Jan. 13, 1970 J. E. CLARKE 3,489,248

U-FRAME HYDRAULIC VEHICLE LIFT

Filed Jan. 25, 1968 2 Sheets-Sheet 1

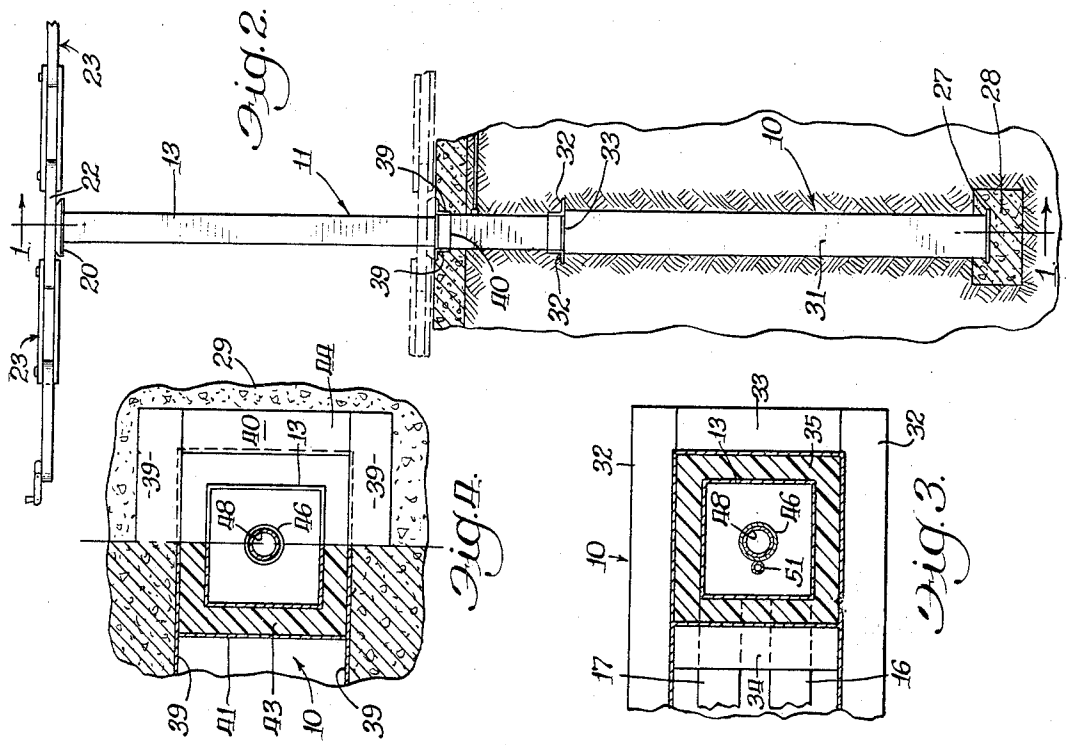


Fig. 2.

Fig. 4.

Fig. 3.

