April 21, 1953 J. O. REDINBAUGH 2,635,668

CAMBER CORRECTION TOOL

Filed July 29, 1949 3 Sheets-Sheet 1

Fig. 1.

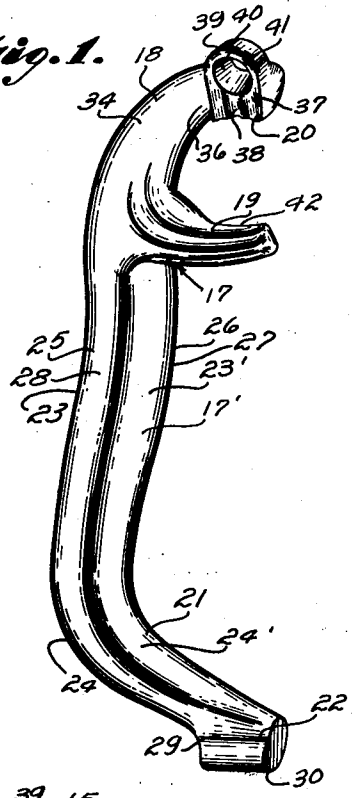


Fig. 2.

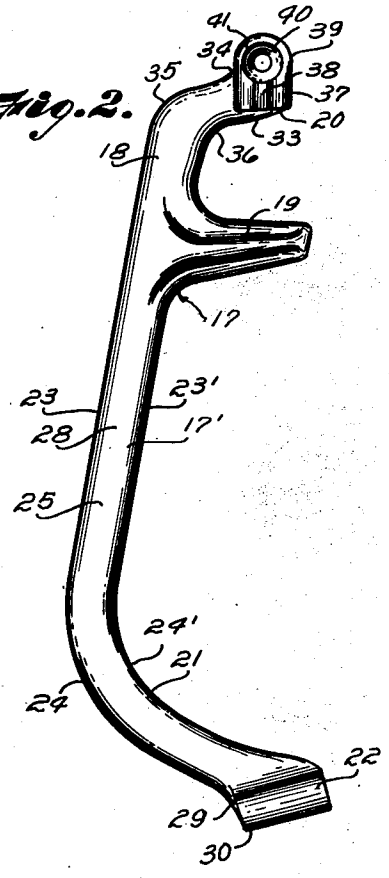
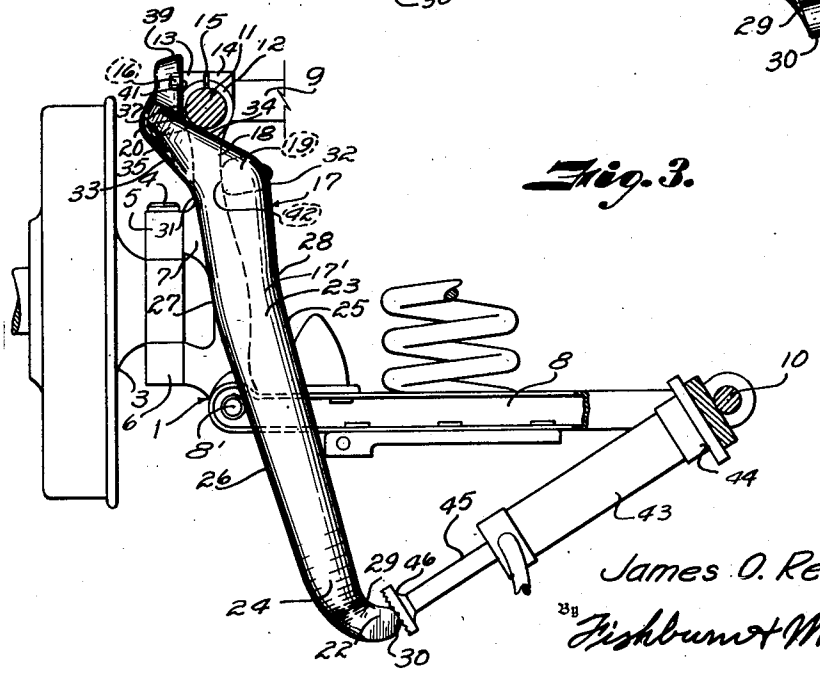


Fig. 3.



