April 14, 1942. C. C. JACKSON ET AL 2,279,992

HINGE CONSTRUCTION

Filed Sept. 5, 1940 2 Sheets-Sheet 1

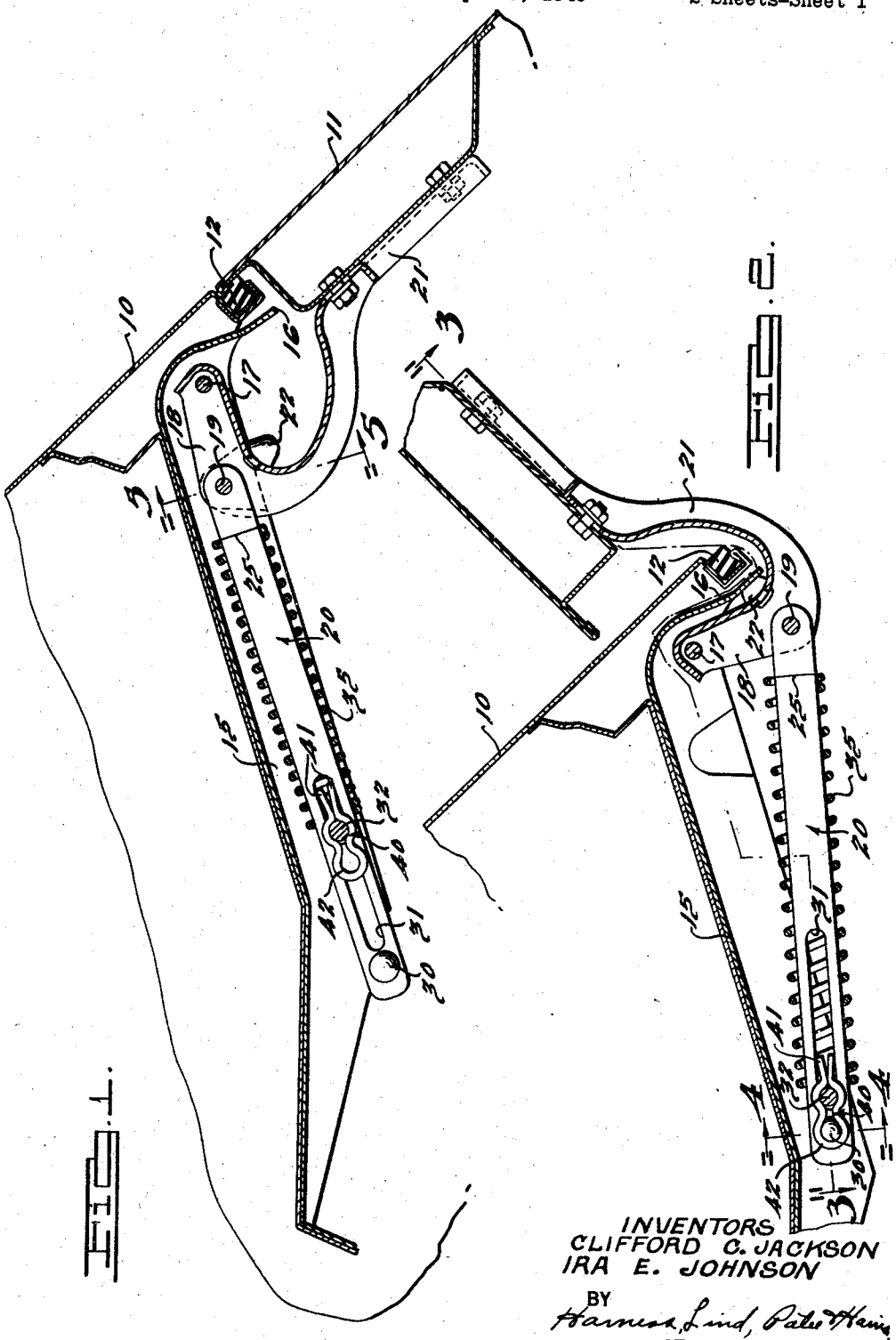


Fig. 1.

