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Kaczmarek(10) **Pub. No.: US 2007/0144985 A1**(43) **Pub. Date: Jun. 28, 2007**(54) **VERTICALLY ADJUSTABLE UTENSIL
HOLDER**(30) **Foreign Application Priority Data**

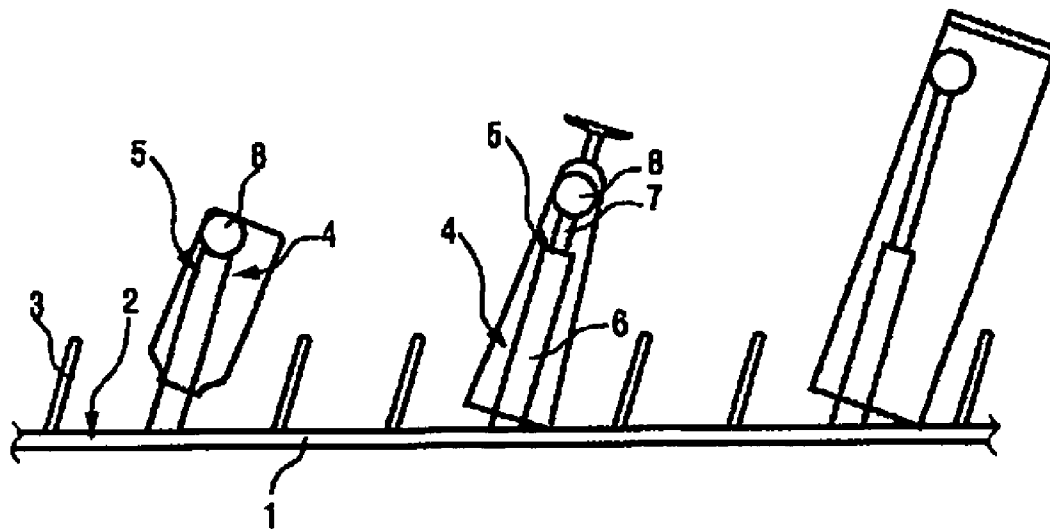
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NEW BERN, NC 28562(57) **ABSTRACT**

A vertically adjustable utensil holder (4) for placing on a basket spike (3) of a utensil basket (1) of a dishwasher comprises a shaft (5) which, during operation, projects into an inside of hollow-bodied utensils and on which the utensils are supported. It is further developed according to the invention in that the shaft (5) has several sections and its components (6; 7) are displaceable relative to each other (FIG. 1).

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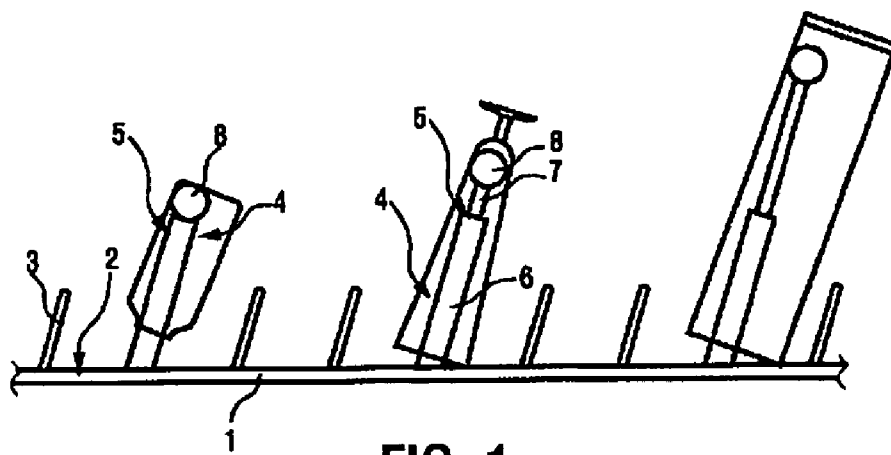


