May 25, 1954

L. H. SEIBERT

CHEST CATCH

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2,679,417

FIG.1

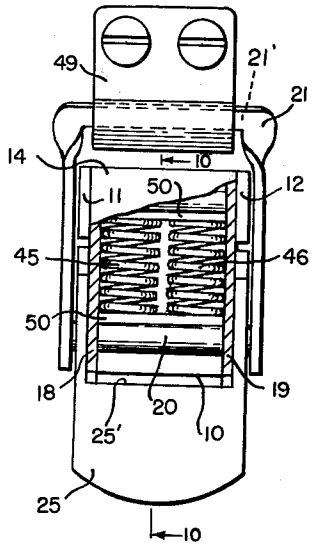


FIG.2

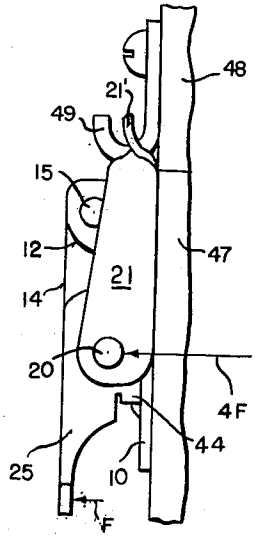


FIG.3

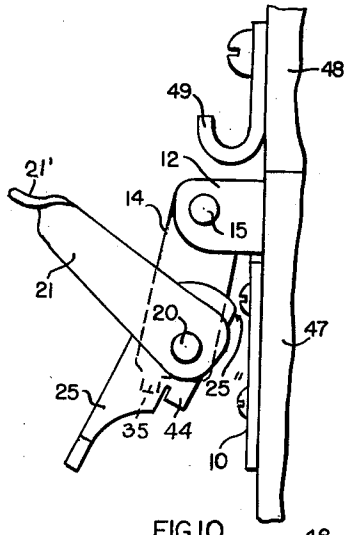


FIG.4

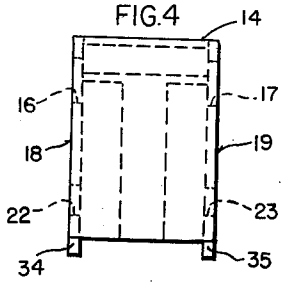


FIG.5

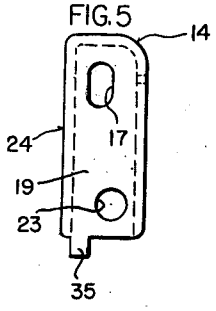


FIG.10

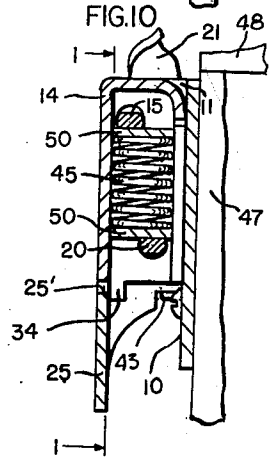


FIG.6

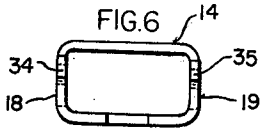


FIG.7

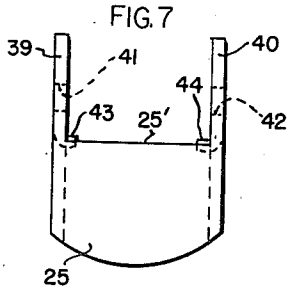


FIG.8

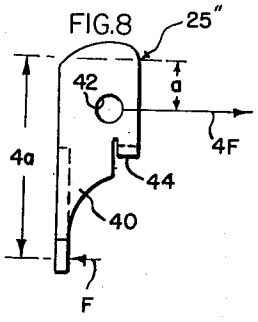


FIG.11

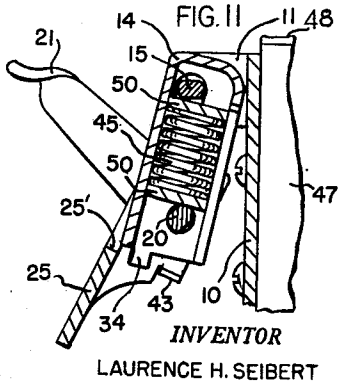
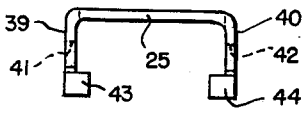


FIG.9



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2,679,417

CHEST CATCH

Laurence H. Seibert, Little Silver, N. J.

