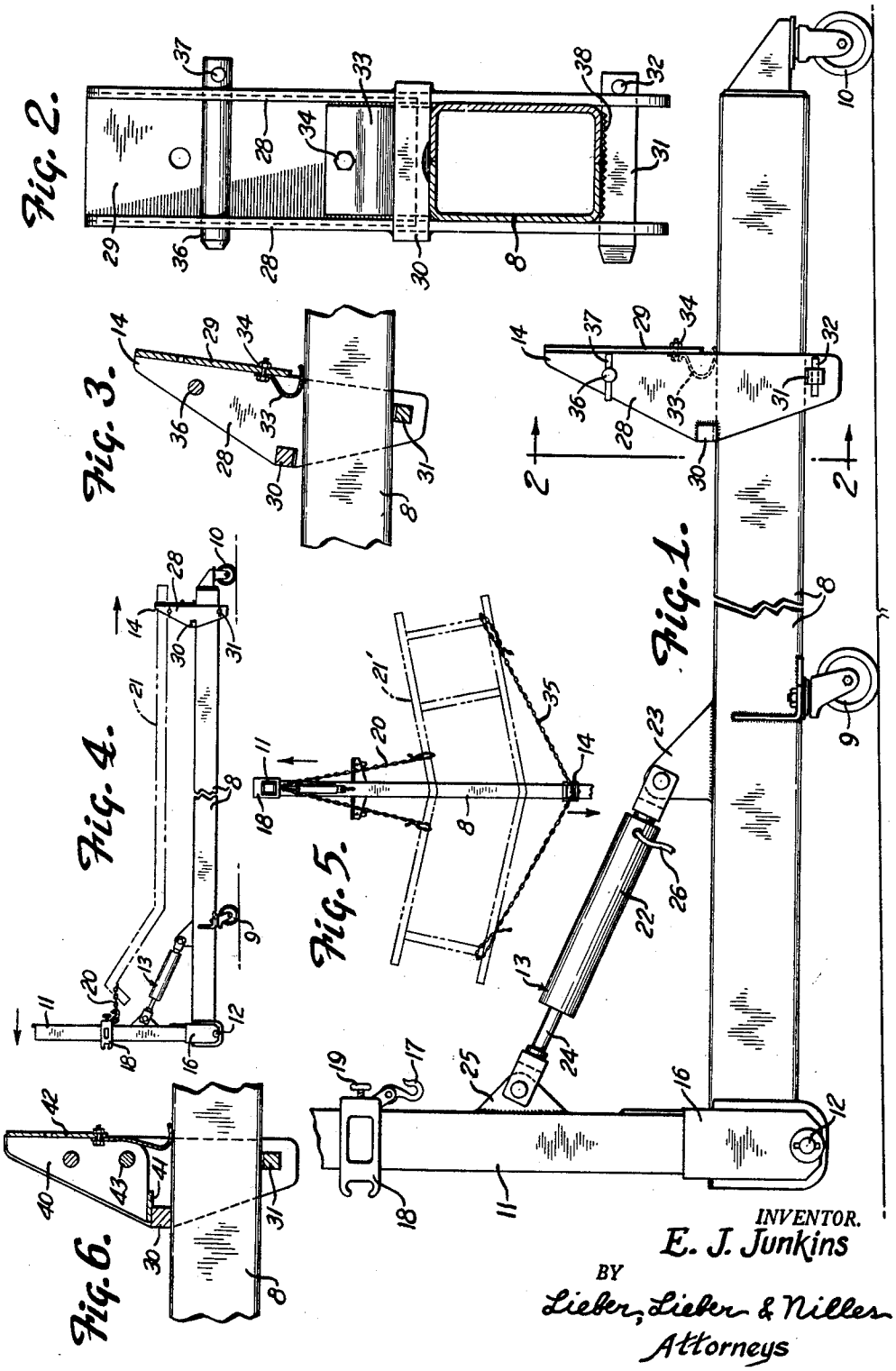
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VEHICLE REPAIR DEVICE

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VEHICLE REPAIR DEVICE

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The present invention relates generally to improvements in the art of straightening damaged and distorted articles, and relates more particularly to improvements in the construction and operation of repair devices for straightening and restoring vehicle frames and unitized bodies.

