

Oct. 24, 1944.

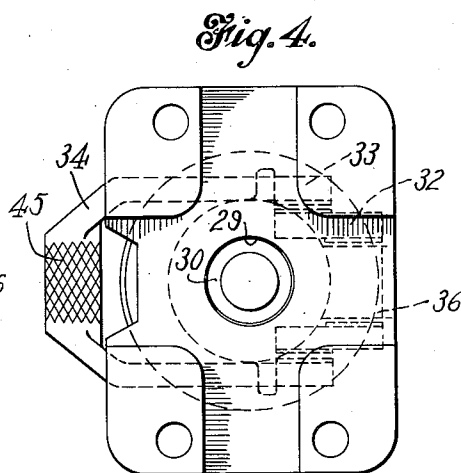
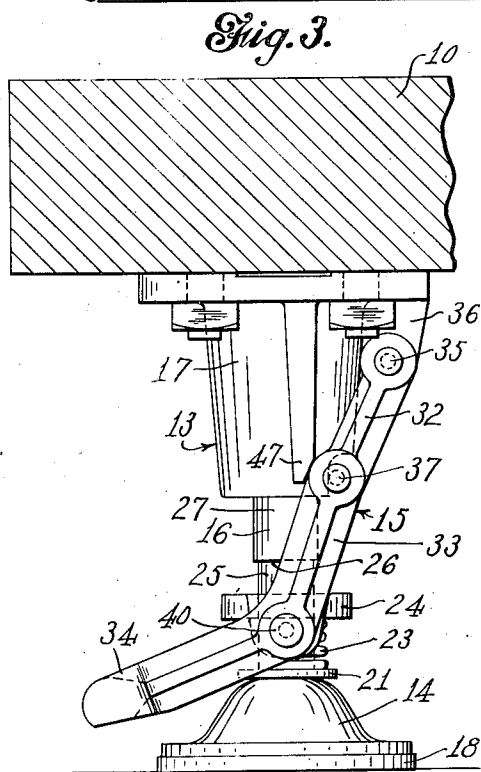
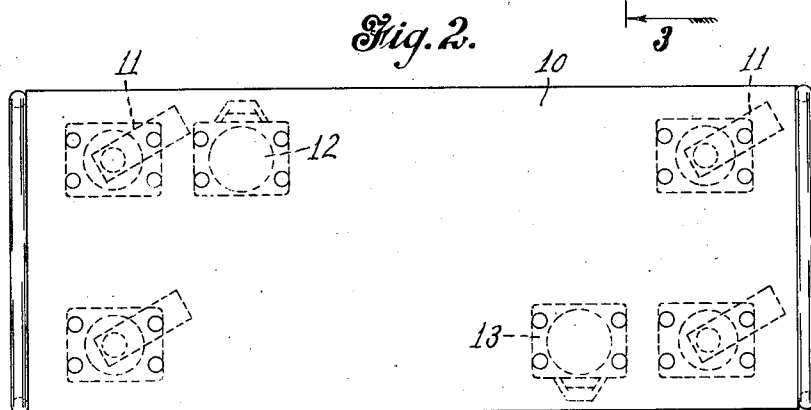
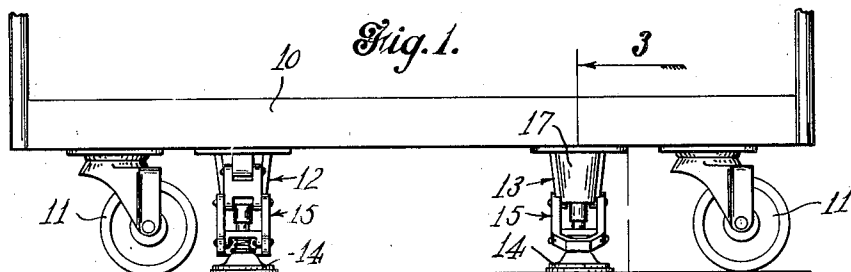
W. F. HEROLD

2,360,874

INDUSTRIAL TRUCK

Filed May 4, 1942

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 5.

