

[54] COMBINATION BOOK ENCLOSURE AND READING LAMP

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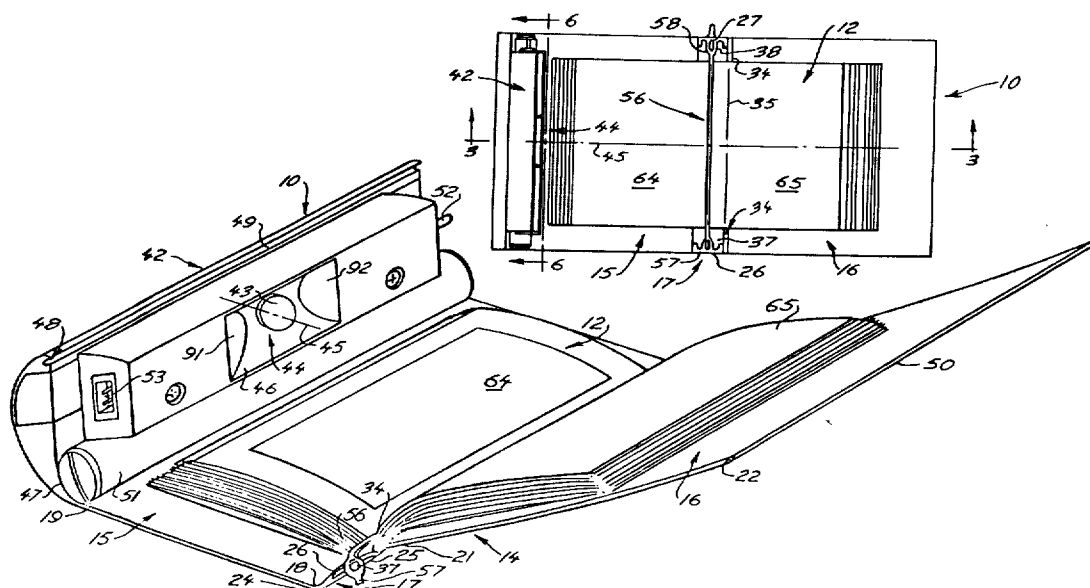
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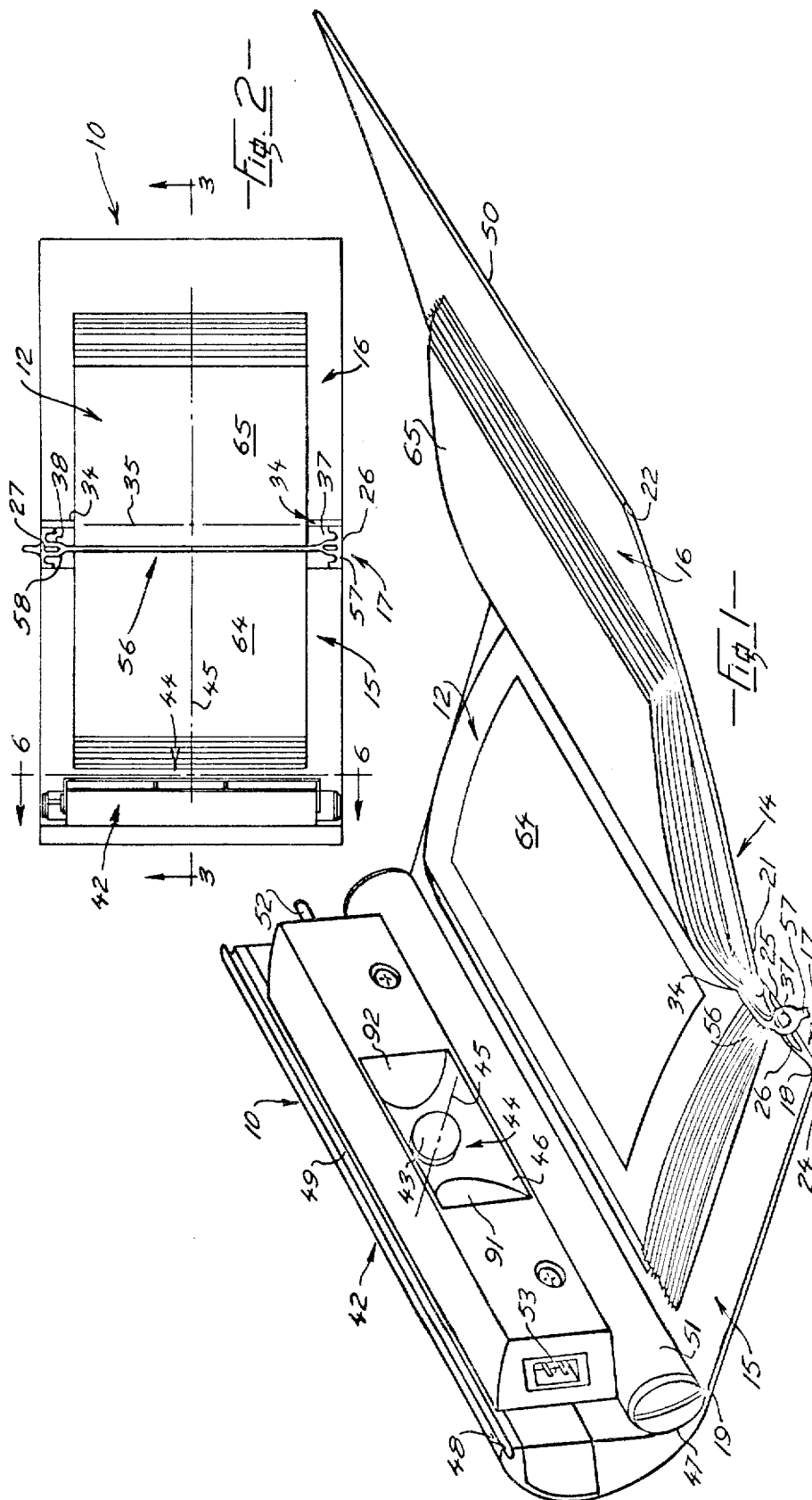
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## ABSTRACT

