A. KAMMERMANN.

APPARATUS FOR WASHING CROCKERY, CUTLERY, AND THE LIKE.

APPLICATION FILED JUNE 29, 1915.

1,355,341. Patented Oct. 12, 1920.

3 SHEETS—SHEET 1.

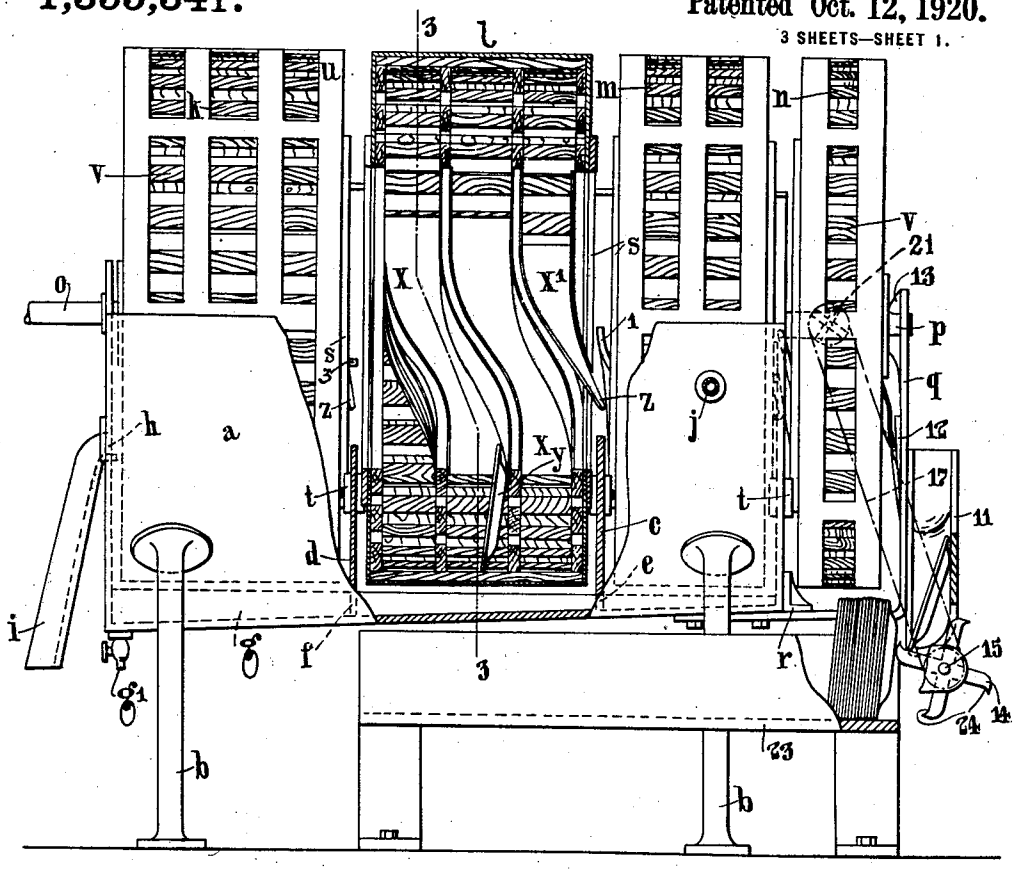

Fig. 1.

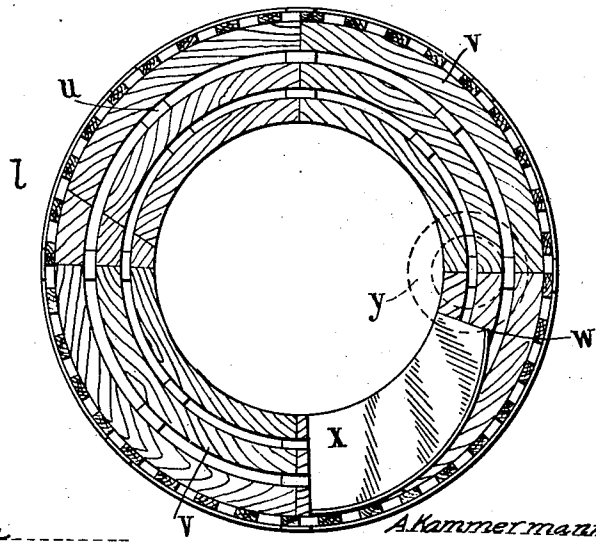

Fig. 3.

