

May 28, 1957

A. J. MATTER

2,793,467

FOOT ADJUSTERS FOR ENCLOSED APPLIANCES

Filed March 12, 1954

4 Sheets-Sheet 1

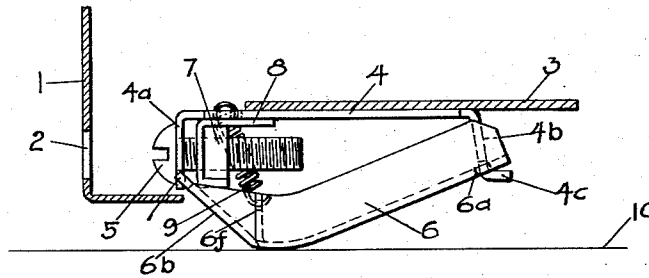


Fig. 1

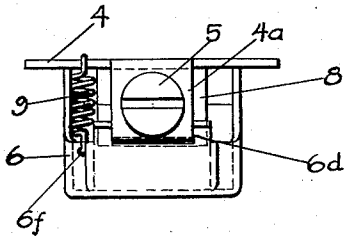


Fig. 2

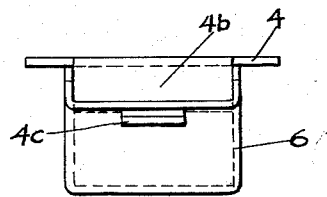


Fig. 3

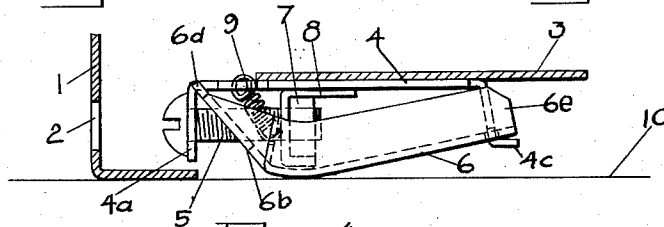


Fig. 4

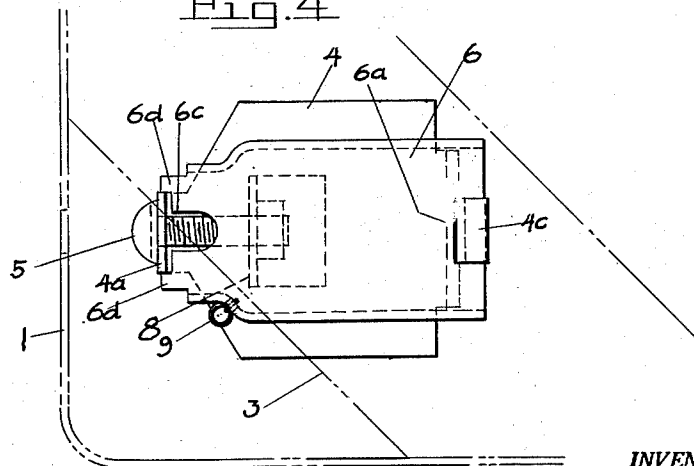


Fig. 5

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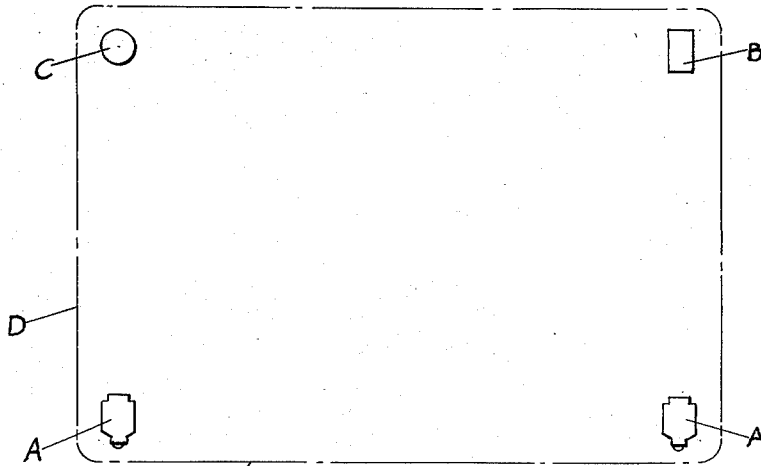


