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[54] **VEHICLE MOUNTED LOADER FOR HANDLING CONCRETE CASTINGS**

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[51] **Int. Cl.** **B60p 1/48**

[58] **Field of Search** .... 214/77 R, 78, 80, 8, DIG. 3, 214/DIG. 4, DIG. 1, 1 P

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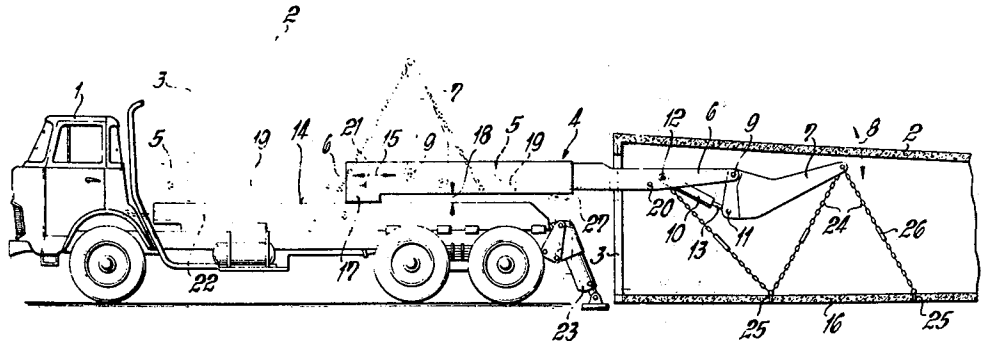
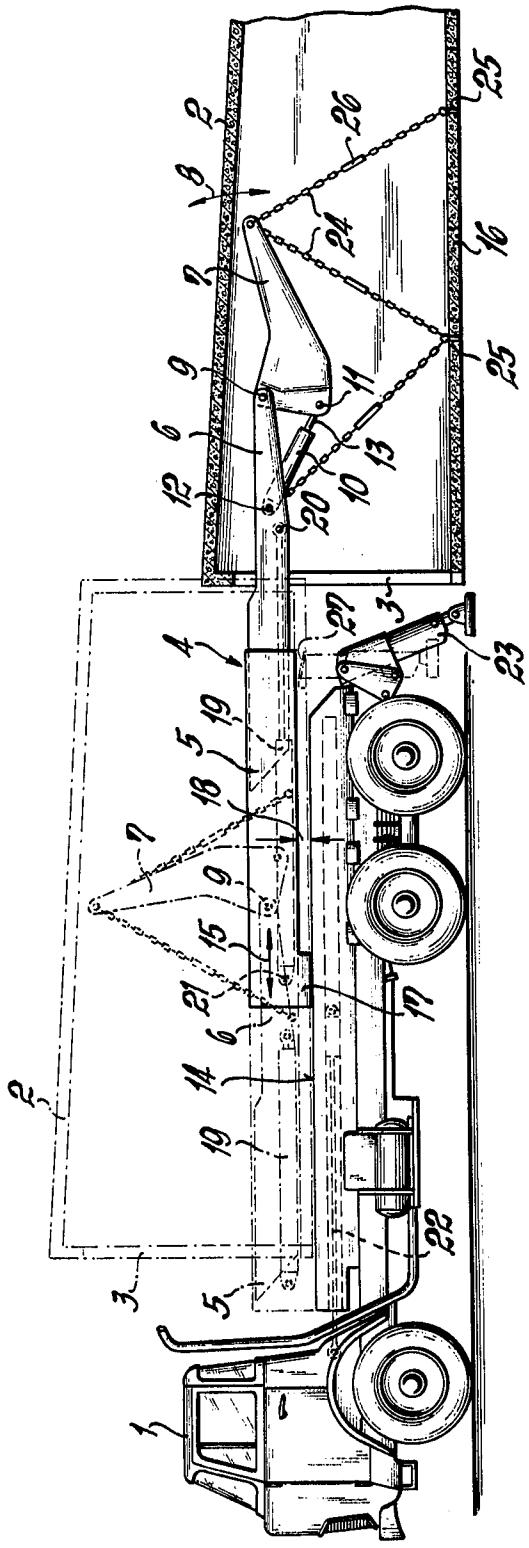
[57] **ABSTRACT**

