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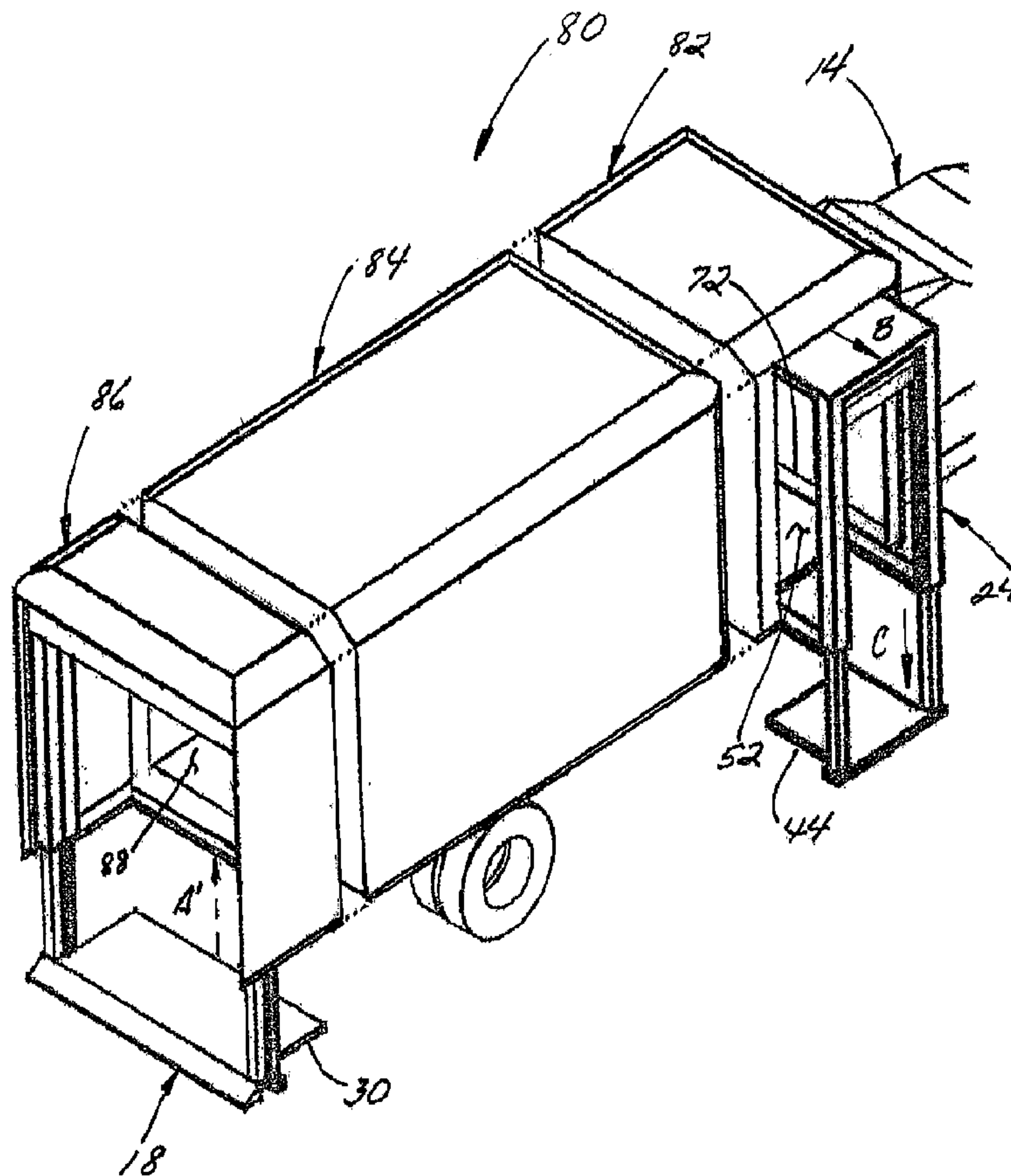
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(57) Abrégé/Abstract:

A goods handling apparatus for a cargo storage and transport vehicle includes a movable cargo platform continuous with a portion of cargo enclosure floor, when the cargo platform is in an upper position. Cargo may be slid between the trailer floor and the cargo

(57) Abrégé(suite)/Abstract(continued):

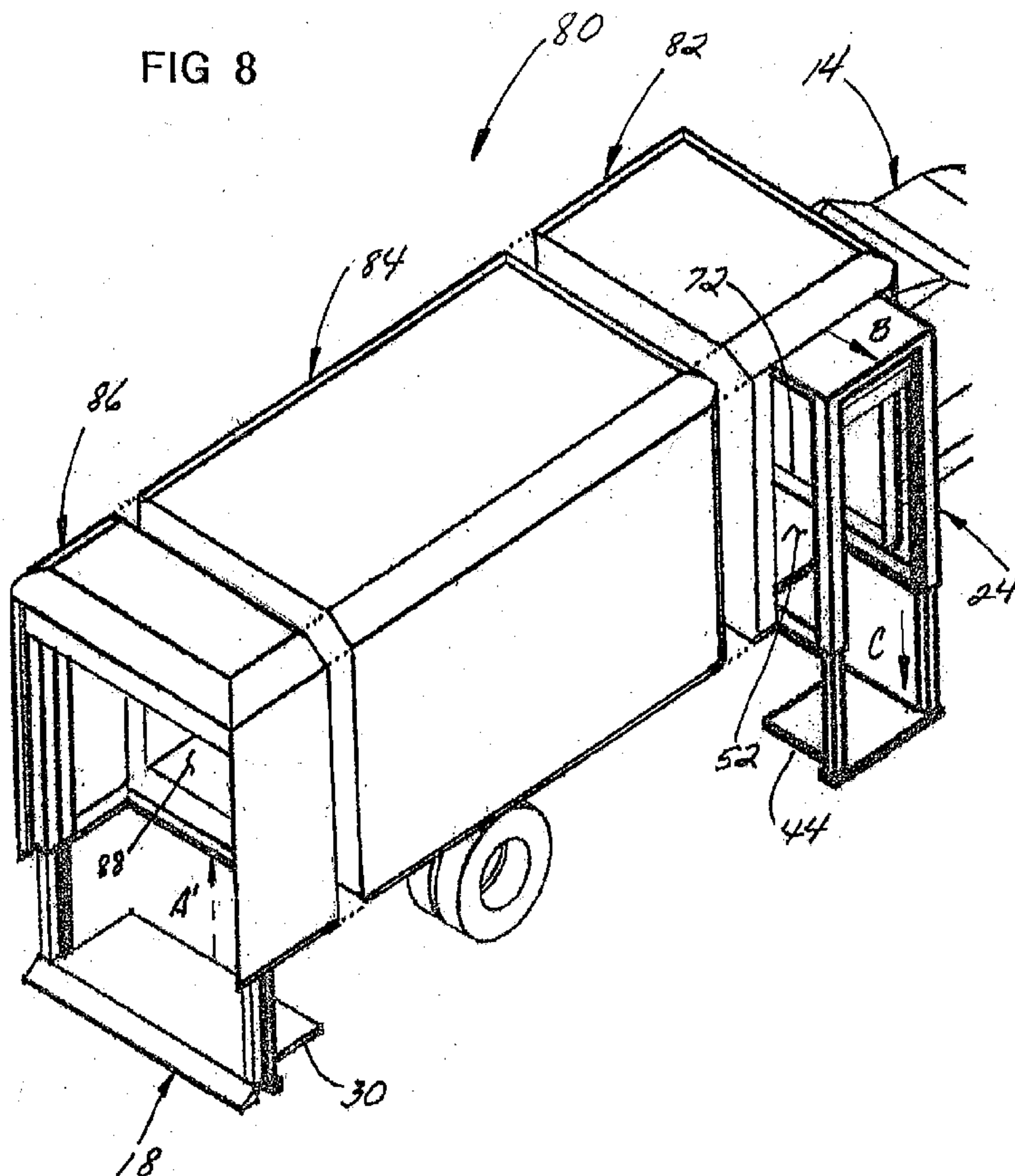
platform. A vertical actuator raises and lowers the cargo platform between the upper position and a lower position atop the ground or other vehicle support surface whereupon cargo may be slid between the cargo platform and the ground or other positions. The cargo platform is disposed substantially within the plan perimeter of the floor of the cargo module during raising and lowering. A modular system may be integrated into the cargo enclosure or may be incorporated into a modular, enclosure for appending to a cargo box of the prior art.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52