Fig. 6

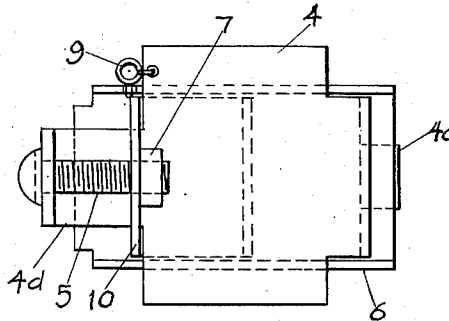


Fig. 7

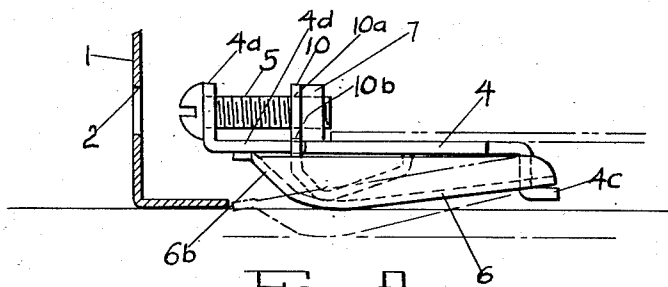


Fig. 8

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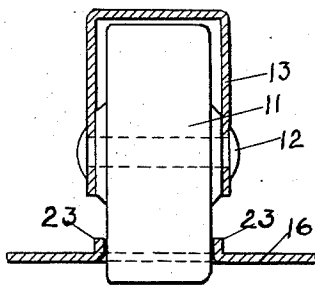


