

# United States Patent

[19]  
Cole

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[54] WEAPON LOADER

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93003

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[51] Int. Cl. .... B65g 7/00

[58] Field of Search..... 214/1 D, 1 R; 187/9; 269/17

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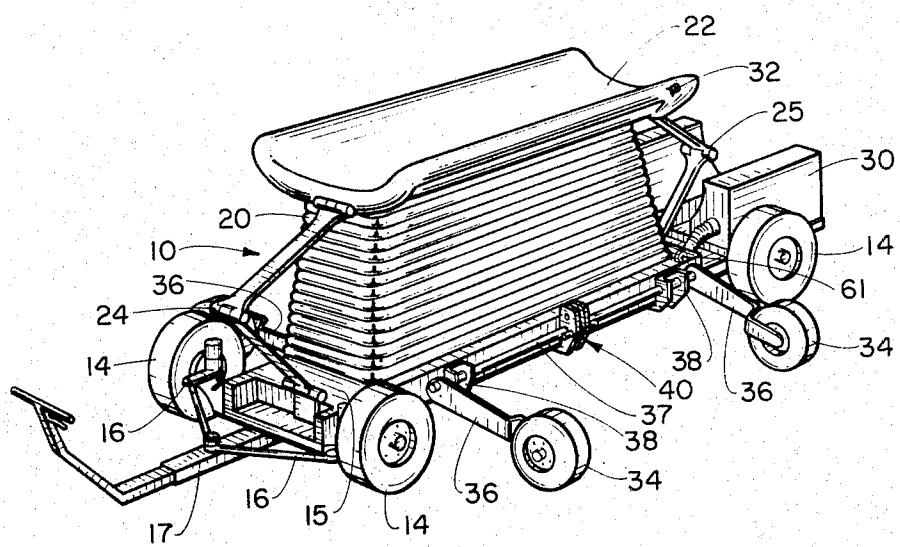
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[57] ABSTRACT

A flexible, rapid-lift rate, rapidly positioned missile loader with sufficient pitch-roll-yaw freedoms to accelerate weapon loading and the like. The missile loader poses the missile on a long spring column of air leaving it free to be "float" positioned to final indexing. Air is induced into bellows type lifting elements by a low pressure powered blower. Transverse positioning of the loader carriage is easily accomplished through the provision of air-actuated lift outrigger wheels.

