This invention relates to concealed hinges, and particularly, hinges of the kind of what may be termed the wide throw type adapted for use in connection with the doors or closure members of the rear compartments or luggage compartments of a motor vehicle body; and the object of the invention is to provide a hinge of the kind described, with means for automatically latching the hinge when in open position to aid in the support of a door or swinging member in open position and prevent accidental closing thereof while at the same time permitting forcible movement of the door or swinging member into closed position; a further object being to provide a hinge of the class described employing butt members which are angularly arranged with respect to each other when the hinge is in closed position and wherein a long arm multiple link unit is employed for movably coupling the butt parts to permit a wide throw or swinging movement of one butt part with respect to its opposed part; a further object being to employ a hinge, one of the butts of which is provided with a cam surface over which a spring pressed roller is adapted to pass, said cam surface being notched at a predetermined point to receive said roller, the same acting as a key or latch element for supporting the butt parts in separated position against accidental closing; a further object being to provide a hinge, the link arms of which are preferably composed of laminated strips to provide a simple, economical and yet strong and durable hinge structure; and with these and other objects in view, the invention consists in a hinge of the class and for the purpose specified, which is simple in construction, efficient in use, and which is constructed as hereinafter described and claimed.

The invention is fully disclosed in the following specification, of which the accompanying drawing forms a part, in which the separate parts of our improvement are designated by suitable reference characters in each of the views, and in which:

Fig. 1 is a side view of a hinge made according to our invention, showing the same in closed position in full lines and extended position in dotted lines; and,

Fig. 2 is a face view of the hinge shown in Fig. 1 in extended position, with parts of the construction broken away and in section.

The hinge forming the subject matter of the present invention is of the type and kind shown and described and claimed in a companion application Serial No. 91,374 filed of equal date hereafter with. The present hinge is adapted for similar uses, and while being of modified form, the latching principle herein disclosed is applicable to a hinge of the link arrangement disclosed in said companion application.

In the drawing, 5 represents one of the butts of the hinge, the butt being adapted for mounting in connection with the stationary support, whereas the butt 6 is adapted to be coupled with the door or swinging member. The butt 5 is composed of two substantially similar sheet metal parts, each having an attaching plate portion 7 provided with elongated apertures 7a to provide adjustable mounting in connection with its support.

At 8, we have shown angularly arranged bearing plates which are provided with projecting rounded cam surfaces 9, notched or recessed at a predetermined point as indicated at 10. Each bearing plate 8 is cut out and fashioned to form outwardly extending ears 11 which are apertured to receive one end of springs 12. The other ends of said springs are mounted in grooves at the end portions of a pin 13, as clearly seen in Fig. 2 of the drawing. On this pin is an anti-frictional roller 14 which is adapted to ride over the cam surface 9 and to drop into the notch or recess 10 as later described. The bearing plates 8 are provided with outwardly pressed portions such as indicated in section at 15 in Fig. 2 of the drawing to form restricted bearing surfaces for pairs of link arms 16 and 17 mounted on pinion pins or rivets 18 and 19 respectively, which are arranged centrally of the offset bearing portions 15.

The butt 6 is also composed of two substantially similar parts having attaching plate portions 20 of the contour seen in Fig. 2 of the drawing, which attaching plate portions will be apertured to provide suitable mounting in connection with the door or swinging member, the apertures being omitted in the construction shown. At 21, are the bearing plates of the butt which extend angularly with respect to the attaching plates 20 and are preferably of the contour seen in Fig. 1 of the drawing.

The plates 21 are arranged in spaced relation to each other and mounted between these plates are link arms 16a and 17a which are of the same construction as the arms 16 and 17. One end of each arm is pivotally mounted to the bearing plates on the pivots 22 and 23 respectively. The free end of the arm 16a is pivoted to the free end of the arm 17 on a pivot pin 25, and the arms 16, 16a are pivotally mounted on the pivot pin 26 near their ends. The last named ends of the arms 16, 16a are offset in opposed directions, which result
is accomplished by simply reversing the manner of stacking or arranging the links.

In the construction shown, the pairs of arms 16, 17 are composed of two sheets or laminae, as will be clearly seen upon a consideration of Fig. 2 of the drawing, whereas, the single arms 16a and 17a are composed of three sheets or laminae so as to fit between the spacing of the pair of arms 16 and 17 as is clearly represented in Fig. 2 of the drawing. Any number of the links, sheets or laminae may be arranged one upon the other to give the desired strength and rigidity to the resulting hinge. At the same time, the link arms may be composed of single thicknesses of metal throughout, and this would be especially true where the question of cost is not a factor, and further, where a relatively light construction will suffice. The present hinge differs from the hinge shown in the companion application not only from the standpoint of the different form of butt members employed, but also, from the standpoint of the use of the two link arms in connecting the bearing housing rather than the three arms as in said other case. Furthermore, by mounting the link arms in the manner disclosed, the necessity of utilizing bushings on the pivot pins is also eliminated.