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April 21, 1953 J. O. REDINBAUGH 2,635,668

CAMBER CORRECTION TOOL

Filed July 29, 1949 3 Sheets-Sheet 2

Fig. 4.

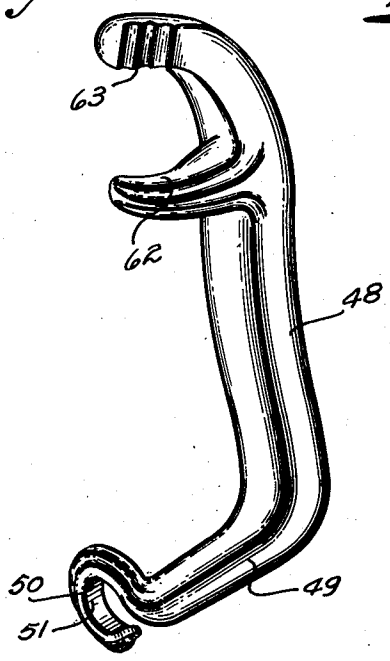


Fig. 5.

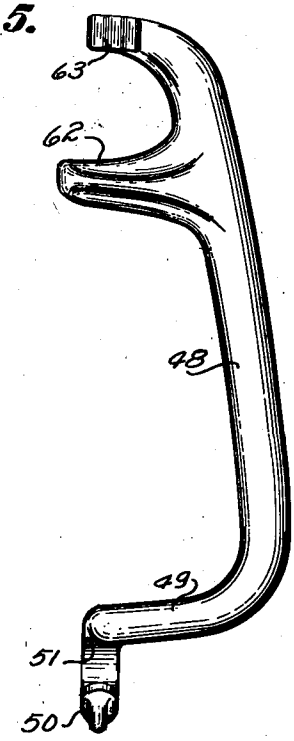
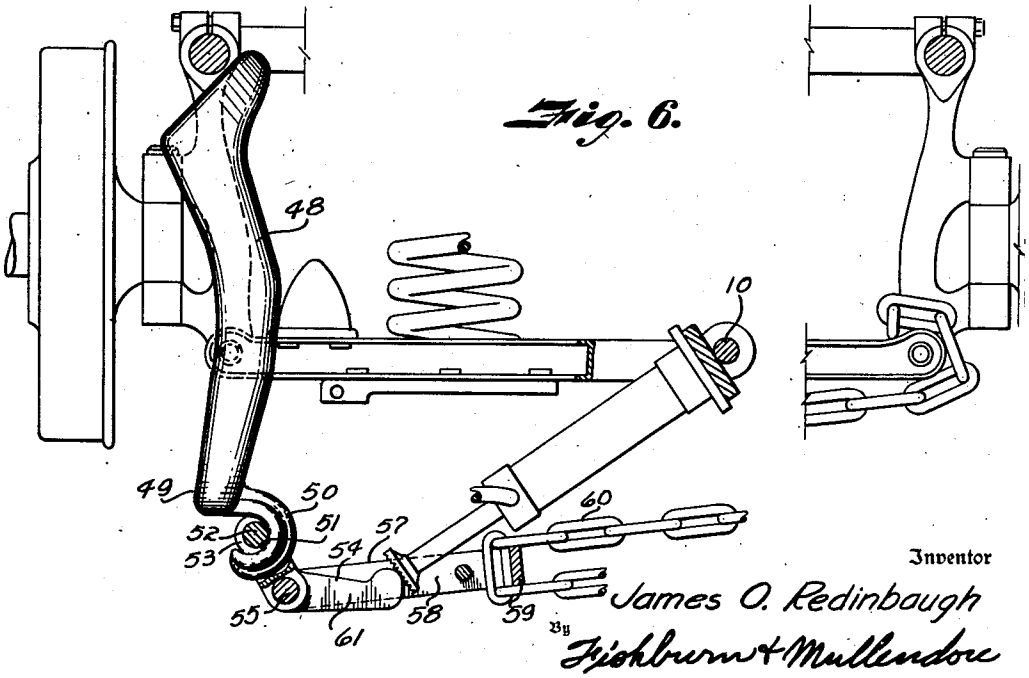


Fig. 6.