FIG. 1

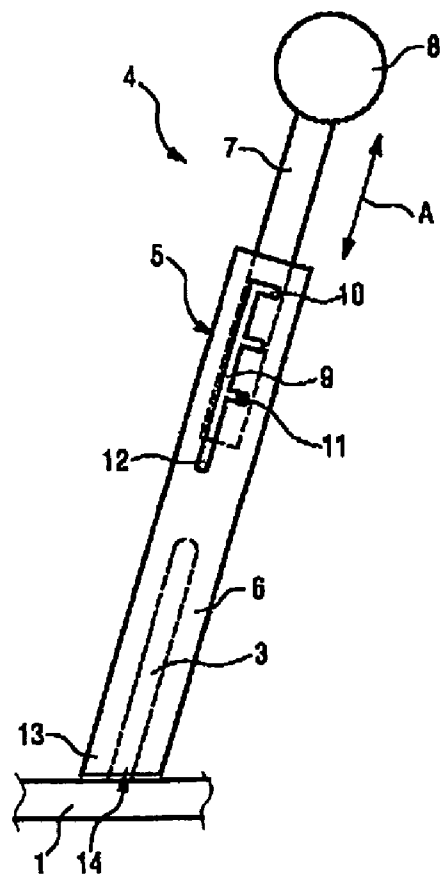


FIG. 2

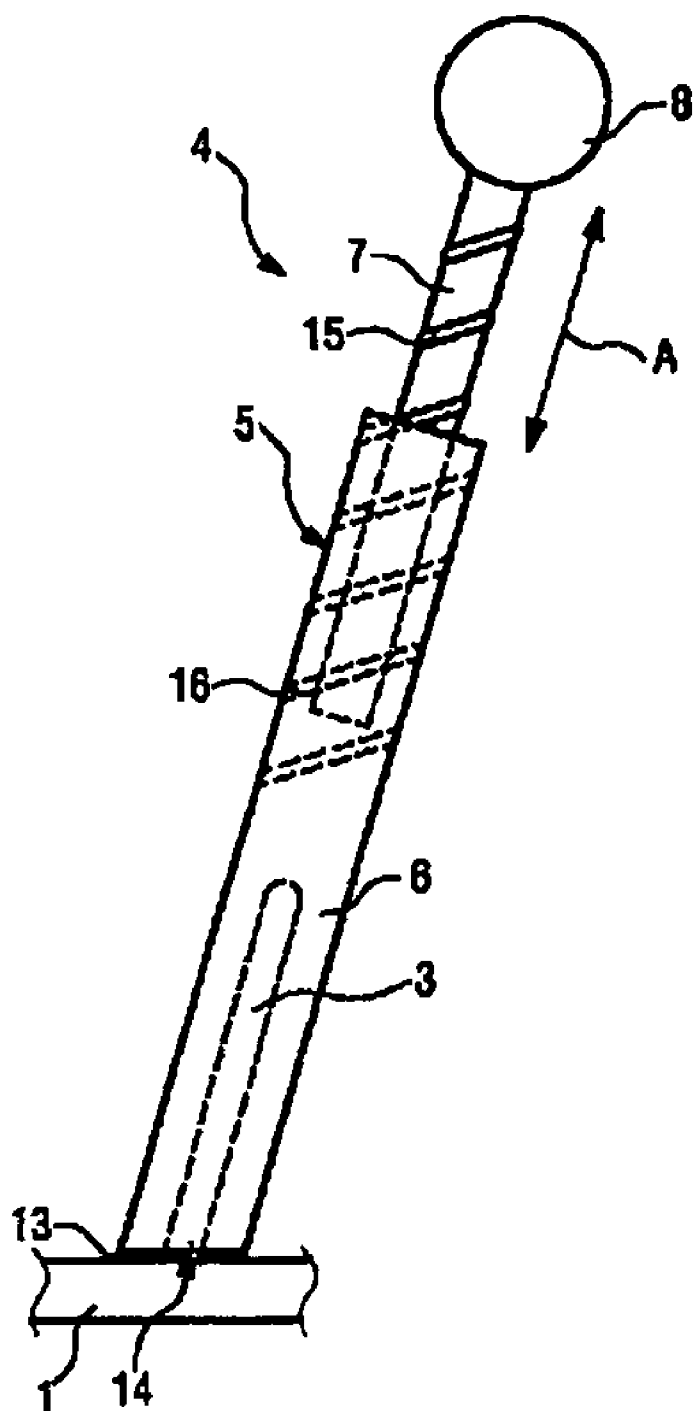


FIG. 3

VERTICALLY ADJUSTABLE UTENSIL HOLDER

[0001] The invention relates to a utensil holder for a dishwasher, with a shaft which is able to project into the interior of a hollow bodied dish.

