May 22, 1928. 1,670,501

C. A. GOODSPEED

LINKAGE

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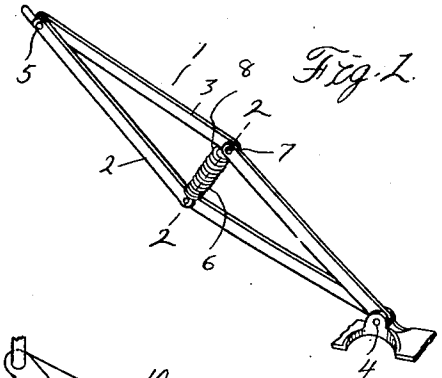


Fig. 1.

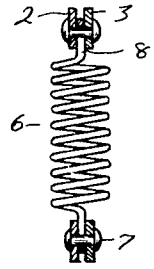


Fig. 2.

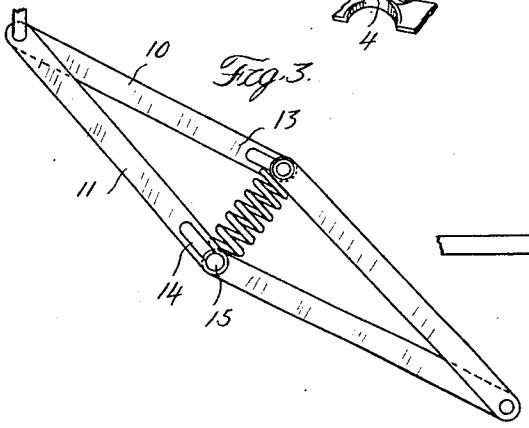


Fig. 3.

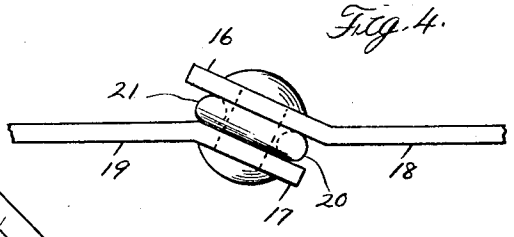


Fig. 4.

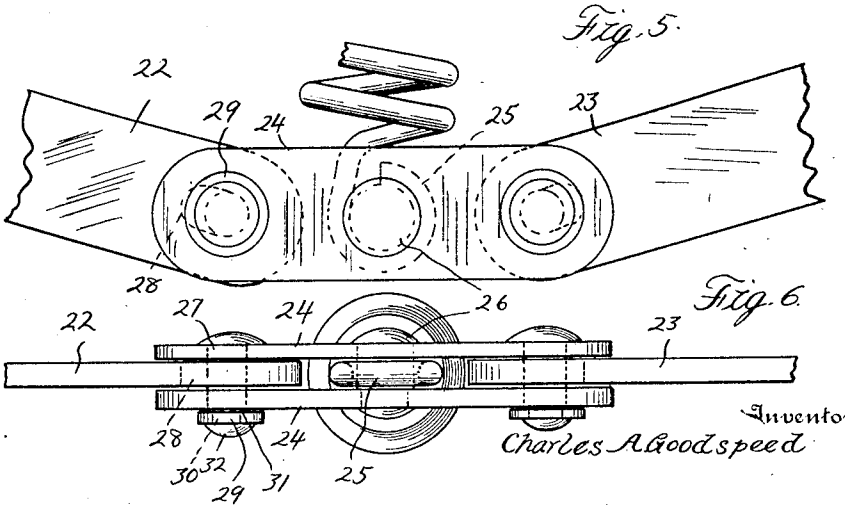


Fig. 5.

Fig. 6.

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Fig. 7.

