Nov. 27, 1962 F. J. FONTANA ETAL 3,065,494

BALL JOINT TILT GLIDE

Filed May 16, 1960

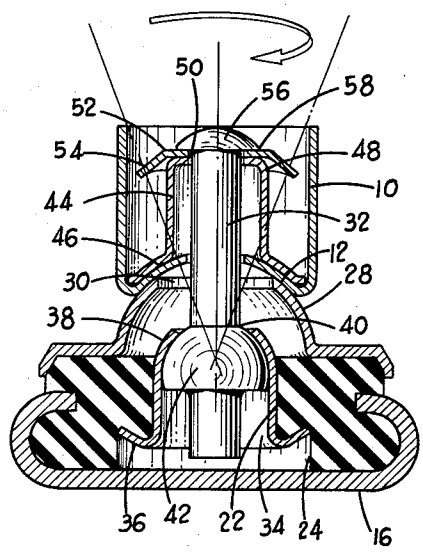


FIG. 1.

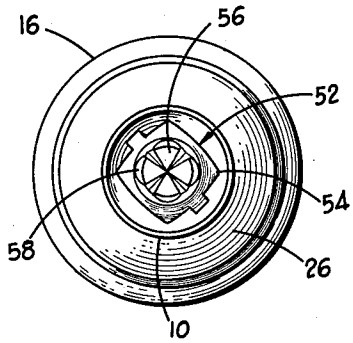


FIG. 2.

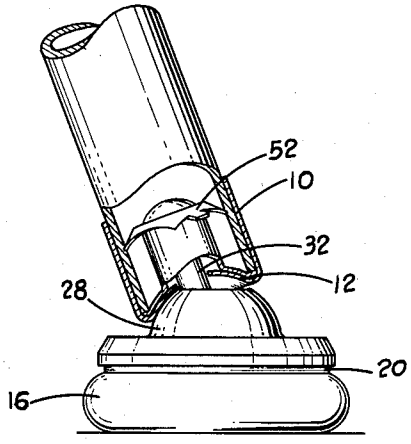


FIG. 3.

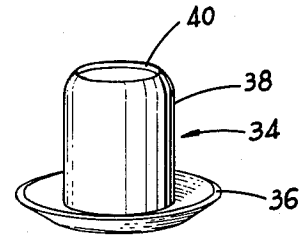


FIG. 4.

INVENTORS
Frank J. Fontana
Michael Kramcsak, Jr.

By A. G. Douvas
ATTORNEY

United States Patent Office 3,065,494 Patented Nov. 27, 1962

3,065,494

BALL JOINT TILT GLIDE

Frank J. Fontana and Michael Kramcsak, Jr., Bridgeport, Conn., assignors to The Bassick Company, Bridgeport, Conn., a corporation of Connecticut

Filed May 16, 1960, Ser. No. 29,496
3 Claims. (Cl. 16—42)

This invention relates to a detachable glide structure for furniture legs of the type employing a resilient cushion and more particularly to a structure of this type in which the cushion remains relatively unflexed regardless of the angle to which the furniture leg is tilted.

Glider units having polished floor-engaging buttons are employed primarily to aid in moving furniture over the floor quietly and to avoid scratching or injuring the floor. Structures of this type have, in the past, employed resilient cushioning means between the floor contact button and the furniture leg for absorbing the shock and vibration transmitted through the leg. In order to provide a glide structure in which the bottom surface of the button remains parallel to the plane of the floor regardless of the angle to which the furniture leg is positioned, there have been designed glide units employing universal joints or the like to allow such positioning.

In structures of this type, there is normally provided a concave, semi-spherical bottom surface formed on the furniture leg attachment means. A metal contact plate is provided on the upper surface of the glide, having a semi-spherical outer configuration in which the plate makes full surface contact with the concave surface of the furniture leg attachment means so that regardless of the position with which the contact plate is shifted with respect to the normal axis of the furniture leg, there will be provided full surface contact between the members.