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FIG 8



(57) Abstract: A goods handling apparatus for a cargo storage and transport vehicle includes a movable cargo platform continuous with a portion of cargo enclosure floor, when the cargo platform is in an upper position. Cargo may be slid between the trailer floor and the cargo platform. A vertical actuator raises and lowers the cargo platform between the upper position and a lower position atop the ground or other vehicle support surface whereupon cargo may be slid between the cargo platform and the ground or other positions. The cargo platform is disposed substantially within the plan perimeter of the floor of the cargo module during raising and lowering. A modular system may be integrated into the cargo enclosure or may be incorporated into a modular, enclosure for appending to a cargo box of the prior art.

Cargo Handling Apparatus

Field of the Invention

[0001] The field relates to delivery trucks with lifts to raise and lower cargo to and from an enclosure mounted on the chassis of a cargo truck.

Background

[0002] While lifts are known that extend off the back of a truck by folding down or by arcuately extending outward and down from the back of a truck. These lifts fail to provide for use when space behind a truck is limited, are bulky additions to the truck, and do not provide additional floor space while enclosing the lift components within the enclosure of the cargo area.

[0003] Typically, trailers and vehicles with a trailer or enclosure for hauling cargo are arranged to haul cargo within the trailer and atop a trailer floor. One such arrangement is found in a delivery truck which includes a vertically movable lift gate which swings down and extends rearwardly from the end of the trailer floor. Cargo is either loaded onto or off the rear lift gate and either elevated or lowered for pick up or delivery of the cargo. However, in inclement weather, the operator and the cargo may be exposed to rain or snow by being outside of the confines of the trailer. Moreover, extra room behind the trailer is required to accommodate the length of the lift gate and additional space to load and unload cargo therefrom.

[0004] A number of prior art systems have been developed which, in part, address this limiting aspect of the above delivery trucks. U.S. Patent 4,236,747 issued December 2, 1980 to Ratliff discloses a transport vehicle for medium-sized route delivery of goods. The versatile design allows for removability of the central partition in each cargo bay and adjustability of the position of the floor. A delivery truck body or trailer, which is convertible between being arranged for side loading at ground level or rear loading at dock height, is disclosed in U.S. Patent 4,659,132 to Day.

[0005] Price teaches a double drop trailer with lifts therein in U.S. 5,092,721. A first lift comprises upper and lower platforms rigidly interconnected one to another, the second lift located in the rear section.

[0006] Three U.S. patents to Greenlaw, et al, U.S. 5,915,913, 6,328,525 and 6,474,446 teach delivery vehicles with multi-tier storage and elevator assemblies installed therein. Substantially continuous side access door provide total exterior access to the lowermost tier of cargo in the '525 patent, the '913 patent teaching elevator assemblies for multi-tier storage. The '446 patent teaches a framing system that reduces structural requirements of side walls and

floors, permitting multiple side access ports and reduced floor thickness to permit easier access from the pavement.

[0007] Recently issued Patent 7,114,905 to Dibdin teaches methods and an apparatus for optimizing use of storage space in a trailer. The apparatus provides a loading apparatus for the trailer having a platform movable relative to the floor of the trailer to facilitate loading of goods.

[0008] Published application 2003/0147734 to Adams discloses a goods handling system for a vehicle or railway trailer which allows the level of access to all areas of the trailer to be improved.

[0009] None of the known lifts provide vertically movable cargo within the confines of a trailer enclosure. Additional space is required rearwardly of the trailer for most of the known systems. Additionally, movable side cargo-receiving lifts are capable of being used for floor space for hauling cargo.

BRIEF SUMMARY OF THE INVENTION

[0010] A goods handling apparatus for a cargo storage and transport trailer includes a movable cargo platform module forming a separate part of the trailer floor that may be continuous with the trailer floor when the cargo platform is in an upper position, and cargo may be slid between the trailer floor and the cargo platform or may remain on the platform during hauling of the cargo to a destination. A vertical actuator attached to the cargo platform raises and lowers the cargo platform between the upper position and a lower position atop the ground or other vehicle support surface or loading dock. Cargo may be slid or rolled off the platform without lifting between the cargo platform and the ground or other surface. The cargo platform is positioned substantially within the plan perimeter of the floor of the trailer during lifting and lowering, allowing cargo to be loaded or off-loaded in tight confines not possible with known lifts.

[0011] A cargo handling apparatus may be incorporated into a conventional delivery trailer of a truck, which will lift and lower cargo within the confines of the trailer. In one example, the platform is confined to the perimeter of a module that may be modularly coupled with the truck. In one example, a modular lift extends from side of the truck allowing the lift to clear the chassis of the truck.

[0012] In one example, rear impact protection is provided by an integrated cross member that is capable of lowering and rising with the lift mechanism integrated into the rear of enclosure. In one advantage, goods handling apparatus may eliminate the need for additional working space behind or to the rear of the trailer of the vehicle by deploying and lifting a vertically movable cargo platform which is positioned within a rearward opening formed into

the floor of the trailer floor and within the plan profile of the trailer (e.g. the perimeter of the enclosed area).

[0013] In one example, a goods handling apparatus which extends laterally from the side of a trailer only a distance sufficient for a cargo platform to move vertically just outboard of the frame of the trailer provides for raising and lowering within the perimeter of the goods handling apparatus module.

BRIEF DESCRIPTION OF THE FIGURES

[0014] Figure 1 is a perspective view of a vehicle showing two embodiments of the invention incorporated into the trailer assembly of the vehicle.

[0015] Figure 2 is a side elevation broken view of Figure 1.

[0016] Figure 3 is a top plan view of Figure 1.

[0017] Figure 4 is another view of Figure 1 showing both embodiments of the invention deployed.

[0018] Figure 5 is a broken side elevation view of Figure 4.

[0019] Figure 6 is a broken top plan view of Figure 4.

[0020] Figure 7 is a perspective exploded view of Figure 1.

[0021] Figure 8 is a perspective partially exploded view of two additional embodiments of the invention.

