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[54] RETRACTABLE PIVOT BOLT ARRANGEMENT

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[58] Field of Search105/368, 366; 248/361; 24/221

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[57] ABSTRACT

A pivot bolt arrangement for securing a container having socket-type openings to a housing mounted on a chassis frame support is arranged to be retracted into the housing when not in use. The housing forms a hollow or open space into which the bolt is retracted. The bolt extends upwardly through an opening in the top of the housing with its head resting on a collar. When the bolt extends through the socket-type opening in the container, it can be pivoted relative to the collar for securing the container to the housing. A pivot handle is attached to the bolt for rotating it and for retracting it into the housing.

5 Claims, 8 Drawing Figures

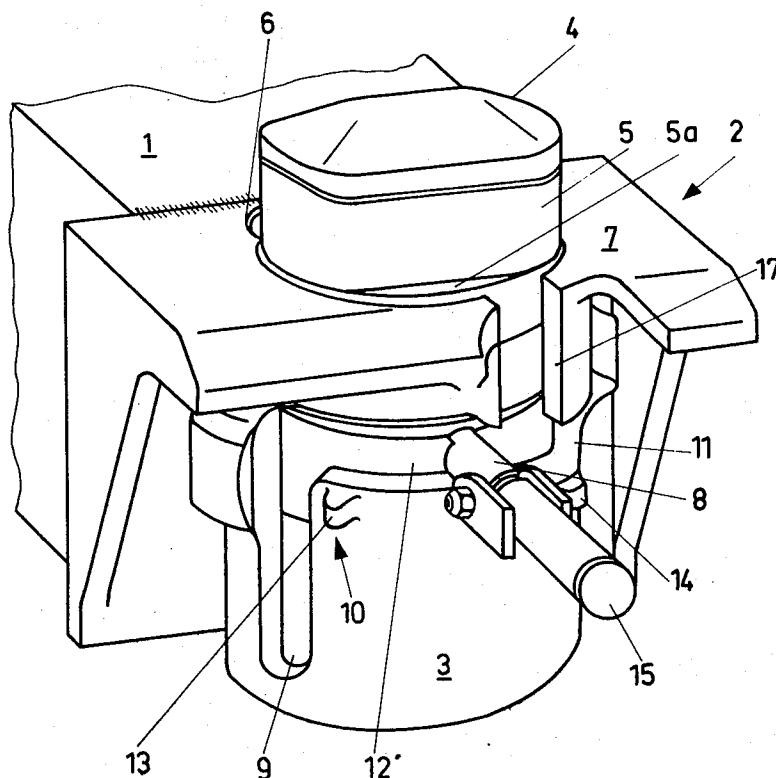
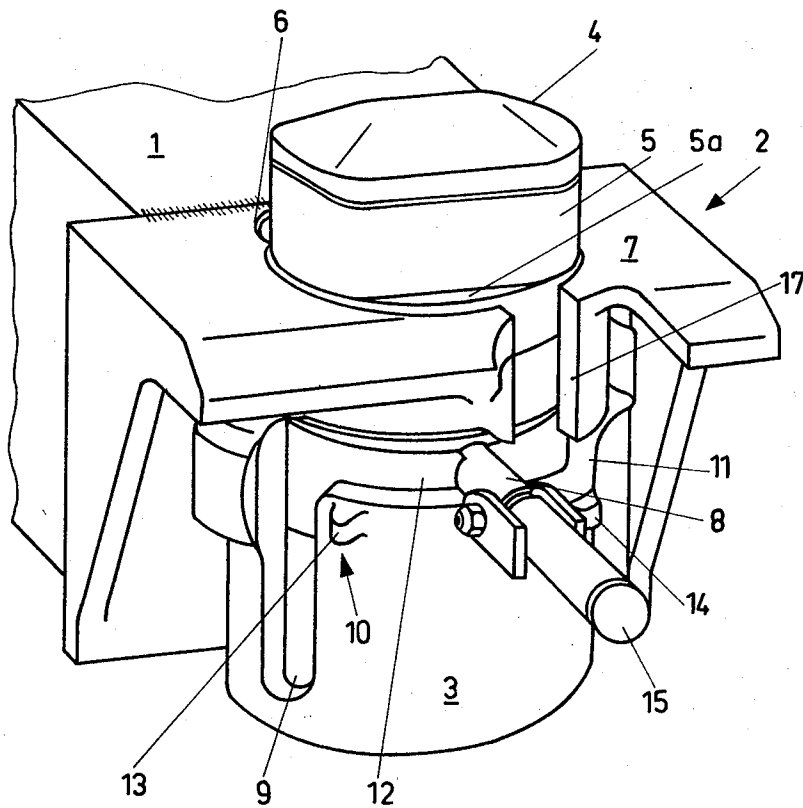


