

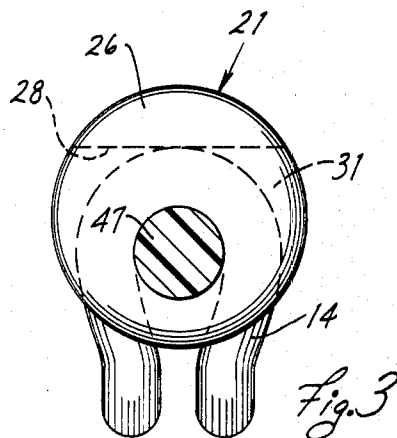
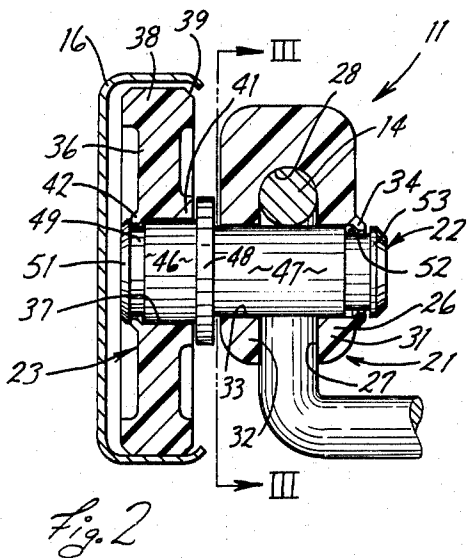
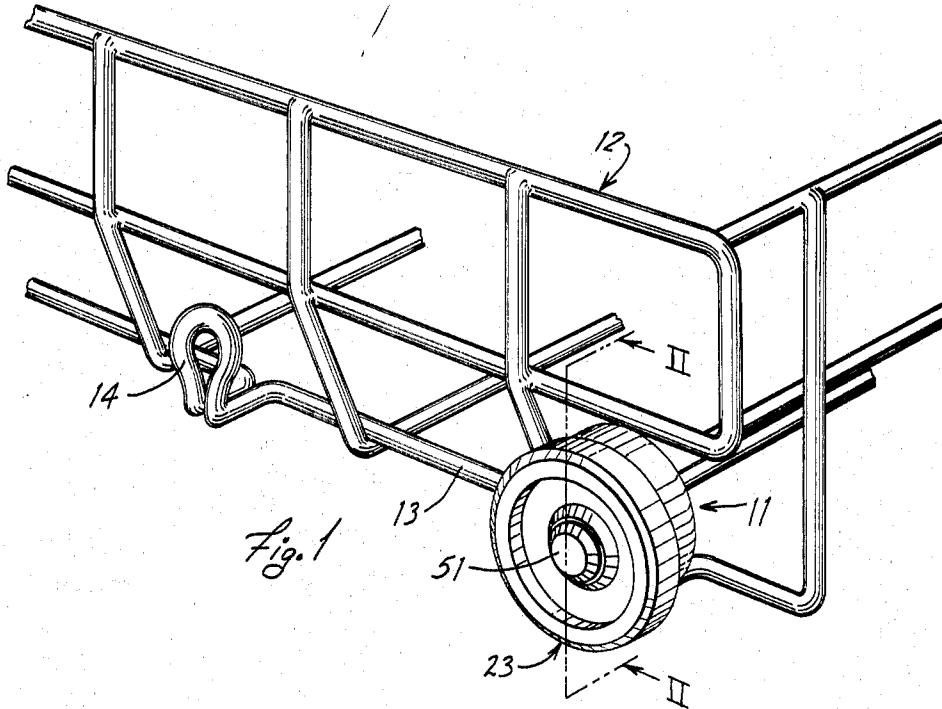
June 27, 1972

