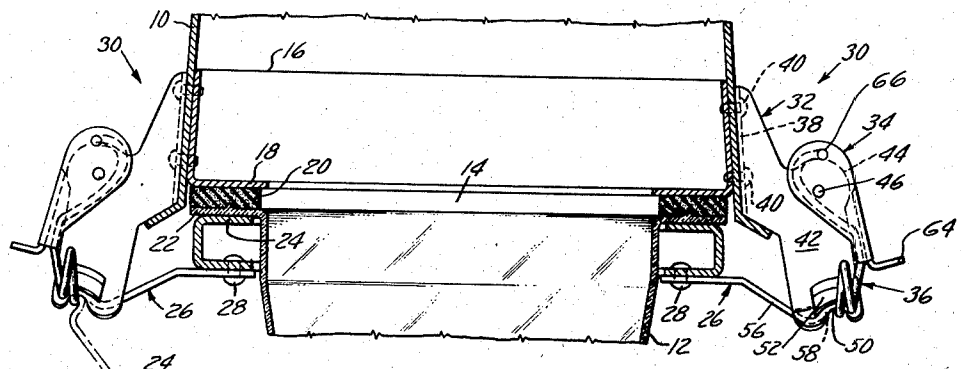
Feb. 17, 1959 G. E. SWANSON 2,873,471

HINGE CATCH

Filed April 30, 1956

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FIG. 1



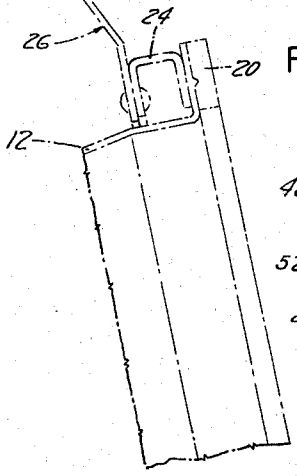


FIG. 5

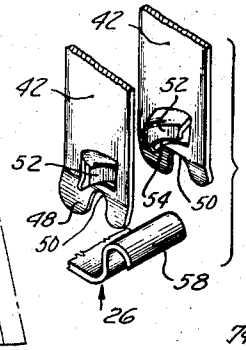


FIG. 2

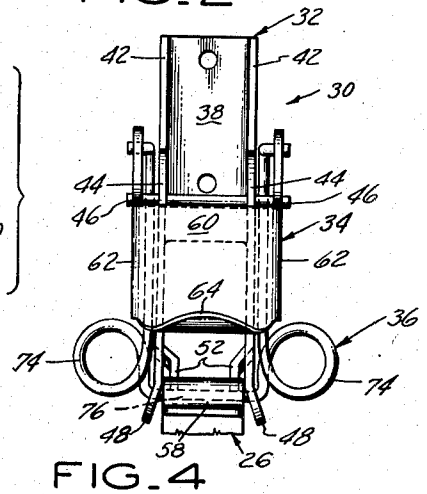


FIG. 3

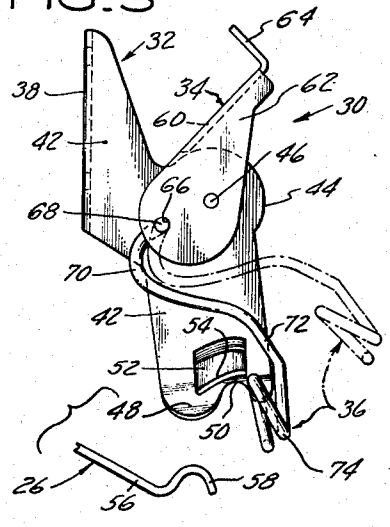
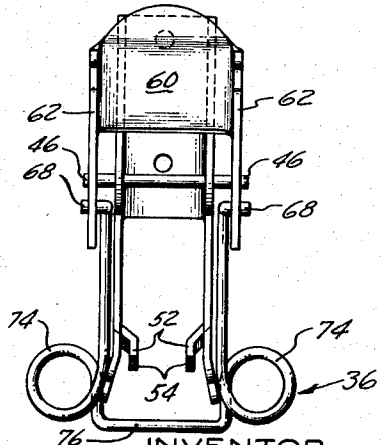