Fig. 1

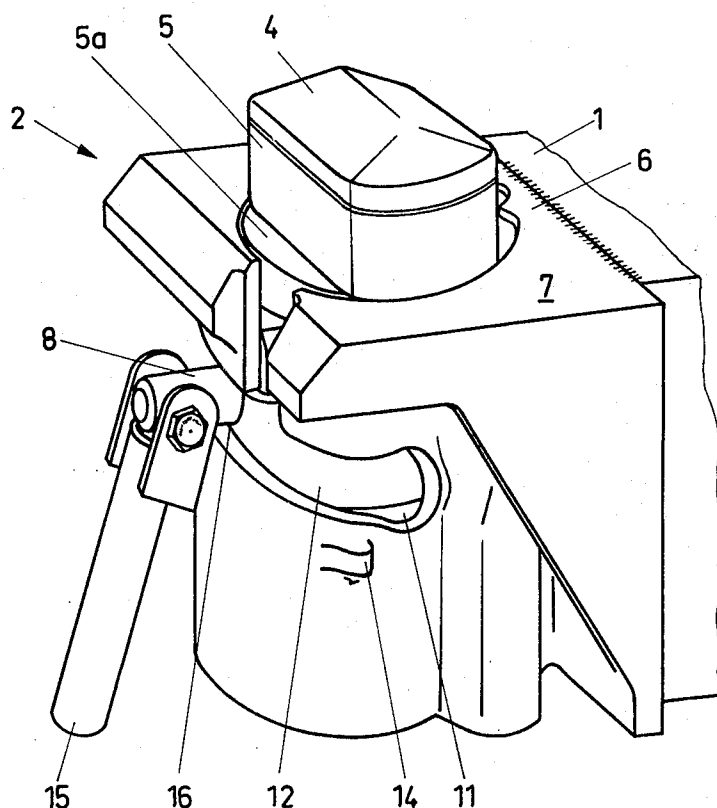


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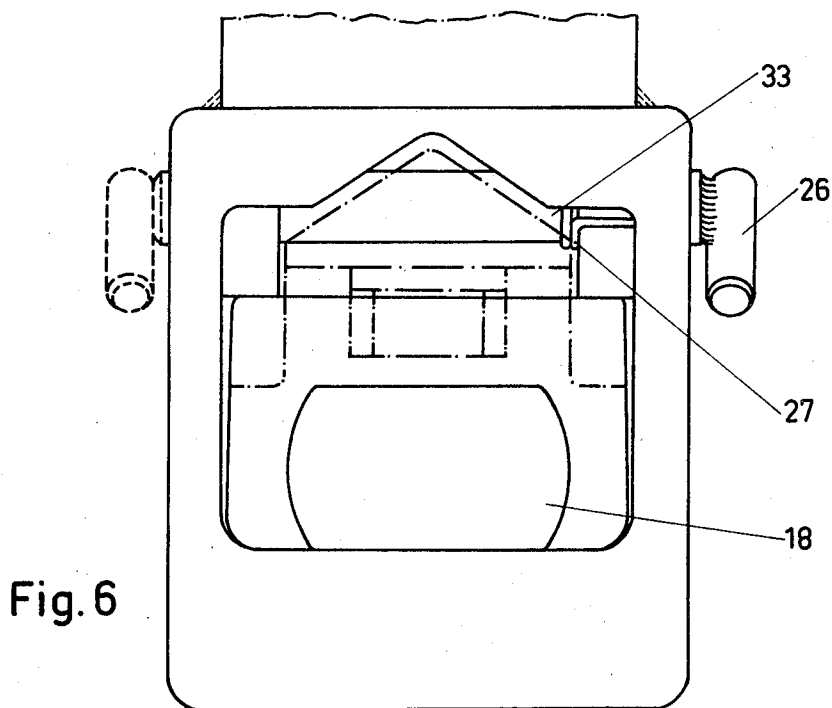
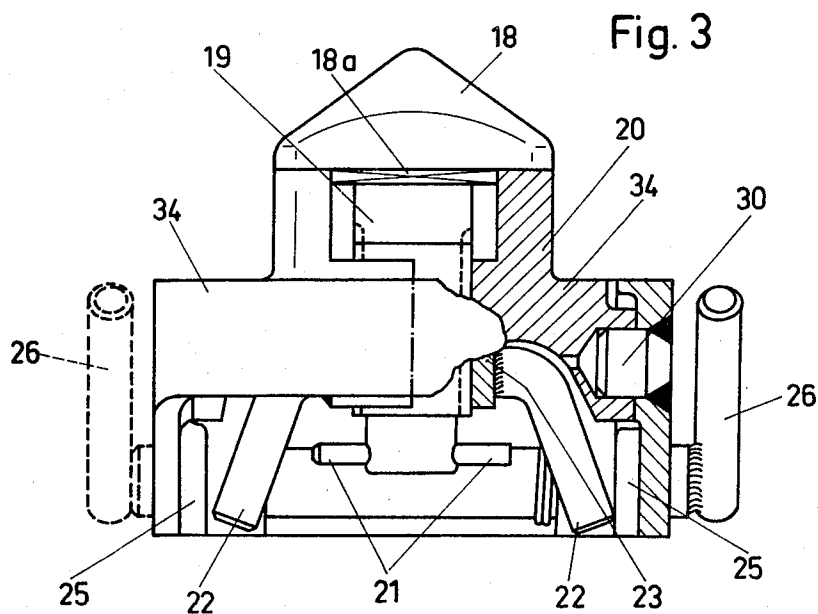