WALTER POMPEY

3,672,743

ROLLER AND RETAINER FOR A WIRE BASKET

Filed Aug. 17, 1970



INVENTOR
WALTER POMPEY
BY Woodruffe Blanchard & Flynn
ATTORNEYS

1

3,672,743

ROLLER AND RETAINER FOR A WIRE BASKET
Walter Pompey, Kalamazoo, Mich., assignor to W-L
Molding Company, Portage, Mich.
Filed Aug. 17, 1970, Ser. No. 64,163
Int. Cl. A47b 97/00

U.S. Cl. 312—352

8 Claims

ABSTRACT OF THE DISCLOSURE

A support roller assembly primarily for rollingly supporting a wire basket, such as in a dishwasher. The roller assembly includes an inverted, substantially U-shaped plastics retainer member adapted to be disposed in embracing relationship with one of the wires of the basket. The retainer member supports thereon a roller support shaft or stud, the stud being axially connected to the retainer member by means of a resilient snap fit. The stud in turn rotatably supports a plastics roller thereon, which roller is resiliently snapped onto the stud so as to be axially retained relative to the basket.

FIELD OF THE INVENTION

This invention relates to a roller assembly having improved retainer means for permitting a roller to be operatively and rotatably mounted on a wire basket. It particularly relates to such a roller assembly adapted for manufacture entirely from plastics materials and for use under conditions of water and load, such as encountered in an automatic dishwasher.

BACKGROUND OF THE INVENTION

While the particular support roller assembly of the present invention is applicable to a wide variety of uses, the particular problem given rise to its development existed in the field of automatic dishwashing equipment and, accordingly, it will be described and discussed in connection therewith. However, it should be emphasized that this is merely for convenience in illustrating and describing the invention inasmuch as the support roller assembly according to the present invention is equally applicable in many other fields of use.

In the field of mechanical dishwashers, there is commonly provided a wire basket for holding the dishes. Such a basket is normally provided with rollers in order that it may move conveniently from one position to another, such as from a loading position to a washing position in a residential dishwasher, or from a washing position to a rinsing position in a commercial dishwasher. For such purposes it is common to mount rollers under the wire basket but in view of the conditions of use, it is preferred to use plastics rollers rather than metal rollers for reasons already well known to the industry. While the rollers themselves have been familiar for several years, the mounting of the rollers onto the basket has presented a problem which has, insofar as I am aware, not been adequately solved prior to the present invention. Particularly, in previous practices the rollers have tended to become loose after a certain amount of use and/or have wobbled during use, such that the purpose of using the rollers has been materially interfered with. Previous attempts to improve such mountings have resulted in devices which are either unacceptably expensive to manufacture, unacceptably expensive to install, or both.

Accordingly, the objects and purposes of the present invention are:

(1) To provide a support roller assembly having an improved mounting device for permitting a roller and stud assembly to be permanently and reliably mounted onto a wire basket.

2

(2) To provide a mounting device, as aforesaid, which can be molded from a plastics material.

(3) To provide a mounting device, as aforesaid, which can be installed quickly and easily by unskilled personnel, as by a simple single motion.

(4) To provide a mounting device, as aforesaid, which can be applied either manually or by extremely simple equipment.

(5) To provide a mounting device, as aforesaid, which will hold the roller firmly and reliably for the full life of the equipment with which same is to be used.

Other objects and purposes of the invention will be apparent to persons acquainted with apparatus of this general type upon reading the following specification and inspecting the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an oblique view of a fragment of a typical wire basket with which the improved support roller assembly of the present invention is used, and showing the support roller assembly mounted on the basket.

FIG. 2 is a central longitudinal sectional view taken on the line II—II— of FIG. 1.

FIG. 3 is a sectional elevational view taken on the line III—III of FIG. 2.

Certain terminology will be used in the following description for convenience in reference only and will not be limiting. The words "rightwardly," "leftwardly," "upwardly" and "downwardly" will refer to directions in the drawings to which reference is made. The words "inwardly" and "outwardly" will refer to directions toward and away from, respectively, the geometric center of the support roller assembly and associated parts thereof. The words "inwardly" and "outwardly" will also refer to directions toward and away from, respectively, the geometric center of the basket having the support roller assemblies mounted thereon. Said terminology will include the words above specifically mentioned, derivatives thereof and words of similar import.