[0022] Figure 9 is a detailed view of an example of an actuator and underride protection.

[0023] Examples are illustrated in the drawings and are described herein. It is intended that the embodiments and figures disclosed herein are to be considered to be illustrative rather than limiting.

DETAILED DESCRIPTION OF THE INVENTION

[0024] Referring now to the drawings, an otherwise conventional delivery 10 vehicle is shown and includes a trailer assembly 12 and a truck 14. A trailer assembly 12 includes a trailer body 16 defining an enclosure above a trailer floor 28 and having a longitudinally extending frame 26 which may be formed as an integral part of the truck 14.

[0025] Two examples of integrated lift platforms 18, 24 are illustrated. The examples may be combined in one trailer 12 or may be used separately. In one example, a vertically movable cargo platform 30 is rectangular, but may be of any convenient shape or size and may have a tapered lip or ramp 32 along the rearwardly distal edge, for example. This example includes upright frame members 36 and 38 rigidly connected at each rearwardly corner of the platform 30 or at least within the enclosure when the platform is raised. Each are upwardly

engaged into one of two elongated upright channels 40a and 42a of vertical actuators 40 and 42, respectively. These actuators 40 and 42 may be rigidly attached or affixed to an inner surface of the trailer 16 or an intermediate support in an upright orientation within the enclosure of the trailer 16.

[0026] The trailer floor 28 includes an opening 34 which may be formed in the distal rearward portion of the trailer floor 28. The opening substantially mates with and receives the platform 30 so that, when the platform 30 is in the upper position, top-most surface of the platform 30 is substantially continuous with and uninterrupted of the trailer floor 28 so that cargo within the trailer 16 may be slid onto or from the platform 30 without the need for lifting or use of a wheeled cart or hand truck, for example.

[0027] An overhead-type door 22, shown in the open position in Figures 4 and 7 and in the closed position in Figure 1, may completely enclose the trailer 16, including all of the components of the cargo handling apparatus 18. During inclement weather, a movable door 22 may be left closed while the apparatus 18 is loaded with cargo and then moved downwardly by actuators 40 and 42 to the lowered position resting atop the ground or other vehicle support surface, that movement being in the direction of arrow A as illustrated in Figures 4 and 5. The door 22 may be opened a distance sufficient for removal of the cargo from the platform 30. Note importantly that, as best seen in the top plan view of Figures 3 and 6, the amount of rearwardly space required for loading and offloading of cargo from the trailer 16 is reduced compared to known lifts.

[0028] In one example, an underride mechanism 64 includes spaced upright frame members 66 and 68 which are coupled movably by elongated channels 40b and 42b, for example. The height and position rearwardly of the trailer 16 prevent other vehicles from sliding beneath the truck during an unintended rear-end collision with the vehicle 10. In one example, actuators 40 and 42 may be downwardly deploy the underride member 64 upon engagement with the platform 30, when the platform 30 is lowered, as disclosed in more detail in reference to Figure 9.

[0029] An example of a side loading lift 24 includes an additional feature of a movable cargo receiving module 24 having a module floor 52, an upright back panel 62, two vertical actuators 54 and 56 and an upper protective panel 60. The module 24 also includes a module floor 44 which, in the upper position, just closely fits within a modular floor cutout 50 so that the module platform 44 is continuous with and uninteruptive of the module floor 52.

[0030] To deploy this cargo module 24, a power track 70 connected within the trailer 16, in one example, is laterally oriented at approximately the trailer floor level. The power truck 70 will move the module 24 outwardly in the direction of arrow B, as best seen in Figure 6. When

the module platform 44 clear the frame 26, the module platform 44 may be lowered in the direction of arrow C by actuators 54, 56 until the modular platform 44 comes to rest atop the ground or otherwise. Cargo loading and unloading onto or from the interior of the trailer 16 is facilitated as the module 24 may be installed anywhere along the length of the trailer and on either side for convenience or special delivery needs.

[0031] Referring now to Figure 8, a cargo truck 80 and includes one or more modular lifts 18, 24. A modular lift 18, 24 may be installed within a self-contained handling add-on module 86, 82. Operation of each of the lifts 18 and 24 is as previously described. The modularity may be used for any cargo truck. Refrigerated cargo spaces may benefit from an interlock or curtain that reduces the amount of cooled air that escapes from the cargo enclosure during loading and off-loading.

[0032] In one example, such as illustrated in Figures 7-9, rear impact protection is integrated with the lift mechanism. For example, a cross member 64 is coupled to a platform 30, which may be raised or lowered, by retractable members 66, 68. Both the retractable members 66, 68 and the platform 30 may be mounted to the cargo enclosure 12, 84 of the truck 10 by support members 40, 42. Each of the support members 40, 42 may include enclosed channels 40a, 40b, 42a, 42b. The enclosed channels are schematically illustrated in the exploded view of Figure 7, for example, and are illustrated with additional detail in Figure 9. A detailed view of two of the enclosed channels 40a, 40b for one of the support members 40 shows a spring biased coupling member 67 coupling the retractable member 66 to cross member 64. One or more limiting devices 69 may be provided to limit the maximum extent of the movement of the retractable member 66 in the upward and/or downward directions. As the platform 30 moves downward, the cross member 64 may remain stationary until the platform reaches the cross member 64. Then, the platform 30 and the cross member 64 may continue to move downward together. As the platform 30 is raised upwardly, the cross member 64 may be raised, also, until the retractable member 66 reaches the limit device 69, for example, which limit device 69 positions the cross member 64 at a height to provide for rear impact protection.

Listing of Components

- 10. Cargo storing & transport vehicle
- 12. Trailer assembly
- 14. Truck
- 16. Trailer body
- 18. Cargo (goods) handling apparatus/lift
- 20. Trailer wheel
- 22. Rear door
- 24. Cargo handling apparatus/lift/receiving module
- 26. Longitudinal trailer frame
- 28. Trailer floor
- 30. Movable cargo platform
- 32. Ramp
- 34. Floor cutout
- 36. Upright frame member
- 38. Upright frame member
- 40. Vertical actuator
- 40a, b. Upright Channel
- 42. Vertical actuator
- 42a, b. Upright Channel
- 44. Module movable cargo platform
- 46. Upright frame
- 48. Upright frame
- 50. Module floor cutout
- 52. Module floor
- 54. Vertical actuator
- 56. Vertical actuator
- 58. Side door
- 60. Module top panel
- 62. Module back panel
- 64. Under ride member
- 66. Upright frame
- 68. Upright frame
- 70. Track
- 72. Track
- 80. Cargo storage and transport vehicle
- 82. Front cargo handling add-on module
- 84. Intermediate trailer section
- 86. Rear cargo handling add-on module
- 88. Trailer floor
- 90/92. Linear Actuator