Fig. 2



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Fig. 4

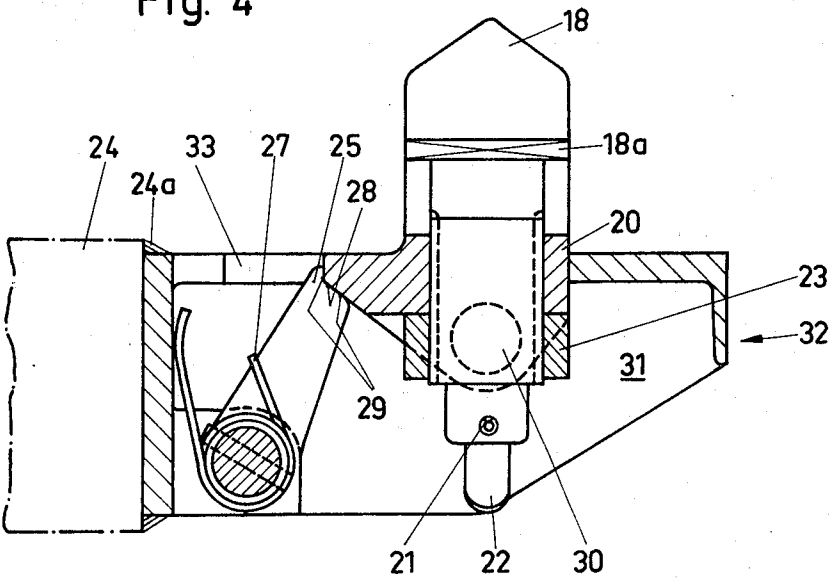
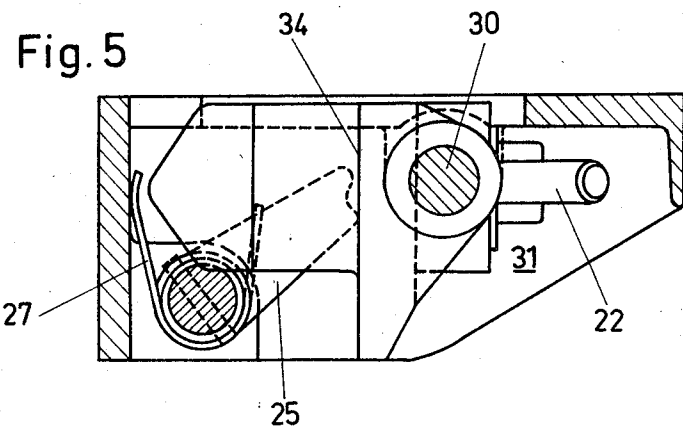