Witnesses:

Wm. Rohse

P. O. Bellhaus

A. Kammermann Inventor:

by Munn & Co

Attorney:

A. KAMMERMANN.

APPARATUS FOR WASHING CROCKERY, CUTLERY, AND THE LIKE.

APPLICATION FILED JUNE 29, 1915.

1,355,341. Patented Oct. 12, 1920.

3 SHEETS—SHEET 2.

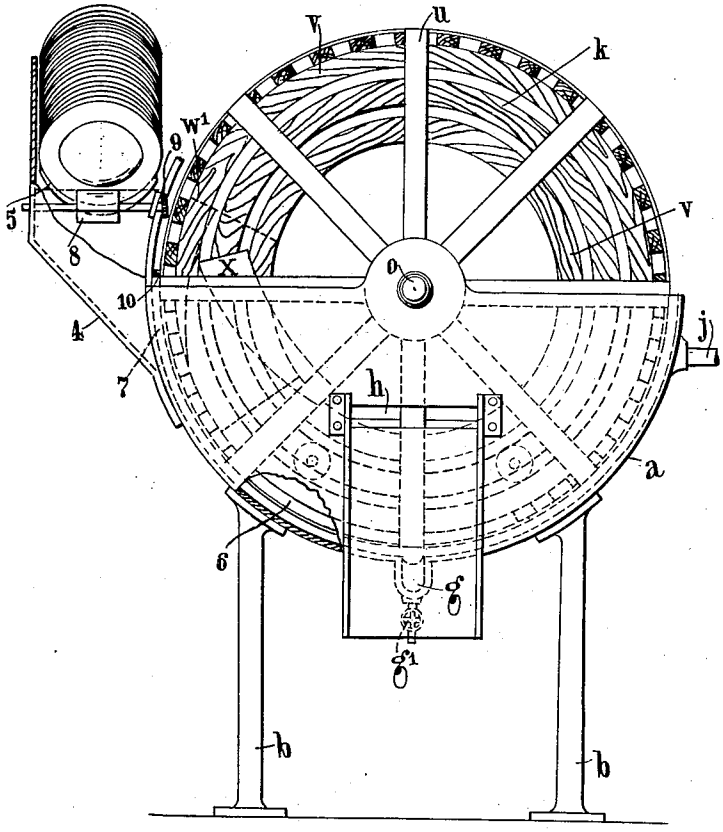

Fig. 2.

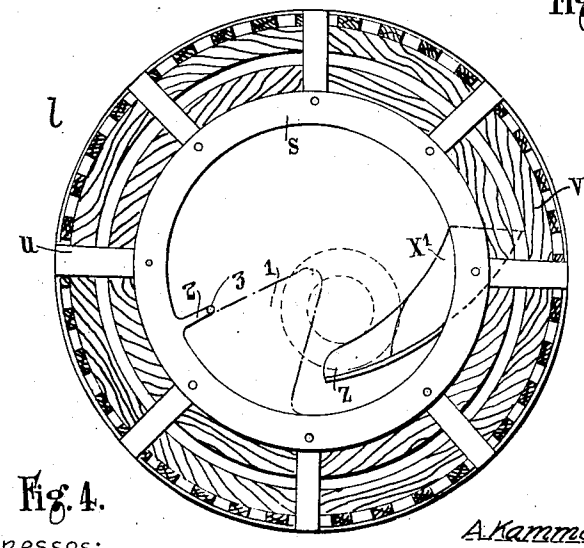

Fig. 4.

