United States Patent

[11] **3,575,288**

[72] Inventor **Byron L. Brucken**
Dayton, Ohio

[21] Appl. No. **842,494**
[22] Filed **July 17, 1969**
[45] Patented **Apr. 20, 1971**
[73] Assignee **General Motors Corporation**
Detroit, Mich.

[54] **ADJUSTABLE LEG ASSEMBLY**
4 Claims, 3 Drawing Figs.

[52] **U.S. Cl.** **206/46,**
229/23, 248/24, 248/188.4
[51] **Int. Cl.** **B65d 19/40,**
B65d 85/68, F16m 13/00
[50] **Field of Search** 206/46
(FURN.), 46 (HWDE), 46 (MACH); 229/23 (C);
248/24, 188.4, 119

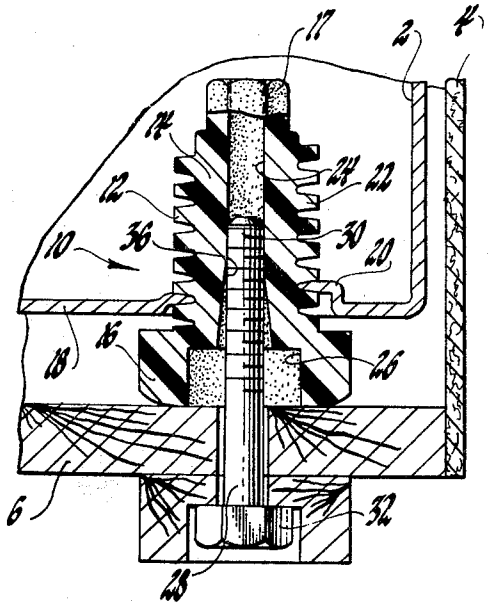
[56] **References Cited**

UNITED STATES PATENTS

1,120,369	12/1914	Booraem	220/(APDIG)
2,804,253	8/1957	Brandt	229/23(C)
3,436,045	4/1969	Anspaugh	248/188.4

Primary Examiner—William T. Dixson, Jr.
Attorneys—William S. Pettigrew and Frederick M. Ritchie

ABSTRACT: In the preferred form, an adjustable leg assembly including an externally threaded, vertically adjustable, leveling member, adapted to be received in a threaded portion in the base of the domestic appliance, and furthermore, having an internal bore for receiving a shipping bolt whereby the domestic appliance may be rigidly secured to the base of a shipping container by the shipping bolt and leveling member. Also, the leveling member has a counterbore adapted to receive a resilient plug when the shipping bolt is removed from the leveling member at which time a plurality of such adjustable leg assemblies may be vertically, axially adjusted with respect to the respective threaded portions in the base of the domestic appliance so as to level the domestic appliance when supported on the adjustable leg assemblies.