Fig. 2.

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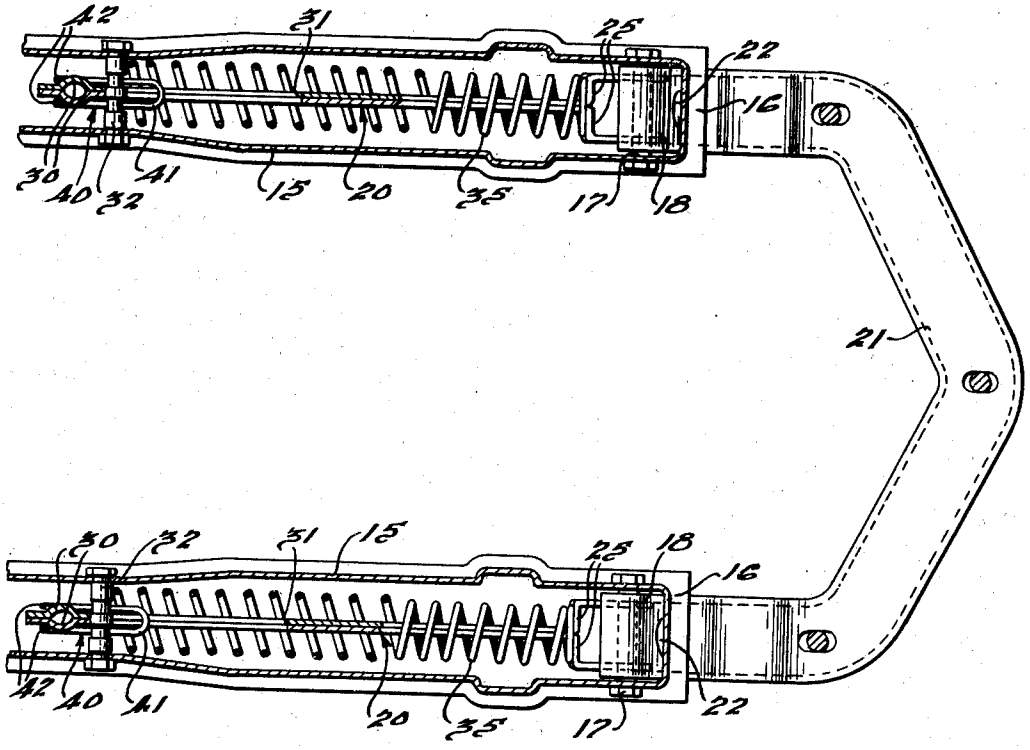


FIG. 3.

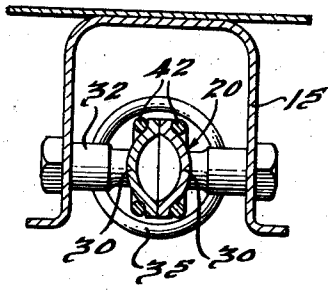


FIG. 4.

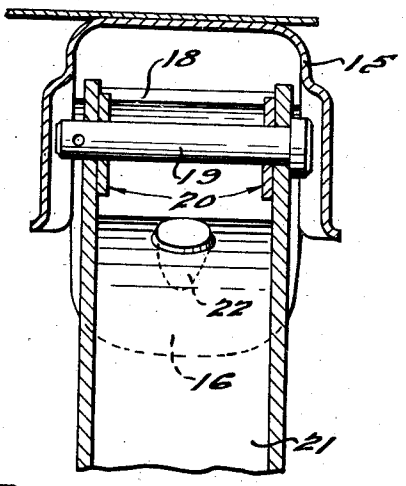


FIG. 5.

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UNITED STATES PATENT OFFICE

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HINGE CONSTRUCTION

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Application September 5, 1940, Serial No. 355,430

10 Claims. (Cl. 16—135)

Our present invention relates to hinge constructions particularly suited for the deck lids of compartments, such as the trunk compartments of automobiles. The primary object of the present invention is to provide a sturdy hinge for the deck lid of a compartment, which hinge will have various advantages as will presently appear.