Fig. 5



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Fig. 7

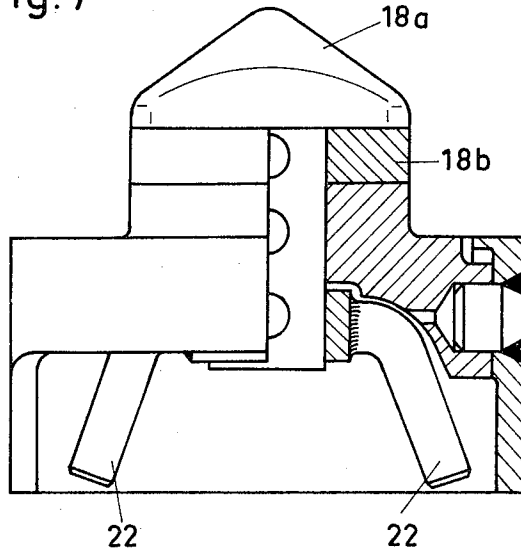
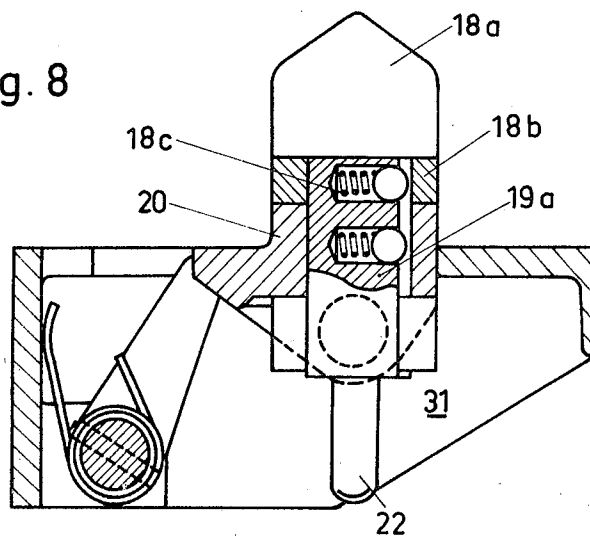


Fig. 8



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RETRACTABLE PIVOT BOLT ARRANGEMENT

SUMMARY OF THE INVENTION

The invention is directed to a turning or pivot bolt arrangement positionable within socket-type openings in a container for securing the container on a chassis frame support, and, more particularly, it is directed to the arrangement of the bolt which can be adjusted for securing different thicknesses of the container plate to the support and also for retracting the bolt into a housing when it is not in use.

For the economical utilization of a truck, the same frame support should be usable for attaching a normal superstructure to the truck or for securing one or several containers in place. When pivot or turning bolts are used, for securing the containers in position, they project upwardly from their guide collars through the frame support and are in the way when not in use. In the past, it has been known to utilize pivot bolts which can be detached from the chassis frame. In such a case, the bolts are carried loosely in the truck as long as it supports a conventional superstructure. When the truck is to be converted to support one or several containers, the changeover operation is time-consuming and, in addition, there is the risk that one or a number of the bolts not secured in position will become lost. When such a problem arises, the operator of the truck attempts to secure the container with the remaining bolts and, as a result, the bolts become overstressed and tend to break so that the container is not adequately secured and may fall off the truck.

Accordingly, the primary object of the present invention is to provide a pivot bolt arrangement which is secured to the chassis frame support of the truck at all times and which can be retracted into a housing or similar structure so that it does not cause any interference when it is not in use.

Therefore, in accordance with the present invention, a connecting element composed of a housing is attached to the truck frame support and is arranged to receive the pivot bolt. The housing is formed of a top wall and sidewalls which combine to provide an open or hollow space below the top wall into which the bolt can be retracted. The housing is secured to the frame support along one of its sidewalls which has a height somewhat less than the height of the web of the frame support so that a fillet weld can be formed along the top of the sidewall for securing it to the frame support at a position below the top surface of the frame support.