FIG. 4



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FIG. 6

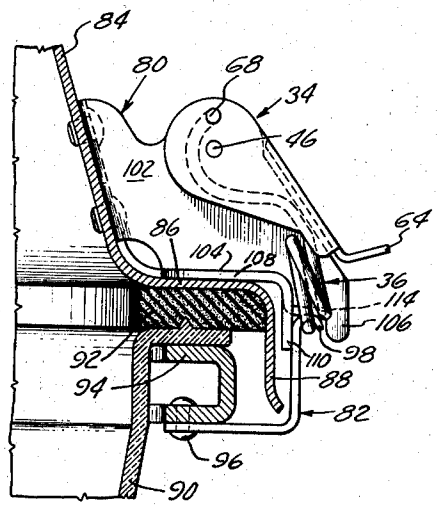


FIG. 7

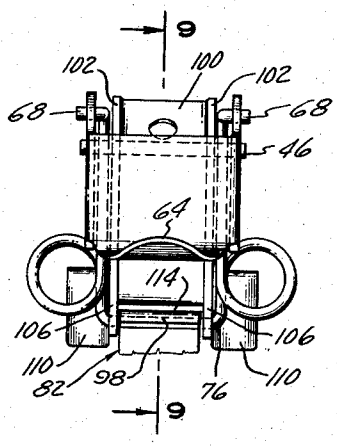


FIG. 8

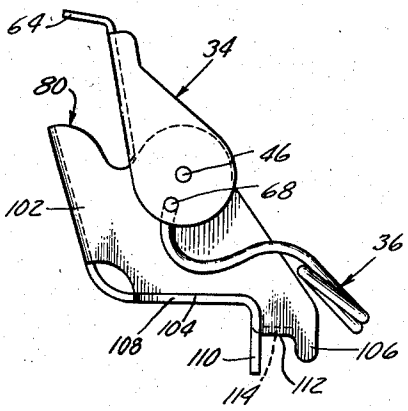
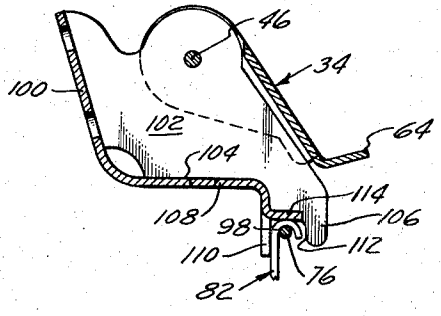


FIG. 9



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2,873,471

HINGE CATCH

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Application April 30, 1956, Serial No. 581,573

5 Claims. (Cl. 16—147)

This invention relates to a latch structure and, more particularly, to an improved hinge catch.

It is an object of the invention to provide a sturdy but simple and economical latch structure comprising a catch which may be secured to an enclosure such as a case or the like to receive a strike attached to a cover or section of the enclosure, the catch being adapted to not only retain the cover in closed position, but also to provide a hinge about which the strike and cover can be pivoted when desired. It will be seen that the invention provides improvements applicable to enclosure latches generally and particularly advantageous in the construction of hinge catches which are ordinarily provided in pairs, one for each of two oppositely located sides of an opening in an enclosure, and which engage independent strikes to secure a cover in closed position over the opening and either of which will hingedly support the cover on its associated strike when the opposite catch and strike are disengaged.

The more specific objects as well as advantages of the invention will become apparent to those skilled in the art from the detailed description having reference to the attached drawings. The said drawings show but two embodiments of the invention, and it will be understood that the drawings and the description of the embodiments therein shown are not to be taken as limiting or defining the scope of the invention, the claims forming a part of this specification being relied upon for that purpose.