A vehicle mounted loader for handling large concrete castings or the like, such as garages, mini-houses, etc. which are formed with at least one opening into which one longitudinal support member projects. Pivoted for vertical movement to the outer end of the support member is a lifting arm which is connected by cables or chains to the bottom of the casting. A fluid motor connecting the lifting arm and the support member enables rocking of the arm to a position at right angles to the support member, which telescopes with another support member on the vehicle. By a fluid motor the telescoping support members can be shifted relative to each other for moving the casting to and from transporting position on the vehicle. Other fluid motor means operates to actuate the telescoping support members as a unit along the vehicle. Foot bracing means for the vehicle is movable to a position to hold the casting in place during transportation.

2 Claims, 1 Drawing Figure

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VEHICLE MOUNTED LOADER FOR HANDLING CONCRETE CASTINGS

BACKGROUND AND SUMMARY OF THE INVENTION

The invention concerns a vehicle with loading equipment for large box-like containers having at least one opening, and especially concrete castings such as garages, mini-houses, dwelling cells, etc. Such equipment has a lifting arm capable of outward extension, like a telescope, especially in the longitudinal direction of the vehicle and which can swivel in a vertical plane. The lifting arm is provided at its free end with a supporting device capable of being inserted into the container, and the lifting device, which serves to swivel the lifter arm, is attached to the outermost telescoping member.

According to the invention, this vehicle is characterized by the fact that only one part of the outermost telescoping member of the lifting arm is capable of swiveling in a vertical direction. When the load is raised and lowered, the position of the telescoping arm remains unchanged, except for the swiveling part of the outermost telescoping member, thus improving the stability and reducing the tendency to tip to the side. The center of gravity of the lifting arm is essentially preserved, since only a small part of its vertical position, in terms of weight, is changed when the load is raised. Naturally, the same is true when the load is lowered. The fluid motor for the lifting process, except for the load being taken up, operates to swing upwardly only the weight of the lifting arm.

The lifting device is joined to the swiveling part of the outermost telescoping member on the one hand, and to the non-swiveling part of such telescoping member on the other hand. It consists of a cylinder with a reciprocable piston inside it. The relative displacement of the piston and cylinder can be carried out by means of compressed air. If a return movement is impossible through any forces or weight, a double-acting cylinder can be provided instead of a single-acting cylinder. Otherwise, it is of no consequence whether the piston moves with respect to the cylinder or vice versa.

Another feature of the invention is that the swiveling and nonswiveling parts of the outermost telescoping member in the take-up and release position of the outermost telescoping member are located roughly in an extension of one another. In the transporting position these parts are disposed at an angle, preferably at a right angle to one another, the swiveling part being actuated upwardly. The length of the swiveling part must be such that even when concrete boxes with a bottom are loaded, the latter will not move from below toward the non-swiveling part of the lifting arm when it is swung all the way up.

The telescoping member of the supporting arm are preferably capable of movement in a roughly horizontal direction rearwardly of the forward motion of the vehicle. In this position, the container is taken up or set down with the swiveling part in a roughly horizontal or a slightly downward sloping position. In this connection, it is of particular advantage for the telescoping arm to be capable of movement with respect to the vehicle in the longitudinal direction so that it is possible to achieve a certain extended position of the supporting device. In the present case, the telescoping member connected to the supporting device is designated as the outer member and that member closer to the operator's cabin, is designated as the inner member. The innermost telescoping member, due to its capability of longitudinal displacement with respect to the loading area of the vehicle, forms with the latter yet another telescoping unit.

