May 27, 1969 W. N. PHILLIPS 3,446,379

HIGH-LIFT ELEVATING MECHANISM

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Fig. 4

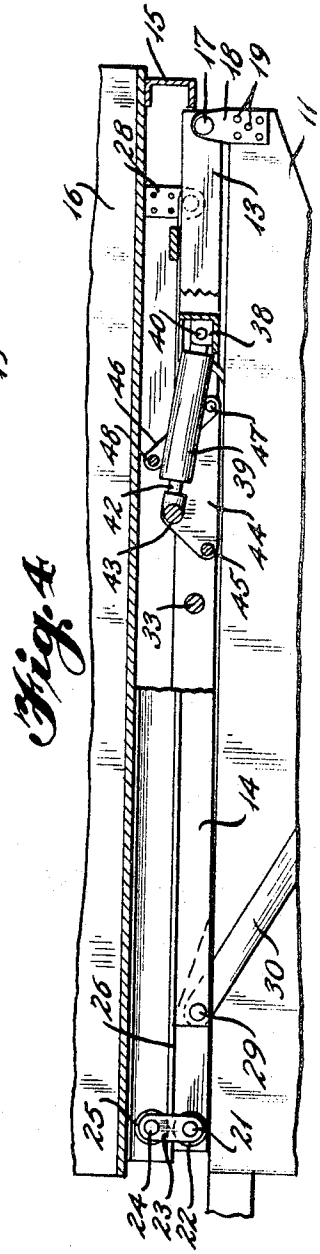
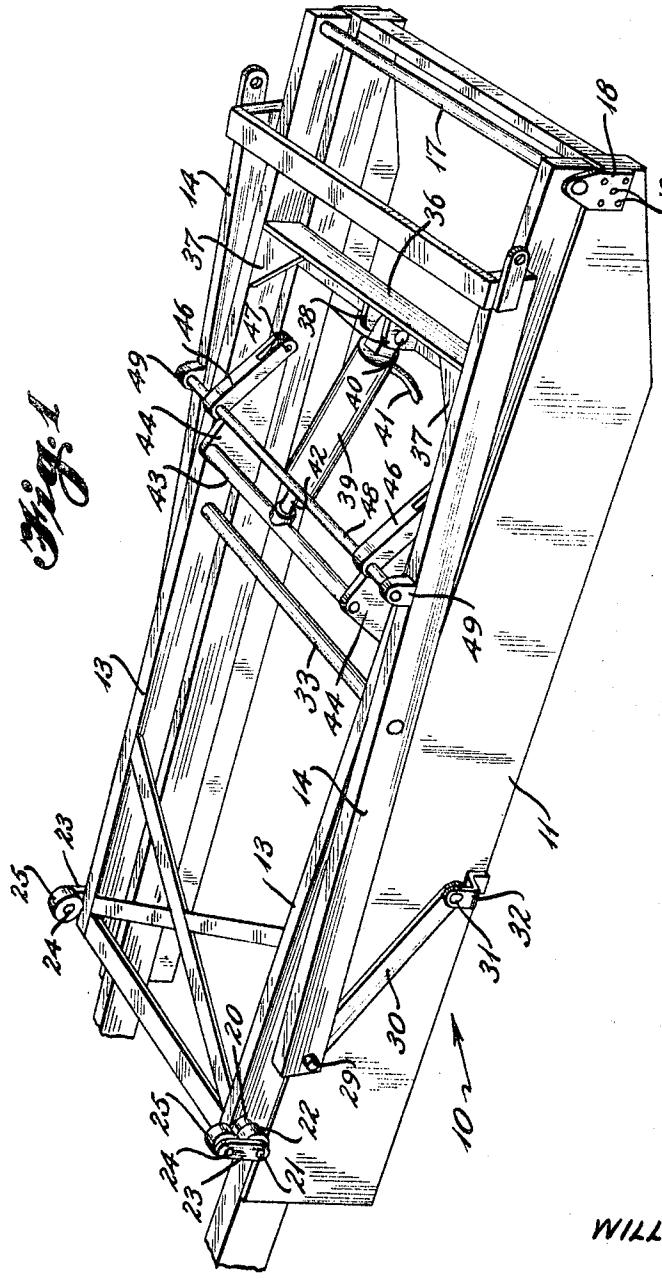