[0002] Such a utensil holder is disclosed in DE 199 44 883 A1. It comprises a foot element, a central bar and a head section. The utensil holder of prior art is secured with the foot element in the utensil basket of a dishwasher, preferably at a point of intersection of two lattice bars of the utensil basket. It also comprises a pin on which the head section can be placed. The central bar also has on its end opposite the foot section on which the head section can be placed a pin on which the head section can be placed. The utensil holder of prior art can be adapted to hollow bodied utensil parts of different heights, for example to baby bottles instead of light beer glasses or flower vases, by removing the central bar and securing the head section directly on the foot element. The head section has flexible holder arms on which the utensil part is placed and which are pressed resiliently against the inside of the utensil part only at certain points. Because of their flexibility they are automatically adapted to different diameters of the utensils. The utensil holder of prior art is disadvantageous in that on the one hand it requires an expensive foot section design, and on the other hand the head section is also expensive to design and, due to ageing in particular, there is a tendency for the flexible arms to break off if the utensil holder is not treated properly. Finally the adaptation of the utensil holder to utensil parts of different sizes is also impracticable because the central bar is superfluous if there is adaptation to small utensil parts and must be removed, with the risk that it could be lost.

[0003] The object of the invention is therefore to indicate a utensil holder which is simple to operate and can be adapted better to the length of hollow-bodied utensils.

[0004] The utensil holder according to the invention for a dishwasher comprises a shaft which is able to project into the interior of hollow-bodied utensils for supporting or holding the utensils, the shaft having several sections and its components being displaceable in relation to each other for adapting the length of the utensil holder to the length of the interior of the hollow-bodied utensils. Because of the adjustability of the length of the utensil holder, it can be adapted perfectly and simply by the user to the length of the interior of hollow-bodied utensils.

[0005] The shaft is preferably infinitely adjustable. The shaft therefore consists of at least two parts. "Displaceable" means that the length of the shaft can be adjusted by the displacement of at least two of its components relative to each other. The invention therefore avoids having to dismantle the utensil holder for adapting to utensil parts of different heights, as proposed in the state of the art. Rather it follows the principle that the length adaptation of the utensil holder is achieved by a relative displacement of its components so that all the components remain integrated in the utensil holder and cannot be lost.

[0006] Different cross-sectional profiles are considered for the components of the shaft. They share the common feature that they have a guide surface along which both components can be displaced towards each other. The guide surfaces only allow a relative displacement in the two desired directions for shortening or lengthening the shaft. Cross-sections

which partially grip each other are suitable for this purpose. According to a first advantageous embodiment of the invention the shaft may therefore have at least one outer shaft and one inner shaft, which can telescoped towards each other between a withdrawal position and an insertion position. The outer shaft and inner shaft, which therefore represent examples of the above-mentioned components of the shaft, consequently have cross-sections which preferably fully enclose one another. For example, a circular inner shaft may be displaceable in an annular outer shaft. This cross-sectional design for outer and inner shafts provides a well guided relative displacement relative to each other. Here it is irrelevant which of the two shaft sections serves for fastening to the utensil basket, i.e. remains fixed, and which is moved relative to it. Obviously other cross-sections may be used based on this principle, for example square or elliptical.

[0007] The displacement path of the components of the shaft is limited by a withdrawal position in which the maximum length of the utensil holder is reached, and an insertion position in which the utensil holder is at its shortest. In the withdrawal and insertion position means of simple design, for example stops, can be arranged for secure fixing of the inner shaft in the outer shaft.

[0008] In principle the relative position of the outer shaft to the inner shaft will be maintained after an arbitrary adjustment. For this purpose the components must be designed fixedly in a selected position relative to each other. In principle this can be achieved by friction or positive clamping. Fixing of the relative position of the outer and inner shafts relative to each other by means of friction clamping can be achieved in that they form a friction pair that bears one against the other, at least in sections. For this purpose the inside diameter of the outer shaft and the outer diameter of the inner shaft must be matched to each other so that the outer and inner shafts can only be displaced towards each other with a certain expenditure of force. However, such fixing presents the risk that it may be inadvertently adjusted. Moreover, its exact dimensioning and hence its function can be lost by material ageing, for example if the utensil holder is manufactured completely from plastic. This risk is avoided if such fixing is achieved by positive clamping. According to a further embodiment, the shaft may therefore have stop means for setting a withdrawal position, thus ensuring that the withdrawal position of the utensil holder, once selected, is not accidentally lost again, for example by collision with utensil parts when loading the utensil basket.

