

Feb. 3, 1970

C. M. WYLIE

3,492,855

BODY AND FRAME STRAIGHTENING TOOL

Filed Nov. 20, 1967

2 Sheets-Sheet 1

Fig. 1

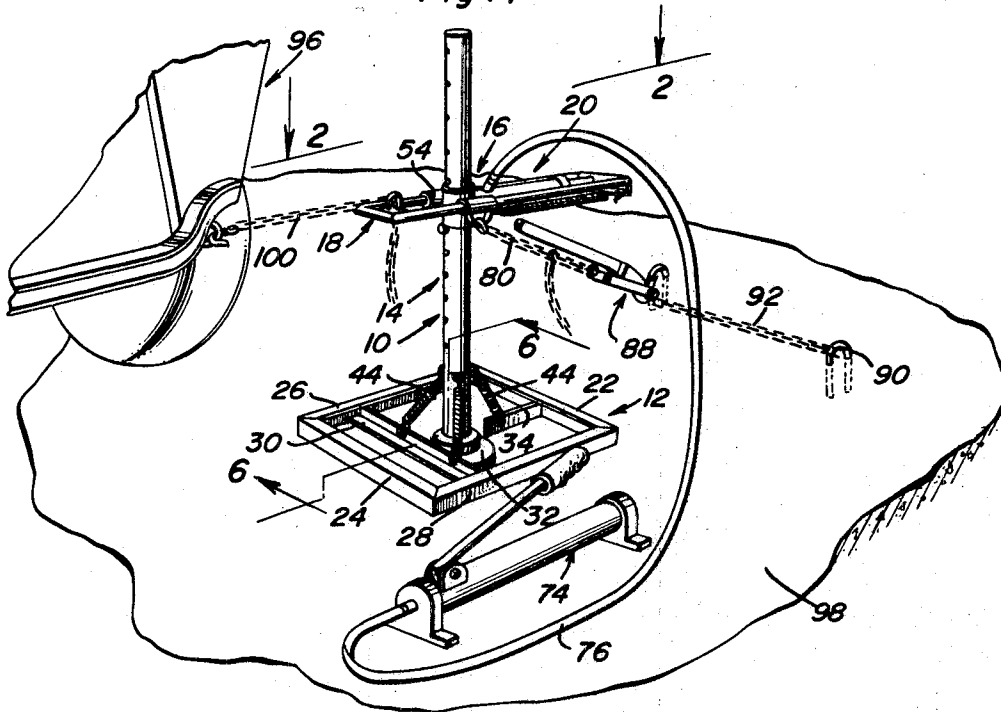


Fig. 2

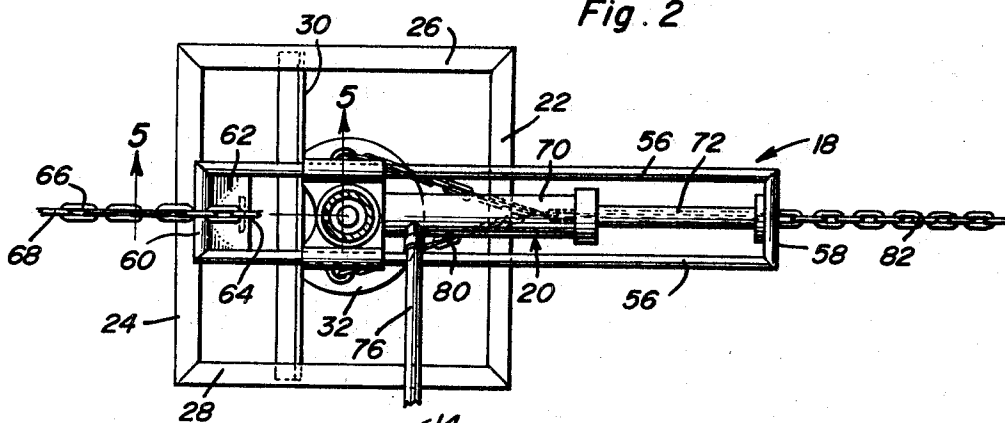
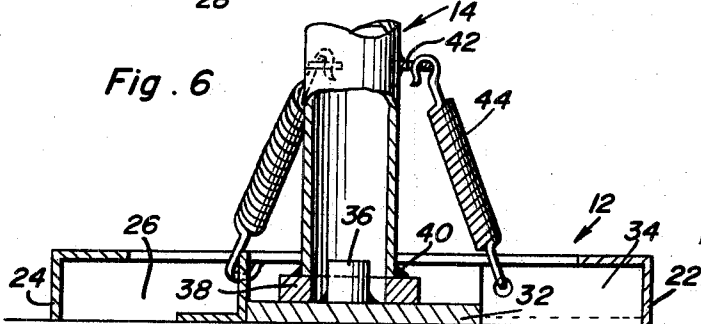


