

[54] **QUICK-RELEASE SUPPORT MEMBER ATTACHMENT MEANS**

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248/25, 248/188.4

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[56] **References Cited**

UNITED STATES PATENTS

1,373,061	3/1921	Ellmann et al.	151/35
1,473,910	11/1923	Lambert	85/61
1,875,209	8/1932	Baldwin	85/51
2,099,793	11/1937	Blake	248/119 R
2,139,063	12/1938	Beach	248/25
2,273,772	2/1942	Pollitz	85/62
3,080,690	3/1963	Budd	108/51

3,436,045	4/1969	Anspaugh	248/119 R
3,582,032	6/1971	Placek	85/62

FOREIGN PATENTS OR APPLICATIONS

718,958	11/1954	Great Britain	85/51
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Primary Examiner—Marion Parsons, Jr.

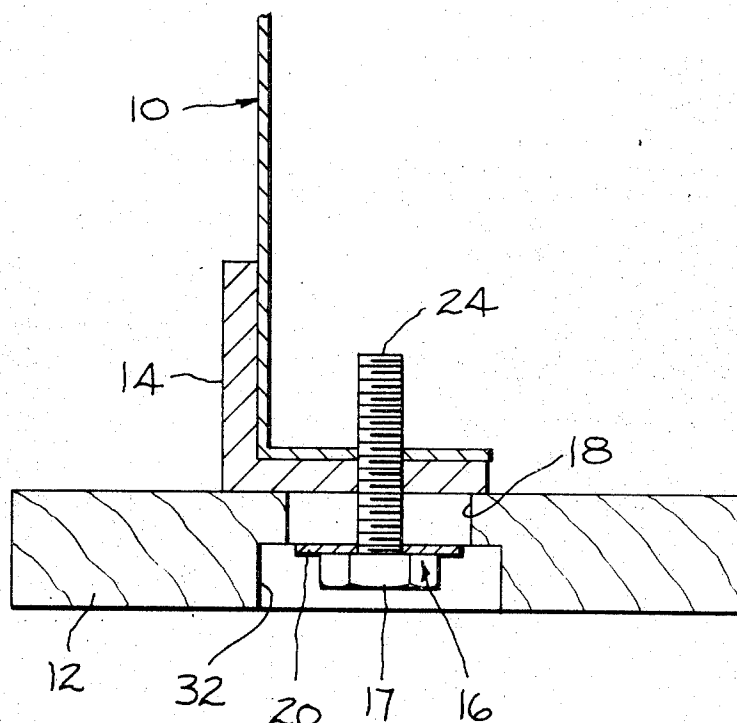
Attorney—George C. Atwell et al.

[57]

ABSTRACT

A support member such as a skid is attached to a frame of a machine or similar apparatus by means of a bolt extending through an aperture in the support member. The head of the bolt is engaged by a bifurcated retention means, the outer dimension of which is greater than the corresponding aperture dimension. The skid is readily released from the supported machine with minimum time and effort by manually applying sufficient force to the support member in a direction generally away from the frame, thereby deforming and reducing the outer dimension of the retention means and allowing it and the bolt head to pass through the aperture in the support member.