PATENTED APR 20 1971

3,575,288

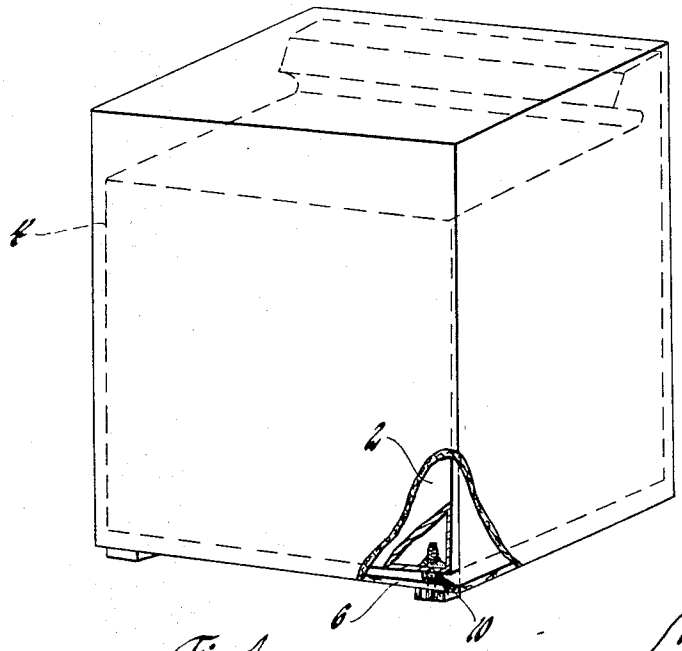


Fig. 1

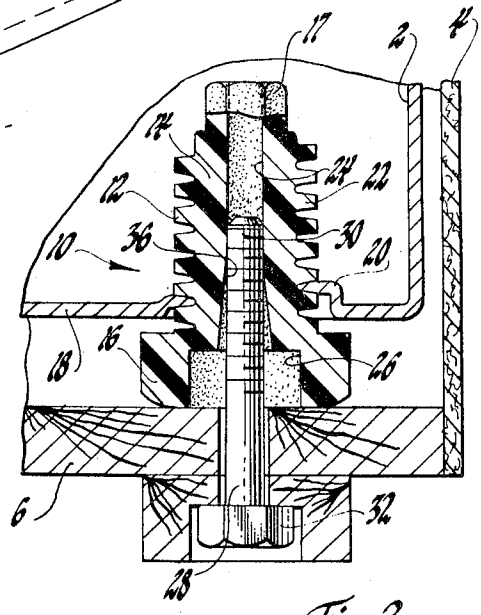


Fig. 2

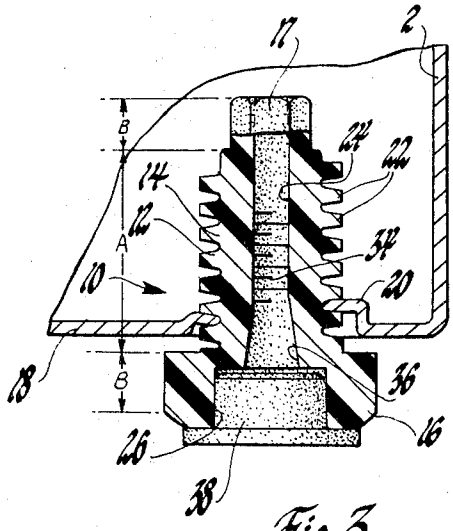


Fig. 3

INVENTOR.
Byron L. Brucken

BY
Frederick M. Ritchie
ATTORNEY

ADJUSTABLE LEG ASSEMBLY

The present invention relates to a novel adjustable leg assembly for attachment to threaded members in the base of a domestic appliance and which may be axially movable with respect to the base of the domestic appliance so as to adjust the domestic appliance in a level position. Among the objects of the present invention is the provision of a novel adjustable leg assembly having a leveling member adapted to receive a shipping bolt for securing the domestic appliance in a shipping container.

Another object of the present invention is the provision of the counterbore in the leveling member of the adjustable leg assembly adapted to receive a resilient pad whereby the leveling member and the resilient pad act as a foot for the domestic appliance.

Still another object of the present invention is the utilization of an externally threaded leveling member which is axially adjustable with respect to the base of the domestic appliance to level the domestic appliance, and which can be used as a device for securing the domestic appliance to a shipping container during shipping and for retaining a resilient plug at a final destination or location.

By this novel construction and assembly, the appliance manufacturer can readily and easily assembly the adjustable leg assembly on the appliance and use the assembly as a securing device during shipping. Thereafter, the party installing the same in its operative position in the home, or other place of use, can readily remove the shipping bolt, insert the resilient plug, and vertically adjust each of the adjustable leg assemblies to level the domestic appliance in its operative position upon the floor or supporting structure at the ultimate location.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred embodiment of the present invention is clearly shown.

In the drawings:

FIG. 1 is a front right isometric view of a domestic appliance within a shipping container with a lower front corner of the appliance and its container broken away to show the adjustable leg assembly of the present invention;

FIG. 2 is an enlarged sectional view of the lower right front corner of the domestic appliance within the shipping container showing the adjustable leg assembly in greater detail; and

FIG. 3 is an enlarged sectional view of the lower right front corner of the domestic appliance removed from the shipping container with the shipping bolt removed and the resilient plug inserted into the leveling member of the adjustable leg assembly.

In accordance with this invention and with reference to FIG. 1, a domestic appliance 2 is positioned within a shipping container 4 having a base or wooden shipping pallet 6. The domestic appliance 2 may be of any type, but more particularly of the type where it is desirable to operate in a level position and thus require adjustable leveling legs such as the adjustable leg assembly 10. This would include both clothes washing machines and dryers. While it is contemplated that several such assemblies be used with each appliance, only one is described in detail as representative of each such assembly.

