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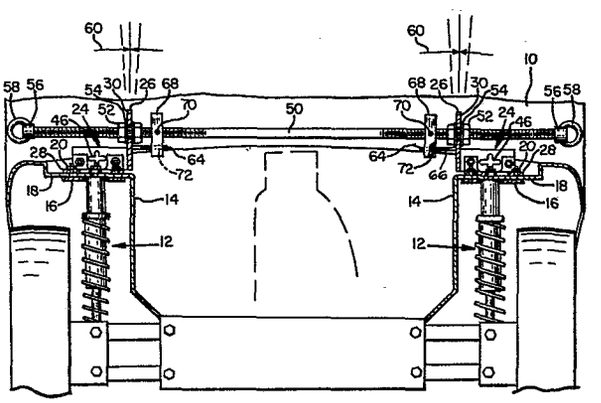
(54) Straightening tool for vehicle bodies.

(57) The present specification discloses a straightening tool (24, 50) for use in straightening vehicle bodies (10) of the type constructed such that the front and body construction is integral with upright wheel supporting struts (12). In a view of the integral structure both the struts (12) and body (10) must be straightened in the event of damage. This is difficult since an outside anchor point is usually required.

The present invention simplifies such straightening by providing a pair of the rigid right angle brackets (24) threadedly engaged by a threaded bar (50) and arranged for connection to opposite wheel supporting struts (12) of a vehicle (10) so that one strut (12) can form an anchor point for straightening the other strut (12) upon threaded adjustment of the bar (50) in the brackets (24). The bar (50) also has end loops (58) for rotating it and also so that it can be anchored to an outside source for straightening one or both of the struts (12). The brackets (24) have a removable base portion (28) for substitution of selected bases to accommodate different struts. The brackets (24) also include side apertures (46) for removably receiving a tension device for applying a sideways force if desired. Gauge means (64, 68) are provided between the brackets (24) and the bar (50) to illustrate adjusting distance.



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DESCRIPTION

STRAIGHTENING TOOL FOR VEHICLE BODIES

The present invention relates to a straightening tool for use with vehicle bodies.

Some vehicles bodies are now being constructed in a manner such that front end body construction is integral with upright wheel supporting struts. Such struts are known as McPherson struts. In view of this integral relationship, both the strut and body portion must be straightened in the event that damage is caused by a collision or the like. Such is difficult to accomplish since an outside anchor point is usually required for the connection of one end of straightening tools. The integral relationship of the vehicle body and the wheel supporting struts also has the disadvantage that body portions must be bent in order to change the camber of the front wheels. This makes it difficult to accomplish an otherwise simple aligning function.

An aim of the present invention is to provide a straightening tool for use with vehicle bodies which can be arranged to force the struts and integral body portions into desired positions.

Another aim of the present invention is to provide a straightening tool that is simplified in structure and economical to manufacture.

According to the present invention there is provided a straightening tool for vehicle bodies of the type having integral connection to front and upright wheel supporting struts terminating at the top in upwardly exposed fastening means, said tool comprising a bracket having a base portion, securing means on said base portion arranged removably to secure said base portion to the fastening means at the top of an upright wheel supporting strut, and connecting means on said

bracket arranged to provide connection with an outside pulling or pushing force to force said bracket and a connected bent upright wheel supporting strut into a straightened condition.

According to a further aspect of the present invention there is provided a straightening tool for vehicle bodies of the type having integral connection to front and upright wheel supporting struts terminating at the top in upwardly exposed fastening means, characterised in that said tool comprises a bracket having a base portion, securing means on said base portion being arranged to removably secure said base portion to the fastening means at the top of an upright wheel supporting strut, and connecting means on an angular extension of said base portion and on an elongated rigid bar, providing axial connected adjustment of said bar relative to said angular extension whereby said bar upon being adjusted axially relative to said angular extension and being anchored at one of its ends is arranged to force said bracket and a connected bent upright wheel supporting strut into a straightened condition.