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CAMBER CORRECTION TOOL

Filed July 29, 1949 3 Sheets-Sheet 3

Fig. 7.

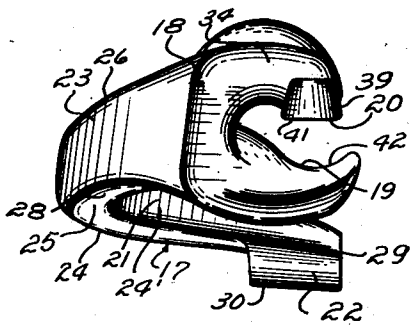


Fig. 8.

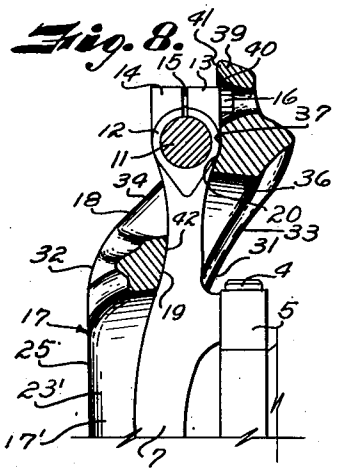


Fig. 9.

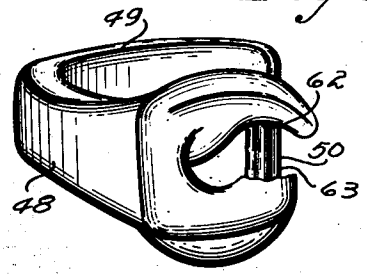
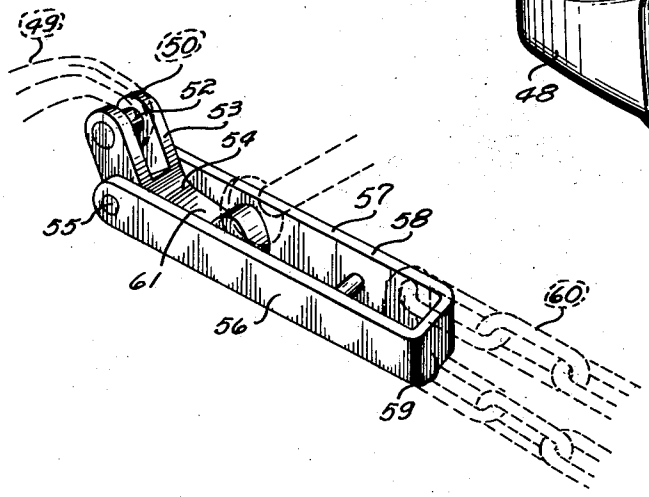


Fig. 10.



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CAMBER CORRECTION TOOL

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Application July 29, 1949, Serial No. 107,456

3 Claims. (Cl. 153—39)

1

This invention relates to a device for correcting camber of a motor vehicle wheel, for example, in a modern automotive vehicle having knee action mounting of the steerable wheels, the king pin support arm is rather easily knocked out of alignment which results in improper contact of the wheel tread causing excessive wear of the tires and it is therefore the principal object to provide a tool for shaping the king pin support arm to give the desired camber without removing any of the wheel mounting parts.

Other objects of the invention are to provide a tool of this character by which a bend is made in the king pin supporting arm at the desired point, without dangering alignment of the king pin bearings; to provide a tool adapted to apply pressure against one side of the clamp of the king pin supporting arm that connects with the upper control arm of the knee action mounting and to apply an opposed pressure against the king pin supporting arm directly above the king pin bearing, for effecting the bend between the pressure applying points; to provide a tool with a clamp engaging jaw adapted to engage a maximum area of the clamp including the clamping ears so as to avoid injury to the clamping portion of the arm; to provide the clamp engaging portion of the tool with a recess to accommodate the head of the clamping bolt and which assists in supporting the tool in engagement with the king pin supporting arm, and holds the weight of the tool while the power or jack element is applied, and to provide a tool that is of strong and rigid construction.