One object of the present invention is to provide a hinge comprising a toggle, one arm of which is provided with an extension connected to the deck lid and forming the operating lever of the toggle, and the other arm of which is surrounded by a spring adapted to retain the deck lid in closed position, to aid in raising the deck lid from a partially open position to raised position and to resist free closing of the deck lid in order that accidental injury to a person's hands or fingers might be avoided.

Another object of the present invention is to provide a toggle hinge construction having a spring aiding in the operation of the toggle, such spring being positioned about an arm of the toggle and bearing against a shoulder on the arm and a fixed abutment.

Another object of the invention is to provide a fixed abutment for the spring of a spring toggle by means of a guide member passing through a slot in an arm of the toggle about which the spring is positioned, so that as the joint of the toggle approaches a straight line between the pivotal supports for the ends of the arms of the toggle, the spring will be compressed and retained in compressed position to aid in retaining the deck lid in closed position, to aid in raising the deck lid from a partially opened position to raised position, and to resist closing of the deck lid.

Another object of the present invention is to provide a toggle arm for the construction outlined above which is relatively simple to manufacture and sturdy in construction, said toggle arm comprising complementary longitudinal halves each of which is bent laterally adjacent the joint of the toggle to form shoulders against which the compression spring may bear, and each of which may be formed at its free end to provide one portion of complementary snap-engaging means for holding the deck lid in raised position.

Another object of the present invention is to provide relatively simple but effective complementary snap-engaging means associated with an arm of a spring-aided toggle hinge comprising protrusions on the arm of the toggle and a spring clip adapted to engage said protrusions when the deck lid is in raised position, which snap-engaging means may be readily disassociated by the application of downward pressure to the deck lid.

These and other objects and advantages of the present invention will be more fully apparent from a study of the following specification and accompanying drawings wherein like numerals refer to like parts throughout.

In the drawings,

Fig. 1 is a sectional view through a portion of the trunk compartment of an automobile and of the deck lid therefor and showing the hinge construction of the present invention in closed position;

Fig. 2 is a view similar to Fig. 1 but showing the deck lid in raised position and the complementary snap-engaging means engaged to hold the deck lid in raised position;

Fig. 3 is a detail view taken substantially along line 3—3 of Fig. 2, showing the construction of the complete hinge;

Fig. 4 is a vertical section on an enlarged scale of the snap-engaging means taken substantially along line 4—4 of Fig. 2; and,

Fig. 5 is a section on an enlarged scale of the toggle joint taken substantially along line 5—5 of Fig. 1.

The present invention is shown as associated with the rear compartment of an automobile having a rear wall 10 in which is provided an opening adapted to be closed by a deck lid 11, the edge of the deck lid resting upon a resilient strip 12 encircling the opening. The upper wall of the compartment closed by the deck lid is provided with a bracing channel member 15 having an overhanging rear end 16 adjacent the upper edge of the opening closed by the deck lid 11. At the rear extremity of the channel member 15 there is provided a bolt 17 which extends between the walls of the channel member and provides a fixed pivot for one arm 18 of a toggle hinge construction. The arm 18 is pivotally attached by joint member 19 to the other arm 20 of the toggle, and the arm is provided with an integral extension 21 attached to the deck lid and forming the operating lever of the toggle. The extension 21 is reversely bent in U-shape so as to be capable of passing around the overhanging rear end 16 of the channel member 15 and the edge of the opening in which the rubber strip 12 is positioned. As seen in Fig. 3, it is to be appreciated that the extension 21 is formed as a yoke member so as to have both ends thereof forming arms 18 of a pair of toggle hinges, thus imparting rigidity to the entire deck lid construction. A rubber bumper 22 may be provided on the surface of the extension 21 adjacent the joint member 19 so as to engage the overhanging end 16 and prevent metal to metal contact of moving parts when the deck lid is raised.