7 Claims, 5 Drawing Figures

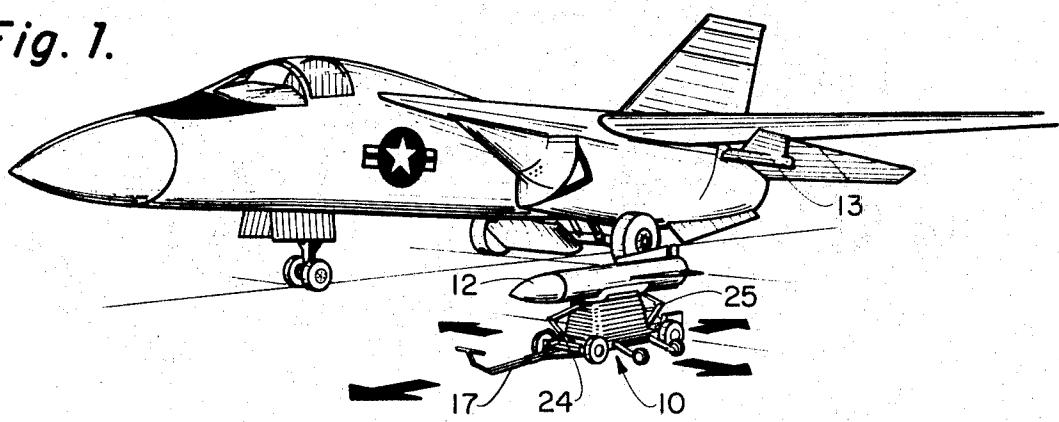


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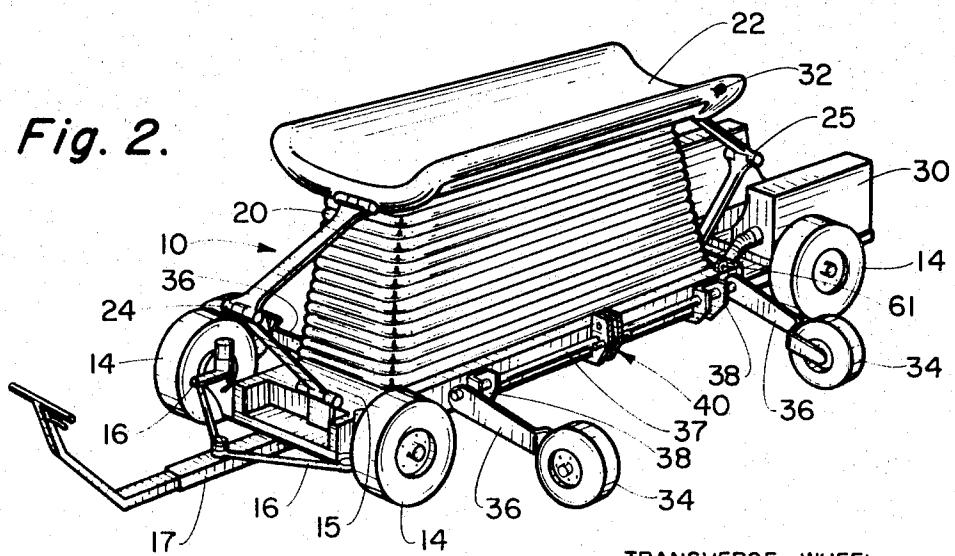
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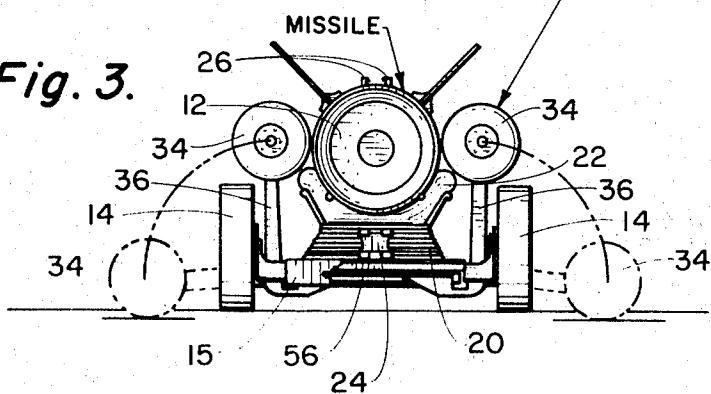
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



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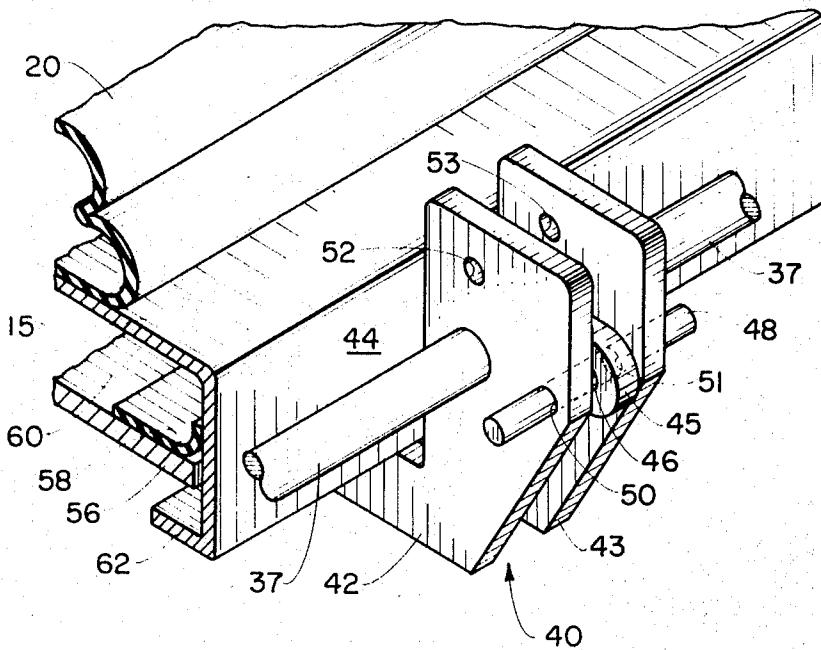


Fig. 4.