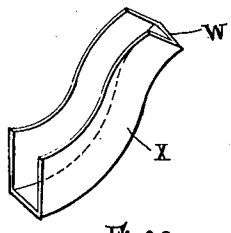

Fig. 8.

Witnesses:

Wm. Kehse

G. D. Rathvane

A. Kammermann Inventor:

by. Munn & Co

Attorney:

A. KAMMERMANN.

APPARATUS FOR WASHING CROCKERY, CUTLERY, AND THE LIKE.

APPLICATION FILED JUNE 29, 1915.

1,355,341.

Patented Oct. 12, 1920.

3 SHEETS—SHEET 3.

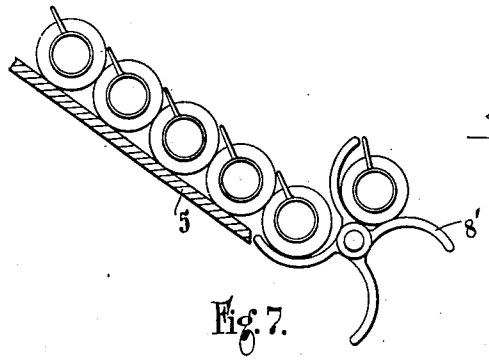

Fig. 7.

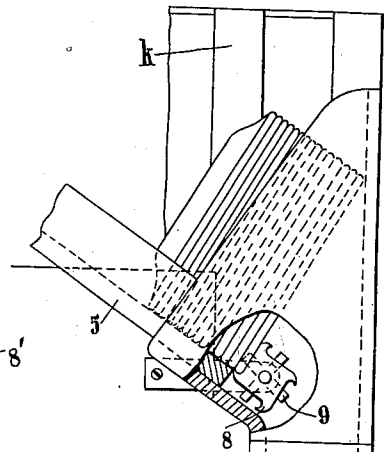

Fig. 6.

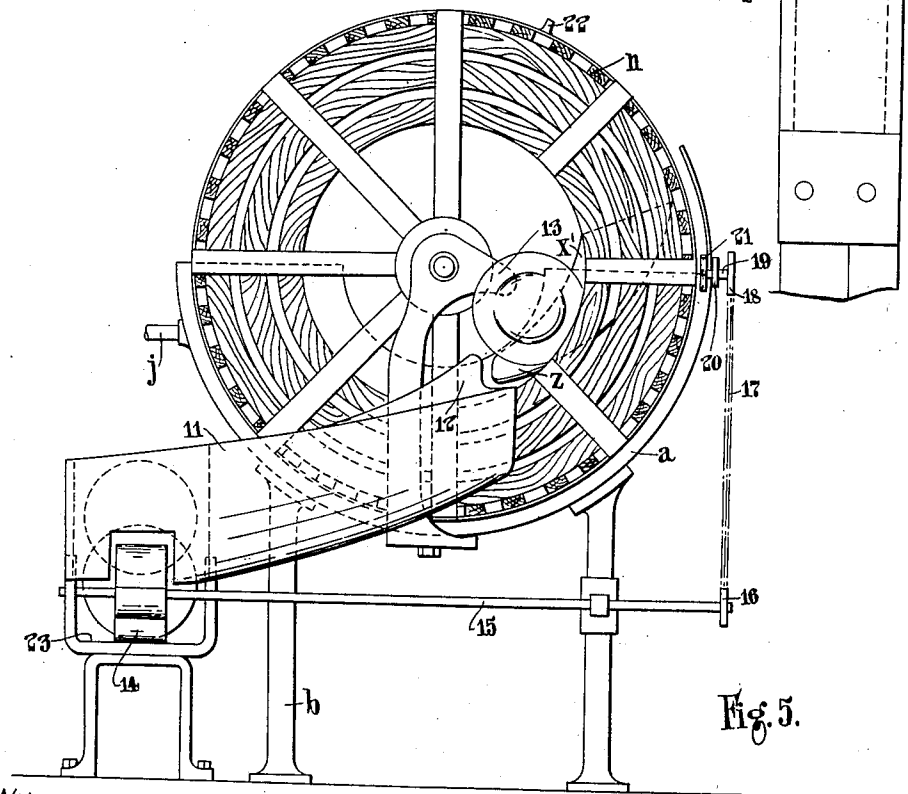

Fig. 5.

