H. W. BELL AND H. L. HOYT, JR.

SPRING SUSPENSION.

APPLICATION FILED MAY 17, 1921.

1,420,680.

Patented June 27, 1922.

6 SHEETS—SHEET 1.

Fig. 1

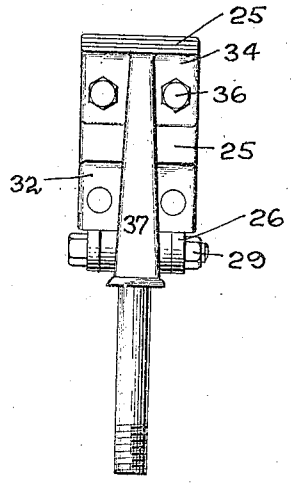


Fig. 2

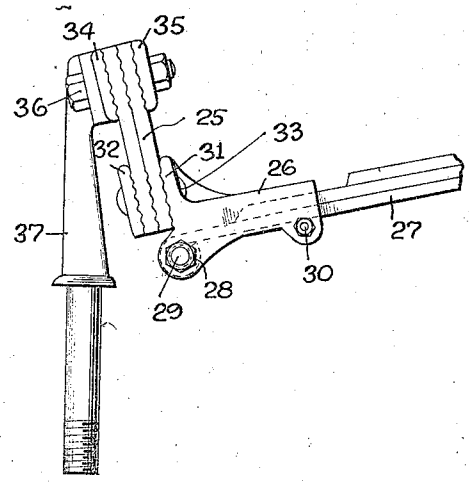


Fig. 3

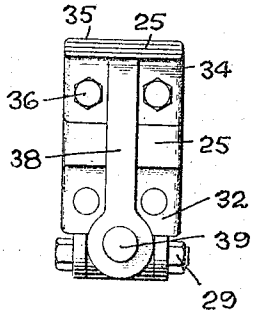
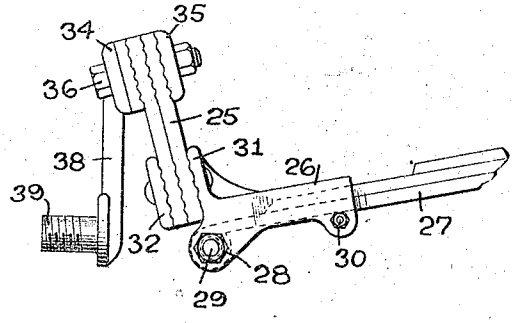


Fig. 4



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6 SHEETS—SHEET 2.