A primary object of this invention is to provide improvements in vehicle repair devices of the general type shown and described in the co-pending application of Alex H. Luedicke, Jr. and William R. Chapman, Serial No. 814,428, filed May 20, 1959 now Patent No. 2,998,837, and especially improvements in adjustable anchor or reaction posts for such devices.

In the co-pending application above-identified, a vehicle frame and/or body straightening device is disclosed which comprises, in general, a main beam having an upright force applying arm attached thereto at one end and movable by a pressure actuator, and an anchor post or reaction member pivotally secured to the opposite end of the beam, the force applying or pressure arm and the anchor or reaction post being separately attachable to the bent frame or workpiece to transmit pulling or straightening forces thereto.

While these prior devices have proven highly satisfactory and have enjoyed widespread commercial acceptance and success, there is a frequent need for adjustment in the distance between the pressure or force applying arm and anchor or reaction post due to the variety of sizes and styles of frames or unitized bodies requiring repair as well as in the particular type of repair work required as a result of the damaging forces; and since the anchor post in the prior devices is pivotally secured to the beam, it was heretofore necessary to form the beam of telescopic sections and to provide means for locking the sections in properly adjusted position in order to permit adjustments to be made in the spacing between the force applying arm and the anchor post.

It is accordingly an object of the present invention to provide a vehicle frame and/or body straightening device wherein these prior objections are completely obviated, and in which desired adjustments in the spacing of the pressure arm and anchor post may be readily effected without the need for any tools whatsoever.

Another object of the invention is to provide an improved vehicle repair device which embodies an anchor or reaction post which is freely movable along the main beam when under no load, and which is moreover highly effective and efficient in automatically retaining a given position when placed under severe loads.

Still another object of this invention is to provide a novel and improved anchor or reaction post for vehicle frame or body straightening devices which is infinitely freely adjustable along the main beam of such device to any desired position, which is automatically locked or anchored in its adjusted position when placed under a load, and which may be used in conjunction with beams of varying types and cross-section whether they be of tubular or I-beam construction.

These and other objects and advantages of the invention will become apparent from the following detailed description:

A clear conception of the several features constituting the present improvement and of the mode of applying and of utilizing apparatus embodying the invention may be had by referring to the drawing accompanying and

forming a part of this specification wherein like reference characters designate the same or similar parts in the various views.

FIG. 1 is a side elevational view of a typical vehicle repair device embodying one of the improved anchor posts constituting the subject matter of the present invention;

FIG. 2 is a transverse section through the main beam taken along the line 2—2 of FIG. 1 and looking in the direction of the arrows;

FIG. 3 is a fragmentary part-sectional view of the improved anchor or reaction post under no load and showing the same tilted to a position permitting free sliding adjustment along the main beam;

FIG. 4 is a somewhat reduced side view of the straightening device showing the same operating on a vehicle frame having one type of damage, the frame being shown by means of dot-and-dash lines;

FIG. 5 is a similarly reduced fragmentary top view showing the device operating on a vehicle frame having another type of damage; and

FIG. 6 is a fragmentary part-sectional view similar to FIG. 3 but showing the use of a removable insert member for tying the side plates of the anchor post together thus, in effect, providing a two-piece post.

While the present invention has been shown and described herein as being embodied in a vehicle frame straightening device of a particular type, it is not intended to restrict the use or application thereof by reason of such specific disclosure since it may obviously be used to advantage in connection with other types of repair apparatus wherein it is desired to exert pressure between a force applying element and a reaction member. Furthermore, the improved device is equally well adapted for use in repairing unit bodies, and the term "frame" as used throughout this specification and the appended claims is intended to apply either to a structural frame member as such or to that part of a unitized body corresponding to the frame. It is also contemplated that the broadest possible interpretation shall be given to various descriptive terms used herein.