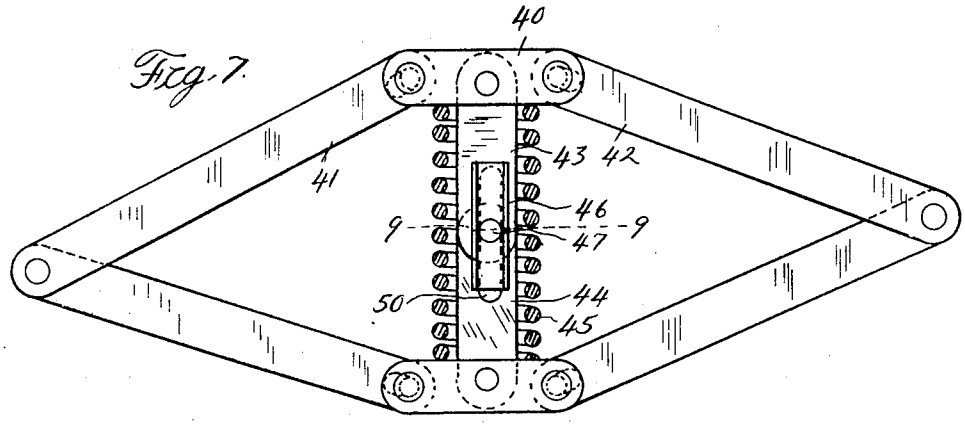


Fig. 8.

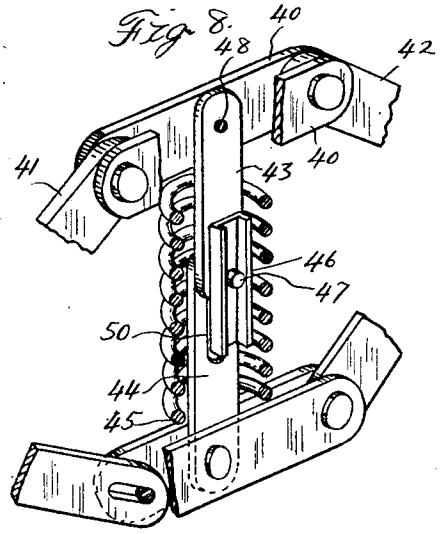


Fig. 9.

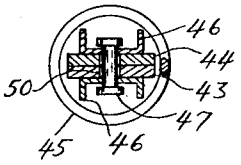
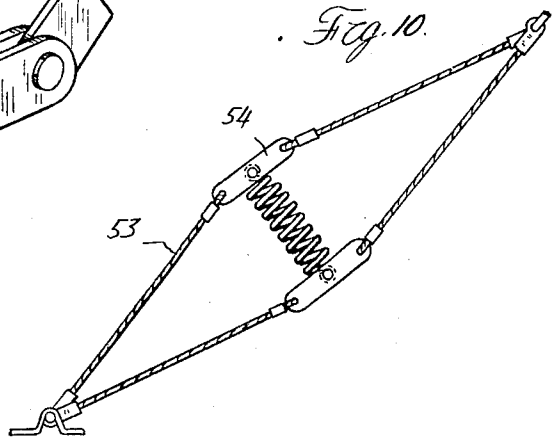


Fig. 10.



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LINKAGE

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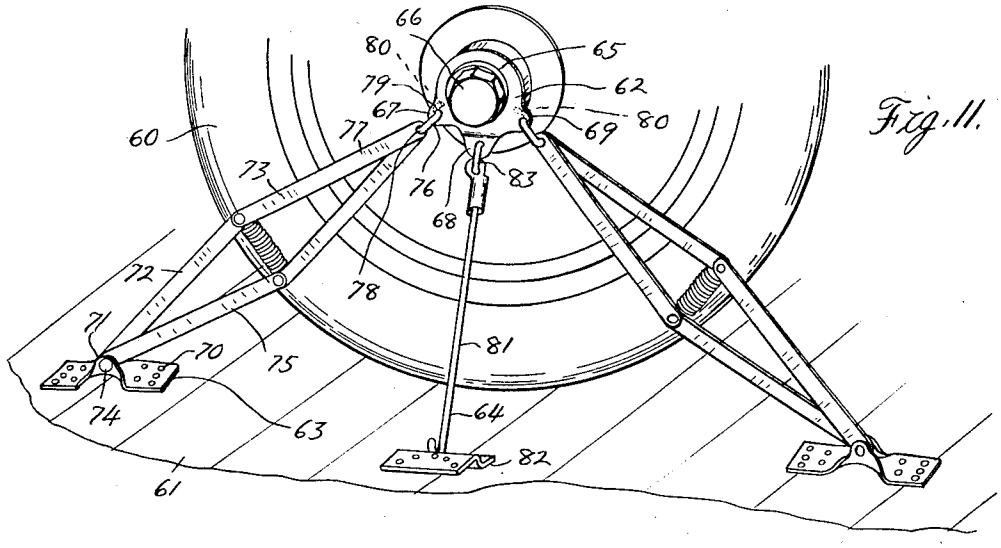


Fig. 11.