Fig. 5

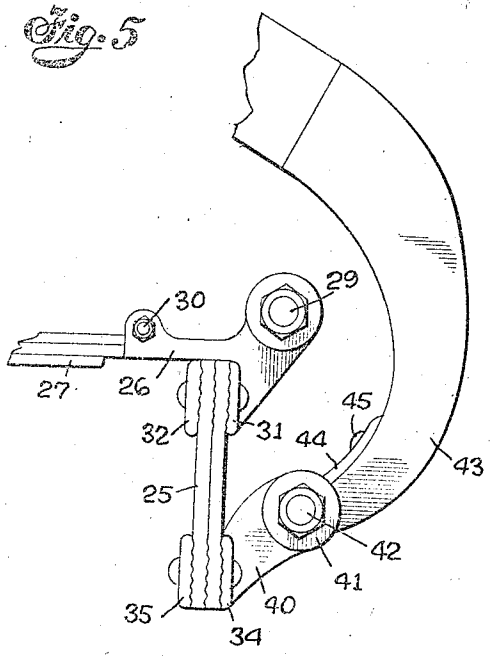


Fig. 6

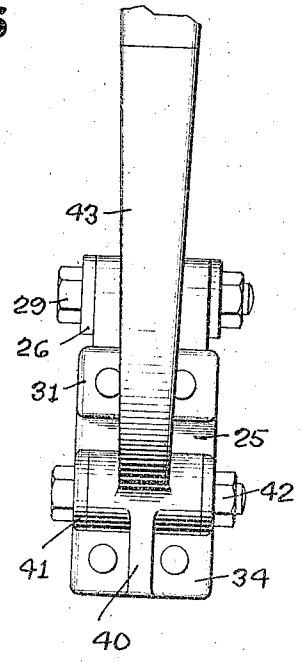


Fig. 7

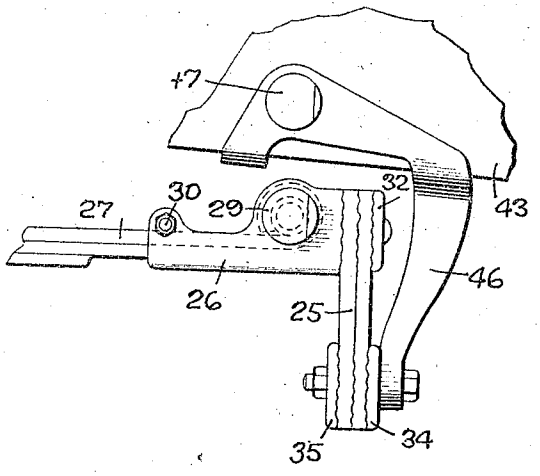
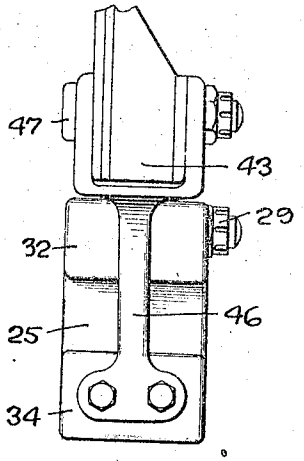


Fig. 8



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6 SHEETS—SHEET 3.

Fig. 9

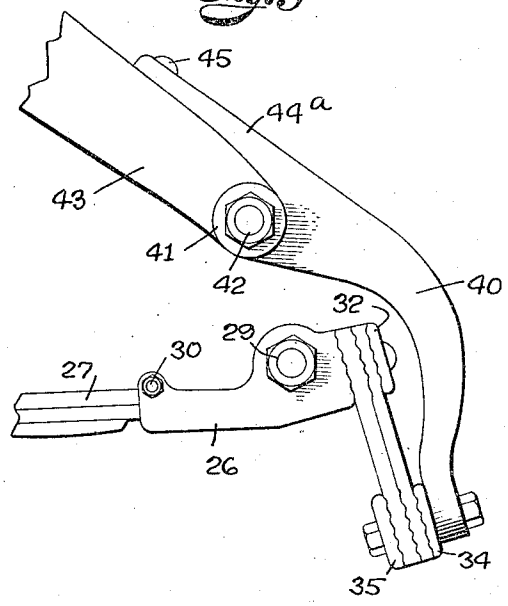


Fig. 10

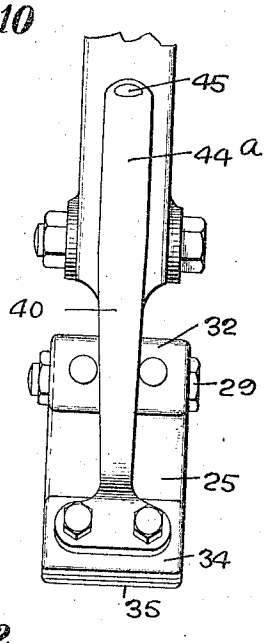


Fig. 11

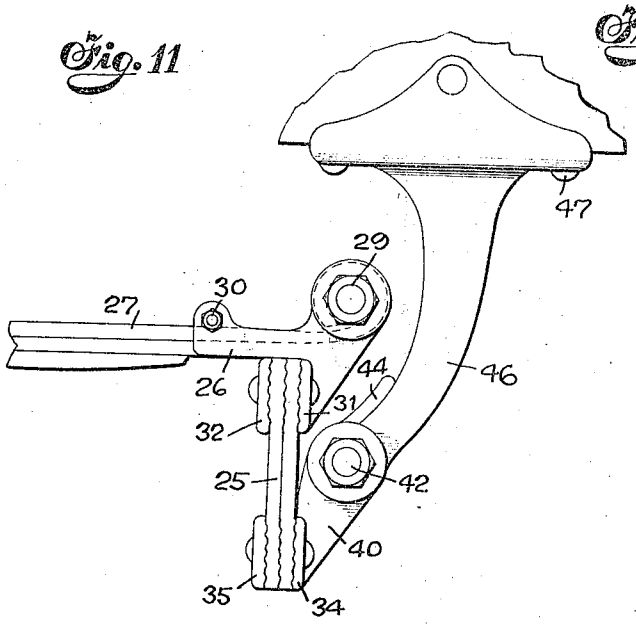
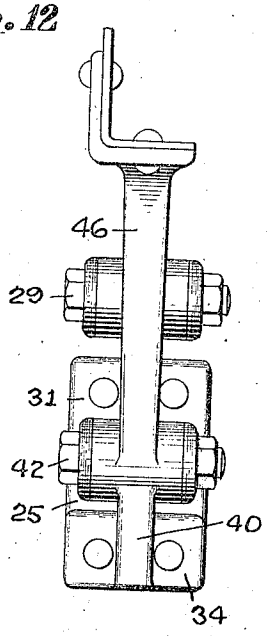


