March 24, 1931. J. SOSS 1,797,802

CONCEALED HINGE

Filed Oct. 30, 1928

Fig. 1.

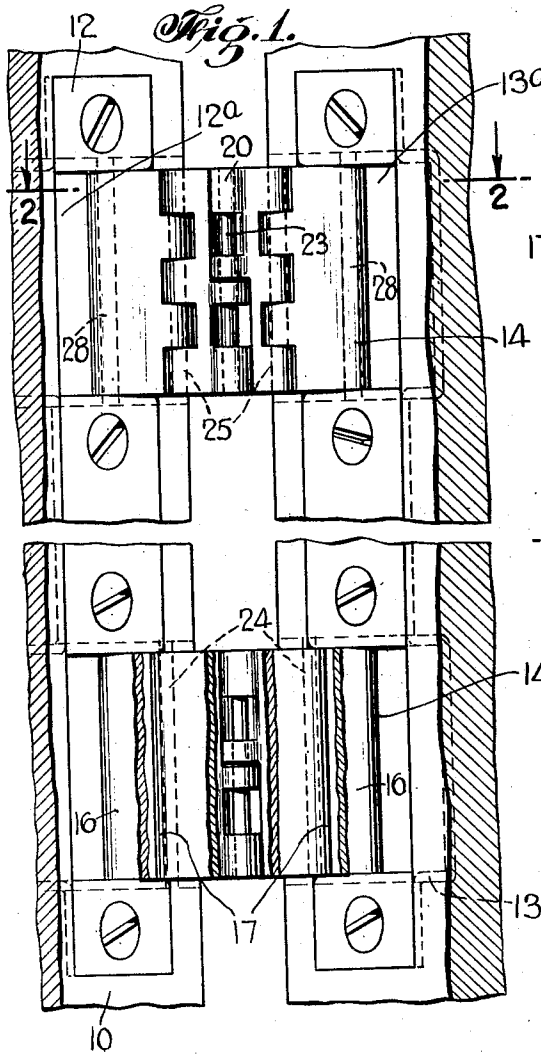


Fig. 3.

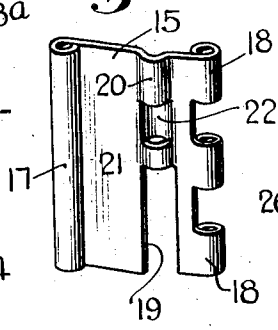


Fig. 4.

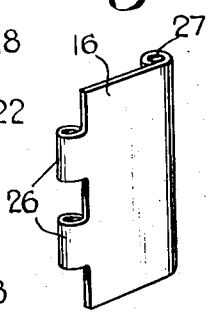
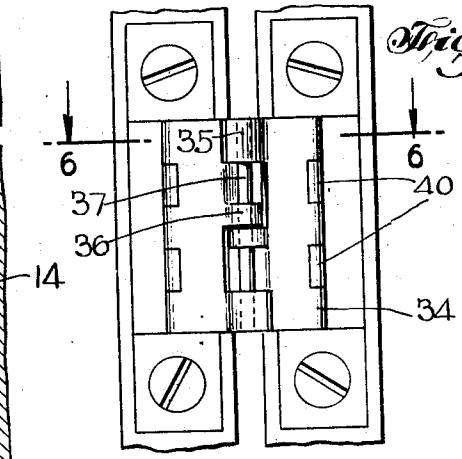


Fig. 5.



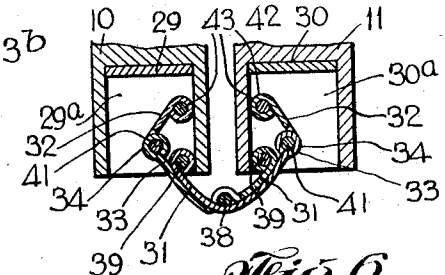
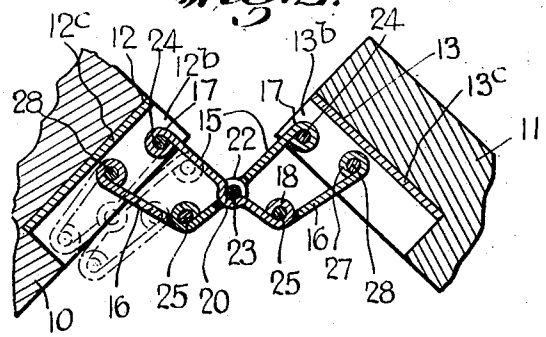


Fig. 6.

Fig. 2.



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UNITED STATES PATENT OFFICE

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CONCEALED HINGE

Application filed October 30, 1928. Serial No. 315,980.