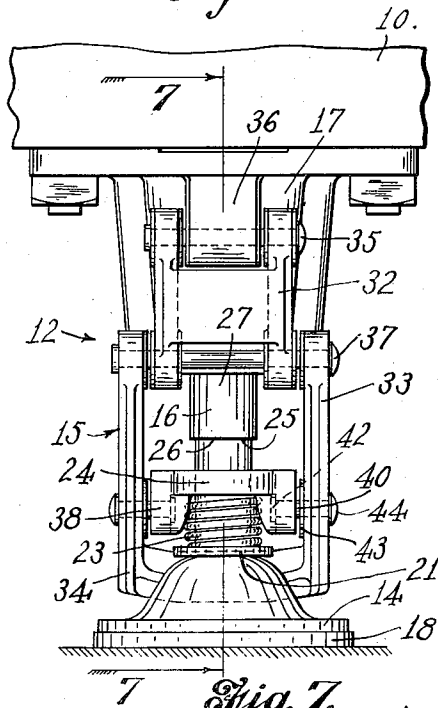


Fig. 6.

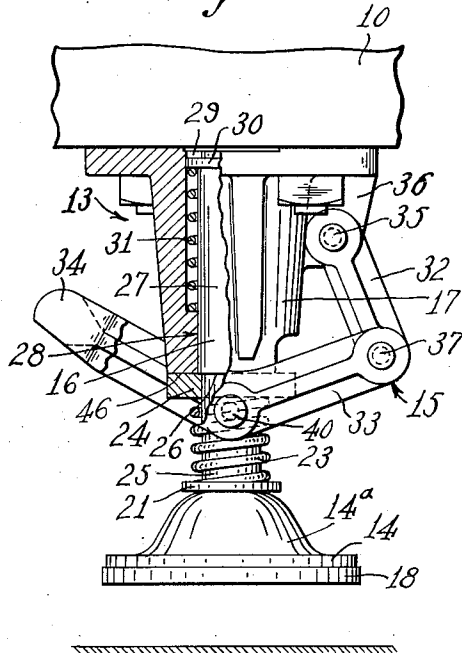


Fig. 7.

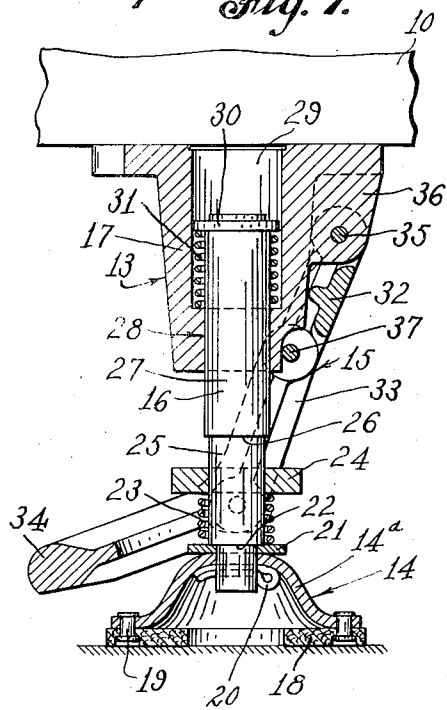


Fig. 8.

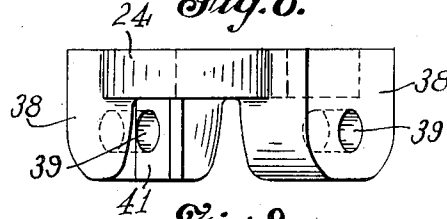
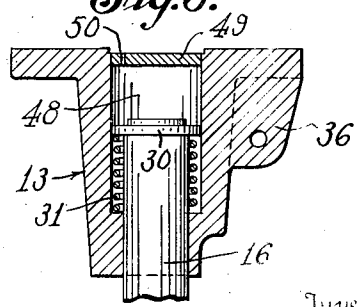


Fig. 9.