CLAIMS

1. A goods handling device for a cargo storage and transport vehicle, said goods handling device comprising:

a trailer assembly comprising an enclosure including a trailer floor defined by a trailer floor perimeter, a vertical wall extending upwards from said trailer floor perimeter, a roof assembled to an upper portion of said vertical wall, and a door;

said trailer floor comprising a fixed floor portion having a fixed floor upper surface and a moveable cargo platform having a cargo platform upper surface forming one substantially continuous and uninterrupted trailer floor surface when placed in an upper position;

said moveable cargo platform comprising a platform periphery, said platform periphery having a perimeter edge portion that defines a portion of said trailer floor perimeter;

at least two vertical actuators located on opposing sides of said moveable cargo platform, providing vertical motion of said moveable cargo platform between said upper position and a lower position, said lower position being at least one of a ground and a vehicle support surface;

wherein said door is located proximate said floor perimeter edge portion of said platform periphery allowing for transfer of cargo between said moveable cargo platform and said at least one of a ground and a vehicle support surface;

a cargo module comprising a module floor;

a second moveable cargo handling platform being a subcomponent of said module floor, wherein a top surface of said second cargo handling platform is substantially continuous with and uninterrupted of said module floor when placed in a stored position, and a top surface of said module floor is substantially continuous with and uninterrupted of said trailer floor when placed in an upper position;

a horizontally sliding track, providing a horizontal motion to said cargo module;

a second pair of vertical actuators located on opposing sides of said second moveable cargo platform, providing vertical motion of said second moveable cargo platform between said upper position and a lower position, said lower position being at least one of a ground and a vehicle support surface; and

wherein a second door is located proximate a floor perimeter edge portion of said second moveable cargo platform allowing for transfer of cargo between said second moveable cargo platform and said at least one of a ground and a vehicle support surface.

2. A goods handling device as recited in claim 1, wherein said door spans an entire length of said trailer floor perimeter edge portion of said platform periphery.
3. A goods handling device as recited in claim 1, said cargo handling platform further comprising a ramp assembled along said trailer floor perimeter edge portion of said platform perimeter.
4. A goods handling device as recited in claim 1, wherein a vertical portion of said vertical actuators are concealed by said trailer assembly when said cargo handling platform is in said upper position.
5. A goods handling device as recited in claim 1, said goods handling apparatus further comprising a horizontally sliding mechanism, providing said cargo handling platform with a horizontal motion.
6. A goods handling device as recited in claim 1, wherein said door spans between the at least two vertical actuators when said door is in a closed position.
7. A goods handling device as recited in claim 1, said trailer floor perimeter further defined by a front edge located towards a front of a vehicle, a rear edge located towards a rear of the vehicle, and a pair of side edges spanning between said front edge and said rear edge; and
wherein said trailer floor perimeter edge portion of said platform periphery forms a continuous section of said rear edge of said trailer floor.
8. A goods handling device as recited in claim 1, said goods handling apparatus further comprising a cargo module, said cargo module comprising:
said cargo handling platform is a subcomponent of a module floor, wherein a top surface of said cargo handling platform is substantially continuous with and uninterrupted of said module floor when placed in a stored position, and a top surface of said module floor is substantially continuous with and uninterrupted of said trailer floor when placed in an upper position; and
a horizontally sliding track, providing a horizontal motion to said module floor.
9. A goods handling device as recited in claim 8, wherein a fixed portion of said vertical actuators are assembled to said module floor.

10. A goods handling device as recited in claim 8, wherein said door spans between the at least two vertical actuators when said door is in a closed position.
11. A goods handling device as recited in claim 8, said trailer floor perimeter further defined by a front edge located towards a front of a vehicle, a rear edge located towards a rear of the vehicle, and a pair of side edges spanning between said front edge and said rear edge; and
wherein said trailer floor perimeter edge portion of said platform periphery forms a continuous section of said side edge of said trailer floor.
12. A goods handling device as recited in claim 1, said trailer floor perimeter further defined by a front edge located towards a front of a vehicle, a rear edge located towards a rear of the vehicle, and a pair of side edges spanning between said front edge and said rear edge; and
wherein said trailer floor perimeter edge portion of said second moveable cargo platform periphery forms a continuous section of said side edge of said trailer floor.
13. A goods handling device as recited in claim 12,
wherein said trailer floor perimeter edge portion of said moveable cargo platform periphery forms a continuous section of said rear edge of said trailer floor.
14. A goods handling device as recited in claim 1, said trailer floor perimeter further defined by a front edge located towards a front of a vehicle, a rear edge located towards
a rear of the vehicle, and a pair of side edges spanning between said front edge and said rear edge; and
wherein said trailer floor perimeter edge portion of said moveable cargo platform periphery forms a continuous section of said rear edge of said trailer floor.
15. A goods handling device as recited in claim 1, wherein said door spans across the at least two vertical actuators located on opposing sides of said moveable cargo platform; and
further comprising a second door spanning across the second pair of vertical actuators located on opposing sides of said second moveable cargo platform.
16. A goods handling device as recited in claim 1, further comprising a rear impact protection having a pair of retractable members projecting downward to a position below said

moveable cargo platform and a cross member horizontally disposed between said pair of retractable members;

wherein said retractable members are spring biased allowing said cross member to remain stationary until the platform reaches the cross member, at which time, said moveable cargo platform and said cross member continue moving in a downward together.

