

May 13, 1952

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2,596,816

HINGE

Filed March 1, 1949

2 SHEETS—SHEET 1

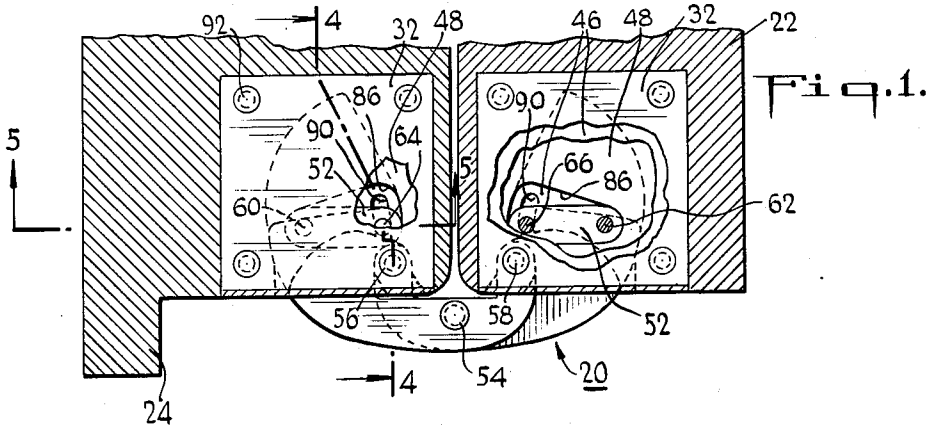


Fig. 1.

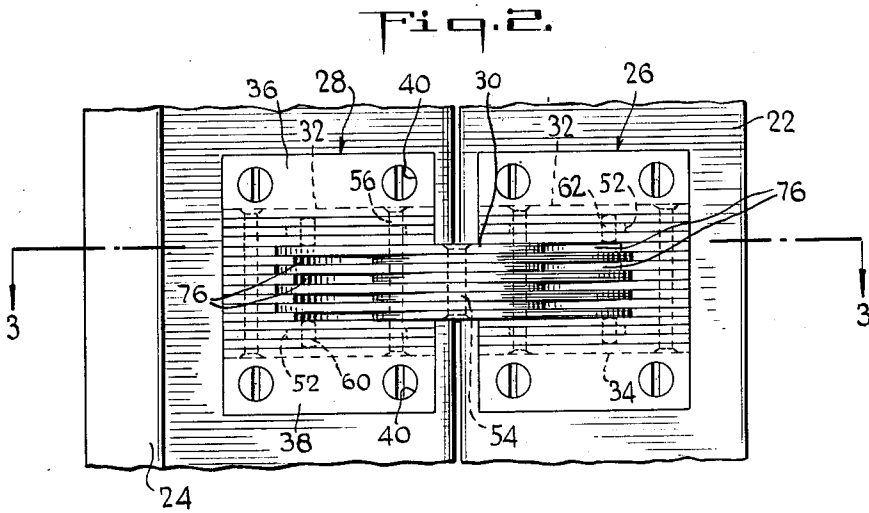


Fig. 2.

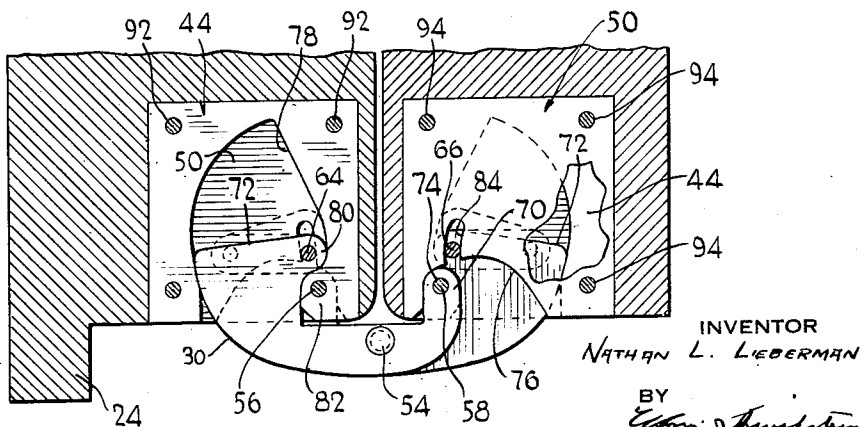


Fig. 3.