The arms 17, 17a are provided intermediate their ends with elongated apertures 21, 27a. When only the apertures 27 in the arms 17 perform a function and use in the construction shown, it is preferred that the apertures be stamped in all arms in order to eliminate the necessity of forming two distinct arms. In the construction shown, the pin 13 or the end portions thereof project through and are free to move in the apertures 27 in the movement of the roller 14 from the position shown in full lines in Fig. 1 to the position of the hinge shown in dotted lines in Fig. 1, in which latter position, said roller is dropped into the notch and the pin 13 is moved inwardly in the aperture 27.

While the linkage of the hinge is normally sufficient to support a door or swinging member in its raised or extended position, with the butt positioned in the dotted line position shown in Fig. 2, by employing the automatic latching means consisting of the roller 14 entering the notch or recess 10, additional means is provided for retaining the door or swinging member against accidental or closing. On grasping the door and forcibly moving it in the direction of closure, the roller 14 will be forced out of the notch or recess 10 against the action of the springs 12 and also travel over the cam surface 9 as the door continues in its movement into closed position. With this construction, a substantially fool-proof door supporting means is provided which will avoid the accidental dropping of doors or closures controlling the compartments or luggage spaces at the rear of motor vehicles.

In use, a pair of the complete hinge units is employed in doors of the kind under consideration, one at each side of the door. However, in different types of installations, one or more of these hinge units may be employed. The hinge is adapted for use in connection with any type or kind of stationary support and swinging member, where a wide throw is essential, and further, where it is desirable to automatically latch the door or swinging member when in open position. In some instances, it may be found desirable and practical to latch the door or swinging member in closed or other positions, which result may simply be accomplished by adding additional notches or recesses in the surface over which the anti-frictional roller passes.

The hinge herein disclosed employs a link unit so mounted in connection with the respective butts as to provide free swinging movement with respect to an axis or center, arranged in spaced relation with respect to the butts as in the companion application so as to prevent jerking or binding action of the hinge in the operation of opening or closing the door or swinging member.

Having fully described our invention, what we claim as new and desire to secure by Letters Patent, is:

1. A concealed hinge consisting of two butts, a link unit for hingedly coupling said butts to provide wide throw swinging movement of one butt with respect to the other butt, the link unit comprising a long link arm and a short arm pivotally engaged to each butt, means for pivoting the short arm of each butt with the long arm of the opposed butt, means for pivoting the long arm links of both butts together adjacent said last named pivoting means, the respective butts being of the same size and contour, one of said butts having bearing plates arranged in juxtaposition, and the long arms pivoted to the bearing plates of said butt being arranged in pairs and disposed at outer side surfaces of said bearing plates.

2. A concealed hinge consisting of two butts, a link unit for hingedly coupling said butts to provide wide throw swinging movement of one butt with respect to the other butt, the link unit comprising a long link arm and a short arm pivotally engaged to each butt, means for pivoting the short arm of each butt with the long arm of the opposed butt, means for pivoting the long arm link arms of both butts together adjacent said last named pivoting means, the long and short arms of the respective butts being of the same size and contour, one of said butts having bearing plates arranged in juxtaposition, the long arms pivoted to the bearing plates of said butt being arranged in pairs and disposed at outer side surfaces of said bearing plates, and the other butt of the hinge having bearing plates arranged in juxtaposition to each other and the link arms pivoted therewith being disposed between said plates and between the pairs of opposed link arms.

3. A concealed hinge consisting of two butts, a link unit for hingedly coupling said butts to provide wide throw swinging movement of one butt with respect to the other butt, the link unit comprising a long link arm and a short link arm pivotally engaged to each butt, means for pivoting the short arm of each butt with the long arm of the opposed butt, means for pivoting the long arm links of both butts together adjacent said last named pivoting means, the long and short arms of the respective butts being of the same size and contour, one of said butts having bearing plates arranged in juxtaposition, the long arms pivoted to the bearing plates of said butts being arranged in pairs and disposed at outer side surfaces of said bearing plates, the other butt of the hinge having bearing plates arranged in spaced relation to each other and the link arms pivoted therewith being disposed between said plates and between the pairs of opposed link arms, different types of installations, one or more of these hinge units may be employed. The hinge is adapted for use in connection with any type or kind of stationary support and swinging member, where a wide throw is essential, and further, where it is desirable to automatically latch the door or swinging member when in open position. In some instances, it may be found desirable and practical to latch the door or swinging member in closed or other positions, which result may simply be accomplished by adding additional notches or recesses in the surface over which the anti-frictional roller passes.