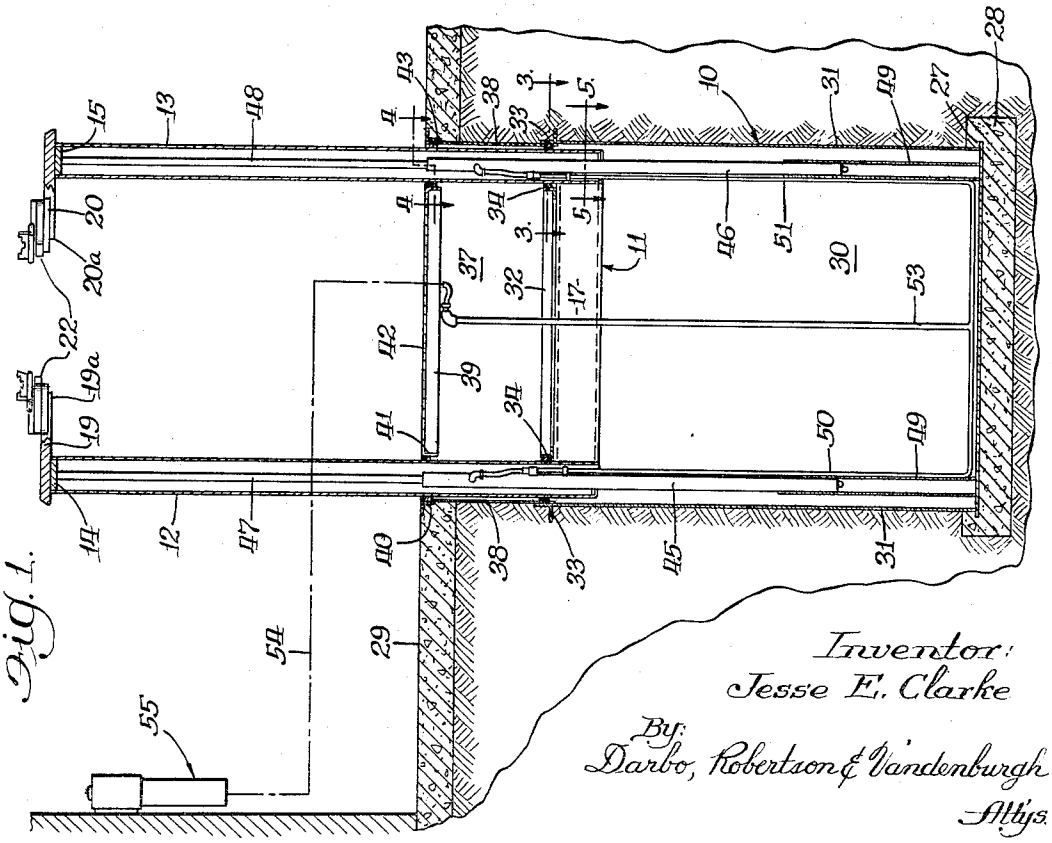


Fig. 1.

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U-FRAME HYDRAULIC VEHICLE LIFT

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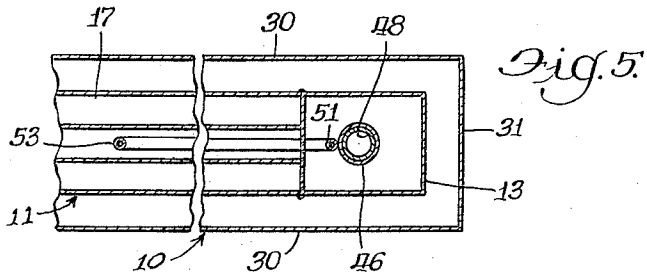


Fig. 5.

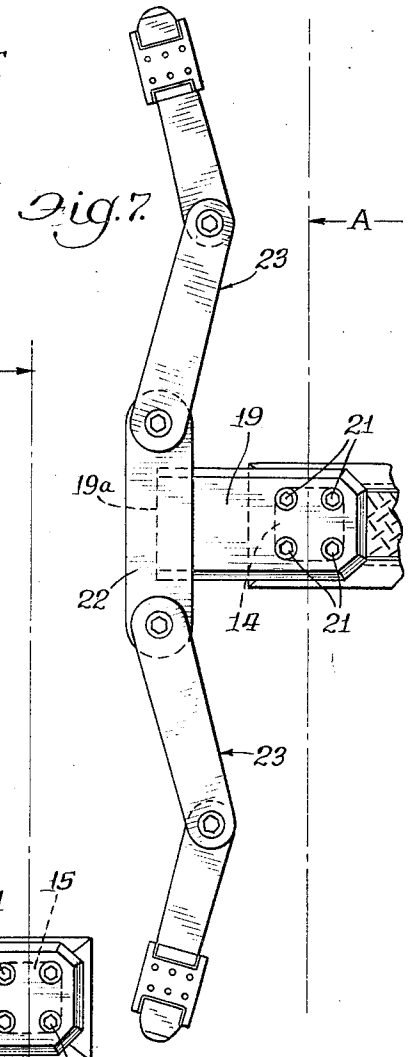


Fig. 7.

