

April 15, 1941.

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2,238,705

FURNITURE LEG SHOE

Filed Sept. 20, 1939

2 Sheets-Sheet 1

Fig. 1.

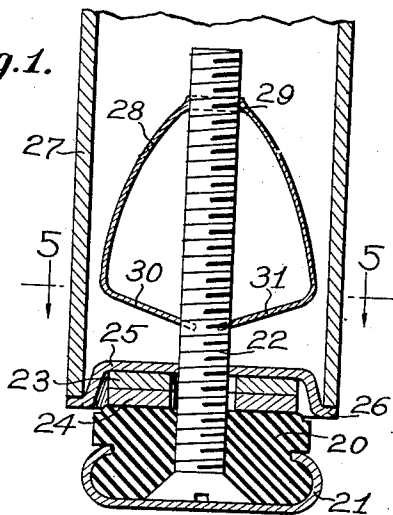


Fig. 2.

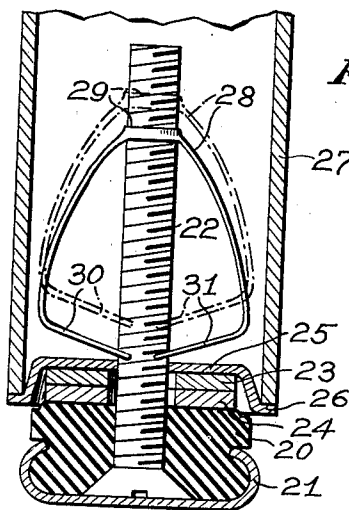


Fig. 3.

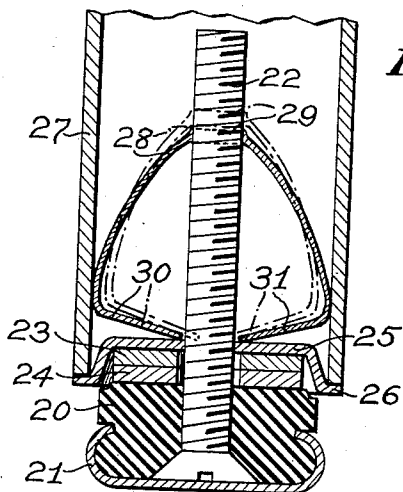


Fig. 4.

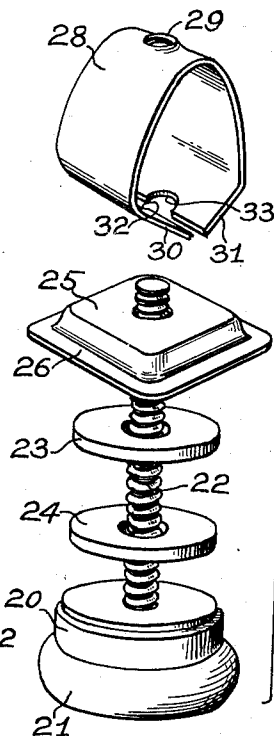


Fig. 5.

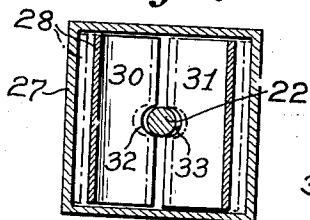
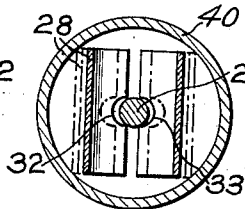


Fig. 6.



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2 Sheets-Sheet 2

Fig. 7.

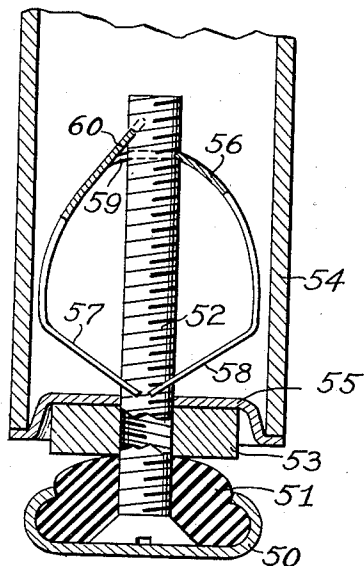


Fig. 9.