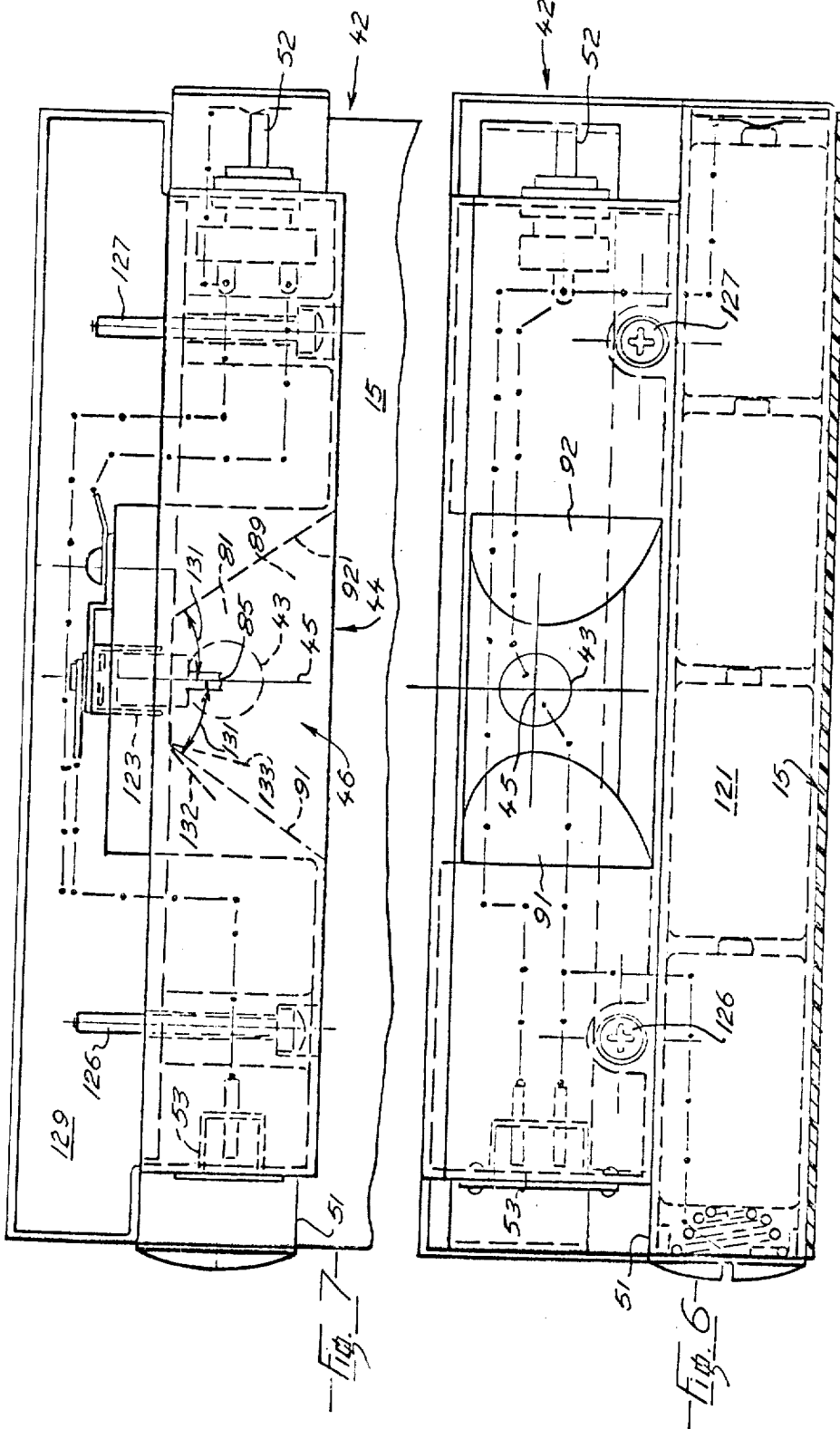
Combination book enclosure and reading lamp to retain book therein and to provide illumination for reading. Combination has first and second cover portions, and spine portion extending from first portion and inclined at obtuse angle thereto. Spine portion hinges the second cover portion. Lamp housing on outer edge of first cover portion has upper edge to accept and releasably retain outer edge of second cover portion to maintain enclosure closed to protect book. Lamp in lamp housing provides illumination of pages within acceptable limits of brightness variation and glare. Flexible link extends between ends of spine portion and passes between pages to retain book spine against spine portion without damaging book.