Fig . 6



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Fig. 3

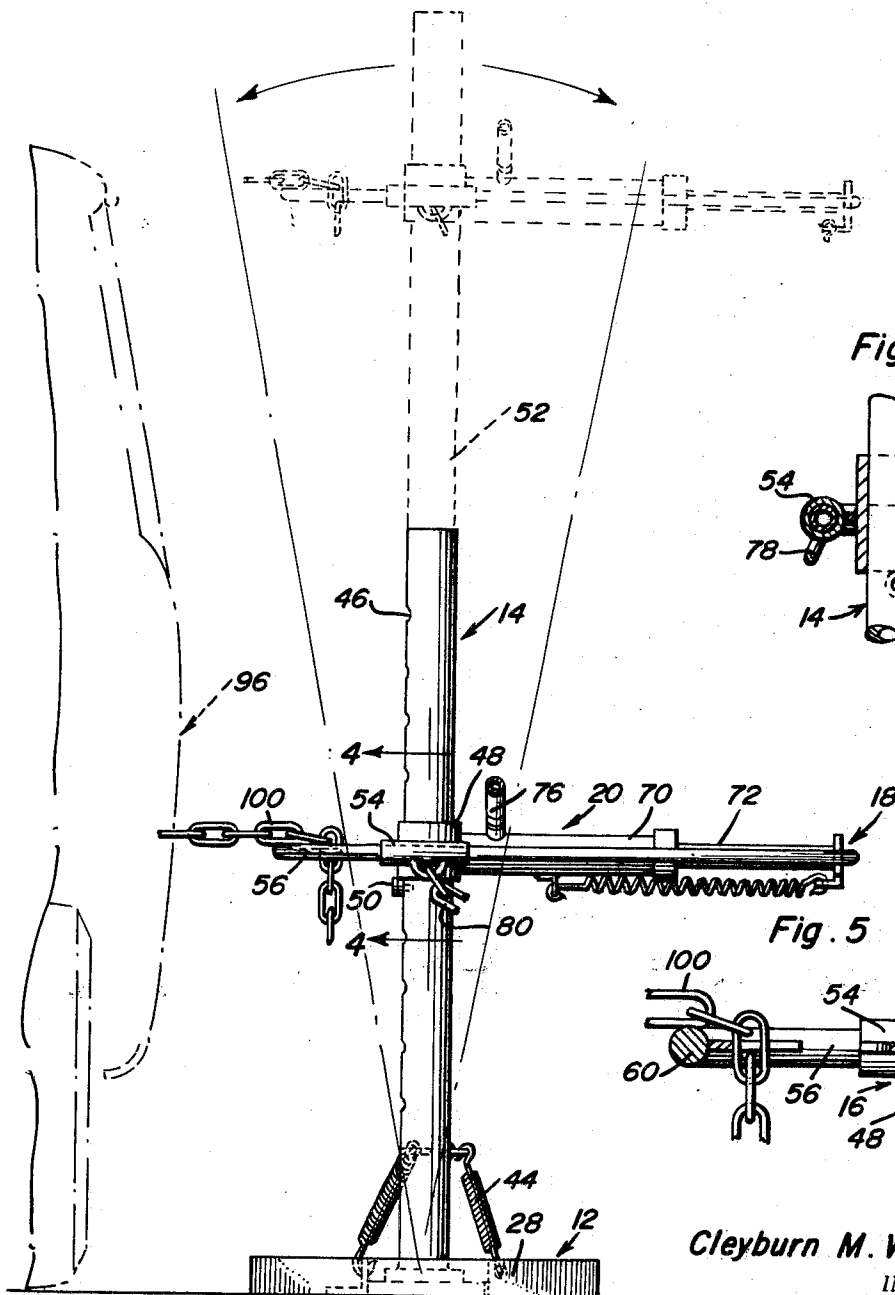


Fig. 4

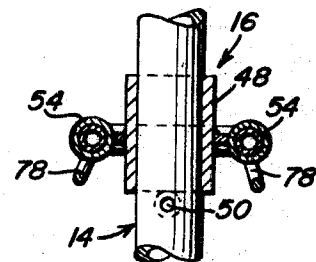
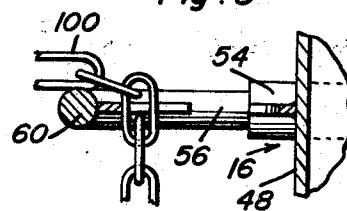


