June 23, 1936. E. F. BAIRD 2,045,173

KNEE-ACTION HOIST ATTACHMENT

Original Filed Feb. 2, 1934

Fig. 1.

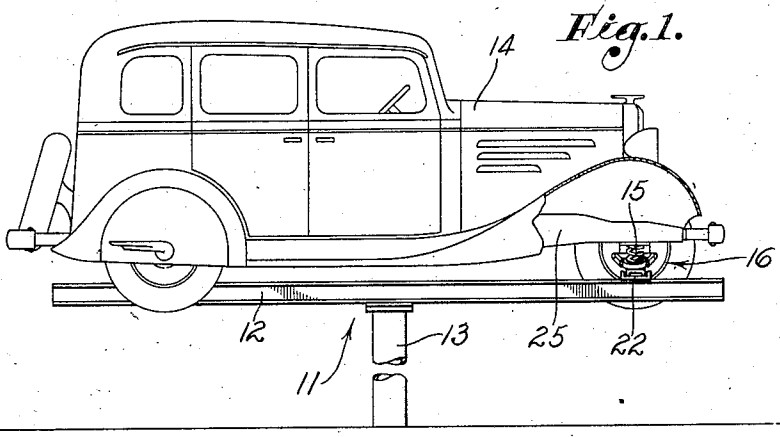


Fig. 2.

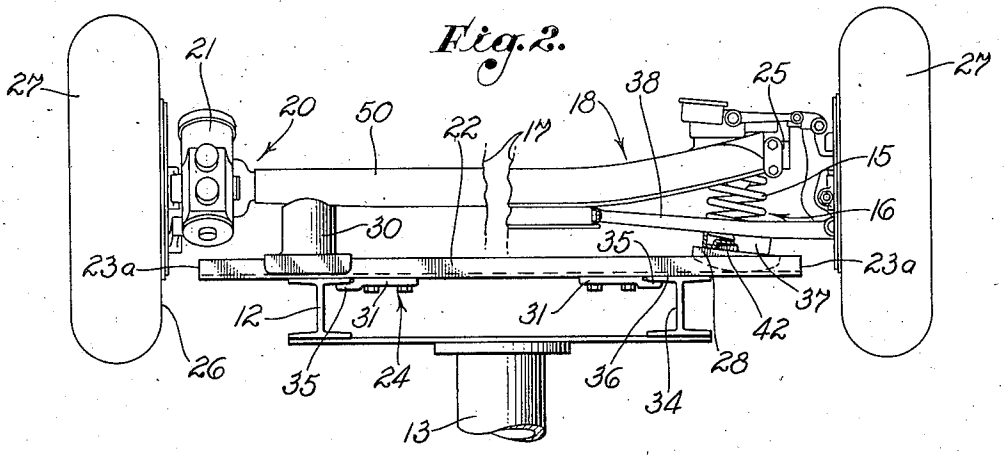


Fig. 3.

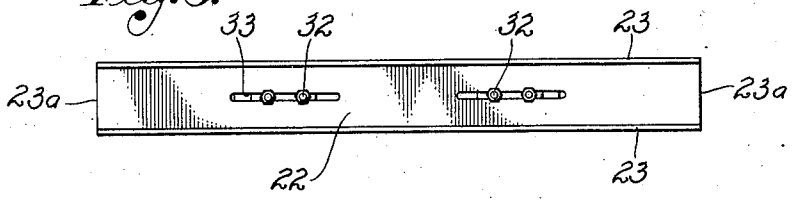


Fig. 4.

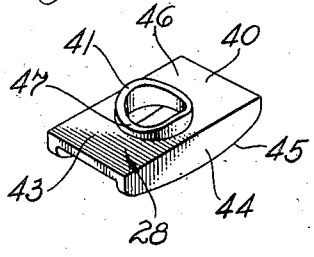
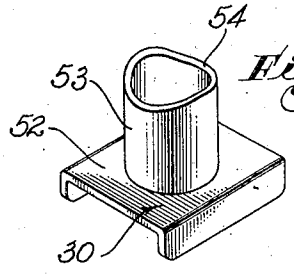


Fig. 5.