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UNITED STATES PATENT OFFICE

2,360,874

INDUSTRIAL TRUCK

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Application May 4, 1942, Serial No. 441,621

21 Claims. (Cl. 188—5)

In industrial trucks used in factories and similar places for carrying loads of various kinds from one place to another, it is frequently desirable to have means for anchoring and stabilizing the truck, for example, during loading or unloading, so that it will not be shifted out of place. Devices have been provided for this purpose having foot-like members movable downwardly to engage the floor with a frictional contact. However, prior devices have been open to a number of objections which have prevented their giving satisfaction in use. Among such objections was the fact that the foot-like member was customarily located where it was likely to strike projections such as door sills and the like as the truck moved over the floor. Also, hand-operated means for adjusting the height of the foot members was supplied, and this was so arranged and located as to interfere with access to the upper or load-carrying part of the truck.

One of the objects of my invention is to overcome the drawbacks and disadvantages of previous floor-engaging anchoring and stabilizing devices.

Another object is to provide an improved floor-engaging or holding device located wholly below the body of the truck and capable of very convenient operation, as by means of the foot of the person operating the truck.

Another object is to provide a device of this character which can be located under the body of the truck remotely from the corners thereof and in a position in which it does not project substantially in a lateral direction beyond the lines of the truck and which, nevertheless, is very conveniently operable and also has a very effective and secure holding action.

To these and other ends, the invention consists in the novel features and combinations of parts to be hereinafter described and claimed.

In the accompanying drawings:

Fig. 1 is a side elevation, partly broken away, of an industrial truck embodying my improvements;

Fig. 2 is a top plan view of the truck shown in Fig. 1, the positions of the supporting casters and the floor-engaging anchoring devices being indicated in dotted lines;

Fig. 3 is a detail section on line 3—3 of Fig. 1, showing one of the floor-engaging devices in position for holding or anchoring the truck;

Fig. 4 is a top view of one of the floor-engaging devices removed from the body of the truck;

Fig. 5 shows, on a larger scale, the floor-engaging device appearing at the left of Fig. 1;

Fig. 6 is a view somewhat similar to Fig. 3, but partly broken away, showing the upper or disengaging position of the foot member;

Fig. 7 is a section on line 7—7 of Fig. 5;

Fig. 8 is a detail edge view of the sliding collar operable by the toggle levers; and

Fig. 9 is a fragmentary sectional view illustrating a slight modification of the structure shown in the other figures.

In Figs. 1 and 2, I have shown a truck having a body 10 running gear such as commonly found in industrial trucks used in factories and like places for transporting goods of different kinds. The body 10 is supported on wheels or casters 11 of any appropriate character, supporting it at a relatively small distance from the floor. In the form shown, the rolling supporting members 11 are constituted by swivel casters arranged near the four corners of the body.

In respect to the improved anchoring or stabilizing devices of this invention, it may be said that while I do not limit myself to the use of any particular number of such devices used in association with the truck, I prefer to employ two anchoring devices in most instances. These anchoring devices have in this particular instance the arrangement shown in Figs. 1 and 2, there being an anchoring device 12 at one side of the truck and a second anchoring device 13 of identical construction at the opposite side, the two devices preferably having the relation shown in the drawings. In this arrangement, the device 12 is located in proximity to one of the corner casters at one side of the truck, and the device 13 has a similar arrangement with respect to the diagonally-disposed corner caster.