Witnesses:

Wm. Hobbs

P. O. Kalhave

A. Kammermann Inventor:

by Munn & Co

Attorney:

UNITED STATES PATENT OFFICE.

ARTHUR KAMMERMANN, OF LONDON, ENGLAND.

APPARATUS FOR WASHING CROCKERY, CUTLERY, AND THE LIKE.

1,355,341. Specification of Letters Patent. Patented Oct. 12, 1920.

Application filed June 29, 1915. Serial No. 36,979.

To all whom it may concern:

Be it known that I, ARTHUR KAMMERMANN, a citizen of the Swiss Confederacy, residing at 36 and 37 Kensington Garden Square, London, W., England, have invented certain new and useful Improvements in Apparatus for Washing Crockery, Cutlery, and the like, of which the following is a specification.

The object of the present invention is to provide an improved washing apparatus for use in hotels, restaurants, hospitals, barracks, private houses and similar places where various utensils have to be washed quickly and effectively and which will cleanse various utensils such as plates, cups, saucers, glasses, spoons, forks and the like and which will preferably in addition deliver them in a dry state ready for use without it being necessary for any person to come in contact with the water.

A very important feature of the invention lies in the provision of means for intermittently carrying the articles upward while in the apparatus and then letting them fall rapidly. I find that this rapid falling motion is most effective both for cleaning purposes, in which case the articles drop through the cleansing liquid and are thus subjected to a swilling action, and for drying purposes; and I find that the use of brushes or other frictional cleaning devices may be dispensed with, thus making the apparatus very simple and avoiding the somewhat frequent renewal of worn parts.

A further important feature of the invention lies in employing rotary drums or compartments in the lower part of which the articles are allowed to remain freely until they are transferred to another drum or compartment by means of a guide carried by and rotatable therewith. This guide is preferably combined with a bulkhead or projection which is adapted to effect the above-mentioned lifting of the articles and their subsequent release, as hereafter more fully explained.

In carrying the invention into effect I preferably employ a plurality of washing drums each of which is divided into a number of compartments, a guiding device carried by each compartment serving, as the drum rotates, to cause the utensils to pass from one compartment to another and from one drum to the next. I may, however, use only a single drum in some cases divided into a suitable number of compartments or I may use a number of drums each of which contains only one compartment. These drums are preferably circular in form but they may be elliptical, polygonal or other suitable shape as may be found convenient.

The washing drums are arranged to rotate within a chamber or sink which is provided with suitable partitions so that preferably each drum rotates in a separate compartment in the sink. The compartments in the sink are adapted to hold the washing liquid so that a sufficient depth is maintained to cover the article when in the lower portion of the drums.

I prefer to arrange the inlet for supplying the cleaning liquid, which may be hot water, so that the liquid enters the last compartment of the sink first and passes from one compartment to another, taking the grease away which is floating on the surface of the liquid and renewing at the same time, the water in the next compartment of the sink, until finally after having passed through all the rinsing and washing compartments, the now dirty water leaves the first compartment of the sink adjacent the first drum and passes down a suitable waste pipe.

In this manner the utensils pass from dirty water to cleaner water during their progress through the drums and finally meet with the clean water as it enters the apparatus before they are discharged into the drying drum or drums.

Suitable feeding and discharging means are preferably provided so that the articles to be cleaned may be automatically fed to and removed from the drums, as will be hereinafter more fully described.