12 Claims, 7 Drawing Figures









## COMBINATION BOOK ENCLOSURE AND READING LAMP

### BACKGROUND OF THE INVENTION

#### 1. Field of the Invention

The invention relates to a carrying case or enclosure for retaining and protecting a book, the case being provided with a lamp to provide illumination for reading.

#### 2. Prior Art

It is known to provide a reading lamp particularly adapted for releasably securing to a book cover to provide illumination for reading the book. Typical devices are disclosed in U.S. Pat. Nos. 2,377,538; 2,524,461 and 2,561,744 and are satisfactory for some purposes. However, when the lamp is not in use it requires storage, which can be inconvenient. Further the devices are not very suitable for use with soft cover books as the device is clipped to the pages and to the cover and a normal soft cover lacks rigidity required to support the lamp. Further in some devices the clip requires removing for turning the pages. The difficulties above have been reduced by a hinged book cover device as disclosed in U.S. Pat. No. 3,586,847 which secures the book to the cover device by clips. However the cover device is limited to use with books of a certain size as hinges straddling the spine of the cover device are spaced apart at a fixed distance. Further the book tends to be damaged as the clips slide on the book cover when the cover is opened or closed. Further, some of the devices have poorly designed reflectors which produce beams which can produce eye strain due to excessive stray light and wide variations in brightness across the pages, with tendencies to glare due to small angles of incidence of light.