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2 SHEETS—SHEET 2

Fig. 8.

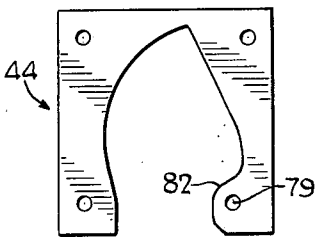


Fig. 9.

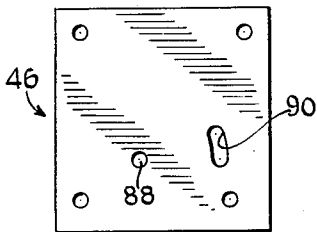


Fig. 10.

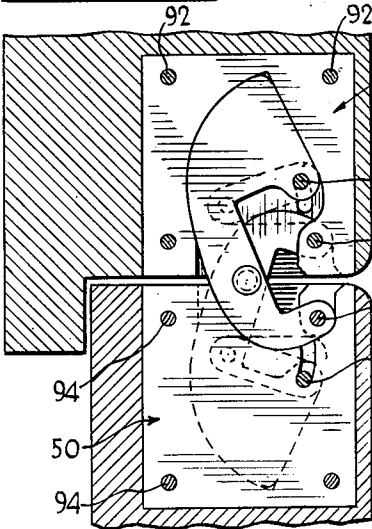
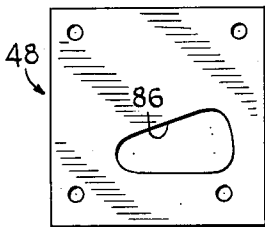


Fig. 7.

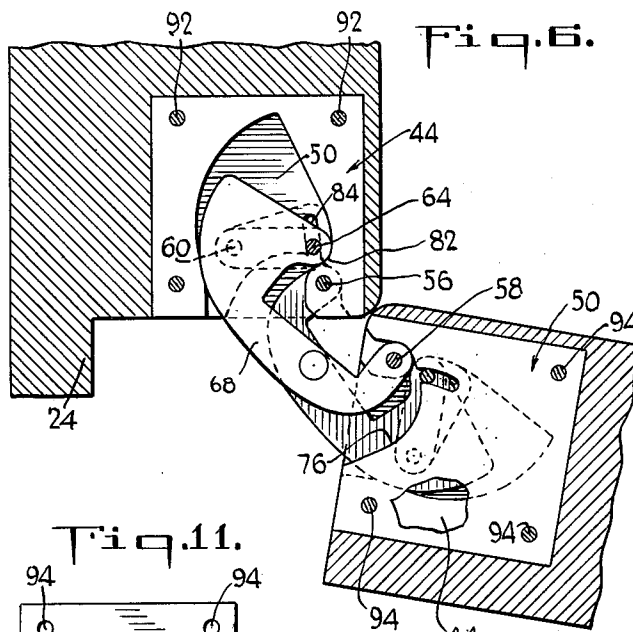


Fig. 6.

Fig. 11.

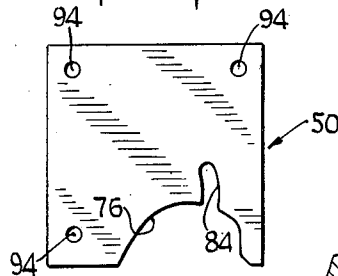


Fig. 4.

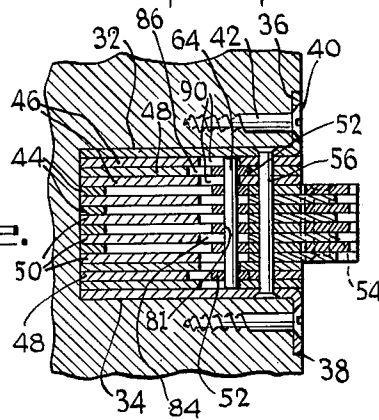


Fig. 12.

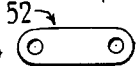
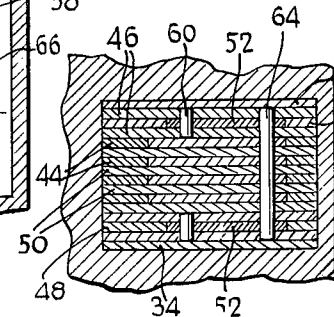


Fig. 5.