These anchoring devices 12 and 13 are constructed and arranged for operation by means of the foot of the person operating the truck, for which purpose a suitable pedal member is provided, as hereinafter described. Each anchoring device is attached to the body of the truck at the under portion, near one of the side edges of the truck, and the operating means for the anchoring device is located adjacent that side edge, so that the mechanism can be very conveniently operated by the person's foot. Each anchoring device has an upwardly-movable floor-engaging member or foot, and the operating mechanism for the foot is of the lever type and has two definite positions, one of which is the floor-engaging position in which the truck is

anchored against movement, the other position being the inoperative position in which the foot is elevated from the floor at a definite upward spacing.

In the drawings, the floor-engaging foot member is shown at 14 and the lever mechanism for operating the same is shown at 15. The member 14 is attached to the lower end portion of a vertically-movable rod or plunger 16, the upper end of which is guided in a socketed housing 17 attached in any suitable manner, as by bolts, screws, or the like, to the under surface of the body 10.

Referring now to the details, it will be seen that the foot member 14 shown has a metal body in the form of an inverted cup 14^a, which cup carries a suitable element for frictionally engaging the floor. The floor-engaging element in this instance is formed of a disk-like body 18 of brake-lining material or the like which may be secured to member 14^a by means such as the rivets 19. The lower end of the rod or plunger 16 is somewhat reduced, and extended into an opening in member 14^a, and secured in said member in a suitable manner as by means of a cotter pin 20. At the upper surface of the foot member 14, a washer 21 surrounding the plunger is held in place against a shoulder 22 formed on the plunger. Above washer 21 a helical spring 23 surrounds the plunger and is adapted to be compressed against the washer 21 by means of a collar 24 operable by lever mechanism 15. This collar 24 is arranged to slide up and down on a cylindrical portion 25 of the plunger, which portion 25 extends from washer 21 to an upper shoulder 26 formed on the plunger.

Above the portion 25 of the plunger, the latter is provided with a larger-diametered cylindrical portion 27 which engages an opening 28 in the lower part of the housing 17. The upper part of the plunger extends into a cylindrical socket 29 in the housing. The upper end portion of the plunger is provided with a laterally-extending integral collar 30, and a helical spring 31 is arranged around the plunger between the collar 30 and the bottom of the socket 29. The spring 31 is an expansion spring and its tendency is to hold the plunger in the raised position shown in Fig. 6.

The lever mechanism for operating the foot member is in the nature of a toggle device adapted to be operated by a person's foot, and in the present instance, the toggle device comprises an upper lever pivoted to and depending from the housing 17, and a second lever pivoted to the lower end of the first and provided with a pedal extension readily accessible at the side of the truck. The upper lever of the toggle is shown at 32, the lower lever at 33, and the pedal extension of lever 33 at 34. Lever 32 is of generally H-shape and at its upper end is pivoted by means of a pin 35 to a lug 36 on the housing. Lever 33, with its pedal extension 34, is generally of U-shape, the pedal extension 34 being at the connecting part of the U. The open end of the U-part is pivoted by means of a pin 37 to the lower end of lever 32. The pedal extension 34 is preferably offset from the plane of lever 33 at a slight angle, as shown. At the junction of lever 33 with the pedal extension 34, connection of the lever system is made to the plunger and its attached parts.

The collar member 24, previously mentioned, is disposed within the open part of the lever member 33, 34 and is provided at the sides with

lugs 38. These lugs 38 provide means for connecting the collar to the lever mechanism, for each lug 38 is provided with a lateral hole 39 receiving a pin 40 extending through a side member of lever 33, 34 and providing a pivot member connected to the collar. In the case shown, each of the lugs 38 is provided at its inner face with a recess 41 receiving a head 42 at the inner end of the corresponding pin 40. Between the outer face of each lug 38 and the inner face of the associated lever leg or branch is a washer 43, and the pin passes through this washer and through the associated lever leg, and at the outer face of the lever leg is upset or riveted over as indicated at 44 to complete a pivotal connection between the lower toggle lever and the collar.