Fig. A



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Fig. 2

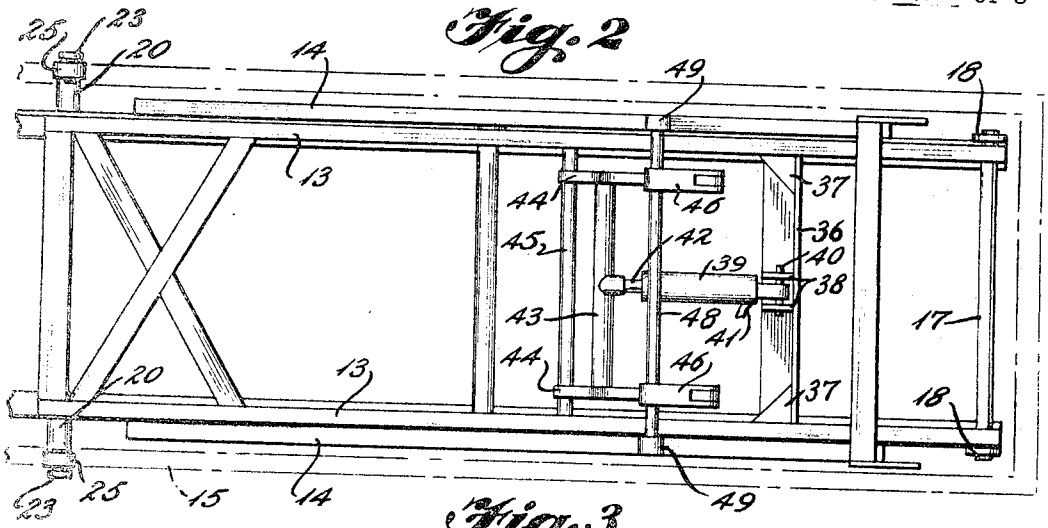
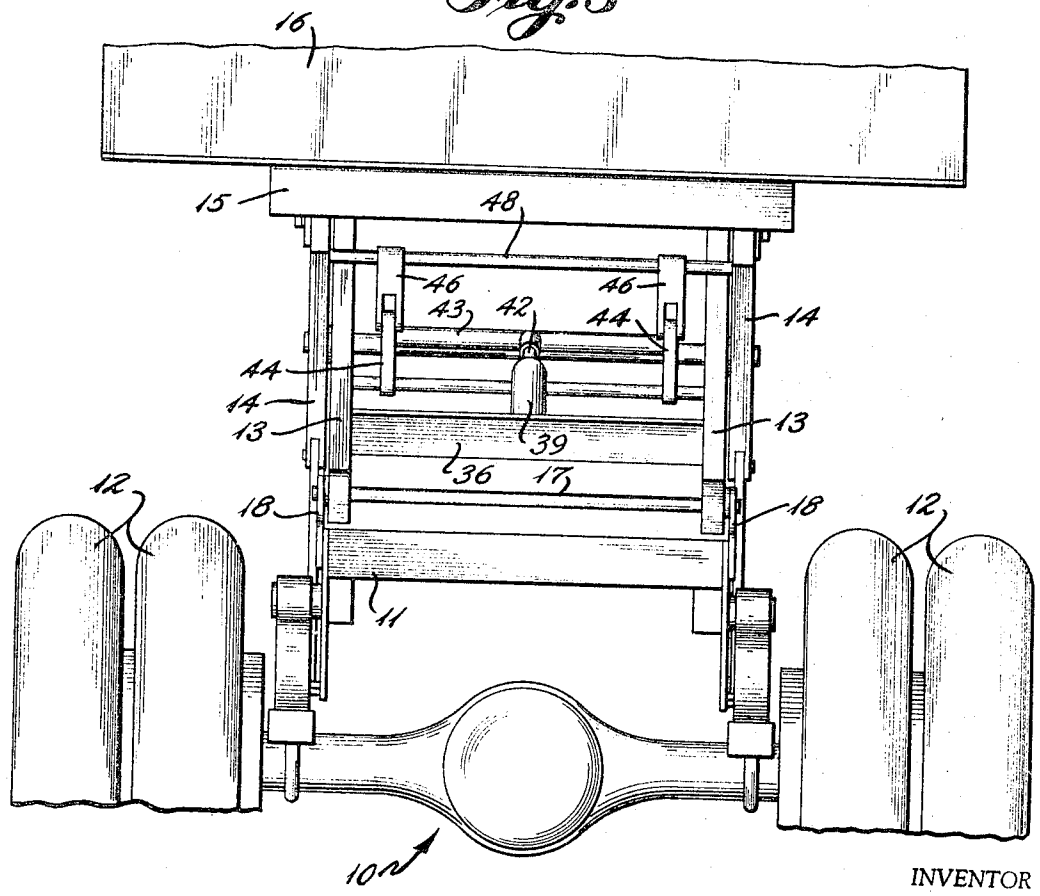