### SUMMARY OF THE INVENTION

The invention reduces difficulties of the above by providing a combination book enclosure and reading lamp adapted for use with hard or soft cover books having a wide variation in thickness. The enclosure protects the book and maintains it in a closed condition when not in use, and can be ready for use by opening the cover and switching on the lamp. Further, the device can be provided with rechargeable batteries so as to be independent of a main electrical supply, or the device can be provided with a plug adapted to be fitted into an electrical outlet. The book is releasably retained in the device without damage to the book.

The invention provides a combination book enclosure and reading lamp adapted to retain a book therein to provide protection for the book when not in use and to provide illumination for reading the book. The combination includes a cover assembly including first and second cover portions having respective inner and outer edges. The assembly further includes a spine portion having spaced parallel first and second edges and spaced ends, space between the edges defining width of the spine portion. The first edge of the spine portion is adjacent the inner edge of the first cover portion with the spine portion inclined at a fixed obtuse angle to the first cover portion. A hinge is provided adjacent the second edge of the spine portion to hinge the second cover portion to the spine portion, the hinge having a hinge axis. Link attachment means are provided adjacent each end of the spine portion. A lamp housing is provided adjacent the outer edges of the first cover portion, the housing including an electrically powered

lamp having an elongated reflector positioned so as to illuminate pages of the book for reading. The lamp housing has a lower edge adjacent the outer edge of the first cover portion and upper edge spaced upwards from the lower edge and adapted to accept and retain the outer edge of the second cover portion when the second cover portion is closed for protecting the book. A flexible link extends between the link attachment means, the link being parallel to the hinge axis and adapted to pass between pages of the book adjacent spine of the book so that the spine of the book is urged against the spine portion of the assembly so as to retain the book within the enclosure.

A detailed disclosure following, related to drawings, describes preferred embodiments of the invention, which however is capable of expression in structure other than that particularly described and illustrated.

### DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective of a device according to the invention, in which a cover member is shown swung open at a hinge thereof, a book retained therein also being shown open.

FIG. 2 is a top plan view of the device of FIG. 1,

FIG. 3 is a simplified section in a plane normal to the hinge, as seen from 3—3 of FIG. 2,

FIG. 4 is a fragmented elevation of an end of a spine portion of the assembly, showing a link attachment means and hinge portion,

FIG. 5 is a fragmented elevation of a flexible link,

FIG. 6 is a fragmented section as seen from 6—6 of FIG. 2, showing a lamp housing of the device with some internal detail,

FIG. 7 is a top plan of the lamp housing of FIG. 6 showing some internal detail.

### DETAILED DISCLOSURE

#### FIGS. 1 through 3

A combination book enclosure and reading lamp 10 according to the invention is shown retaining a book 12 therein. The combination includes a cover assembly 14 having first and second cover portions 15 and 16 and a spine portion 17. The cover portion 15 has inner and outer edges 18 and 19 and the cover portion 16 has inner and outer edges 21 and 22. The spine portion has spaced parallel first and second edges 24 and 25 and spaced ends 26 and 27, space between the edges 24 and 25 defining width 28 of the spine portion. The first edge 24 of the spine portion is adjacent the inner edge 18 of the first cover portion so as to be essentially integral therewith, the spine portion being inclined at a fixed obtuse angle 30 to the front cover portion. The angle 30 is about 125° but can vary between lower and upper limits shown as broken lines 31 and 32 of 110° and 140° respectively. A hinge 34 is provided adjacent the edges 25 and 21 to hinge the second cover portion to the spine portion, the hinge having a hinge axis 35. Link attachment means 37 and 38 are provided adjacent the ends 26 and 27 respectively of the spine portion 17, and are spaced apart sufficiently to accept the book therebetween.