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KNEE-ACTION HOIST ATTACHMENT

Edward F. Baird, Glendale, Calif.

Application February 2, 1934, Serial No. 709,475
Renewed September 4, 1934

16 Claims. (Cl. 254—89)

My invention relates to hoists for raising vehicles so as to give access to the under-carriage structure and the lower parts of the mechanism of the vehicles, and relates in particular to an attachment which may be readily applied to present hoist equipment or which may be embodied in new hoist equipment, so as to make it possible to use such hoist equipment with vehicles having all types of wheel suspension, including what is known as "knee-action" wheel suspension.

Until lately it has been common practice to equip automobiles with axles at the front and rear ends thereof, extending entirely across the under portion of the vehicle in such position that the lifting structures of hoists could be brought readily into engagement therewith without danger of injury to any of the parts or mechanisms. Some motor car manufacturers have now adopted what is known as the knee-action front wheel suspension, which avoids the use of a front axle supported by elliptical springs and employs instead thereof a system of levers or parallel links. At the present time these knee-action suspensions are divided into two main classes, namely, the spring cup type and the dead axle type, both of which will be hereinafter referred to in particular. It is found that standard hoisting equipment is not suitable for use with knee-action front wheel suspensions and that where the use of an ordinary hoist is attempted, there is great danger of injury to the knee-action suspension and the steering mechanism associated therewith, since the engagement of levers forming the knee-action suspension by the rails of a standard hoist places bending stresses therein. Furthermore, there is an ever present danger of the vehicle slipping and falling from the hoist due to the absence of means for producing a secure engagement of the hoist structure with the knee-action suspension structure.

It is an object of my invention to provide an attachment which may be readily applied to standard hoisting equipment, such attachment making it possible to use the hoisting equipment with all types of cars, and particularly to support cars having knee-action suspension in a satisfactory and secure manner.

A further object of the invention is to provide a hoist which may be used with cars having the wheels thereof set at different gauges. A present tendency in the manufacture of automobiles is to vary from what was originally considered a standard gauge for the lateral spacing of the wheels, and with each difference in gauge of wheels in knee-action suspension, there is required a different position of the engaging parts of a hoist.

A further object of the invention is to provide a hoist, and an attachment for a hoist, having lifting or engagement means especially suited for use with what is known as the cup type suspension, employing a heavy helical spring, the lower end of which is seated in a cup member having a lateral rocking action. My present invention provides pillar members so formed that they will engage the spring cups in centralized relation and will transmit the lifting force of the hoist to the spring cups in intramarginal relation to the spring so that a harmful eccentric loading of the spring is avoided.

A further object of the invention is to provide adjustable pillar members of the character set forth in the preceding paragraph which will support the vehicle in such a manner that all danger of slippage or overturning is avoided.

A feature of the invention is that it is especially adapted for use not only with knee-action suspension and the standard spring suspensions, but it is especially advantageous with vehicles having the springs thereof mounted in underslung relation to the axles, that is, with the elliptical springs passing under the axles. Considerable difficulty has been encountered in the handling of such vehicles on standard hoists, but my invention provides a channel for positively engaging the spring or yoke bolts in such a manner that there is no danger of the vehicle slipping from proper position on the hoist.

Further objects and advantages of the invention will be made evident throughout the following part of the specification.

Referring to the drawing, which is for illustrative purposes only,

Fig. 1 is a side view of a hoist equipped with my invention.

Fig. 2 is a front end view of the hoist, this view showing the supports for two different types of knee-action wheel suspensions.

Fig. 3 is a plan view of the simple form of cross bar forming a part of the hoist attachment.

Fig. 4 is a perspective view of the relatively short rotatable pillar member forming a part of the invention.

Fig. 5 is a perspective view of a pillar member adapted for use with what is known as the dead axle type of knee-action suspension.