Of the drawings,

Fig. 1 is a vertical sectional view of a lamp enclosure having a cover or section which is supported by a pair of hinge catches incorporating the features of the present invention;

Fig. 2 is an enlarged front view of one of the hinge catches shown in Fig. 1, showing the same in engagement with and securing a strike;

Fig. 3 is a side elevational view of the catch, showing the same as it is conditioned to release the strike which is shown disengaged from the catch;

Fig. 4 is a view similar to Fig. 2, but showing the catch as it is conditioned to release the strike;

Fig. 5 is a perspective view of the lower end portion of the catch and showing a fragment of the strike disengaged from or in exploded relationship to the catch;

Fig. 6 is a side view of a catch and strike of alternative construction, showing the said catch and strike as associated with a lamp enclosure generally similar to that shown in Fig. 1;

Fig. 7 is a front view of the catch shown in Fig. 6 and shows a fragment of the strike engaged and retained thereby;

Fig. 8 is a view similar to Fig. 6, but showing the catch conditioned to disengage the strike; and

Fig. 9 is a vertical sectional view taken as indicated by the line 9—9 of Fig. 7.

A latch structure incorporating the features of this invention may be used to advantage in many installations, but it is believed that its most advantageous use will be

as a hinge catch for an enclosure comprising two relatively movable sections. A typical use for a hinge catch of this type is in securing two sections of a street lamp enclosure as illustrated in Fig. 1. Such an enclosure may include relatively movable upper and lower sections, the upper section comprising a metal housing **10** which supports and may provide a reflector for the lamp, and the lower section comprising a glass dome **12** which depends from the housing **10** and covers the lamp opening **14** therein. The structure can also include a ring **16** secured to the housing **10** adjacent the opening **14** and which is generally L-shaped in cross section to provide an inturned flange **18** to engage a rubber or rubber-like sealing ring **20** which is secured to a radially outwardly extending flange **22** on the upper end of the glass dome or cover **12**. An annular metal frame member **24** can also be connected with the dome or cover **12** below its flange **22** to secure a pair of radially outwardly extending strikes **26, 26** which are preferably located oppositely of each other. As shown in the drawings, the strikes **26, 26** are connected to the ring **24** as by rivets **28, 28**, but other conventional fastening means may be employed.

The catches indicated generally at **30, 30** and which are provided in accordance with the present invention are secured externally of the lamp housing **10** for engagement with the respective strikes **26, 26** as will be described. One catch **30** is the duplicate of the other and, therefore, it is necessary that only one be described in detail. In describing the catch, reference will be had to that catch **30** shown on the right in Fig. 1 and the manner in which said catch is operated to engage and release its associated strike **26** will be described. When both catches engage their respective strikes, the dome or cover **12** will be supported as shown in Fig. 1, but when the right-hand catch **30** is operated to release its strike **26**, the dome **12** will swing downwardly on the left-hand catch **30** to the position shown by the broken lines in Fig. 1.

The catch **30** comprises three main elements, namely, a latch base or frame **32**, an operating lever **34** and a wire spring **36**, the lever and spring comprising the links of a toggle latch. The base or frame **32** has a back wall **38** which engages the exterior surface of the lamp housing **10** and which can be conveniently secured thereto as by a pair of rivets **40, 40** or other fastening means extending through suitable apertures provided in said back wall and in the wall of the said housing. The frame **32** also has a pair of forwardly and downwardly extending side walls **42, 42**. It will be observed that each of the side walls **42, 42** has a forwardly extending parti-circular section **44** and that an opening is provided approximately in the center of said parti-circular section so that a transversely extending horizontal pivot pin **46** is supported by said forwardly extending side walls **42, 42**. The pivot pin **46** provides the means for pivotally supporting the lever **34** for movement around said parti-circular sections **44, 44** of the side walls in a manner which will be more fully described hereinafter.