It is also an object of the invention to provide a tool for decreasing camber.

In accomplishing these and other objects of the invention hereafter pointed out, I have provided improved structure the preferred forms of which are illustrated in the accompanying drawings, wherein:

Fig. 1 is a perspective view of a camber correcting tool constructed in accordance with the present invention and shaped to increase the camber.

Fig. 2 is a side elevational view of the tool.

Fig. 3 is a fragmentary elevational view of the knee-action mounting of a motor vehicle wheel showing application of the tool to the king pin supporting arm together with mounting of the hydraulic jack for applying power to the tool.

Fig. 4 is a perspective view of the tool constructed in accordance with the present invention for removing camber.

Fig. 5 is a side elevational view of the tool illustrated in Fig. 4.

2

Fig. 6 is a front elevation view of the knee-action mountings of the front wheels of a vehicle and showing application of the tool illustrated in Figs. 4 and 5 for removing camber.

Fig. 7 is a plan view of the tool illustrated in Figs. 1 to 3 inclusive, particularly illustrating the shape of the head and king pin arm knuckle engaging jaws.

Fig. 8 is an enlarged section showing the head of the tool as applied to the king pin supporting arm, particularly illustrating engagement of the jaws.

Fig. 9 is a plan view of the tool illustrated in Figs. 4 to 6 inclusive.

Fig. 10 is a perspective view of the bell crank lever mechanism used in connection with the form of tool illustrated in Figs. 4 to 6 inclusive.

Referring more in detail to the drawings:

1 designates the knee-action mounting for one of the front or steerable wheels of an automobile represented by the hub assembly 3 that is mounted on a king pin 4 having its ends carried in upper and lower bearings 5 and 6 of an arm 7, the arm 7 being carried by the A-frame 8 and control arm 9 of the knee-action mechanism. The A-frame 8 is attached to the main frame of a vehicle by means of a shaft 10 and extends laterally therefrom to pivotly connect with the lower end of the arm 7 by means of a pin 8'. The control arm 9 is also pivotly mounted to the frame of the vehicle and extends over the A-frame to journal the ends of a cross-pin 11 on which the upper end of the king pin supporting arm is fixed by a sleeve-like clamp 12 forming a part of the arm 7 and having ears 13 and 14 on the respective sides of a split 15 of the sleeve. Extending through the outermost ear 13 and threadedly engaged in the ear 14 is a cap screw 16 by which the ears are drawn together to contract the sleeve portion of the clamp into contact with the pin 11, as in conventional manner. It is obvious that the automobile structure including the knee-action mounting of the wheels form no part of the present invention, but are illustrated and described to give a better understanding of the function and application of the camber correcting tools to which the present invention pertains.

17 designates the tool constructed in accordance with the present invention for applying camber and which includes a body portion 17', a head 18 provided with jaws 19 and 20, and a leg portion 21 terminating in a foot 22. The tool is constructed to have a yield point substantially higher than the yield point of the king pin sup-

porting bracket and is therefore ruggedly constructed. The body portion 17' is of substantially rectangular cross-section and has substantially straight sides 23 and 23' curving downwardly and laterally as at 24 and 24' into the leg portion 21. The other sides 25 and 26 of the body portion are curved slightly below the head portion as indicated at 27 and 28. The leg portion is thus offset from the head portion by reason of the curves 27 and 28, so that when the head portion is engaged with the king pin carrying arm as later described, the leg portion clears the wheel to provide the desired leverage action of the tool.

The foot portion 22 curves laterally in the direction of the offset as indicated at 29 and has a projecting substantially semi-cylindrical terminal 30 adapted to be engaged with a jack as later described.