Each of the arms 20 preferably comprises complementary right and left stampings welded together throughout the greater portion of their length so as to form a fairly rigid construction.

Each complementary half is preferably bent laterally near one end so as to form a pair of shoulders 25 adjacent the toggle joint, and then bent longitudinally again to form a clevis adapted to have the toggle joint member 19 pass therethrough to join arm 18 to arm 20. Each of the complementary halves is likewise provided with a protrustion 30 adjacent the opposite end thereof, the pair of protrusions being opposite each other to form a rounded bulge near the end of the toggle arm 20. A slot 31 extends longitudinally of the toggle arm 20 from a point near the protrusions 30 toward the joint of the toggle, and a fixed guide member 32 mounted in the flanges of member 15 passes through the slot 31 to guide the arm 20 as it is moved by the action of the toggle.

A spring 35 is maintained in position about the arm 20, one end of the spring bearing against the shoulders 25 and the other end of the spring bearing against the guide member 32. The spring is compressed to its greatest extent when the distance between the shoulders 25 and the guide member 32 is shortest, which would be when the toggle joint member 19 is in line with the fixed pivot 17 and the guide member 32. The arms 18 and 20 are so related to the shape of the extension 21 and the deck lid 11 that the deck lid is almost in closed position when the spring 35 is compressed to the greatest extent, and the toggle joint member 19 will have passed beyond the line between fixed pivot 17 and guide member 32 when the deck lid is fully closed so that the spring resists opening of the deck lid and holds the same firmly against the rubberous strip 12. However, as soon as the deck lid has been opened slightly against the further compression of spring 35 the joint member 19 will pass beyond the line between the fixed pivot 17 and the guide member 32 in the opposite direction and spring 35 will aid in raising the deck lid. Preferably, sufficient strength is provided in spring 35 and the spring is so proportioned as to aid in holding the deck lid in raised position. Likewise, it may be seen that the spring resists closing of the deck lid increasingly as the deck lid moves toward an almost closed position so as to act as a safety device preventing accidental smashing of fingers, etc.

In order to hold the deck lid in completely raised position there is preferably provided snap-engaging means which may be disengaged by a direct pull on the deck lid when in raised position. Such means comprise the protrusions 30 and a spring clip 40 mounted upon the guide member 32. The spring clip is preferably U-shaped, with the bight 41 thereof extending through the slot 31 so as to maintain the legs 42 of the U-shaped clip in alignment with the longitudinal dimensions of toggle arm 20, and the legs 42 of the U-shaped clip member are preferably looped in shape so as to engage over the protrusions 30. The member 40 as shown in the drawings is formed by bending and shaping a continuous piece of wire so as to provide each leg of the U-shaped member with a portion adapted to embrace a reduced portion of the guide member 32 which serves to hold the member 40 against lateral displacement. Other forms of spring clip engaging members may be substituted, the present form being one found to be easily manufactured and assembled.

Having described the preferred embodiment of our invention, it should be apparent to those skilled in the art that the same permits of modifications in detail and arrangement. All such modifications as come within the scope of the following claims are considered to be a part of our invention.

We claim:

1. A deck lid hinge construction for the deck lid of a compartment, comprising a fixed pivot mounted in said compartment, a toggle having the end of one arm pivotally connected to said fixed pivot and having its other arm provided with a longitudinal slot, the arm of said toggle connected to said fixed pivot having an integral extension attached to the deck lid and forming the operating lever of the toggle, a guide member mounted in fixed position in said compartment and extending through said slot, said guide member, fixed pivot, and arms being so arranged with respect to the deck lid that the joint of said toggle passes beyond a straight line between said guide member and said fixed pivot in one direction when the deck lid is completely closed and in the opposite direction when the deck lid is moved toward raised position, a spring arranged to be compressed by said toggle as the joint of said toggle is moved toward a line between raid guide member and said fixed pivot whereby said spring tends to retain the deck lid in closed position, to aid in raising the deck lid from a partially opened position to raised position, and to resist closing of the deck lid, and complementary snap-engaging means associated with a fixed portion and a movable portion of said hinge construction and adapted to engage each other when the deck lid is in raised position to hold the deck lid in raised position.