Fig. 5



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BODY AND FRAME STRAIGHTENING TOOL

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10 Claims

ABSTRACT OF THE DISCLOSURE

An upright standard having a lower end supported from a base for universal angular displacement of the standard relative to the base and with a guide structure carried by the upper end portion of the standard and a follower supported from the guide structure for guided reciprocal movement relative thereto transversely of the standard, thrust means being operatively connected between the follower and the guide structure operative to shift the follower relative to the latter and the follower being adapted to have one end of the tension member secured thereto with a second tension member extending between the standard or the guide structure and a stationary point the surface upon which the base rests.

The vehicle body and frame straightening tool of the instant invention has been specifically designed to provide a means whereby body and frame portions of damaged vehicles may have tension applied thereto in predetermined selected directions in order to straighten the body and frame portions.

Similar tools have been heretofore provided but these previous tools have not included means whereby tension forces inclined relative to the horizontal could be effected. With the vehicle body and frame straightening tool of the instant invention tension forces may be caused to act upon vehicle body and frame sections in directions inclined relative to a horizontal direction and even in upwardly inclined directions.

Heretofore the previously known similar tools could readily apply tension forces in a horizontal direction and in inclined directions only if additional tensioning effecting apparatus was utilized in conjunction therewith such as floor anchor tension members in order to effect a slightly downwardly inclined tension force and jacks in order to effect a slightly upwardly inclined tension force.

Accordingly, it is the main object of this invention to provide a vehicle body and frame straightening tool which will be operative, independent of other tensioning apparatus, to effect slightly inclined tension forces on vehicle body and frame portions which are to be straightened.

Another object of this invention, in accordance with the immediately preceding object, is to provide a vehicle body and frame straightening tool which is versatile in use in that its structure particularly well adapts it to be utilized in conjunction with substantially all vehicle body and frame straightening operations.

Yet another object of this invention is to provide a tool whose structural features thereof enable a workman to readily properly set up the tool in substantially all vehicle body and frame straightening operations.

A final object of this invention is to provide a vehicle body and frame straightening tool which will conform to conventional forms of manufacture and be of simple construction and easy to use so as to provide a device that will be economically feasible, long lasting and relatively trouble free in operation.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the ac-

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companying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a perspective view of the tool operatively supported from and anchored to a shop floor and also operatively connected to a vehicle body portion which is to be straightened;

FIGURE 2 is an enlarged horizontal sectional view taken substantially upon a plane indicated by the section line 2-2 of FIGURE 1;

FIGURE 3 is an enlarged side elevational view of the tool;

FIGURE 4 is an enlarged fragmentary vertical sectional view taken substantially upon the plane indicated by the section line 4-4 of FIGURE 3;

FIGURE 5 is an enlarged fragmentary vertical sectional view taken substantially upon a plane indicated by the section line 5-5 of FIGURE 2; and

FIGURE 6 is an enlarged fragmentary vertical sectional view taken substantially upon the plane indicated by the section line 6-6 of FIGURE 1.

Referring now more specifically to the drawings the numeral 10 generally designates the vehicle body and frame straightening tool of the instant invention. The tool 10 includes a base referred to in general by the reference numeral 12, an upright standard referred to in general by the reference numeral 14, a guide structure generally referred to by the reference numeral 16 vertically shiftable on the standard 14 and a follower assembly generally referred to by the reference numeral 18 guidingly supported from the guide structure 16 for guided movement relative thereto. Also, the tool 10 includes a single acting extendable hydraulic cylinder referred to in general by the reference numeral 20 operatively connected between the guide structure 16 and the follower assembly 18 operative to cause shifting of the follower assembly 18 relative to the guide structure 16.

