

Oct. 20, 1970

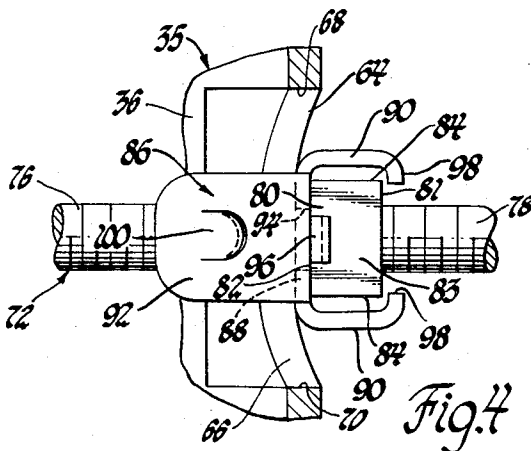
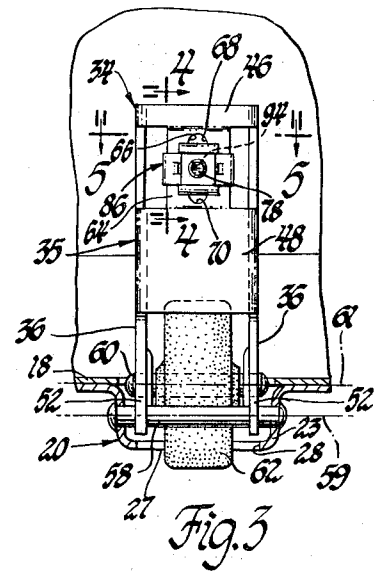
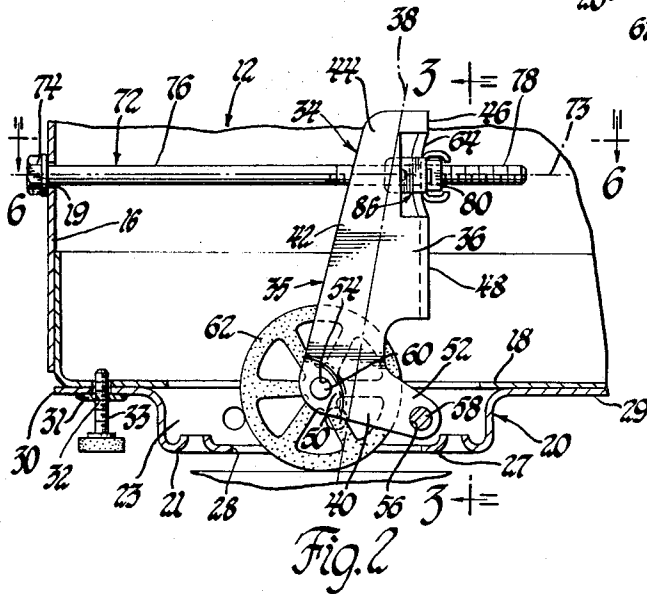
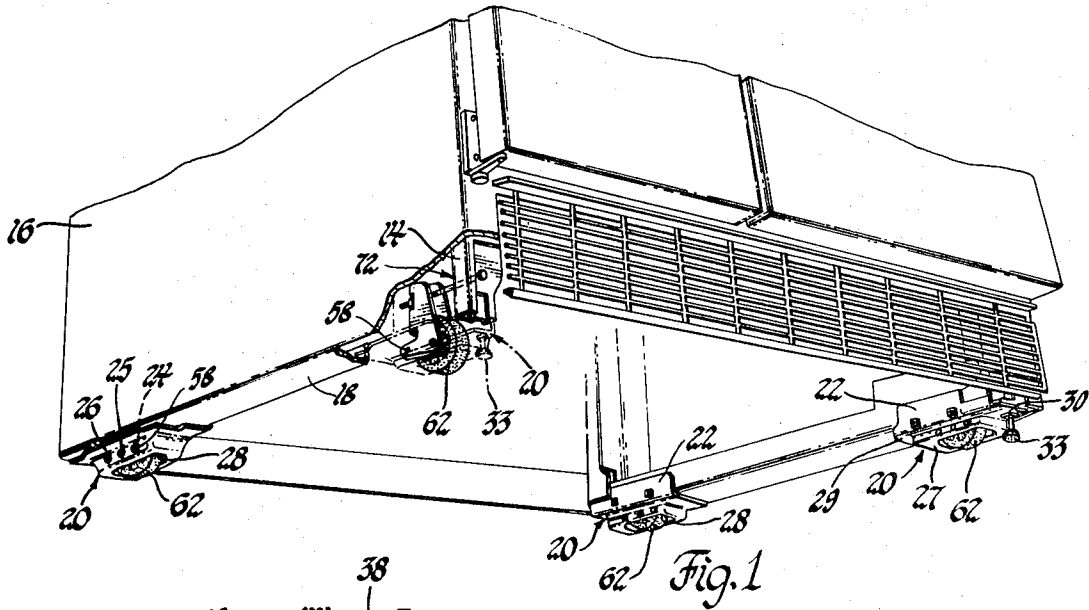
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3,534,430