This invention relates to concealed hinges and particularly to devices of this class wherein the separate butts of the hinge are coupled together through a plurality of links coupled with each other and said butts; and the object of the invention is to provide a hinge of the class specified, the links of which are composed of elongated strips of sheet metal fashioned to form thereon a plurality of spaced pintle bearings, the axis of which is arranged longitudinally of the longitudinal plane of the links; a further object being to provide a hinge each joint section of which consists of four links, two of each kind or contour, wherein a number of the bearings of a link of one kind are formed by pressing the material of the link forwardly and backwardly with respect to the plane thereof and particularly to the formation of such bearings intermediate the side edges of said links; a further object being to provide a hinge of the class described employing elongated hinge butts having spaced offset portions forming bearings for the separate link units employed in the hinge; 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 more fully 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 my improvement are designated by suitable reference characters in each of the views, and in which:—

Fig. 1 is a perspective side view of a stationary support and swinging member with the swinging member shown in open position and illustrating one of my improved hinges, and part of the construction being broken away and in section.

Fig. 2 is a section on the line 2—2 of Fig. 1.

Fig. 3 is a perspective view of one of the links from which the separate link units of the hinge are formed.

Fig. 4 is a view similar to Fig. 3 showing another link which I employ.

Fig. 5 is a face view of a stationary support and swinging member and showing a modified form of hinge with the swinging member in open position; and,

Fig. 6 is a section on the line 6—6 of Fig. 5.

Heretofore, it has been customary in hinges of the general class under consideration to employ links consisting of flat sheet metal stampings arranged in a pile or one upon the other with the flat surfaces adjacent but in parallel relation in forming the link unit of the hinge, and it is one of the distinctive features of my invention to provide a hinge employing a series of elongated links preferably formed from sheet metal wherein the walls of the links are arranged vertically to provide the greatest possible strength in employing a comparatively thin wall in the construction of the links, and further whereby the butts or supports in connection with which the links are pivoted will be comparatively thin and in other words will occupy the least amount of space in their respective supports.

In carrying my invention into effect, I have shown in Figs. 1 to 4 inclusive, one form of hinge structure and one method of its use. In Figs. 1 and 2, 10 will represent a door frame or stationary support; 11 represents a door or swinging member, 12 the butt secured to the support 10 and 13 the butt secured to the support 11. The butts 12 and 13 are preferably made from sheet metal and may if desired constitute a part of the respective supports 10 and 11.

As shown in the accompanying drawing, these butts are formed from strips of sheet metal each of which is offset at two or more places to form substantially box-shaped bearing portions 12*a* and 13*a* respectively. These box-shaped portions include top and bottom walls 12*b* and 13*b* and back walls 12*c* and 13*c*. Arranged in each of the offset box-shaped bearing portions 12*a*—13*a* are link units 14, and as these units are both of the same structure, a description of one will apply to the other. The link unit 14 is made up from two links 15 and 16 shown in perspective detail in Figs. 3 and 4 of the drawing, and two of these links are employed in making up the entire unit 14.

The link 15 is provided at one side edge with an elongated bearing 17 and at the other side edge with spaced bearings 18, both of the bearings 17 and 18 being formed by curling the sheet from which the link 15 is formed. Intermediate the bearings 17 and 18 and preferably adjacent the bearings 18, the link is cut out as seen at 19 adjacent one end thereof and up to a central point on the link.

The remainder of the link in alinement with the cut out or aperture 19 is pressed in opposite directions to form forwardly extending arc-shaped bearings 20 and 21 and a backwardly extending arc-shaped bearing 22. These bearings form between them a circular chamber to receive a central pintle or pivot pin 23, and by inverting another link 15 to arrange the bearings 20, 21 and 22 within the aperture 19 of the first link, the two links 15 may be coupled together by the pin 23. When thus assembled, the bearings 21 of each link 15 will be adjacent and the bearings 20 will be arranged at the upper and lower edges of the complete unit 14 in the manner seen in Fig. 1 of the drawing.

The links 15 are pivoted to the respective butts 12 and 13 by pins 24 which are supported in the top and bottom walls 12*b*—13*b* of the bearings 12*a*—13*a* as clearly seen in Fig. 2 of the drawing, whereas other pins 25 are passed through the bearings 18 and through other bearings 26 of the links 16 for coupling the links 15 and 16 together, it being seen that the bearings 26 are arranged at opposite sides of the central bearing 18 of the links 15 forming a continuous hinge joint. The other side edge of the link 16 is provided with an elongated bearing 27 in which pivot pins 28 are mounted the latter being also mounted in the top and bottom walls 12*b* and 13*b* of the respective butts.