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2,596,816

HINGE

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Application March 1, 1949, Serial No. 79,011

6 Claims. (Cl. 16-164)

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This invention relates to hinges. More particularly my invention pertains to the type of hinge known as a concealed hinge, this being a hinge which is so constructed that when the hinge butts face one another, the pivotal means interconnecting the butts is concealed within and between the butts. Even more particularly, the instant invention is concerned with a concealed hinge wherein a plurality of load-carrying links constitutes the means pivotally interconnecting the two butts.

Heretofore, concealed hinges of the character described have been subject to certain defects inherent in their construction and which prevented their widespread use. For example, these hinges tend to sag and cause the rotatably connected parts to become disaligned. Moreover, in these hinges the weight of the rotatably supported part has been carried on pintle pins, these being inherently of an incorrect structural shape to sustain heavy thrust loads. Such construction was a factor in permitting the foregoing sagging. The same construction, on occasion, also led to deformation of the pintle pins, e. g. by buckling, which made the hinge hard to turn and sometimes even jammed it. Furthermore, because the pintle pins carried a vertical thrust, it was necessary to provide tight connections between the load-carrying links and the pintle pins, an arrangement which added substantially to the cost of making the hinge.

Another difficulty experienced with previous types of concealed hinges was that, for the purpose of assembly, it was necessary to introduce the load-carrying links and/or pintle pins into the butts from sides of the butts which were located within the pivotally joined parts. In practice, such arrangement allowed foreign bodies to enter the butts and links, where they interfered with proper operation of the hinge.

Another drawback of present-day link type concealed hinges is that the size of any given hinge is fixed, being determined by the size of the butts, so that, if, for example, a long hinge is needed, either a specially long set of butts must be fabricated or several hinges with shorter butts have to be employed. Likewise, hinges required to support heavy loads had to be made with large and massive butts, each of a different size depending on the duty required.

It is an object of my invention to provide a link type concealed hinge having an improved and novel construction which enables it to overcome the foregoing defects and drawbacks.

More specifically, it is an object of my inven-

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tion to provide a link type concealed hinge in which all the individual load-carrying links or group of links always have a major part of their entered portions vertically supported in all positions of the hinge. As used herein, the term "entered" denotes that part of a load-carrying link which is located within a butt.

It is another specific object of my invention to provide a link type concealed hinge in which the load-carrying links, either individually or in groups, are supported at both their pivoted and distal ends in all positions of the hinge. As used herein the term "distal" denotes that end of each load-carrying link remote from the end which is fixedly pivoted to a butt.

It is another specific object of my invention to provide a link type concealed hinge in which all sides of the butts are closed, except those through which the load-carrying links extend, thus preventing foreign bodies from fouling the links.

It is another object of my invention to provide a link type concealed hinge in which the butts are laminated and constitute many similar parts so that simply by the addition or subtraction of similar parts, the size of the hinge readily can be increased or decreased to fit the circumstances of use.

It is another object of my invention to provide a link type concealed hinge wherein the butt has a laminated construction consisting of similar interchangeable parts that can be manufactured easily and economically from sheet stock by stamping, die casting, injection-molding, or any other economical process conventionally used for mass-producing interchangeable parts.

It is another object of my invention to provide a link type concealed hinge of the character described which can be made economically and from elements of comparatively small size.

It is another object of my invention to provide a link type concealed hinge in which the movement of the load-carrying links is controlled among other things by pintles which carry no vertical thrust so that the movement of the hinge is smooth and the hinge is less likely to become jammed.

It is another object of my invention to provide a link type concealed hinge in which the load-carrying links directly transmit vertical thrust from one to the other of the butts.

It is another object of my invention to provide a link type concealed hinge in which wobbling is minimized by having each link positively supported at its pivoted end and adjacent its

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distal end, by having movement of the distal end positively controlled in all positions of the hinge, and by having the support for the distal end located at least in part between the support for the pivoted end and the movement controlling means for the distal end.

Other objects of my invention will in part be obvious and in part will be pointed out hereinafter.

My invention accordingly consists in the features of construction, combinations of elements and arrangements of parts which will be exemplified in the construction hereinafter described, and of which the scope of application will be indicated in the appended claims.