In Fig. 1 I show a hoist 11 which in accordance with standard structural practices comprises a pair of longitudinal rails 12 mounted upon the upper end of a piston or ram 13 which

extends downwardly into a cylinder and is adapted to be raised by fluid pressure. On the hoist 11 I show a view of an automobile 14 which is partly sectioned at the forward end thereof to give a side view of the spring 15 of a knee-action suspension 16 which may be referred to as a cup knee-action suspension. Fig. 2 shows the front end of the hoist 11, and the upper part of Fig. 2 is divided by broken lines 17. On opposite sides of these lines 17 are shown a part 18 of an automobile structure having a spring cup type of knee-action suspension and a part 20 of an automobile structure employing what is known as a dead axle type knee-action suspension 21.

The invention includes a cross bar 22 comprising a channel with the flanges 23 thereof facing upwardly. Means 24 are provided for mounting the channel in laterally extended and centralized relation on the rails 12 of the hoist 11. This means for securing the cross bar 22 is adjustable to suit the varying widths or spacings between the rails 12 found in the various hoists now in use, and such means is also adapted to permit the cross bar 22 to be moved in a direction lengthwise of the hoist, or parallel to the rails 12, so as to accommodate cars of different lengths. A feature of the invention is that the cross bar 22 is of such length that the ends 23*a* thereof extend beyond the frame of the hoist 11 formed by the longitudinal rails 12, and that the cross bar 22 has a length greater than the width of the chassis or frame 25 of any vehicle adapted to be handled by the hoist. In fact, the cross bar 22 is of such length that it approaches very close to the inner faces 26 of the vehicle wheels 27. This cross bar, accordingly, extends well out under the wheel suspension structure and is adapted to receive thereon an adjustable engaging means which will be hereinafter referred to as pillar members 28 and 30 shown respectively in Figs. 4 and 5. The mounting means 24 comprises a pair of bodies 31 adapted to be secured to the under face of the cross bar 22 by means of bolts 32 which pass upwardly through slots 33 in the cross bar 22, these slots 33 being of such length that the blocks or bodies 31 may be moved inwardly and outwardly in accordance with the spacing between the side rails 12 which are in the form of H-beams placed with their webs 34 substantially vertical. The bodies or blocks 31 are provided with projecting fingers or tongues 35 adapted to project under the inwardly extending finages 36 of the H-beams forming the rails 12 so that the cross bar 22 cannot be lifted, so that the cross bar is held in a centralized relation to the longitudinal axis of the hoist, and so that the cross bar may be moved longitudinally along the rails 12.

One form of cup type knee-action suspension, as shown in Fig. 1 and in the right-hand portion of Fig. 2, has lower cup members 37 which receive the lower ends of the springs 15, these cup members being connected to lower lever members 38 of the knee-action suspension 16 in a downwardly and outwardly sloping position. It is characteristic of this form of knee-action suspension that the slope of the cup members 37 changes as the levers 38 swing upwardly, and in a commonly used form of such suspension, the angularity of the cup members 37 increases relative to a horizontal plane as such cup members are moved upwardly against the expansive force of the spring 15. The pillar members 28 are so formed that they will engage the cup members 37 and will readily adjust themselves to the angular positions of such cup members. As shown in Fig. 4, each pillar member 28 comprises a body 40 with an upwardly extending centralizing projection 41 for engaging the central opening 42 of the cup member 37, this centralizing projection 41 being conveniently formed from an upwardly projecting annular wall. The body 40 of the pillar member 28 comprises an essentially horizontal wall 43 with flanges 44 extending downwardly from the edges thereof, the spaces of these flanges 44 being such that they may be included between the flanges 23 of the cross bar 22 when in operative position, as shown in Figs. 1 and 2. The body 40 has the lower portion thereof convex in lengthwise direction so that the members 28 may have a limited rotational or rolling movement in the channel formed by the cross bar 22. This convexity is provided by curving the lower edges 45 of the downwardly extending flanges 44, as shown in Figs. 2 and 4.

