Nov. 18, 1930. F. STAINES 1,782,018

DEVICE FOR CLEANING AND WASHING CROCKERY AND THE LIKE

Filed Oct. 4, 1927 3 Sheets-Sheet 1

Fig. 1.

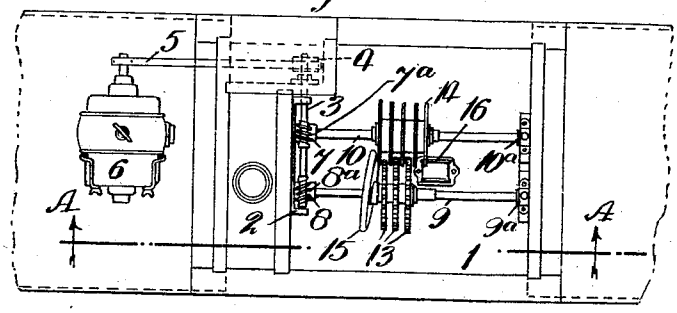
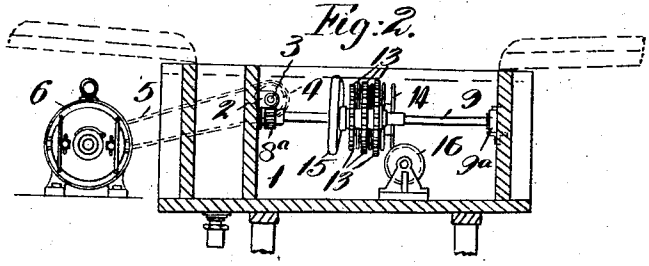


Fig. 2.



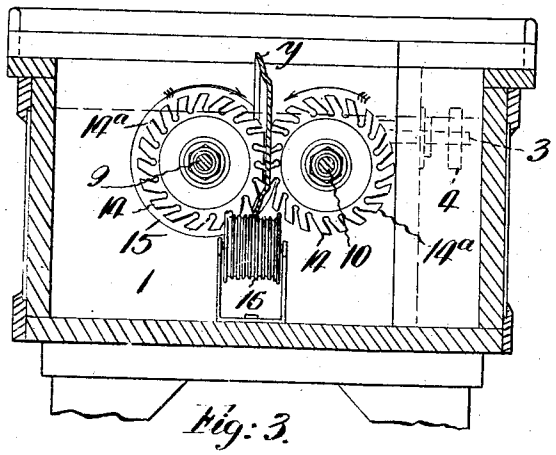


Fig. 3.

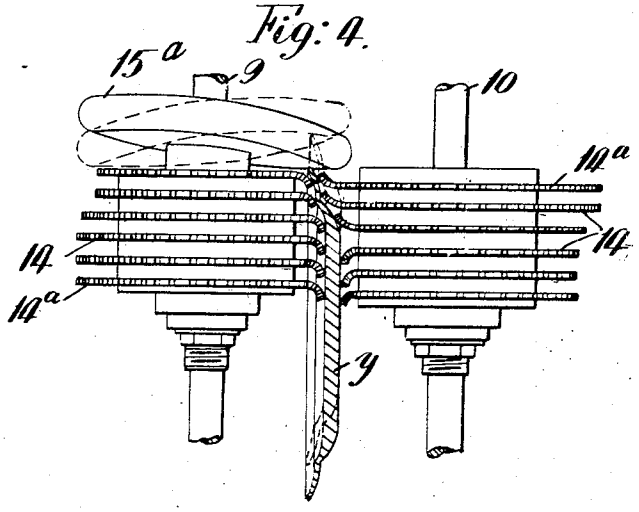
Inventor;
Frank Staines,
By his Att'y, Harold D Penney

Nov. 18, 1930. F. STAINES 1,782,018

DEVICE FOR CLEANING AND WASHING CROCKERY AND THE LIKE

Filed Oct. 4, 1927 3 Sheets-Sheet 2

Fig: 4.



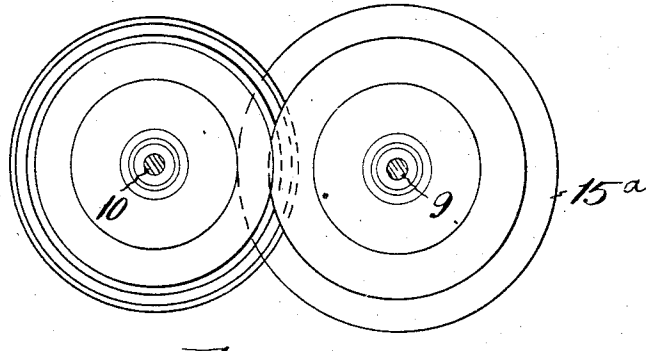


Fig: 5.