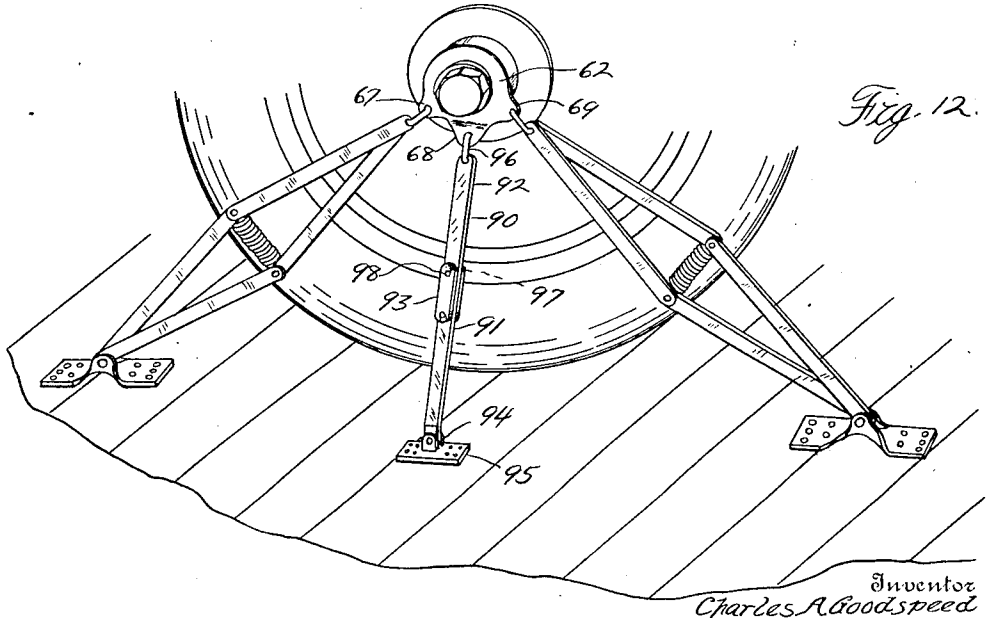


Fig. 12.

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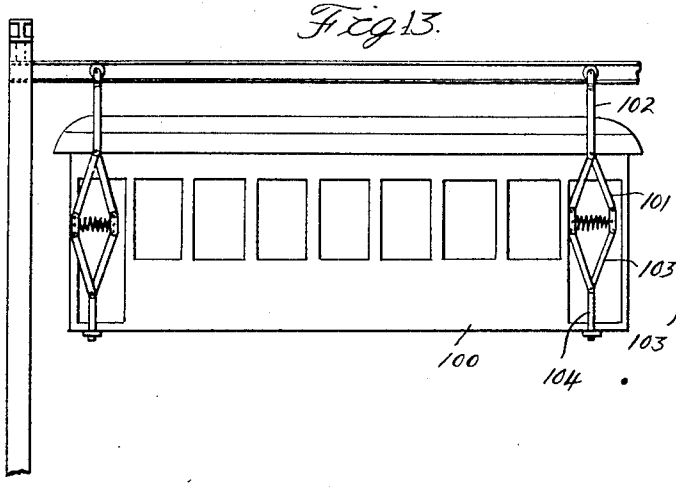
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LINKAGE

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Fig. 13.



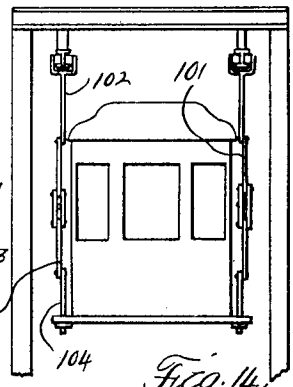


Fig. 14.

Fig. 15.

