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Brenner et al.

[11] **3,779,258**

[45] **Dec. 18, 1973**

[54] **ROTATING SILVERWARE BASKET FOR DISHWASHER**

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[52] **U.S. Cl.** **134/138,** 134/144

[51] **Int. Cl.** **B08b 3/02**

[58] **Field of Search** 134/138, 139, 141, 134/142, 144, 176, 179

[56] **References Cited**

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1,345,412	7/1920	Smith	134/139
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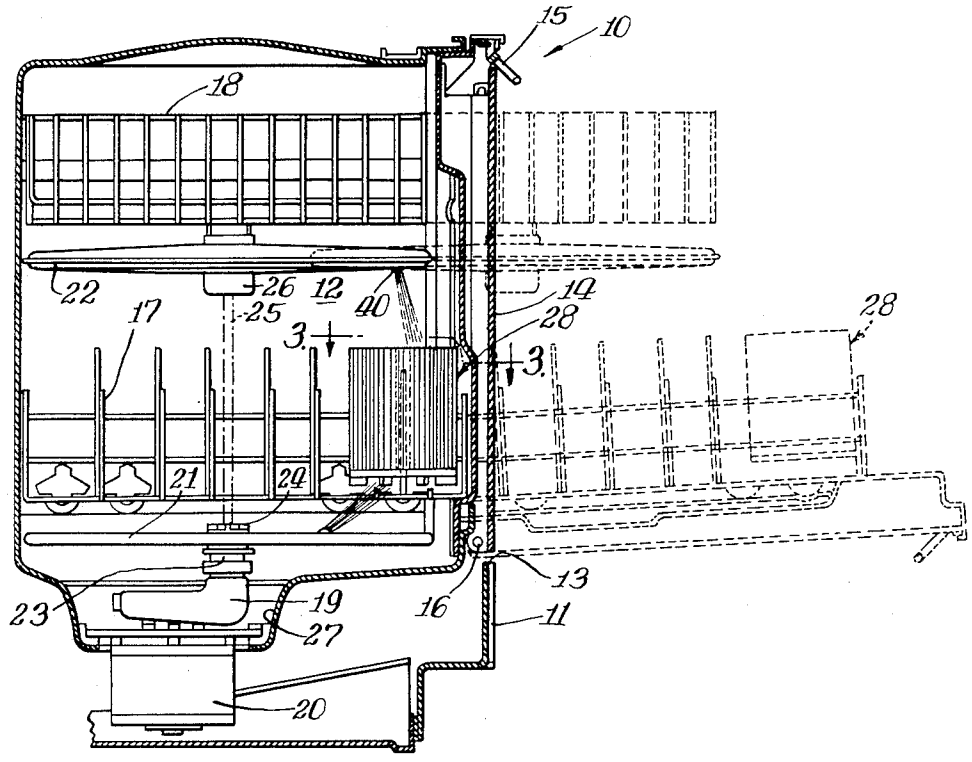
Primary Examiner—Robert L. Bleutge

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[57] **ABSTRACT**

A dishwasher having a holder for holding silverware to be washed rotatably mounted on a dish holding rack in the washing chamber. The silverware basket is rotated on the dish holding rack so as to permit subjecting silverware carried thereby to a spray of washing liquid, with the spray striking the silverware in different angular positions as the silverware basket revolves. The spray itself may have movement relative to the dish holding rack and silverware holding basket, and in the illustrated embodiment is provided by a rotating spray arm. Further, in the illustrated embodiment, the rotation of the silverware basket is effected by a supplemental spray acting against vanes on the rotatable silverware basket.