The adjustable leg assembly of the present invention is more clearly shown in detail in the enlarged views, FIGS. 2 and 3. The adjustable leg assembly 10 includes a leveling member 12 having an externally threaded portion 14 and the head portion 16. The domestic appliance 2 is provided with a base formed of bottom panels such as 18 which in turn is provided with a threaded portion or member 20 located in each corner of the base. The preferred form of this threaded member 20 is shown in FIGS. 2 and 3 and is a thread formed in the base panel 18. However, it is within the contemplation of this invention to use other types of threaded members such as a nut welded to the base panel 18 or other forms of threaded members securely fastened to the base panel 18. The externally

threaded portion 14 of the leveling member 12 has an external helical thread 22. This externally threaded portion 14 is received by the threaded member 20 and is axially adjustable with respect to the threaded member 20 due to the helical thread 22 when the leveling member 12 is rotated. Rotation of the leveling member 12 is facilitated by the head portion 16 of the leveling member 12 which in preferred form would be hexagonal in cross section so as to be adapted to be received by a wrench or other similar tool. The other end of the leveling member is also provided with a head portion 17 of hexagonal cross section.

The leveling member 12 is also provided with an internal bore 24 which in the preferred form extends through both the head portions 16 and 17 and the externally threaded portion 14. However, it is also contemplated that this internal bore need not extend all the way through the externally threaded portion 14. Furthermore, in the preferred form, the internal bore 24 is nonthreaded. The counterbore 26, concentric with the internal bore 24 is located within the head portion 16 of the leveling member 12.

In accordance with one of the objects of this invention, the internal bore 24 is adapted to receive a shipping bolt 28 which is also part of the adjustable leg assembly. The shipping bolt 28 has a threaded portion 30 and a head portion 32. When the shipping bolt 28 is inserted into the internal bore 24 and rotated, the shipping bolt itself forms a thread 34 within the internal bore 24 so as to be snugly retained within the leveling member 12. In the preferred form, the internal bore 24, at the end toward the counterbore 26, is provided with an elongated frustoconical or tapered passageway 36 concentric to the internal bore 24. This tapered portion aids in initiating a standard shipping bolt in the thread cutting function as the bolt is rotated and thus inserted into the internal bore 24. When the shipping bolt 28 is removed from the internal bore 24, threads 34 formed by the shipping bolt would remain as shown in FIG. 3. However, the internal bore 24 may be previously threaded.

Since in the preferred form, the internal bore 24 is nonthreaded and the shipping bolt 28 performs a thread cutting function, the adjustable leg assembly leveling member 12 is made of polypropylene. The leveling member 12 is made from one piece of polypropylene so as to be less expensive in manufacture. Furthermore, the relative softness of polypropylene to steel makes it easier to form the internal threads 34 of the internal bore when the shipping bolt 28 is inserted into the internal bore. As the shipping bolt 28 cuts the threads 34, the shipping bolt is secured with respect to the leveling member 12 and thus firmly holds the domestic appliance to the shipping container base 6. Also the use of a plastic permits plastic deformation of the external threads 22 to provide a further friction locking action between the assembly 10 and the threaded member 20 of base panel 18.

When the domestic appliance 2 within the shipping container 4 arrives at its final destination, the shipping bolts 28 are removed from the assemblies 10, thus freeing the domestic appliance from the base 6 of the shipping container. The domestic appliance is then removed from the shipping container. Since the shipping bolt 28 is now removed from the leveling member 12, the counterbore 26 is free to receive a plug 38. This plug 38 is resilient and is preferably made of rubber. This resilient plug 38 along with the leveling member 12 acts as a foot for the domestic appliance when the domestic appliance is set up at its final destination. The use of the resilient plug 38 is particularly helpful for a domestic appliance which has certain natural vibrations. On other appliances, the plug 38 is not necessary as the plastic member 12 itself will not be destructive to a floor.

