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LOCKING HINGE

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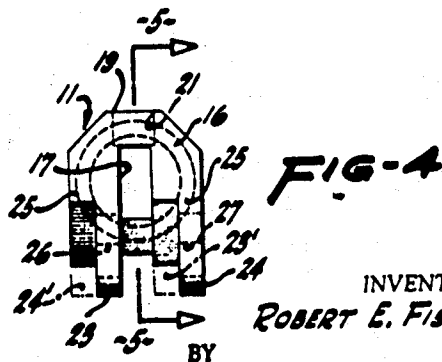
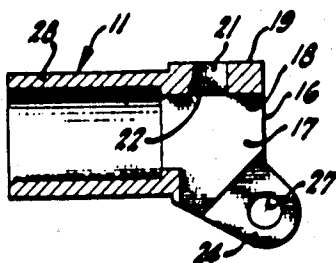
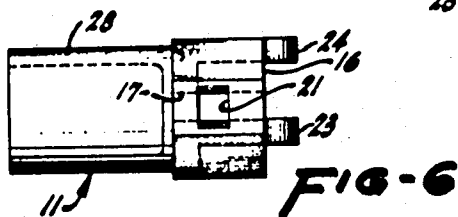
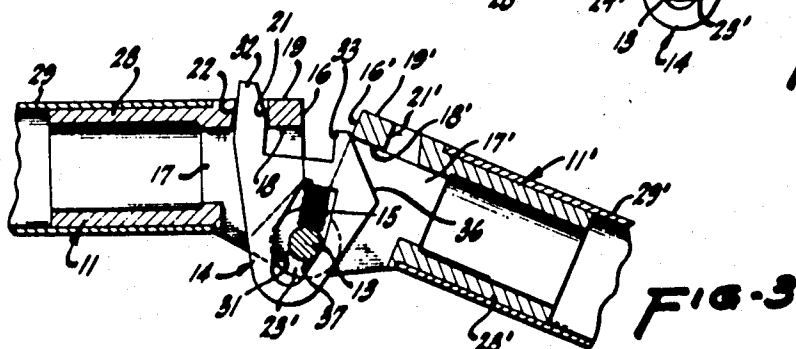
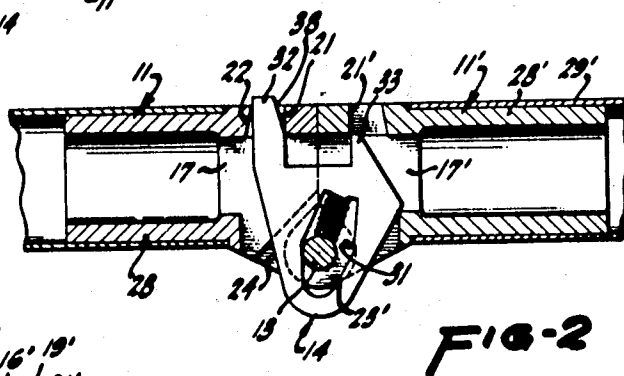
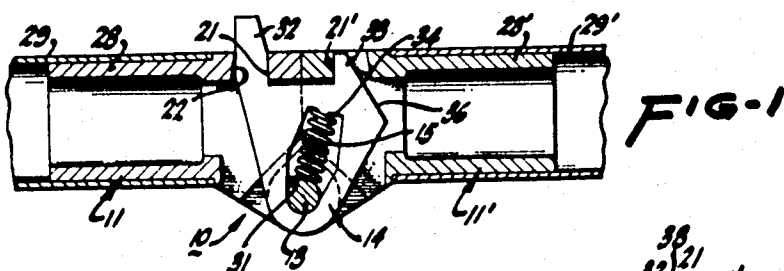


FIG-5

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LOCKING HINGE

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This invention relates to hinges and has for its main object the provision of a hinge that locks automatically when closed.

A further object is to provide a hinge for pivotally connecting two tubular members, which is operable to lock the tubular members in axially aligned position and which is manually unlockable to allow the tubular members to be folded into side-by-side relationship.

Another object of the invention is to provide a locking hinge having a minimum of parts and in which the two major hinge elements are identical in order to minimize the cost of manufacture and assembly of the hinge.

Other objects and advantages will become apparent in the course of the following detailed description.