Inventor;
Frank Staines,
By his Att'y,
Harold S. Penney

Nov. 18, 1930. F. STAINES 1,782,018

DEVICE FOR CLEANING AND WASHING CROCKERY AND THE LIKE

Filed Oct. 4, 1927 3 Sheets-Sheet 3

Fig: 6

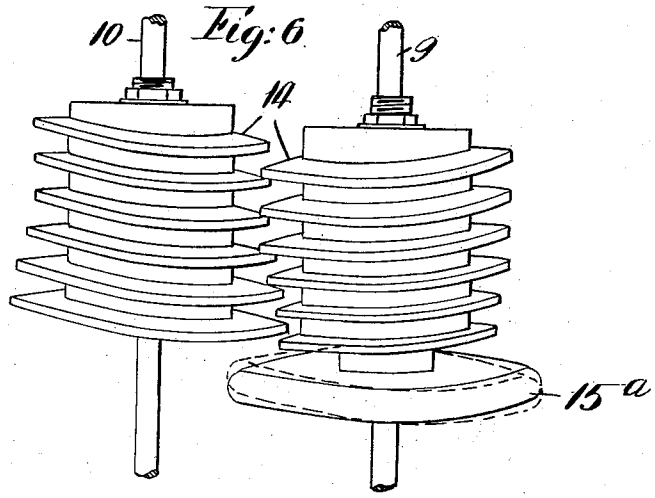


Fig: 7.

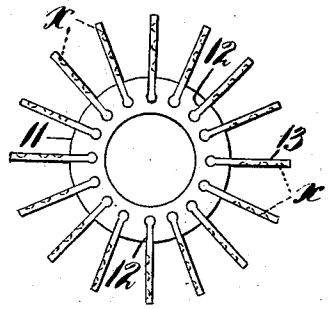
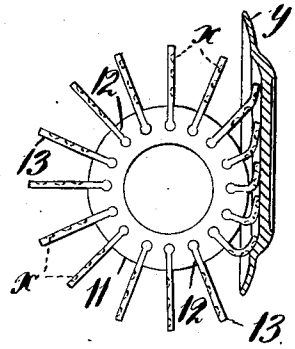


Fig: 8.

Fig. 10.



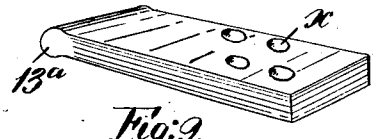


Fig: 9.

Inventor;
Frank Staines,
By his Att'y,
Harold D. Penney

Patented Nov. 18, 1930 1,782,018

UNITED STATES PATENT OFFICE

FRANK STAINES, OF LONDON, ENGLAND

DEVICE FOR CLEANING AND WASHING CROCKERY AND THE LIKE

Application filed October 4, 1927, Serial No. 223,894, and in Great Britain November 6, 1926.

This invention relates to devices for cleaning and washing crockery of the kind in which the articles, plates for example, are subjected whilst immersed in the cleaning liquid to the action of rotary brushes arranged upon spindles disposed one upon each side of the plate and in planes parallel to the plane of said plate.

The present invention has for its object to provide a device of the general type above referred to designed to secure the more rapid and effective cleaning of the articles.

According to this invention the articles to be washed are subjected to the action of rotary bodies in the form of brushes or discs, formed of india-rubber or other flexible material disposed at a right angle to the plate and so arranged as to act simultaneously upon the front and back of the article, said plate during the operation of the discs being caused to rotate at a speed preferably equal to the speed of the cleaning bodies, and preferably also the plate has a reciprocatory motion transversely of the said cleaning bodies, or said cleaning bodies or the effective surfaces thereof reciprocate transversely of said plate.

Preferably the cleaning bodies are arranged in two series respectively disposed upon spindles arranged one on each side of the plate, and they are of such diameter that their edges normally overlap. The bodies are arranged in spaced relationship one to another, those of one series being staggered with respect to the other, so that when no plate is between them their outer edges do not contact, when however a plate is in position the edges of the discs contact therewith and are turned over so that a substantially broad surface is acting upon the plate.

Where the rotary bodies are in the form of brushes the brushes of one series may be in the same plane as the brushes of the other series, the bristles interengaging when no article is between them.

In the preferred form where discs are employed the said discs are cut to form a number of flaps, and, in order to secure a certain cohesion of the surfaces thereof with the plate, there are formed in the sides of the flaps recesses or chambers which act as suckers and cause the flaps to adhere more or less tightly to the plate.

Instead of discs the cleaning bodies may each comprise a boss or hub from which radiate flaps of flexible material, the effective surfaces of which are normally parallel to the general plane of the plate.

The flaps just referred to may have their effective surfaces provided with recesses or chambers as previously described. Preferably the length of each series of discs is such that when the plate is in position they extend beyond the centre thereof, so that as it rotates the whole surface of the plate is acted upon.

The rotation and reciprocation of the plate may be effected by means of a rotating disc or swash plate arranged to engage the edge of the said plate and so mounted that it is not at a right angle to its axis. Instead of mounting the disc as just described, a disc may be employed provided with a cam surface adapted to secure the desired movement of the plate.

Instead of reciprocating each series of discs or the like, they may be so mounted that they are inclined with respect to the spindle supporting them. In order to retain the plate in position between the cleaning devices, a roller or rollers is or are provided so disposed as to engage the edge of the plate at a point or points such as will give the plate a tendency to fall inwards. Preferably the roller or rollers is or are covered with india-rubber or other material so as to avoid damage to the plate, said surface being ribbed, scored or otherwise treated to engage the edge of the plate and retain same in a vertical or substantially vertical position. In rinsing the plates they may be placed between the cleaning bodies.