Fig. 12



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6 SHEETS—SHEET 4.

Fig. 13

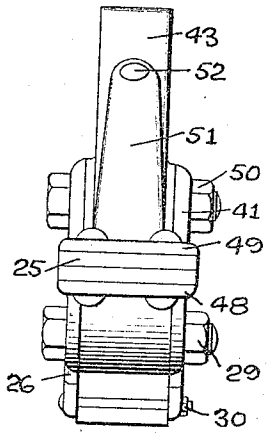


Fig. 14

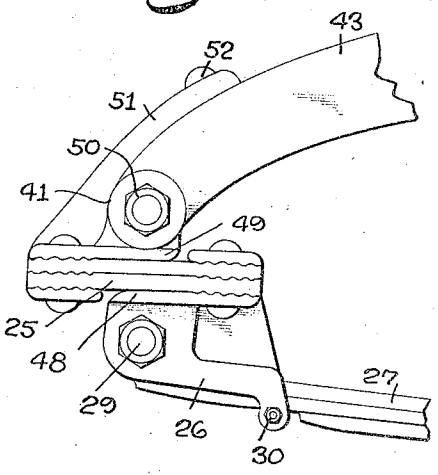


Fig. 15

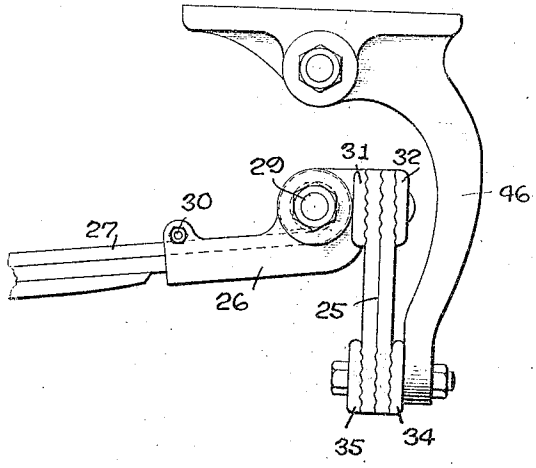
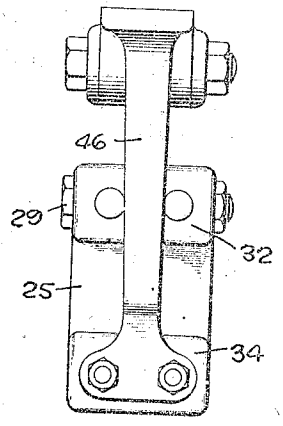


Fig. 16



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6 SHEETS—SHEET 5.