A lamp housing 42 is provided adjacent the outer edge 19 of the cover 15. The housing includes an electrically powered lamp 44 having a bulb 43, a central lamp axis 45 and an elongated reflector 46 positioned so as to illuminate pages of the book for reading. The lamp housing has a lower edge 47 adjacent the outer

edge 19 of the cover portion to hold the housing rigidly relative to the first cover portion, and an upper edge 48 spaced upwards from the lower edge. The edge 48 is adapted to accept and retain the outer edge 22 of the second cover portion when the second cover portion is closed for protecting the book during storage or carrying. The upper edge 48 has a groove 49 extending therealong, and the outer edge 22 of the cover portion 16 has a complementary tongue 50, the groove accepting the tongue when the cover is closed. The tongue and groove serve as cooperating releasable latch means to retain the outer edge of the cover 16 against the housing. As seen in FIG. 3, the cover portion 16 has flexibility and can be curved slightly as shown approximately in broken outline 16.1, which facilitates fitting of the tongue 50 into the groove 49, the tongue and groove being shown in engagement in broken outline at 49 and 50.1. Thus the hinge 34 is under low compression forces when the cover 16 is closed. Flexibility in the cover portions and spine portion provides accommodation for insertion of the tongue within the groove and retention therein. The housing 42 has a battery container 51 to receive batteries as shown in FIG. 7, and a switch 52 for controlling the lamp 44. A receptacle 53 is provided in the housing for recharging the batteries as required.

A flexible link 56 extends under tension between the link attachment means, the link having ends 57 and 58 releasably secured to the link attachment means 37 and 38 respectively. The link is generally parallel to the hinge axis and passes between pages of the book adjacent the spine 60 of the book. Thus the spine of the book is adjacent the spine portion 17 of the combination 10 so as to retain the book firmly adjacent the spine portion. The link passes between the middle pages of the book and does not damage the book, nor restrict turning of the pages, which contrasts with some prior art devices. The ends of the link are positively located on the attachment means and are not free to move laterally relative to the spine portion.

Each link attachment means has a plurality of projections, as will be described with reference to FIG. 4, so as to provide accommodation for a range of book thicknesses. When fitted in the enclosure an upper corner 62 of the book spine 60 is adjacent the hinge 34. For a relatively thin book the link 56 extends between portions of the attachment means closer to the hinge so that the upper corner of the book spine is similarly positioned relatively closely to the hinge. The device accommodates a book of a maximum thickness no greater than the width 28 of the spine portion in which the link extends between attachment means farther from the hinge. It is preferable, but not essential, that the link passes between pages at the center of the book.

Two important aspects, namely glare and surface brightness, were considered in selection of the lamp 44 which is designed for use with batteries, and thus, due to limited power available efficient reflector design is important. In an open condition as shown in full outline the book 12 has upper pages 64 and 65 exposed on the left hand and right hand portions 67 and 68 of the book respectively. The first and second cover portions 15 and 16 are positioned adjacent front and rear covers 70 and 71 respectively of the book. This is compatible with common practice of receiving illumination from the reader's left hand side, however the book could be reversed so that the lamp is on the right hand side.