In the top wall of the housing a noncircular opening is provided within which the guide collar for the pivot bolt is positioned and a certain amount of play is provided so that the collar can be retracted into the housing by means of a pivot lever. The sidewalls of the housing provide a cylindrically shaped housing section in which an L-shaped slot is provided for guiding the pivot lever as it positions the bolt. One portion of the L-shaped slot extends horizontally and a second portion extends vertically downwardly from the horizontal section. By displacing the pivot lever selectively through the L-shaped slot, the bolt can be pivoted for securing the container in place and, in addition, the bolt can be retracted into the housing by moving the pivot lever through the vertically arranged section of the slot. Stop members are secured to the exterior of the housing adjacent the slot for securing the pivot lever in position. The pivot lever is formed of a hinged construction composed of a first part disposed in the horizontal position and a second part hinged to the first part for movement between a horizontal position and a vertical position. In the horizontal position, the second part extends axially from the first part so that the pivot lever can be positioned through the slot and when the second part is moved into the vertical position the pivot lever is secured in place. Another feature of the invention is the construction of the pivot bolt arrangement so that it can be employed for securely attaching two different standardized plate thicknesses of container plate to the truck frame support. In one embodiment of the bolt arrangement, the adjustment to different thicknesses of the container plate can be made by positioning the pivot lever in selected loca-

tions within the horizontal part of the L-shaped slot in the housing. At the end of the slot remote from the vertical section, a downwardly inclined end part can be provided to receive the pivot bolt as it is turned transversely to its guide collar and lowered relative to the remaining part of the horizontal section for adjusting to the thickness of the container plate. In this arrangement the bolt head locks the container to the housing and, in turn, to the frame support when the container plate containing the socket openings to which the bolts extend have a thinner standardized thickness.

On the other hand, if a thicker container plate section is used, the bolt is rotated by means of the pivot lever through the horizontal leg to its opposite end at the upper end of the vertical section of the slot. Since the container plate is positioned about the guide collar of the bolt, the bolt arrangement will not move downwardly through the vertical leg but will secure the container to the frame support. A stop member is secured to the outer surface of the sidewalls of the housing to hold the pivot lever in position after its second part is moved from the horizontal to the vertical position. In this location, the bolt head is positioned in a relatively higher plane than when the pivot lever is positioned at the opposite end of the slot and, accordingly, it is capable of firmly securing a thicker container plate to the support. As indicated, with the bolt disposed in either of the two end positions in the slot, the second section of the pivot lever can be hinged into its vertical position and folded against the outer surface of the housing. The stops on the outer surface of the housing prevent the bolt from being displaced by vibrations generated as the truck is driven and, moreover, by folding the pivot lever downwardly the width of the vehicle is reduced.

In order to facilitate the positioning of the pivot bolt, a center position can be located in the horizontal leg of the L-shaped slot by means of a depression located between the stops which identify the end positions of the pivot lever. Further, another slot having a width through which the pivot lever can pass is disposed upwardly from the horizontal leg of the L-shaped slot through the sidewalls of the housing and extending to the top of the housing. By aligning the pivot lever in the horizontal leg of the L-shaped slot with the assembly slot the bolt arrangement can be lifted upwardly from the housing by moving the lever through the assembly slot so that the bolt arrangement is available for repair or replacement without requiring any tools for dismantling the housing and removing the bolt arrangement.

In addition to the retractable feature described above, it is also possible to provide another embodiment of the bolt arrangement which is adjustable for two different standardized plate thicknesses and in which a hinged support of the bolt arrangement is provided for displacing the bolt into the housing so that it does not provide any interference above the surface of the frame support of the truck. In this embodiment, at least one supporting lever secures the bolt arrangement in its locking position by means of a spring-loaded construction. When the lever is displaced from its supporting position, the bolt arrangement can be rotated about a pivot support into a retracted position within the housing.