Application June 12, 1951, Serial No. 231,246

15 Claims. (Cl. 292—247)

(Granted under Title 35, U. S. Code (1952), sec. 266)

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The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment of any royalty thereon.

This invention relates to improvements in fasteners of the spring-toggle type more particularly adapted for securing the lids, covers or separable members to cabinets, boxes, trunks and similar containers.

Examples of fasteners or latching devices belonging to the same general class to which the present inproved fastener relates, are shown and described in Patent No. 1,390,105, issued September 6, 1921, to Benjamin H. Erwin; in Patent No. 2,457,985, issued January 4, 1949, to Louis M. Dyson; in Patent No. 2,462,282, issued February 22, 1949, to Jack Pickford; and in application filed concurrently herewith by Cataldo Celeste for Inclosed Spring-Loaded Catch, now issued as Patent No. 2,633,531, Serial No. 231,243 (now Patent No. 2,635,910, issued April 21, 1953).

Among the objects of the present invention is the provision of an improved fastener of the character referred to which, although requiring but a very small eccentricity of movement to apply or close, is effective to hold a lid or cover in tightly closed relation to the associated box or container.

Another object resides in the provision of an improved fastener of the character referred to wherein the individual parts or elements are so designed and coordinated as to give to the complete assembly each of the desirable structural and operating features of fasteners or latching mechanisms such as those aforesaid.

A further object of the invention is the provision of a catch which is adequately protected from breakage or injury to other equipment or personnel by enclosing the springs and retaining the parts flat against the cabinet whether in open or closed position.

Still another object is the provision of means to facilitate the initial opening of the catch without increasing its size or likelihood of accidental opening.

Other objects and advantages will hereinafter appear.

For the purpose of illustrating the invention, an embodiment thereof is shown in the drawing, wherein:

Fig. 1 is a front elevational view, partly in section, of a fastener constructed and operating in accordance with the present invention, the section being taken on the line 1—1 in Fig. 10;

Fig. 2 is a side elevational view, looking toward the left in Fig. 1;

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Fig. 3 is an elevational view similar to Fig. 2 but showing the improved fastener in the open or release position thereof;

Figs. 4 and 7 are front elevational views, respectively, of two of the parts in Fig. 1;

Figs. 5 and 8 are side elevational views looking toward the left in Figs. 4 and 7, respectively;

Figs. 6 and 9 are end elevational views looking upwardly in Figs. 4 and 7, respectively;

Fig. 10 is a sectional view taken on the line 10—10 in Fig. 1; and

Fig. 11 is a view similar to Fig. 3 but in section, the section being taken on a line corresponding to line 10—10 in Fig. 1.

The base of the improved fastener is a foot plate or base plate 10 adapted to be secured to the front of a chest or other enclosure, and at opposite edges thereof it has formed thereon outturned parallel ears or lugs 11 and 12.

The body 14 of the fastener shown in detail in Figs. 4, 5 and 6 is pivotally connected to base 10 by a steel pin 15 whose ends are fixed rigidly in lugs 11 and 12 by welding or in any other suitable manner so that the pin cannot rotate with respect to the base. That part of pin 15 between lugs 11 and 12 is made flat on opposite sides thereof, as shown in Figs. 10 and 11, and passes loosely through longitudinal slots 16 and 17 in the respective side walls 18 and 19 of body 14. As viewed in Figs. 2, 3, 10 and 11, body 14 can therefore be rotated through one-hundred-eighty degrees clockwise with respect to base 10. During such movement, however, pin 15 remains fixed in the position thereof shown in Figs. 10 and 11.