FIG 1

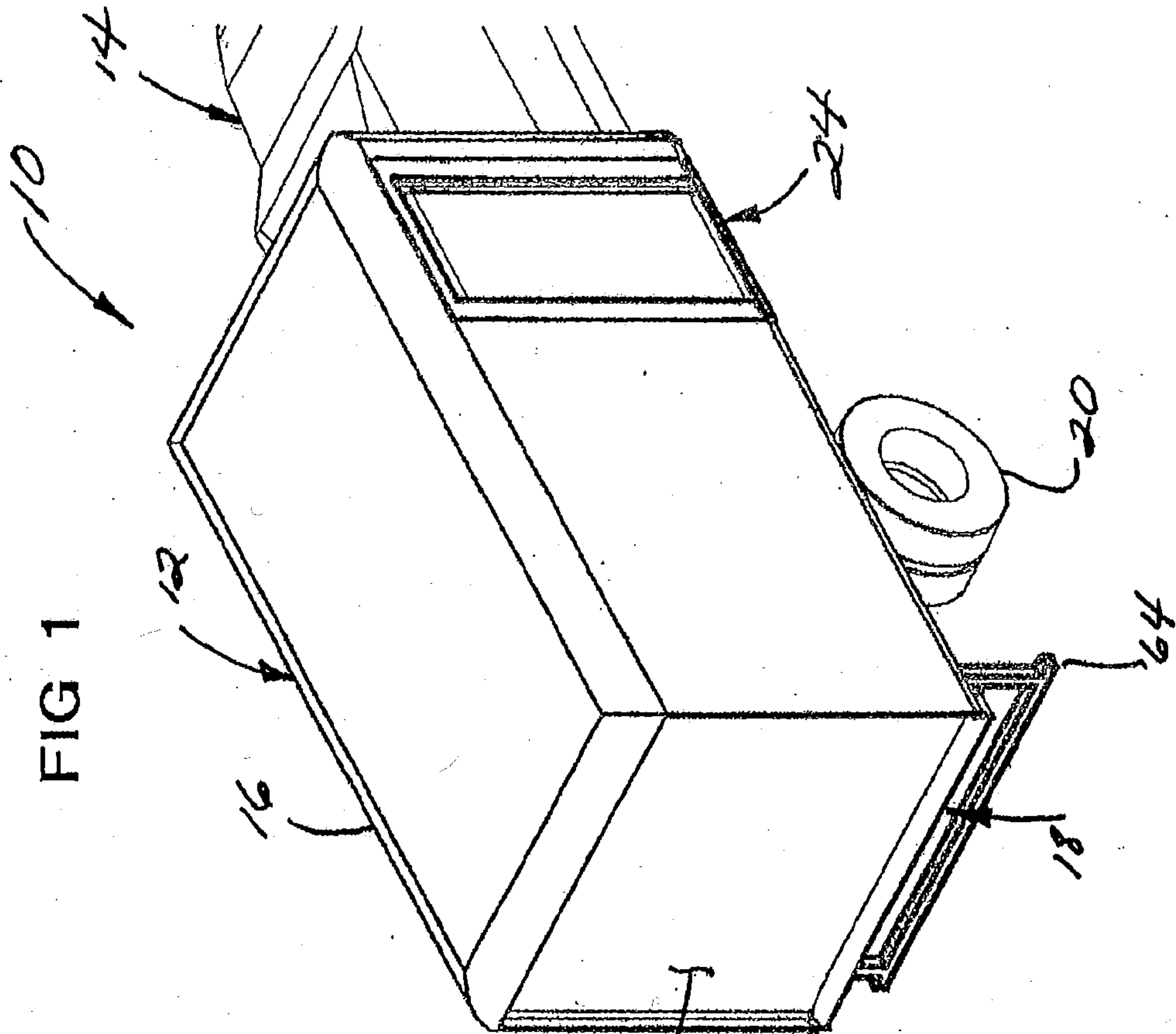


FIG 2

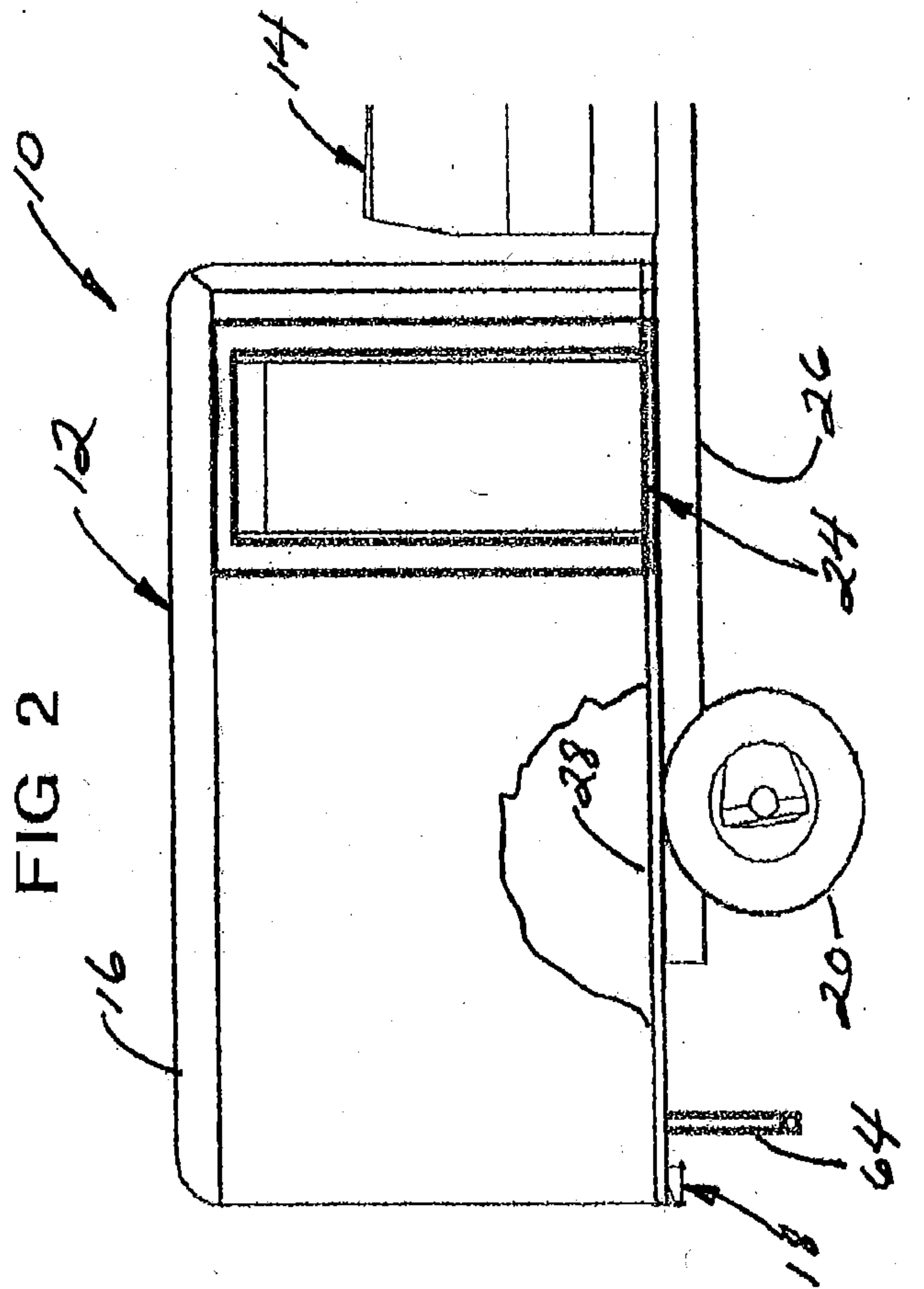
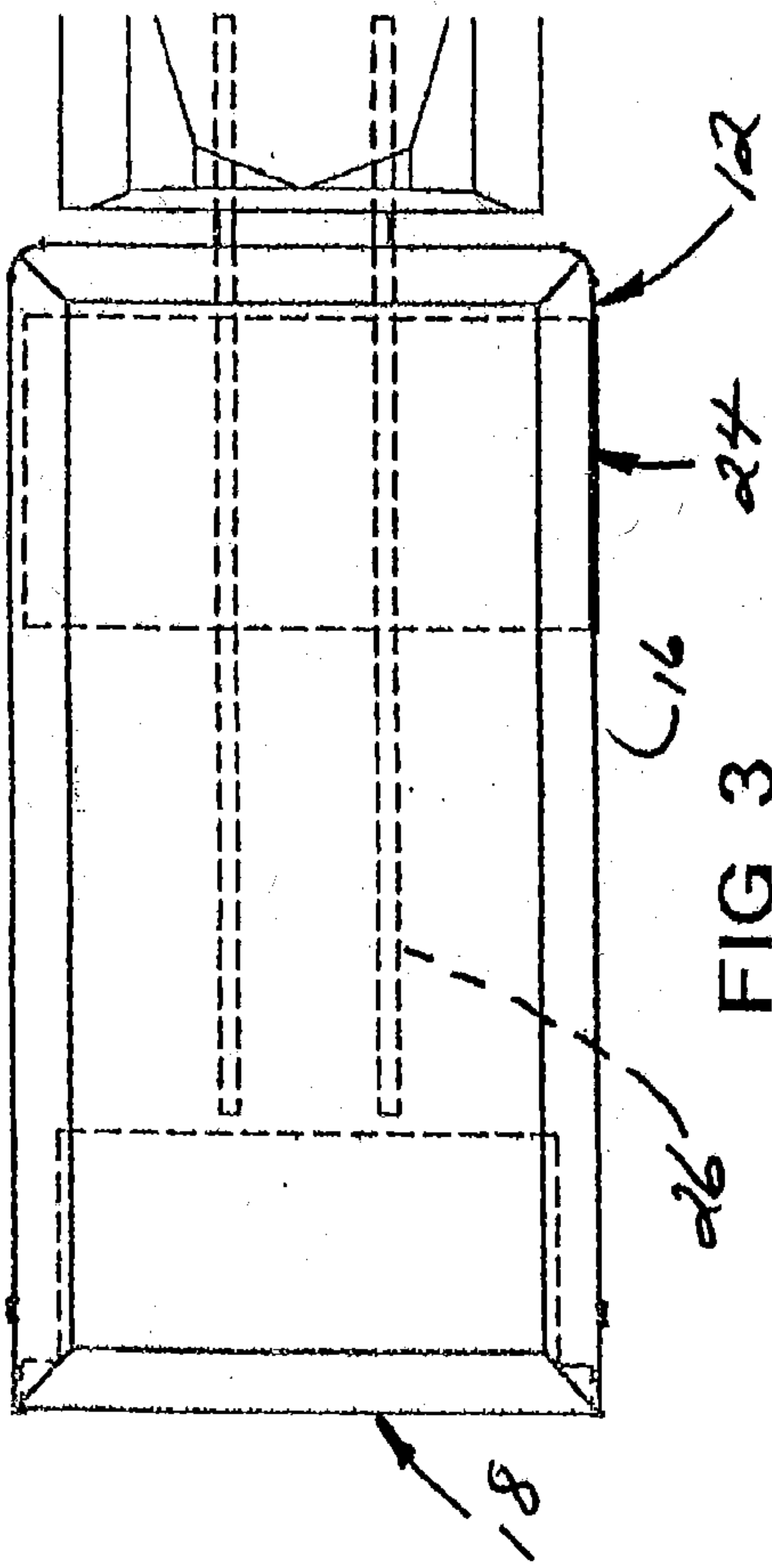