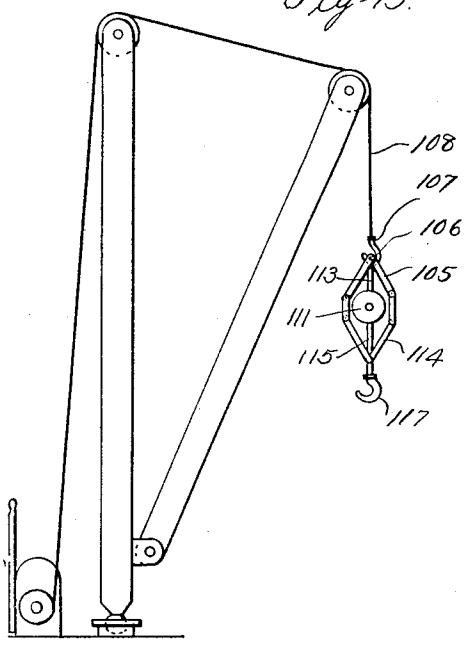
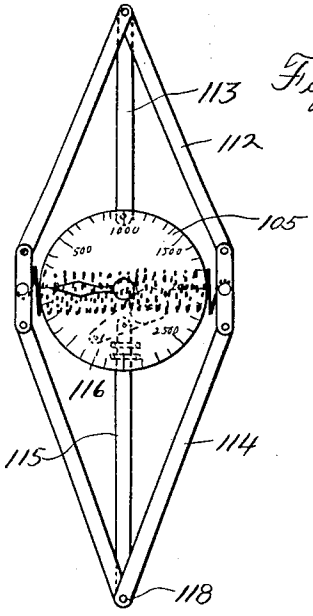


Fig. 16.



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UNITED STATES PATENT OFFICE.

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LINKAGE.

Application filed March 18, 1925. Serial No. 16,531.

This invention relates generally to linkage and refers more particularly to toggle linkage.

One of the essential objects of the invention is to provide a linkage of this type in which the pivotally connected sections of two toggle links are preferably connected together at their outer ends and are preferably spaced apart at their inner ends by a resilient member which preferably extends between the pivotal points of the toggle links.

Another object is to provide a simple and reliable system in which the sections of each toggle link normally extend at an angle to each other and are adapted to be subjected at their outer ends to a force tending to align the sections.

A further object is to provide a construction of the type described in which the force applied at the outer ends of the toggle link sections may be resisted by a very light spring which is preferably applied at the pivotal points of the toggle links.

Still another object is to provide a simple construction that can be manufactured at a comparatively low cost.

In the accompanying drawings;

Figure 1 is a perspective view of a construction embodying my invention.

Figure 2 is a sectional view taken on the line 2—2 of Figure 1.

Figure 3 is a side elevation of a slightly modified form.

Figure 4 is a fragmentary top plan view of another modification.

Figure 5 is a fragmentary side elevation of another modification.

Figure 6 is a fragmentary front elevation of the construction shown in Figure 5.

Figure 7 is a side elevation of another modification.

Figure 8 is a fragmentary perspective view of the construction shown in Figure 7.

Figure 9 is a sectional view taken on the line 9—9 of Figure 7.

Figure 10 is a side elevation of another modification.

Figure 11 is a side elevation of my linkage construction applied to a motor vehicle.

Figure 12 is a view similar to Figure 11 but showing a slightly modified form of construction.

Figure 13 is a side elevation of my linkage construction applied to a passenger car of a monorail system.

Figure 14 is an end view of the construction shown in Figure 13.

Figure 15 is a side elevation of my linkage construction used in connection with a scale and hoist.

Figure 16 is an enlarged side elevation of the linkage and scale construction shown in Figure 15.

Referring now to the drawings in which like characters of reference designate corresponding parts throughout the several views, the numeral 1 designates a linkage embodying my invention. As shown, this construction preferably consists of two toggle links 2 and 3 respectively which are pivotally connected at their outer ends as shown at 4 and 5 respectively. Any suitable means, (not shown) may be applied to the outer pivots 4 and 5 respectively for exerting a force tending to align the toggle links. In order that the force applied to the outer ends of the links may be resisted and gradually and effectively cushioned, I preferably provide a suitable coil spring 6 that is preferably positioned between the pivots 7 of the toggle links 2 and 3 respectively. As shown in Figure 2, this spring is preferably provided at its opposite ends with suitable curved arms 8 that are secured to the pivots 7 of the toggle links. Thus, the toggle links will normally be held at an angle to each other by the tension of the spring 6. Inasmuch as this spring is located between the intermediate pivots 7 of the toggle links, it is readily apparent that the resistance of the spring increases when the toggle links straighten out consequently light springs will suffice. Moreover the construction is such that a terrific force may be applied to the outer ends of the toggle links without materially affecting the springs 6.