Pivotally connected to body 14 by a steel pin 20 of the same cross-sectional shape and size as pin 15, is a steel bail 21. The ends of pin 20 are fixed rigidly in the ends of the bail arms and the flattened intermediate part passes loosely through holes 22 and 23 in the respective side walls 18 and 19 of body 14. As viewed in Figs. 2 and 10, bail 21 and pin 20 fixed thereto can accordingly be rotated through one-hundred-eighty degrees counter-clockwise with respect to body 14. This bail is formed with a closed bight portion in the form of a straight cross bar 21' and the length of the bail arms is sufficient for the bar to swing upwardly over and into a hook 40 on the lid of the closure of the chest or the like upon which the device is installed, when the body or housing 10 is moved from its lowermost or closed-catch position a sufficient distance (sixty or seventy degrees of such movement being ordinarily sufficient) to properly raised or released-catch position.

The operating handle 25 of the fastener shown in detail in Figs. 7 to 9 is pivotally connected to the body 14 of the fastener by the same steel pin 20 which pivotally connects bail 21 to body 14. As shown in Figs. 4, 5 and 6, the body 14 is made up of sheet metal formed with an outer face 24 and with the side walls 18 and 19 having, respectively, holes 22 and 23 through which pin 20 passes, and slots 16 and 17. The side walls 18 and 19 are continued in the back of the fastener to close in the rear portion, and the face of the fastener is formed at the top to close in the top portion approximately down to the point where the side portions are continued around to the rear. At the lower end of the side walls 18 and 19 lugs 34 and 35 are provided for a purpose to be described later. The operating handle 25 includes two similar side portions 39 and 40 provided respectively with holes 41 and 42 and also with lugs 43 and 44.

Coil springs 45 and 46 are disposed in the body or housing 14 and are compressed between pins 15 and 20. As shown in Figs. 1, 10 and 11, a steel rectangular thrust plate 50 which has a relatively loose fit within housing 14, is interposed between each of the pins 15 and 20 and the respective adjacent ends of the springs.

To install the fastener the base 10 thereof is screwed to the front face of a cabinet or other container 47 whose lid or cover 48 is provided with a hook 49.

In the following explanation of the operating action in applying the fastener and in snapping it closed or in releasing it, the reference will be to Figs. 2, 3, 10 and 11 of the drawing. Preparatory to closing the cover 48 tightly on container 47, the forefinger is hooked under the lower edge of handle 25 and the latter moved clockwise about pin 20 to engage lugs 43 and 44 with lugs 34 and 35, respectively, so that handle 25 becomes, in effect, an extension of housing 14 to increase the leverage ratio considered from pin 15 as the pivotal point.

With lugs 43 and 44 engaged with lugs 34 and 35, housing 14 and bail 21 are also moved clockwise and about the fixed pin 15. Bail 21 is then pushed clockwise about pin 20, and over hook 49. With pressure now exerted downward and in the righthand direction on handle 25, the edge portion 25' thereof engages lugs 34 and 35 of housing 14 which is, accordingly, moved counter-clockwise about pin 15. This movement straightens out the toggle to a position of maximum stress whereat the hook and bight 21' and the pins 15 and 20 are in a common plane—that is to say, on dead center, such action being allowed for by further compression of springs 45 and 46 to exert, through housing 14 and pin 20, a strong downward pull on bail 21 and hook 49. The plane mentioned is inclined downwardly and away from the face of the base 10 at a slight angle, so that further movement of the lower parts of the bail and housing toward the right to the closed-catch position shown in Fig. 10, is permitted. During this action, there is a corresponding relative movement vertically of housing 14 with respect to the fixed base 10, the purpose of slots 16 and 17 being to permit this. As the toggle passes to the right of dead-center, the fastener, under force exerted by the compressed springs 45 and 46, snaps into the closed position shown in Figs. 1, 2 and 10 and is at least partially locked therein by reason of engagement of the flat surfaces of pins 15 and 20 with the flat thrust plates 50, as shown in Fig. 10.