In the drawings forming a part of this application, and in which like parts are designated by like reference numerals throughout the same,

FIG. 1 is a sectional view of a locking hinge constructed in accordance with the invention, showing the hinge in closed and locked position.

FIG. 2 is a sectional view, similar to FIG. 1, showing the position of the lock member when moved to a position to allow the hinge to be opened.

FIG. 3 is a view, similar to FIG. 1, showing the position of the elements when the hinge is being closed.

FIG. 4 is an end view of one of the hinge members.

FIG. 5 is a sectional view of the hinge member of FIG. 4, taken on line 5-5 of FIG. 4.

FIG. 6 is a plan view of the hinge member of FIG. 4.

Referring now to the drawings, wherein is illustrated a preferred embodiment of the invention, the locking hinge 10 is made up of two identical hinge members 11 and 11', hinge pin 13, lock member 14 and spring 15. Since hinge members 11 and 11' are identical, only hinge member 11 will be described in detail, it being understood that corresponding parts on hinge member 11' will be referred to by corresponding primed reference numerals.

Hinge member 11, which is preferably a casting, has a flat end 16 and a cavity 17 extending centrally into the hinge member from the flat end. This cavity extends towards and terminates at the inner side 18 of the top hinge member wall 19. The top wall 19 has an opening 21 into the cavity 17 that is spaced from the flat end 16. The side 22 of opening 21 away from the flat end 16 is inclined inwardly into the cavity and away from the flat end, preferably at an angle of approximately 10°.

The hinge member 11 has two parallel ears 23 and 24 formed thereon extending outwardly and away from the flat end 16. As best seen in FIG. 4, the ears 23 and 24 are disposed one on each side of cavity 17, and are spaced at different distances from the center of the cavity so that when the hinge members 11 and 11' are assembled, the ears 23 and 24' will be adjacent each other on one side of cavity 17 and ears 24 and 23' will be adjacent each other on the other side of the cavity. Preferably each ear 23 and 24 is half the thickness of the side walls 25 of the hinge member, with the inner surface of ear 23 being flush with the cavity 17 and the outer surface of ear 24 being flush with the outer surface of said wall 25.

The ears 23 and 24 are provided with aligned holes 26 and 27 having their axes in the plane of the flat end 16 and offset from the center of the hinge member for the reception of hinge pin 13. Pin 13 may be a solid pin or a roll pin, as desired.

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The hinge member 11 has a tubular shank 28 for telescopic reception into a structural tubular member 29, to which it may be rigidly secured by any conventional means.

The flat lock member 14 is disposed in cavity 17 with the hinge pin 13 passing through the elongated slot 31 of the lock member. The lock member has two unequal-length prongs 32 and 33 on the upper end thereof, with the longer prong 32 extending into and through opening 21 and the shorter prong 33 extending into, but not through, opening 21', as seen in FIG. 1. Spring 15 is disposed in the lock member slot 31, and bears against the hinge pin 13 and the upper end of the slots 31 to bias the lock member in a direction to project the prongs 32 and 33 into the openings 21 and 21'. The upper end of slot 31 of the lock member 14 has a downwardly projecting stub 34 fitting within the upper end of spring 15 to hold the spring captive within the slot. The major axis of slot 31 is preferably inclined away from the long prong 32, and the slot 31 is widened intermediate its ends to facilitate closing of the hinge. The lock member has a cam surface 36 on its upper edge adjacent the short prong 33.

The lock member may be a single cast piece, or it may be formed, if desired, by a plurality of thin stamped pieces each having the configuration illustrated in FIG. 1, which pieces are assembled to the desired thickness to fill the cavity 17. If such is the case, one or more of the central stamped pieces are provided with the spring retaining stub 34.

To unlock the hinge from its closed position shown in FIG. 1, the locking member prong 32 is depressed manually, forcing the locking member against the bias of spring 15 so that the prong 33 moves down through opening 21' and below the inner side 18' of top wall 19', as shown in FIG. 2. The hinge members 11 and 11' may now be pivoted about hinge pin 13 to their open position wherein the axes of shanks 28 and 28' are parallel. As soon as the hinge starts to be opened the manual pressure on prong 32 may be released, and the lock member will return to its position with respect to hinge member 11 as illustrated in FIG. 1.