[0009] A particularly simple advantageous embodiment of the invention of such stop means may be provided if either the outer or inner shaft has a guide groove into which a guide pin on the inner or outer shaft engages when the utensil holder is in operation. It may comprise a section running in the longitudinal direction of the shaft, which section represents the maximum adjustment path of the outer and inner shafts. Transverse grooves, which define adjustment stages, may branch transversely from them. The guide groove is arranged particularly advantageously on the outer shaft, projecting through the wall of the outer shaft, for this enables the user to see clearly the relative position of the guide pin inside the guide groove, so that he is able to adjust and lock the utensil holder specifically in the adjusted position.

[0010] In the aforementioned exemplary embodiment it is only possible to adjust the utensil holder in certain stop stages. An advantage embodiment of the invention provided as an alternative to this makes available an infinite adjustment facility since the outer and inner shafts have a coil which, during operation, engages in the threaded groove in the inner and outer shafts. The relative displacement of the two components of the shaft is therefore possible by means of a relative distortion. The pitch of the coil ensures that the displacement is not accidentally adjusted by the intrinsic weight of the rotary shaft section or by vibrations. This embodiment also provides operability that is extremely easy to understand and is therefore simple.

[0011] As an alternative to a specific adjustment of the utensil holder, it may be adjusted automatically. A further advantageous embodiment of the invention may comprise, for this purpose, a spring which is supported on the outer shaft and the inner shaft and holds them together in the withdrawal position. Here the spring can be dimensioned so that the adjustable shaft section is pressed down by the intrinsic weight of the utensil part until the utensil part stands on the bottom surface of the utensil basket. On the other hand, it is so strong that it presses the moved shaft section into the withdrawal position against its own weight. This then completely obviates the need to adjust the utensil holder to the size of the utensil part, thus further simplifying the operation of the utensil holder.

[0012] The utensil holder is preferably placed with another section on a basket spike in the utensil basket. According to a further advantageous embodiment of the invention the utensil holder may have at the opposite upper end a head with a diameter which is larger than that of the shaft and which, in operation, produces an essentially punctual contact face of the utensil on the utensil holder. This ensures that the utensils rest not only in the utensil basket but also bears only punctually against the utensil holder. Otherwise, particularly in the case of a cylindrical or conical glass, the utensils could bear against the shaft of the utensil holder along a linear contact face on which the cleaning and drying of the utensils could be impaired. As a result of this unsightly, visible residues could remain behind, particularly in the case of glass utensils. In a further embodiment flexible retaining arms are arranged on the upper end of the inner shaft for punctual support inside the hollow-bodied utensils. The flexible retaining arms, preferably more than three, straddle the inside of the hollow-bodied utensils, thereby supporting them.

[0013] The utensil holder is preferably suitable for fastening to a utensil basket.

[0014] In a further embodiment the utensil holder can be fastened to a bar or lattice wire of the utensil basket by means of a plug or snap connection. The utensil holder according to the invention may therefore be securely fastened at any point on the utensil basket.

[0015] According to a further advantageous embodiment of the invention the head may have a spherical or hemispherical shape so that the smallest possible contact surface of the utensils is achieved on the utensil holder, even when the utensils come to rest with their bottom surfaces on the utensil holder.

[0016] The object of this patent application is also the use of the utensil holder described above, according to the invention, in a dishwasher, and a dishwasher according to the invention with a utensil holder described above.

[0017] The principle of the invention is explained in even greater detail in the following with reference to figures by way of examples, where:

[0018] FIG. 1 shows a sectional side view of a utensil basket with three utensil holders,

[0019] FIG. 2 shows a first embodiment of a utensil holder according to the invention, and

[0020] FIG. 3 shows a second embodiment of the utensil holder according to the invention.

[0021] FIG. 1 shows a section of a utensil basket 1 of a dishwasher in a side view. Inclined basket spikes 3 project from a horizontal bottom surface 2 of utensil basket 1. They serve to keep utensils, particularly cups and saucers, in an essentially upright vertical position so that no water remains in their recesses and they can dry completely. Generally more basket spikes are provided that are required for cups and saucers. The area of the utensil basket remaining free is therefore frequently used for cups, beakers and glasses. Because of their short length, however, the basket spikes do not provide sufficient support for taller glasses in particular, for example lager or beer glasses or vases, with the result that they tip up during the washing process and can consequently be damaged. Nevertheless, in order for them to be used for slim, tall utensil parts, a utensil holder 4 is placed on some of basket spikes 3, as shown in FIG. 1. The holder comprises a two-part cylindrical shaft 5, which is composed of an outer shaft 6 and an inner shaft 7. Utensil holder 4 has at a lower end 13 an orifice 14 with which it is pushed onto basket spike 3 so that the latter projects into the cylindrical inside of utensil holder 4. Orifice 14 is also designed as a guide for basket spike 3 so that utensil holder 4 is securely retained on basket spike 3 and does not wobble.