When open at the beginning of the book, the left hand portion of the book has a few pages and the right hand portion has many, thus the left hand upper page 64 is spaced at a maximum distance from the lamp. In such a condition, angle of incidence of the light from the reflector at a random position 74 is at an angle 75 and glare and brightness are acceptable. As the reader progresses through the book, the angle of incidence at the position 74 becomes progressively less. On the last left hand page of the book angle of incidence 75.1 relative to that page at 74.1 is at a minimum and distance is at a minimum and thus a tendency for glare off the pages is at a maximum. The pages on the right hand side of the open book receive light from the lamp 44 at greater angles of incidence and greater distances and thus glare consideration is relatively unimportant. However, distance from the light source is greater than for the left hand side pages and thus brightness considerations dominate. To limit maximum distance from the light source of outer edges of pages on right hand side of book, opening of the cover 16 is restricted by the hinge 34. From closed to maximum opened condition as shown, the cover portion 16 swings through an angle 77 of about 110°. When reading, the combination is supported in the palm of the reader's hand and the thumb (not shown) is usually placed between the pages at which the book is open. The reader's thumb helps to hold the left hand side pages down to ensure sufficient illumination for lighting portions of the pages against the binding, the limitations on the cover opening augmenting support of the back covers.

The reflector 46 has a particular profile designed to accommodate the variation in the angles of incidence and light source distances as outlined also with acceptable glare and brightness. A partial-parabolic, elongated reflector has been found acceptable, however cylindrical or other profiles would also serve to reduce glare and produce acceptable variations of surface brightness across the pages. As seen in FIG. 3, the reflector has an elongated partially cylindrical surface 87 having upper and lower curved inner portions 80 and 81 which are generally parabolic and disposed symmetrically about the central lamp axis 45. The bulb 43 has an axial center line 83 coincident with the axis 45 and normal to the hinge axis 35, and a filament 85 disposed thereon. The filament 85 is positioned close to the focus (not shown) of the parabolic portions so as to produce a slightly diffused beam from the inner portion with limited light dispersion. The reflector 46 also has generally plane upper and lower outer portions 88 and 89 which merge smoothly with the inner portions of the reflector to provide illumination of the pages so that glare and variations in brightness are within acceptable limits for reading. The upper outer portion 88 is disposed generally parallel to the axial center line 83 and the portion 89 is disposed at an angle 90 to the center line 83. Thus the lower portion 89 diverges downwardly and outwardly from the bulb axial center line 83. The portion 88 reflects light downwards onto left hand portions of pages on the left hand side of the open book, and reduces chances of direct light from the bulb reaching the reader's eyes. The angle 90, which is about 25° but can vary between 15° and 60°, provides clearance for light reflected from the portion 88.

As seen in FIG. 1, the reflector has a pair of inclined, oppositely facing end portions 91 and 92 which are generally plane and described in greater detail with ref-

erence to FIG. 7. The end portions are disposed in planes generally normal to the first cover member and inclined to the central axis 45 so as to produce a fan-shaped beam of light of sufficient width to illuminate outer portions of the pages of the book.

#### FIGS. 4 and 5

With reference to FIG. 4, the link attachment means 37 has a plurality of projections 101 spaced between the first and second edges 24 and 25 of the spine portion. Two projections 102 and 103 are shown and are suitable for normal soft cover books. If the enclosure is adapted to retain hard cover books, which can be generally thicker, three or four projections can be provided. The plurality of projections extend axially outwards from a recess 105 adjacent the end 27. Each projection is defined in part by four generally plane side-walls. Space between the side walls and the spine or an adjacent projection provides clearance to accept ends of the link. For a book of a particular thickness, the end 57 of the link 56 engages the projections 102, portions of the link passing through clearances 106 and 107 on either side of the projection.

The spine portion 17 has a convex inner face 108 which is approximately complementary to concave curvature of the spine of an open soft cover book, as seen in FIG. 3. The hinge 34 has a hinge pin 110, a portion of which only is shown, which pin passes through complementary hinge portions 111 and 112 of the spine portion and cover 16 respectively. The hinge is similar to a piano hinge extending continuously along the spine portion 17 so as to provide a sturdy support for the cover portion 16. The hinge is designed to resist relatively low compression forces when the cover portion 16 is urged against the upper edge 48 of the lamp housing.