In the accompanying drawings in which is shown one of the various possible embodiments of my invention:

Fig. 1 is a top view of a hinge constructed in accordance with my invention, the same being shown in open position and connecting a door stile to a door jamb;

Fig. 2 is a front view of said hinge;

Fig. 3 is a sectional view taken substantially along the line 3—3 of Fig. 2;

Figs. 4 and 5 are sectional views taken substantially along the line 4—4 and 5—5, respectively, of Fig. 1;

Figs. 6 and 7 are views similar to Fig. 3, but illustrating a hinge in partially closed and fully closed positions, respectively;

Figs. 8, 9, 10 and 11 are plan views of different type laminae employed in the butts; and

Fig. 12 is a plan view of a radius link used to control the movement of the load-carrying links.

In general, I achieve the several objects of my invention by making both butts of a laminated construction and by providing each butt with a set of alternate laminae which are so fashioned that they support the fixedly pivoted end of each load-carrying link from above and below. Moreover, the other set of laminae in each butt are interleaved with laminae of the first set and are so fashioned that they support the entered portions of the distal ends of the load-carrying links from above and below.

It will be appreciated that, by making the butts from laminae, the foregoing construction may be provided with comparative ease and with relatively little expense, in contrast for example to a mechanically equivalent construction of butts fashioned in one piece.

Inasmuch as both ends of all load-carrying links are supported directly by the butts, it is not necessary to have pintles transmit a thrust load from the load-carrying links to the butts, and the pintles which interconnect the ends of each set of links may be employed solely to guide movement of said ends. Such arrangement causes the hinge to swing much more freely than heretofore and makes the chance of jamming or deforming the pintle much more unlikely.

Pursuant to a feature of the invention, the distal ends of the load-carrying links are guided by radius links, these being links with one end pivoted to a butt and the other to the distal ends of a set of load-carrying links. The radius links provide a smooth movement of the load-carrying links as the hinge swings. Due partly to the effect of commercial tolerances and partly to the inherent operation of a linkage system of this type, the use of radius links alone for controlling the position of the distal ends of the load-carrying links usually is not sufficient to prevent rattling or misalignment under all conditions.

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To aid these links in their operation, I prefer to employ a cam type interengagement between the distal ends of the load-carrying links and the butts. For this purpose the load-carrying links are provided at their distal ends with oppositely disposed cam edges that continuously, in all positions of the hinge, engage profiles formed in the associated butt laminae. Accordingly, any transverse force applied to the pintle pins which connect the distal ends of the load-carrying links to the radius links will cause the radius links to rotate and transfer the lateral stress of the opening or closing action to the fixed pivot pin of the radius link. In this fashion the pintle which formerly connected the load-carrying links to the butts is eliminated, together with the stresses induced in such pintle during opening and closing of the hinge.

Optionally the radius links may be eliminated altogether. However, I have found that their presence tends substantially to reduce any rattling, sloppiness or misalignment due to the presence of commercial tolerances in fashioning the cam edges and profiles aforementioned.

Referring now in detail to the drawings, the reference numeral 20 denotes a hinge embodying my invention and pivotally connecting a door stile 22 to a door jamb 24. The door stile and hinge are shown in open position, this being 180° removed from the closed position of the hinge and door stile illustrated in Fig. 7. The hinge constitutes a pair of butts 26, 28 and a plurality of thin, flat load-carrying links 30, all specially constructed pursuant to my invention.

Each butt is made of a stack of laminae, i. e. thin, flat members. Regardless of the height of the butt only six different types of laminae are used. Two of these are the top and bottom cover plates 32, 34, each of which has an erect flange 36, 38 on its front edge which is provided with counter-sunk openings 40 for reception of the heads of screws 42 to hold the butts in place. Because of the flanges, the top and bottom cover plates are not, strictly, laminae. However, they are so denominated for convenience. The other four types of laminae are indicated by the reference numerals 44, 46, 48 and 50. Of these, the laminae 46, 48 are employed solely adjacent the tops and bottoms of the butts, and the laminae 44, 50 are present throughout the intermediate or central portions of the butts. These central laminae 44, 50, as soon will be seen, are the ones which are varied in number to change the height of the hinge. One of each type of central laminae 44, 50 is provided in each butt for each load-carrying link 30 having its proximate end pivoted to said butt.