With the linkage employed in the respective units 14, it will be apparent that the swinging member 11 may be opened to an angle of ninety or more degrees, and when moved into a closed position, all of the links in each unit will be contained within the offset box-shaped bearing portions 12*a*—13*a* in the manner indicated by the dotted line position of the links seen at the left of Fig. 2 of the drawing.

It will also be understood that while two of the units 14 are shown in Fig. 1 of the drawing, the central portion of the separate supports and hinge butts is broken away to clearly indicate that any desired number of these units and the offset portions in the separate butts may be provided.

My invention is primarily designed for use in connection with supporting the doors of motor vehicles but may be used for any desired purpose, and it will be understood that by constructing and arranging the links in the manner disclosed I provide a hinge which is comparatively light and thin in structure but which possesses the required and greatest possible strength and rigidity, it being further understood that by reason of the arrangement of linkage employed, I provide a hinge construction which will operate with the greatest ease and smoothness, especially in that the friction surfaces of the separate parts or links employed in the hinge are materially reduced, especially as compared with the flat link hinges heretofore referred to.

It will also be apparent that my invention is not limited to a multiplicity of the link units 14 in the construction of a hinge as disclosed in Figs. 1 to 4 inclusive, nor am I limited to the particular relative movement of the separate butts. To illustrate one variation in this structure, I have shown in Figs. 5 and 6 of the drawing, a modified form of hinge wherein the swinging member 11 is movable relatively to the stationary support 10 through an arc of approximately one hundred and eighty degrees.

In this construction, the separate hinge butts 29 and 30 are provided with deeper offset bearing portions 29*a* and 30*a* than those employed in the structure shown in Figs. 1 and 2 but substantially the same type of hinge unit is employed and consists of two similar links 31 which are substituted for the links 15 and two other similar links 32 which are substituted for the links 16. The links 31 are provided with continuous bearings 33 equivalent to the bearings 17 and with spaced bearings 34 similar to the bearings 18.

Substantially centrally of the links 31 are three offset bearings 35, 36 and 37 with the same arrangement as the bearings 20, 21 and 22, and in joining both of the links 31, a pin 38 is mounted in the bearings 35, 36 and 37 and pins 39 are employed to pivot the links 31 to the offset bearing portions 29*a*—30*a* with the respective butts. In like manner, the links 32 have at one side bearings 40 similar to the bearings 26 which are coupled with the bearings 34 by pins 41 and at the other side with bearings 42 in which the pins 43 are mounted to pivot the links 32 in the respective butts.

It will also be noted that the links 31 are preferably curved or arc-shaped in form intermediate the side portions thereof instead of being straight as in Figs. 1 to 4 inclusive. This is essential to permit of the one hundred and eighty degree swing of the door and further necessitates the greater depth in the bearing portions of the respective butts.

From the foregoing, it will be apparent that various different types of linkage may be employed to produce practically any desired swing or throw of a door by simply changing the arrangement of the pivots and the contour of the separate links as well as in modifying the respective butts to suit such change in linkage, and various other changes in and modifications of the construction here-

in shown and described may be made within the scope of the appended claims without departing from the spirit of my invention or sacrificing its advantages.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In a hinge of the class described, a link unit, said unit being formed from two pairs of elongated links having bearings arranged thereon with their axis extending longitudinally of the links, means for pivotally coupling the links of one pair at a point intermediate the side edges of said links, said means comprising arc-shaped bearing members extending at opposite side faces of the respective links, and each of said links having a recess extending from the central portion thereof outwardly through one end of the link to receive the arc-shaped bearing members of the other companion link.

2. In a hinge of the class described, a hinge link comprising an elongated body of sheet material and arc-shaped pintle bearings on said body intermediate the side edges thereof and arranged on opposite side faces of the link so as to couple said link with a pintle pin of the hinge, said arc-shaped pintle bearings being disposed at one end of the link, and said link having a recess in line with said bearings to receive similar bearings of a companion link in the construction of the hinge.

3. A hinge of the class described comprising two butt members, a link unit for movably coupling said butt members, said unit comprising two similar pairs of links, one link in each pair being pivoted to the respective butts and provided intermediate its side edges with recesses opening outwardly through one end thereof whereby said links may be interlocked, said links having arc-shaped bearing members in alinement with said recesses, said bearing members being disposed at opposite sides of said links, a pintle pin passed through the arc-shaped bearing members of said links for coupling the same together, and the other links of each pair being pivotally coupled to said butts and to the free side edges of the first named links.

In testimony that I claim the foregoing as my invention I have signed my name this 29th day of October 1928.

JOSEPH SOSS.