With reference to FIG. 5, the link 56 has rings 115 and 116 adjacent outer ends 57 and 58 respectively, the rings having central openings to accept the projections of the link attachment means. Tabs 118 and 119 extend a short distance outwards from the rings 115 and 116 respectively, and are adapted to be gripped by the finger and the thumb for engaging and disengaging the ring from the projection for removal or insertion of the book. Thus at least one end of the link is releasable from the attachment means so as to facilitate insertion of the book. Clearly alternative links could be used, such as an endless loop of elastomeric material such as a rubber band which can be retained releaseably on each attachment means. This alternative is not shown.

#### FIGS. 6 and 7

The battery container 51 has a plurality of batteries 121 (broken outline), the batteries arranged in series so as to generate sufficient voltage for the bulb 44. Undesignated conductors shown in broken line extend from the ends of the battery container through the switch 52 to a bulb socket 123 retaining the bulb 44. For ease of maintenance the battery container 51 and reflector 46 are an integral unit secured by a pair of screws 126 and 127 passing into an outer wall 129 of the lamp housing 42. The AC power receptacle 53 receives low current from a conventional transformer-rectifier (not shown) for recharging the batteries when required. It has been found that when using four, C-size, nickel/cadmium cells powering a 6-volt, 2.5 watt, miniature screw base bulb, (number 425), 2.3 candle-

power is attained when the batteries are in good condition. Such batteries can be recharged for 14 hours to provide a working life of 3 hours between charges. Alternatively, alkaline/manganese batteries can provide a life of 5 hours of continuous usage.

With reference to FIG. 7, the end portions 91 and 92 are inclined at angles 131 to the axial center line 83 of the bulb. The angle 131 is about 35° but could be within a range of upper and lower limits 132 and 133 of 60° and 20° respectively. The range of angles is sufficient to produce a fan-shaped beam of light with sufficient intensity to illuminate the pages for reading.

#### ALTERNATIVES AND EQUIVALENTS

The device is shown with a soft cover book. Clearly a hard cover book can be substituted, with minor modification where required. Because a maximum thickness of hard cover books is considerably thicker than the maximum thickness of soft cover books, the spine width 28 can be increased to accommodate a wider range of books. Thus the link attachment means can have more projections and the spine has a greater length and the cover portions are larger to accommodate larger books.

As the area of pages of hard cover books can be considerably greater than that of soft cover books, a portable battery-powered lamp is less suitable and thus a mains powered lamp is preferred. When using AC mains power, more power is available than when using batteries and clearly reflector design is less critical.

Clearly means for accepting power from an automobile battery can be provided in either embodiment thus permitting reading in an automobile. Concentration of light on the pages as provided by the reflector 46 is particularly advantageous in an automobile as stray light is negligible and thus driver disturbance is reduced.

#### I claim:

1. A combination book enclosure and reading lamp adapted to retain a book therein to provide protection for the book when not in use, and to provide illumination for reading the book, the combination including:

a. a cover assembly to form the enclosure, the assembly being characterized by:

first and second cover portions having respective inner and outer edges;

a spine portion having spaced parallel first and second edges and spaced ends, space between the edges of the spine portion defining width of the spine portion, the first edge of the spine portion being adjacent the inner edge of the first cover portion so as to be essentially integral therewith, the spine portion being inclined at a fixed obtuse angle to the first cover portion;

a hinge portion provided adjacent the second edge of the spine portion to hinge the second cover portion to the spine portion, the hinge having a hinge axis;

a link attachment means provided adjacent each end of the spine portion, the attachment means being spaced sufficiently to accept a spine of a book therebetween;

b. a lamp housing provided adjacent the outer edges of the cover portions, the housing being characterized by:

a lower edge of the housing adjacent the outer edge of the first cover portion to hold the housing rigidly relative to the first cover portion;