To open or release the fastener with the same closed as shown in Figs. 2 and 10, the forefinger is hooked under the lower edge of handle 25 and the latter pulled clockwise about pin 20, the force exerted for this purpose being designated F in Figs. 2 and 8 and the points of contact with base 10 being designated 25'', in Fig. 8. Handle 25 functions as a lever of the second class. The dimensions a and $4a$ (Fig. 8) of the two arms of the lever result in a force 4F being applied to pin 20 at both ends thereof, as shown in Fig. 2. The forces 4F, applied through pin 20 to bail 21, as shown in Fig. 2, move the bail clockwise about hook 49 to initiate reverse or outward movement of the toggle. The clockwise movement of handle 25 about pin 20 engages lugs 43 and 44 with lugs 34 and 35, respectively, whereupon housing 14 is moved clockwise about pin 15 and bail 21 is moved clockwise about hook 49. When the toggle passes to the left of dead-center the force exerted by compressed springs 45 and 46 completes the opening movement with a quick snap action. Bail 21 is then free to be swung counter-clockwise about pin 20, and clear of hook 49.

An important structural and operating feature of the improved fastener resides in the novel design and arrangement of handle 25. With the fastener closed as shown in Figs. 1, 2 and 10, the compressed springs 45 and 46 exert on bail 21 a total downward pull which might be as high as seventy-five pounds, the spring characteristics being chosen to suit particular requirements for holding lid 48 tightly closed on the container 47. This relatively strong force exerted by the springs downwardly with respect to bail 21 is also applied to housing 14 through pin 20, and is a strong force opposing clockwise movement of housing 14 about pin 15. Also acting to hold the fastener closed, or in other words, to resist any clockwise movement of housing 14 about pin 15, is the strong force by which the flat thrust plates 50 are pressed against the respective flat surfaces of pins 15 and 20 by springs 45 and 46, as shown in Fig. 10. Assuming that for the purpose of forcing a clockwise movement of housing 14 about pin 15 to open or release the fastener it takes a force of 4F applied to both ends of pin 20, as shown in Fig. 2, it will be observed that on account of the leverage action provided by handle 25, a force of only F is required to release the fastener. This feature becomes particularly important should the fastener become stuck or clogged with snow and ice. Under such conditions, the ample space between base 10 and the lower edge of handle 25 permits a sufficient grip to be had on handle 25, although the operator may be wearing mittens.

With the fastener open as shown in Figs. 3 and 11, the spring housing 14 may be pushed to the right, against the front wall of container 47, and bail 21 may be swung counter-clockwise until it also is against this wall. In such case, the compressed springs 45 and 46 press plates 50 against one of the flat surfaces of the respective pins 15 and 20 to hold housing 14 and bail 21 firmly against the front wall of the container. With housing 14 and bail 21 so disposed with respect to each other, the two may be swung clockwise about pin 15, through one-hundred-eighty degrees. They will then stand upright and will be held so by the action of springs 45 and 46 pressing the flat thrust plate 50 against the top, flat surface of pin 15.

As shown in Figs. 10 and 11, both the top and

bottom flat surfaces of the fixed pin 15 are in horizontal planes. This arrangement provides that in moving housing 14 from any intermediate position thereof to the down position shown in Figs. 1, 2 and 10 or to the straight-up position, such movement will be completed with a quick snap-action. Also, the oppositely-disposed flat surfaces of pin 20 are arranged so that either one or the other is pressed flat against the adjacent surface of the associated plate 50 when bail 21 is in either one or the other of the two extreme positions thereof, i. e., in juxtaposition with respect to housing 14 as shown in Figs. 1, 2 and 10, or extending straight out with respect to housing 14, which would be the down position in Figs. 3 and 11.