The upper surface of the pedal extension 34, adjacent the free extremity of the extension, is suitably roughened, preferably as shown at 45 in Fig. 4, so that a person's foot can be engaged therewith without slipping.

It will be seen that in the "off" or disengaged position of the anchoring device, shown in Fig. 6, the lower surface of the foot member 14 will be spaced upwardly from the floor at a certain definite distance. The spring 31 in the upper socket acting on the plunger or stem urges it in an upward direction, and upward movement of the plunger is arrested by the upper surface of collar 24 coming against the lower surface of the socketed part of the housing, as indicated at 46 in Fig. 6. The spring 23 is in the normal or expanded condition.

In order to move the foot member to the engaged position, the operator's foot is pressed down on the free extremity of the pedal extension, which is readily accessible for the purpose at the side of the truck, and the lever mechanism is thereby operated to carry the foot member 14 to the floor-engaging position. As the toggle mechanism is moved, the first effect is to move collar 24 downward by means of the pins carried by the lower toggle lever. This causes the lower spring 23 to be moved downwardly ahead of collar 24, and spring 23, being engaged with the upper part of foot member 14, moves the foot member downwardly. At a later stage of this movement, the lower surface of the foot member engages the floor. Upon further downward movement of the pedal extension, the spring 23 is compressed, the foot member being restrained against further downward movement and the collar member 24 moving down away from the shoulder 26. Finally, as the spring 23 is further compressed, the toggle members 33 and 32 become aligned with each other and snap beyond the center line to lock the toggle in the position shown in Figs. 3 and 7. In this position, the toggle is stopped by coming into contact with stop member 47 provided on the sides of the housing and having lower end portions adapted to be contacted by the upper end portions of lever member 33. At this stage, the foot member 14 is held against the floor with a certain definite pressure corresponding to the strength of spring 23 and the compression thereof which has taken place. By this means, a very satisfactory frictional engagement between the foot member and the floor can be provided, the spring 23 being of proper strength and being compressed to a proper degree for the purpose in view. This frictional or yielding engagement between the foot member and the floor is provided notwithstanding the fact that the lever mechanism

which is employed for operation of the device has a positive lock in its engaged position.

In order to release the anchoring device, it is simply necessary to introduce the toe beneath the pedal extension so as to lift the latter and move the toggle lever to the release point. As soon as the release point is reached, the lower spring is expanded to raise the collar and the upper spring is expanded to raise the plunger from the upper end. When the release point is reached, the moving parts are carried by a practically instantaneous action into the position shown in Fig. 6.

It will be understood that when the anchoring device is placed in the operative position, the foot member will be thrust against the floor with sufficient force to transfer the greater part of the load at that side of the truck from the supporting casters to the anchoring device, so that the weight of the truck and its contents is sustained from the anchoring device, the latter being frictionally engaged with the floor and effectively held against lateral movement, whereby the truck itself is firmly anchored and stabilized. The weight is taken off the casters at that side of the truck, but usually the downward movement of the foot member 14 is of such extent that the casters remain in light contact with the floor. Substantially the same operation takes place at the other side of the truck when the foot member at that side is caused to make contact with the floor, and the effect of the two anchoring devices will be to support the truck firmly independently of the casters or wheels and prevent any shifting movement in a horizontal plane.

In Fig. 9, I have shown a modification of the structure in which the housing 17 is provided with a dashpot for cushioning the upward movement of the plunger and its attached parts when the holding device is released. In this case, the upper end portion of the plunger operates in a socket 48, the upper end of which is covered over by a member 49 having a small air-escape opening 50 therein. There is thus provided an air chamber from which the air escapes slowly through the opening 50 as the plunger moves upwardly, so as to cushion, and thereby slow, the upward stroke of the plunger.