Another feature of the invention is that only the innermost end of the innermost telescoping member bears against the vehicle or its loading area, and the preponderance of both this telescoping member as well as the other telescoping members located in the transporting position have a distance from the loading area of the vehicle corresponding at least to the thickness of a container bottom. The travel guide between the innermost telescoping member and the vehicle loading area is accordingly limited to the innermost end of the inner telescoping member. The reason for this is that the bottom of a raised or lifted container in the transporting position is arranged between the lifting arm and the loading area, and, if no other special measures are taken, the useful loading area is shortened by the length of the travel guide of the inner telescoping member. Total utilization of the loading area is achieved by slitting the bottom at this point so that it can engage the innermost end of the innermost telescoping member on the sides. If no bottom is present, these problems do not appear. In this case, for instance, an additional reinforcement device, e.g. rollers or the like, lying on the loading area can be provided on the outer end of the innermost telescoping member. Also conceivable is the arrangement of an accessory reinforcing device for the innermost telescoping member or another member with the bottom slit in the central longitudinal direction.

Since very high edge pressures must be dealt with, the innermost telescoping member is advantageously movably supported by means of tread rollers, track wheels, or the like on the vehicle. In the case of a small load, a sliding track can also be provided at this point. In another variant of the invention, the telescoping members are capable of movement relative to one another by means of slide bearing guides. In this respect, shackle elements can also be provided as in the case of a connection between the innermost telescoping member and the vehicle.

Another feature of the invention is that each telescoping member is capable of movement relative to its adjacent member and the innermost member relative to the vehicle by means of at least one fluid motor for each. As has already been explained, then an additional fluid motor is used to swivel the outermost end of the outer telescoping member.

In the case of a vehicle with at least one extendable supporting foot for bracing it on the bottom, another version of the invention is characterized by the fact that the supporting foot in the raised position is capable of being inserted or engaged in a hollow space of the container in the transporting position. With the result, the loaded container is secured against unintentional movement.

BRIEF DESCRIPTION OF THE DRAWING

The FIGURE is a side elevation of a motor truck equipped with a loading device for large concrete castings.

DESCRIPTION OF PREFERRED EMBODIMENT

The motor truck 1 serves for the transportion of fin-

ished garages of concrete castings **2**, from the factory to the subsequent location. On the front side of the castings **2** toward the vehicle, an opening **3** is provided through which a lifting arm **4** can be inserted to extend into the garage interior. This opening will subsequently receive the garage door.

The lifting arm **4** consists essentially of a member **5** and a telescoping member **6** which moves inside it. The telescoping member **6** consists of two parts, the outer lever part **7** which is capable of swiveling with respect to the inner part in the directions of the double arrow **8.** This outer lever part **7** is generally triangular in shape, and represents the actual lifting member. The swivel axis is denoted by **9** where the part **7** pivots to the end of the telescoping member **6.** The piston and cylinder assembly providing the fluid motor **10** is connected respectively to the part **7** and telescoping member **6** and its swiveling axes are denoted by **11** and **12.** Since the line connecting these two swivel axes is located at a distance below the swivel axis **9** of the two parts of the outer telescoping member, the outer lever part **7** swivels upwardly when the piston **13** of the fluid motor moves outwardly. This causes the casting to be lifted off the ground. Conversely, the casting can be lowered when the piston **13** moves inwardly.

The telescoping member **5** is capable of longitudinal movement with respect to a loading area **14** of the truck **1** in the directions of arrow **15.** The solid lines indicate the re-set position and the broken lines indicate the transporting position of this telescoping member. The same is true of the casting **2** and the other moving or swiveling elements. In the pick-up or release position, the two parts of the outer telescoping member **6** are roughly located in the same line, while in the transporting position, they form roughly a right angle.