8 Claims, 5 Drawing Figures



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SHEET 1 OF 2

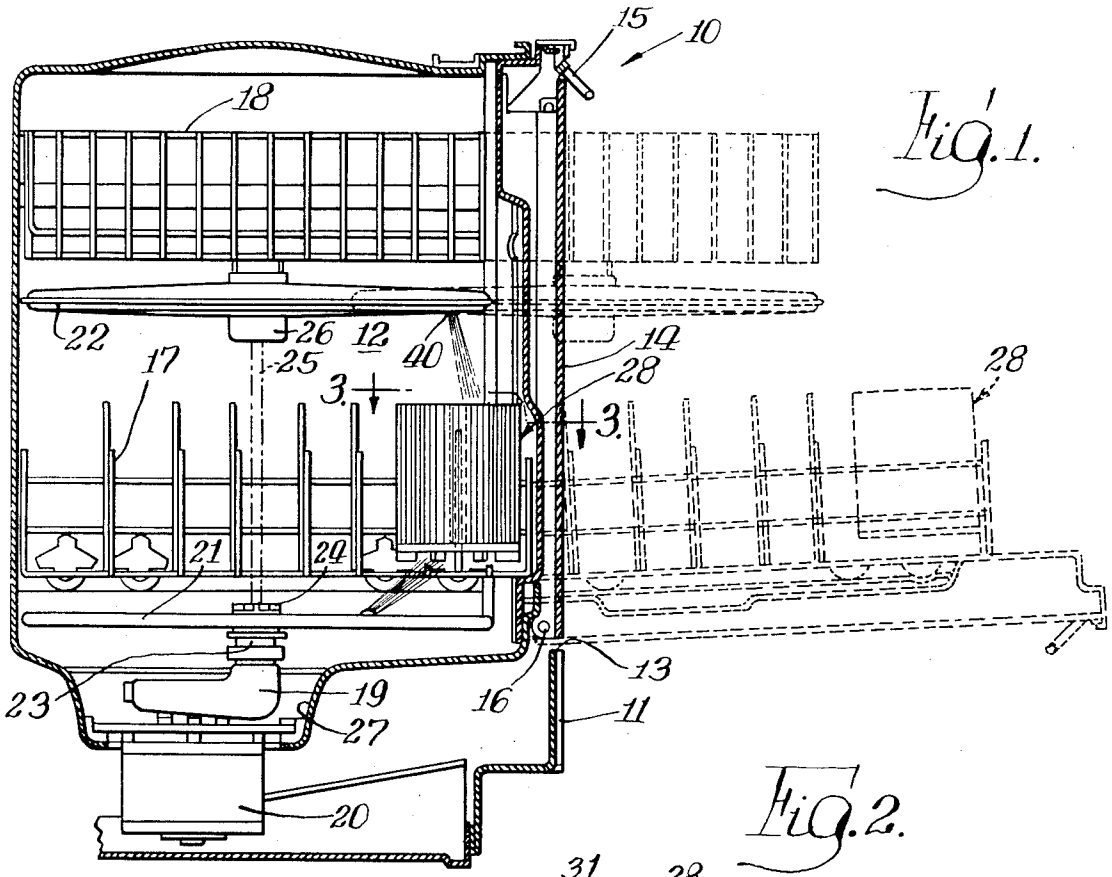


Fig. 1.

Fig. 2.