In Figure 3 I have shown a slight modification in which the upper section 10 of each toggle link 11 and 13 respectively is provided with elongated slots 14 for receiving the pivots 15.

In Figure 4 I have shown still another modification in which the adjacent end portions 16 and 17 respectively of the toggle sections 18 and 19 respectively are preferably off-set slightly at an angle and receive the curved end portions 20 of the coil spring 21 therebetween.

In Figures 5 and 6 another modification is shown wherein the sections 22 and 23 re-

spectively of each toggle link are preferably spaced slightly apart and are connected at their adjacent ends by parallel links 24. With this construction the curved end portions 25 of each spring are preferably secured to a suitable headed element 26 that extends between the parallel links 24 approximately midway the pivots 27 connecting the links 24 to the toggle sections 22 and 23 respectively. These sections 22 and 23 are also preferably provided with elongated slots 28 for receiving the pivot elements 27. Suitable metal washers 29 surround the reduced portions 30 of the headed pivot elements 27 between the shoulders 31 and riveted head 32 thereof. Thus, any tendency of the parts to bind is obviated entirely.

In Figures 7 to 9 inclusive I have shown another modification in which the parallel links 40 connecting the adjacent ends of the sections 41 and 42 respectively of the toggle links are preferably connected by means of the cross links 43 and 44 respectively. With this construction the coil spring 45 is preferably sleeved upon the cross links 43 and 44 and is preferably centralized therein by suitable channel-shaped bars 46 that are connected to the link 43 by the pivot 47 that connects the links 43 and 44 respectively together. As shown, the cross links 43 and 44 preferably extend between the parallel links 40 and are connected thereto approximately midway of the pivots 48 by means of suitable pivot elements. The cross link 44 is also preferably provided with an elongated slot 50 that receives the pivot element 47 and limits the outward movement of the cross links 43 and 44 respectively. With this construction, the ordinary or standard form of coil spring may be used for the reason that no special securing means therefor is required. As shown, the ends of the spring 45 simply bear against the inner edges of the parallel links 40.

In Figure 10 I have shown another modification in which the sections 53 of the linkage 54 are preferably formed of cables which may be formed of any suitable material such as steel. These cables may be secured at their inner ends by any suitable means to the parallel links 54 and may be connected together by any suitable means at their outer ends for the purposes set forth in connection with the devices shown in the preceding figures.

As shown in Figures 11, 12, 13, 14, 15 and 16 respectively this linkage construction may be used in combination with many different devices. In Figures 11 and 12 it is used as an anchorge device for holding an automobile 60 upon a suitable support such as the floor 61 of a freight car while in transit. As shown, an anchorage device of this type is preferably located opposite each wheel of the vehicle and comprises an adapter plate 62, anchor or floor plates 63 and the intermediate tie members 64. The adapter plate 62 may take any form desired but is preferably provided with a centrally threaded opening 65 that receives the usual exteriorly threaded wheel hub 66 and has three depending apertured lugs 67, 68 and 69 respectively. In order that any movement of the vehicle in opposite directions may be taken care of by my anchorage device, the floor plates 63 are preferably located in adadvance and in rear of each wheel of the vehicle and are preferably rigidly secured to the floor of the freight car by means of suitable nails 70. To facilitate attachment of the tie members 64, these floor plates 63 are preferably provided intermediate their ends with upstanding lugs 71 which are preferably spaced sufficiently apart to receive the lower ends of the tie members 64. As shown, the toggle links 72 and 73 respectively of each tie member are pivotally connected at their lower ends to the lugs 71 and are preferably loosely connected at their upper ends to the lugs 67 and 69 respectively of the adapter plate 62. Any suitable means such as the rivets 74 may be used to connect the lower sections 75 of the links to the lugs 71, while suitable links 76 are preferably used to connect the upper sections 77 of the toggle links to the lugs 67 and 69 respectively of the adapter plate. As shown, these links 76 are preferably U-shaped in form, one arm portion 78 being pivotally engaged with the upper sections 77 of the toggle links, while the other arm 79 of the links pivotally engages the lugs 67 and 69 respectively and is provided with a lateral extension 80 that bears against the inner faces of the lugs when the parts are assembled. Thus, with this construction, the tie members 64 may be readily attached to or detached from the adapter plate 62 by merely engaging or withdrawing the arm 79 and extension 80 from the openings in the lugs 67 and 69 respectively. Moreover, when the parts are assembled, this loose connection will relieve the tie members of any undue stresses or strains should a tire of a wheel become flat while in transit.