6 Claims, 4 Drawing Figures



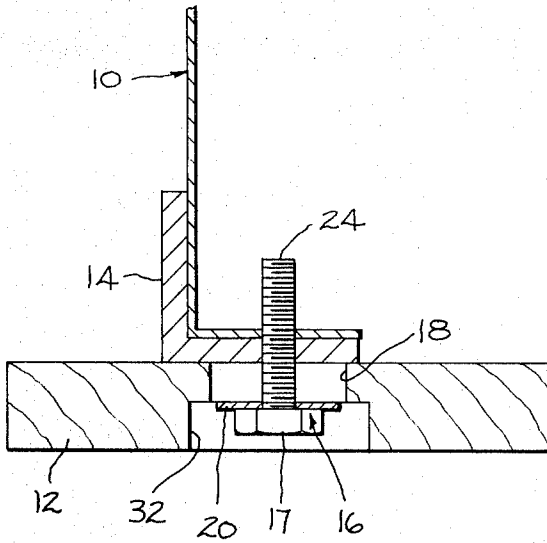


FIG. 1

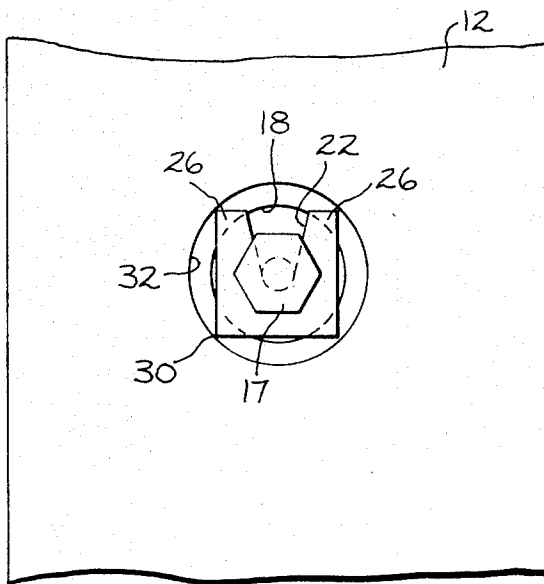


FIG. 2

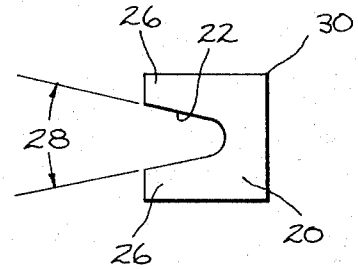


FIG. 3

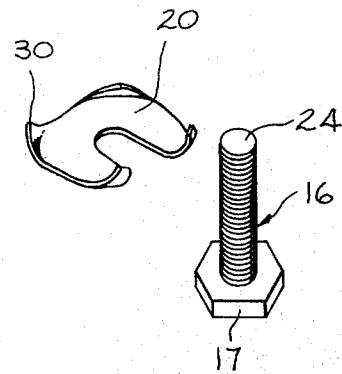


FIG. 4

QUICK-RELEASE SUPPORT MEMBER ATTACHMENT MEANS

BACKGROUND OF THE INVENTION

The present invention relates generally to an attachment arrangement between a support means and supported apparatus. More specifically, the present invention is directed to an attachment arrangement which enables a support member such as a skid to be readily released from a supported apparatus with a minimum amount of expended time and effort.

In modern production facilities ways are continually being sought to reduce the amount of human effort and time necessary for the production, transportation and installation of products. The present invention is concerned with the type of products requiring a temporary support means, such as one or more skids or an attached pallet for facilitating warehousing and shipping, that is removed prior to installation of the product. Examples of such products would be refrigerators, ovens and dishwashers, but it is understood that these appliances are merely representative of a broader class of machines and other apparatus to which this invention is applicable.

In the past, such support means have been attached to the under surface of products by inserting bolts through apertures in the support means and thereby directly engaging the supported apparatus at one or more points thereon. In many instances, the plurality of bolts securing the support means to the supported apparatus serve as adjustable leveling feet after the temporary support means is removed and the device is installed in a final location. In this arrangement, it is generally necessary, as part of the installation procedure, to expose the temporary supporting means whereby the bolts can be manipulated to release the temporary support means, and thereafter reattach the bolts and adjust them in accordance with their permanent function as leveling feet.

The present invention overcomes certain disadvantages of the prior art and teaches a structure whereby the temporary support means is quickly releasable from the supported apparatus merely by applying sufficient force against the support means in a direction generally away from the apparatus. Considerable time and effort is saved since the bolts attaching the temporary support means to the apparatus do not have to be separately manually disengaged. The present invention is particularly advantageous where the bolts are in the form of adjustable feet, since it eliminates the need for removing such adjustable feet to remove and discard the support means and then subsequently re-engaging the feet to serve as elements for leveling and permanently supporting the apparatus.

Accordingly, it is an objective of the present invention to provide improved attachment means for temporarily attaching support means to a machine or other apparatus which facilitates rapid removal of the support means.

A further objective of the present invention is to significantly reduce the time and effort required for removing support means such as pallets or skids from apparatus when the apparatus is being prepared for its intended operative function.

SUMMARY OF THE INVENTION

In carrying out the objectives of this invention, in one

form thereof, a structure is provided for attaching a temporary bottom support member such as a skid to a machine or other bulky apparatus and rendering the support means releasable therefrom in response to a force applied against the support member without the need for specific disengagement or rearrangement of any attachment elements. More specifically, a retention means is mounted in alignment with an aperture in the support member through which a fastening bolt extends. The retention means preferably includes an opening therein of smaller dimension than the head of the fastening bolt. The fastening bolt head thereby is engaged by the retention means to secure the support member to the underside of the machine. When sufficient force is applied to the support member in a direction generally outwardly and away from the machine, the retention means deforms so as to pass through the aperture in the support member along with the head of the fastening bolt, thereby releasing the support member from the machine. Where, as is frequently the case, the aforementioned bolt comprises an adjustable foot used for leveling and permanently supporting the machine in use, the machine is ready for final installation immediately upon removal of the support member without the need for first removing the adjustable foot and then reassembling the foot on the machine.