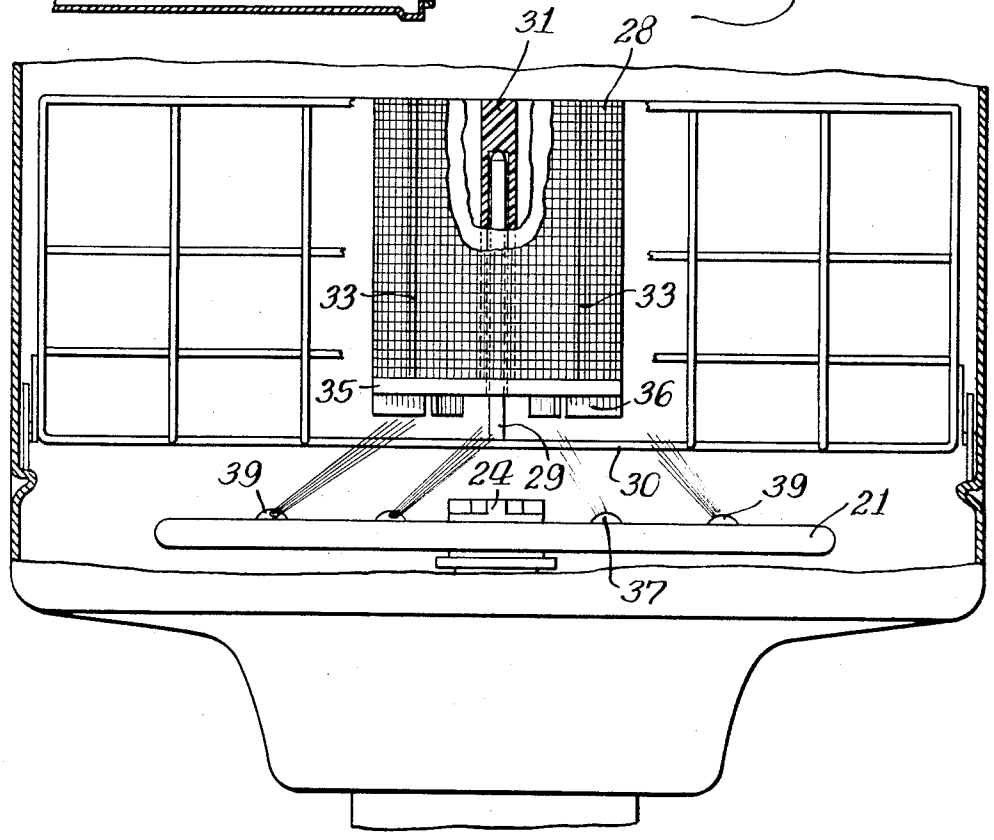


Fig. 3.

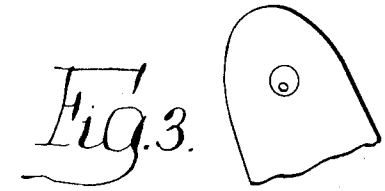
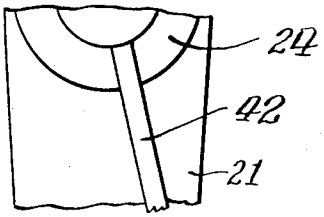
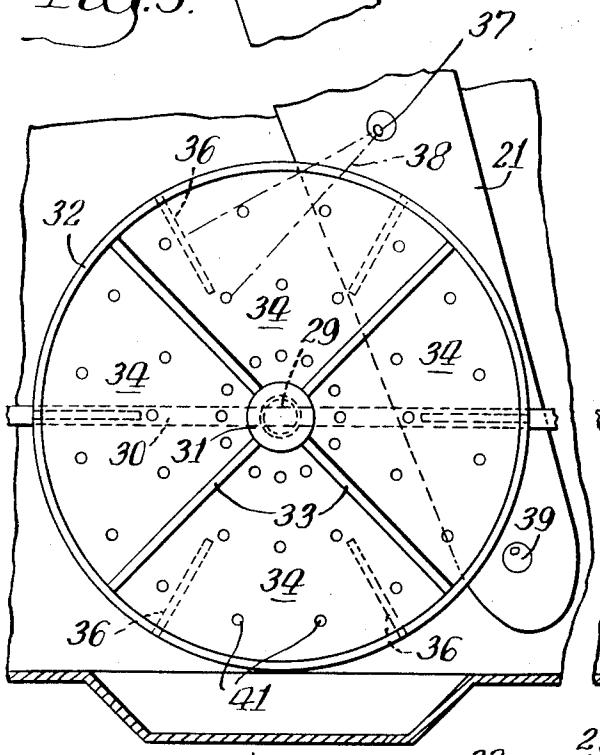


Fig. 5.