The improved fastener is of the pre-loaded or spring-loaded variety. This important feature is brought about by the fact that with the fastener in the open or release position thereof as shown in Figs. 3 and 11, the springs 45 and 46 are compressed a substantial amount between pins 15 and 20. As soon, therefore, as bail 21 takes hold on hook 49 in tightening down on lid 48, the relatively strong pull exerted by the springs which were already partly compressed, becomes effective on hook 49. As the fastener is completely closed as shown in Figs. 1, 2 and 10, the springs are further compressed to bring into full play the maximum force intended for the springs to exert in holding lid 48 tightly closed with respect to container 47. From this it will be seen that the fastener is effective to hold a lid or cover in tightly closed relation to the associated box or container, although requiring but a very small eccentricity of movement in being closed for such purpose.

It will be appreciated from the foregoing disclosure that the housing 14, with the first pin 15 and the spring means with the plate 50 supplying a "flat" against the pin, constitutes a link device useful in toggles of various forms where it is desired to yieldingly hold the linkage in a given position, and is a subcombination in the organization of the whole catch disclosed.

In the claims, the term "flat" is used in the broad sense, and contemplates modifications such as using pins of a circular cross-sectional area but bent in a single plane to form protrusions extending outwardly, in opposite directions from the longitudinal axis.

While but one embodiment of the invention has been shown and described, it will be understood that various modifications, such as in the size, shape and arrangement of the parts, are possible without departing from the spirit of the invention or the scope of the claims.

What is claimed is:

1. A chest catch comprising, a hook adapted to be fixed to the cover of a chest, a base plate adapted to be fixed to the body of said chest, said base plate including a pair of spaced lugs extending substantially perpendicularly from said base plate, a first pivot pin extending between said lugs and fastened thereto, said pivot pin having at least one flat surface along the long dimension thereof and said flat surface being approximately perpendicular to said base plate, a spring housing having a generally rectangularly shaped cross section, opposite short walls of said housing each being provided with a longitudinal slot near one end of said housing, said opposite short walls of said housing each being provided with a second aperture near the other end of said housing, said housing being

mounted between said pair of lugs with said first pivot pin extending through said longitudinal slots, said housing being rotatable about said pin, a bail, a second pivot pin fixed between the open ends of said bail, said second pin having at least one flat surface along the long dimension thereof and facing the closed end of said bail, said spring housing being mounted between the open ends of said bail with said second pivot pin extending through said second pair of apertures, said bail and second pivot pin being rotatable with respect to said spring housing and said bail being disposed to be engageable with said hook, coil spring means in said housing and compressed between said first and second pivot pins, a first rectangular thrust plate within said housing between one end of said spring means and said first pivot pin, a second rectangular thrust plate within said housing between the other end of said spring means and said second pivot pin, a generally U-shaped lever member, a pair of apertures in opposite arms of said U-shaped member, said lever being mounted with the arms of said U-shaped member about said spring housing and with said second pivot pin extending through said apertures in said arms, said lever being rotatable with respect to said second pivot pin, whereby when the chest is closed, lifting the closed end of said U-shaped member causes the ends of the arms of the U to bear against said base plate and said housing to pivot about said second pivot pin away from said body.

2. A chest catch as claimed in claim 1 wherein said first and second pivot pins each further include a second flat surface parallel to its one flat surface.

3. A chest catch as claimed in claim 2, further including first lugs projecting from said housing and engageable with said lever member to limit the degree of counter-clockwise rotation thereof with respect to said spring housing about said second pivot pin, and second lugs projecting from said lever member and engageable with said first lugs to limit the degree of clockwise rotation of said lever member with respect to said spring housing about said second pivot pin.