The connection between the bar and the brackets preferably comprises a threaded connection whereby the brackets can be forcibly moved in one direction or the other. The base portion of the bracket has a plurality of apertures arranged to be secured to the top of the wheel supporting strut. The brackets have side apertures arranged to allow for releasable connection to a chain for allowing a pulling force to be applied sideways of the brackets and in addition the bar has end eyes which allow a pulling force to be applied by a chain. The brackets preferably have a removable base portion which allows one base to be substituted for another to accomodate different structures of McPherson struts. Two of such brackets are preferably used in connection with the threaded bar to accomplish relative movement of the

brackets where desired. The bar may also be used with hanger links for supporting the engine if desired.

The present invention will now be further described by way of example, with reference to the accompanying drawings, in which:-

Figure 1 is a perspective view of one embodiment of straightening tool constructed according to the present invention, as applied to a vehicle for accomplishing a repairing function;

Figure 2 is an enlarged vertical sectional view taken on the line 2-2 of Figure 1;

Figure 3 is a fragmentary plan view of one of the bracket members which form a part of the straightening tool in Figs. 1 and 2; and

Figure 4 is a face view of a motor hanger link that may be used with the present invention.

With particular reference to the accompanying drawings, the present invention is intended for use with a particular type of vehicle construction, namely, a vehicle 10 of the type having upright wheel supporting struts 12 which are generally known as McPherson struts. As best seen in Figure 2, such wheel supporting struts and wheel assemblies are integral with vehicle body portions 14. The upper ends of the wheel supporting struts 12 have plate-like connections 16 to horizontal body portions 18, such connections being made by means of a plurality of connecting bolts 20 projecting above the flat body portions 18.

The invention comprises a pair of heavy duty brackets 24 having a body portion 26 and a base portion 28. Body portion 26 has an upright end wall 30 and integral right angle side walls 32. End walls 30 have apertures 34 therein near their upper ends. Base portions 28 comprise a flat plate 36 and integral upright side walls 38. Base portions 28 are dimensioned so that

their walls fit inside of the walls 32 of the body portions 26 and have removable bolted connections 40 thereon. Base portions 28 have a plurality of apertures 42,(see Figure 3), arranged in a pattern to provide for the connection of the brackets to the projecting bolted connections 20 forming a part of the wheel struts. Various patterns and locations of the apertures may be provided so that a fit can be made for various makes of McPherson struts. All of the various forms of McPherson struts cannot be fitted with one base portion 28 and thus base portions having different aperture arrangements may be substituted one for another. The base portions 28 of the brackets have a central aperture 44 to provide clearance for a main or central bolt of the wheel strut. The side walls 32 of the body portions 26 have chain pull apertures 46 arranged to receive a chain so that a sideways pull can be applied to the bracket if desired. The side walls 38 of the base portions 28 have slots 48 aligned laterally with the apertures 46 to provide clearance for chains to be engaged in the apertures.

The apertures 34 in the end walls 30 of the body portions 26 receive an elongated threaded bar 50 having opposed nuts 52 threadedly engaged on opposite sides of the end walls. Washer 54 are provided between the nuts and the end walls. Bar 50 has good tensile strength so as to be able to withstand a pulling force thereon and is also sufficiently rigid so as to be used to apply a compressive force.

The ends of the bar 50 have end nuts 56 having eye loops 58 thereon. The loops 58 are usable in combination with any suitable pulling tool. Nuts 56 are removable to provide assembly of the bar and brackets. Each bracket 24 has an integral finger 64 projecting from the end wall 30 in a direction parallel to the bar 50. These fingers have graduation marks 66 thereon and

are associated with collars 68 supported on the bar 50 and arranged for selected placement by setscrews 70. Collars 68 have apertures 72 slidably receiving the fingers 64 for a purpose to be described.

In the main use of the tool for straightening vehicle bodies, the tool is secured to the body portion at the upper portion of the wheel struts in the manner shown in Figures 1 and 2. That is, the respective brackets are secured to the existing projecting bolts 20 that form a part of the wheel strut, the threaded bar 50 extending crosswise of the vehicle. Assuming that one of the sides of the vehicle is damaged, such damaged portion is readily bent back into its original place by threaded operation of the nuts 52 on the bar 50 in the necessary direction. Such bar can be manipulated by threaded operation of the nuts 52 to either push or pull the vehicle parts as required, as shown by the arrow diagrams 60 in Figure 2. The desired or necessary distance of straightening movement or the bounce-back of the metal can be determined by a reading taken on the graduated fingers 64 in relation to the collars 68.