The lower or depending ends **48, 48** on the side walls **42, 42** are flared or bent laterally outwardly, the flared end portions providing a guide for the engaging end of the strike **26** as will be described. Each of the flared bottom end portions **48, 48** of the frame side walls are notched as indicated at **50, 50** to receive the bottom transversely extending horizontal portion of the spring **36**. Adjacent and above the notch **50** in each side wall **42**, a portion **52** of the side wall is struck inwardly. The inwardly struck portion or ear **52** is bent to extend substantially parallel to the side wall and is struck with an arcuate lower edge **54**. The inwardly struck portions or ears **52, 52** of the side walls **42, 42** cooperate to provide a downwardly facing seat for the catch-engaging end of the associated strike **26**. More specifiically, the arcuate lower edges **54, 54** of

the ears 52, 52 provide a cradle receiving the strike which will now be described.

It will be readily understood that that portion of the strike 26 which is secured to the cover or dome 12 at the ring 24 may take various forms particularly suited to the configuration of the dome or other enclosure section to which it is attached. It is important, however, that the outwardly extending portion 56 of the strike be formed to cooperate with the catch 30. More specifically, the said outwardly extending portion 56 is just wide enough to engage the ears 52, 52 and to be guided into such engagement by the flared ends 48, 48 of the frame side walls 42, 42. The end 58 of the outwardly extending portion of the strike 26 is formed as a hook which is arched similarly to the arc of the lower edge 54 on each of the frame ears 52, 52. In other words, the hook portion is upwardly convex and downwardly concave. Thus, when the cover or dome 12 is swung into the position shown in Fig. 1, the hooked end 58 of the strike 26 will be cradled by the ears 52, 52 of the frame, and the transversely extending horizontal portion of the spring 36 will engage within the hooked end to retain the strike 26 and cover 12 in closed position. When the spring 36 engages the strike to retain the same, the said horizontal portion of the spring is engaged in the notches 50, 50 provided at the bottom of the frame side walls in a manner which will be described hereinafter.

The operating lever 34 which is pivotally supported at the pin 46 by the side walls of the frame 32 is used to engage and disengage the spring 36 with the strike 26. The said lever 34 can conveniently be formed as a sheet metal stamping having a front wall or plate 60 and rearwardly extending side walls or plates 62, 62. The front wall 60 is wider than the back wall 38 of the frame 32 so that the side walls or plates 62, 62 of the lever will be spaced outwardly from the side walls 42, 42 of the frame when the lever is pivotally connected therewith in the manner shown. A forwardly extending flange 64 is provided on the lower end of the front wall of the lever 34 for engagement by the thumb or fingers to operate or pivot the lever. As best shown in Figs. 1 and 3, the rearwardly extending side walls or plates of the lever 34 are parti-circular and receive the pivot pin 46 eccentrically with respect to their parti-circular edges. When the lever is pivoted on the pin 46, the front wall 60 of the said lever swings around the parti-circular sections 44, 44 of the frame side walls. As is also shown in Figs. 1 and 3, a suitable aperture 66 is provided in each side wall 62 of the lever for pivotally receiving an end of the spring 36. The apertures 66, 66 are spaced from the pivot pin 46 or from the pivot axis of the lever so that the ends of the spring will be swung around the pivot axis in an over-center action when the lever is pivoted.

As will be hereinafter described, the lever as shown in Fig. 1 is positioned to engage the spring 36 with the hooked end of the strike 26. In that position of the said lever, the spring-receiving apertures 66 are disposed forwardly of the pivot axis of the lever and forwardly of a plane including that axis and the notches 50, 50 in the side walls of the frame. When the lever 34 is positioned as shown in Fig. 3, the spring-receiving apertures 66, 66 are positioned rearwardly of the pivot axis 46 and the said plane, having passed over-center of the pivot axis. In this last described position of the lever 34, the spring 36 is released from engagement with the hooked end of the strike.