SUMMARY OF THE INVENTION

The objects and purposes of the present invention are met by providing a retainer member, preferably constructed of plastics, and having a substantially inverted U-shaped configuration. The retainer is disposed in embracing relationship to one of the wires of a basket, which wire preferably has a looped portion disposed in the slot defined between the legs of the retainer. The retainer has an opening extending through the legs thereof in which is positioned a first portion of a support shaft or stud, also adaptable to making from plastics, which first shaft portion also extends through the wire loop for interconnecting the loop and the retainer. The retainer has a resilient annular flange which extends into a groove formed adjacent the free end of the first shaft portion for axially securing same together by means of a resilient snap fit. The stud also includes a second portion which extends outwardly beyond the retainer and has a plastics roller rotatably supported thereon. The roller preferably has a resilient annular flange formed on the outer axial side thereof, which flange is received within a second groove formed adjacent the free end of the second shaft portion for axially retaining the roller on the stud by means of a resilient snap fit. The stud also includes an annular, radially extending flange or shoulder disposed between the retainer and the roller.

DETAILED DESCRIPTION

FIG. 1 illustrates therein a box-like wire basket 12, such as for a dishwasher, having a plurality of support roller assemblies 11 (only one illustrated in FIG. 1)

3

mounted thereon. The basket 12 particularly includes a lower support rod 13 having at least one looped portion 14 adjacent each corner of the basket for permitting one of the support roller assemblies 11 to be mounted adjacent each corner of the basket. The support roller assemblies 11 cooperate with any suitable track structure 16 (FIG. 2) for permitting the basket 12 to be moved with respect to a fixed supporting structure. The basket 12 and the track structure 16 are conventional and may take many different structural forms while still utilizing the improved support roller assembly 11 therewith. Thus, the basket and track structure will not be described in detail.

The support roller assembly 11 as illustrated in FIG. 2 includes a retainer member 21 adapted to be fixedly mounted on the wire basket, a support shaft or stud 22 adapted to be mounted on the retainer 21, and a roller 23 adapted to be rollingly supported on the stud 22.

The retainer 21 substantially comprises a cylindrical body member 26 (FIG. 3) having a slot 27 extending inwardly from the arcuate peripheral surface thereof, which slot is substantially transverse to the longitudinal axis of the cylindrical body member 26. The slot 27 is provided with an upper arcuate end wall 28. The slot 27 causes the body member 26, when viewed from the side thereof (as illustrated in FIG. 2), to have an inverted, substantially U-shaped configuration. The slot 27 results in the formation of substantially parallel, downwardly extending legs 31 and 32, which legs have coaxial openings 33 extending therethrough. The openings 33 in this embodiment extend in the axial direction of the cylindrical body member 26 and are laterally or eccentrically offset relative to the central axis of the body member 26, the openings 33 being positioned closely adjacent the lower end of the legs 31 and 32. However, it will be recognized that this eccentric positioning of the openings 33, while advantageous in making possible a minimum length for the legs 31 and 32, may be varied as desired to meet different dimensional requirements or the openings may be made concentric with said central axis if preferred.

The retainer 21 is also provided with an annular, resilient lip or flange 34 adjacent one axial end of the cylindrical body member 26, which annular flange 34 is of a generally frusto-conical configuration and extends axially outwardly and radially inwardly relative to the openings 33. The purpose of the flange 34 will be explained hereinafter.

Considering now the roller 23, same includes an annular web portion 36 having a central opening 37 extending therethrough. An annular, axially extending rim 38 is fixedly, here integrally, secured to the outer circumferential portion of the web 36. The hub of the annular web portion 36 is provided with an annular abutment shoulder 41 adjacent one axial end thereof, whereas the hub of the annular web 36 is provided with an annular, resilient lip or flange 42 adjacent the other axial end thereof. The flange 42 is similar to flange 34 in that it is of a frusto-conical configuration and extends axially outwardly and radially inwardly relative to the central annular opening 37. The purpose of the flange 42 will also be described hereinafter.