I will now proceed to describe a suitable embodiment of the invention for cleaning articles such as plates, but as will be explained later on, the apparatus may with slight modifications be arranged to clean other articles.

Referring now to the accompanying drawings:—

Figure 1 is a side view of the apparatus showing parts in section.

Fig. 2 is a view of the left hand end of the apparatus looking at Fig. 1.

Fig. 3 is a sectional view taken through the drum 1 on the line 3—3 of Fig. 1, but with the drum in such a position that the guide plate hereinafter described is just on the point of releasing the plate.

Fig. 4 is an end view of the right hand end of the drum 1.

Fig. 5 is a view of the right hand end of the machine.

Fig. 6 is a detail view of the feeding mechanism.

Fig. 7 is a view on an enlarged scale of a modified form of feeding mechanism, and

Fig. 8 is a perspective view on a smaller scale indicating the shape of the guideways in the drums.

In the drawings, *a* represents a main chamber or sink which is semi-cylindrical in form and is supported on suitable standards *b*. The sink is divided in the form shown, into three compartments by means of the partitions *c* and *d* as shown in Fig. 1. Openings are provided at *e* and *f* at the base of these partitions to allow communication between the several compartments and a gully or channel *g* is provided along the base of the sink as shown in Fig. 2. The gully is inclined toward the left hand end where it is provided with a draw off cock *g'*. The partition *c* is somewhat higher than the partition *d* and the left hand end of the sink, looking at Fig. 1, is provided with a discharge opening *h*, communicating with a suitable discharge pipe *i* the discharge opening *h* being at a slightly lower level than the top of the partition *d*. An inlet pipe connection is provided at *j* in the right hand compartment in the sink at a higher level than the first partition *c*. The inflow of liquid is intended to be sufficiently rapid to cause an overflow over the partitions *c* and *d* in spite of the openings at *e* and *f* thus allowing any grease to float over the partitions.

Mounted for rotation within the several compartments of the sink are three drums *k*, *l* and *m* while a further drum *n* is provided outside the end of the sink, this latter drum being used for drying purposes. The four drums are all adapted to be rotated together from a driving shaft *o*. The shaft *o* is supported at the left hand end of the sink in a suitable bearing, preferably a ball or roller bearing and a shaft *p* is also provided on the right hand side of the drum *n*, which is supported in a suitable bearing in a frame member *q*, which is carried upon a bracket *r* secured to the bottom of the sink. The inner sides of the two outer drums as well as both sides of the two inner drums are supported for rotation by means of projecting rings *s* carried on the faces of the drums which engage with rollers *t* pivotally mounted upon the partitions *c* and *d* and the end wall of the sink.

The four drums are all of very similar construction the drums *k* and *l*, in the form illustrated, being of the same width and each containing three compartments, while the drum *m* is of less width and contains two compartments and the drum *n*, which is used for drying as previously stated, is only provided with one compartment. The internal construction of the drums will be understood from the sectional illustration of the drum *l* shown in Fig. 1. The drums are preferably built up in the form of an open metal frame *u*, the members of which have secured thereto a series of wooden slats *v* forming with the metal frame, a complete drum having an apertured periphery through which the cleaning liquid may pass and side portions and partitions as clearly shown in Fig. 1. It will be understood that the slats *v* which form the partitions are of circular form so that the partitions divide off the drums into three circular trough shaped chambers, which I term compartments for the sake of convenience, these compartments communicating with each other by sinuous guideways *x* which cause the plates or the like to be carried through the drums in an axial direction, *i. e.* to be transferred from one compartment to another in a manner which will now be described.