HEIGHT ADJUSTABLE CASTER MECHANISM

Filed April 3, 1969

2 Sheets-Sheet 1



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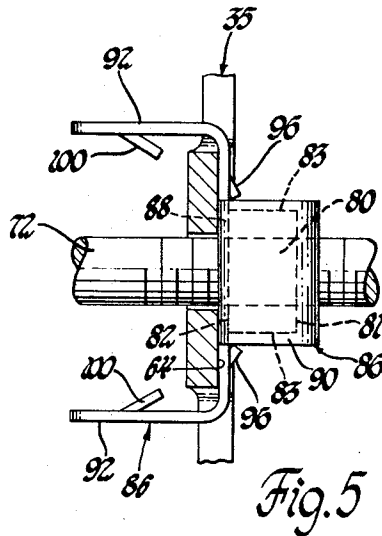


Fig. 5

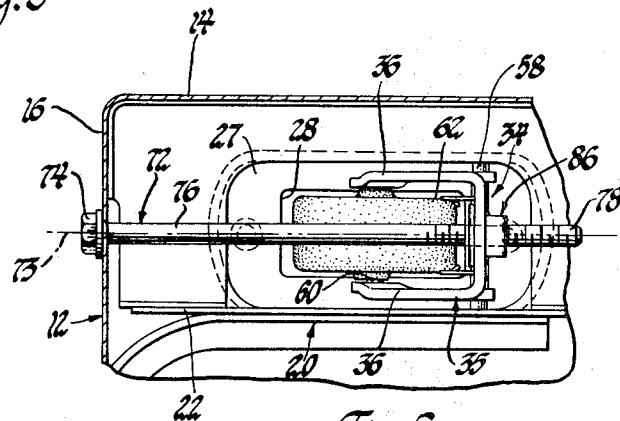


Fig. 6

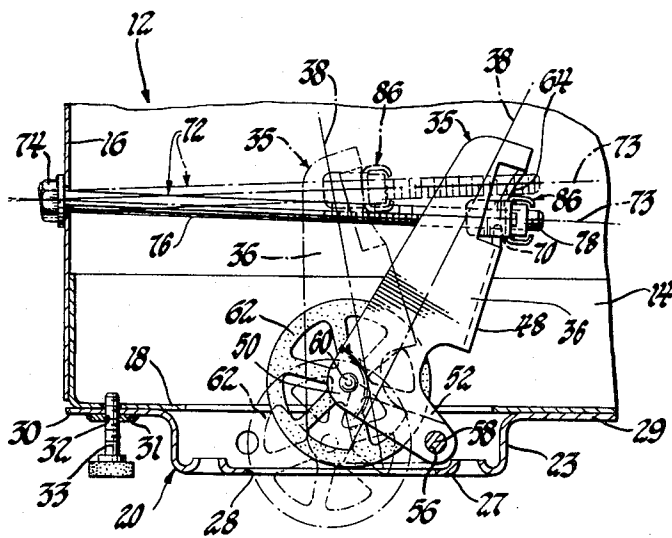


Fig. 7

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HEIGHT ADJUSTABLE CASTER MECHANISM
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Filed Apr. 3, 1969, Ser. No. 813,054
Int. Cl. B60b 33/06

U.S. Cl. 16—34

3 Claims

ABSTRACT OF THE DISCLOSURE

In preferred form, a height adjustable retracting caster mechanism for a refrigerator comprising: a bracket containing a cam surface; a roller secured to the bracket; and an adjusting assembly including a bolt extending through the refrigerator frame having thereon a coupling assembly engaging the camming surface of the bracket to cause pivotal movement with respect to the frame. The coupling assembly slides on the cam surface minimizing the effort required to turn the adjusting bolt.