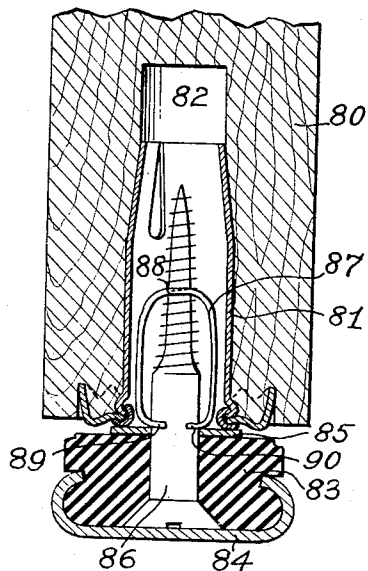


Fig. 8.

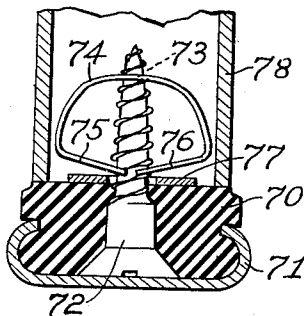


Fig. 10.

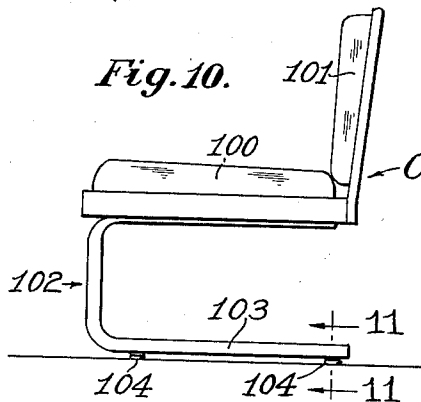
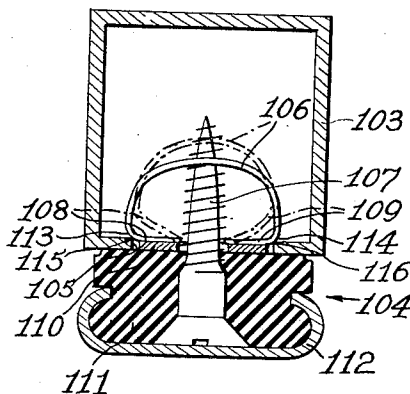


Fig. 11.



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## UNITED STATES PATENT OFFICE

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## FURNITURE LEG SHOE

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Application September 20, 1939, Serial No. 295,744

5 Claims. (Cl. 16—42)

This invention relates generally to securement means for furniture leg shoes and the like. In its more specific aspect it relates to shoes of this character that are intended to be secured to a furniture leg by insertion of a portion thereof into a hollow portion of the furniture leg.

While I will describe and illustrate my invention from the standpoint of its specific aspect, it will be understood that my invention is not to be so limited.

The general object of my invention is the provision in a furniture leg shoe in which term I include all floor engaging arrangements adapted for attachment to a furniture leg whether of the "glide" or "slide" type or of the "caster" type in which the floor engaging member is in the form of a rolling body, of a construction that is simple, effective and economical and that permits of ready application of the shoe to or removal thereof from a furniture leg without the use of tools.

Among the more particular objects of my invention is the provision in a furniture leg shoe of a construction whereby the shoe may be clamped in place on a furniture leg by manipulation of a protruding portion of the shoe, and may be removed from a furniture leg by manipulation of the same parts.

Among the particular objects of my invention is further the provision in a furniture leg shoe of a clamping member, whereby the shoe may be attached to a furniture leg, in the form of a member that is expansible to engage portions of the furniture leg, and the provision of means whereby a clamping member, such as just described, may be expanded or contracted by manipulation of a portion of the furniture leg shoe while the shoe is in place on the leg.