The hinge herein disclosed employs a link unit so mounted in connection with the respective butts as to provide free swinging movement with respect to an axis or center, arranged in spaced relation with respect to the butts as in the companion application so as to prevent jerking or binding action of the hinge in the operation of opening or closing the door or swinging member.
notch in said bearing plates to support the hinge butts in predetermined position with respect to each other.

4. A concealed hinge consisting of two butts, a link unit for hingedly coupling said butts to provide wide throw swinging movement of one butt with respect to the other butt, the link unit comprising a long link arm and a short link arm pivoted to each butt, means for pivoting the short arm of each butt with the long arm of the opposed butt, means for pivoting the long link arm of said links in said link unit having a recess into which the short link arm is adapted to pass to tensionally latch said link against movement relatively to said bearing portion, and said link comprising a pair of link parts disposed on opposite sides of the bearing portion of said butts and said element comprising a roller mounted between said link parts, and means projecting from opposite sides of said roller for supporting and guiding the roller in its movement with respect to said parts.

8. A hinge of the class described employing relatively movable butts, means for hingedly coupling said butts, said last named means involving a part movable relatively to one butt part, and said last named means being provided one with a spring actuated roller and the other with a notch for receiving said roller to automatically retain said parts against relative movement when in one position.

10. In a hinge of the class described, one of the butts of which consists of two substantially similar parts having bearing portions disposed in juxtaposition, said bearing portions having outwardly offset bearing portions links arranged and pivotally supported on the offset bearing portions of said plates, and the edge portions of said plates extending to form a round cam surface with a notch or recess formed therein at a predetermined point.

11. A concealed hinge consisting of two butts, each of said butts having an attaching plate portion and an angularly extending link supporting part, the attaching plate portions of the butts being disposed in angular relationship to each other when the hinge is in closed position, a link unit for hingedly coupling said butts to provide wide throw swinging movement of one butt with respect to the other, the link unit comprising a long link arm and a short link arm pivoted to the link supporting part of each butt, the long and short link arms being arranged in pairs with the long and short arms of the other butt disposed between and operating within said pairs of arms, means for pivoting the short arm of each butt with the long arm of the opposed butt, means for pivoting the long arms of both butts together adjacent said last named pivots, and tensional means on one of said short arms and one of said butts for retaining the hinge against accidental movement in one position of said butts with respect to each other.

12. In a hinge employing relatively movable butts, means for hingedly coupling said butts, said means comprising a link unit consisting of pairs of substantially similar links pivoted to each of said butts and to each other, one of the links and the butt member to which said link is pivoted having interengaging means for latching said link and butt member against relative movement in one position of the link on said butt member, said means comprising a spring actuated part movably supported in said link and cooperating with a recess in said butt member.

13. A hinge of the class described comprising two butts and a link unit hingedly coupling said butts, one of said butts having spaced bearing plates within and between which two links of said unit are arranged and pivoted, the other butt having bearing plates disposed one upon the
other, the other links of said unit being pivoted to the first named links and consisting of pairs of link members arranged on outer surfaces of the bearing plates of the second named butt and on the outer surfaces of said first named links.

14. A hinge of the class described comprising two butts and a link unit hingedly coupling said butts, one of said butts having spaced bearing plates within and between which two links of said unit are arranged and pivoted, the other butt having bearing plates disposed one upon the other, the other links of said unit being pivoted to the first named links and consisting of pairs of link members arranged on outer surfaces of the bearing plates of the second named butt and on the outer surfaces of said first named links, means movably supported between one pair of the second named links and cooperating with the bearing plates of said second named butt for retaining the butts against relative movement in one position thereof.

15. A concealed hinge consisting of two butts, each of said butts having an attaching plate portion and an angularly extending link supporting part, the attaching plate portions of the butts being disposed in angular relationship to each other when the hinge is in closed position, a link unit for hingedly coupling said butts to provide wide throw swinging movement of one butt with respect to the other, the link unit comprising a long link arm and a short link arm pivoted to the link supporting part of each butt, means for pivoting the short arm of each butt with the long arm of the opposed butt, means for pivoting the long arms of both butts together adjacent said last named pivots, the long and short link arms pivoted to one of said butts being arranged in pairs and disposed at each side of the link supporting part of said butt, and the long and short arms of the other butt being disposed between and operating with said pairs of arms.

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