Referring to the drawing, the typical frame straightening device shown therein as embodying the present improved anchor or reaction post comprises, in general, a generally horizontal main beam 8 supported above the floor by a plurality of ground engaging wheels 9, 10 for portability, a force applying or pressure arm 11 secured as by means of a pivot pin 12 for swinging movement to one end of the beam 8, a hydraulic power actuator 13 secured between the beam 8 and the pressure arm 11 for swinging the same about its pivot 12, and an anchor or reaction post 14 adjustable along the beam 8 remote from the pressure arm 11 as hereinafter more fully described.

The main beam 8 may either be of tubular construction as shown or it may be formed of I-beam stock, and the transporting wheels 9, 10 or selected ones thereof may be in the form of casters with the wheels 9 being located near the center of gravity of the device and the wheel 10 at the end opposite the pressure arm 11 for greater maneuverability. The pressure arm 11 is preferably formed with a pair of spaced lower flange plates 16 providing a bifurcated member spanning the beam 8 and secured thereto by the pin 12, and a hook 17 carried by a strap 18 slidably received by the pressure arm 11 is adjustable in height by means of a set screw 19, the hook 17 being adapted for receiving a flexible force transmitting element such as a chain 20 attachable to a damaged frame 21 or other workpiece. The power actuator 13 is shown as a fluid motor or hydraulic ram having its cylinder end 22 pivotally secured to an upstanding flange or bracket 23 on the beam 8 with the piston or plunger

24 being pivotally attached to a projecting flange or bracket 25 on the arm 11, and the cylinder 22 of the power actuator is connected to a suitable pump, not shown, by means of a flexible hose 26 to supply fluid under pressure thereto and thus swing the force applying arm 11 about its pivot.

The anchor or reaction member 14 embodying the present invention comprises, in general, a pair of laterally spaced side plates 28 interconnected along their upper edge portions by a plate 29, the lower portions of the side plates 28 below the connecting plate 29 spanning the opposite sides of the main beam 8. Also interconnecting the side plates 28 are a pair of spaced bars 30, 31 forming abutments engageable with and bearing upon the top and bottom surfaces respectively of the main beam 8, the abutments 30, 31 being relatively offset with the upper abutment 30 being located closer to the force applying arm II than the lower abutment 31. In other words, the abutments 30, 31 are offset relative to a plane disposed approximately perpendicular to the main beam 8 and are positioned a sufficient distance apart so that the member 14 will be normally supported in approximately vertical condition to provide an upright anchor post remote from the pressure arm 11.

The top abutment 30 may be welded or otherwise permanently secured to each of the side plates 28, but to permit ready application of the member 14 to the beam 8 and allow for removal therefrom, the lower abutment 31 is preferably loosely received in alined apertures in the side plates 28 and is retained in position therein by suitable locking pins 32 or the like. The lower edge of the interconnecting plate 29 should terminate a spaced distance above the upper surface of the beam 8 when the member 14 is in vertical position, as shown in FIG. 1, to thereby permit the member 14 to be tilted, as shown in FIG. 3, to release the abutments 30, 31 from engagement with the beam 8 and thereby permit free sliding movement of the reaction member to any desired position of adjustment along the beam. To insure that the abutments 30, 31 are normally retained in clamping engagement with the beam 8 and that the member 14 is returned to its vertical position for immedaite use as an anchor or reaction post after an adjustment in its position has been effected, resilient means such as a leaf spring 33 is provided for constantly urging the member 14 and its abutments 30, 31 to clamped condition, the leaf spring 33 having one end thereof secured to the plate 29 as at 34 with the free end thereof coacting with the upper surface of the main beam 8 remote from the abutment 30. To provide for the reception of a flexible element such as a chain 35 adapted to be secured to the workpiece 21' for the performance of certain work, a rod or bar 36 is also scured within alined apertures formed in the upper portion of the side plates 28 of the member 14, the rod 36 being retained in position as by means of locking pins 37, and the chain 35 may be secured to the rod 36 in an obvious manner when desired.

While the means for urging the reaction or anchor post 14 to its effective working position as shown in FIG. 1 has been illustrated and described herein as a leaf spring 33, any suitable means may be provided for such purpose whether it be in the form of a leaf, coil or wire spring or a wedge, cam or the like; and this element 33 may, of course, be carried by any convenient part of the anchor post in a suitable manner. Also, to insure a positive gripping action of the bearings or abutments 30, 31 in their effective positions, either one or both of the abutments is preferably formed with a serrated or knurled bearing surface as shown by the numeral 38 in FIG. 2.