These objects and such other objects as will hereinafter appear or be pointed out are attained by the illustrative embodiments of my invention shown in the drawings, in which:

Figure 1 is a longitudinal sectional view through one embodiment of my invention shown inserted into a hollow furniture leg, without however being clamped in place;

Figure 2 is a view similar to Figure 1, showing an intermediate position of the parts in the operation of attaching the furniture leg shoe to a furniture leg;

Figure 3 is a view similar to Figure 1, but showing the parts as they appear when the furniture leg shoe is clamped in place in the furniture leg;

Figure 4 is an exploded view in perspective of

the parts constituting the furniture leg shoe of Figure 1;

Figure 5 is a sectional view, on a reduced scale, taken substantially on the line 5—5 of Figure 1, looking in the direction of the arrows;

Figure 6 is a sectional view, similar to Figure 5, but showing a furniture leg shoe of the type of Figure 1 as applied to a furniture leg having a circular cross section;

Figures 7 and 8 are sectional views similar to Figure 1 and each illustrative of a further embodiment of my invention, and portions of Figure 7 being broken away to disclose the underlying construction;

Figure 9 is a sectional view similar to Figure 1 of an embodiment of my invention adapted for insertion into a caster socket of conventional type such as is customarily used on wooden furniture legs;

Figure 10 is a side elevational view of a chair of the type in which the floor engaging portion is a horizontal tubular member, and shows a further embodiment of my invention applied thereto; and

Figure 11 is a sectional view on an enlarged scale, substantially on the line 11—11 of Figure 10, looking in the direction of the arrows.

In the first embodiment of my invention, as shown in Figures 1 to 5 inclusive, 20 designates a cushioning element, made of some elastic, compressible material, such as soft rubber, and this element is seated in a floor engaging cup shaped member 21, which is preferably made of some hard, smooth material that will slide over a floor without scratching it. While the cushioning element is shown as permanently mounted within the member 21, it may be found that for certain purposes a mounting that is not permanent is preferable.

Extending upwardly through the cushioning element, and having its head imbedded therein is shown a member 22, in the form of a screw, the function of which is to effect the clamping of the furniture leg shoe, as will appear hereinafter. The parts thus far described constitute a unit, all portions of which move together and serve for manipulation of the locking arrangement to be hereinafter described.

At 23 and 24 are shown washers seated on the cushioning element 20 which is shown as having a flat upper surface, and seated on the washer 23 is a flanged plate 25 which is adapted to receive on the flanges 26 thereof the end portions of a hollow tubular furniture leg 27. It will be observed that the leg 27 is square in cross section

(see Figure 5) for which reason the plate 25 is preferably also square. Besides serving to carry the leg 27 the plate 25 also serves to center the furniture leg shoe in relation to the leg.

Carried in threaded relation on the screw 22 is shown a resilient locking member 28 in the form of a split loop, having its bight portion in threaded relation to the screw 22 as by the threaded opening 29, while its lowermost portions, which are in the form of inwardly and downwardly extending arms 30 and 31 embrace the screw 22 and are provided with recesses 32 and 33 into which the sides of the screw 22 enter.

It will be observed by reference to Figure 4 that the loop is shown as made of sheet material in the form of a strip of uniform width and consequent cross-section throughout its extent, except at the points where the recesses 32 and 33 and the opening 29 are formed.

As already stated the screw 22, the cushioning member 20 and the cup 21 turn as a unit. It will be clear that as the screw 22 is turned, by turning the parts 20 and 21, while the locking member 28 is held against rotation within the square furniture leg (see Figure 5), the result will be a movement of the member 28 along the axis of the screw, in a direction dependent on the direction of turning of the screw.

By turning the parts 20 and 21 in the proper direction after the furniture leg shoe is inserted into the furniture leg as shown in Figure 1, the locking member 28 will first be caused to assume the position shown in full lines in Figure 2, in which the free end portions of the legs 30 and 31 have come into contact with the flanged plate 25. The change that has been effected will become clear by comparison of the full line position of the member 28 in Figure 2 with its dot and dash line position in said figure, the latter corresponding to the initial position of Figure 1.