The present tool is thus useful in repairing damaged vehicle bodies of the type using the upright wheel supporting struts. The present tool is also useful in adjusting wheel camber since as is well known, and as stated above, the wheel strut is an integral part of the body whereby in order to adjust the wheel camber, the body must be bent. The tool may have other uses as well. For example, only one of the brackets may be attached to a wheel strut and straightening accomplished by an outside pulling or pushing force on the bar 38. Connection to the bar in this case is accomplished by use of the eye loops 58. Bending movement sideways of the brackets 24, with or without the bar 50, can also be accomplished by an outside force associated with chains connected to

the brackets by means of the apertures 46. Preferably, a chain used in this latter instance is engaged across a bracket 24 in both apertures 46 for providing an even pull on the bracket.

With reference to Figure 4, hanger links 76 can be used with the invention to support the engine of a vehicle if desired. These links comprise a sturdy plate-like member having an opening 78 therein arranged to receive the bar 50 and having a chain engaging aperture 80 in the lower portion thereof. A suitable number of the links 76, such as a pair of them, are placed on the bar 50, and by suitable connection of a chain or chains to them and to the vehicle motor, the latter can be supported off its mounts.

It is to be understood that the form of my invention herein shown and described is to be taken as a preferred example of the same and that various changes in the shape, size and arrangement of parts may be resorted to without departing from the present invention, as defined by the scope of the subjoined claims.

CLAIMS

1. A straightening tool for vehicle bodies (10) of the type having integral connection (16, 20) to front and upright wheel supporting struts (12) terminating at the top in upwardly exposed fastening means (20) characterised in that, said tool comprises a bracket (24) having a base portion (28), securing means (42) on said base portion (28) being arranged to removably secure said base portion (28) to the fastening means (20) at the top of an upright wheel supporting strut (12), and connecting means (34, 52) on an angular extension (30) of said base portion and on an elongated rigid bar (50), providing axial connected adjustment of said bar (50) relative to said angular extension (30) whereby said bar (50) upon being adjusted axially relative to said angular extension (30) and being anchored at one of its ends is arranged to force said bracket (24) and a connected bent upright wheel supporting strut (12) into a straightened condition.

2. A straightening tool as claimed in claim 1, in which said connecting means (34, 52) comprises a threaded adjustment (52) between said angular extension (30) and said bar (50).

3. A straightening tool as claimed in claim 1, in which said connecting means (34, 52) comprises threads on said bar (54) and a pair of nuts (52) disposed on opposite sides of said angular extension (30) and threadedly engaged with said bar (50).

4. A straightening tool as claimed in claim 1, in which said securing means comprises a plurality of apertures (42) in said base portion (28) arranged to receive fastening means (20) on the upright wheel supporting struts (12) for securing said base portion (28) to the vehicle (10).

5. A straightening tool as claimed in any one of the preceding claims, including a pair of said brackets (24) for securement to opposite wheel supporting struts (12) whereby said brackets (24) and bar (56) are arranged to accomplish a straightening function by relative movement of said brackets (24) along said bar (50).

6. A straightening tool as claimed in any one of claims 1 to 4, including connecting means (56, 58) on at least one end of said bar (50) for anchored securement of said bar (50) to an outside force.

7. A straightening tool as claimed in any one of the preceding claims, in which said base portion (28) is removably attached to said bracket (24) for substituting base portions (28) with different securing means (42).

8. A straightening tool as claimed in any one of claims 1 to 6, in which said bracket (24) includes side walls (32) secured to said base portion (28), and apertures (46) in said side walls (32) arranged to removably receive a tension member arranged to apply a straightening force which is sideways to said bracket (24).

9. A straightening tool as claimed in any one of the preceding claims, including gauge means (64, 68) between said bracket (24) and said bar (50) arranged to show adjusting distance.