FIG 3



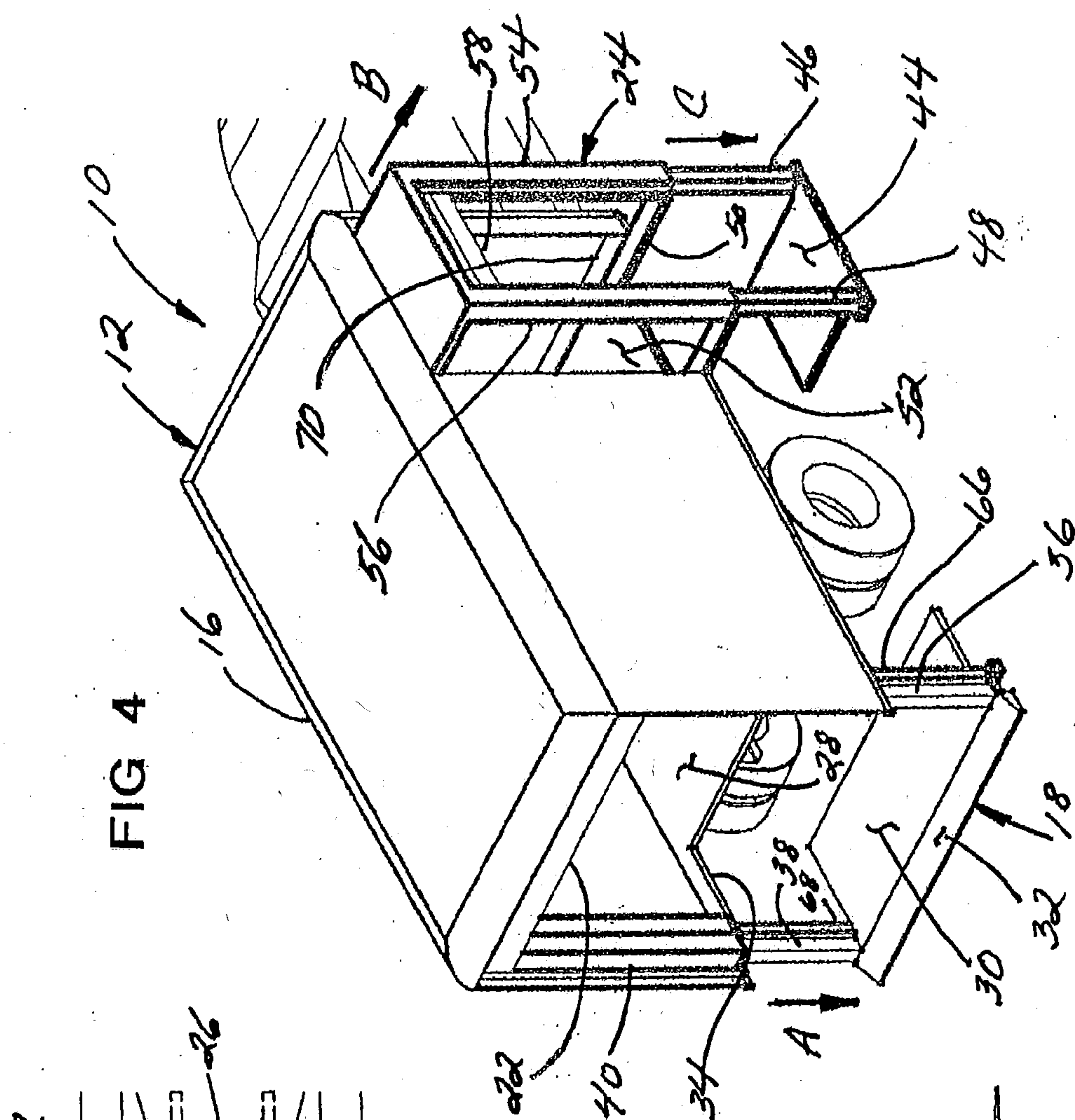


FIG 4

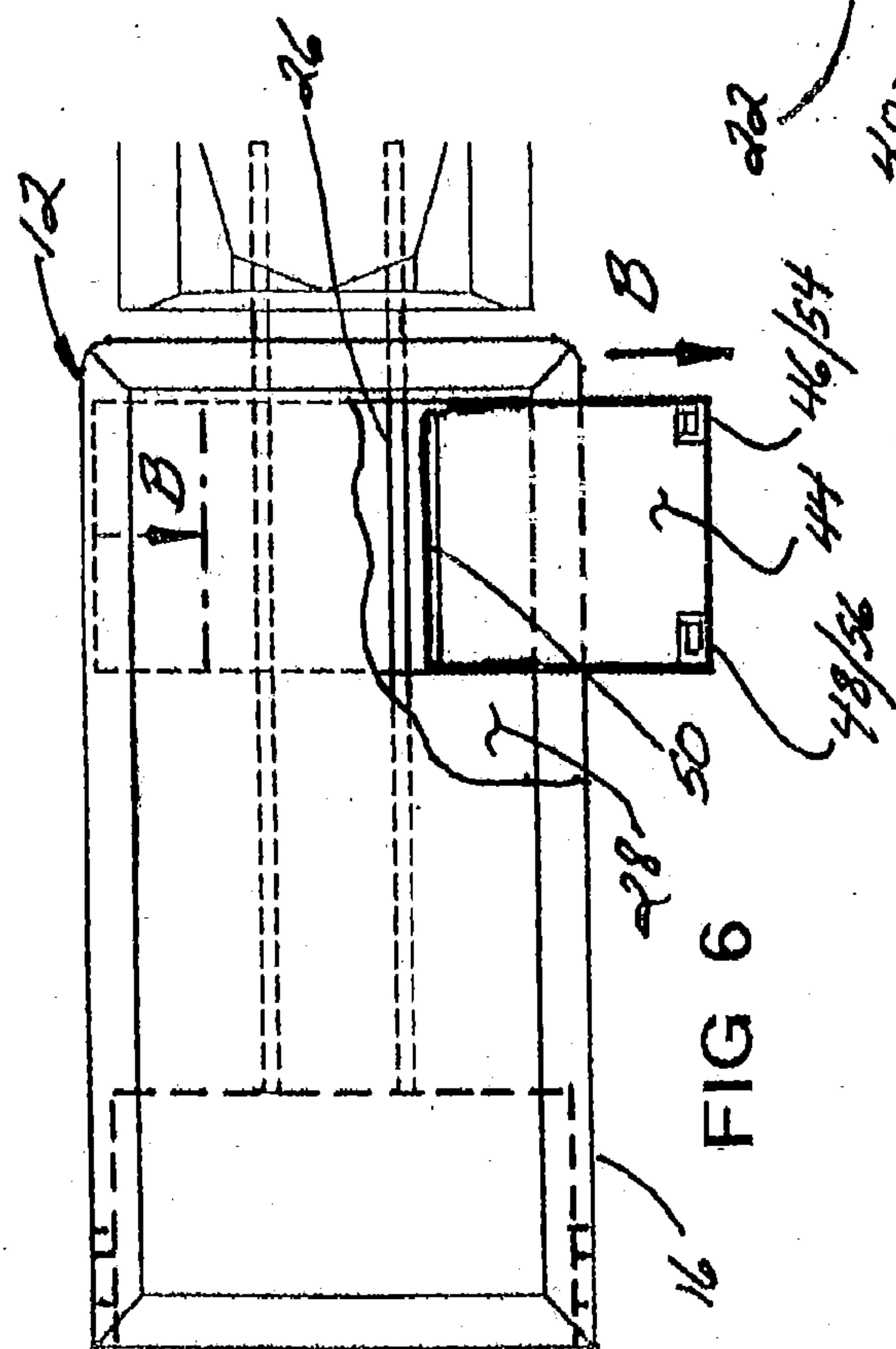
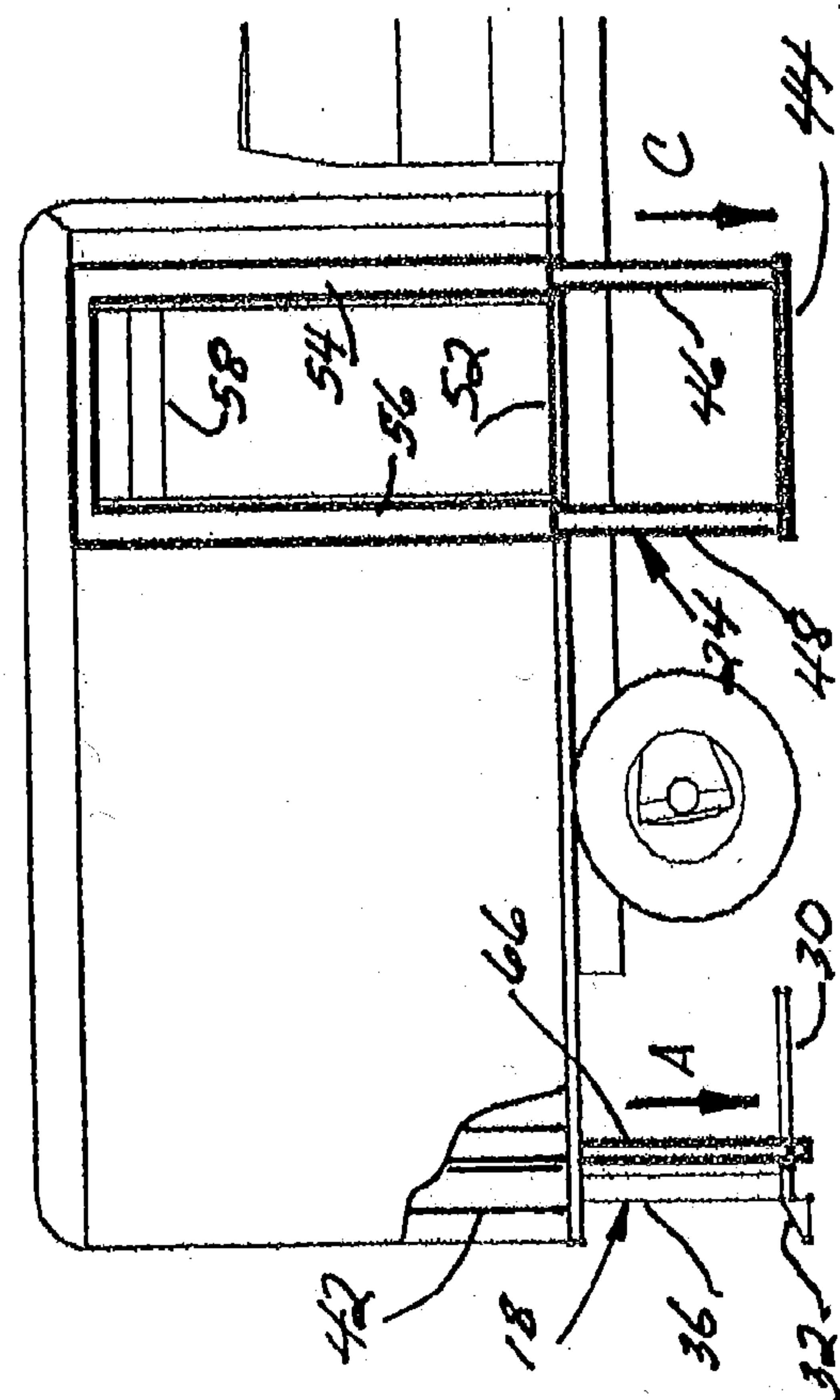