It will be understood that when the anchoring devices are placed on the truck in the manner shown in Figs. 1 and 2, they will not project laterally beyond the lines of the truck and they will at no time be in a position to strike a door sill or the like before the latter is reached by one of the casters. In other words, one of the casters first engages the sill or projection so as to lift the truck, the associated anchoring device being in following rather than in leading relation to such caster. Thus, any interference with the progress of the truck is minimized. Further, it is to be noted that as the anchoring devices are located wholly below the body or bed of the truck or vehicle, they do not in any way interfere with the load carried by the vehicle body. Also, there is in practice no difficulty arising from the dragging of the foot members on or along the floor, because for practical purposes each foot member has only two positions, one of which is the "off" position in which there is a definite and sufficient spacing from the floor for clearance purposes, and the other of which is the "on" position in which the foot member is sufficiently engaged with the floor to sustain a large part of the truck weight.

The improved anchoring devices are of great

utility in holding and stabilizing industrial trucks while loading or unloading is going on or while other operations are being carried out. In some cases, movable platforms are used in factories, on which workmen may stand for doing work on airplane structures and the like, and these movable platforms can be effectively held in position by the use of anchoring devices such as herein described.

Various changes in the organization of parts and in the details of the structure can be obviously be made without departing from the principles of my invention or the scope of the claims.

What I claim is:

1. An anchoring device for industrial trucks and the like, comprising a housing adapted to be fastened to the underneath portion of the truck body and having a socket therein, a plunger having an upper portion moving in said socket, a spring in said socket acting against the plunger and tending to hold the plunger in a raised position, the lower portion of the plunger being disposed outside of said socket, a foot member carried by the lower end portion of the plunger, a spring surrounding the plunger above the foot member and adapted to exert pressure on the foot member in the direction of the floor as said spring is compressed from above, a collar loosely surrounding the plunger above said spring and adapted to compress the same, and a toggle structure connected to said collar and to said housing and having a pedal extension whereby the device may be actuated by a person's foot to cause the foot member to be pressed against the floor or raised clear of the floor.

2. An anchoring device for industrial trucks or the like, comprising a housing adapted to be fastened to the underneath portion of the truck body and having a socket therein, a plunger having an upper portion moving in said socket in an upward and downward direction, a spring in said socket acting against the plunger and tending to hold it in a raised position, the lower portion of the plunger being disposed outside of the socket, a foot member attached to the lower end portion of the plunger, a toggle structure having upper and lower portions of which the upper is attached pivotally to said housing, and cushioned means of connection between the lower portion of said toggle structure and the structure comprising the plunger and foot member.

3. An anchoring device for industrial trucks or the like, comprising a housing adapted to be fastened to the underneath portion of the truck body and having therein a substantially vertical guide, a plunger having an upper portion moving in said guide and a lower portion disposed exteriorly of the housing and carrying a foot member engageable with a supporting surface, means urging said plunger toward a raised position, a spring surrounding the plunger above the foot member and adapted to exert pressure against the foot member in a downward direction as the spring is compressed from above, a member loosely surrounding the plunger above said spring and adapted to compress the same, and a toggle structure connected to said last-named member and to said housing and adapted on straightening to compress the spring and move the foot member downwardly.

4. An anchoring device for industrial trucks and the like, comprising a plunger movable substantially vertically and carrying at its lower end a foot member adapted to engage a supporting

surface, a spring surrounding the plunger and adapted to press the foot member against the supporting surface, and operating means for the structure including the plunger and foot member, said operating means comprising a collar loosely embracing the plunger above the said spring and adapted to compress the spring from above.

5. An anchoring device for industrial trucks and the like, comprising a plunger movable substantially vertically and carrying at its lower end a foot member adapted to engage a supporting surface, a spring surrounding the plunger and adapted to press the foot member against the supporting surface, and operating means for the structure including the plunger and foot member, said operating means comprising a collar loosely embracing the plunger above the said spring and adapted to compress the spring from above, said operating means also comprising a toggle structure having a swinging lower portion connected to the collar and a swinging upper portion fixedly supported.