4. In a device for clasping two parts together, a hook adapted to be fixed to one of said parts; a member adapted to be fixed to the other of said parts including a pair of outwardly extending spaced lugs, a first pivot pin extending between said lugs and fastened thereto, a generally hollow spring housing having a front wall and opposing side walls, there being a first pair of apertures, one in each side wall, near one end of said housing and a second pair of apertures, one in each side wall, near the other end of said housing, said housing being mounted with said first pivot pin extending through said first pair of apertures, said housing being rotatable about said pivot pin, a bail, a second pivot pin fixed between the open ends of said bail, said spring housing being mounted with said second pivot pin extending through said second pair of apertures, said bail and second pivot pin being rotatable with respect to said housing and said bail being disposed to be engageable with said hook, said second pivot pin having a least one flat surface along the long dimension thereof, and spring means within said housing extending between said first and second pins and biasing said pivot pins in a direction away from said spring means, whereby said bail, second pivot pin and housing constitute a toggle joint, there being a given angle formed by said housing and said bail in

one position of said joint, said second pivot pin being at the apex of said angle, so that said spring means exerts pressure against said flat surface of said second pivot pin and thereby tends to maintain said housing and bail at said given angle.

5. In a device as claimed in claim 4, said first pivot pin including at least a flat surface along the long dimension thereof, whereby said housing, first pivot pin and lugs constitute a second toggle joint, there being a given second angle formed by said housing and said lugs in one position of said second joint, said first pivot pin being at the apex of said angle, so that said spring means exerts pressure against said flat surface of said first pivot pin and thereby tends to maintain said housing and lugs at said second angle.

6. In a device as claimed in claim 4, said second pivot pin including a plurality of flat surfaces along the long dimension thereof, whereby said housing, second pivot pin and bail form a multi-position toggle joint.

7. In a device as claimed in claim 4, said first pivot pin including a plurality of flat surfaces along the long dimension thereof, whereby said housing, first pivot pin and lugs form a multi-position toggle joint, and said second pivot pin including a plurality of flat surfaces along the long dimension thereof, whereby said housing, second pivot pin and bail form a multi-position toggle joint.

8. In a device for clasping two parts together, a hook adapted to be fixed to one of said parts, a base member adapted to be fixed to the other of said parts and including a pair of outwardly extending spaced lugs, a first pivot pin extending between said lugs and fastened thereto, a generally hollow housing having a front wall and opposing side walls, there being a first pair of apertures, one in each side wall, near one end of said housing, and a second pair of apertures, one in each side wall, near the other end of said housing, said housing being mounted with said first pivot pin extending through said first pair of apertures, said housing being rotatable about said first pivot pin, a bail, a second pivot pin fixed between the open ends of said bail, said housing being mounted between the open ends of said bail with said second pivot pin extending through said second pair of apertures, said bail and said second pivot pin being rotatable with respect to said housing, and said bail being disposed to be engageable with said hook, said bail and housing constituting a toggle, and having a dead-center maximum stressed position when the hook and said pins are in a common plane and with the mutually connected ends of the bail and housing spaced from said base member, a lever member having an aperture therethrough intermediate the ends thereof, said lever member being mounted with one end thereof extending from said housing and with the second pivot pin extending through its aperture, whereby when said parts are clasped together, lifting said one end of said lever member causes the other end thereof to bear against said other of said parts, and said housing to pivot about said second pin and move away from said other of said parts, said lever having a closed-catch position parallel to and close against said base member, whereby when its outer end is drawn outwardly from said base member, its other end will act against said base member as a fulcrum and move said second pin and connected end of said housing and bail outwardly and upwardly to free the bail from the hook.

9. In a device for clasping two parts together, a hook adapted to be fixed to one of said parts, a base member adapted to be fixed to the other of said parts including a pair of outwardly extending spaced lugs, a first pivot pin extending between said lugs and fastened thereto, a generally hollow housing having a front wall and opposing side walls, there being a first pair of apertures, one in each side wall, near one end of said housing, and a second pair of apertures, one in each side wall, near the other end of said housing, said housing being mounted with said first pivot pin extending through said first pair of apertures, said housing being rotatable about said first pivot pin from a closed-catch position extended oppositely from said hook to a released-catch position with its free end nearer the hook, a bail, a second pivot pin fixed between the open ends of said bail, said housing being mounted between the open ends of said bail with said second pivot pin extending through said second pair of apertures, said bail and said second pivot pin being rotatable with respect to said housing, and said bail closed at its outer end and having a length to engage at its closed end with said hook when said housing is at said released-catch position and a lever member comprising a substantially flat front wall and parallel, opposed side walls, said side walls extending beyond said front wall to form a pair of parallel arms, each arm having an aperture, said apertures being spaced from the free end of said arms, said lever member being mounted with said housing between said arms and with said second pivot pin extending through the apertures in said arms, said lever member being rotatable with respect to said second pivot pin, whereby when said parts are clasped together, with said housing in said closed-catch position, lifting of the outer end of said front wall of said lever member causes it to pivot about said second pivot pin and the free ends of said arms of the lever to bear against said base member so that said second pivot pin will force said housing to pivot about said first pivot pin and swing away from said base member toward said released-catch position.