In addition to load-carrying links and laminae, each hinge also includes two radius links 52 and several pintles 54, 56 or 58, 60 or 62, and 64 or 66. The pintle 54 serves to pivotally interconnect the knuckle-shaped load-carrying links of each set to the load-carrying links of the other set. The pintle 56 serves to fixedly pivotally connect one end of each of the load-carrying links of one set to one of the butts and the pintle 58 serves to fixedly pivotally connect one end of each of the load-carrying links of the other set to the other butt. The pintles 60, 62 serve to pivotally interconnect the fixedly pivoted end of the radius links to their associated butts and the pintles 64, 66 serve to pivotally interconnect the swinging ends of the radius links to the distal ends of the associated sets of load-carrying links. These latter pintles also interconnect the distal ends

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of the load-carrying links of each set for common movement.

As indicated above, each load-carrying link is knuckle-shaped. It includes an elongated central body 68 having an aperture therein for rotatably receiving the pintle 54. Said pintle thus extends through registered apertures in all the load-carrying links and is prevented from falling out by some suitable means, as for example, by having its ends headed and, optionally, received in counter-sunk holes in the uppermost and lowermost of the load-carrying links.

Every load-carrying link has at one end thereof a rearwardly extending coplanar ear 70. This ear may be perpendicular to the longitudinal axis of the central body and, if desired, can be of comparatively slender transverse width, that is to say, can be comparatively slender in a direction parallel to the longitudinal axis of the body 68. The other end of each link also has a rearwardly extending coplanar ear 72. This latter ear preferably has a substantial transverse width in order, as soon will be seen, to afford a large bearing surface for vertical transmission of loads between the butts and the load-carrying links.

All the load-carrying links are flat and of uniform thickness and, moreover, are in juxtaposition, being stacked upon one another so that the overlapping portions of the central bodies of the divers load-carrying links are in slidable engagement with one another. The load-carrying links constitute two sets, to wit, one set which is pivoted to one of the butts and a second set which is pivoted to the other of the butts. It is convenient to relatively dispose the load-carrying links of each set as shown so that every other load-carrying link belongs to the same set; that is to say so that the load-carrying links of one set are interleaved with the load-carrying links of the other set. However, it is within the scope of my invention to have two or more load-carrying links of either or both sets juxtaposed.

The ears 70 of all of one of the sets of load-carrying links are of the same shape and each is provided with a through opening 74. These openings in said set of links are vertically registered and rotatably receive the pintle 58 affixed to the butt 26 which is mounted in the door stile 22. The ears 70 in the other set of load-carrying links likewise are registered and have vertically aligned openings in which the other pintle 56 is rotatably received, this being the pintle which is affixed to the butt 28 in the door jamb 24.

The individual load-carrying links are equal in thickness to the individual laminae 44-50 and each said link is coplanar with a single lamina in each of the two butts. These links are coplanar only with the central laminae, indicated by the reference numerals 44, 50. Even more specifically, the ear 70 of each load-carrying link is coplanar with and is located within only a central lamina of the type indicated by the reference numeral 50. Accordingly, as the hinge opens or closes, each ear 70 rotates within a lamina 50. To permit such rotation, each said lamina 50 is fashioned with an indentation 76 in the edge thereof which faces the opposite butt when the hinge is closed. Said indentation 76 has a profile which negatively matches the periphery of that portion of the ear and adjacent part of the central body 68 located within the lamina 50 when the hinge is closed. The correspondence between the profile of the indentation and the shape of the associated cam edge of the load-carrying link

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can be seen in Fig. 7 and the shape of the indentation itself is clearly illustrated in Figs. 3 and 6. It will be apparent that each butt has a number of the type of central laminae indicated by the numeral 50 which is equal to the number of load-carrying links in the set of such links secured by fixed pivot to that butt.

The distal end 72 of each load-carrying link is coplanar with and is disposed only within laminae of the type indicated by the reference numeral 44. Each butt has a number of these laminae equal to the number of load-carrying links secured by fixed pivot to the other butt. Each lamina 44 is characterized by the presence of a deep notch 78 whose profile is dependent upon the shape of the cam edge of the ear 72 and adjacent portion of the central body 68 of the load-carrying link. This profile is such that, when the hinge is closed, opposite portions of the cam edge of said load-carrying link and body are engaged by at least parts of the profiles of the notch. Optionally, and as shown, a large portion of the periphery of such opposite parts of the cam edge of the ear and body of the load-carrying link negatively match the profile of the notch so that, when the hinge is closed (see Fig. 7), the ear extends all the way down into the notch. However, this is not essential.