DESCRIPTION OF THE DRAWINGS

The subject matter which is regarded as the invention is particularly pointed out and distinctly claimed in the claims appended to this specification. The invention, however, both as to representative structure and method of practice, may be best understood by reference to the following description, taken in connection with the accompanying drawings, wherein:

FIG. 1 is a sectional elevational view of a portion of a temporary support member fastened by improved attachment means to a supported machine;

FIG. 2 is a bottom view of FIG. 1;

FIG. 3 illustrates retention means utilized as part of the attachment means in accordance with the present invention; and

FIG. 4 is a view of certain components of the preferred embodiment of the invention including the retention means shown in FIG. 3, after deformation thereof in accordance with the function of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. 1 of the drawings, a machine or other apparatus generally indicated as 10 is connected to and supported on a support member such as a skid 12. Typically, machine 10 may include a frame member 14 which lies in an abutting relationship with skid 12. A fastening member shown in the form of a bolt 16, which may further function as an adjustable foot for leveling the supported machine 10, extends through an aperture 18 in skid 12 and threadably engages the frame 14. The bolt 16 has a radially outwardly extending shoulder or head portion 17. The diameter of the head portion 17 is less than the diameter of the aperture 18 so that the head portion 17 can pass through the aperture 18.

In order to manually prevent the passage of the head portion 17 through aperture 18 and thereby retain the skid 12 in engagement with the machine frame 14, for

example during shipment, a retention means, preferably a plate 20, is provided. The plate 20 is disposed between the skid 12 and the underside of the head portion 17. In the specific embodiment described, the plate 20 is made of sheet metal. However, it is to be understood that such retention means could be made of plastic or any other material susceptible to being deformed or shattered in response to a manual force translated thereto yet sufficient in strength to normally retain the skid 12 in engagement with the frame 14.

The plate 20 (FIG. 3) is preferably of generally bifurcated shape and includes a slotted opening 22 through which a threaded shank 24 (FIG. 1) of bolt 16 extends. The slotted opening 22 in plate 20, as partially seen in FIG. 2 and fully depicted in FIG. 3, extends inwardly from one side of plate 20 and provides two spaced fingers 26 for engaging the head portion 17 of bolt 16. As specifically seen in FIG. 3, the slotted opening 22 is preferably tapered at an angle indicated as 28. The outer end of the slotted opening 22 preferably has a width dimension significantly larger than the diameter of the threaded shank 24 of bolt 16. The inner end of the slotted opening 22 had a width dimension less than the diameter of the head portion 17 of the bolt 16.

As shown in FIGS. 1 and 2, the outer dimension of the plate 20 is normally greater than the diameter of aperture 18, and portions 30 of the plate 20 overlap the skid 12 circumjacent aperture 18 and thereby engage against the skid 12. Although the plate 20 is shown generally in the shape of a square in FIG. 3, it is to be understood that other shapes may be employed for accomplishing the purposes of the present invention.

In the embodiment shown and described, the bolt 16 takes the form of an adjustable foot in which the head portion 17 constitutes a base member for engaging or resting against a supporting surface. Such an adjustable foot would be used for leveling an appliance after installation. However, even if the fastening member is in some equivalent form other than bolt 16 and/or does not serve as an adjustable foot, it is within the scope of this invention that a support member such as the skid 12 could be removed in the general manner described whereby the fastening member or bolt 16 remains on the device as a residual appendage.

An additional facet of the present embodiment of the invention described herein is the inclusion of a counterbore in the bottom surface of skid 12 as shown in FIG. 1. The counterbore is in axial alignment with the aperture 18 and serves as a recess 32 for the plate 20 and bolt head portion 17. This structure enables the bottom surface of the support member to have a flush profile.

In addition, in this embodiment, as shown in FIG. 3, the outer dimension of plate 20 is designed so that at least two of the diagonally disposed corner portions 30 thereof engage the walls of recess 32, providing a press fit. It is to be understood that alternative shapes of retention means serving the purpose of plate 20 could be employed. The binding engagement of plate 20 or its equivalent to the skid 12 facilitates assembly since the plate 20 is independently held in the recess 32 by the aforementioned press fit and it is not necessary to hold the plate in position manually while a fastening member such as bolt 16 is insertably attached. Moreover, this arrangement permits the plate 20 to be preassembled in the skid and the skid may then be secured to the machine by the fastening member at any desired later time.