Fig. 17

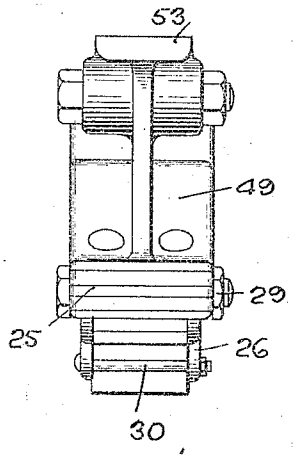


Fig. 18

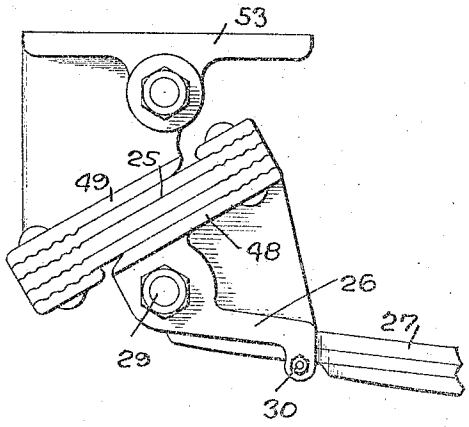


Fig. 19

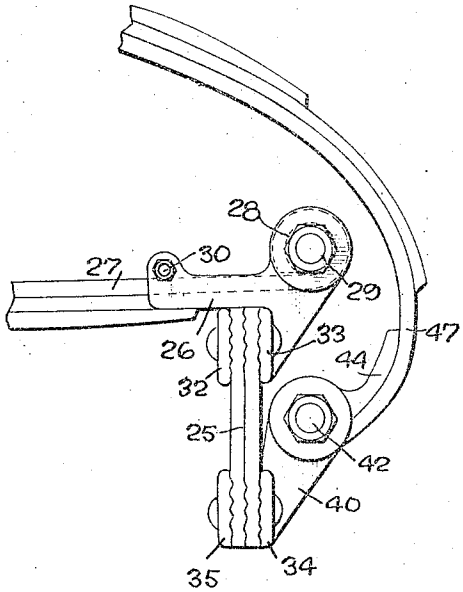
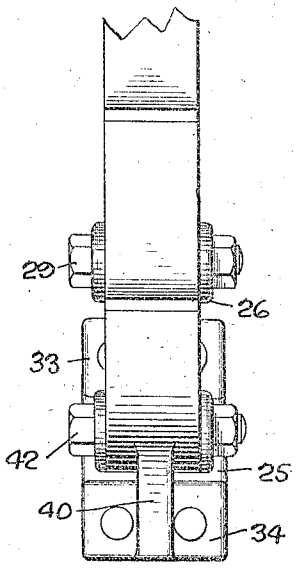


Fig. 20



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SPRING SUSPENSION.

APPLICATION FILED MAY 17, 1921.

1,420,680. Patented June 27, 1922.

6 SHEETS—SHEET 6.

Fig. 21

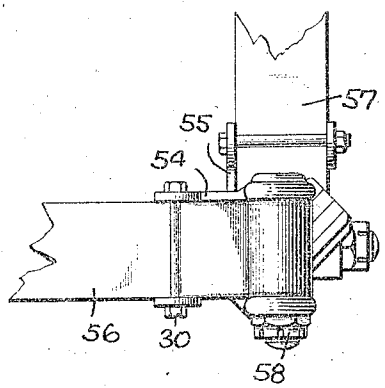


Fig. 22

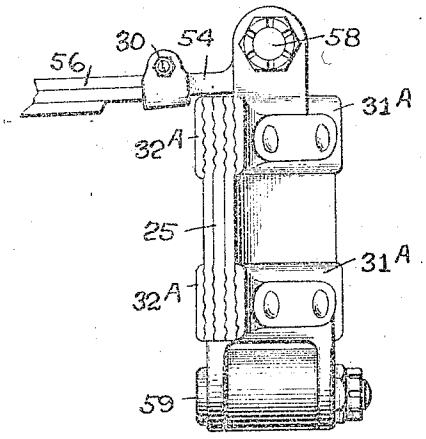
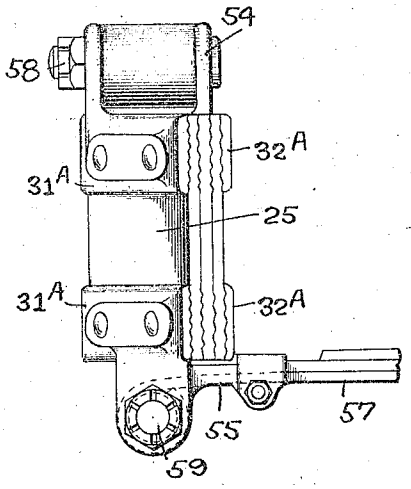


Fig. 23



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UNITED STATES PATENT OFFICE.

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SPRING SUSPENSION.

1,420,680. Specification of Letters Patent. Patented June 27, 1922.

Application filed May 17, 1921. Serial No. 470,244.