When the pivot bolt is rotated into its retracted position along with the guide collar, it does not project either upwardly or downwardly relative to the chassis frame support and, as a result, can be integrally attached to the frame support without affecting the clearance between the frame support and the ground. In addition, by means of a spacer mounted between the bolt head and its guide collar, the pivot bolt can be adapted to secure different thicknesses of container plate to the frame support.

The various features of novelty which characterize the invention are pointed out with particularity in the claims annexed to and forming a part of this specification. For a better understanding of the invention, its operating advantages and specific objects attained by its use, reference should be had to the accompanying drawings and descriptive matter in which there are described and illustrated preferred embodiments of the invention.

In the drawings:

FIG. 1 is a front perspective view of one embodiment of the present invention for securing a container to a frame support by means of a pivot bolt arrangement;

FIG. 2 is a perspective side view of the arrangement shown in FIG. 1 with a handle illustrated in the folded down position as compared to the horizontal position in FIG. 1;

FIG. 3 is a front view, partly in section, of another embodiment of the present invention with one bolt arrangement represented in the raised and unlocked position;

FIG. 4 is a side view, partly in section, of the pivot bolt arrangement in FIG. 3;

FIG. 5 is a side view, partly in section, similar to FIG. 4, however, with the bolt arrangement being rotated from the vertical into the horizontal position;

FIG. 6 is a top view of the pivot bolt arrangement shown in FIG. 3, with the horizontal position of the bolt, as shown in FIG. 5, illustrated in dot-dashed lines;

FIG. 7 is a front view, partly in section, of a third embodiment of the present invention, with the pivot bolt in a position similar to that illustrated in FIG. 3; and

FIG. 8 is a side view, partly in section, of the embodiment illustrated in FIG. 7 in a position similar to that illustrated in FIG. 4.

DETAILED DESCRIPTION OF THE INVENTION

In FIGS. 1 and 2, a bracket-type housing 2 is welded along one of its upper edges to a section 1 of a chassis frame support, not otherwise illustrated. The housing is constructed of a top wall 7, having a rectangular shape, and sidewalls which are disposed along three sides of the housing with one sidewall abutting the frame section 1 of the chassis frame support. By means of the sidewalls an open space is provided below the top wall 7 in which an inner cylindrically shaped housing wall section 3 is positioned. An opening 6 of irregular or noncircular shape extends through the top wall 7 in alignment with the cylindrically shaped housing section 3. A hammer head-shaped bolt 4 is shown in the unlocked position of the bolt arrangement extending upwardly from the top wall 7 of the housing 2 and rests on a similarly hammerhead-shaped guide collar 5 which also extends upwardly above the top wall of the housing. A pivot pin or journal, not visible in the drawing, extends downwardly from the bolt 4 through the collar 5 into the housing section 3. Secured to and extending radially from the pivot pin below the top wall 7 of the housing is a pivot lever 8 which extends through an L-shaped slot 10 in the wall of the housing section 3. The L-shaped slot 10 is formed of a vertical leg 9 which extends downwardly from one end, the left end as viewed in FIG. 1, of a horizontal leg 12 of the slot. In FIG. 1 the pivot lever 8 is shown at an intermediate position in the horizontal leg 12 of the slot 10. The pivot lever 8 has a handle 15 hinged to its radially outer end and the handle is movable between a horizontal position, see FIG. 1, and a vertical position, see FIG. 2. On the outer surface of the housing section 3, stop members 13 and 14 are positioned below the horizontal leg 12 of the slot 10 which cooperate with the handle 15 of the pivot lever 8 when it is in the vertical position to prevent displacement of the pivot lever and, in turn, of the bolt.

By moving the pivot lever through the horizontal and vertical legs 12, 9 of the slot 10 the bolt can be rotatably displaced for securing a container in place on the frame support 4. By aligning the pivot lever with the vertical leg 9 and moving it downwardly therethrough, the bolt arrangement can be retracted into the housing so that it does not obstruct or project above the housing and interfere with the use or operation of the truck. The socket-type opening of a container plate construction which fits over the bolt and around the guide collar does not form a part of the invention, and since it is well known, is not illustrated in the drawing.

The end 11 of the horizontal leg 12 of the slot is enlarged in the downward direction so that the lower edge surface of the slot extends downwardly from the normal plane of the edge surface for the remainder of the slot. The stop member 14 is positioned adjacent the end 11 of the slot.