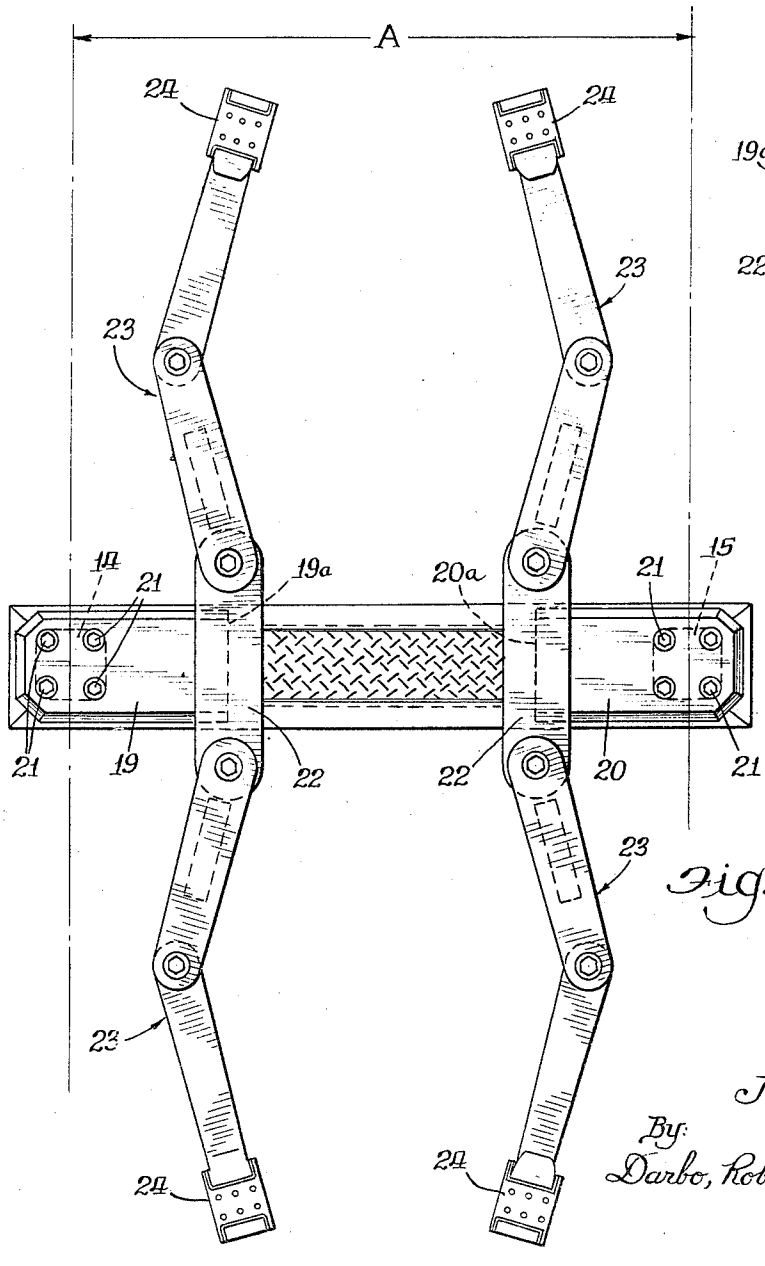


Fig. 6.

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U-FRAME HYDRAULIC VEHICLE LIFT

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Int. Cl. B66f 7/00; B60s 13/00
U.S. Cl. 187—8.41 6 Claims

ABSTRACT OF THE DISCLOSURE

An automotive vehicle lift is formed of a U-frame received in a housing embedded below the floor. The sides of the U are formed by rectangular hollow columns closed at the top and open at the bottom. Within each of the columns and bearing against the closed top thereof and the bottom of the housing are hydraulic lifting cylinders. These are connected to a positive displacement hydraulic pump. The columns are vertically movable in bearings held by the housing, one bearing being adjacent the floor level and a second bearing being spaced downwardly from the first bearing. At the top of each column is a bolster. Each bolster carries two vehicles supporting arms. The connection between the bolster and the arms is offset from the columns. The bolsters are removably affixed to the columns whereby the offset may either be inwardly, towards the other column, to form a drive-over hoist or outwardly, away from the other column, to provide a drive-through hoist.

BACKGROUND OF THE INVENTION

Most commonly used vehicle lifts for gasoline stations and the like employ one or more large cylindrical hydraulic rams, the large diameter ram being necessary to provide stability to resist bending loads on the ram. These are air-hydraulic rams wherein air pressure is employed to force the hydraulic fluid into the ram. When more than two rams are employed in the lifting of a single vehicle there are dangers involved in the event that the rams do not move substantially uniformly and to this end some prior art devices have endeavored to equalize the piston travel with external rack and pinion sets or cable and pulley sets.