In closing the hinge, the hinge members are pivoted back together again. As the hinge members near the closed position, the upper part of flat end 16' of hinge member 11' will engage the cam surface 36 on the lock member and ride therealong to force the lock member downwardly. The side 37 of slot 31 rides against the hinge pin 13 causing the lock member to rotate slightly, as illustrated in FIG. 3, such rotation being allowed by the inclined surface 22 of opening 21 and the inclined surface 38 of the lock member prong 32, in order that the lock member may be easily depressed. After the lock member prong 33 has been sufficiently depressed to enter cavity 17', the hinge is moved to fully closed position with the flat ends 16 and 16' in abutment. At that time the spring 15 will snap the locking member prong 33 into opening 21' to lock the hinge in closed position.

In addition to the novel locking action, an important aspect of the present invention is that the two major elements of the hinge, namely, the hinge members 11 and 11', are identical, which has a significant advantage in lowering the cost of tooling and manufacture, as well as increasing the ease in assembly of the hinges since the assembler need not be concerned with distinguishing between differently shaped parts.

It is to be understood that the form of the invention herein illustrated and described is to be taken as a preferred embodiment of the same and that various changes in the shape, size and arrangement of parts may be re-

sorted to without departing from the spirit of the invention or the scope of the attached claims.

Having thus described my invention, what I claim is:

1. A locking hinge comprising:

- a first hinge member having a flat end with a cavity extending centrally into said flat end, said cavity extending towards and terminating short of one wall of said hinge member, said hinge member having an opening spaced from said flat end through said side into said cavity, said hinge member having two ears extending out and away from said flat end on the side thereof opposite to said wall, said ears being disposed one on each side of and at different distances from the center of said cavity, said ears having aligned holes therethrough on an axis lying in the plane of said flat end;
- a second hinge member identical with said first hinge member;
- a hinge pin extending through said ear holes of both hinge members;
- a lock member having an elongated slot and a short and a long prong extending therefrom, said lock member being disposed in said hinge member cavities when said hinge members are closed with their flat ends in abutment, with the hinge pin extending through said slot, with said long prong extending into and through the opening in said first hinge members and with said short prong extending into the opening of said second hinge member;
- spring means biasing said lock member in a direction to project said prongs into said openings;
- said lock member having a cam surface thereon adjacent said short prong engageable with the flat end of said second hinge member upon closing of said hinge members to move said lock member against the bias of said spring means.

2. A locking hinge as set forth in claim 1, wherein the major axis of said lock member slot is inclined away from said long prong.

3. A locking hinge as set forth in claim 1, wherein the major axis of said lock member slot is inclined away from said long prong and is widened intermediate its length, and wherein the side of the opening in each hinge member away from said flat end is inclined inwardly into said cavity and away from said flat end.

4. A locking hinge as set forth in claim 1 wherein said elongated slot is closed.

5. A locking hinge as set forth in claim 1 wherein said lock member defines a stub projecting into said slot toward said hinge, and said biasing means consists of a coil spring positioned in said slot, seated on said stub, and

applying compressive force to said hinge-pin and said lock member.

6. A locking hinge comprising:

- a first hinge member having a flat end with a cavity extending centrally into said flat end, said cavity extending toward and terminating short of one wall of said hinge member, said hinge member having an opening spaced from said flat end through said side into said cavity, the side of said opening in each hinge member away from said flat end being inclined inwardly into said cavity and away from said flat end, said hinge member having two ears extending out and away from said flat end on the side thereof opposite to said wall, said ears being disposed one on each side of and at different distances from the center of said cavity, said ears having aligned holes therethrough on an axis lying in the plane of said flat end;
- a second hinge member identical with said first hinge member;
- a hinge pin extending through said ear holes of both hinge members;
- a lock member having a closed elongated slot and a short and a long prong extending therefrom, the major axis of said slot being inclined away from said long prong, said slot being widened intermediate its length, a stub projecting from said lock member into said slot toward said hinge-pin, said lock member being disposed in said hinge member cavities when said hinge members are closed with their flat ends in abutment, with the hinge-pin extending through said slot, with said long prong extending into and through the opening in said first hinge members and with said short prong extending into the opening of said second hinge member;
- a coil spring positioned in said slot, seated on said stub, and applying compressive force to said hinge-pin and said lock member;
- said lock member having a cam surface thereon adjacent said short prong engageable with the flat end of said second hinge member upon closing of said hinge members to move said locker member against the bias of said spring.

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