Further turning movement in the proper direction causes an axial compression of the member 28, and a lateral expansion thereof. This lateral expansion may take place either as a bodily movement of the arms 30 and 31 outwardly, or as a swiveling movement of the arms 30 and 31 about the point of contact of their inner ends with the surface of the member 25, or finally as a combination of these two movements. It is this combinational movement that is illustrated in Figures 3 and 5.

As will be readily apparent on inspecting Figure 5, the clamping there shown is relatively weak, since further manipulation of the screw 22 to shorten the clamping member will cause the inner ends of the arms 30 and 31 to slide inwardly until they again strike the sides of the screw 22. On continued manipulation of the screw 22 beyond this point, a powerful clamping action may be obtained by the application of a relatively small force to the glide 21. The principles underlying this action will now be explained.

Assuming the parts as in Figure 3, except that the arms 30 and 31 instead of being spaced from the sides of the screw are in contact therewith, it will be obvious that on continuing the downward movement of the bight portion of the member 28, the arms 30 and 31 will pivot about their inner ends. Since these arms are almost horizontal, the path of their outer ends will be in a circular (or rather cylindrical) arc that is almost vertical and further is almost tangential to the vertical inner wall of the furniture leg. On continued downward movement of the bight portion of member 28, therefore, these arms will

tend to wedge themselves in place between the screw 22 and the walls of the furniture leg, and the leverage of the wedging action will be considerable because of the near tangential paths of the outer ends of the arms. In fact, due to bending of the arms 30 and 31, which is resisted by the resiliency of the material of which they are made, the path may become tangential; in this case the resistance to bending of the arms 30 and 31 limits the maximum pressure they are capable of exerting.

The advantages of having the arms 30 and 31, that is the horizontally arranged portions of the clamping member, positioned at the bottom of the clamping member rather than at the top thereof, are that when they are at the bottom the points thereof at which they contact the inner walls of the tube move downwards a substantial distance relatively to said walls, which has the effect of drawing the member 22 and the parts on which it is carried into the furniture leg. If approximately horizontal portions corresponding to the arms 30 and 31 were positioned at the top of the clamping member the above referred to downward movement would still take place but it would be much smaller in extent and the inward drawing effect would be much smaller.

It will be observed that when the weight of the furniture rests on the flanged plate 25, the cushioning element will be compressed and the plate 25 will move down, thereby, at least in part, relieving the tension on the member 28. The clamping force may in fact be so regulated that when the weight of the furniture rests on the shoe the latter is loose in the leg. As soon as the furniture leg is lifted, however, the shoe automatically assumes its clamped position. This action is of advantage in prolonging the life of the locking member 28 by reducing the tension to which it is subjected.

To remove the shoe from the furniture leg obviously requires a turning of the parts 20 and 21 in a direction reverse to that in which they are turned when the shoe is clamped in the leg. In Figure 6 I have indicated the application of a shoe such as just described to a tubular leg of circular cross section designated by the numeral 40. The parts of the shoe have been numbered as before. While obviously the locking member 28 is not held against rotation in the round leg of Figure 6 as it is in the square leg of Figure 1, I have found that if the member 28 is expanded sufficiently to frictionally engage the walls of the tubing when it is inserted therein, it will be held against rotation sufficiently to permit the production of a greater clamping force.

In Figure 7 I have shown a second embodiment of my invention. It comprises, like the first embodiment, a rigid floor engaging member 50, within which is seated a resilient cushioning member having the head of a screw 52 imbedded therein. Instead of the washers 23 and 24, however, I have shown a nut 53 threaded on the screw 52, so that pressure of the furniture leg 54 on the flanged plate 55 is not transmitted to the cushioning member 51, which consequently is not compressed, with the result that the tension relieving action described in connection with the preceding embodiment cannot take place.