Moreover, the profile of the notch 78 is shaped to engage opposite portions of the cam edge of the ear and link body at all times during the swinging movement of the hinge. Such contact is facilitated by specially shaping the ear 72 to provide the same with a lobe 80 extending from the rear of the ear 72 in a direction toward the other ear 70. This lobe desirably is comparatively slender in a direction perpendicular to that in which it extends, i. e., in a direction parallel to the direction in which the ear 70 extends away from the body of the load-carrying link. Said lobe may be generously rounded to facilitate smooth engagement between the same and the profiled edge of the notch 78. It will be appreciated that, in effect, the ear 72 with its lobe 80 function as a cam which is in continuous engagement with the profile of the notches 78 thereby to control the motion of the distal end of the link.

The shape of the cam and the profile of the notch are selected to give the links a movement such that the butts will experience a relative rotation about the pivotal axis of the hinge. Such shapes and profiles can be determined readily by kinematic layouts, that is by plotting the positions of the ear 72 as the butts are progressively rotated about the desired axis and drawing the notch as an envelope to such positions. The shaping of the profile is expedited by the provision of the lobe 80, as it has been found that the same enables the ear 72 to generate a smooth curve.

Each lamina 44 includes a portion 82 at the throat of the notch 78, this portion serving to constrict the throat and to provide an opening 79 for supporting the pintle 56 or 58. Said portion overlies that part of the notch 76 of the adjacent laminae 50 wherein the ears 70 are located. By virtue of this arrangement, each pair of adjacent laminae 44 have snugly slidable between them and flatly support an ear 70 which is pivoted by the pintle 56, 58 to the butt in which said ears are disposed. With such an arrangement the laminae 44 cooperate with the interleaved ears 70 to transmit vertical loads directly from each of said ears to

its proximate butt or vice versa. It further will be noted by observing the positions assumed by the ear 70 with respect to the laminae 44 in the various positions of the hinge, that the ears are afforded vertical support over considerably more than a major portion of their area in all positions of the hinge.

The notch 76 is shallow in comparison to the notch 78, due to the fact that the ear 72 is enlarged. Owing to this arrangement each ear 72 is flatly supported and snugly slidable between a pair of overlying and underlying laminae 50. In this fashion the distal ends of the load-carrying links likewise directly transmit thrust to the butts in which they are located or vice versa. The ends 72 are made large enough so that in all positions of the hinge a very substantial portion, and preferably a major portion of each said end, is supported by the laminae 50 between which this end is transitably interleaved.

It now will be apparent that, if a vertical load is imposed on the door stile 22, this load will be transmitted by the butt 26 directly to the ears 70 of the said load-carrying links pivoted to this butt and directly to the distal ends of the load-carrying links slidable in said butt. The load-carrying links will not flex readily due to the mutual support afforded at their cross-over portions and to the manner in which the individual links are interleaved between the laminae 44, 50. Said links will transmit the vertical load directly through the pivotal and distal ends of the links to the butt 28 in the door jamb. At no time, it is observed, is any vertical load imposed on any of the pintles, so that the swinging action of the hinge is not interfered with.

In addition to the cam edges and profiled notches, the movement of the distal ends 72 of each load-carrying link optionally is guided by some other mechanism well known to the art. According to an ancillary feature of my invention, such other mechanism is comparatively simple and lends itself to assembly in a laminated butt such as shown herein. Said mechanism includes one pintle 64, 66 in each butt. This pintle extends through vertically aligned openings 81 in the distal ends of each load-carrying link whose movement in the butt is to be guided. Preferably said openings are located in the lobes 80. The pintle 64, 66 thus serves to join all the lobes of each set of load-carrying links for common movement. Moreover, one end of each pintle, and preferably both ends thereof, is rotatably connected to one end of a radius link 52 whose other end is rotatably secured to the butt by the fixed pintle 60, 62. The radius links in each butt are above and below the distal ends of the load-carrying links in that butt and have their pintles 60 or 62 vertically aligned.

Due to the fact that the pintles 64, 66 connect all the distal ends of each set of load-carrying links and since these ends are vertically supported on the laminae 50, it is necessary for each said laminae to be provided with a clearance slot 84 constituting a segment of a circle having its center at the pintle 60, 62.