In the use of the invention with a cup type knee-action suspension, the pillar members 28 are moved laterally in the cross bar 22 to such positions that the centralizing projections 41 are aligned with the central openings of the cup members 37. The hoist structure is then raised, and as the pillar members 28 engage the cup members 37, they will rotate through engagement with the lower faces of the cup members 37, and the upper face 46 of each body will be firmly seated against the bottom of its cooperating cup member 37. The lines of the lifting forces transmitted from the pillar members 28 to the cup members 37 will be within the peripheries of the cups and will be distributed over the lower faces of such cups so that no danger of an unnatural deformation of the springs 15 will be produced. The pillar members have positive engagement with the vehicle through the extension of the centralizing projections 41 into the openings 42 of the cup members 37, and there is consequently no danger of the vehicle slipping from properly supported position. Owing to the relatively great extension of the ends of the cross bar 22, the pillar members 28 have a relatively wide range in which they may be moved so as to be brought into alignment with the spring cups employed on different characters of cars.

A further feature of the invention is the making of the pillar members so that they will engage a standard type axle, that is, an axle supported under the chassis of a vehicle by means of elliptical springs. This is accomplished by providing a depression 47 in the upper part of each member 28, such depression 47 being formed in the upper end of the centralizing projection 41. The pillar members 28 may be moved inwardly in the channel forming the cross bar 22 to such position that the depressions 47 will engage a straight horizontal portion of a vehicle front axle of old type, and such axle will be engaged and lifted in such a manner that it will not slip and in such a manner that danger of overturning of the vehicle due to dislodgment of a supporting means is avoided.

The knee-action spring suspensions, as hereinbefore mentioned, also include what is known as the dead axle type by reason of the fact that they have an axle member 50 extending laterally in rigid connection with the vehicle chassis, the ends of this rigid or dead axle 50 being con-

nected to the knee-action suspension such as shown at **21** in Fig. 2. For use with this type of wheel suspension, my invention provides pillar members **30**, each consisting of a supporting means **52** in the form of an inverted channel adapted to fit over the upper parts of the flanges **23** of the cross bar **22**, and a post or pillar **53** having a depression or channel **54** formed in the upper end thereof, this channel being of a character to receive an end portion of the dead axle **50** and to transmit from the cross bar **22** to the dead axle **50** the lifting force of the hoist in a stable and secure manner. The pillar members **30** are taller than the pillar members **28** owing to the fact that the level of the dead axle **50** is higher than the horizontal plane in which the spring cups **37** rest. Accordingly, when the vehicle is raised by use of either the pillar members **28** or **30**, in accordance with existing requirements, such vehicle will be maintained in a substantially horizontal position.

Although I have herein shown and described my invention in simple and practical form, it is recognized that certain parts or elements thereof are representative of other parts, elements, or mechanisms which may be used in substantially the same manner to accomplish substantially the same results; therefore, it is to be understood that the invention is not to be limited to the details disclosed herein but is to be accorded the full scope of the following claims.

I claim as my invention:

1. A hoist attachment of the character described, for use with a vehicle hoist having a longitudinal frame, including: a cross bar; means for securing said cross bar to said frame of said hoist in laterally extending position; and a pair of pillar members slidably mounted on said cross bar and being adapted to rotate in upright planes.

2. A hoist attachment of the character described, for use with a vehicle hoist having a longitudinal frame, including: a cross bar; means for securing said cross bar to said frame of said hoist in laterally extending position; and a pair of pillar members slidably mounted on said cross bar and being adapted to rotate in upright planes substantially coinciding with said cross bar.

3. A hoist attachment of the character described, for use with a vehicle hoist having a longitudinal frame, including: a cross bar; means for securing said cross bar to said frame of said hoist in laterally extending position; and a pair of pillar members slidably mounted on said cross bar and being rotatable in upright planes.

4. A hoist attachment of the character described, for use with a vehicle hoist having a longitudinal frame, including: a cross bar; adjustable means for securing said cross bar to said frame of said hoist in laterally extending position and in centralized relation to the longitudinal axis of said frame; and a pair of pillar members slidable lengthwise of said cross bar and being adapted to rotate in upright planes.

5. A hoist attachment of the character described, for use with a vehicle hoist having a longitudinal frame, including: a cross bar; adjustable means for securing said cross bar to said frame of said hoist in laterally extending position and in centralized relation to the longitudinal axis of said frame; and a pair of pillar members adjustable lengthwise of said cross bar and being adapted to rotate in upright planes substantially coinciding with said cross bar.