The base 12 includes four generally L-shaped angle iron side members 22, 24, 26 and 28 suitably interconnected at adjacent ends in order to form a rectangular base. The base also includes an L-shaped angle member 30 secured between the side members 26 and 28 intermediate their opposite ends. The base 12 additionally includes a standard positioning foot plate 32 secured to the side of brace member 30 remote from the side member 24 and extending between the brace member 30 and an L-shaped angle iron 34 extending between the side member 22 and the adjacent portion of the foot plate 32. The center of the foot plate 32 includes an upwardly projecting stud 36 secured thereto in any convenient manner and the lower end of the tubular standard 14 is loosely telescoped over the stud 36 and has a reinforcing annulus 38 secured thereto as by welding 40. The annulus 38 defines an end member for the lower end of the standard 14 and is also telescoped over the stud 36 and abuts the upper surface of the foot plate 32.

The lower end portion of the standard 14 further includes a plurality of laterally outwardly projecting apertured lugs 42 and a plurality of expansion spring 44 are secured between the lugs 42 and the brace members or angle irons 30 and 34 so as to yieldingly retain the standard 14 in position with its longitudinal center axis generally normal to the plane of the base 12. Of course, as illustrated by the phantom line showing in FIGURE 3, the standard 14 may be angularly adjusted relative to the base 12.

The standard 14 includes a plurality of vertically spaced bores 46 and the guide structure 16 includes a centrally disposed sleeve 48 snugly and slidably received on the standard 14. A removable fastener 50 is provided and is selectively engageable in the apertures or openings 46 to act as an abutment for the sleeves 48. The fastener 50 may either be disposed below the sleeve 48 to limit its

downward movement on the standard 14 or above the sleeve 48 to limit upward movement of the sleeve 48 on the standard 14. Further, the standard 14 is tubular and therefore a diametrically reduced end portion of an upper removable extension section 52 of the standard 14 may be telescoped into the open upper end of the standard 14. Of course, the extension 52 may also be provided with apertures 46 and the upper end of the standard 14 may be internally threaded with the extension 52 provided with a diametrically reduced externally threaded neck portion on its lower end threadably engageable in the upper end of the standard 14, if desired.

The guide structure 16 includes a pair of opposite side sleeves 54 which parallel each other and are generally horizontally disposed. The sleeves 54 are supported on opposite sides of the sleeve 48 and comprise tubular guides through which the parallel elongated opposite side members 56 of the follower assembly 18 are slidably received. One pair of corresponding opposite end side members 56 are interconnected by means of a first transverse member 58 and the other pair of corresponding opposite ends of the side members 56 are interconnected by a second transverse member 60. An anchor plate 62 is secured between the opposite side members 56 inwardly of the transverse member 60 and is notched as at 64 so as to selectively anchor individual links 66 of a tension chain 68 to the corresponding end of the follower structure or assembly 18.

The single acting hydraulic cylinder assembly 20 includes a cylinder portion 70 having its base end supported from the sleeve 48 and an extendable piston rod portion 72 having its free end secured to or at least abutted against the transverse member 58. Accordingly, the hydraulic cylinder 20 may be utilized to force the follower assembly 18 to the right as viewed in FIGURE 2 of the drawings. Further, it may be seen from FIGURE 3 that an expansion spring 73 is operatively connected between the transverse member 58 and the cylinder portion 73 so as to bias the assembly 18 to the left.

The hydraulic cylinder 20 comprises a portion of a portable jacking unit including a hand actuated pump assembly referred to in general by the reference numeral 74 and with which the hydraulic cylinder 20 is communicated by means of a hydraulic hose 76.

Each of the sleeves 54 includes a depending eye portion 78 and a link chain bridle 80 has its free ends secured to the eye portions 78 and one end of a link chain section 82 is secured to the bridle 80 intermediate its opposite ends while the other end of the link chain section 82 is anchored to a chain tightening assembly generally referred to by the reference numeral 84 and of conventional design and suitably anchored to a floor anchor 90 by means of a further link chain section 92.

In operation, the standard 14 is erected adjacent the vehicle 96 which is to have a portion thereof straightened. The vehicle 96 may be disposed upon the floor 98 in which the floor anchor 90 is anchored or it may be positioned upon jacks supported from the floor 98. Then, a link chain section 100 may be operatively connected between the portions of the vehicle 96 to be straightened and the anchor plate 62 and the link chain sections 82 and 92 may be operatively connected between the bridle 80 and the floor anchor 90 and tightened by means of the link chain tightening connector 88 as desired. Of course, it is to be noted that the floor 98 has a plurality of floor anchors anchored therein disposed about the vehicle 96 and that a suitable chain or chains (not shown) may be utilized to anchor the side of the vehicle 96 remote from the standard 14 to the flooring or floor 98.