- an upper edge of the housing spaced upwards from the lower edge of the housing;  
 cooperating releaseable latch means adjacent the upper edge of the housing to accept and retain the outer edge of the second cover portion when the second cover portion is closed for protecting the book;  
 an elongated reflector fitted within the housing and positioned facing the spine portion;  
 an electrically powered lamp fitted within the reflector and positioned therein to direct light on to the pages for reading;
- c. a flexible link extending under tension between the link attachment means so as to be generally parallel to the hinge axis, the link passing between the pages of the book adjacent the spine of the book so that the spine of the book is urged against the spine portion of the assembly so as to retain the book firmly within the enclosure.
2. A combination as claimed in claim 1 in which:
- i. the link has two ends, at least one end of the link being releasably attached to one link attachment means so as to permit placing of the book between the attachment means and then to permit extension of the link across the open book for engagement with the remaining attachment means to retain the spine of the book against the spine portion.
3. A combination as claimed in claim 1 in which each attachment means has a plurality of projections spaced between the first and second edges of the spine portion so as to provide accommodation for a range of book thicknesses, so that when a book within the enclosure is closed an upper corner of the spine of the book can be positioned adjacent the hinge of the cover assembly.
4. A combination as claimed in claim 3 in which the link is elastic and has a ring adjacent each outer end thereof, each ring having an opening adapted to engage a respective projection and each ring having a tab extending therefrom for gripping when engaging or disengaging the ring from the projection when removing or inserting a book.
5. A combination as claimed in claim 1 in which the lamp has:
- i. a bulb having an axial center line and a filament disposed thereon,
- ii. the reflector has a partial, generally cylindrical reflecting surface having a central lamp axis coincident with the bulb axial center line and normal to the hinge axis; a curved inner portion disposed symmetrically about the bulb; an upper outer portion being plane and disposed approximately parallel to the bulb center line; and a lower outer portion disposed at an angle of between 15° and 60° to the bulb center line so as to diverge downwardly and outwardly from the bulb axial center line; the inner and outer portions of the reflector merging together to provide illumination of the pages such

- that glare and variations in brightness of the page are within acceptable limits for reading.
6. A combination as claimed in claim 5 in which the reflector has opposed spaced end portions, the end portions being generally plane and disposed in planes generally normal to the first cover portion and disposed to the axial center line at an angle of between 20° and 60° so as to produce a fan-shaped beam of light of sufficient width to illuminate pages of the book.
7. A combination as claimed in claim 1 in which the cooperating releaseable latch means to retain the outer edge of the second cover portion includes:
- i. the housing having a groove extending along the upper edge thereof,
- ii. the outer edge of the second cover portion having a tongue complementary to the groove so as to be retained in the groove, flexibility in the cover portion and spine portion permitting insertion and retention of the tongue in the groove.
8. A combination as claimed in claim 1 in which the spine portion has a convex inner face so as to be approximately complementary to concave curvature of the spine of an open book.
9. A combination as claimed in claim 1 in which the fixed obtuse angle between the first cover portion and the spine portion is between 110° and 140°.
10. A combination as claimed in claim 9 in which:
- i. the link is elastic and has two ends, one end of the link having an opening to engage one of the link attachment means so as to be releasably attached to one link attachment means,
- ii. the link attachment means is a projection to accept the opening of the link, so that the book can be placed between the attachment means and, upon extension of the link across the open book, the projection engages the opening of the link and the spine of the book is retained firmly against the spine portion by tension in the link and by positive location of ends of the link on the attachment means.
11. A combination as claimed in claim 10 in which the cooperating releaseable latch means to retain the outer edge of the second cover portion includes:
- i. the housing having a groove extending along the upper edge thereof,
- ii. the outer edge of the second cover portion having a tongue complementary to the groove so as to be retained in the groove, flexibility in the cover portion and spine portion permitting insertion and retention of the tongue in the groove.
12. A combination as claimed in claim 1 in which opening of the second cover portion is restricted by the hinge so that from closed to maximum opened condition the second cover portion swings through an angle of about 110°.

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