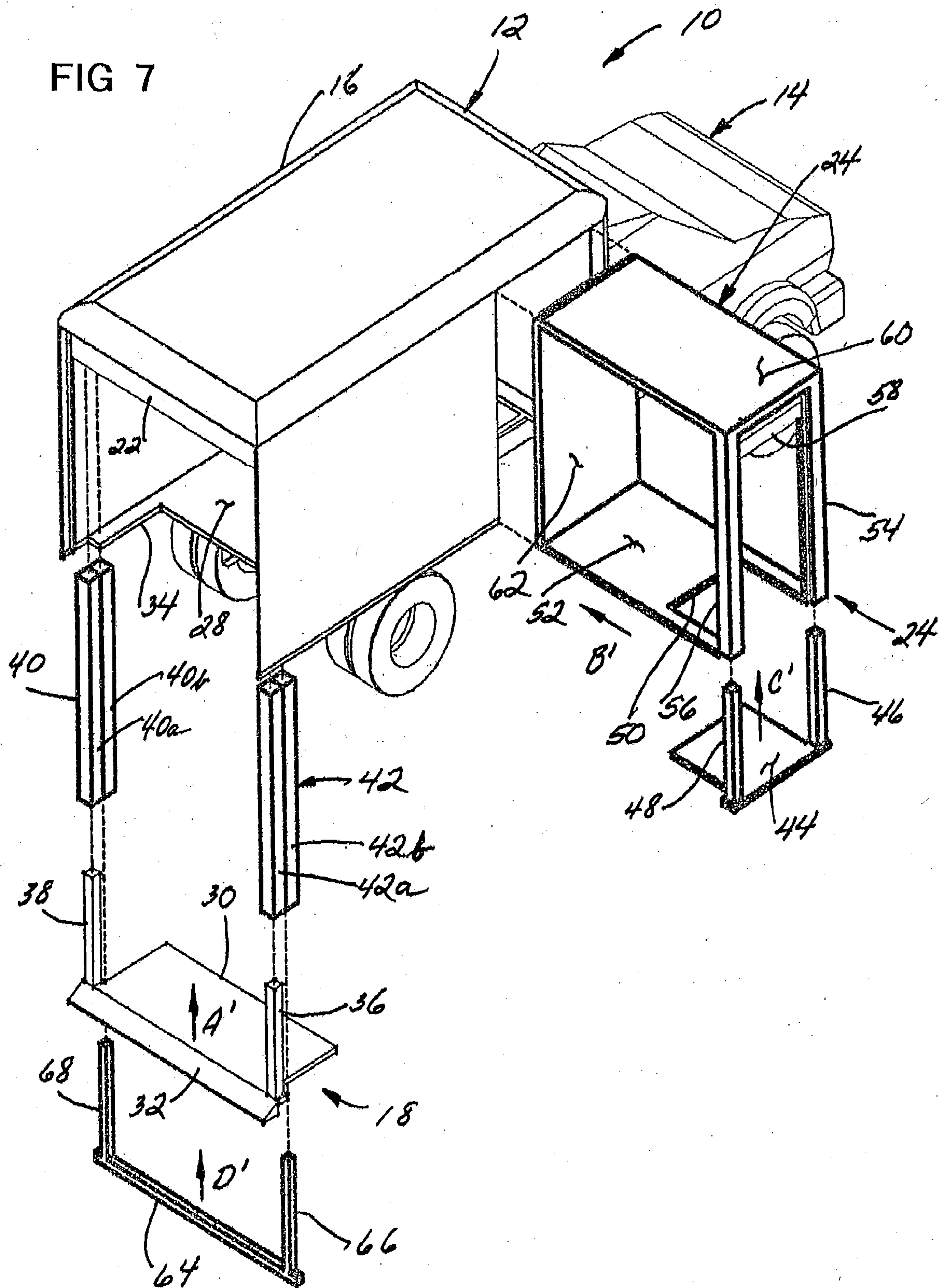
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66
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FIG 5