When viewed from the front as in Fig. 4, the one-piece wire spring 36 is generally U-shaped and has outwardly extending ends 68, 68 projecting through the lever apertures 66, 66. Accordingly, the upwardly extending resilient legs of the generally U-shaped spring are disposed between the side walls of the frame 32 and the side walls of the lever 34. As best shown in Fig. 3, the upper end portions of said spring legs are bowed or arched rearwardly as indicated at 70 to extend rearwardly of the pivot pin 46. The intermediate portions of the spring legs are bowed forwardly as indicated at 72, 72, and the lower portions of the legs are looped or coiled outwardly as indicated at 74, 74 to increase the spring force and resiliency of the legs. The horizontal crosspiece portion 76 connecting the legs at their lower ends extends transversely of the frame between its side walls and is arranged to engage within the notches 50, 50 of the said side walls and to engage within the hooked end 58 of the strike 26.

Reference is again made to Figs. 1 and 3 and to the positions of the lever 34 and the spring 36. In the position of the lever shown in Fig. 3, there is no tension applied to the spring 36 and it is projected downwardly so that it can be swung with respect to the lever and frame, the transversely extending horizontal portion 76 of the said spring clearing the lower ends of the frame side walls. When the spring is positioned as shown in Fig. 1 with its horizontal portion 76 engaged within the frame notches 50, 50, the horizontal portion 76 cannot be moved forwardly or rearwardly and tension is applied to the spring. That is, the spring legs are stretched as their ends are pivoted by the lever over center of the pivot pin 46 from a position rearwardly thereof to the position forwardly thereof shown in Figure 1. In such pivoting movement, the lever 34 and spring 36 cooperate as a toggle, the spring being under tension by reason of its engagement within the notches 50, 50. When the ends 68, 68 of the spring are disposed forwardly of the pivot axis and the plane including that axis and the notches 50, 50, the spring tension biases the operating lever 34 clockwise whereby the front wall 60 of the lever 34 is thrust against the forwardly bowed sections 72, 72 of the spring legs with a snap action. Thus, the spring retains the lever in the position shown in Fig. 1 which position may be referred to as its locked position.

The operation of the catch shown in Figs. 1 to 5 is characteristically simple and is apparent from the drawings. That is, to retain the cover 12 in closed position, it is only necessary to thrust the strike 26 into engagement with the catch 30, to swing the spring 36 below the frame notches and to then swing the lever clockwise to the closed position shown in Fig. 1. More specifically, the strike 26 is properly engaged by seating the hooked portion 58 thereof on the arcuate edges 54, 54 of the frame ears 52, 52. Then, the spring 36 is pivoted clockwise with respect to the lever and frame from the broken line position shown in Fig. 3 to the full line position thereof. Then, the lever 34 is swung clockwise from the position shown in Fig. 3 to the position shown in Fig. 1. In so doing, the transversely extending horizontal portion 76 of the spring is drawn upwardly into the notches 50, 50 and within the hooked end of the strike to force the strike against its seat. When the hooked end of the strike 26 has been seated in the frame and secured by the spring, the cover 12 can be swung on the catch as a hinge, this action being shown by the broken line position of the cover in Fig. 1. That is, the hooked end 58 of the strike can rotate on the arcuate edges 54, 54 of the frame ears 52, 52 while still being engaged and retained by the transversely extending, horizontal crosspiece section 76 of the retaining spring 36 which then serves as a pintle for the swinging movement of the strike and cover. Thus it will be seen that the U-shaped, one-piece wire spring 36 serves two primary functions, namely, it provides the toggle force for the catch and provides the pivot bar or pintle for the hinge action.

When it is desired to release one strike 26 so that the cover can swing on the other strike and catch, it is only necessary to pivot the lever 34 from the position shown in Fig. 1 to the position shown in Fig. 3 and then to swing the spring 36 away from the frame notches 50, 50. That is, in swinging the lever from the position shown in Fig. 1 to the position shown in Fig. 3, the spring 36 is extended downwardly out of engagement with the notches 50, 50 and the hooked end of the

strike so that the spring can be swung away from the notch to permit swinging movement of the cover **12** and the adjacent strike **26**.