Fig. 9

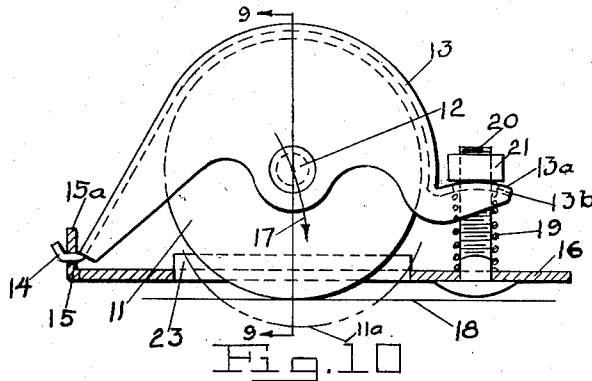


Fig. 10

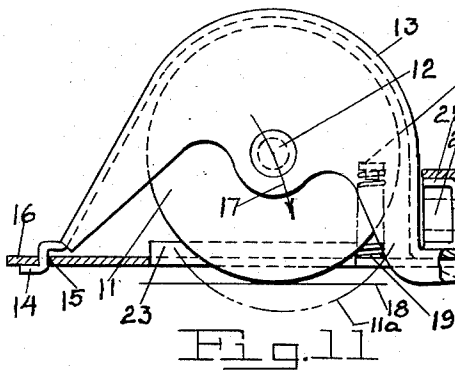


Fig. 11

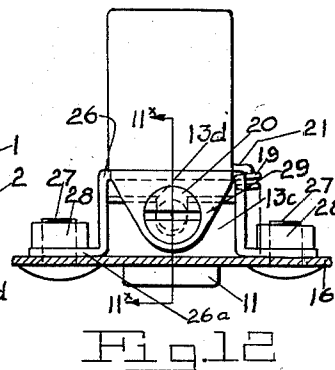


Fig. 12

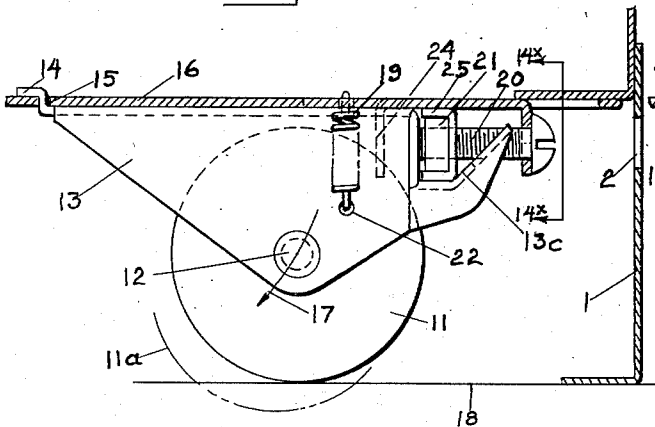


Fig. 13

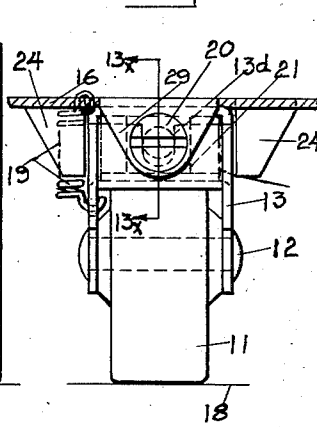


Fig. 14

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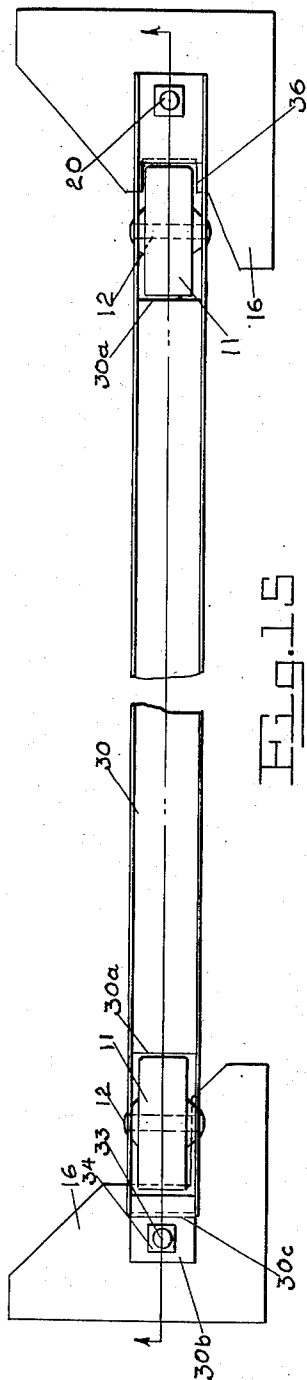


Fig. 15

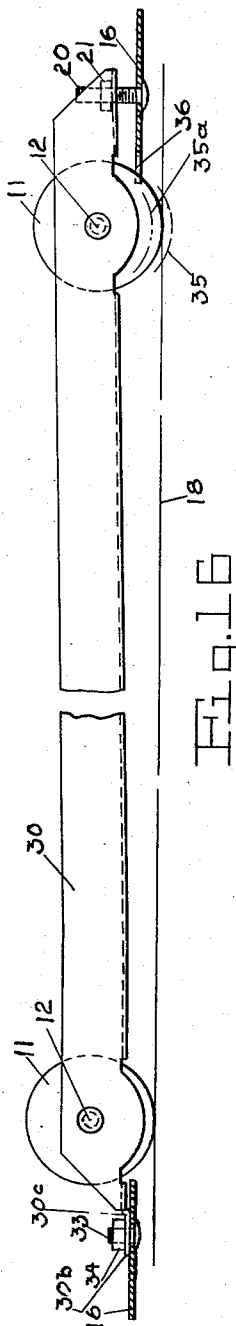


Fig. 16

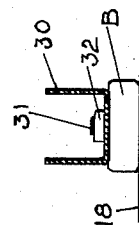


Fig. 17

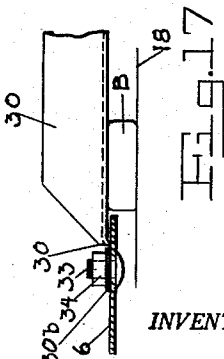


Fig. 18

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FOOT ADJUSTERS FOR ENCLOSED APPLIANCES

Albert J. Matter, Park Ridge, Ill.

Application March 12, 1954, Serial No. 415,931

16 Claims. (Cl. 45—137)

This invention relates to improvements in foot adjusters for enclosed appliances and has for its object to provide such means enclosed within the cabinet or casing of an appliance such as automatic washing machines, driers, ranges, refrigerators or other such enclosed appliances and adjustable through small apertures in the front wall of said cabinet or casing by means of screw driver or key, or through a front panel or drawer-opening with a wrench or other small tool.

Another object is to provide devices for this purpose, readily attachable to gussets or other frame members of such appliances or cabinets thereof and of relatively inexpensive construction.

Another object is to provide a plurality of supports for such appliances or cabinets, two of which are adjustable from without, to level the appliance front to back and side to side, and one or more of which automatically adjusts to provide 4 point support and eliminate wobble of said appliance or cabinet.

Another object is to provide such adjustable supports with rollers to permit easy removal and replacement of an appliance from and toward a wall for the purpose of cleaning back of the appliance or decorating the wall, such supports being adjustable for leveling the appliance when in place for use.