The retainer 21 and the roller 23 are axially interconnected by means of the support shaft or stud 22, which stud 22 includes first and second cylindrical shaft portions 46 and 47. The shaft portion 46 is rotatably received within the opening 37 for supporting the roller 23, while the shaft portion 47 is received within the openings 33 for enabling the shaft 22 to be supported on the retainer 21. The stud 22 further includes an enlarged annular flange 48 disposed between the shaft portions 46 and 47, which annular flange 48 functions both as an axial shoulder for restraining axial movement of the retainer 21 and roller 23, and as a spacer for maintaining the retainer 21 and roller 23 slightly axially spaced from one another.

As illustrated in FIG. 2, the shaft portion 46 is provided with an annular groove or recess 49 adjacent the free end

4

thereof, which groove 49 forms an annular retainer flange 51 on the free end of the shaft portion 46.

The second shaft portion 47 is also provided with an annular groove or recess 52, which groove 52 is likewise provided adjacent the free end of the shaft portion 47 and forms an annular retainer flange 53 on the free end of the shaft portion 47. The flanges 34 and 42 are each of sufficient inward radial extent as to overlap the retainer flanges 53 and 42. The amount of such overlap is determined by the nature of the material used, small enough to permit assembly as described further below but large enough to prevent, or at least resist, disassembly.

The retainer 21, the stud 22 and the roller 23 are all preferably constructed of a nonmetallic material, preferably plastics, especially where their use is to be under conditions of water and load. In one preferred embodiment of the invention, the retainer 21 and stud 22 are constructed of nylon, and the roller 23 is constructed of Celcon (trademark). However, it is entirely within the scope of the invention to make the several parts of the roller and retainer assembly of such other materials, including rubber, synthetic rubbers or metal, as may be required by the conditions of use. If the retainer 21 is of metal, especially if both the retainer 21 and the shaft 22 are of metal, the flanges 34 and 42 will be shortened so as to have a press-fit relationship with the adjacent flanges 53 and 51, respectively. Thus, said flanges will pass each other in assembly under anti-parallel axial pressures, as described further below, but will still perform their respective retaining functions.

ASSEMBLY

The assembly of the support roller apparatus 11 according to the present invention, though somewhat suggested above, will be described in detail to ensure a complete understanding thereof.

One preferred sequence of assembly is to preassemble the roller and stud at the point of manufacture of same and then to assemble such preassembled unit into the basket and retainer at a later point of operation, such as at the plant making dishwashers.

In this sequence, the roller 23 is positioned adjacent and in axial alignment with the end of the shaft portion 46, the shoulder 41 being disposed closely adjacent the retaining flange 51. The roller 23 is then moved axially (rightwardly in FIG. 2) onto the shaft portion 46, which movement is permitted by the fact that the shaft portion 46 has a diameter slightly smaller than the diameter of the opening 37 so as to permit the roller 23 to freely rotate relative to the shaft portion 46. The roller 23 will be moved axially onto the shaft portion 46 until the shoulder portion 41 abuts the annular flange 48.

As the shoulder 41 axially approaches the flange 48, the annular resilient lip 42, which lip will be cammed outwardly by the retainer flange 51, will resiliently snap into the annular groove 49, whereupon the radial inner edge of the lip 42 will thus be disposed within the groove and positioned inwardly of the retainer flange 51, thereby preventing the roller 23 from moving axially outwardly (leftwardly in FIG. 2) relative to the stud 22.