As presently practiced, however, the machine 10 is inverted for attachment of skid 12. Therefore, with the skid 12 against the underside of machine 10, if the outer dimension of the plate 20 is made smaller than the dimension across the recess 32, the plate 20 may be dropped into the recess 32 and held therein by gravity until the bolt 16 is inserted. The press fit described above permits greater flexibility in assembly, since, for example, the machine 10 may be merely tilted and laid on its side and the plate 20 will still be held in position by the press fit while the bolt 16 is installed.

In accordance with the present invention the skid 12 or other support member is simply and easily removed by merely applying a force to the skid 12 in a direction away from the device 10. By the application of such a force, which may be accomplished by hammering or prying, the portions 30 are deformed, as seen in FIG. 4, so that the outer dimensions of the plate 20 are thereafter less than the diameter of the aperture 18. The portions 30, therefore, no longer engage the skid and the deformed plate is caused to pass through the aperture 18. Since the head portion 17 of bolt 16 is of smaller dimension than aperture 18, it passes through the aperture along with the deformed plate 20, thereby effecting removal of the skid 12.

As shown by a comparison of FIGS. 3 and 4, the outer end of the slotted opening 22 becomes narrower after the plate 20 is deformed. However, since the width dimension at the outer end of the slotted opening 22 is initially significantly larger than the diameter of the threaded shank 24, the outer end of the slotted opening 22 remains wider than the diameter of the threaded shank 24 after the deformation. Sufficient clearance is thereby provided between the threaded shank 24 and the slotted opening 22 after deformation to facilitate removal of the plate 20 from the bolt 16 after the skid 12 has been removed. Such removal can be accomplished by merely sliding the plate 20 in a lateral direction away from the outer end of the slotted opening 22.

As shown in FIG. 2, the plate 20 is of a generally rectilinear configuration and of a size in relationship to the aperture 18 that the corners of the plate extend beyond the edge of the aperture and contact the support member, and the straight edges of the plate extend across the aperture whereby only the corners need to undergo deformation in removing the support member from the underside of the apparatus. Alternatively, the plate 20 may be formed having a generally triangular or polygonal configuration whereby adjacent straight edges are merged at corners that extend outwardly beyond the edge of the aperture 18.

From the aforementioned description, it can be seen this invention provides an attachment arrangement by which a temporary support member can be easily removed from a supported machine or other apparatus with a minimum of time and effort. Moreover, the disclosed attachment arrangement, when employed with apparatus which includes adjustable feet for leveling the apparatus at final installation, further reduces the time required, by obviating the need for removal and reassembly of the adjustable feet.

While a presently preferred embodiment of the invention is shown and described, it is, of course, understood that various modifications may be made, and it is intended to cover in the appended claims all such

modifications as fall within the true spirit and scope of the invention.

I claim:

1. A quick-release means for temporarily attaching the support member to apparatus to facilitate safe transport thereof comprising:

a bolt-like leg member connected to the underside of the apparatus and protruding therefrom, said bolt-like leg member having a shank and a widened foot portion integral to the outer end of the shank,

a support member disposed beneath the apparatus and having an aperture therethrough in alignment with the leg member such that the shank thereof protrudes through the aperture and the foot portion projects below the aperture,

a deformable plate disposed between the support member and the foot portion and acting to hold the support member against the underside of the apparatus,

the aperture being an enlarged opening and the plate being shaped as a plane figure having generally opposite edge portions thereof extending across the aperture and having corner portions extending outwardly past the edge of the aperture in contact with the support member, and

the plate being adapted to deform and move entirely through the aperture with the foot portion in response to a force applied to the support member to free it entirely from its engagement to the apparatus

tus such that damage and deformation is restricted solely to the plate.

2. The invention of claim 1 wherein the plate is adapted to fall free from the leg member after the plate moves through the aperture.

3. The invention of claim 1 wherein the leg member is releasably threadably attached to the apparatus.

4. The invention of claim 1 wherein the plate has a slotted opening extending from its outer edge inward toward its center, and the dimension across the opening adjacent the center of the plate is less than the width of the foot portion and greater than the thickness of the shank.

5. The invention of claim 1 wherein the plate has an opening therethrough, the shank extends through the plate opening and the foot portion of the leg member serves as a shoulder contacting the plate surface adjacent the opening, the plate is adapted to reside against the support member and normally hold its shape and thereby prevent the support member from moving away from the apparatus, and the plate being further adapted to deform in response to manual force directed against the support member whereby the plate assumes a new shape that will slip entirely through the aperture.

6. The invention of claim 1 wherein the support member has a recess about the aperture enabling the plate and the foot portion of the leg member to be insert past the outside surface of the support member.

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