The locking member 56 is in general similar to the locking member 28, having arms 57 and 58, corresponding to the arms 30 and 31 of the member 28. Instead of the threaded opening 29 however I have shown a plain opening 59, one

side of which engages the screw 52, while from the opposite side projects a tongue 60 struck up out of the member 56 and engaging the opposite side of the screw 52. For better engagement the end of the tongue may be concaved to conform to the contours of the screw 52.

The top of the cushioning member 51 is rounded as shown at 61 instead of flat as in the preceding embodiment, and this permits a limited tilting movement of the parts 50 and 51 relatively to the screw 52 and the nut 53, which is more or less prevented by the flat top construction of the cushioning member 20 of the embodiment of Figure 1.

The functioning of this embodiment is similar to that of the first described embodiment and therefore needs no detailed description. However it is to be observed that this embodiment permits of a manipulation in which the nut 53 is first turned on the screw 52, so as to bring the ends of the arms 57 and 58 into contact with the plate 55, or even to tension them initially, and the shoe is then mounted on a leg, after which the parts 50 and 51 are manipulated to effect the clamping.

The embodiment of Figure 8 comprises a cushioning member 70 and a floor engaging cup shaped member 71 carried thereby. These are similar to the corresponding parts of the embodiment of Figure 1. Imbedded in the member 70 is a threaded member 72, shown as in the form of a wood screw, which is in threaded engagement with an opening 73 in the resilient locking member 74, which is similar to the locking member 23, but is shown relatively shorter and broader, so that its arms 75 and 76 are almost horizontal. A washer 77 is interposed between the locking member 74 and the cushioning member 70 and serves as an abutment for the locking member. It will be observed that the washer 77 is of restricted diameter so that the furniture leg 78 rests directly on the cushioning member 70.

While in general this embodiment functions like the foregoing embodiments it will be observed that since there is no element like the washers 24 and 23 or the nut 53, to distribute the pressure of the furniture leg on the cushioning member 70, the latter may be locally compressed and thereby relative tilting of the leg of the shoe is possible. Due to the friction between the furniture leg and the relatively soft cushioning member there is less tendency for accidental rotation of the shoe relatively to the leg than where an unyielding contact, such as that of metal to metal is used, and any tendency for the shoe to work loose is thereby lessened. Due to compressibility of the member 70, the tension relieving action of the first embodiment is a property of the embodiment of Figure 8.

In Figure 9 I have shown the application of my invention to a caster socket of the conventional type used on wooden furniture legs. In this figure the furniture leg is shown at 80, and a conventional caster socket at 81, and the latter is driven into a bore 82 of the leg 80.

The floor engaging unit again comprises a resilient cushioning member 83 seated in a rigid cup 84 that is adapted to have its outer surface glide over the floor. On the flat upper surface of the cushioning member 83 seats a washer 85 and this is adapted to receive the pressure of the furniture leg thereon, this being transmitted through the caster socket 81 which rests on the washer. As in the other embodiments, a threaded member, such as the wood screw 86 has

one end imbedded in the cushioning member, so that the screw 86 the cushioning member 83 and the floor engaging cup 84 all move as a unit. The locking member 87, in the form of a resilient open loop as before, is in threaded engagement with the screw 86 as indicated at 88, and its two legs 89 and 90 are adapted to glide in opposite directions over the washer 85. It will be observed that the locking member is relatively long and narrow, whereby it is adapted to secure a firm hold on the inner walls of the caster socket.

My invention is further adapted for use with the currently popular styles of furniture in which the floor engaging portion is a length of tubing. In Figure 10 I have shown an example of such furniture in the form of a chair C, having a seat 100, a back 101 and a supporting arrangement in the form of bent tubing 102, the lowermost portions 103 of which are adapted to rest on the floor. In Figure 10 I have shown two shoes 104 of my improved type applied to a leg 103, and the details of this construction are shown in Figure 11, which represents a section through the leg 103 and a shoe 104, on an enlarged scale.

On referring to Figure 11, it will be observed that the leg 103 is of square cross section. However it will be obvious, when the principles of my invention are better understood, that it is equally applicable to legs of other sectional contours, such as circular sections, for example.