In one such construction, the means for engaging the glide unit with the furniture leg includes a stem member which extends upwardly through the center of the cushioning member and is frictionally coupled to the furniture leg such that any pivoting or tilting of the furniture leg with respect to the normal axis of the glide results in excessive compressive and tension stresses being set up within the cushion member and distortion of the cushion member itself. This distortion caused by compression and tension of the resilient cushion adjacent the stem is completely independent of the normal compressive stress on the cushion when the cushion is subjected to the weight of the furniture leg through normal usuage. Under such circumstances, the natural resilience of the elastic cushion member provides a definite tendency to return the stem to a vertical position such that the axis of the stem is in line with the normal axis of the glide unit, notwithstanding the fact that the supported furniture leg is required to remain in the tilt position.

It is therefore a primary object of this invention to provide an improved glide unit of the type employing a resilient cushion positioned between the button and the furniture leg, which allows the universal tilting of the stem with respect to the button without stressing the resilient cushion.

It is a further object of this invention to provide an improved tiltable glide unit of this type in which the supporting stem is stable in any position to which it is driven by the supported leg and the floor surface.

Other objects of this invention will be pointed out in the following detailed description and claims and illustrated in the accompanying drawing which discloses, by way of example, the principle of this invention, and the best mode which has been contemplated of applying that principle.

In the drawings:

FIG. 1 is a front elevational view, in section of the apparatus of the present invention.

FIG. 2 is a top plan view of the apparatus shown in FIG. 1.

FIG. 3 is side-elevational view, partially in section of the apparatus of FIG. 1 mounted on a furniture leg.

FIG. 4 is a perspective view of swivel ball joint member of the apparatus shown in FIG. 1.

In general, one embodiment of this invention comprises a glide unit for a furniture leg, allowing universal motion therewith after assembly including a metal button having a bottom face adapted to engage the floor with the button carrying a hollow resilient cushion. A semi-spherical contact and guide plate is rigidly secured to the upper surface of the cushion opposite that of the button and a cup-shaped furniture leg attaching device is provided which includes a bottom surface of concave configuration which cooperates with the semi-spherical contact plate to allow universal movement between the furniture leg and the glide button. A stem member extends upwardly from the button through the hollow cushion and means are provided for frictionally engaging the cup and the furniture leg to insure frictional engagement between the guide plate and the bottom surface of the furniture leg attachment cup. The improvement resides in rigidly securing a swivel ball joint member comprising a hollow cup to the hollow resilient cushion and providing on the upstanding stem member, a cooperating swivel portion or ball which allows universal tilting of the stem and furniture leg with respect to the button without stressing the hollow resilient cushion carried by the button with the contact plate acting to support the furniture leg on the glide unit.

Referring now to the drawings, there is shown a cup-shaped furniture leg attaching portion **10**, which has its bottom portion **12** bent upwardly to achieve a concave configuration with the bottom portion **12** being provided with a central aperture **14**. The glide unit further includes a polished floor-engaging button **16** comprising a sheet metal shell open at its top face and including inwardly directed terminal portions **18**, which are adapted to rigidly engage a hollow resilient cushion **20** which is inserted within the button **16**, the resilient cushion being constructed of rubber or like material. The resilient cushion **20** has a pair of internal bores **22** and **24**, the lower bore **24** located adjacent the inner surface of button member **16** being of somewhat greater diameter than the upper bore **22**. A guide plate **26** formed of sheet metal of similar construction to cup member and button **16** is mounted on the upper surface of the hollow resilient cushion **20** and is provided with a central, semi-spherical or convex portion **28**, which cooperates with the bottom surface **12** of cup **10**. In like manner to cup **10**, a central aperture **30** is provided on the plate or guide member **26** which in like manner to opening **14** allows a vertical metal stem **32** to extend upwardly and centrally of cup member **10**, guide member **26**, cushion **20** and button **16**.