6. An anchoring device such as described, comprising a movable member having a substantially vertical stem carrying at its lower end a foot member engageable with a supporting surface, means for guiding said movable member for substantially vertical rectilinear movement, a spring adapted to be compressed from above for pressing the foot member against the supporting surface, and means operable from the side of the vehicle by the foot of the operator for compressing said spring comprising a toggle having a downwardly movable lower member operable to press down on the spring and a fixedly supported upper member, said toggle being movable to an over-center position for locking said movable member in position.

7. An anchoring device such as described, comprising a movable member including a vertically guided stem and an associated foot member engageable with a supporting surface, said foot member being mounted at the lower end of said stem, a spring surrounding the stem and engaging the foot member from above so that when compressed from above it presses the foot member against the supporting surface, and operating means in embracing relation to the stem and located above the spring and movable downwardly to compress it.

8. An anchoring device comprising a foot member engageable with a lower supporting surface, a stem carrying said foot member and extending upwardly therefrom, means guiding the stem for up-and-down movement, a spring surrounding the stem and arranged so that when compressed from above it acts against the foot member and presses it downwardly toward the supporting surface, a member loosely embracing the stem above the spring and adapted on downward movement to compress the spring, and an operating lever system having an element pivotally connected to said member.

9. An anchoring device such as described, comprising a movable member having a lower foot and an upwardly extending stem attached thereto, means for guiding the stem for up-and-down movement, an operating toggle including upper and lower members pivoted together, means for pivotally supporting the upper end of the upper member of the toggle so that on breaking the toggle the lower portion of the lower member thereof is raised, cushioned means of connection between said last-named portion and said mov-

able member, and a rigid extension on the lower toggle member whereby the toggle can be operated by the foot of the operator.

10. In an anchoring device such as described, the combination of a toggle having an upper member and a lower member pivoted together at their ends, means for supporting the upper member in fixed pivotal relation to the underneath portion of a truck body, a substantially vertically and rectilinearly guided supporting member for supporting the truck body from a lower supporting surface having lost-motion cushioned support from the lower member of said toggle at a point below the pivotal connection between the members of the toggle, and foot operable operating means for the toggle connected to the lower toggle member.

11. An anchoring device such as described, comprising a toggle including upper and lower members pivoted together at their adjacent ends, the lower member having two portions extending at an obtuse angle to each other whereby one of said portions is adapted to act as a pedal extension, means for pivoting the upper end of the upper toggle member in fixed pivotal relation to the underneath portion of a truck body, a movable supporting element adapted to support the truck body from a lower supporting surface having a cushioned lost-motion connection with the lower member of the toggle adjacent the apex of the above-mentioned obtuse angle, and means at the under portion of the truck body for guiding the upper portion of said movable element for vertical movement.

12. An anchoring device such as described, comprising a toggle including upper and lower members pivoted together at their adjacent ends, the lower member having two portions extending at an obtuse angle to each other whereby one of said portions is adapted to act as a pedal extension, means for pivoting the upper end of the upper toggle member in fixed pivotal relation to the underneath portion of a truck body, a movable supporting element adapted to support the truck body from a lower supporting surface having a cushioned lost-motion connection with the lower member of the toggle adjacent the apex of the above-mentioned obtuse angle, and means at the under portion of the truck body for guiding the upper portion of said movable element for vertical movement, said guide means having an externally disposed stop engageable by the intermediate portion of the toggle.

13. An anchoring device comprising a socketed housing having flange means for securing it to the underneath portion of a truck body, a plunger having an upper end entered into the socket of said housing and movable therein in a vertical direction, the lower end of said plunger being exteriorly disposed and carrying a foot engageable from above with a lower supporting surface, an operating toggle having upper and lower ends, means for pivotally supporting the upper end of said toggle from the truck body at a point adjacent the housing and in fixed relation thereto, and means of connection between the toggle and said plunger whereby a lower portion of the toggle is guided vertically from the plunger and the foot is yieldingly pressed against said supporting surface when the toggle is in the extended position.