2. A deck lid hinge construction for the deck lid of a compartment, comprising a fixed pivot mounted in said compartment, a toggle having the end of one arm pivotally connected to said fixed pivot and having its other arm provided with a longitudinal slot, the arm of said toggle connected to said fixed pivot having an integral extension attached to the deck lid and forming the operating lever of the toggle, a guide member mounted in fixed position in said compartment and extending through said slot, said guide member, fixed pivot, and arms being so arranged with respect to the deck lid that the joint of said toggle passes beyond a straight line between said guide member and said fixed pivot in one direction when the deck lid is completely closed and in the opposite direction when the deck lid is moved toward raised position, a spring arranged to be compressed by said toggle as the joint of said toggle is moved toward a line between said guide member and said fixed pivot whereby said spring tends to retain the deck lid in closed position, to aid in raising the deck lid from a partially opened position to raised position, and to resist closing of the deck lid, and complementary snap-engaging means associated with said guide member and the toggle arm guided by said guide member and adapted to engage each other when the deck lid is in raised position to hold the deck lid in raised position.

3. A deck lid hinge construction for the deck lid of a compartment, comprising a fixed pivot mounted in said compartment, a toggle having the end of one arm pivotally connected to said fixed pivot and having its other arm provided with a longitudinal slot, the arm of said toggle connected to said fixed pivot having an integral extension attached to the deck lid and forming the operating lever of the toggle, a guide member mounted in fixed position in said compartment

and extending through said slot, said guide member, fixed pivot, and arms being so arranged with respect to the deck lid that the joint of said toggle passes beyond a straight line between said guide member and said fixed pivot in one direction when the deck lid is completely closed and in the opposite direction when the deck lid is moved toward raised position, a spring arranged to be compressed by said toggle as the joint of said toggle is moved toward a line between said guide member and said fixed pivot whereby said spring tends to retain the deck lid in closed position, to aid in raising the deck lid from a partially opened position to raised position, and to resist closing of the deck lid, and complementary snap-engaging means associated with said guide member and the toggle arm guided by said guide member and adapted to engage each other when the deck lid is in raised position to hold the deck lid in raised position, said means comprising a protrusion on the end of the toggle arm guided by said guide member and a resilient clip mounted on said guide member.

4. A deck lid hinge construction for the deck lid of a compartment, comprising a fixed pivot mounted in said compartment, a toggle having the end of one arm pivotally connected to said fixed pivot and having its other arm provided with a longitudinal slot, the arm of said toggle connected to said fixed pivot having an integral extension attached to the deck lid and forming the operating lever of the toggle, a guide member mounted in fixed position in said compartment and extending through said slot, said guide member, fixed pivot, and arms being so arranged with respect to the deck lid that the joint of said toggle passes beyond a straight line between said guide member and said fixed pivot in one direction when the deck lid is completely closed and in the opposite direction when the deck lid is moved toward raised position, a spring arranged to be compressed by said toggle as the joint of said toggle is moved toward a line between said guide member and said fixed pivot whereby said spring tends to retain the deck lid in closed position, to aid in raising the deck lid from a partially opened position to raised position, and to resist closing of the deck lid, and complementary snap-engaging means associated with said guide member and the toggle arm guided by said guide member and adapted to engage each other when the deck lid is in raised position to hold the deck lid in raised position, said means comprising a protrusion on the end of the toggle arm guided by said guide member and a resilient clip mounted on said guide member and said resilient clip comprising an extension engaged in said slot to retain said clip in operative position.