To all whom it may concern:

Be it known that we, HARVEY W. BELL, a citizen of the United States, and a resident of Yonkers, county of Westchester, and State of New York, and HAZEN L. HOYT, JR., a resident of Great Neck, Long Island, county of Nassau, and State of New York, have invented certain new and useful Improvements in Spring Suspensions, of which the following is a specification.

Our invention relates to spring suspensions of the type disclosed in application for United States Letters Patent, Serial No. 363,189, wherein the spring and the vehicle body or other related parts are connected by flexible links which are rigidly secured at their opposite ends and which are so constituted as to permit perfect freedom of spring action while controlling side sway and other objectionable movements.

The objects of our invention are to provide simple and practical means for enabling the attachment and use of suspension means of this character with vehicles now on the market and in every day use.

In the accomplishment of these objects we have devised various forms of attachment devices capable of ready application to the forms of vehicle springs used with different makes of cars.

In the accompanying drawings we have illustrated a number of different forms the invention may take, but wish it understood that further modifications may be made without departure from the true spirit and scope of the invention as hereinafter defined and claimed.

In the drawings referred to, Figures 1 and 2 are end and broken side views respectively of a form of front spring connection for Ford cars.

Figures 3 and 4 are similar views of a Ford rear spring connection.

Figures 5 and 6 are broken, side and end views respectively of a form of rear end connection for a rear semi-elliptic spring.

Figures 7 and 8 are like views of a rear end connection for a front semi-elliptic spring.

Figures 9 and 10 are side and end views of a rear end rear spring connection, and

Figures 11 and 12 are similar views of another form of front spring rear end connection.

Figures 13 and 14 are end and broken side views of a front spring front end connection.

Figures 15 and 16 are side and end views of another form of front spring rear end connection.

Figures 17 and 18 are end and side views of another form of front end connection for semi-elliptic rear springs.

Figures 19 and 20 are side and end views of a rear end connection for a three-quarter elliptic rear spring.

Figures 21, 22 and 23 are plan, side and rear end views respectively of a connection for platform springs.

In all the forms of the invention illustrated the flexible connecting link, which is designated 25 and which is made up of one or more layers of suitable flexible material such as rubber impregnated canvas belting of the like, is rigidly secured and held at its opposite ends between pairs of cooperating clamping jaws. Also the clamps which are applied to one spring member are alike in that they consist in each instance of a channel shaped bracket 26 adapted to overlie the face of the main leaf 27 of the spring and arranged with its side walls embracing the edges of the spring and perforated in line with the eye 28 which is ordinarily turned in the end of the main leaf to receive a fastening bolt 29. The side walls of these channel brackets are also shown as perforated at points inward from the ends of the springs to receive a supplemental fastening bolt 30 which extends across the face of the main leaf so as to secure the bracket against pivotal movement about the main fastening bolt 29.

The clamp carried by the channel bracket consists of cooperating relatively fixed and movable jaws 31 and 32 secured together by bolts, rivets or other fastenings 33. These clamp jaws have relatively wide clamping faces so as to securely grip the supporting links over extended areas and hence to firmly secure the same without liability of tearing or abrasion.

The attachment device for the other end of the link likewise is made up of cooperating relatively fixed and movable clamping jaws 34, 35 secured firmly together over the interposed portion of the link by bolts or other fastenings 36.

The specific form of these attachments will vary to suit different cars. In the first two figures the clamp 34, 35 is carried by a post 37 adapted to be substituted in place of the usual shackle post on the front axle of a Ford car. The bracket 26 being of a size to fit the forward front spring it will be evident that this makes it possible to substitute this improved form of link suspension in place of the usual Ford rigid link suspension by simply attaching brackets 26 to the ends of the front spring and replacing the usual shackle posts with our special clamp supporting posts 37. In making this change the bolt 29 may be the same bolt which was formerly used for the connection of the rigid suspension links at the ends of the front spring and the auxiliary securing bolts 30 may be taken from the clips ordinarily used on the spring and which become unnecessary when the channel brackets 26 are applied, since these brackets may overstand the second leaf, as we have indicated, and hence operate in the capacity of spring clips.

The form of rear spring connection shown in Figs. 3 and 4 is generally similar to the front spring connection, the main difference being that the clamp carrying post 38 is provided with a horizontal bolt extension 39 instead of the vertical bolt extension shown, to fit a corresponding horizontal seat on the rear axle housing.