The present invention is directed to an improved swivel arrangement between the elements making up the glide for allowing free universal movement between the furniture leg and the glide button **16** while preventing any abnormal stress upon the resilient cushioning member **20**. In this regard, a swivel ball joint member **34** formed of sheet metal and being generally cylindrical at the lower end is positioned within the smaller bore **22** of the resilient cushion and is rigidly locked to the cushion member by having its lower terminal edge **36** bent over to achieve frictional locking of the joint member to the resilient cushion **20**. The upper terminal portion **38** of the cylindrical swivel ball joint member **34** is bent inwardly to produce a semi-spherical configuration with the extreme

end of this member being open to form aperture 40 of a diameter slightly greater than the diameter of stem 32. A semi-spherical ball or swivel member 42 is mounted on the lower end of stem 32 adjacent the semi-spherical portion 38 of the swivel ball joint member allowing the ball joint member 38 to embrace closely the ball portion 42 to achieve the desired swivel joint between the stem 32 and the lower portion of the glide unit.

During the assembly, means are provided for coupling together the elements making up the structure, which include the use of an inner sleeve member 44 which is generally cylindrical in configuration but includes an outwardly projecting curved terminal surface 46 at the lower end thereof which seats against the inner surface of the bottom portion 12 of the leg mounting cup 10. The upper end of the cylindrical inner sleeve 44 is provided with an inwardly directed flange 48 terminating in an opening or aperture 50 of a diameter slightly in excess of the diameter of stem 32. The leg mounting cup 10 is adapted to receive a hollow tubular leg member (not shown) which is inserted within the cup 10 and is adapted to slide down along the inner wall and to be frictionally engaged by an umbrella element 52, which consists primarily of a rectangular member being bent downwardly at the four corners as indicated at 54 to provide locking clips which are somewhat resilient and act to frictionally engage the inner surfaces of a metallic hollow leg (not shown) which is inserted within the leg mounting cup 10. The manner in which the cup member 10 is attached to the leg is conventional and forms no part of the present invention, but the frictional engagement occurs primarily due to the inward or downwardly flexing of tips 54 as the leg is inserted within the cup member 10. Any attempt to remove the cup member 10 from the furniture leg results in an upward flexing of the tips 54 tending to further secure the hollow leg member within the cup 10.

The elements making up the glide unit are held in assembled relation by peening or otherwise deforming the upper end of stem 32 after assembly. One method of assembly may comprise inserting the cylindrical swivel ball joint member 34 within cushion member 20 and deforming terminal end 36 to securely lock this member to the cushion. After which, the shaft, including the ball portion 42, which may be integral or rigidly secured to the stem at this position, is inserted within the swivel ball joint member to achieve a universal connection at this point. The guide plate member 26 is positioned on the upper surface of the cushion member 20 and the leg mounting cup 10 is positioned axially thereon with the inner sleeve 44 and the umbrella 52 in place next, the protruding upper end 56 of stem 32 is peened over or deformed sufficiently to provide a lip portion 58 acting to position the members axially on shaft or stem 32 under slight compressive loading by initially compressing the resilient member 20 during assembly. After assembly of the cup member 10 and its elements, the intermediate plate member 28, the swivel ball joint member 34 and the resilient cushion 20, the cup-shaped button member 16 may be rigidly secured to the bottom surface of cushion 20 by deforming the sides of this member so that terminal portion 18 is driven into the body of the resilient cushion 20.

It is evident from reference to FIG. 3, that after the furniture leg is inserted within the leg mounting cup 10, the umbrella 52, frictionally engages the inner surface of the leg, with the result that any tilting of the furniture leg with respect to the normal axis of the glide member will result in tilting of stem 32. In response to such tilting movement, surface 12 of cup 10 will slide over the surface of contact member 28 and ball member 42 will rotate within ball joint member 34, the bottom surface of the button 16 remaining in contact with the floor. In the present improved structure, such tilting results only in the rotation of ball member 42 with respect to the swivel ball joint member 34, the axis of which also remains vertical regardless of the angular position to which the furniture leg is moved. Pivotal movement is enhanced, while at the same time there is no tendency to return the stem 32 to a vertical position regardless of the fact that the supported leg remains in a tilted position as indicated in FIG. 3.