The effective length of the chain sections 82 and 92 determines the angularity of the standard 14 relative to the vertical and after the desired angularity of the standard 14 has been properly set, the hydraulic cylinder 20 may be actuated and extended by operation of the handle pump 74. Of course, the height of the sleeve 48 on the

standard 14 may be adjusted so that the link chain section 100 will substantially parallel the longitudinal center axis of the elongated follower assembly 18 thereby insuring that the hydraulic cylinder 20 will have a straight line pull on the portion of the vehicle 96 to be straightened. If a slight upward pull is to be effected, the standard 14 has its upper end inclined toward the vehicle 96 and the adjacent portion of the vehicle 96 may be anchored to the floor 98 to prevent it from being pulled upward upon actuation of the cylinder 20. Of course, if a slightly downwardly inclined pull is to be applied to the portion of the vehicle 96 to be straightened, the upper end of the standard 14 is inclined away from the vehicle 96 and suitable portions of the vehicle 96 may have jacks disposed thereunder to prevent the vehicle 96 from being pulled downward on its springs.

Inasmuch as the tool 10 has been specifically designed for the above operation, it is to be noted that the provision of a plurality of floor anchors 90 about the area of the floor 98 from which the vehicle 96 is supported greatly facilitates proper utilization of the tool 10.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention.

What is claimed as new is as follows:

1. A vehicle body and frame straightening tool comprising an upright standard including means at its lower end for universal support of the latter from a support surface, a guide structure carried by the upper end portion of said standard and defining a path of movement extending transversely of said standard, a follower supported from said guide structure for guided reciprocal movement relative thereto along said path, and thrust means operatively connected between said follower and said guide structure operative to shift the former relative to the latter, said guide structure being mounted on said standard for rotation about the center axis of said standard.

2. The combination of claim 1 wherein said guide structure is mounted on said standard for vertical adjustable positioning therealong.

3. A vehicle body and frame straightening tool comprising a base, an upright standard whose lower end is supported from said base for angular displacement of said standard relative to said base, a guide structure carried by the upper end portion of said standard and defining a path of movement extending transversely of said standard, a follower supported from said guide structure for guided reciprocal movement relative thereto along said path, and thrust means operatively connected between said follower and said guide structure operative to shift the former relative to the latter, said guide structure being mounted on said standard for rotation about the center axis of said standard.

4. The combination of claim 3 wherein said guide structure is mounted on said standard for vertical adjustment therealong, and means operative to prevent movement of said guide structure in at least one direction past predetermined positions on said standard.

5. The combination of claim 1 wherein said means includes means operative to yieldingly urge said standard toward a position disposed normal to said surface.

6. The combination of claim 1 wherein said thrust means comprises an elongated extendable fluid motor.

7. A vehicle body and frame straightening tool comprising a base, an upright standard whose lower end is supported from said base for angular displacement of said standard relative to said base, a guide structure carried by the upper end portion of said standard and defining a path of movement extending transversely of said stand-

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ard, a follower supported from said guide structure for guided reciprocal movement relative thereto along said path, and thrust means operatively connected between said follower and said guide structure operative to shift the former relative to the latter, said base being horizontally enlarged relative to the lower end of said standard and therefore defines a load distributing foot for said standard, said base including an upstanding centrally disposed stub shaft, the lower end of said standard being hollow and at least slightly loosely telescoped over the upper end of said stub shaft and having an annular reinforcing member secured to the lower terminal end thereof also telescoped over said stub shaft, said base including an upwardly facing abutment surface surrounding the lower end of said stub shaft upon which said reinforcing member rests.

8. The combination of claim 7 including a plurality of upstanding expansion springs disposed about the lower end of said standard including one set of corresponding upper ends secured to portions of said standard spaced above said base and a second set of corresponding lower

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ends secured to portions of said base spaced outwardly from the lower end of said standard.

9. The combination of claim 8 wherein said guide structure is mounted on said standard for vertical adjustment therealong, and means operative to prevent movement of said guide structure in at least one direction past predetermined positions on said standard.

10. The combination of claim 9 wherein said guide structure is mounted on said standard for rotation about the center axis of said standard.

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