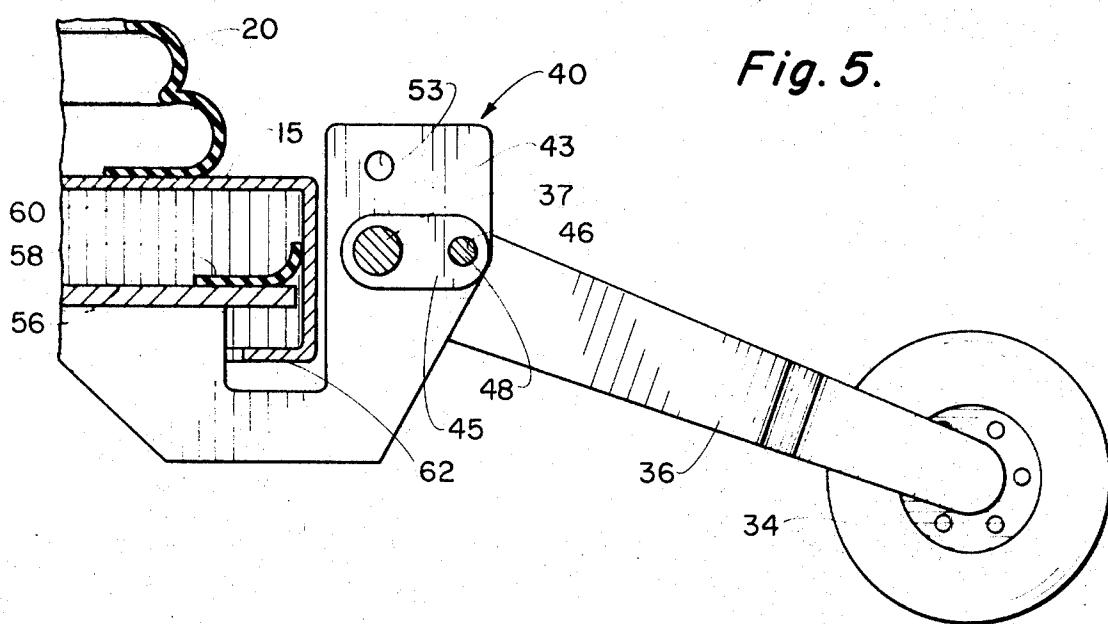


Fig. 5.

**WEAPON LOADER****STATEMENT OF GOVERNMENT INTEREST**

The invention described herein may be manufactured and used by or for the Government of the United States of America for governmental purposes without the payment of any royalties thereon or therefor.

**BACKGROUND OF THE INVENTION**

The present invention is related to lifting devices and particularly to the type using inflatable members to lift a load.

Previous loaders utilizing direct mechanical, pneumatic pressure or hydro-mechanical lifting means, positioned precision missile attach fittings in proximity with precision missile attachment receivers in a rigid fashion causing great difficulty in final indexing of missile to launcher. Indexing to final position was then performed through complicated and time-consuming cranking and leveling of the missile into place.

The present lifting device is a wheeled missile transporting and lifting vehicle which employs low pressure air operating over a large surface to lift a missile supporting tray toward and away from the missile loaded position. The missile in its supporting tray can then be readily positioned with sufficient three degrees of freedom to index rapidly with the attach fittings.

**STATEMENT OF THE OBJECTS OF THE INVENTION**

It is an object of the invention to provide a flexible flotation, rapidly positioned missile loader.

Other objects, advantages and novel features of the invention will become apparent from the following detailed description of the invention when considered in conjunction with the accompanying drawings wherein:

**BRIEF DESCRIPTION OF THE DRAWINGS**

FIG. 1 illustrates the use of the device of the present invention for loading a missile for attachment onto an aircraft.

FIG. 2 shows a perspective view of the missile loader with the missile cradle in raised position.

FIG. 3 is an end view of the present device with cradle in lowered position and carrying a missile.

FIG. 4 shows an enlarged detail view of an embodiment for locking the transverse wheel (outrigger) assembly in lowered position.

FIG. 5 is an enlarged sectional view of a portion of FIG. 4 illustrating means for air actuating the transverse wheels.

**DESCRIPTION OF THE PREFERRED EMBODIMENT**

Referring to the drawings, like numerals refer to like parts in each of the figures. As shown in FIG. 1 the missile loading vehicle 10 of this invention is maneuverable in the direction of the arrows to position the missile 12, for example, in the general area beneath the attach fitting 13 on the aircraft wing. The vehicle can be towed about on its regular wheels 14 and attached to the carriage frame 15 steered by means of linkage 16 coupled with towbar 17.

A bellows type lifting element 20 is supported on carriage frame 15 and in turn carries a cradle 22 on the top portion thereof. Toggle-arm members 24 and 25 fastened between carriage frame 15 and cradle 22 are positioned fore and aft on vehicle 10 for the purpose of steadyng the cradle while being raised and while in the raised position, as shown in FIG. 2. Nevertheless, there is sufficient play in the bellows and toggle-arm members to allow some pitch, roll and yaw freedom of movement to position a missile for accurate indexing of the missile supporting lugs 26 with the aircraft attach fitting 13.