To mount such preassembled unit onto the basket, the retainer 21 will be positioned in embracing relationship on the loop 14 by positioning the retainer 21 so that same is disposed above the loop 14 with the legs 31 and 32 being directed downwardly and the resilient flange 34 being directed inwardly toward the center of the basket. The retainer 21 will then be moved downwardly so that the loop 14 extends into the slot 27, the slot 27 having a width substantially equal to the width of the wire 14 so that wire 14 will be snugly received within the slot 27. With the loop 14 received within the slot 27, the openings 33 formed in the legs 31 and 32 will be substantially aligned with the opening defined by the loop 14.

The stud 22 will then be positioned adjacent to and axially aligned with the opening 33 formed in the outer

5

leg portion 32 and the stud 22 will then be pushed axially inwardly (rightwardly in FIG. 2) into the openings 33 so as to extend across the slot 27, whereupon the shaft portion 47 will extend through the opening defined within the wire loop 14. The inward axial movement of the stud 22 is possible by means of a relatively small axial pushing force inasmuch as the shaft portion 47 has an external diameter substantially equal to the diameter of the openings 33. The retainer flange 53, as it is axially pushed toward the resilient flange 34, will cause the resilient flange 34 to deflect radially outwardly until the flange 53 passes axially thereby, whereupon the resilient flange 34 will snap radially inwardly so as to extend into groove 52, and thus prevent the stud 22 from being axially withdrawn (leftwardly in FIG. 2) from the retainer 21. The inward pressing movement of the stud 22 will continue until the annular shoulder 48 substantially abuts the outer surface of the leg portion 32, in which position the resilient flange 34 will have snapped into the groove 52. The flange 34 and the shoulder 48 thus cooperate to axially retain the stud 22 relative to the retainer 21.

The parts may be dimensioned so that the shaft portion 47 rotates relative to the retainer 21, but it is preferred that the shaft portion 47 be snugly received within the openings 33 and the roller rotate on the shaft.

With the support roller assembly 11 mounted on the wire loops 14 in the manner described above, the retainer 21 will resist rocking moments imposed thereon due to the lateral offset relationship between the roller 23 and the loop 14 inasmuch as a substantial vertically extending portion of the loop 14 is disposed within the slot 27. At the same time, the retainer 21 will permit downward vertical loads imposed on the basket 12 to be transferred directly from loop 14 onto the stud 22, which in turn will transfer the load directly to the roller 23. Thus, the downward vertical loads are not directly imposed onto the retainer 21. This arrangement thus permits the roller to be supported on the basket in a rigid and dependable manner so as to enable the roller assembly to have a long life, while at the same time the roller assembly can be easily and quickly assembled or mounted on the basket without requiring special tools or equipment, the complete roller assembly being interconnected to the basket merely by axially pressing the component parts together, as above described.

While the assembly sequence as described above has assured preassembly of the roller 23 onto the stud 22 before the stud has been mounted onto the basket, it will be apparent that this sequence could be reversed in that the roller 23 could be mounted on the stud 22 after mounting of the stud onto the basket.

In this embodiment the wire 14 is primarily held in place with respect to the shaft 47 by being looped therearound and held from endwise displacement by the retainer 21. However, it is further conceivable that said wire 14 or other generally elongated member, might be further held tightly with respect to the retainer 21 by having the legs 31 or 32 thereof urged toward each other by compression between the flange 48 and the retainer 53. This would at least help to hold the wire 14 in place with respect to the retainer even if it were shaped to include a straight section within the retainer substantially parallel with the surface 28 thereof.

Although a particular preferred embodiment of the invention has been disclosed in detail for illustrative purposes, it will be recognized that variations or modifications of the disclosed apparatus, including the rearrangement of parts, lie within the scope of the present invention.