In Figs. 5 and 6 we have illustrated a connection for the rear end of a semielliptic rear spring. The spring attached bracket and clamp construction is generally similar to that first described and the only practical difference is that in this case the attachment bracket 40 for the opposite end of the link is provided with ears 41 pierced to receive the shackle bolt 42 at the rear end of the side sill 43 of the frame, said bracket also having an extension 44 in rear of the bolt 42 forming a lever bearing against the inner curved face of the sill member and ordinarily secured by a rivet or bolt fastening 45.

The construction illustrated in Figs. 9 and 10 is generally similar to that last described but in this particular instance it will be noted that the leverage extension 44^A of the frame attachment bracket 40 overlies the top or outer side of the frame member 43, this on account of the flat angle of the rear end of the frame member.

For the connection of the rear ends of front semielliptic springs we may use constructions like those shown in Figs. 7–8, 11–12, and 15–16. In each of these instances there is a bracket 46 which is adapted to be secured by bolts, rivets or other fastenings 47 to the side sill 43 of the car, said bracket being suitably shaped to fit the particular make of car. In the forms shown in Figs. 7 and 8 and 15 and 16 the clamp 34, 35 is directly carried by this bracket whereas in the form shown in Figs. 11 and 12 an attachment like that shown in Figs. 5 and 6 is used embodying parts 40 and 44 and secured by a shackle bolt 42.

For a three-quarter elliptic rear end suspension we may use a structure like that shown in Figs. 5 and 6, as illustrated in Figs. 19 and 20, the leverage extension 44 in this case being designed to bear against the inner end portion of the upper leaf spring 47 instead of against a rigid frame member.

In Figs. 13 and 14 we have illustrated a form of attachment for the front ends of front springs similar in general respects to the constructions described except that in this case the clamps are disposed to hold the connecting link substantially horizontal and are provided with cooperating bearing pads 48—49 standing in overlapping relation and bearing on opposite faces of the interposed intermediate portion of the link. The upper bracket is designed to be attached to the forward end of the side frame member 43, being generally similar to the brackets illustrated in Figs. 5, 9, 11 and 19 in that it has ears 41 to fit the forward end of the frame pierced to receive the forward shackle bolt 50. This bracket also in this case is shown provided with rearwardly extending leverage projections 51 overlying the upper face of the side sill and secured down by a bolt or rivet 52.

In Figs. 17 and 18 we have illustrated a form of front end connection for a rear semielliptic spring like the connection last described in that the link is interposed between bearing surfaces to operate as a cushion but differing from that form in that the clamps are arranged to support the link on a downward forward incline so as to adapt the same to take the forward thrust of the spring occasioned by the propelling effort of the rear wheel. The upper bracket member 53 in this case may be a special bracket or the one which is provided on the car for the regular rigid shackle.

In the platform type of spring suspension a connection is used such as illustrated in Figs. 21, 22 and 23. The brackets 54, 55 which are attached to the longitudinal side spring and the transverse rear springs 56 and 57 respectively are generally similar to the channel brackets 26 already described but differ from them in that the clamp jaws 31^A, 32^A are disposed substantially at an angle of 45 degrees to the upper and lower shackle bolts 58, 59 so as to bring the flat plane of the connecting link at a substantially equal angle to both the front and the rear springs.

In all forms of the invention the flexible supporting link is rigidly held at its ends

to the parts of the spring suspension which it connects and hence is adapted to oppose side sway and other forces which it is desired to control while flexing freely to the normal action of the spring or springs.

The attachments are easily applied by simply removing the rigid links and substituting the special brackets with which the clamps are provided, using in most instances the same shackle and clip bolts as were employed with the rigid links, the perforated ears at the sides of the attachment brackets enabling this substitution and the longitudinal extensions of the brackets forming in effect angle braces to make the brackets rigid on the spring or frame parts.

What we claim is:

1. In spring suspensions for vehicles, the combination with a leaf spring provided with an eye at the end thereof, of a bracket channeled to receive and fit over the end of the spring and having side walls perforated in line with the eye in the end of the spring, a bolt extending through said perforations and eye to fasten the bracket on the spring, clamp members carried by said bracket, a flexible supporting link held by said clamp members and a bracket for attachment to another member of the vehicle having clamp members engaged with another portion of said link.