Obviously, both catches **30, 30** and their associated strikes **26, 26** can be engaged as shown in Fig. 1 to retain the cover **12** in closed position or both can be disengaged for complete removal of the cover. However, there is a distinct advantage in being able to disengage one catch and its associated strike to swing the cover on the other catch. This permits maintenance personnel to replace lamps within the lamp housing without complete removal of the cover and without requiring that the cover be held by other means while the lamp is being changed.

The alternative form shown in Figs. 6 to 9 differs only in details of construction of the strike and the catch frame, the lever and spring being identical with their counterparts shown in Figs. 1 to 5 and similarly identified. The modified frame and strike which are indicated generally by the references **80** and **82** are particularly adapted for a lamp enclosure which is slightly different from that shown in Fig. 1. The modified lamp enclosure comprises a housing **84** which has a lower section extending radially outwardly at **86** and then downwardly at **88**. The lamp dome **90** like the first described dome supports a sealing ring **92** for engagement with the housing and a support ring **94** for a plurality of strikes of the type indicated at **82**. The said strike is secured to the ring **94** as by rivets **96, 96** and extends radially outwardly therefrom and then upwardly on the outside of the lower end portion **88** of the housing **84**. The upper end of the extending portion of the strike **82** has a hook **98** for engagement with the spring **36** similarly to the manner in which the first described strike engaged the retaining spring.

The frame **80** like that in the first described embodiment has a back wall **100** and forwardly extending side walls **102, 102** the back wall being secured to the lamp case housing **84** by conventional fastening means. The frame **80** differs from the first described embodiment in that the forwardly projecting side walls **102, 102** have substantially horizontal lower edges **104, 104** and appendages **106, 106** which extend downwardly at the front ends of the edges **104, 104**. The frame **80** is additionally different from the first described embodiment in that a sheet metal section **108** is formed integrally with the back wall to extend forwardly therefrom in a substantially horizontal plane in engagement with the lower edges **104, 104** of the side walls **102, 102**. Depending ears can be provided on the side walls **102, 102** to fit within notches in the wall section **108** to secure the same in the aforedescribed position which is best shown in Fig. 9. Forwardly of the section **108**, the sheet metal stamping is provided with two downwardly extending shoulders **110, 110** which are disposed outwardly of the side walls **102, 102** and which cooperate with the appendages **106, 106** on said side walls to define notches **112, 112** therein for receiving the lower transversely extending portion **76** of the spring **36**. A section **114** of the frame extends forwardly between the shoulders **110, 110** and is disposed between the side walls **102, 102** at the top of the notches **112, 112** to provide a downwardly facing seat for the hooked end **98** of the strike **82**.

As in the first described embodiment, the hooked end of the strike is guided into position adjacent the notches defined in the lower ends of the side walls and between the said shoulders **110, 110** and the appendages **106, 106** on the side walls. When the hooked end of the strike engages or is seated upon the section **114** of the forwardly projecting portion of the back wall of the frame, the spring **36** can be swung below the hooked end of the strike in registry with the notches **112, 112**, and then the lever **34** can be pivoted to the position shown in Fig. 6 to firmly engage the spring in the notches and in the hooked end of the strike. Obviously, disengagement is effected by swinging the lever away from the frame to extend the spring **36** downwardly so that it can be swung away from the notches.

The invention claimed is:

1. Hinge and catch structure for an enclosure which comprises a housing and a cover therefor, the said structure comprising a pair of latch frames attached to opposite sides of the housing and each of which defines a concave seat, a pair of strikes attached to opposite sides of the cover and each comprising a hook with the convex side thereof entered in the seat of an associated latch frame, and two pairs of toggle latch links, a pair of links being associated with each latch frame and hook and one link of each pair comprising a lever which is pivotally attached to its associated latch frame and the other link of each pair comprising a generally U-shaped wire spring pivoted at its ends to said one link so that its crosspiece portion will enter the concave side of the associated hook in operation of the lever to press the said hook into the associated seat, the said crosspiece portion of each spring link serving as a pintle to accommodate swinging movement of its associated hook and the cover when the other spring link is disengaged from its associated hook.