The embodiments of the invention in which I claim an exclusive property or privilege are defined as follows:

1. In combination with a boxlike wire basket having a support wire, a support roller assembly mounted on

6

said basket for rollingly supporting same, said support roller assembly comprising:

a retainer member mounted on said support wire in embracing relationship therewith;

a stud shaft having one end thereof supported on said retainer member;

a roller supported on said stud shaft adjacent the other end thereof; and

locking means for axially securing said roller, said shaft and said retainer member relative to one another, said locking means including coacting means for creating a resilient snap fit between said shaft and said retainer member for preventing relative axial movement therebetween in at least one direction;

said coacting means including a resilient frusto-conical flange integrally connected to said retainer member and disposed in surrounding relationship to said shaft, said flange extending outwardly toward said one end of said shaft, said shaft having an annular groove formed therein adjacent said one end thereof for enabling said flange to resiliently extend therein for preventing axial movement of said retainer member relative to said shaft only in a direction toward said one end of said shaft.

2. The combination according to claim 1, wherein said retainer member has a slot formed therein so as to provide a pair of leg-like projections, said one end of said shaft extending between said pair of projections and across the width of said slot, and a portion of said support wire being disposed in the bottom of said slot and being positively confined between said retainer member and said shaft.

3. The combination according to claim 2, wherein said support wire is provided with a looped portion disposed within said slot in closely confined relationship between said pair of leg-like projections, said shaft extending through the opening defined by said looped portion for positively interconnecting said retainer member to said looped portion.

4. The combination according to claim 2, wherein said shaft has a second annular groove formed therein adjacent the other end thereof, and said roller having a second resilient frusto-conical flange integral therewith and directed toward said other end of said shaft, said second flange resiliently extending into said second groove for preventing axial movement of said roller relative to said shaft only in an axial direction toward said other end of said shaft, and said shaft further having an annular flange integral therewith and disposed intermediate the length thereof for disposition between and in abutting engagement with said retainer member and said roller.

5. In combination with a boxlike wire basket having a support wire, a support roller assembly mounted on said basket for rollingly supporting same, said support roller assembly comprising:

a U-shaped retainer member mounted on said support wire in embracing relationship therewith, said retainer member having a pair of leg portions defining a slot therebetween, said pair of leg portions having substantially aligned openings extending therethrough in a direction substantially transverse to said slot, and a portion of said support wire being disposed in the bottom of said slot whereby said leg portions are disposed on opposite lateral sides of said support wire;

a stud shaft having one end thereof supported on said retainer member, said one end of said shaft being disposed within said openings and extending between said pair of leg portions and across the width of said slot at a location disposed between the bottom of said slot and the free end of said slot so that said portion of said support wire is positively confined within the bottom of said slot between said retainer member and said shaft;

7

a roller supported on said stud shaft adjacent the other end thereof;

first locking means coacting between said retainer member and said one end of said shaft for preventing axial movement of said retainer member relative to said shaft in a direction toward said one end thereof, said first locking means including a first projection fixedly connected to one of said retainer member and said shaft; and

second locking means coacting between said shaft and said roller for preventing axial movement of said roller in a direction toward said other end of said shaft, said second locking means including a second projection fixedly connected to one of said roller and said shaft;

one of said first and second locking means causing creation of a resilient snap fit for preventing relative axial movement in the specified direction, the projection associated with said one locking means being resilient.

6. The combination according to claim 5, wherein the projection associated with said first locking means is resilient to create a snap fit between said retainer member and said shaft, and wherein the projection associated with said second locking means is also resilient to create a snap fit between said roller and said shaft.

8

7. The combination according to claim 5, wherein the projection associated with said one locking means comprises an annular resilient flange extending at least partially radially relative to said shaft, and said one locking means also including an annular groove adapted to receive therein said resilient annular flange.

8. The combination according to claim 5, wherein said first and second locking means include first and second recesses, respectively, and said projections each being resilient and disposed for coaction with a respective recess permitting said roller and said retaining member to be axially secured relative to said shaft.

References Cited

UNITED STATES PATENTS

3,146,045	8/1964	Kauffman	31—311	X
3,389,497	6/1968	Cremer	46—221	
3,221,439	12/1965	Schaper	46—221	X
3,383,148	5/1968	Dicken, Jr.	312—311	

JAMES T. McCALL, Primary Examiner

U.S. Cl. X.R.

312—311, 330