While there has been shown and described, and pointed out the novel features of the invention as applied to a preferred embodiment, it will be understood that various omissions and substitutions and changes in the form and details of the device illustrated and in its operation may be made by those skilled in the art without departing from the spirit of the invention. It is the intention, therefore, to be limited only as indicated by the scope of the following claims.

What is claimed is:

1. In a tiltable glide including a button having a floor engaging surface, an annular resilient cushion secured to the button opposite the floor engaging surface, a support plate mounted on the cushion opposite the button, a leg engaging member slidably mounted on the support plate and forming with the support plate a load carrying universal action ball and socket, and a stem extending through aligned openings in the support plate and leg engaging member and operatively secured to the button and leg engaging member to maintain the glide in the assembled relationship, the improvement comprising the combination of a socket member received in the through-opening of the cushion and having an outwardly diverging terminal portion overlapping the cushion remotely of the load carrying ball and socket operable to limit movement of said socket member toward said load carrying ball and socket, said socket member having at its end adjacent the load carrying ball and socket a concave semi-spherical inner surface of radius of curvature smaller than and generally concentric of said load carrying ball and socket, said concave surface having an opening therein centrally thereof adapted to receive freely the stem, and a ball member secured to the stem having a convex semi-spherical surface complementary to and slidably engaging said concave surface of the socket member to define a retaining ball and socket at the button end of the stem.

2. A tiltable glide, comprising in combination, a button having a floor engaging surface, an annular resilient cushion secured to the button on the side thereof opposite the floor engaging surface, a first set of opposing rigid members abutting opposite sides of the cushion in line with the central opening thereof and restrained in movement toward one another by the resiliency of the cushion, said members having, respectively, a concave semi-spherical surface and a convex semi-spherical surface of different radii facing in opposite directions and having generally the same center of curvature, said members also having aligned openings centrally of the respective surfaces generally in line with the through-opening of the cushion, a stem of smaller transverse dimension than the aligned openings adapted to extend therethrough and be laterally movable therein limitedly before contact with the members, a second set of opposing rigid members disposed outwardly of the first set of members, said second set of members having, respectively, a convex semi-spherical surface and a concave semi-spherical surface adapted to face in opposite directions, be complementary to, and engage slidably the semi-spherical surfaces of the first set of members, said second set of members being operatively secured rigidly to the stem operable to maintain all of the members secured together, and means on the one member of the second set remote from the button adapted to be secured to the supported article of furniture.

3. A tiltable glide, comprising in combination, a button having a floor engaging surface, an annular resilient cushion secured to the button opposite the floor engaging surface, a support plate mounted on the cushion opposite the button, a leg engaging member on the support plate adapted to be secured to the supported article leg, the leg

engaging member and support plate having, respectively, complementary mating concave and convex semi-spherical surfaces slidably engaging to form a load carrying universal action ball and socket, a rigid socket member securely positioned in the through-opening of the annular cushion and having an outward diverging terminal portion overlapping the cushion remotely of the load carrying ball and socket operable to prevent movement of said socket member toward said load carrying ball and socket, said socket member having at its end adjacent the load carrying ball and socket a concave inner semi-spherical surface smaller than and generally concentric of said load carrying ball and socket, all of said semi-spherical surfaces being aligned and having therein aligned openings centrally thereof, a stem extending through the aligned openings and operatively secured at one end to the leg engaging member, and a rigid ball member secured to the other end of the stem having a convex semi-spherical surface complementary to and slidably engaging said concave surface of the socket member to form a retaining ball and socket.

References Cited in the file of this patent

UNITED STATES PATENTS

2,140,541	Moore	Dec. 20, 1938
2,666,608	Holm	Jan. 19, 1954
2,757,407	Kramcsak	Aug. 7, 1956