Fig. 3



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Fig. 5

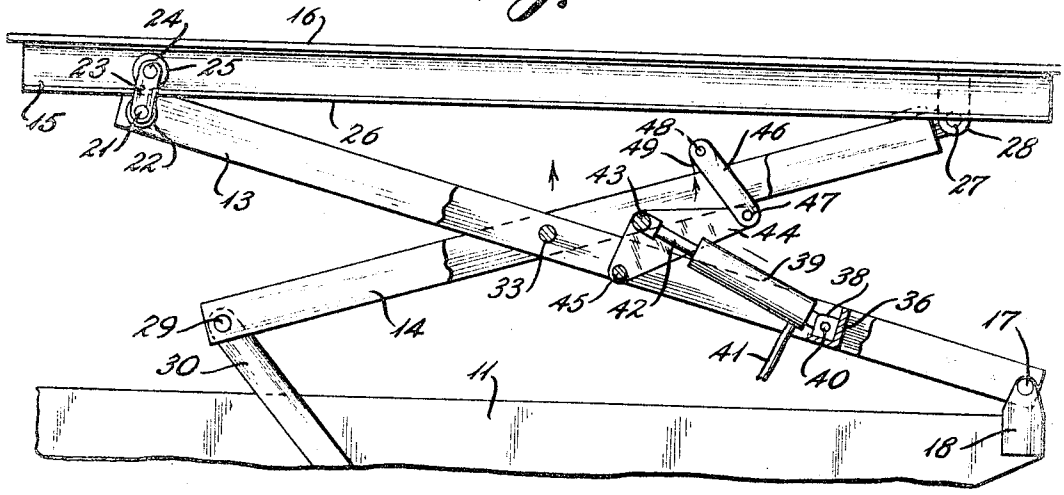
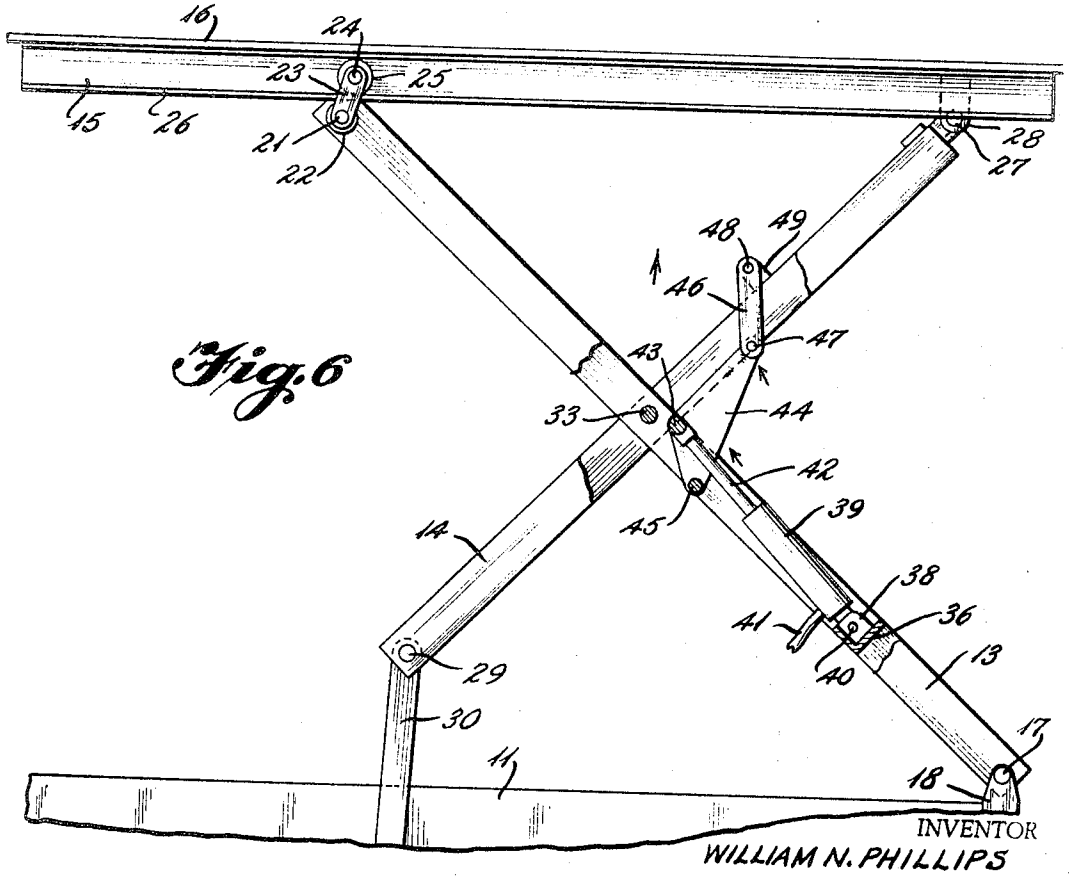