I attain these objects by means of the devices shown in the accompanying drawings in which:

Fig. 1 is a side elevation of one of the front feet, with an appliance cabinet wall and gusset in cross section, and the foot adjusted to raise the appliance cabinet corner to maximum upward position.

Fig. 2 shows a front elevation of the aforesaid adjustable foot.

Fig. 3 is a rear elevation of the same.

Fig. 4 shows a side elevation similar to Fig. 1 but with the foot adjusted to lower the cabinet corner to its lowest position.

Fig. 5 is a bottom view of the parts shown in Fig. 4 with the cabinet corner and the diagonal gusset outline.

Fig. 6 shows the outline of an appliance cabinet or casing with two front manually operable adjusters, one rear automatic adjuster, and 1 rear non-adjustable support, all in plan view, as shown in Fig. 6 of my co-pending application, Serial No. 390,599.

Fig. 7 is a plan view of a modified form of adjuster.

Fig. 8 shows a side elevation of the same.

Fig. 9 is a rear elevation, partially in cross-section, of Fig. 10.

Fig. 10 shows a side elevation of an adjuster having a roller for supporting an appliance and provided with a vertical adjusting screw.

Fig. 11 is a side elevation, partially in cross-section, showing a roller adjuster with a horizontal adjusting screw operable with a screw driver through an orifice in the cabinet wall.

Fig. 12 is a front elevation of the same.

Fig. 13 shows a side elevation of a modified form of roller adjuster.

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Fig. 14 is a front elevation of the same.

Fig. 15 shows a plan view of a two-roller adjusting unit.

Fig. 16 is a side elevation of said two-roller adjuster.

Fig. 17 shows a modified form of adjusting unit similar to that shown in Fig. 16 but provided with an automatic adjuster in place of the rear roller.

Fig. 18 is a front elevation of the same showing the channel shaped cross member in cross section.

Like numerals of reference indicate similar parts throughout the several views.

1 indicates the lower front wall of an appliance cabinet with an orifice 2 through which a screw driver or key may be inserted to adjust the cabinet to level position.

3 is a gusset plate attached to the cabinet. A base-plate 4 is attached to the gusset 3, as by spot welding or with screws, rivets or bolts. If preferred this base plate 4 may be a part of the said gusset stamped from the same piece. Base plate 4 is provided with a down-turned ear 4a, perforated to receive a screw 5 and a down-turned end 4b having a tongue 4c, part of which extends horizontally as shown in Figs. 1 and 4.

6 indicates a U-shaped shoe perforated at 6a for hingedly attaching it to said tongue 4c. The front end of shoe 6 is inclined upwardly at 6b to provide a cam surface and has an opening 6c to clear screw 5. It is also provided with ears 6d which slidably engage down-turned ears 4a on base plate 4 to guide the front end of shoe 6 throughout its adjustment. 10 indicates a floor upon which the shoe 6 rests.

A nut 7 and U-shaped cam 8 are mounted on screw 5 so as to slide between base-plate 4 and inclined front end 6b of shoe 6, thus providing means for adjusting shoe 6 from the position shown in Fig. 1 to that shown in Fig. 4 or vice versa, without moving screw 5 from its position relative to orifice 2 in cabinet 1. If preferred, the cam 8 and nut 7 may be combined into a single unit.

Shoe 6 may be modified to eliminate the side walls 6e which are provided for greater strength when thin material is used.

To hold shoe 6 up against cam 8 a spring 9 is provided with one end attached to shoe 6 through a hole 6f and the other end to base plate 4. It is obvious that other spring means may be applied to serve this purpose.

In the modified form shown in Figs. 7 and 8 the ear 4a is bent upwardly and the cam indicated at 10 is formed upwardly and provided with orifice 10a for screw 5 and orifice 10b adapted to slidably surround extension 4d on base-plate 4.

When it is desirable, as with ranges for instance, to occasionally move an appliance from a wall or recess for cleaning or decorating, the adjusters may be provided with rollers as shown in Figs. 9 to 16 inclusive. Referring to these illustrations 11 indicates a roller mounted for rotation on rivet 12 carried in a housing 13 having a bent end 14 adapted to hingedly engage a slot 15 provided in an appliance gusset indicated at 16. The said hinged connection permits adjustment of the roller in the direction of the arrow 17 and thereby raises or lowers a corner of the appliance to or from the floor line indicated at 18. A spring 19 normally holds the roller upwardly until forced down by an adjusting screw 20 and nut 21. In Fig. 10 the spring 19 surrounds the screw 20. In Figs. 11 and 12 spring 19 is connected with a bent ear 21 formed in the side of housing 13. In Figs. 13 and 14 spring 19 engages an orifice 22 in a side wall of housing 13 and is supported by hooking its upper end in an orifice in gusset 16.