2. In spring suspensions for vehicles, an attaching bracket adapted to rest on one face of a leaf spring and having side walls to embrace the edges of the leaf spring and provided with perforations adapted to align with an eye on the end of the leaf spring, a fastening bolt to extend through said perforations and eye to secure the bracket on the spring, a supplemental fastending bolt connecting the opposite sides of the bracket and adapted to extend across the face of the spring at a point removed from the first bolt, clamping means carried by said bracket and a flexible supporting link engaged and held by said clamping means.

3. In spring suspensions for vehicles, an attachment bracket having a channel to receive the end portion of a leaf spring, means for rigidly attaching the bracket to said leaf spring including a fastening extending through the side walls of said channel bracket and through a portion of the leaf spring to thereby position and secure the bracket on the spring, a separately formed flexible supporting link rigidly secured to said bracket and an attachment rigidly secured to another portion of the flexible link and adapted for connection with another portion of the vehicle.

4. In spring suspensions for vehicles, a bracket provided with means for rigidly and immovably securing the same to an end of a leaf spring, a separately formed flexible supporting link rigidly secured to said bracket and a bracket for attachment to another part of the vehicle rigidly secured to another portion of said flexible link.

5. An attachment for applying flexible link connections to spring suspensions comprising a bracket adapted to overlie the end portion of a leaf spring provided with ears to embrace the edges of the spring and perforated to align with the eye usually provided at the end of the main spring leaf to receive the shackle bolt ordinarily employed in connection with such eye and a clamp for rigidly securing the flexible connecting link, carried by said bracket.

6. An attachment for applying flexible link connections to spring suspensions comprising a bracket adapted to overlie the end portion of a leaf spring provided with ears to embrace the edges of the spring and perforated to align with the eye usually provided at the end of the main spring leaf to receive the shackle bolt ordinarily employed in connection with such eye and a clamp for rigidly securing the flexible connecting link, carried by said bracket, said bracket having additional ears spaced from the shackle bolt ears and pierced to receive a clip bolt.

7. An attachment for applying flexible link connections to spring suspensions comprising a bracket adapted to overlie the end portion of a leaf spring provided with ears to embrace the edges of the spring and perforated to align with the eye usually provided at the end of the main spring leaf to receive the shackle bolt ordinarily employed in connection with such eye, a clamp for rigidly securing the flexible connecting link, carried by said bracket and a companion clamp for rigidly holding another separated portion of the flexible link and provided with means for enabling attachment of the same to a vehicle part cooperatively related to the spring.

8. In a spring suspension, the combination with relatively movable vehicle parts which are ordinarily coupled by a rigid shackle and are provided with shackle bolts by which the rigid shackle is secured to said parts, of a flexible supporting link designed to be substituted in place of the rigid shackle and provided with clamps rigidly secured to separated portions of the same and having means for enabling the clamps to be hung on the shackle bolts with which the related parts are ordinarily equipped.

9. In a spring suspension, the combination with relatively movable vehicle parts which are ordinarily coupled by a rigid shackle and are provided with shackle bolts by which the rigid shackle is secured to said parts, of a flexible supporting link designed

to the substituted in place of the rigid shackle and provided with clamps rigidly secured to separated portions of the same and having means for enabling the clamps being hung on the shackle bolts with which the related parts are ordinarily equipped, said clamps having braces engaging portions of said related parts at points removed from the shackle bolt connections.

10. In a spring suspension, the combination with relatively movable vehicle parts which are ordinarily coupled by a rigid shackle and are provided with shackle bolts by which the rigid shackle is secured to said parts, of a flexible supporting link designed to the substituted in place of the rigid shackle and provided with clamps rigidly secured to separated portions of the same and having means for enabling the clamps being hung on the shackle bolts with which the related parts are ordinarily equipped, said clamps having braces engaging portions of said related parts at points removed from the shackle bolt connections and means for securing said braces to the parts to prevent pivotal movement of the clamps about the shackle bolt centers.

11. In spring suspensions, a flexible link connection designed to be substituted in place of the usual rigid connection between related parts of a vehicle spring suspension and including a flexible link and clamps rigidly holding separated portions of the same, said clamps having perforated ears to receive the shackle bolts usually employed with the rigid shackle connections and at least one of said clamps having a brace extending from the perforated ears and engaging a portion of the part to which the clamp is applied at a point remote from the shackle bolt connection.