Each radius link is coplanar with and located in a lamina 48, being disposed within a sector-shaped through opening 86 fashioned in said lamina. Said opening is sufficiently large to accommodate the link in all positions assumed during movement of the hinge. The pintle 60,

62 for the radius link is journaled in vertically aligned openings 88 in the two laminae 46 immediately above and below the lamina 48. Each lamina 46 also is provided with a clearance slot 90 which is a segment of a circle whose center is at the opening 88. Said slot 90 receives an end of the pintle 64, 66.

It now will be apparent that each butt includes a large central portion made up of interleaved laminae 44, 50, these being the laminae which afford vertical bearing support for both ends of the load-carrying links. Each butt also includes a set of three laminae above the set of laminae 44, 50 and a second set of three laminae below the laminae 44, 50. These sets of three laminae in each instance include the lamina 48 interleaved between a pair of laminae 46. Said sets constitute a housing, so to speak, for the radius link.

In addition to the foregoing laminae, each butt also includes the cover plates 32, 34. All the laminae and the cover plates are secured together by some suitable means, as for example by rivets 92 passing through registered apertures 94 in the several laminae and cover plates.

Although the laminae and links have been shown and described herein as individually constituting single flat pieces, it is to be understood that each lamina and link may comprise two or more separate flat pieces stacked on one another.

It thus will be seen that I have provided a hinge which achieves the several objects of my invention and is well adapted to meet the conditions of practical use.

As various possible embodiments might be made of the above invention, and as various changes might be made in the embodiments above set forth, it is to be understood that all matter herein described, or shown in the accompanying drawings, is to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. A link type concealed hinge comprising a pair of butts, two sets of load-carrying links interconnecting the butts, a fixed pivot interconnecting the proximate ends of the load-carrying links of one of said sets to one of said butts, a fixed pivot interconnecting the proximate ends of the load-carrying links of the other of said sets to the other of said butts, the distal ends of each of the load-carrying links of each set being slidable within the butt other than that to which it is fixedly pivoted, the load-carrying links of one set crossing, being juxtaposed to and being slidable on the load-carrying links of the other set, means to pivotally interconnect the crossing portions of the load-carrying links of one set to the load-carrying links of the other set between the butts, and means to guide the movement of the distal ends of the load-carrying links of each set so that the butts are pivotally movable with respect to one another, each of said butts including a group of pairs of supporting surfaces immovable with respect to their associated butt, the surfaces of each pair being spaced from one another axially of the fixed pivots, each pair of surfaces slidably supporting between them the distal end of a different individual load-carrying link which is fixedly pivoted to the opposite butt, each of said butts also including a second group of pairs of supporting surfaces immovable with respect to their associated butt, the surfaces of each pair in the second group being spaced from one another axially of the fixed pivots, each pair

of surfaces of the second group slidably supporting between them the fixedly pivoted end of a different individual load-carrying link which is fixedly pivoted to the butt having said pair of surfaces of the second group, so that the distal and fixedly pivoted ends of the load-carrying links are directly supported from the butts whereby vertical thrust is transmitted from one butt to the other directly through each load-carrying link.

2. A link type concealed hinge comprising a pair of butts, two sets of load-carrying links interconnecting the butts, a fixed pivot interconnecting the proximate ends of the load-carrying links of one of said sets to one of said butts, a fixed pivot interconnecting the proximate ends of the load-carrying links of the other of said sets to the other of said butts, the distal ends of each of the load-carrying links of each set being slidable within the butt other than that to which it is fixedly pivoted, the load-carrying links of one set crossing, being juxtaposed to and being slidable on the load-carrying links of the other set, means to pivotally interconnect the crossing portions of the load-carrying links of one set to the load-carrying links of the other set between the butts, means to guide the movement of the distal ends of the load-carrying links of each set so that the butts are pivotally movable with respect to one another, means forming part of each butt to individually slidably support in that butt the distal end of each load-carrying link fixedly pivoted in the other butt, and means forming part of each butt to individually slidably support in that butt the end of each load-carrying link fixedly pivoted in said butt, whereby said load-carrying links transmit vertical thrust from one to the other of the butts through the means slidably supporting the ends of the load-carrying links.