On the lower side of the leg 103 is an opening 105, sufficiently large to admit the resilient locking member 106 of the shoe 104. The opening 105 may be assumed for simplicity of explanation and illustration to be square; it will become apparent, as the description proceeds, that it might have other configurations, such as a circular contour.

The locking member 106 is shown in threaded engagement with the screw 107, shown as a wood screw, and its lower legs 108 and 109 have their end portions in sliding engagement with the washer 110, which seats on the flat upper surface of the cushioning member 111, having its lower portions surrounded by the cup shaped floor engaging member 112. As in the other embodiments the screw 107, the cushioning member 111 and the cup 112 are fixedly related so as to form a unit by manipulation of which the locking of the shoe in the leg will result. Such manipulation for the purpose of locking has the effect of first shortening the locking member 106, the initial position of which will be one such as indicated in dot and dash lines in Figure 11, and in causing a lateral spreading of the same into some such position as shown in full lines in Figure 11, in which the outer portions 113 and 114 of the legs 108 and 109 overlap wall portions 115 and 116 of the tube 103; so that the shoe 104 is locked in place in the leg 103. The locking, in this case, is effected by the lower portions of the locking member 106 instead of by the side portions as in the preceding embodiments. Removal of the shoe may be effected by first turning the floor engaging portion in a direction to contract the locking member, and then drawing it through the opening in the leg. To prevent rotation of the locking member during this operation it may be drawn outward during the manipulation so that it catches on the edges of the opening.

It is to be understood that while my invention has been described in connection with furniture

leg shoes of the "glide" or "slide" type, that it is equally applicable to furniture leg shoes of the "caster" types.

While the locking members of the various embodiments have been described as of resilient material, my invention also contemplates the use of locking members that are not resilient, or resilient only to a limited degree. With such constructions the locking member will be permanently deformed when once clamped on a furniture leg, so that it will be unfit for use thereafter such non resilient or partly resilient constructions however have the advantages of cheapness, and for certain purposes may be found preferable.

While I have herein disclosed several illustrative embodiments of my invention it will be understood that the same may be embodied in many other forms without departing from the spirit thereof, as will be obvious to those skilled in the art, and that the disclosure herein is by way of illustration merely and is not to be interpreted in a limiting sense, and that I do not limit myself other than as called for by the language of the claims.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent, is:

1. A furniture leg shoe comprising a floor-engaging portion provided with a shoulder serving as a seat for a furniture leg and with an abutment, a clamping member comprising a vertically elongated split loop having a pair of lateral sections diverging relatively steeply downwardly and outwardly from a bight portion and an inwardly and slightly downwardly directed arm attached to the outer end of each section, whereby said arms are nearly horizontal, said arms being shorter than said sections and having their free ends in spaced adjacency to each other, stop means for limiting inward movement of said free ends of said arms, and means for moving said bight portion towards said shoulder by movement of said floor-engaging portion, whereby, on continued movement of said bight portion, the ends of said arms will engage said abutment and said stop means and will pivot about their free ends, whereby said clamping member will be contracted vertically and expanded laterally and the outer ends of said arms will move in an arc that is substantially vertical, whereby said arms will more closely approach the horizontal and whereby when said clamping member is inserted into the end of a tubular furniture leg having a suitably dimensioned bore and so that its end seats on said shoulder, said clamping member will engage the walls of said bore because of the lateral component of movement of said arms.

2. A furniture leg shoe comprising a floor-engaging portion and a leg engaging portion, a threaded member projecting upwardly from said floor-engaging portion, said member being anchored to said floor-engaging portion so as to turn therewith, a split resilient loop having its bight portion in threaded engagement with said member, said loop being in the form of a continuous strip of sheet material of substantially uniform cross-section throughout substantially its length and having two outwardly bowed legs extending downwardly from its bight portion, and the end portion of each leg being in the form of an inwardly directed arm terminating adjacent the threaded member and directed downwardly and inwardly towards said