12. In spring suspensions, a flexible link connection designed to be substituted in place of the usual rigid link connection between related parts of a vehicle spring suspension and including a flexible link and clamps rigidly holding separated portions of the same, said clamps having perforated ears to receive the shackle bolts usually employed with the rigid shackle connections and said clamps having braces extending from the perforated ears and engaging portions of the parts to which the clamps are applied at points remote from the shackle bolt connections.

13. In spring suspensions, a flexible link connection designed to be substituted in place of the usual rigid link connection between related parts of a vehicle spring suspension and including a flexible link and clamps rigidly holding separated portions of the same, said clamps having perforated ears to receive the shackle bolts usually employed with the rigid shackle connections and said clamps having braces extending from the perforated ears and engaging portions of the parts to which the clamps are applied at points remote from the shackle bolt connections and means for fixing said braces to the parts which they engage.

14. In spring suspensions, a flexible link connection designed to be substituted in place of the usual rigid link connection between related parts of a vehicle spring suspension and including a flexible link and clamps rigidly holding separated portions of the same, said clamps having perforated ears to receive the shackle bolts usually employed with the rigid shackle connections and at least one of said clamps having a brace extending from the perforated ears and engaging a portion of the part to which the clamp is applied at a point remote from the shackle bolt connection and means for fixing said brace to the part which it engages.

15. A flexible link connecting means for replacement of the usual rigid spring shackle on cars comprising a bracket provided with means for attachment of the same to the end of a leaf spring, a clamp carried by said bracket, a flexible suspension link rigidly secured at one end in said clamp, a clamp rigidly engaged with the opposite end of said link and a post carrying said last-mentioned clamp and having a screw threaded end for substitution in place of the post ordinarily employed for the usual rigid shackle.

16. A flexible suspension link for connecting the angularly related ends of the longitudinal and transverse springs of a platform spring suspension comprising clamps provided with means for direct attachment of the same to the shackle bolts usually provided at the ends of such angularly related springs and a flexible suspension link rigidly held at its opposite ends in said clamps, said clamps standing at substantially equal angles to the shackle bolts aforesaid to thereby position the suspension link at an angle to both the springs.

17. A flexible connection attachment for vehicle spring suspensions comprising brackets having opposed bearing faces, a flexible connecting link interposed between said bearing faces, clamps carried by said brackets at the sides of said bearing faces and rigidly securing separated portions of the connecting link, said brackets having perforated ears and shackle bolts extending through said perforated ears and the related parts of the spring suspension to which the brackets are applied.

18. A flexible connection attachment for vehicle spring suspensions comprising brackets having opposed bearing faces, a flexible connecting link interposed between said bearing faces, clamps carried by said brackets at the sides of said bearing faces and

rigidly securing separated portions of the connecting link, said brackets having perforated ears, shackle bolts extending through said perforated ears and the related parts of the spring suspension to which the brackets apply and angle braces carried by the brackets and overlying the parts to which said brackets are applied.

19. A flexible connection attachment for vehicle spring suspensions comprising brackets having opposed bearing faces, a flexible connecting link interposed between said bearing faces, clamps carried by said brackets at the sides of said bearing faces and rigidly securing separated portions of the connecting link, said brackets having perforated ears, shackle bolts extending through said perforated ears and the related parts of the spring suspension to which the brackets apply, angle braces carried by the brackets and overlying the parts to which said brackets are applied and means for securing said angle braces to such parts at points removed from the shackle bolts aforesaid.

20. A flexible connection attachment for vehicle spring suspensions comprising brackets having opposed bearing faces, a flexible connecting link interposed between said bearing faces, clamps carried by said brackets at the sides of said bearing faces and rigidly securing separated portions of the connecting link, said brackets having perforated ears and shackle bolts extending through said perforated ears and the related parts of the spring suspension to which the brackets apply, said clamps and bearing faces being positioned to maintain the interposed flexible connecting link at an angle to carry the thrust of the related parts across the bearing faces.

In witness whereof, we have hereunto set our hands this 16th day of May, 1921.

HARVEY W. BELL.
HAZEN L. HOYT, JR.