This invention relates to a height adjustable retracting caster mechanism, and more particularly to a caster mechanism for a heavy domestic appliance such as a refrigerator or the like. The desirability of equipping heavy domestic appliances or furniture with casters for mobility has long been evident. This enables the appliance or other heavy object supported by the casters to be easily moved.

Thus, supporting surfaces on which dust, food particles collect can be cleaned periodically without great effort. Furthermore, esthetic considerations often dictate that furniture and appliances be rearranged occasionally.

In clean modern design of household appliances it is desirable that casters be equipped with retracting mechanisms hidden by the appliance cabinet. Caster retractability is desirable in order to allow corner located fixed support leveling feet to hold the appliance in place when the casters are raised. When they are lowered the appliance feet will be lifted from the floor to allow quick roller movement on the casters. Also, normally the casters are raised from the floor and this prevents supporting rollers of certain synthetic plastics from taking a permanent set.

It is also desirable that retractable casters be easily adjustable from a retracted raised position to a lowered surface engaging position so that a housewife can easily perform the adjustments with simple tools. Therefore, a good retractable caster design should be constructed to require only a minimal effort to perform the adjustment.

Occasionally, space limitations above the supported device, prohibit the device from being raised any appreciable height; accordingly, a good retractable mechanism should be adjustable over a wide range of usable heights.

Applicant's invention provides a novel arrangement of simple parts which function to produce the aforesaid desirable attributes in a readily installed retractable caster mechanism.

Accordingly, it is an object of this invention to provide a height adjustable retracting caster mechanism which may be adjusted over a wide range of usable heights including a lowered ground engaging position at which a supported device can be easily moved and a raised retracted position above ground.

Another object of this invention is to provide an adjustable retracting caster mechanism that is adapted for inclusion on heavy devices such as floor mounted domestic appliances and can be easily moved into a retracted position inside the device so that corner feet on the device hold it in place; and further can be positioned in a lower

ground engaging position to raise the feet to permit the device to be easily rolled from a set position.

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

FIG. 1 is a partially broken away perspective view of a lower corner of a refrigerator including the invention;

FIG. 2 is a fragmentary side view of the retractable caster mechanism of the present invention;

FIG. 3 is a vertical sectional view taken along line 3—3 of FIG. 2;

FIG. 4 is an enlarged, fragmentary vertical sectional view taken along line 4—4 of FIG. 3;

FIG. 5 is an enlarged, horizontal sectional view taken along a line 5—5 of FIG. 3;

FIG. 6 is a view in horizontal section taken along the line 6—6 of FIG. 2 looking in the direction of the arrows; and

FIG. 7 is a side elevational view like FIG. 2 which shows the caster mechanism in its raised or retracted position.

Referring now to the drawings and more particularly to FIGS. 1 and 2; a refrigerator 12 is shown having a corner frame 14. Frame 14 has a vertical wall 16 and a horizontal bottom wall 18. Side wall 16 contains a circular opening 19 near bottom wall 18.

Rigidly affixed by conventional means, such as spot welding or the like, to wall 16 and wall 18 is a reinforcing gusset 20 which comprises a cylindrical base 21 and an essentially L-shaped upper member 22 formed integrally therewith. Cylindrical base 21 has an upstanding vertical side 23 having three pair of spaced apart openings 24, 25 and 26 therethrough and a horizontal bottom portion 27 containing a relatively large rectangular opening 28.

L-shaped member 22 has a vertical segment and spaced apart horizontal flanges 29 and 30 which extend to one side. Flange 30 contains a small rectangular block 31 secured thereto having a vertically directed threaded bore 32 which threadably receives a corner foot or leg 33 that supports the weight of the refrigerator.

Each foot 33 in the refrigerator is associated with a retractable height adjustable caster mechanism 34. Each mechanism 34 has an upstanding bracket 35 having a pair of identically shaped side walls 36. Side walls 36 are substantially truncated in shape and have a longitudinal center line 38, a relatively wide lower base segment 40, an intermediate segment 42 and a relatively narrow top segment 44. Base segments 40 have an average width approximately $\frac{1}{3}$ the longitudinal length of side walls 36 measured along center line 38. Side walls 36 are integrally joined by a top segment interconnecting member 46 and an intermediate segment interconnecting member 48.