[0022] At its upper end utensil holder 4 has a spherical head 8 whose diameter is greater than the diameter of shaft 5. Because of this dimensioning of head 8, a utensil part is largely prevented from being supported along a line of contact on utensil holder 4 on which the cleaning and drying performance of the washing process could be limited. Instead almost every utensil part rests only punctually on utensil holder 4, namely on head 8 of utensil holder 4 on the one hand, and on bottom surface 2 of utensil basket 1 on the other.

[0023] Outer shaft 6 and inner shaft 7 of utensil holder 4 are capable of being telescoped and are therefore displaceable relative to each other. Utensil holder 4 may therefore be set to utensil parts of different heights so that it can provide safe support for both shorter utensil parts such as beakers, glasses or baby bottles, and higher utensil parts such as lager and beer glasses or glass vases.

[0024] FIGS. 2 and 3 represent by way of example two alternative embodiments of utensil holder 4. Utensil holder 4 in FIG. 2 provides a locking device with which inner shaft 7 can be established in three different positions relative to outer shaft 6. For this purpose outer shaft 6 has an elongated guide groove 9, which passes through a wall of outer shaft 6. It runs essentially in the longitudinal direction of outer shaft 6 and hence parallel with a direction of displacement of inner shaft 7 relative to outer shaft 6, which is identified by an arrow A. Guide groove 9 also has short transverse grooves 10 running at right angles to direction A. On inner shaft 7 is arranged a locking pin 11 which engages in guide groove 9 and can be displaced into one of transverse grooves 10. Inner shaft 7 may therefore be locked in four positions inside outer shaft 6. It can be brought in three extended

positions by engaging locking pin 11 in one of transverse grooves 10, and into a retracted position by positioning locking pin 11 at a lower end 12 of guide groove 9. Such an adjustment can easily be carried out by the user because he is able to follow optically the position of locking pin 11 inside guide groove 9 and transverse grooves 10 respectively. For guide groove 9 and transverse grooves 10 penetrate outer wall of outer shaft 6 and therefore render locking pin 11 visible. The operator need not therefore operate utensil holder 4 intuitively.

[0025] Outer shaft 6 and inner shaft 7 are designed as hollow cylindrical bodies so that utensil holder 4 can also be placed on basket spikes of different lengths. This ensures that utensil holder 4 can also be pushed onto a long basket spike and yet can still be used when inserted, i.e. only slightly extends basket spike 3. When utensil holder 4 is inserted, a long basket spike then projects into the cylindrical inside of inner shaft 7. The use of utensil holder 4 is therefore limited neither to particular areas inside utensil basket 1, namely to basket spikes 3 of a certain length, nor to certain withdrawal positions when it was placed on a long basket spike 3.

[0026] Utensil holder 4 according to FIG. 2 enables inner shaft 7 to be adjusted relative to outer shaft 6 in only four fixable positions. FIG. 3, on the other hand, represents an example of a utensil holder 4 with a infinite adjusting facility. For this purpose inner shaft 7 has a spirally wound coil 15 on its outside, which coil interacts with a threaded groove 16 in the inner face of the hollow cylindrically designed outer shaft 6. An adjustment of inner shaft 7 relative to outer shaft 6 in direction A can therefore be achieved by twisting inner shaft 7 relative to outer shaft 6. Because of the direction of coil 15 and threaded groove 16 shown, utensil holder 4 can therefore be shortened when inner shaft 7 is twisted to the right. The stiffness of the spiralling of coil 15 and threaded groove 16 ensures that on the one hand not too many rotations are required to achieve an appreciable change in length of utensil holder 4. On the other hand the thread is not chosen with such a steep pitch that a position of inner shaft 7 relative to outer shaft 6 brought about by the operator can easily be adjusted by the intrinsic weight of inner shaft 7 and by that of a utensil part which is deposited on utensil holder 4, or even by vibrations.

[0027] For successful adjustment of utensil holder 4 it is necessary for outer shaft 6 not to rotate when inner shaft 7 is rotated. For this purpose orifice 14 can be dimensioned so that it provides a clamping fit of utensil holder 4 on basket spike 3. Alternatively or in addition to this, grooves can be milled at the lower end 13 of utensil holder 4, in which grooves engage lattice bars which form bottom face 2 of utensil basket 1 and on which basket spikes 3 are fastened.