To hold the rollers in position against side movement the gussets 16 shown in Figs. 9-10 and 11 are provided with guide surfaces 23.

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In the form shown in Figs. 13 and 14 the guides consist of ears 24 bent downwardly from gusset 16.

For the purpose of vertically adjusting the roller 11 as shown in Fig. 10 housing 13 is provided with a horizontally extending portion 13a having an orifice 13b which surrounds screw 20. Adjustment of this type is by means of nut 20.

In Figs. 11 to 14 inclusive housing 13 is provided with an inclined cam surface 13c on which a cam-piece 25 rests. Said cam-piece 25 carries nut 21 on screw 20 and is slidably supported by gusset 16 as shown in Fig. 13 or by a cam-housing 26 which may be attached to gusset 16 by screws 27 and nuts 28 or by rivetting or welding or it may be formed as a part of the said gusset. For support of the screw head 20 an ear 29 is formed downwardly from gusset 16, Figs. 13 and 14 or from cam housing 26 as shown in Figs. 11 and 12. Although in these forms of the invention a roller on the housing is the element that rests on the floor, the housing serves the same purpose as do the shoes in Figs. 1-5; the roller simply serving as antifriction means. Therefore the housings may be called shoes provided with means to secure a rolling contact with the floor, instead of a mere sliding contact.

Housing ends 13c are slotted at 13d to pass screw 20.

Vertical adjustment of roller 1 is accomplished by means of a screw driver or key inserted through orifice 2 in appliance cabinet wall 1 and turning screw 20 so as to move the cam-piece 25 along the cam-surface 13c.

For the purpose of simplified description the foot or roller adjuster is referred to as unit A and is so indicated in Fig. 6. D in Fig. 6 indicates the outline of an appliance cabinet and 1 indicates the front thereof. In the preferred assembly two units A are attached at the front corners of the appliance as shown in Fig. 6 and at B is indicated an automatic adjuster which may be of the type shown in my co-pending application Ser. #390,599. At c a plain non-adjustable foot may be used.

The procedure for installation of an appliance equipped with these units is as follows:

Front adjusting units A have the shoes or rollers adjusted upwardly to their limit, which can be done during assembly at the factory. In this position of the front adjusters the appliance is tilted slightly downward at the front.

The appliance D is now slid backwardly into its intended location, causing the automatic unit B to adjust upwardly.

Unit A opposite unit C is next adjusted to level the appliance from front to back.

To level the appliance from left to right, unit A opposite unit B is next adjusted in the same manner.

If the center of gravity is toward the unit B slight downward pressure may be applied on the corner diagonally opposite unit B so as to provide 3 point bearing on units A and C, which will permit unit B to automatically adjust downwardly to the floor and thus provide 4 point bearing.

A modified form of adjusting unit is shown in Figs. 15 to 18 inclusive in which a relatively long bridge member extends from front to rear of an appliance and carries two supporting members such as rollers or one roller at the front end and an automatic adjuster B at the rear end. The aforesaid bridge member is indicated at 30 and is channel shaped for stiffness as shown in Fig. 18. Rollers 11 are rotatably mounted on rivets 12 carried in the side walls of bridge member 30 and said rollers protrude through openings 30a provided in bridge member 30 so that they may rest on floor 18. When automatic adjuster B is provided opening 30a is omitted at this point and adjuster B is attached as by a screw 31 and nut 32 or by any other suitable means such as rivetting, or welding. Adjuster B may also be of the type shown in my co-pending application, Ser. No. 309,449, now Patent No. 2,682,131, granted June 29, 1954.

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Bridge member 30 is provided at the rear with an extension 30b attachable to rear gusset 16 by means of a screw 33 and nut 34. As extension 30b is relatively thin it permits bending or hinge action at 30c when the opposite or front end is adjusted up or down. This adjustment is accomplished by means of a screw 20 and nut 21 shown in Fig. 16. Screws 20 are preferably of the carriage-bolt type with a square shoulder held in a square hole in the front gusset 16 and pass freely through a hole in the bottom of bridge member 30. 35 and 35a indicate the lower and upper adjusted position of roller 11 which is guided against excess side movement by side edges of a notch 36 in gusset 16.