Base segments 40 each have frame pivoted edge sections 50 and 52. More particularly, section 50 contains an opening 54, and section 52 contains an opening 56. A pin or shaft 58 having a longitudinal axis 59 is positioned in openings 56 and pivotally secures bracket 34 to gusset 20 at openings 24 therein. A shaft 60 having a longitudinal center line 61 is positioned in openings 54 and rotatably secures a nylon roller 62 to bracket 35.

A cam surface 64 on bracket 35 is concaved inwardly toward center line 38 and is integrally formed between interconnecting members 46 and 48 adjacent each top segment 44. As best seen in FIG. 2, surface 64 has a chord length to segment height ratio of approximately 8:1 with its chord length being approximately $\frac{1}{3}$ of the longitudinal length of side walls 36 measured along center line 38. An elongated opening 66 in surface 64 is bounded

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by an upper surface 68 and a lower surface 70. As shown, the opening 66 is located approximately in the center of cam surface 64. Elongated opening 66 is substantially elliptically shaped and has its major axis essentially parallel to center line 38.

An elongated adjusting bolt 72 has a longitudinal center line 73, a head 74 positioned exteriorly of vertical wall 16, and a shaft 76. Shaft 76, which has a diameter approximately $\frac{1}{2}$ the distance of opening 66 along its major axis, contains a threaded end 78 positioned interiorly of frame 14 through opening 19. Threaded end 78 of shaft 76 is slidably located within opening 19 and elongated opening 66.

Threadably positioned on end 78 is a rectangular nut 80 having an outside face 81, and a face 82 against surface 64. Nut 80 also has a pair of vertical side edges 83 and a pair of horizontal top and bottom edges 84. A coupling member 86 loosely couples nut 80 and camming surface 64 together.

As best seen in FIGS. 4 and 5, coupling member 86 comprises a rectangular body 88 positioned between nut 80 and surface 64, a pair of nut-retainer arms 90, and a pair of cam-guide arms 92. Body 88 has a circular opening 94 for receiving shaft 76 and a pair of tabs 96. Tabs 96 which are located adjacent opposite edges of body 88 are angularly directed toward bolt 72 and each terminates in close spaced relationship to nut 80 for loosely retaining it against lateral movement with respect to arms 90.

Arms 90 extend generally perpendicular from body 88 adjacent and in close space relationship to vertical edges 83 of nut 80. Arms 90 also have bent over ends 98 in close spaced relationship to front face 81 to loosely connect nut 80 against movement from cam 64. Thus the member 86 is loosely coupled to nut 80.

Arms 92 which extend generally perpendicularly from body 88 on a side of body 88 opposite to arms 90 each contain a tab 100. Tabs 100 are each angularly directed toward surface 64 and terminate in close spaced relationship thereto. Tabs 100 and arms 92 fit around surface 64 as best seen in FIG. 5 to be loosely coupled with respect thereto.

Turning now to a discussion of the operation of this preferred embodiment, in the solid line position of FIG. 7 the roller 62 is initially retracted. The leveling foot 33 is threadably positioned in bore 32 so that it initially will carry the weight of frame 14. Adjusting bolt 72 is positioned such that threaded end 78 will rest on lower surface 70 of elongated opening 66.

As bolt 72 is rotated in a first or second direction, it is apparent that nut 80 will advance or recede along threaded end 78 of shaft 76. When bolt 72 is rotated in a first direction such that nut 80 advances toward head 74, nut 80 will eventually cause body 88 of coupling member 86 to bear against the cam surface 64. As bolt 72 is rotated further in the first direction, bracket 35 will begin to pivot downwardly about pin or shaft 58. Nut 80 and coupling member 86 will cam upwardly along surface 64 causing bolt 72 to shift upwardly to assume a more horizontal position. This lost motion of member 86 and nut 80 with respect to cam surface 64 allows bracket 35 to pivot freely without binding against member 86.

The above discussed relationships will be essentially continued as roller 62 passes through rectangular opening 28 to engage the frame supporting surface. Further travel of roller 62 will cause the adjacent foot 33 to be raised from the surface.

If bolt 72 is rotated in a second direction, nut 80 will recede away from head 74 along shaft 76 carrying coupling member 86 in the same direction. Bracket 35 will begin to pivot upwardly and member 86, guided by cam-guide arms 92 and angular tabs 100 will cam downwardly on surface 64. Continued rotation of head 74 in the second direction will eventually raise roller 62 off the supporting surface and reengage leveling foot 33

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therewith. Further rotation will retract the roller further into frame 14.