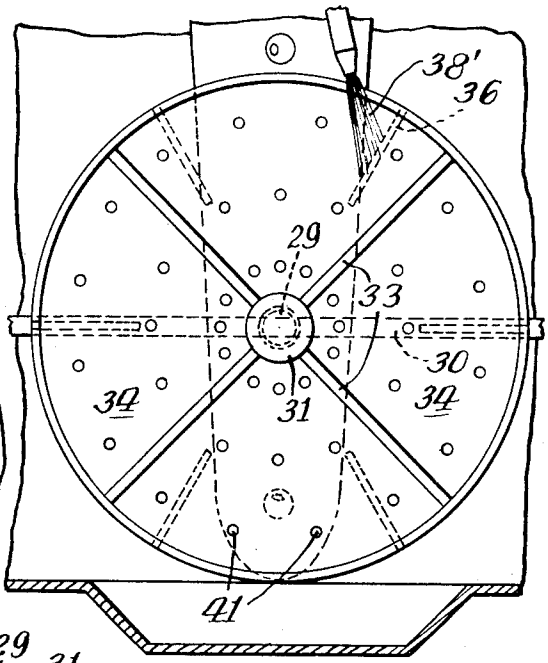
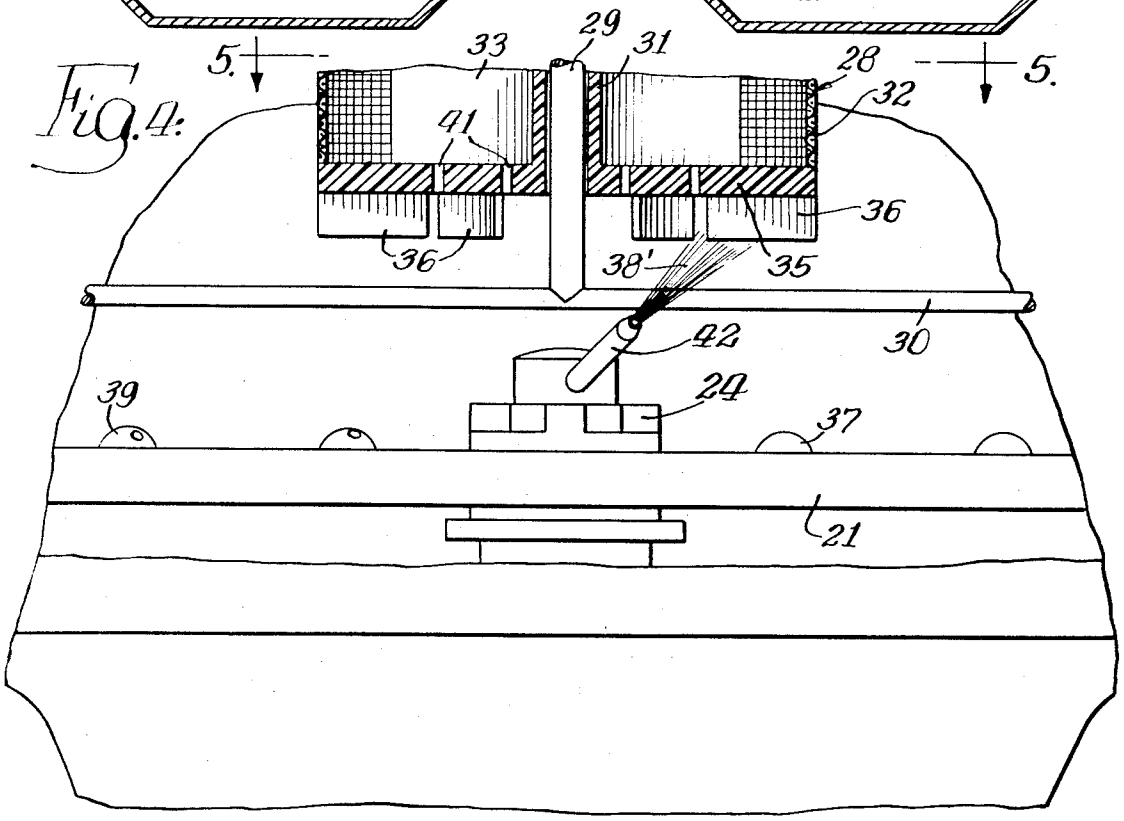


Fig. 4.