6. A hoist attachment of the character described, for use with a vehicle hoist having a longitudinal frame, including: a cross bar comprising a channel with the flanges thereof faced upwardly; means for securing said cross bar to said frame of said hoist in laterally extending position; and a pair of pillar members slidably mounted on said cross bar between the flanges thereof and being adapted to rotate in upright planes.

7. A hoist attachment of the character described, for use with a vehicle hoist having a longitudinal frame, including: a cross bar comprising a channel with the flanges thereof faced upwardly; means for securing said cross bar to said frame of said hoist in laterally extending position; and a pair of pillar members carried on said cross bar between the flanges thereof so as to rotate in upright planes, said pillar members each comprising a body of a width to fit between said flanges of said channel, each having the lower face thereof downwardly convex in lengthwise direction, and each having an upwardly faced centralizing projection for engagement with a spring cup of a knee-action wheel suspension.

8. A hoist attachment of the character described, for use with a vehicle hoist having a longitudinal frame, including: a cross bar comprising a channel with the flanges thereof faced upwardly; means for securing said cross bar to said frame of said hoist in laterally extending position; and a pair of pillar members carried on said cross bar between the flanges thereof so as to rotate in upright planes, said pillar members each comprising a body of a width to fit between said flanges of said channel, each having the lower face thereof downwardly convex in lengthwise direction, and each having an upwardly faced centralizing projection for engagement with a spring cup of a knee-action wheel suspension, there being a lengthwise depression in the upper part of each of said pillar members for engagement with a standard type vehicle axle.

9. A hoist attachment of the character described, for use with a vehicle hoist having a longitudinal frame, including: a cross bar of a length to project beyond the sides of said frame; means for adjustably securing said cross bar to said frame in laterally extending position; and a pair of pillar members adjustable longitudinally relative to said cross bar and being rotatable in upright planes.

10. A hoist attachment of the character described, for use with a vehicle hoist having a longitudinal frame, including: a cross bar of a length to project beyond the sides of said frame; means for securing said cross bar to said frame of said hoist in laterally extending position; and a pair of pillar members adjustable lengthwise of said cross bar and being adapted to rotate in upright planes.

11. An adjustable vehicle hoist of the character described, including: lifting means, a horizontal frame structure adapted to be raised by said lifting means, said frame structure having a cross bar adjustably mounted on the forward end thereof; and a pair of pillar members slidably mounted on said cross bar and being adapted for rotation in upright planes.

12. A hoist attachment of the character described, for use with a vehicle hoist having a longitudinal frame, including: a cross bar adjustably connected to said frame; and a pair of

pillar members slidably mounted on said cross bar and adapted to rotate in upright planes, said pillar members each having the lower face thereof downwardly convex in lengthwise direction, and each having a centralizing projection for engagement with a spring cup of a knee-action wheel suspension.

13. A hoist attachment of the character described, for use with a vehicle hoist having a longitudinal frame, including: a cross bar connected to said frame; and a pair of pillar members adjustably mounted on said cross bar and adapted to rotate in upright planes, and each of said pillar members having a centralizing projection for engagement with a spring cup of a knee-action wheel suspension.

14. A hoist attachment of the character described, for use with a vehicle hoist having a longitudinal frame, including: a cross bar; adjustable means for securing said cross bar to said frame in laterally extending position and in centralized relation to the longitudinal axis of said frame; and a pair of pillar members adjustably mounted on said cross bar and adapted to rotate in upright planes, and each of said pillar members having a centralizing projection for engagement with a spring cup of a knee-action wheel suspension.

15. A hoist attachment of the character described, for use with a vehicle hoist having a longitudinal frame, including: a cross bar; adjustable means for securing said cross bar to said frame; and a pair of pillar members slidably mounted on said cross bar, said pillar members being adapted for rotation in upright planes, and each of said pillar members having centralizing means adapted for engagement with a knee-action wheel suspension mechanism.

16. A hoist attachment of the character described, for use with a vehicle hoist having a longitudinal frame, including: a cross bar; means for securing said cross bar to said frame; and a pair of vehicle supporting members slidably mounted on said cross bar, said members being adapted for rotation in upright planes, and each of said members having centralizing means adapted for engagement with a knee-action wheel suspension mechanism.

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