A number of disadvantages of such conventional prior art apparatus are overcome by the embodiments of the present invention, to wit: the vertically movable U-shaped carriage of the present invention insure that the two vertically movable columns, which provide flexing stability with the imposition of offset loads, move in unison since they are tied together as a single element. These columns with the attendant seals and bearings need not be as accurately formed as is required of the prior art hydraulic rams since they need not be formed to contain the oil pressures encountered in the lifting of a vehicle. Comparatively inexpensive hydraulic cylinders are contained within the columns and need only perform the lifting force, rather than being large enough in diameter to carry offset loads. Being within the enclosed columns the hydraulic cylinders are protected against the deleterious action of dirt, water, cleaning compounds, etc. The complete vehicle lift may be factory assembled and shipped and installed as a unit substantially reducing the problems otherwise attendant field assembly. If desired, the bolsters may be reversed in the field to change from a drive-over to a drive-through lift, or vice versa, depending upon the whims of the user.

DESCRIPTION OF THE FIGURES

FIGURE 1 is a vertical section through an installed embodiment of the invention;

FIGURE 2 is an end view of the embodiment of FIGURE 1;

FIGURE 3 is a partial section as seen at line 3—3 of FIGURE 1;

FIGURE 4 is a partial section as seen at line 4—4 of FIGURE 1;

FIGURE 5 is a partial section as viewed at line 5—5 of FIGURE 1;

FIGURE 6 is a plan view of the FIGURE 1 embodiment which forms a drive-over vehicle lift; and

FIGURE 7 is a partial plan view illustrating the repositioning of the bolster to form a drive-through lift.

DESCRIPTION OF SPECIFIC EMBODIMENT

Although the following disclosure offered for public dissemination is detailed to ensure adequacy and aid understanding, this is not intended to prejudice that purpose of a patent which is to cover each new inventive concept therein no matter how others may later disguise it by variations in form or additions or further improvements. The claims at the end hereof are intended as the chief aid toward this purpose; as it is these that meet the requirement of pointing out the parts, improvements, or combinations in which the inventive concepts are found.

In the disclosed embodiment there is a housing generally **10** which receives a U-shaped carriage generally **11**. The sides of the carriage are formed by vertical columns **12** and **13**, which are rectangular in horizontal cross section. The columns are closed at the top by plates **14** and **15**. Adjacent their open bottoms the columns are connected by two box cross members **16** and **17**.

At the top of the columns are bolsters **19** and **20** respectively. The bolsters are affixed to the columns by four bolts **21** threaded into top plates **14** and **15** respectively. Bolsters **19** and **20** have an end **19***a* and **20***a* which overhangs the side of the column. Secured on the overhanging end of the bolsters are links **22**. Each link has secured to it a pair of jointed arms generally **23**. At the ends of the jointed arms are vehicle contacting pads **24**. This arm and pad structure is illustrated and described in greater detail in my prior U.S. Patent No. 3,315,764. In some embodiments the link **22** can be omitted and the arms **23** pivotally attached directly to bolsters **19** and **20**.

Referring to FIGURES 6 and 7 particularly, the columns **12** and **13** are spaced from each other a distance approximately equal to the width of the track of an automotive vehicle, said width being indicated by the dimension A. Thus, with the bolsters arranged in the manner illustrated in FIGURES 1 and 6, the lift forms a drive-over arrangement. When the vehicle is moved into position for lifting, it straddles the arms **23**. By removing bolts **21**, the bolsters **19** and **20** can be rotated 180 degrees in a horizontal plane and reaffixed to the columns in the manner illustrated in FIGURE 7. The lift now provides a drive-through type arrangement wherein the vehicle moves in the space between the jointed arms **23** as it moves on or off the lift.

Housing **10** includes a bottom **27** which rests on a concrete footing **28**. The top of the housing is level with the floor surface **29**. There are two lower sides **30** and lower ends **31**. At the top of the lower portion of the housing are two side angles **32** and two end angles **33**. There are two internal cross angles **34** best seen in FIGURES 1 and 3. Held within the flanges of the angles are lower bearings **35** for the columns **12** and **13**. Particularly from FIGURE 3, it will be seen that the bearings **35** also prevent rotation of the columns **12** and **13** about their vertical axes.