[0028] Since the previous utensil holders described in detail are exemplary embodiments, they can be modified in any manner by the person skilled in the art within a wide range without departing from the scope of the invention. In particular the specific embodiments of the stop means may be designed, for example as a pushbutton in interaction with bores or the coil in a shape other than described here. Similarly, the head may be designed in another shape, for example as a hemisphere or cube, if this is desirable for design reasons. Furthermore, the use of the indefinite article

“a” or “an” does not rule out the possibility that the characteristics in question may also be present in several locations.

LIST OF REFERENCE NUMBERS

[0029]	1. Utensil basket
[0030]	2. Bottom surface
[0031]	3. Basket spike
[0032]	4. Utensil holder
[0033]	5. Shaft
[0034]	6. Outer shaft
[0035]	7. Inner shaft
[0036]	8. Head
[0037]	9. Guide groove
[0038]	10. Transverse groove
[0039]	11. Locking pin
[0040]	12. Lower end of guide groove 9
[0041]	13. Lower end of utensil holder 4
[0042]	14. Orifice
[0043]	15. Coil
[0044]	16. Threaded groove

1-15. (canceled)

16. A utensil holder for a dishwasher comprising:

a shaft for projecting into an inner space of hollow-bodied utensils inserted thereover to thereby support such utensils, the shaft having a plurality of sections with at least two of such sections being displaceable relative to each other for adjustable variation of the length of the utensil holder, whereby the length of the utensil holder can be adjustably varied to accommodate hollow-bodied utensils having inner spaces of differing lengths.

17. The utensil holder according to claim 16, wherein the length of the shaft is infinitely adjustable.

18. The utensil holder according to claim 16, wherein the shaft has at least one outer shaft section and one inner shaft section that can be telescoped relative to each other between a withdrawal position and an insertion position.

19. The utensil holder according to claim 16, wherein the shaft includes stop means for setting an adjusting position.

20. The utensil holder according to claim 18, wherein a selected one of the outer and the inner shaft section has a guide pin and the other of the outer and the inner shaft section has a guide groove for engaging the guide pin on the other shaft during operation.

21. The utensil holder according to claim 18, wherein a selected one of the outer and the inner shaft section has a coil and the other of the outer and the inner shaft section has a threaded groove that, during operation, is engaged by the coil on the other shaft.

22. The utensil holder according to claim 18 and further comprising a spring supported on the outer shaft section and the inner shaft section and operating to hold the outer shaft section and the inner shaft section together in a withdrawal position.

23. The utensil holder according to claim 18 and further comprising a head on the upper end of the inner section of the shaft, the head having a diameter greater than that of the outer shaft section and the head being able to be in essentially point contact with a surface in the inside of the utensils inserted on the shaft.

24. The utensil holder according to claim 23, wherein the head has a selected one of a spherical and a hemispherical shape.

25. The utensil holder according to claim **18** and further comprising flexible retaining arms arranged on the upper end of the inner shaft section for point contact with a surface in the inside of the utensils inserted on the shaft.

26. The utensil holder according to claim **18**, wherein the utensil holder can be fastened to a utensil basket of a dishwasher by placing the utensil holder on a basket spike of the utensil basket.

27. The utensil holder according to claim **18**, wherein the utensil holder can be fastened to a bar or lattice wire of the utensil basket of a dishwasher by means of a plug connection.

28. The utensil holder according to claim **18**, wherein the utensil holder is suitable for fastening to a utensil basket of a dishwasher.

29. A method for using a dishwasher, the method comprising:

inserting a hollow-bodied utensil to be washed by the dishwasher over a utensil holder having a shaft for projecting into an inner space of hollow-bodied utensils inserted thereover to thereby support such utensils, the shaft having a plurality of sections with at least two of

such sections being displaceable relative to each other for adjustable variation of the length of the utensil holder, whereby the length of the utensil holder can be adjustably varied to accommodate hollow-bodied utensils having inner spaces of differing lengths; and

operating the dishwasher to effect washing of the hollow-bodied utensil.

30. A dishwasher comprising:

a utensil holder having a shaft for projecting into an inner space of hollow-bodied utensils inserted thereover to thereby support such utensils, the shaft having a plurality of sections with at least two of such sections being displaceable relative to each other for adjustable variation of the length of the utensil holder, whereby the length of the utensil holder can be adjustably varied to accommodate hollow-bodied utensils having inner spaces of differing lengths; and

means for operating the dishwasher to effect washing of the hollow-bodied utensil.

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