Either head portion 16 or 17 of the leveling member 12, now receiving the plug 38, is adapted to be received by a wrench so as to be rotated causing the external helical thread 22 to coact with the threaded member 20 of the domestic appliance base 2 so as to cause axial or vertical movement of the adjustable leg assembly with respect to the domestic

appliance 2. When the domestic appliance is provided with a plurality, for example, four of these adjustable leg assemblies, each of these adjustable leg assemblies may be so vertically adjusted so as to level the domestic appliance on its final destination.

A typical preferred form of this invention includes a polypropylene leveling member having an externally threaded portion **14** with a dimension A of approximately 1.40 inches with each of the hexagonal head portions **16** and **17** having a dimension B of approximately 0.50 inch. The external helical thread has six threads per inch with a minor diameter of 0.70 inch, a pitch diameter of 0.80 inch and a major diameter of 1.0 inch. The internal bore has approximately a 0.25-inch diameter and is nonthreaded before the shipping bolt is inserted. The tapered portion **36** of the internal bore **24** is frustoconical approximately 0.50 inch long and gradually and continuously flares outward from a 0.25-inch diameter to a 0.375-inch diameter or approximately a 7° taper. The counterbore **26** is approximately 0.75 inch in diameter and has approximately a 0.40-inch depth. The portion of the rubber plug **38** which extends into the counterbore has a diameter of approximately 0.765 inch so as to provide a snug fit whereby the resilient plug is retained within the counterbore. The outer portion of the rubber plug has a diameter of approximately 1.24 inches so as to approximately cover the 1.25-inch hexagonal head portion.

It is thus seen that a single easily manufactured leveling member provides both a retainer member for securing the domestic appliance to a shipping container during shipping and a leveling member for the domestic appliance at its final point of destination. While the embodiment of the present invention as herein disclosed constitutes the preferred form, it is to be understood that other forms might be adopted.

I claim:

1. In an appliance having a number of threaded holes in its bottom panels for threadedly receiving adjustable leg assemblies and which is secured to a pallet for shipping, the improvement comprising a plurality of shipping and adjustable leg assemblies each adapted to be received within one of said threaded holes, each of said shipping and adjustable leg assemblies comprising a leveling member having an externally threaded portion vertically axially adjustably secured within one of said threaded holes and a head portion extending below said appliance for supporting said appliance either on said pallet or in operating position, said threaded portion having an internal bore of diameter smaller than the minor diameter of the threads thereon, said head portion having a counterbore communicating with said internal bore and of diameter larger than the diameter of said internal bore, a shipping bolt threadedly engaging said internal bore and having a head on the side of said pallet opposite to said appliance when said domestic appliance is supported on said pallet, and a resilient plug of diameter slightly larger than the diameter of said counterbore and adapted to be received therein with a snug fit when said shipping bolt is removed from said leveling member and said appliance is removed from said pallet, each of said leveling members being adapted for manual rotation at said head portion for movement thereof vertically axially with respect to one of said threaded holes to level said domestic appliance in its operating position.

2. The shipping and adjustable leg assemblies of claim 1 wherein said leveling member is made of polypropylene, said shipping bolt has a threaded portion with a diameter slightly larger than the diameter of said internal bore, and said counterbore communicates with said internal bore by means of a tapered passageway to facilitate the initiation of a thread cutting function by said shipping bolt as it threadedly engages said internal bore.

3. The shipping and adjustable leg assemblies of claim 1 wherein said leveling member includes another head portion at the opposite end thereof from the first said head portion to adapt said leveling member for manual rotation from above the bottom panels of said appliance.

4. In an appliance having a number of threaded holes in its bottom panels for threadedly receiving adjustable leg assemblies and which is secured to a pallet for shipping, the improvement comprising a plurality of shipping and adjustable leg assemblies each adapted to be received within one of said threaded holes, each of said shipping and adjustable leg assemblies comprising a leveling member having an externally threaded portion vertically axially adjustably secured within one of said threaded holes and a head portion extending below said appliance for supporting said appliance either on said pallet or in operating position, said threaded portion having an internal bore of diameter smaller than the minor diameter of the threads thereon, and a shipping bolt threadedly engaging said internal bore and having a head on the side of said pallet opposite to said appliance when said domestic appliance is supported on said pallet, each of said leveling members being rotatable by said head portion for movement vertically axially with respect to one of said threaded holes to level said domestic appliance in its operating position when said shipping bolt is removed from said leveling member and said appliance is removed from said pallet.