Assuming a plate to be in the left hand compartment of the drum *l* as the drum rotates the edge of the plate is caught by the transverse edge of a bent metal guideway *x* which serves to afford communication between the first and second compartments; the wooden slats forming the sides of the compartments being bent so as to cause the first compartment to merge into the metal guideway, the form of which will be understood from Fig. 8. The transverse edge *w* of the guideway *x* is enabled to engage the plate owing to the fact that it is not flush with the inner periphery of the drum but is spaced therefrom as shown in Fig. 3, the guideway *x* being of less depth at its upper than at its lower end (Figs. 3 and 8). As the drum continues to rotate the plate is carried up by the edge *w* of the guideway *x* until it overbalances and falls rapidly down the guideway into the center compartment. The plate is shown at *y* in Figs. 1 and 3. In the latter figure it is supposed to have been raised by the rotation of the drum to a point when it is just about to overbalance from the edge *w* and fall down the guideway until it assumes the position shown in Fig. 1. On the continued rotation of the drum the plate will tend to remain by gravity at the bottom of the drum but will of course, rotate in the liquid therein by virtue of its engagement with the inner periphery of the drum. This state of affairs will continue until the edge *w* of the corresponding guideway *x* in the center compartment engages the plate when in turn the edge *w* of this second guideway will raise the plate and allow it to fall into the third or right hand compartment

of the drum *l*. This latter compartment is also provided with a guide way *x'* having an edge *w* as before. The lower end of this guideway *x'* however, is extended through a central opening in the side of the drum as shown at *z*; this end of the guideway being bent slightly into a channel shaped form so as to guide the plate outwardly as it rolls down the guideway. It will be understood that the compartments of the next drum *m* are similarly constructed to those of the drum *l* and that an opening is also provided in the side of the drum *m* so that when the plate rolls out from the guideway *x'* it will fall into the left hand compartment of the drum *m*.

In order to insure that the plate may fall correctly into the drum *m* the latter is provided with an outwardly bent metal plate 1 which extends toward the center line of the machine and which forms a guide for the plates as they roll down the guideway *x'*. The relation of the plate 1 to the guideway *x'* and the mode in which it guides the plate as the latter rolls down the guideway will be understood from Fig. 4 in which the plate 1 which is actually attached to the drum *m*, is shown in dot and dash lines.

The plate 1 may also serve a further function, viz: that of communicating motion from the drum *l* to the drum *m*. For this purpose on the right hand side of the drum *l* a suitable bracket or the like 2 is provided having an outwardly extending projection 3 which is adapted to engage the side of the plate 1 upon the drum *m*, so that as the drum *l* rotates the drum *m* is carried around therewith. By employing this mode of communicating motion from one drum to the next, there is no possibility of placing the drums in incorrect relation to each other in the sink if they have been removed for cleaning purposes, since the drum *l* will simply rotate until the projection 3 hits against the plate 1 whereupon the drum *m* will be carried around as mentioned above. It will be understood that similar provision is made for rotating the drum *l* from the drum *k* and the drum *n* from the drum *m*.

In place of employing a guideway *x* with a transverse edge *w* for lifting the plates and allowing them to fall in the manner already described, I preferably in the case of the first compartment, on the left of the drum *k*, arrange that the edge of the guideway therein corresponding to the edge *w* is arranged close to the inner periphery of the drum as shown at *w'* in Fig. 2, so that in this particular compartment the plate is not lifted in the manner previously described but as soon as it is reached by the guideway it is transferred to the center compartment after which the operations in the drum *k* are precisely similar to those already described in connection with the drum *l*.

The plates are fed in to the drum *k* by means to be presently described and during the operation of the machine traverse in turn the drums *k*, *l*, *m* and *n* after which upon discharge from the drum *n* they are delivered by delivery apparatus which will be further described.

The cleansing liquid, which is preferably hot water or hot soda-water is run into the sink through the inlet *j* and there is therefore a gradual flow of liquid toward the discharge end of the sink as already described. It will be understood that as the drums are rotated the liquid will be agitated to a certain extent and in view of the fact that the plates or other articles are kept in motion within the compartments of the drums, a very effective cleansing is effected.