Fig. 6



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3,446,379

HIGH-LIFT ELEVATING MECHANISM

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U.S. Cl. 214—512
3 Claims

ABSTRACT OF THE DISCLOSURE

An apparatus for raising and lowering a high-lift vehicle frame by means of inner and outer lift arms which raise the frame from the chassis of the vehicle by a scissors action while maintaining the same generally horizontal. The mechanism for raising the frame is mounted directly between two pairs of arms and is adapted to react between them with no strain or elevating force applied against the chassis of the vehicle.

BACKGROUND OF THE INVENTION

Field of the invention

The present invention relates generally to vehicles having portions adapted to be raised and lowered relative to the chassis and relates particularly to a high-lift vehicle having at least one pair of high-lift arms on each side and mechanism carried by certain of said high-lift arms and adapted to react against certain other high-lift arms with a scissors action.

Description of the prior art

Many mechanisms have been provided for raising and lowering a high-lift frame generally parallel to the chassis of a vehicle; however, most of these devices have been connected to the chassis in such a manner that the chassis has been subjected to a force exerted by the elevating mechanism. The elevating mechanism usually has included a fluid cylinder which has extended below the chassis and created road clearance problems. Efforts have been made to provide sliding cam arrangements but these have not been satisfactory since one end of the cylinder pushed against the high-lift frame and required greater bulk for strength and consequently greater weight.

SUMMARY OF THE INVENTION

The present invention is an apparatus for elevating a high-lift frame and body by forcing apart the arms of the high-lift mechanism without directly subjecting the chassis of the vehicle to any of the forces created by the apparatus so that the only forces on the chassis would be the weight of the high-lift and cargo. This is accomplished by providing a fluid cylinder mounted directly on at least one of the high-lift arms and reacting against a compound linkage connected to at least one of the other high-lift arms.

It is an object of the invention to provide a high-lift elevating mechanism of simpler construction, at reduced cost, and supported by a vehicle chassis of less bulk and weight, as well as of practical and commercially desirable and acceptable construction.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective of the chassis and the high-lift arms of a vehicle illustrating one application of the invention.

FIG. 2 is a top plan view thereof.

FIG. 3 is a rear elevation of a vehicle illustrating the frame partially elevated by the high-lift arms.

FIG. 4 is a side elevation with portions broken away for clarity and illustrating the high-lift mechanism in lowered position.

FIG. 5 is a view similar to FIG. 4 illustrating the high-lift mechanism partially raised.

FIG. 6 is a view similar to FIG. 4 illustrating the high-lift mechanism fully raised.

DESCRIPTION OF THE PREFERRED EMBODIMENT

With continued reference to the drawings a vehicle **10** is provided having a chassis **11** supported by ground-engaging wheels **12**. Pairs of inner and outer high-lift arms **13** and **14**, respectively, are mounted on the chassis **11** in any desired manner and are adapted to be operated to raise and lower a frame **15** on which a body **16** (FIG. 4) is mounted.

As illustrated, the inner arms **13** are mounted at one end on a shaft **17** carried by a pair of mounting plates or brackets **18** secured to opposite sides of one end of the chassis **11** in any desired manner, as by bolts **19**. The opposite end of each of the inner arms **13** is provided with a spacer **20** having a stub shaft **21** on its outer end on which a roller **22** is mounted. A link **23** is pivotally mounted on the stub shaft **21** exteriorly of the roller **22** and the opposite end of such link is provided with a stub shaft **24** on which a roller **25** is mounted. The rollers **22** and **25** are adapted to be disposed on opposite sides of a web or flange **26** forming part of the frame **15**.