5. A deck lid hinge construction for the deck lid of a compartment, comprising a fixed pivot mounted in said compartment, a toggle having the end of one arm pivotally connected to said fixed pivot and having its other arm provided with a longitudinal slot, the arm of said toggle connected to said fixed pivot having an integral extension attached to the deck lid and forming the operating lever of the toggle, a guide member mounted in fixed position in said compartment and extending through said slot, said guide member, fixed pivot, and arms being so arranged with respect to the deck lid that the joint of said toggle passes beyond a straight line between said guide member and said fixed pivot in one direction when the deck lid is completely closed and in the opposite direction when the deck lid is moved toward raised position, a spring arranged to be compressed by said toggle as the joint of said toggle is moved toward a line between said guide member and said fixed pivot whereby said spring tends to retain the deck lid in closed position, to aid in raising the deck lid from a partially opened position to raised position, and to resist closing of the deck lid, the arm of said toggle guided by said guide member having a shoulder adjacent the joint of the toggle and said spring being disposed about said arm between said shoulder and said guide member, and complementary snap-engaging means associated with a fixed portion and a movable portion of said hinge construction and adapted to engage each other when the deck lid is in raised position to hold the deck lid in raised position.

6. A deck lid hinge construction for the deck lid of a compartment, comprising a fixed pivot mounted in said compartment, a toggle having the end of one arm pivotally connected to said fixed pivot and having its other arm provided with a longitudinal slot, the arm of said toggle connected to said fixed pivot having an integral extension attached to the deck lid and forming the operating lever of the toggle, a guide member mounted in fixed position in said compartment and extending through said slot, said guide member, fixed pivot, and arms being so arranged with respect to the deck lid that the joint of said toggle passes beyond a straight line between said guide member and said fixed pivot in one direction when the deck lid is completely closed and in the opposite direction when the deck lid is moved toward raised position, and a spring arranged to be compressed by said toggle as the joint of said toggle is moved toward a line between said guide member and said fixed pivot whereby said spring tends to retain the deck lid in closed position, to aid in raising the deck lid from a partially opened position to raised position, and to resist closing of the deck lid, the arm of said toggle guided by said guide member comprising complementary longitudinal halves each of which is bent laterally adjacent the joint of said toggle to form shoulders and said spring being disposed about said arm between said shoulders and said guide member.

7. A deck lid hinge construction for the deck lid of a compartment, comprising a fixed pivot mounted in said compartment, a toggle having the end of one arm pivotally connected to said fixed pivot and having its other arm provided with a longitudinal slot, the arm of said toggle connected to said fixed pivot having an integral extension attached to the deck lid and forming the operating lever of the toggle, a guide member mounted in fixed position in said compartment and extending through said slot, said guide member, fixed pivot, and arms being so arranged with respect to the deck lid that the joint of said toggle passes beyond a straight line between said guide member and said fixed pivot in one direction when the deck lid is completely closed and in the opposite direction when the deck lid is moved toward raised position, a spring arranged to be compressed by said toggle as the joint of said toggle is moved toward a line between said guide member and said fixed pivot whereby said spring tends to retain the deck lid in closed position, to aid in raising the deck lid from a partially opened position to raised posi-

tion, and to resist closing of the deck lid, the arm of said toggle guided by said guide member comprising complementary longitudinal halves each of which is bent laterally adjacent the joint of said toggle to form shoulders and said spring being disposed about said arm between said shoulders and said guide member, and complementary snap-engaging means associated with said guide member and the toggle arm guided by said guide member and adapted to engage each other when the deck lid is in raised position to hold the deck lid in raised position, said means comprising a protrusion on the end of the toggle arm guided by said guide member and a resilient clip mounted on said guide member and said resilient clip comprising an extension engaged in said slot to retain said clip in operative position.