ROTATING SILVERWARE BASKET FOR DISHWASHER

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to dishwashers, and, in particular, to dishwashers having silverware holding means.

2. Description of the Prior Art

In the conventional dishwasher, a receptacle is provided for holding the silverware separately from the dishes. Usually the silverware holding means comprises a separate basket having wall means for supporting the silverware in an upright position. It is desirable in such dishwashers to provide improved washing action relative to the silverware, which in many cases has difficult to remove matter thereon. A problem arises in that the supporting walls tend to hinder the washing action of the conventional spray means provided for contacting the silverware with the washing liquid.

To provide such improved washing action, it has heretofore been proposed to utilize a moving silverware basket carried by the dish holding rack. One example of such a dishwashing apparatus is shown in the Maloney U. S. Pat. No. 1,540,793. Therein, the silverware holder is pivotally mounted on a horizontal shaft so as to be swung back and forth about the axis of the shaft as the result of the impingement of washing liquid spray against a pair of vanes extending oppositely outwardly away from the shaft axis. The washing liquid is delivered onto the vanes from a sprinkler head, which is in turn rocked back and forth to wash the silverware in the holder. Thus, the holder and spray are synchronized to move back and forth together, with the center of the spray being selectively directed toward different ones of the two vanes on the silverware holder.

In the Schleyer et al. U. S. Pat. No. 2,712,826, a dishwashing machine is shown to utilize a silverware holding basket which rotates with the dish holding rack about the center axis of the spray means. In this case, the spray means is stationary and the basket rotates as a result of dish reaction from the spray streams.

In the Swetnam U. S. Pat. No. 3,288,155, a pair of spray arms is provided, cooperating with a fixed silverware holding means.

SUMMARY OF THE INVENTION

The present invention contemplates an improved dishwasher structure wherein the silverware basket is rotatably mounted on the dish holding basket. Means are provided for rotating the silverware basket, and in the illustrated embodiment comprise spray means acting against vanes on the silverware basket. Silverware in the silverware basket is washed by sprays of washing liquid delivered from a pair of spray arms, herein one under and one over the silverware basket, so that a changing relationship of the silverware in the silverware basket to the direction of washing liquid spray is provided for improved washing of the silverware.

Thus, the present invention comprehends means for moving the silverware basket relative to the dish holding means independently of the action of the washing spray directed thereagainst by the washing spray means. Resultingly, the silverware holding means has two different movements relative to the spray means for providing such improved efficiency in the washing of the silverware. One relative movement is effected by the movement of the silverware holding means bodily, and the second relative movement is effected by the rotation of the spray arms.

The rotation of the silverware holding basket herein is about a vertical axis, and the reaction means on the silverware holding means comprises vanes extending downwardly from the holding means. The force means may comprise a jet of washing liquid different from the spray means jets directed upwardly toward the vanes from the supply of washing liquid under pressure. The spray arms may rotate about a vertical axis spaced from the vertical axis of the silverware holder.

BRIEF DESCRIPTION OF THE DRAWING

Other features and advantages of the invention will be apparent from the following description taken in connection with the accompanying drawing, wherein:

FIG. 1 is a partial vertical section of a dishwasher having a silverware washing means embodying the invention, with the rack thereof shown in broken lines in a loading position;

FIG. 2 is a fragmentary enlarged front elevation thereof, with portions broken away to facilitate illustration of the invention;

FIG. 3 is an enlarged fragmentary horizontal section illustrating the relationship of the spray means and silverware holder, taken substantially along the line 3—3 of FIG. 1;

FIG. 4 is a fragmentary front elevation of a modified form of a dishwasher embodying the invention; and