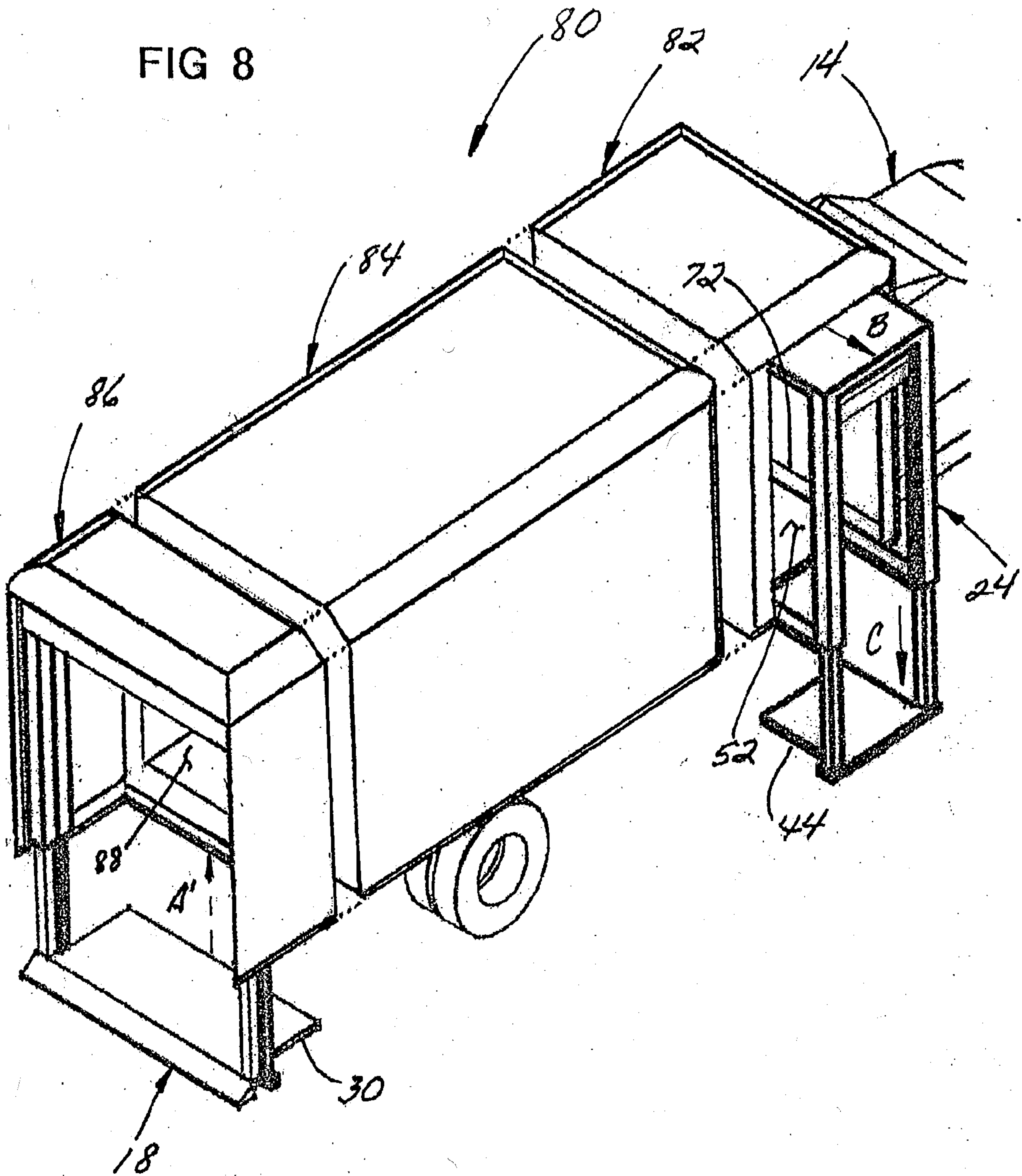
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FIG 7



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FIG 8



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