10. A straightening tool as claimed in claim 1, including a pair of said brackets (24) for securement to opposite wheel supporting struts (12), and hanger links (76) on said bar (50) arranged to receive a supporting line for connection to a vehicle motor.

FIG.1

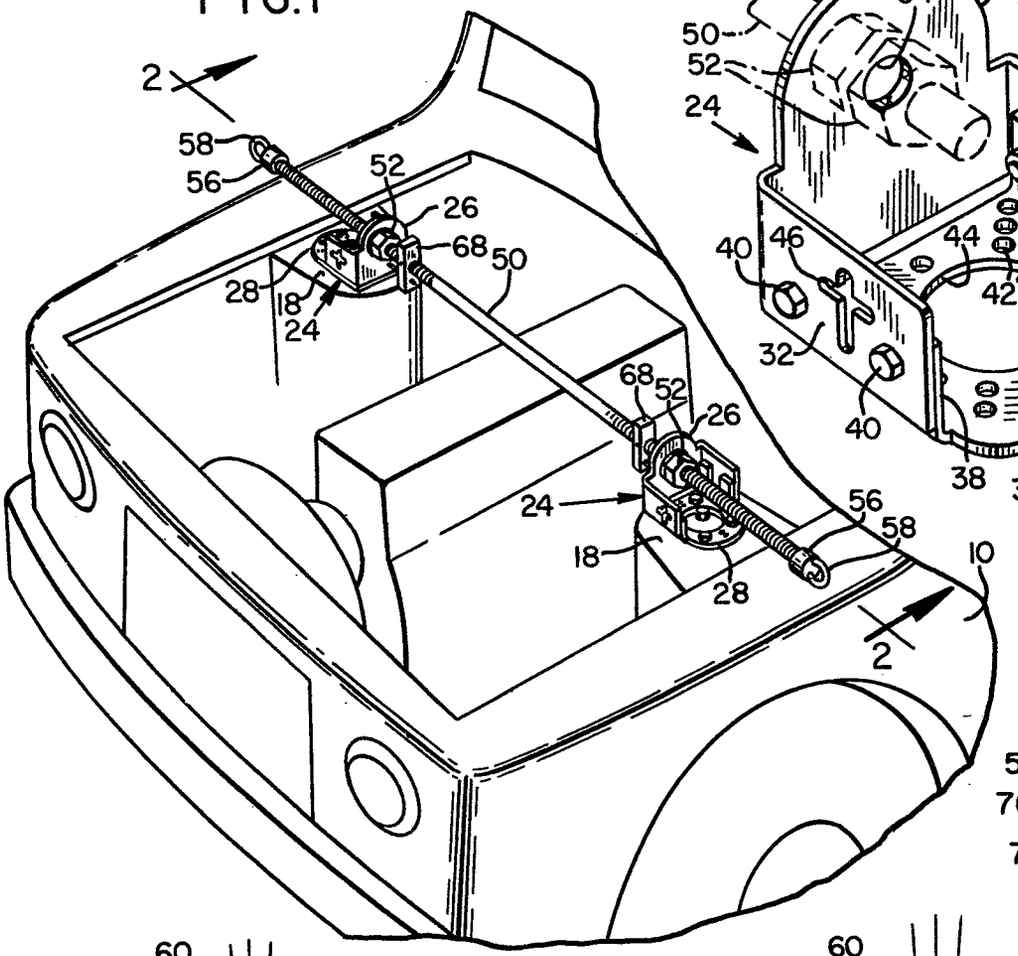


FIG.3

FIG.4

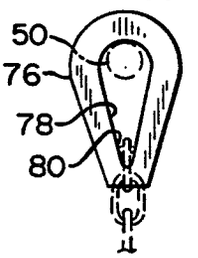
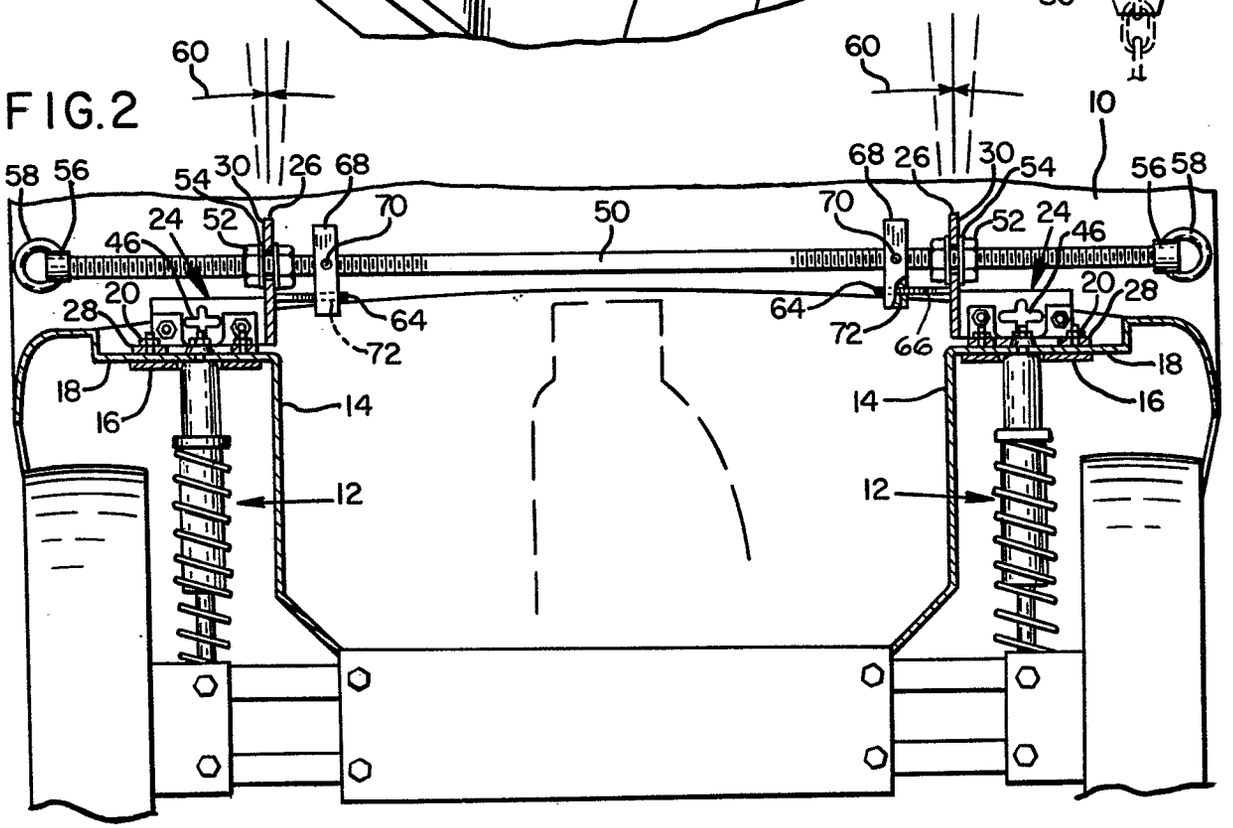


FIG.2



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EUROPEAN SEARCH REPORT

Application number

EP 82 30 2881.6

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
X	US - A - 4 201 076 (D.R. JARMAN et al.) * fig. 1 to 6 * --	1,4-6
A	US - A - 4 238 951 (J.D. GRAINER et al.) ----	

CLASSIFICATION OF THE APPLICATION (Int. Cl. 3)

B 60 S 5/00
B 21 D 1/12

TECHNICAL FIELDS SEARCHED (Int.Cl. 3)

B 21 D 1/00
B 60 S 5/00
B 62 D 17/00

CATEGORY OF CITED DOCUMENTS

X: particularly relevant if taken alone
Y: particularly relevant if combined with another document of the same category
A: technological background
O: non-written disclosure
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E: earlier patent document, but published on, or after the filing date
D: document cited in the application
L: document cited for other reasons

&: member of the same patent family, corresponding document

X The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Berlin	26-07-1982	BECKER