14. In an anchoring device such as described, a stem with a presser foot at the lower end, a fixed vertical guide on the vehicle body for the upper portion of the stem, an operating element

including interpivoted toggle members, an upper fixed support for one of the toggle members, a cushioned lost-motion connection between the other toggle member and the presser foot located in close proximity to said foot, and means operable by the foot of the operator for actuating said operating element, said toggle members being movable to an over-center position to lock said stem in position.

15. In an anchoring device such as described, a plunger with a presser foot at the lower end, a vertical fixed guide enclosing the upper portion only of the plunger, an operating toggle having a fixed upper mounting on said guide, and a sliding spring-controlled member guided on the lower part of said plunger providing a lost-motion connection between the lower part of the toggle and the presser foot.

16. An industrial truck having supporting wheels adjacent the corners and provided in proximity to one of said wheels with an anchoring device fastened to the underneath portion of the truck body and comprising a vertically guided plunger and a toggle operable by the operator's foot for moving the plunger downwardly, said toggle having at its lower part near the lower end of the plunger an operating extension and being set to swing on an axis longitudinal to the truck and being in all of its positions substantially within a space limited by a vertical plane coinciding with the side margin of the body.

17. An industrial truck having supporting wheels adjacent the corners and provided in following relation to one of said wheels with an anchoring device fastened to the underneath portion of the truck body and comprising a vertically guided plunger and a toggle for moving the same downwardly, said toggle being set to swing transversely to the truck and in the extended position being at a slight angle to the vertical, the upper end of the toggle having a fixed pivotal mounting inwardly of the plunger axis.

18. An industrial truck having supporting wheels adjacent the corners and provided in following relation to one of said wheels with an anchoring device fastened to the underneath portion of the truck body and comprising a vertically guided foot-carrying plunger and a toggle for moving the same downwardly, said toggle being set to swing transversely to the truck and in the extended position being at a slight angle to the vertical, the upper end of the toggle having a pivot fixed in relation to the truck body, and the

lower part of the toggle having a pedal extension which in the extended position of the toggle is located in close proximity to the foot of the plunger.

19. An industrial truck having supporting wheels adjacent the corner and provided adjacent one of said wheels with an anchoring device fastened to the underneath portion of the truck body and comprising a foot-carrying plunger, a fixed vertical guide therefor out of which the lower part of the plunger extends downwardly, and an operating toggle for moving the plunger downwardly set to swing in a vertical plane transversely to the truck and comprising an upper member having an upper end in fixed relation to the truck and a lower member having an upper pivotal connection with the first toggle member and a lower pivotal connection with said plunger, said toggle members being movable to an over-center position to lock the plunger.

20. An industrial truck having supporting wheels adjacent the corners and provided adjacent one of said wheels with an anchoring device fastened to the underneath portion of the truck body and comprising a foot-carrying plunger, a fixed vertical guide therefor from which the plunger extends downwardly, a toggle for moving the plunger downwardly comprising an upper toggle member having its upper end fixed in relation to the truck body and a second toggle member having an upper end pivoted to the lower end of the first toggle member, a spring controlled member guided along the plunger, means of pivotal connection between said spring-controlled member and the lower toggle member, and means in close proximity to the foot carried by the plunger whereby the toggle is operated.

21. In an anchoring device such as described, a stem with a presser foot at the lower end, a fixed vertical guide on the vehicle body for the upper portion of the stem, spring means tending to hold the stem in a raised position, and means for pressing the presser foot against the ground in opposition to said spring means comprising a toggle adapted to be straightened to shift the presser foot downwardly against the ground, said toggle having an upper member whose upper end is pivoted in fixed relation to the vehicle and a lower member pivoted to the upper toggle member and having swinging and sliding relation to the stem.

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