One end of each of the outer arms **14** is connected by a pin **27** to a lug **28** carried either by the frame **15** or by the body **16**. The opposite end of each of the outer arms is pivotally connected by a pin **29** to one end of a link **30**, the opposite end of which is connected by a pin **31** to a bracket **32** welded or otherwise attached to the chassis **11**. The inner and outer arms **13** and **14** on each side of the vehicle are disposed adjacent to each other and each of such arms is mounted on a central shaft **33** which extends between the arms on opposite sides of the vehicle to maintain the arms in alignment and to provide a fulcrum about which the arms will be moved.

The structure thus far described is conventional and forms no part of the inventive concept.

In order to raise and lower the frame **15** and the body **16** it is desirable to spread the inner and outer arms **13** and **14** apart and pivot the same about the central shaft **33** in a scissors action. This is accomplished by providing a support member **36** extending between and connected to the inner lift arms **13** in any desired manner, as by welding or the like. If desired, strengthening members or gussets **37** (FIG. 1) may be connected to the support member **36** to provide additional rigidity at the corners. A pair of lugs **38** are mounted on the support member **36** and are adapted to support one end of a fluid cylinder **39** by means of a pivot pin **40**.

The cylinder **39** may be of the single acting type in which fluid under pressure is introduced into the cylinder through a fluid line **41** to extend a piston and piston rod **42**. The free end of the piston rod **42** is connected substantially centrally of a crossbar **43**, the opposite ends of which are pivotally connected to a bracket **44** located adjacent to each of the inner arms **13**. Each of the brackets **44** is pivotally mounted at another location to the inner arms **13** by means of a pivot pin or shaft **45** so that when the piston rod **42** is extended the brackets **44** will swing about the pivot pins **45**. At a third location of each of the brackets **44**, a link **46** is rotatably attached at one end by a pin **47** and the opposite ends of such links are connected to a common shaft **48**. The opposite ends of the shaft **48** are journaled in bearings **49** carried by each of the outer arms **14**.

In the operation of the device, when the high-lift arms are in lowered position and the frame **15** and the body **16** are resting on the arms **13** and **14** supported by the

chassis **11**, fluid admitted under pressure through the line **41** into the cylinder **39** will cause the piston rod **42** to be extended to pivot the brackets **44** around the pivot pins **45** and raise the third portion of the brackets to which the links **46** are connected. When the links **46** are raised, they will apply an upward force on the outer arms **14** and cause the arms **13** and **14** to pivot about the central shaft **33** in a scissors action. In order to lower the frame **15** and the body **16**, the fluid within the cylinder **39** is relieved and the weight of the frame and body will cause the same to be lowered.

It will be apparent from the foregoing that a high-lift elevating mechanism is provided which is simpler and less expensive to produce, and can be adequately supported by a lighter weight chassis resulting in substantial saving in weight, bulk and consequent manufacturing and transportation costs, particularly in view of the fact that force utilized in performing the lifting operation is exerted between the lift arms and with no force other than the weight of the high-lift mechanism and the cargo carried by the body **16** being imposed upon the chassis **11**. Further, as is apparent from FIG. 4, the lift mechanism will be disposed substantially above the chassis **11** between the arms **13**.

It will be obvious to one skilled in the art that various changes may be made in the described embodiment of the invention without departing from the spirit and scope thereof and therefore the invention is not limited by that which is illustrated in the drawings and described in the specification, but only as indicated in the accompanying claims.

What is claimed is:

1. Apparatus for raising and lowering a high-lift portion of a vehicle having a chassis comprising a pair of lift arms located in transversely spaced relation on the chassis, said lift arms being pivotally connected, one of said arms being pivotally mounted on said chassis and the other being movable relative thereto, a support member extending between said arms, actuating means mounted on said support member, a bracket pivotally mounted on certain of said arms, a crossbar connecting said brackets and being located in spaced relation to said pivot, a link connected at one end to each of said brackets in spaced relation to said crossbar, and the opposite end of each link being connected to other of said arms, whereby when said actuating means is operated said brackets will be rotated about the pivots on said certain arms to raise said links and said links will raise said other arms to cause a scissors action between said arms.

2. The structure of claim **1** in which said means for pivoting said brackets includes fluid cylinder means.

3. The structure of claim **1** in which said bracket means and said rotating means are disposed above said chassis at all times.

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U.S. Cl. X.R.

182—141; 254—122