof by the action of said spring.

5. A torsion hinge as defined in claim 4 in which the friction means acting between said bushing and element comprises a threaded opening in said bushing and matching screw threads on said element.

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