FIG. 5 is a fragmentary horizontal section taken substantially along the line 5—5 of FIG. 4.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In the exemplary embodiments of the invention as disclosed in FIGS. 1 through 3 of the drawing, a dishwasher generally designated **10** is shown to comprise a cabinet **11** defining a dishwashing chamber **12.** The cabinet is provided with a front opening **13** selectively closed by a front door **14** provided with a suitable handle **15** for swinging the door about a lower horizontal pivot **16** between an upright chamber-closing position and a forwardly extending horizontal chamber-opening position. Dishes to be washed are placed on a pair of racks, including a lower rack **17** and an upper rack **18,** which are selectively movable from an operative position in the chamber **12,** as shown in full lines in FIG. **1,** to a loading position at least partially outwardly of the chamber **12,** as shown in broken lines in FIG. **1.** The dishwasher **10** further includes a pump **19** driven by a suitable electric motor **20** for forcibly pumping washing liquid into the chamber **12** by means of a pair of spray arms **21** and **22.** Spray arm **21** is rotatably mounted on a bearing **23** carried on the pump **19** for rotation subjacent to the lower rack **17,** so as to permit spraying of the washing liquid forcibly upwardly through the rack **17** onto the dishes carried thereon during the dishwashing operation. The bearing **23** further includes an outlet element **24** for directing a stream of washing liquid upwardly into a receiver **26** associated with the upper spray arm **22,** with the force of the stream **25** effecting a rotation of the spray arm **22** and a forcible delivery of the liquid from the spray arm onto the lower rack **17** and upwardly into the upper rack **18.** In the illustrated embodiment, the spray arm **22** is rotatably mounted on the upper basket **18.** The washing liquid is returned to pump **19** upon falling from the baskets **17** and **18** as a

result of the collection thereof in a sump **27.** Thus, the dishwashing liquid may be circulated continuously during the dishwashing operation to provide a forceful washing action in chamber **12.**

The invention comprehends providing a silverware basket generally designated **28** mounted for improved washing of silverware placed therein. In the illustrated embodiment, the silverware basket **28** is carried on an upright post **29** mounted on a bottom wire **30** of the lower rack **17.** The basket **28** includes a central socket member **31** rotatably fitted on the upper end of the post **29** to permit rotation of the basket about the vertical axis of post **29.** As illustrated in FIG. **2,** the socket member **31** may be formed of molded plastic, and in the illustrated embodiment, the entire basket **28** comprises a plastic molding for facilitated manufacture and minimum cost. The basket may include a foraminous outer wall **32** and a plurality of radially extending dividing walls **33** cooperating with the socket element **31** to define a plurality of silverware holding spaces or compartments **34** opening upwardly from the basket to receive the silverware to be washed. The silverware rests in the basket on a bottom wall **35.** Depending from bottom wall **35** are a plurality of vanes **36** comprising reaction members arranged to cause rotation of the basket about the vertical axis of post **29** as a result of the impingement of fluid under pressure thereagainst. As shown in FIG. **3,** such action may be effected by a nozzle **37** provided on spray arm **21.** Thus, the stream **38** of dishwashing liquid under pressure ejected from nozzle **37** impinges on the vanes **36** as the spray arm **21** rotates about the vertical axis of bearing **24.** As shown in FIG. **2,** the nozzle **37** provides a jet stream against the vanes **36** once during each revolution of the spray arm **21.** The stream **38** reacts against the vanes to rotate the basket **28** about the axis of post **29** so that, in effect, the basket is spun on the dish holding rack **17** for movement relative to the dish holding rack. At the same time, the dishwashing liquid is sprayed upwardly by washing liquid nozzles **39** on spray arm **21** and downwardly by washing liquid nozzles **40** on spray arm **22** to enter the silverware basket and effectively wash the silverware disposed therein. As a result of the double relative movement between the basket and the washing means, an improved efficient washing of the silverware is effected. in a the spray from washing nozzles **39** and **40** moves ina large circle toward the bottom and top of the silverware basket, while at the same time the basket is rotated about a vertical axis so as to present different of the compartments **34** and different surfaces of the silverware therein to the spray streams. The provision of the spray nozzle **37** on the spray arm provides an intermittent rotational force to the basket for providing improved variation in the presentation of the silverware surfaces to the dishwashing streams. Further, the weight of the silverware and the effective balance thereof effects the speed and uniformity of rotation so as to provide a further variable in the washing action, effecting further improved cleaning of the silverware.