The aforesaid bridge type adjusting unit is particularly desirable as an accessory unit for optional attachment upon installation of an appliance or later.

It will be noted that all of the aforesaid adjusting units are of the hinge type and readily accessible for adjustment from the front of an enclosed appliance and provide for leveling the appliance and eliminating wobble by means of a constant 4 point support.

What is claimed is:

1. In a foot-adjusting unit, a base plate having a screw receiving orifice and a hinge connection, a shoe member hingedly attachable thereto at said connection and having a cam surface, a cam piece engageable with and operable on said cam surface, and a screw mounted in said base plate orifice and engaged with said cam piece to move it and thereby adjust the shoe.

2. A foot adjusting unit comprising a shoe hingedly attachable to a device to be supported thereon and having a cam surface, a cam piece slideable under said device and co-operating with the cam surface of said shoe to raise or lower the free end of said shoe and a headed screw carried by said device in a horizontal position and immovable in a horizontal plane relative to said device and threaded into said cam-piece for the purpose of moving the cam-piece to or from the screw head.

3. A hingedly mountable roller carrying housing having a projection extending from its free end for surrounding a screw, spring means for resiliently supporting said free end, a nut on said screw for adjusting the vertical position of said roller housing free end and guide means limiting side movement of said roller.

4. A combination forming an adjustable foot structure, including a shoe member, a second member, a hinge connection between one end of the shoe member and said second member, a spring connection between said members, and means, including a screw, cooperating with said members to create relative swinging movements of the latter in opposition to the spring while permitting reverse relative movements independent of the screw.

5. A combination as set forth in claim 4, wherein the shoe member is provided with a roller for contact with the floor.

6. A combination as set forth in claim 4, wherein the second member is a part of the appliance to be supported.

7. A combination as set forth in claim 4, wherein the second member and the shoe form part of a complete, self-contained unit adapted to be attached to an appliance.

8. A combination as set forth in claim 4, wherein the means for creating the relative movements between the shoe member and the second member in opposition to the spring includes a cam piece between and slidable along the said members and the screw is connected to the cam piece to move it.

9. A combination as set forth in claim 4, wherein the means for creating the relative movements between the shoe member and the second member includes a cam piece between and slidable along said members, and the screw is screwed into the cam piece; and wherein the second member has an orifice through which the screw extends loosely, and the screw has thereon a part for

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engaging said second member to limit lengthwise movement of the screw in one direction.

10. A vertically adjustable foot structure for an appliance to be supported, comprising a first member adapted to be secured in fixed relation to the appliance, a shoe member underlying said first member and hinged thereto at one end for relative vertical swinging movements, and means, including a screw, cooperating with said members to limit the upward swinging movements of the shoe member.

11. A vertically adjustable foot structure for an appliance, comprising a base member, a shoe member underlying the base member and hinged thereto for relative vertical movements, the shoe member having on its upper side, near the free end, a cam surface, a cam piece between and engaged with said cam surface and the under side of the base member, a part on the base member containing an orifice, and a screw extending loosely through said orifice and into screw-threaded relation to the cam piece.

12. A vertically adjustable foot member for an appliance comprising a first member for use in fixed relation to the appliance, a shoe member overlying the first member and hinged at one end thereto for vertical swinging movements, said first member having therein, below the shoe member, an opening, a roller on the shoe member and projecting down through said opening, and means, including a screw, cooperating with said members to vary the height through which the free end of the shoe may rise.

13. A structure as set forth in claim 12, wherein the means for controlling the height to which the free end of the shoe member may be lifted includes a cam piece between and slidable along the two relatively movable members; while the screw is screwed into the cam piece, extends loosely through an orifice in the second mem-

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ber, and has thereon a part for engaging the latter member for limiting the lengthwise movement of the screw in one direction.

14. A combination adapted to serve as an adjustable foot for an appliance, comprising a first member adapted to be attached to the latter, a shoe member hinged at one end to the first member, the shoe member having at its free end a cam surface facing the first member, a cam block in the space between said cam surface and a surface on the first member and being slidable along the latter surface, and a screw extending through a part on said first member and into the cam block to slide the block along said surfaces to shift the shoe member.

15. A combination as set forth in claim 14, wherein the cam block serves as a stop to determine the upward limit of movement of the free end of the shoe.

16. A combination as set forth in claim 15 having, in addition, a spring between the said members to hold the cam surface of the shoe member yieldingly against the cam block.

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