The head portion 18 extends laterally at an obtuse angle with respect to the side faces 25 and 26, the juncture being formed by rounding curves 31 and 32. The corresponding sides 33 and 34 of the head converge slightly toward the jaw 20. The side faces 23 and 23' of the body portion connect with laterally curving corresponding side faces 35 and 36 of the head portion to effect offset of the jaw 20 from the side face 23', whereby the body and leg portions of the tool clear the sides of the king pin carrying arm and A-frame 8 when the head is engaged with the king pin supporting arm as shown in Fig. 3.

The jaw 20 has a laterally formed face portion 37 having a grooved seat 38 substantially conforming in shape to the juncture of the neck of the supporting arm with the sleeve-like clamping portion thereof. The jaw 20 also includes an upwardly extending lug like portion 39 to provide a continuation of the face 37 and has a conical recess or bore 40 that is adapted to accommodate the head of the cap screw previously described. Cooperating with the face portion 37 and extending about the recess 40 is a face portion 41 that is adapted to engage the face portion of the ear 13 surrounding the head of the cap screw 16 so that when the tool is engaged with the king pin supporting arm the jaw face not only bears against the clamping sleeve portion of the arm but also against the ear 13, whereby the engaging surface of the jaw is extended to distribute the pressure sufficiently for avoiding possible injury to the clamping portion of the arm when the tool is used.

Jaw portion 19 extends laterally from the body portion substantially adjacent the curvature 32 and has a slightly rounding seating face 42 facing the jaw 20 and which is adapted to engage the supporting arm of the king pin at a point directly above the upper king pin bearing as shown in Fig. 3. The jaw 19 is suitably ribbed and joined with the body portion to provide a rigid connection.

In using the tool constructed as described the body portion thereof is brought along side of the A-frame 8 so that the jaws 19 and 20 pass along the opposite sides of the upper portion of the king pin supporting arm with the jaw 20 engaging the side nearest the wheel and the jaw 19 engaging the side opposite the king pin as shown in Fig. 3. In this position the recess 40 accommodates the head of the cap screw and the face of the jaw 20 engages the clamp portion of the king pin supporting arm while the seating face 42 of the jaw 19 engages the opposite side of the king pin supporting arm at a spaced point therebelow but above the upper king pin bearing. In this position the tool is supported with the lower end projecting downwardly so that the leg portion extends under the A-frame and the foot portion 22 is in position to be engaged by a jack 43.

The jack 43 may be of any approved construction that has a base 44 adapted to be placed against the cross-shaft 10 and a movable element 45 having a plate 46 adapted to bear against the rounded face of the foot portion of the tool as shown in Fig. 3. When the jack is in position, it substantially registers with the central plane of the jaw faces, however, the body portion of the tool is offset laterally so as to clear the parts of the knee-action mechanism. When the jack is operated the power is transmitted to the leg portion of the tool to effect movement thereof in the direction of the wheel. This movement causes the head end of the tool to rock on the king pin supporting arm and effect a bend therein between the clamp portion of the arm and the portion engaged by the lower jaw 19, the degree of the bend being such as to restore the proper camber in the wheel when the jack is released. Upon release of the jack pressure, the tool is readily removed from the king pin supporting arm and reapplied in reverse order to the king pin supporting arm at the opposite side of the vehicle, the jack being applied between the shaft and foot portion of the tool in the same manner as previously described and operated to bend the upper portion of that king pin supporting arm to give the proper camber.

It often happens that the wheels may have too much camber and in this instance, it is necessary to use the form of tool illustrated in Figs. 4 to 6 inclusive. In this form of tool the body and leg portions 48 and 49 conform in shape to the body and leg portions of the tool illustrated in Figs. 1 to 3 inclusive, however, the leg portion 48 terminates in a laterally directed hook 50 having an inner seating surface 51 in which is engaged a crosspin 52 carried by a yoke shaped arm 53 of a bell crank lever 54, the bell crank lever 54 being mounted on a cross pin 55, that is carried between the arms 56 and 57 of a yoke shaped member 58 having a cross bar portion 59 adapted to be connected by a chain 60 as later described whereby the pressure of the jack 43 may be applied to the other arm 61 of the bell crank lever 54 as shown in Fig. 6.