It should be apparent that the distance that a bracket 34 is pivoted to disengage a leveling foot 33 from a supporting surface can be adjusted over a wide range. It should also be apparent that frame 14 can be supported and moved on roller 62 in a plurality of heights up to a maximum height which exist when shaft 76 engages upper surface 68 of elongated opening 66.

Further, it should be apparent that the loose coupling of bracket 34 with adjusting bolt 72 which is maintained by cam surface 62 and member 86 over the entire adjustment range minimizes the adjustment effort required.

It should also be apparent that rivet 58 can be located in openings 24, 25 or 26 of base 21. This allows gusset 20 to be used on any corner or side of a supported device.

While the embodiment of the present invention as herein disclosed constitutes a preferred form it is to be understood that other forms might be adopted.

We claim:

1. An adjustable, retractable caster mechanism for use in slidably supporting corners of a domestic appliance comprising: a frame; an upstanding bracket having a side wall with a base segment and a top segment, a cam surface integrally formed on said bracket adjacent said top segment, said base segment having first and second edges, said cam surface containing an opening; a first shaft pivotally securing said base segment to said frame adjacent to said first edge; a roller, a second shaft rotatably securing said roller to said base segment adjacent to said second edge; a third shaft having a head positioned exteriorly of said frame and a threaded end positioned interiorly of said frame, said threaded end slidably contained in said opening of said cam surface; a nut threadably positioned on said third shaft; coupling means for interconnecting said nut and said cam surface to cause threaded movement of said third shaft to pivot said bracket about said first shaft and raise and lower said roller within said frame, coacting means on said coupling means and said cam surface for minimizing the efforts required to turn said third shaft during pivotal movement of said bracket.

2. An adjustable retractable caster mechanism for use in slidably supporting the corner of a domestic appliance comprising: a frame; an upstanding bracket having a side wall with a base segment and a top segment, a cam surface integrally formed on said bracket adjacent said top segment, said base segment having first and second edges, said cam surface containing an elongated opening; a first shaft pivotally securing said base segment to said frame adjacent to said first edge; a roller, a second shaft rotatably securing said roller to said base segment adjacent to said second edge; a third shaft having a head positioned exteriorly of said frame and a threaded end positioned interiorly of said frame, said threaded end slidably contained in said opening of said cam surface; a nut threadably positioned on said third shaft; coupling means for interconnecting said nut and said cam surface to cause threaded movement of said third shaft to pivot said bracket about said first shaft and raise and lower said roller within said frame, said coupling means including a body segment positioned between said nut and said cam surface having a plurality of arms extending generally perpendicularly therefrom in close spaced relationship to said cam surface and said nut, coacting means on said coupling means and said cam surface for minimizing the effort required to turn said third shaft during pivotal movement of said bracket including a surface on said cam surface convexly formed with respect to said nut and angularly directed tabs on said arms terminating in close spaced relationship to said nut and said cam surface.

3. An adjustable retractable caster mechanism for use in supporting the corner of a domestic appliance on a roller bearing comprising: a frame, an upstanding bracket

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having a side wall with a base segment, an intermediate segment, and a top segment, a cam surface integrally formed on said bracket adjacent said head segment, said base segment having first and second edges, said cam surface containing a substantially elliptically shaped opening; a first shaft pivotally securing said base segment to said frame adjacent to said first edge; a roller; a second shaft rotatably securing said roller to said base segment adjacent to said second edge; a third shaft having a head positioned exteriorly of said frame and a threaded end positioned interiorly of said frame, said threaded end slidably contained in said elliptical opening of said cam surface, the diameter of said shaft being substantially smaller than the diameter of said elliptically shaped opening measured along the major axis thereof; a nut threadably positioned on said third shaft; coupling means for interconnecting said nut and said cam surface to cause threaded movement of said third shaft to pivot said bracket about said first shaft and raise and lower said roller within said frame including a coupling member having a body segment positioned between said nut and

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said cam surface, said body segment having a plurality of arms extending generally perpendicularly therefrom in close spaced relationship to said cam surface and said nut, a surface on said cam surface formed convexly toward said nut and angularly directed tabs on said arms terminating in close spaced relationship to said nut and said cam surface for minimizing the effort required to turn said third shaft during pivotal movement of said bracket.

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U.S. Cl. X.R.

16—19