10. In a device as claimed in claim 9, limit means on said housing and said lever member to limit the rotation of said lever member about said second pivot pin, with respect to said housing, to a predetermined angle.

11. In a device as claimed in claim 10, wherein said limit means comprises lugs projecting from said housing and engageable with said lever member, and lugs projecting from said lever member and engageable with said housing.

12. In a spring-toggle fastener of the character described, a bail and a spring housing pivotally connected to function as a toggle joint, spring means disposed in said housing, and a pin constituting the pivotal connection between said bail and said housing and extending through the latter and being rotatable with respect thereto, said pin being fixed with respect to said bail for pivotal movement therewith with respect to said housing, said pin having at least one relatively flat surface along the long dimension thereof, said spring means being secured within said housing so as to exert pressure against said pin, whereby said bail, pivot pin and housing function as a toggle joint, there being a given angle formed by said housing and said bail in one position of said joint, said pivot pin being at the

apex of said angle, such that said spring means exerts pressure against said flat surface of said pin and tends to maintain said housing and bail at said given agle.

13. In a spring-toggle fastener of the character described, a base plate, a bail and a spring housing pivotally connected to function as a toggle, said housing being pivotally connected to said plate, a first pin constituting the pivotal connection between said bail and said housing and extending through the latter and being rotatable with respect thereto, said first pin being fixed with respect to said bail for pivotal movement therewith with respect to said housing, a second pin constituting the pivotal connection between said plate and said housing and extending through the latter and being rotatable with respect thereto, said second pin being fixed with respect to said plate, each of said pins having at least a flat surface along its long dimension, said pins being positioned so that said flat surfaces face one another in at least one predetermined angular relationship of said housing, said base plate and said bail, and spring means disposed in said housing and compressed between said pins so as to exert pressure against both said flat surfaces when said housing, base plate and bail are in said predetermined angular relationship, whereby said pressure against said flat surfaces tends to maintain said housing base plate and bail in said predetermined angular relationship.

14. In a spring-toggle fastener of the character described, a base plate, a bail and a housing pivotally connected to function as a toggle, said housing being pivotally connected to said plate, a first pin constituting the pivotal connection between said bail and said housing and

extending through the latter and being rotatable with respect thereto, said pin being fixed with respect thereto, said pin being fixed with respect to said bail for pivotal movement therewith, a second pin constituting the pivotal connection between said plate and said housing and extending through the latter and being rotatable with respect thereto, said second pin being fixed with respect to said plate, and a lever member pivotally connected intermediate the ends thereof to to said housing, said first pin constituting the pivotal connection of said lever member, said lever member being disposed to function as a lever of the second class, the fulcrum being at one end thereof, the load at said first pin, and the force being applied at the other end thereof.

15. In a spring loaded catch, a spring-loaded link element comprising a substantially hollow spring housing, opposite walls of said housing having apertures therein substantially equally spaced from one end of said housing, a pivot pin extending through said apertures, said pivot pin having at least one flat surface along the long dimension thereof, spring means secured within said housing and including a flat exerting pressure against said pivot pin, said housing being relatively rotatable about said pin to a relative angular position such that the pressure of said spring is exerted against said flat surface and tends to maintain said housing in said relative position.

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