2. Hinge and catch structure for an enclosure which comprises a housing and a cover therefor, the said structure comprising a pair of latch frames attached to opposite sides of the housing and each of which has a wall secured to the housing and a pair of side walls projecting therefrom, an ear having a concave edge struck from each side wall of each latch frame so that the pair of ears on each latch frame define a concave seat, a pair of strikes attached to opposite sides of the cover and each comprising a hook with the convex side thereof entered in the seat of an associated latch frame, and two pairs of toggle latch links, a pair of links being associated with each latch frame and hook and one link of each pair comprising a lever which is pivotally attached to its associated latch frame and the other link of each pair comprising a generally U-shaped wire spring pivoted at its ends to said one link so that its crosspiece portion will enter the concave side of the associated hook in operation of the lever to press the said hook into the associated seat, the said crosspiece portion of each spring link serving as a pintle to accommodate swinging movement of its associated hook and the cover when the other spring link is disengaged from its associated hook.

3. Hinge and catch structure for an enclosure which comprises a housing and a cover therefor, the said structure comprising a pair of latch frames attached to opposite sides of the housing and each of which has a wall secured to the housing and a pair of side walls projecting outwardly therefrom, each of said side walls being provided with a notch, an ear having a concave edge struck from each side wall of each latch frame so that the pair of ears on each latch frame define a concave seat, a pair of strikes attached to opposite sides of the cover and each comprising a hook with the convex side thereof entered in the seat of an associated latch frame, and two pairs of toggle latch links, a pair of links being associated with each latch frame and hook and one link of each pair comprising a lever which is pivotally attached to the side walls of its associated latch frame and the other link of each pair comprising a generally U-shaped wire spring pivoted at its ends to said one link so that its crosspiece portion will enter the side wall notches in the associated latch frame and also enter the concave side of the associated hook in operation of the lever to press the said hook into the associated seat, the said crosspiece portion of each spring link serving as a pintle to accommodate swinging movement of its associated hook and the cover when the other spring link is disengaged from its associated hook.

4. A releasable hinge catch for an enclosure which comprises a housing and a cover therefor, the said struc-

ture comprising a latch frame attached to the housing adjacent the cover and defining a concave seat, a strike attached to the cover adjacent the latch frame and comprising a hook with the convex side thereof entered in the latch frame seat, and a pair of toggle latch links associated with the latch frame and strike, one of the said links comprising a lever pivotally attached to the latch frame and the other link comprising a generally U-shaped wire spring pivoted at its ends to the said lever so that its crosspiece portion will enter the concave side of the hook in operation of the lever to press the said hook into the seat whereby to pivotally retain the cover on the housing, the said crosspiece portion serving as a pintle to accommodate swinging movement of the hook and cover.

5. A releasable hinge catch for an enclosure comprising a housing and a cover therefor, the said structure comprising a latch frame having a wall attached to the housing adjacent the cover and having a pair of side walls projecting outwardly from the housing, each side wall being provided with a notch on the end thereof adjacent the cover and each side wall having an ear struck therefrom toward the other side wall adjacent the notch and each ear having a concave edge adjacent the notch whereby the ears cooperate to define a concave seat, a strike attached to the cover adjacent the latch frame

and comprising a hook with the convex side thereof entered in the seat, and a pair of toggle latch links associated with the latch frame and strike, one of the said links comprising a lever pivotally attached to the side walls of the latch frame and the other link comprising a generally U-shaped wire spring pivoted at its ends to the lever and operable thereby so that its crosspiece portion will enter the side wall notches and the concave side of the hook to press the hook into the seat whereby to pivotally retain the cover on the housing, the said crosspiece portion serving as a pintle for swinging movement of the hook and cover.

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