8. A deck lid hinge construction for the deck lid of a compartment, comprising a fixed pivot mounted in said compartment, a toggle having the end of one arm pivotally connected to said fixed pivot and having its other arm provided with a longitudinal slot, the arm of said toggle connected to said fixed pivot having an integral extension attached to the deck lid and forming the operating lever of the toggle, a guide member mounted in fixed position in said compartment and extending through said slot, said guide member, fixed pivot, and arms being so arranged with respect to the deck lid that the joint of said toggle passes beyond a straight line between said guide member and said fixed pivot in one direction when the deck lid is completely closed and in the opposite direction when the deck lid is moved toward raised position, a spring arranged to be compressed by said toggle as the joint of said toggle is moved toward a line between said guide member and said fixed pivot whereby said spring tends to retain the deck lid in closed position, to aid in raising the deck lid from a partially opened position to raised position, and to resist closing of the deck lid, the arm of said toggle guided by said guide member comprising complementary longitudinal halves each of which is bent laterally adjacent the joint of said toggle to form shoulders and said spring being disposed about said arm between said shoulders and said guide member, and complementary snap-engaging means associated with said guide member and the toggle arm guided by said guide member and adapted to engage each other when the deck lid is in raised position to hold the deck lid in raised position, said means comprising protrusions on each complementary half of the toggle arm adjacent the end of said arm and a U-shaped spring clip mounted on said guide member with the bight thereof passing through said slot to hold the legs thereof in alignment with said arm and each leg thereof comprising a loop adapted to engage over one of said protrusions.

9. A deck lid hinge construction for the deck lid of a compartment comprising a pair of spring toggle hinges, each of said spring toggle hinges comprising a fixed pivot mounted in said compartment, a toggle having the end of one arm pivotally connected to said fixed pivot and having its other arm provided with a longitudinal slot, the arm of said toggle connected to said fixed pivot having an integral extension attached to the deck lid and forming the operating lever of the toggle, a guide member mounted in fixed position in said compartment and extending through said slot, said guide member, fixed pivot, and arms being so arranged with respect to the deck lid that the joint of said toggle passes beyond a straight line between said guide member and said fixed pivot in one direction when the deck lid is completely closed and in the opposite direction when the deck lid is moved toward raised position, and a spring arranged to be compressed by said toggle as the joint of said toggle is moved toward a line between said guide member and said fixed pivot whereby said spring tends to retain the deck lid in closed position, to aid in raising the deck lid from a partially opened position to raised position, and to resist closing of the deck lid; said spring toggle hinges being arranged in substantially parallel planes and the integral extensions of the arms attached to the deck lid being integrally connected to each other to form a cross-brace for the spring toggle hinges and a stiffening support for the deck lid.

10. A deck lid hinge construction for the deck lid of a compartment comprising a pair of spring toggle hinges, each of said spring toggle hinges comprising a fixed pivot mounted in said compartment, a toggle having the end of one arm pivotally connected to said fixed pivot and having its other arm provided with a longitudinal slot, the arm of said toggle connected to said fixed pivot having an integral extension attached to the deck lid and forming the operating lever of the toggle, a guide member mounted in fixed position in said compartment and extending through said slot, said guide member, fixed pivot, and arms being so arranged with respect to the deck lid that the joint of said toggle passes beyond a straight line between said guide member and said fixed pivot in one direction when the deck lid is completely closed and in the opposite direction when the deck lid is moved toward raised position, a spring arranged to be compressed by said toggle as the joint of said toggle is moved toward a line between said guide member and said fixed pivot whereby said spring tends to retain the deck lid in closed position, to aid in raising the deck lid from a partially opened position to raised position, and to resist closing of the deck lid, the arm of said toggle guided by said guide member comprising complementary longitudinal halves each of which is bent laterally adjacent the joint of said toggle to form shoulders and said spring being disposed about said arm between said shoulders and said guide member, and complementary snap-engaging means associated with said guide member and the toggle arm guided by said guide member and adapted to engage each other when the deck lid is in raised position to hold the deck lid in raised position, said means comprising protrusions on each complementary half of the toggle arm adjacent the end of said arm and a U-shaped spring clip mounted on said guide member with the bight thereof passing through said slot to hold the legs thereof in alignment with said arm and each leg thereof comprising a loop adapted to engage over one of said protrusions; said spring toggle hinges being arranged in substantially parallel planes and the integral extensions of the arms attached to the deck lid being integrally connected to each other to form a cross-brace for the spring toggle hinges and a stiffening support for the deck lid.

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