A low pressure powered blower 30 is used to induce air into the bellows lifting element 20. One or more bleeder type air valves 32 can be positioned on the cradle or bellows, or elsewhere on the vehicle as desired to bleed off any excess air pressure for ease in positioning or "floating" the missile beneath the attach fitting 13.

Transverse positioning of the missile loader carriage 15 can be easily accomplished by means of the outrigger wheels 34. A pair of outrigger wheels 34 are provided on each side of missile loader 10. Each of the wheels is attached to a support arm 36 which in turn is fastened to a shaft 37 rotatably mounted in brackets 38 so that each pair of wheels may be raised or lowered, when desired, as shown in FIG. 3. Brackets 38 are attached to a plate 56 beneath frame 15, hereinafter described. A locking means 40, shown in greater detail in FIG. 4, for example, is used to retain the outrigger wheels 34 in raised or lowered position. Shaft 37 rotatably fits through holes in guide plates 42 and 43 which are also attached to a plate 56 beneath frame 15 as hereinafter described. A latch plate 45 having an aperture 46 therethrough is attached to shaft 37, and by means of a latch pin 48 which passes through apertures 50 and 51 in the guide plates and through aperture 46 each pair of outrigger wheels may be locked in the lowered position. By raising a pair of wheels and passing latch pin 48 through apertures 52 and 53 in the guide plates and aperture 46 in the latch plate the outrigger wheels can be locked in the raised position.

With the outrigger wheels locked in the raised position the vehicle can be readily moved about on wheels 14. When both pairs of outrigger wheels 34 are locked in lowered position the upper portion of carriage frame 15 supporting the bellows element 20 and wheels 14 can be raised slightly to permit transverse movement of the vehicle on the outrigger wheels. A preferred means for raising carriage frame 15 and wheels 14 is shown in the cross-sectional view of FIG. 5. Beneath frame 15 is a flat plate 56 provided with a seal 58 which fits against the inside of frame 15. Brackets 38 and guide plates 42 and 43 are fastened to plate 56 for securely mounting shaft 37 and outrigger wheel support arms 36. The plate 56 and seal 58 arrangement permits pneumatic pressure or the like from low-pressure blower 30, for example, to be pumped into space 60 between frame 15 and plate 56, and thus lift frame 15 with wheels 14 a sufficient amount to permit vehicle 10 to be moved transversely on wheels 34. Blower 30, by simple valve arrangement can provide pneumatic pressure to either or both bellows 20 and pneumatic lift space 60. A bleeder valve 61 can be used to release the pressure as desired for lowering frame 15 and wheels 14. When the outrigger wheels are not in use and in raised position,

flange 62 supports the edge of plate 56, and thus brackets 38 and wheels 34.

What is claimed is:

1. A wheeled transporting and lifting vehicle having limited pitch, roll and yaw freedoms for rapidly and precisely indexing load lugs to attach fittings, comprising:
  - a. a vehicle carriage frame having first wheel means thereon, for moving said vehicle about;
  - b. pneumatic lift means carried beneath said carriage frame;
  - c. outrigger wheel means being attached to said pneumatic lift means;
  - d. said outrigger wheel means operable to be raised and lowered, and locking means provided to hold said outrigger wheel means in either of said raised and lowered positions;
  - e. bellows means attached to the upper side of said vehicle carriage frame;
  - f. cradle means in which a load is carried being provided at the top of said bellows means;
  - g. pressure means for providing pneumatic pressure to said bellows means for expanding the bellows and lifting said cradle means;
  - h. means for activating said pneumatic lift means wherein when said outrigger wheel means are locked in the lowered position said vehicle car-

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riage frame with said first wheel means can be lifted and said vehicle can be moved in transverse directions on said outrigger wheel means.

2. A device as in claim 1 wherein toggle-arm members are connected between said carriage frame and said cradle means for steadyng said cradle means when said bellows means are expanded and the cradle means raised, and manual manipulation of said cradle means permits a flotation effect with limited pitch, roll and yaw for precision positioning of a load to attach fittings.
3. A device as in claim 1 wherein said pressure means is a low pressure blower.
4. A device as in claim 1 wherein bleeder valve means is provided to release the pressure in said bellows means for ease in positioning said cradle means.
5. A device as in claim 1 wherein said pressure means provides pneumatic pressure to both said bellows means and said pneumatic lift means.
6. A device as in claim 1 wherein said first wheel means permits steering of said vehicle carriage frame.
7. A device as in claim 1 wherein said outrigger wheel means comprises a pair of hinged wheel support arms and wheels on each side of said vehicle, the axles of said outrigger wheels being substantially normal to said first wheel means.

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