3. A link type concealed hinge comprising a pair of butts, two sets of load-carrying links interconnecting the butts, a fixed pivot interconnecting the proximate ends of the load-carrying links of one of said sets to one of said butts, a fixed pivot interconnecting the proximate ends of the load-carrying links of the other of said sets to the other of said butts, the distal ends of each of the load-carrying links of each set being slidable within the butt other than that to which it is fixedly pivoted, the load-carrying links of one set crossing, being juxtaposed to and being slidable on the load-carrying links of the other set, means to pivotally interconnect the crossing portions of the load-carrying links of one set to the load-carrying links of the other set between the butts, and means to guide the movement of the distal ends of the load-carrying links of each set so that the butts are pivotally movable with respect to one another, said last-named means comprising a profiled notch in each butt for the reception of each distal end of each load-carrying link of one of said sets, said notch engaging said distal end to guide the same so that the butts will move pivotally with respect to one another.

4. A link type concealed hinge comprising a pair of butts, two sets of load-carrying links interconnecting the butts, a fixed pivot interconnecting the proximate ends of the load-carrying links of one of said sets to one of said butts, a fixed pivot interconnecting the proximate ends of the load-carrying links of the other of said sets to the other of said butts, the distal ends of each of the load-carrying links of each set being slidable within the butt other than that to which

it is fixedly pivoted, the load-carrying links of one set crossing, being juxtaposed to and being slidable on the load-carrying links of the other set, means to pivotally interconnect the crossing portions of the load-carrying links of one set to the load-carrying links of the other set between the butts, means to guide the movement of the distal ends of the load-carrying links of each set to that the butts are pivotally movable with respect to one another, said last-named means comprising a profiled notch in each butt for the reception of each distal end of each load-carrying link of one of said sets, said notch engaging said distal end to guide the same so that the butts will move pivotally with respect to one another, and a radius link in each butt having one end pivotally connected to the butt and the other end pivotally connected to the distal ends of load-carrying links slidable in said butt, and means forming part of each butt to individually slidably support in that butt the distal end of each load-carrying link fixedly pivoted in the other butt, and means forming part of each butt to individually slidably support in that butt the end of each load-carrying link fixedly pivoted in said butt, whereby said load-carrying links transmit vertical thrust from one to the other of the butts through the means slidably supporting the ends of the load-carrying links.

5. A link type concealed hinge comprising a pair of butts, each of said butts constituting a stack of laminae, two sets of flat, load-carrying links interconnecting the butts, the thickness of said links being equal to the thickness of said laminae, each load-carrying link being coplanar with a lamina in each butt, the laminae in each butt constituting two sets, a fixed pivot interconnecting the proximate ends of one set of load-carrying links to one of said butts, a fixed pivot interconnecting the proximate ends of the load-carrying links of the other of said sets to the other of said butts, the distal ends of each of the load-carrying links of each set being slidable within the butt other than that to which it is fixedly pivoted, one set of laminae in each butt having located within it the ends only of the set of load-carrying links which are fixedly pivoted to that butt, the other set of laminae of each butt having received within it only the distal ends of the load-carrying links slidable in that butt, the laminae of each set having notches to receive the corresponding portions of the load-carrying links, adjacent notches having their edges out of registry whereby to form surfaces in the butts between which the ends of the load-carrying links are flatly supported and snugly slidable, the load-carrying links of one set crossing, being juxtaposed to and being slidable on the load-carrying links of the other set, means to pivotally interconnect the crossing portions of the load-carrying links of one set to the load-carrying links of the other set between the butts, and means to guide the movement of the distal ends of the load-carrying links to each set so that the butts are pivotally movable with respect to one another.

6. A link type concealed hinge comprising a pair of butts, two sets of load-carrying links interconnecting the butts, a fixed pivot interconnecting the proximate ends of the load-carrying links of one of said sets to one of said butts, a fixed pivot interconnecting the proximate ends of the load-carrying links of the other of said sets to the other of said butts, the distal ends of each of the load-carrying links of each set being slidable within the butt other than that to which it is

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fixedly pivoted, the load-carrying links of one set crossing, being juxtaposed to and being slidable on the load-carrying links of the other set, means to pivotally interconnect the crossing portions of the load-carrying links of one set to the load-carrying links of the other set between the butts, and means to guide the movement of the distal ends of the load-carrying links of each set so that the butts are pivotally movable with respect to one another, said last-named means comprising a radius link in each butt, means to pivotally connect one end of said radius link to its associated butt and means to pivotally interconnect the other end of said radius link to the distal ends of the said load-carrying links slidable in said butt, each butt having a profiled notch

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for the reception of each distal end of each load-carrying link of one of said sets, said notch engaging said distal end to guide the same so that the butts will move pivotally with respect to one another.

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