The washing liquid from nozzles **39** passes into the basket through a plurality of apertures **41** in the bottom wall **35** as well as through the foraminous side wall **32,** to provide a washing of the silverware both from the bottom and from the side. Further, the bottom apertures **41** permit a rapid draining of the washing liquid from the spaces **34** between the passes of the spray arms **21** and **22,** to provide further improved washing of the silverware on the basket **28.**

Referring now to the embodiment of FIGS. **4** and **5,** the delivery of the stream of washing liquid under pressure against the vanes **36** may alternatively be effected by a nozzle **42** connected directly to the bearing **24** so as to remain stationary and provide a constant rotation of the basket **28** as a result of the impingement of the stream **38'** seriatim against the vanes **36.** As shown in FIG. **5,** the nozzle **42** may comprise an elongated tube extending from the bearing **24** to closely adjacent the bottom of the basket **28** so that the stream **38'** is directed forcibly against the vanes **36** as they move successively to adjacent the discharge end of the nozzle. Here, again, the basket is caused to have two movements relative to the spray, namely, a rotational movement about the axis of the post **29** and an intermittent relative movement effected by the swinging of the spray arms therepast.

As the silverware in the basket **28** is exposed constantly at different angles to the washing liquid streams, improved washing of the silverware is effected. As different portions of the basket are exposed to the washing liquid streams, the location of the basket in the chamber **12** may be varied in accordance with the requirements of the dishwashing rack loading arrangement. The invention contemplates alternatively providing an intermittent rotation of the basket or a generally constant rotation in combination with the swinging movement of the spray arms to provide the desired improved silverware washing action.

Having described the invention, the embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. In a dishwasher having a washing chamber, dishrack means for holding dishes to be washed in said chamber, and movable spray means for spraying dishwashing liquid in said chamber for washing the dishes, silverware washing means comprising:

means for holding silverware to be washed and having reaction means thereon;

means for rotationally mounting said silverware holding means on said dishrack means for subjecting silverware held by said silverware holding means to the spray of said dishwashing liquid from said spray means; and

a fixed nozzle directing a fluid stream against the reaction means of said silverware holding means for moving said silverware holding means relative to said dishrack means and independently of the action of spray directed thereagainst by said spray means whereby said silverware holding means has two different movements relative to said spray means for washing of silverware in said silverware holding means.

2. The dishwasher means of claim **1** wherein said spray means and dishrack means have relative rotational movement about a first axis and said silverware holding means has rotational movement about a second axis.

3. The dishwasher means of claim **1** wherein said silverware holding means is mounted on said dish holding means for rotation about a vertical axis.

4. The dishwasher means of claim **1** wherein said spray means is rotatable about a first axis, and said silverware holding means is mounted for rotation about a vertical axis noncoincident with said first axis.

5. The dishwasher means of claim 1 wherein said fixed nozzle is means for moving said silverware holding means comprises hydraulic means including reaction means on said silverware holding means and means for directing a hydraulic jet carried by a stationary portion of said movable spray means.

6. In a dishwasher including dishrack means for supporting dishes within said dishwasher, silverware washing means comprising: a basket; means for rotatably mounting the basket on said dishrack means for rotation about a substantially vertical axis; reaction means on the basket; means for directing a fluid stream against the reaction means to rotate the basket; and rotatable spray means for spraying silverware in the basket with a washing liquid in a moving distribution independently of the movement of the basket by the fluid stream and reaction means, said reaction means comprising a plurality of vanes on said basket, and said fluid stream directing means comprising a fixed nozzle.

7. The dishwasher silverware washing means of claim 6 wherein said reaction means comprises a plurality of vanes on said basket, and said dishwasher includes a single pump for providing said fluid stream and for spraying said washing liquid.

8. The dishwasher silverware washing means of claim 6 wherein said silverware spray means comprises a spray arm rotatable about a fixed axis and said basket is mounted for rotation about a second axis spaced from and parallel to said first axis.

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