threaded member and the remaining portion of each leg being of greater length than said arm and extending from the outer end of said arm upwardly and inwardly towards the bight portion, and said remaining portion where it joins said bight portion being directed substantially transversely thereto, whereby pressures transmitted by said remaining portion to said arm are directed transversely to the end of said arm, an abutment on said leg-engaging portion against which the inner free ends of said arms may bear, and a shoulder on said leg-engaging portion for seating a furniture leg portion, whereby when said leg-engaging portion is inserted within the end of a tubular furniture leg having a bore approximating the transverse width of said loop in its normal conformation, with the end of the furniture leg seating on said shoulder, the ends of the arms of said loop may be caused to press against the walls of said leg by lateral expansion thereof resulting from axial compression of the loop between the bight portion and the abutment which may be accomplished by rotating said leg-engaging member relatively to said loop, and whereby said arms are caused to pivot substantially about a point on said abutment adjacent said threaded member so as to move substantially in a vertically directed arc, thereby wedging themselves between said pivoting point and the wall of said furniture leg.

3. In a furniture leg shoe adapted for attachment to a hollow furniture leg, said shoe comprising a floor-engaging portion provided with a shoulder and a leg-engaging portion adapted for insertion into the furniture leg and comprising an abutment on said shoulder and at least one element adapted to pivot about the meeting point of said abutment and said shoulder, said element having an outer bore-wall engaging portion and an inner pivoting portion adapted to pivot about said meeting point and being of such a configuration and dimensions that when it is moved pivotally about said meeting point with said wall-engaging portion moving downwardly said wall-engaging portion will move into contact with the wall of the bore of said furniture leg at a point slightly above the level of said meeting point, and on continued movement will wedge itself between said abutment and the wall of the bore of the furniture leg by a movement of said wall-engaging portion relatively to said bore-wall that approaches a tangential movement and thereby hold said leg engaging portion within said furniture leg, and means to cause said element to move pivotally about said abutment so as to approach its horizontal position, said means applying a force to said element in a direction substantially approaching the vertical.

4. A furniture leg shoe comprising a resilient floor engaging member provided with a threaded extension, a shoulder on said floor engaging member, a split, resilient, looped member having its bight portion in threaded engagement with said threaded extension and having its free end portions turned inwardly and slightly downwardly so as to be nearly horizontal, stop means for limiting the inward movement of the tips of said free end portions and other portions extending from the outer ends of said end portions upwardly and slightly inwardly toward said bight portion in a generally vertical direction, whereby when said threaded member is turned in one direction said bight portion will travel toward said shoulder, and after said free ends contact the shoulder and the stop means the looped member

will be caused to contract axially of the threaded member and to expand laterally thereof, due to the angling of said end portions, so as to increase the lateral pressure thereof against the inner walls of a tubular furniture leg when said looped member is inserted in the end of such a tubular furniture leg having an internal diameter approximating the horizontal distance between the outer ends of said end portions in their normal unexpanded position, and less than the maximum horizontal distance between said end portions when the looped member is in its position of maximum lateral expansion.

5. A furniture leg shoe comprising a resilient floor engaging member provided with a threaded extension, a shoulder on said floor engaging member, a split, resilient looped member having its bight portion in threaded engagement with said threaded extension and having its free end portions turned inwardly and slightly downwardly so as to be nearly horizontal, stop means for limiting the inward movement of the tips of said free

end portions, and other portions extending from the outer ends of said end portions upwardly and slightly inwardly toward said bight portion in a generally vertical direction, whereby when said threaded member is turned in one direction said bight portion will travel toward said shoulder, and after said free ends contact the shoulder and the stop means the looped member will be caused to contract axially of the threaded member and to expand laterally thereof, due to the angling of said end portions, so as to increase the lateral pressure thereof against the inner walls of a tubular furniture leg when said looped member is inserted in the end of such a tubular furniture leg having an internal diameter approximating the horizontal distance between the outer ends of said end portions in their normal unexpanded position, and less than the maximum horizontal distance between said end portions when the looped member is in its position of maximum lateral expansion.

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