The lower jaw 62 of the head portion of the tool conforms in shape to the lower jaw 19 of the first described tool. The upper jaw 63 bears the same relationship to the jaw 62 but the lug portion of the jaw 20 is omitted for the reason that the cap screw does not extend through the ear 14 of the king pin carrying bracket and because of insufficient clearance between the control arm 9 and clamp 12. The tool is applied as illustrated in Fig. 6 with the jaw 62 engaging the side of the king pin carrying arm adjacent wheel and the jaw member 63 is engaged with the opposite side so that it rests upon the upper bearing of the king pin supporting arm. The jaw member 63 therefore safely supports the tool while the power elements are applied. The shape of the jaw member 63 conforms for all practicable purposes to the outer contour of area of the king pin supporting bracket which it contacts so as to give ample contact and protection to the bracket when the tool is actuated to decrease camber. The

body portion of the tool extends downwardly alongside of the king pin carrying arm and clears the side of the A-frame but the lateral offset in the leg portion 49 positions the hook in alignment with the cross-shaft 10. The cross pin 52 of the bell crank lever 54 is then engaged in the hook 50 and the chain 60 is extended over the cross-bar portion 59 whereupon the opposite end of the chain is connected to the opposite A-frame of the knee-action mechanism. The jack is then applied with one end aganist the shaft 10 and the other against the end of the arm 61 of the bell crank lever as shown in Fig. 6, then when the jack is operated the bell crank lever pulls on the leg of the tool to effect movement thereof in an anti-clockwise direction Fig. 6 so that the clamp portion of the king pin supporting arm is pushed in the direction of the wheel to reduce the camber to the proper amount. If it is necessary to reduce the camber in the opposite wheel, the tool, jack and bell crank mechanisms are applied in similar manner, however, the tool is applied from the opposite side of the king pin supporting bracket.

From the foregoing, it is obvious that I have provided a tool for shaping the king pin supporting arm of a wheel mounting so as to give the desired camber in a wheel without removal of any of the wheel mounting parts. It is also obvious that the shaping of the king pin supporting arm is effected without applying stress or in any way interfering with the action of the king pin because the bend is confined between the upper king pin bearing the clamping portion of the king pin supporting arm.

What I claim and desire to secure by Letters Patent is:

1. A device for correcting camber in a knee action wheel mounting of the type including a bracket carrying a king pin and having an arm portion extending above the king pin and provided with a pin clamp having a tightening screw on one side thereof, said device including a lever-like member having a head, a jaw on said head adapted to engage the clamping screw side of the pin clamp, a jaw adapted for engaging the arm portion above the king pin and on a side opposite said tightening screw, means for rocking said member to effect a bend in said arm between the engaging points of said jaws, and an ear on the first named jaw having a recess to accommodate said clamping screw to support the lever-like member on the supporting bracket.

2. A device for correcting camber in a knee action wheel mounting of the type including a supporting bracket carrying a king pin and having an arm portion extending above the king pin and provided with a pin clamp equipped with a tightening screw, said device including a body member having a head portion, jaws on opposite sides of the head portion and spaced to respectively engage the pin clamp and the side of the bracket opposite the king pin, said jaws having seating faces adapted to fit said engaging portions of the king pin supporting bracket, and a lug on the jaw which is adapted to engage the pin clamp and having a recess for engagement with the clamping screw to support the device on said bracket.

3. A device for correcting camber in a knee action wheel mounting of the type including a supporting bracket carrying a king pin and having an arm portion extending above the king pin and carrying a pin clamp provided with a tightening screw, said device including a body member having a head, a jaw on said head adapted to engage the clamping screw side of the pin clamp, a jaw adapted for engaging the opposite side of the arm portion above the king pin, said body member having shape to clear said mounting when the jaws are engaged with said arm portion and pin clamp, a laterally extending leg on the body member, a foot on said leg adapted to be engaged by a jack to effect a bend in said arm portion between the engaging points of said jaws, and an ear on the first named jaw having a recess to accommodate said tightening screw.

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