Additional flexibility is furthermore imparted to the device through use of a removable and adjustable anchor post insert member 40 as shown in the modification of FIG. 6, the insert member, in effect, replacing the fixed end wall 29 and serving the same purpose as the wall 29, namely that of uniting and properly spacing the side plates 28 while providing a convenient support for the spring 33 or its equivalent. This insert member 40 is of generally L-shape in longitudinal section and of generally U-shape in cross-section and is retained by the pin 43 in a selected one of two adjusted positions either with the short side 41 or its long side 42 projecting upwardly depending upon the height desired by the operator, the pin 43 being readily removable to permit readjustment.

From the foregoing detailed description, it is believed apparent that the repair device may be used in a variety of ways for performing diverse restoring work on frames and bodies, and FIGS. 4 and 5 illustrate the device as used in repairing two different types of frame damage. For example, FIG. 4 shows the device with the anchor or reaction member 14 moved almost to its outermost position on the beam 8 to correct front end damage which has distorted one end of the frame upwardly. In this application, the hook 17 carried by the pressure arm 11 has been secured to one end of the frame 21 by means of a chain 20, and the member 14 is positioned to bear directly against a cross-piece of the frame 21 at the opposite end. The damage will obviously be corrected by a pulling force between the pressure arm 11 and reaction member 14 upon application of pressure by the ram 13. In FIG. 5, side sway or lateral bending of the frame 21' is being corrected with the position of the member 14 having been adjusted somewhat closer to the pressure arm 11. In this illustration, the pressure arm 11 has been attached to a medial portion of one of the frame side rails adjacent the point of damage by a chain 20, and the reaction member has been attached to outwardly spaced points of the other frame side rail by means of a chain 35. Thus, upon application of pressure to the arm 11 by the ram 13, the damage will again be corrected by a pulling force between the pressure arm and the reaction member 14.

It should be understood that it is not desired or intended to limit this invention to the exact details of construction or to the precise mode of operation herein shown and described, since various modifications within the scope of the claims may occur to persons skilled in the art to which this invention pertains.

Various modes of carrying out the invention are contemplated as being within the scope of the following claims particularly pointing out and distinctly claiming the subject matter which is regarded as the invention.

I claim:

1. In a frame and body straightener having an elongated main beam provided with a force applying arm for transmitting restorative force to a workpiece, a reaction member formed by a pair of side plates rigidly interconnected at the upper portions by a transverse integral thrust absorbing end wall with their lower depending portions spanning the opposite sides of the main beam, said member side plates being provided with a pair of vertically spaced abutments both spanning the space between said side plates spaced distances below the lower edge of the interconnecting end wall, said abutments being engageable with opposed surfaces of the beam and being laterally offset with the lowermost abutment posititoned adjacent to the extended plane of said end wall and the uppermost abutment positioned remote from said plane, whereby said abutments form force absorbing bearings preventing displacement of said member along the beam upon application of force thereto in one direction with said member being tiltable in an opposite direction when unloaded to release said abutments for free vertical movement of said member along the beam.

2. A frame and body straightener according to claim 1 wherein the reaction member is also provided with resilient means for releasably holding said abutments in clamping engagement with said beam.

3. A frame and body straightener according to claim 2, wherein the resilient means is a leaf spring secured to the reaction member between the side plates thereof and

which is engageable with the main beam remote from said abutments.

4. A frame and body straightener according to claim 1, wherein the main beam is normally disposed in a generally horizontal position and the reaction member when under load is normally disposed in generally upright position while the offset abutments are engageable respectively with the top and bottom of the beam and the upper abutment is located closer to the force applying arm than the lower abutment.

5. A frame and body straightener according to claim 1, wherein the spaced side plates of the reaction member are united by a removable L-shaped insert adjustable

from a position in which its longest leg extends upwardly between the side plates to a position in which its shorter leg extends upwardly.

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