Extending above angles **32**, **33** are upper sides **37** and upper ends **38**. At the floor level are two side angles **39**, two end angles **40**, two cross angles **41**, and a cover

plate 42. These upper angles hold upper column bearings 43 as well as felt pads 44. Felt pads 44 serve as seals to prevent the entrance of moisture, dirt and the like.

Within the columns 12 and 13 are hydraulic rams comprising respectively, cylinders 45 and 46 and pistons 47 and 48. The upper end of the pistons contact plates 14 and 15 while the lower end of the cylinders are supported on the housing by tubes 49. Conduits 50 and 51 communicate with cylinders 45 and 46 respectively and with a central pipe 53. As indicated by dot dash line 54, central pipe 53 connects with a suitable hydraulic fluid supply device generally 55. This would comprise a suitable source of hydraulic fluid, a positive displacement hydraulic pump and controls therefore (not shown). When hydraulic fluid is supplied to cylinders 45 and 46 the carriage 11 will move to the raised position, illustrated in FIGURE 1, to support a vehicle above the floor for work thereon. When the hydraulic fluid is allowed to flow from pipe 53 to the reservoir the lift will be lowered to the dotted line position illustrated in FIGURE 2. The fact that a pure hydraulic system is employed with small capacity cylinders, rather than the air-hydraulic systems of conventional hoists, has the advantages that: the hoist can be held securely in any raised increment without the necessity of props, etc.; it is rapid acting as compared to the conventional apparatus; and it does not have the "mushy" character encountered where compressed air is involved.

I claim:

1. A below-the-floor vehicle lift for connection to a source of hydraulic fluid, said lift including:

a housing adapted to be imbedded with all but the top thereof below the floor;

a generally U-shaped carriage with two vertical columns forming the sides of the U and a base connecting member between the lower parts of the columns, said columns being hollow with an open bottom and a closed top, said carriage being within said housing with the top of the columns extending out of the top of the housing;

first bearing means mounted on and adjacent the top of the housing and contacting the columns to slidably guide the columns for vertical movement in the housing;

second bearing means mounted in the housing a spaced distance below the first bearing means and contacting the columns to slidably guide the columns for vertical movement in the housing;

hydraulic ram means within said columns and bearing against the top thereof and against a lower part of the housing, said ram means having a hydraulic line connection for connection to said source, whereby when hydraulic fluid under pressure is supplied by said source said ram means will elongate to raise said carriage upwardly above the floor; and

vehicle supporting means affixed to the top of each of the columns.

2. A lift as set forth in claim 1, wherein said columns are rectangular in horizontal cross section.

3. A lift as set forth in claim 2, wherein said housing has two side walls and two end walls, said columns and bearing means being between said walls and adjacent said end walls, said housing including braces between the side walls and supporting the adjacent portions of the two second bearing means.

4. A lift as set forth in claim 3, wherein said columns are spaced apart approximately the track width of a vehicle and said vehicle supporting means includes:

separate bolsters, means releasably affixing the bolsters to the top of the two columns respectively, said bolsters extending toward each other with a portion of each bolster overhanging the side of the column which is adjacent the other column, and two pair of arm means, each pair being affixed to a respective one of said portions, thereby defining a drive-over lift, said affixing means permitting said bolsters to be removed, rotated 180 degrees in a horizontal plane and reaffixed to said columns thereby defining a drive-through lift.

5. A lift as set forth in claim 1, wherein said columns are spaced apart approximately the track width of a vehicle and said vehicle supporting means includes:

separate bolsters, means releasably affixing the bolsters to the top of the two columns respectively, said bolsters extending toward each other with a portion of each bolster overhanging the side of the column which is adjacent the other column, and two pair of arm means, each pair being affixed to a respective one of said portions, thereby defining a drive-over lift, said affixing means permitting said bolsters to be removed rotated 180 degrees in a horizontal plane and reaffixed to said columns thereby defining a drive-through lift.

6. A lift as set forth in claim 1, wherein said housing has two side walls and two end walls, said columns and bearing means being between said walls and adjacent said end walls, said housing including braces between the side walls and supporting the adjacent portions of the two second bearing means.

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HARVEY C. HORNSBY, Primary Examiner

U.S. Cl. X.R.

187—8.75