Since the garage bottom is indicated at **16** and is located in the transporting position between the telescoped members **5** and **6** and the loading area **14,** these parts must be spaced a certain distance from one another. For this reason, only the innermost end of the telescoping member **5** rests on the vehicle, while the predominant part has the above-mentioned distance **18,** thus forming a gap. If the latter is slightly larger than the thickness of the garage bottom **16,** this is adequate.

In a manner not illustrated, the movable connection between the telescoping member **5,** more precisely the innermost end of **17** of this telescoping member, and the loading area is achieved by means of rolling wheels or rollers and corresponding guard rails. The latter must be so designed that they are capable of absorbing upwardly directed forces occurring when the load is raised. If this involves the loading area, this need not necessarily mean that a flat surface such as is customary on trucks is provided, but rather the garage can be set down on supporting rails, brackets, or the like. The expression "loading area" should therefore be understood in the broad sense and includes the vehicle bed.

Between the two telescoping members **5** and **6,** sliding guides (not shown) are provided. Their mutual displacement is brought about by means of a fluid motor **19,** the piston of which is connected at a point **20** to the telescoping member **6,** while the cylinder thereof and the telescoping member **5** are connected at a point **21.** The longitudinal displacement of the telescoping member **5** with respect to the vehicle **1** is achieved by means of the fluid motor **22** whose one end is attached to the vehicle, and whose other end is attached to the telescoping member **5.**

The loading of the concrete casting, such as the garage **2,** takes place as follows: first, the outer lever part **7** of the outer telescoping member **6** is brought into a roughly horizontal position. Then the telescoping member **6** and the entire extending arm are moved rearwardly. Before or after this, two bracing feet **23** mounted on the rear end of the vehicle are extended in order to secure the vehicle against tipping and to take the load off the axles and wheels. The vehicle was first brought as close as possible to the garage and placed in a line with it. After the above-named operating steps have been carried out, the supporting device, which can consist of ropes or chains **24,** is located roughly in the center of the casting so that the latter can be picked up without risk of tipping. Fastening elements **25** are installed at the bottom of the casting to which the chains are fastened. Sleeves may be cast in concrete in the bottom in which the books or rings can be placed. Cable joints **26** or the like are used to tighten the chains. Now the outer lever part **7** is swiveled upwardly, the members **5** and **6** telescoped, and the lever part **7** rocked toward the vehicle cab. The casting can then be lowered somewhat in order to position it exactly on the vehicle. The two bracing feet **23** are then raised from the ground and moved upwardly, their upper ends engaging hollow spaces **27** in the bottom of the castings. This affords security against unintentional movement during transportation. The unloading takes place in the same manner in reverse order. The casting **2** is slotted on its end facing the cab, so that it can be brought even closer to the cab, and in this way the loading area can be fully utilized.

What I claim is:

1. Vehicle mounted loader for handling concrete casting or the like provided with at least one opening and a hollow interior comprising a first support member adapted to be mounted on a vehicle for longitudinal shifting movement for extending inside the casting, a lifting device pivoted at one end to a free end of said first support member for rocking movements in a vertical plane and adapted to project into a casting through said opening to lift and lower the casting in the same horizontal position, means for connecting the other end of said lifting device to the lower portion of the casting, power means between said lifting device and said support member for effecting rocking movement of said device for lifting and lowering the casting to and from transporting position, a second support mounted on the vehicle inside of which said first support member telescopes, a vehicle loading area engaging portion on the forward end portion of said second support member, the remainder of said second support member extending rearwardly of said vehicle engaging portion and being spaced vertically from the vehicle loading area a space approximating the thickness of the casting so that the same can be positioned between the said second support member and the loading area, power means for longitudinally shifting said first support member relative to said second support member, and power means for longitudinally shifting both support members.

2. Vehicle loader as claimed in claim **1,** comprising extendable bracing foot means for the vehicle, and casting engaging means on said foot means operable when in retracted position away from bracing position to engage the casting for militating against unintentional movement of the casting during transportation.

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