The handle 15 of the pivot lever can be locked in its vertical and horizontal position by means of a cup spring, not shown, located in the inner end face of the handle.

Intermediate the ends of the horizontal leg 12 of the slot 10, a center position of the bolt 4, as represented in FIGS. 1 and 2, is provided by a depression 16. This depression 16 makes it possible to locate the turning bolt easily in its center position and, if necessary, stop members may also be located adjacent the center position for locking the pivot lever handle in position.

After the socket-type openings in the plate section of the container are fitted over the bolt and its guide collar, the bolt can be rotated by means of the pivot lever 8 and its handle 11 into either of the locked positions at the opposite ends of the horizontal leg 12. In the pivot bolt arrangement shown in FIGS. 1 and 2, it is possible to secure container plate sections of two different thicknesses by positioning the pivot lever selectively at one or the other ends of the horizontal leg of the slot. If the container has a thicker plate section, the pivot lever and its handle are turned to the left-hand end, as viewed in FIG. 1, of the horizontal leg 12 of the slot 10 so that the head rotates relative to the guide collar and holds the container plate section in position. When the handle is turned to the left-hand end, it is prevented from passing downwardly through the vertical leg 9 and by folding or turning the lever handle 15 downwardly it is locked in place against displacement by means of the stop member 13 projecting outwardly from the surface of the housing section 3.

If, on the other hand, a thinner plate section is used for the container, the pivot lever is turned from its center position at depression 16 to the right-hand end of the horizontal leg 12 and into the downwardly extending end 11. As the pivot lever rides downwardly into the end 11, the collar guide 5 and the bolt 4 recede toward the top wall 7 of the housing 2 and the bolt contacts the thinner wall section of the container and secures it in place. When the bolt is positioned at the end 11, the handle 15 is folded downwardly into the vertical position and is secured against displacement by means of the outwardly projecting stop member 14 on the outer surface of the housing section 3.

As shown in FIG. 1, slightly to the right of the center position of the pivot bolt 4, an assembly slot 17 extends through the housing from the horizontal leg 12 of the slot 10 through the top wall 7. By moving the pivot lever and its handle in alignment with the assembly slot, the bolt can be lifted from the housing 2 through the section 3 for repair or replacement without the requirement of any tools for the disassembly or removal operation.

In the embodiment of the invention shown in FIGS. 3-6, a hammerhead-shaped pivot bolt 18 is provided with a square key 18a on its lower face and is secured to a pivot pin 19 which extends through the guide collar 20. The bolt 18 is supported within a housing 32 having an opening in its upper surface and being open at its base to provide a hollow or open space into which the bolt can be retracted. Within the housing, a pivot lever 21 is located at the lower end of the bolt arrangement and a U-shaped handle 22 is secured to the pivot pin 19 by means of a spindle nut 23 for rotating the bolt between its locked and unlocked positions. In FIGS. 3 and 4, the bolt 18 is shown extending upwardly from the housing in position to secure a container to the frame support 24, however, when the bolt is not being used it is retractable into the housing. To secure the bolt in position for attaching a container to the frame support 24, a pair of supporting levers 25 are secured to the housing and are spring-loaded in the securing position by means of an adjusting spring 27. Each of the levers 25 is provided with a handle 26, note FIGS. 3 and 6, for displacing the levers from the supporting position against the spring effect. The ends of the levers which contact the collar 20 of the bolt have a shaped configuration 28 for engaging the collar 20 and securing the bolt in its upright or attaching position. The shaped configurations 28 on the end of the levers 25 contact the longitudinally extending edge surfaces 29 of the guide collar. The guide collar is secured by pivot bearings 30

to the sidewalls 31 of the housing 32 and the bolt and the collar extend through an opening 33 in the top of the housing. When the handles 26 are pivoted against the force of the springs 27 the levers release the bolt arrangement and it can be pivoted about the pivot bearings 30 downwardly into the housing 32 so that it is displaced below the top surface of the housing as shown in FIG. 5. When the bolt is pivoted downwardly and the handle is released the adjusting springs 27 urge the levers 25 against the flat edges of the guide collar 20 and prevent it from movement within the housing.