The drying drum *n* is entirely independent of the sink and merely rotates in the open air so that as the plates are moved therein they are effectually dried before being discharged.

In order to feed the plates to the drum *k* the following means may be conveniently adopted:—A chute 4 is carried upon the rear portion of the sink casing *a* and communicating with the upper end of this chute is an inclined substantially semi-circular chute 5 which is adapted to receive the plates upon their edges as shown in Fig. 6.

A peripheral opening 6 is provided in the drum *k* so that when the drum rotates into such a position that this opening comes into alinement with an opening 7 in the chute, a plate may pass from the chute into the first compartment of the drum. In order that the plates may be allowed to fall into the chute from the chute 5 one by one a rotatable polygonal cylinder 8 is provided in the chute as shown in Figs. 2 and 6; this cylinder having projecting lips for receiving the edge of a plate as will be understood from an examination of Fig. 6. If this cylinder is rotated through 90° in a clockwise direction looking at Fig. 6 it will be seen that the lower edge will be moved forwardly until the plate can drop vertically down the chute. As the first plate is moved in this manner it will push back the upper portion of the second plate slightly and the lower portion of the second plate will then find a resting place upon the next succeeding lip of the cylinder so that upon a further subsequent rotation of the cylinder through 90° another plate is fed and so on. In order to rotate the cylinder step by step in the desired manner a star wheel 9 is provided upon the shaft upon which the cylinder is mounted and this star wheel is adapted to be engaged by a projection 10 carried upon the periphery of the drum. It will thus be seen that the cylinder will be rotated through 90° for each rotation of the drum so that one plate will be fed during

this interval. Further it will be clear from the foregoing description that for each rotation of the drum a plate is transferred from one compartment to the next so that it is not possible for two plates to be in one compartment together, thus avoiding any risk of breakage or damage.

In order to deliver the plates from the right hand end of the machine a delivery chute 11 is provided, which receives the plates as they are discharged from the lip z of a guideway x' provided in the drum n and operating in a similar manner to that described in connection with the drum l. In order to prevent any chance of the plates falling off sideways as they leave the guideway x' an upwardly extending guide piece 12 may be provided upon the delivery chute 11 as shown in Fig. 5 and also an extension 13 may be provided upon the frame piece q as will also be clear from an examination of Fig. 5. When a plate has rolled down the delivery chute 11 it is received upon one blade of a star wheel 14 as shown in Fig. 1. This star wheel 14 is carried upon a shaft 15 extending toward the rear of the machine and carrying a sprocket wheel 16 which is connected by means of a sprocket chain 17 with a second sprocket wheel 18 carried upon a short shaft 19 mounted upon a suitable bracket member 20, and carrying also a star wheel 21 which is adapted to be engaged by a projection 22 upon the periphery of the drum n so that the first mentioned star wheel 14 is rotated step by step for every complete rotation of the drum n.

The mode in which the star wheel 14 delivers the plates will be understood from an examination of Fig. 1 where it will be seen that a plate is resting upon one of the arms of the star wheel while a series of plates are shown in front of the star wheel upon a delivery table 23. Upon the star wheel rotating through 90° the plate shown resting upon the arm thereof will be lowered to a position behind the rearmost plate upon the table 23 and will be pushed forward slightly as the succeeding arm of the star wheel goes around to a position ready to receive a further plate from the chute 11. The arms of the star wheel 14 are provided with lips 24 at their ends as shown in order to prevent the plates slipping off too soon.

The operation of the machine has been described in connection with the washing of plates and similar articles. If it is desired to deal with cups or glasses the machine may be similarly constructed except that the compartments of the drums may need to be made rather wider and the feeding cylinder 8' must be altered in form so as to receive and feed the cylindrical shaped articles under consideration. A suitable form of feeding cylinder for articles such as cups and glasses is shown in Fig. 7 where it will be seen that the feeding cylinder in this case takes the form of a star wheel having curved arms, to receive the cups or the like which as before may slide down a suitable feeding table 5. Upon a partial rotation of this special form of feeding cylinder it will be seen that a cup received in one of the arms will be carried around and allowed to fall down the chute 4 in a similar manner to the plates already described. The delivery mechanism may be of similar construction to that already described except that the chute 11 may have to be rather wider and the arms of the star wheel may be hollowed slightly to receive the cylindrical shaped cups or glasses; otherwise the operation of this mechanism will be similar to that fully described in connection with the plates.