If desired, an additional tie member 81 may be used to connect the adapter plate 62 to the floor of the freight car. As shown, this tie member 81 preferably consists of a rod that is secured at its lower end to a suitable floor plate 82 and is loosely connected by a link 83 at its upper end to the centre lugs 68 of the adapter plate 62.

Furthermore, a different form of intermediate tie member may be used in connection with the tie members 64. As shown in Figure 12, I preferably use the tie member 90 that consists of the sections 91 and 92 respectively which are connected at their

adjacent ends by parallel links 93. As shown, the section 91 is preferably pivotally connected at its lower end to the spaced upstanding lugs 94 of the floor plate 95, while the section 92 is preferably loosely connected by the link 96 at its upper end to the centre depending lug 68 of the adapter plate 62. The sections 91 and 92 of this tie member are also slotted as shown at 97 to receive the pivot elements 98 connecting the same to the links 93. Thus, this tie member will also compensate for flat tires and in fact will give more freedom than the links 96 alone.

In Figures 13 and 14 I have shown my linkage construction used in connection with a supporting device for a passenger car 100 of a mono-rail system. As shown, the upper sections 101 of the toggle links are pivotally connected to a suitable hanger 102 extending downwardly from the monorail, while the lower sections 103 of the toggle links are preferably pivotally connected to a suitable bracket 104 secured to the passenger car preferably at the bottom thereof. Thus, the linkage construction will effectively cushion the passenger car while in suspension.

In Figures 15 and 16 I have shown my linkage construction in connection with a suitable scale and hoist. As shown, the upper sections 105 of the toggle links are pivotally connected by a suitable bolt 106 which is adapted to be engaged by a suitable hook 107 at the free end of a suitable cable 108.

The scale is designated generally by the numeral 111. As shown, the upper sections 105 of the toggle links are pivotally connected to a vertical rod 113 which in turn is preferably connected to the bolt 106. The lower sections 114 of the toggle links are preferably pivotally connected at their lower ends to a vertical rod 115 which is adapted to actuate the mechanism designated generally by the numeral 116 of the scale 111. Any suitable means such as the hook 117 may be attached to the pivot 118 at the lower ends of the toggle links for supporting the articles while being weighed.

While it is believed that from the foregoing description the nature and advantages of the invention will be readily apparent, I desire to have it understood that I do not limit myself to what is herein shown and described, and that such changes may be resorted to when desired as fall within the scope of what is claimed.

What I claim as my invention is:

1. A linkage comprising two toggle levers having toggle pivots spaced laterally apart, and having the opposite end portions of said levers arranged in overlapping relation, pivot elements extending through said overlapping end portions, and means for resisting movement of said toggle pivots toward each other, including yieldable means extending between said toggle pivots and terminally secured thereto.

2. A linkage comprising two toggle levers having toggle pivots spaced laterally apart and having the opposite end portions of said levers arranged in overlapping relation, pivot elements extending through said overlapping end portions and constituting attaching means for said linkage, and means for resisting movement of said toggle pivots toward each other, including a coil spring extending between and terminally connected to said toggle pivots.

3. A hold-down for vehicles and the like comprising an adapter plate attachable to a part of a vehicle, an anchorage plate attachable to a floor or support for the vehicle, and an intermediate tie member comprising two toggle levers having the opposite end portions thereof arranged in overlapping relation, pivot elements extending through said overlapping end portions and pivotally connected to said adapter plate and anchorage plate, and means for resisting movement of said toggle pivots toward each other, including yieldable means extending between said toggle pivots.

4. A linkage comprising two pairs of levers having the inner ends thereof spaced laterally apart and having the outer ends thereof arranged in overlapping relation, substantially parallel members pivotally connected to the adjacent spaced inner ends of said pairs of levers, pivot elements extending through the overlapping end portions of said levers, and means for resisting movement of said parallel members toward each other including yieldable means extending between said parallel members and terminally connected thereto.

In testimony whereof I affix my signature.

CHARLES A. GOODSPEED.