In the embodiment of the bolt arrangement shown in FIGS. 3-6, the pivot pin 19 of the bolt 18 is axially displaceable relative to the guide collar 20 and is rotatable by means of the pivot lever 21 and the U-shaped handle 22 so that varying thicknesses of container plate can be secured to the housing.

In FIGS. 7 and 8, another embodiment of the bolt arrangement is shown which is similar to that indicated in FIGS. 3-6 in which the bolt can be rotated about pivot bearings into the housing. In this embodiment instead of the spindle nut provided on the pivot pin 19 of the bolt 18, the hammerhead-shaped bolt is formed of an upper hammerhead-shaped part 18a and a spacer 18b having a corresponding transverse section to that of the upper part 18a. The upper part 18a is secured to a pivot pin 19a and the spacer 18b is in frictional contact by means of a spring catch 18c with the pivot pin 19a. The thickness of the spacer 18b, that is, its dimension in the axial direction of the pivot pin 19a, corresponds to the thickness difference between two standard plate thicknesses of the container to be mounted on the chassis frame support. When a thinner plate section of the container is being secured by means of the bolt arrangement in FIGS. 7 and 8, the spacer 18b is turned along with the bolt 18a rotating over the surface of the plate section and locking it in position. In such a construction the spacer 18b turns over the spring catch 18c. However, when a thicker plate section of the container is being secured in place only the bolt 18a is rotated and the spacer 18b remains in position. The bolt 18a holds the thicker plate section of the container on the housing.

While the present invention has been described as advantageous in securing containers to a truck body, it will be appreciated that similar bolt arrangements may be employed for other attachment purposes and it is not required that the bolts be oriented vertically in all cases.

It is claimed:

1. In a locking bolt arrangement for securing a container, having socket-type openings in its bottom wall, to a support surface, and of the type including a locking bolt having a hammerhead and a shank, a hammerhead collar on the support surface beneath the bolt head and rotatably mounting the bolt,

and a pivot lever secured to the shank beneath the collar and extending radially from the shank, the improvement comprising, in combination, a housing secured to the support surface and having a top wall, a rear wall and sidewalls, defining an upwardly and downwardly opening recess, and a cylindrical wall extending downwardly from said top wall in said recess; said top wall having a noncircular aperture and said collar having a noncircular lower portion conformingly engageable in said aperture; said cylindrical wall having a substantially horizontal slot, through which said pivot lever extends, and a substantially vertical slot extending downwardly from one end of said substantially horizontal slot; said collar, when said pivot lever is engaged in said substantially horizontal slot, projecting above said top wall and said bolt head, and when said pivot lever is engaged in said substantially vertical slot, being retracted below the upper surface of said top wall; said bolt head and said collar being aligned with each other when said pivot lever is at an unlocking position intermediate the ends of said substantially horizontal slot, and said bolt head projecting laterally beyond said collar when said pivot lever is adjacent either end of said substantially horizontal slot; and locking protrusions extending outwardly from said cylindrical wall adjacent both ends of said substantially horizontal slot and engaged with said pivot lever to retain said bolt head in a container locking position when said pivot lever is at either end of said substantially horizontal slot.

2. In a locking bolt arrangement, the improvement claimed in claim 1, in which said pivot lever is a two-part lever including an inner part engaged in said substantially horizontal slot, and an outer part hinged to said inner part for movement in a substantially vertical plane to cooperate with said locking protrusions.

3. In a locking bolt arrangement, the improvement claimed in claim 1, including a second substantially vertical slot extending upwardly and communicating with said substantially horizontal slot and opening through said top wall, whereby said pivot bolt, said collar and said lever may be readily extracted upwardly from said housing for removable and inspection, repair and the like.

4. In a locking bolt arrangement, the improvement claimed in claim 1, in which the lower edge of said substantially horizontal slot, at the unlocking position of said lever, has a shallow lever locating recess formed therein.

5. In a locking bolt arrangement, the improvement claimed in claim 1, in which the end of said substantially horizontal slot remote from said one end thereof slopes downwardly, whereby to draw said bolt head into firm engagement with a container having a thinner bottom wall.

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