If it is desired to deal with knives, forks, spoons and the like the drums should have their peripheral portions constructed without the use of battens placed a considerable distance apart as shown on the drawings. Otherwise the drums may be similarly constructed and the washing operation will be the same as that already described in connection with crockery although of course, the compartments must be wide enough to receive the forks or the like which have to be washed therein.

Such articles as forks, spoons, knives or the like may be fed in batches of several at a time and for this purpose feeding machanism of the form shown in Fig. 7 may be employed, the bent arms of the feeding cylinder 8 shown therein taking up a mass of forks or the like as it rotates and discharging them down the chute ready to fall into the first compartment of the drum k, when the peripheral opening 6 therein comes into the right position.

It will be seen that the modifications described for dealing with articles of widely differing natures are so slight that one machine may easily be made to do duty for a large number of different articles. If desired the feeding and delivery wheels or cylinders may be made readily removable so that a different kind may be easily placed in the machine according to the articles which are desired to be cleaned.

It will be understood that I do not desire to limit myself to the exact details of construction described and any desired or known form of feeding and delivery mechanism may be used if desired.

Having described the invention what I claim as new and desire to secure by Letters Patent is:—

1. Apparatus for washing articles such as crockery, glasses, spoons, forks and the like, comprising means for subjecting the articles to the action of a cleansing liquid,

means for conveying said articles from the cleansing means to a drying receptacle through which air may circulate, and means mounted on the receptacle for lifting the articles to a predetermined height within said receptacle and allowing them freely to fall onto a delivery chute for the purposes set forth.

2. Apparatus for washing articles such as crockery, glasses, spoons, forks and the like, comprising means for subjecting the articles to the action of a cleansing liquid, means for conveying said articles from the cleansing means to a revoluble receptacle through which air may circulate for drying the articles after they have been cleaned, and means on the receptacle for lifting the articles to a predetermined height within said receptacle and allowing them freely to fall onto a delivery chute, for the purposes set forth.

3. Apparatus for washing articles such as crockery, glasses, spoons, forks and the like, comprising a plurality of revoluble compartments having their axes horizontal, guide means for transferring the articles from one compartment to the next compartment during the rotation thereof and means for positively carrying the articles upward in the compartments during the rotation thereof and letting them fall down the said guide means through the liquid into the next compartment.

4. Apparatus for washing articles such as crockery, glasses, spoons, forks and the like, comprising a plurality of revoluble drums divided into compartments in which the articles are treated, said drums having their axes horizontal, means for positively carrying the articles upward in the compartments during the rotation of the drums and letting them fall through the liquid and means for transferring the articles from one compartment to another compartment and from one drum to another drum.

5. Apparatus for washing articles such as crockery, glasses, spoons, forks and the like, comprising a plurality of revoluble compartments having their axes horizontal, guide means mounted on and rotating with each compartment and connecting one compartment with a neighboring compartment and means for carrying the articles upward during the rotation of the compartments and letting them fall down the rotating guide means into a neighboring compartment.

6. Apparatus for washing articles such as crockery, glasses, spoons, forks and the like, comprising a plurality of revoluble compartments having their axes horizontal, guide means mounted on and rotating with each compartment and connecting one compartment with a neighboring compartment, one end of the guide means being spaced from the inner surface of the compartment, the article being carried up by said edge until it falls down the guide means into a neighboring compartment.

In testimony whereof I have signed my name to this specification.

ARTHUR KAMMERMANN.