The rotary bodies may be arranged with their axes either in the horizontal or vertical planes.

In order that the invention may be the better understood, drawings are appended in which:—

Fig. 1 is a plan of a machine embodying the present invention.

Fig. 2 is a section on line A—A Fig. 1.

Fig. 3 is a sectional view to a larger scale

than that of Figs. 1 and 2 showing an alternative form of the discs.

Fig. 4 is a plan view of the discs shown in Fig. 3.

Fig. 5 is an end view showing an alternative arrangement of the cleaning discs.

Fig. 6 is a plan view of the discs shown in Fig. 5.

Fig. 7 is a side view of one of the discs shown in Figs. 1 and 2.

Fig. 8 is a front view of the discs shown in Fig. 7.

Fig. 9 is a perspective view of one of the elements of the disc.

Fig. 10 is a sectional view showing the action of cleaning elements illustrated in Figs 1, 2, 7, 8 and 9.

Referring to the accompanying drawings, 1 indicates a tank mounted upon one wall of which is a bracket 2 provided with bearings supporting a shaft 3, said shaft passing outside the tank and being provided with a pulley 4 whereby it may be driven by means of belt 5 from the motor 6.

Mounted upon shaft 3 are worms 7^b of opposite direction one to the other and which worms respectively engage wheels 7^a and 8^a mounted upon spindles 9, 10 supported by bearings such as 9^a 10^a mounted upon the end walls of the tank. The spindles 9, 10 carry the cleaning discs which in the form shown in the figures referred to comprise an annular body 11, Figs. 1–7 and 10, preferably formed of metal. Running transversely of the body are channels 12, the inner ends of which are shaped as shown whereby there is provided an enlargement also running transversely of the body 11.

The cleaning elements are formed of strips of india-rubber 13 having a bulbous extremity 13^a, Figs. 7, 9 and 10, adapted to fit tightly within the enlargement at the inner end of the aforesaid channels 12. By this means the strips 13 are held against displacement under the action of centrifugal force and are also enabled to resist the drag upon them as they are drawn over the article. In order to increase the effect of the strips they are provided upon the surface contacting with the article with recesses x whereby they are caused by suction to adhere closely to the surface to which they are applied, with the result that not only is their cleaning action considerably enhanced, but by reason of their adhesion they more closely follow the outline of the surface to which they are applied, as for instance the curved surfaces at the edge of the plate.

The action of the strips will be readily understood in reference to Fig. 10 where it will be seen that as the ends of the strips contact with the front surface of plate y they bend or turn over so that there is a surface of comparatively large area acting upon said plate.

In the arrangement shown in Figs. 1 and 2 the cleaning discs acting upon the back of the plate are in the form of discs of india-rubber 14 cut as shown more clearly in Figs. 3 and 4, whereby there are provided a series of tongues 14^a which, as they engage the surface of the plate, are turned over so that the sides thereof act upon the plate, as shown more clearly in Fig. 4. The surfaces contacting with the plates may be provided with recesses such as those x before referred to.

The discs of one cleaning member are so arranged that they are staggered with respect to the strips of the other cleaning member, whereby when there is no plate between them the elements of the respective members do not contact one with the other.

Secured to the spindle 9 is a disc 15 formed of wood or other material, preferably having its inner face provided with a covering of india-rubber, so mounted that it runs out of truth and acts as a swash-plate, and with which disc the inner edge of the plate, which is supported by means of the roller 16 also having a rubber face, contacts. Preferably the surface of the roller is grooved, the groove tending to maintain the plate upright.

As shown the cleaning members are so arranged that they act substantially upon one third of the plate and under the action of said members and the disc 15 the plate is caused to rotate, the disc 15 during its rotation causing the plate to move backwards and forwards whereby the whole surface is acted upon, without however the cleaning members passing beyond the centre of the plate, in which case the plate would cease to rotate or only rotate intermittently, as the action of the cleaning members upon one side of the centre would to a great extent nullify or reduce the driving action of those upon the other side.

Instead of mounting the disc 15 in the manner described it may be provided upon its face with one or more cam surfaces or projections whereby the desired to and fro movement of the plate is secured. The plate is held in contact with the disc partly by its own weight, the position of the roller 16 being such that the plate naturally tends to fall inwards towards the said disc 15, and partly by the action of the cleaning members the direction of rotation of which is such that the plate tends to roll towards the said disc.

Preferably the outer diameter of the cleaning members varies towards the outer edge of the plate. Instead of forming one of the cleaning members of strips of india-rubber both may be of disc form as shown in Figs. 3 and 4.

Instead of arranging for the reciprocal motion of the plate to be effected by means of a swash-plate, the cleaning members

themselves may be so set upon their spindles that they are inclined with respect thereto. A disc having a small throw may under these circumstances be substituted for the swash-plate or the said swash-plate be arranged to give a comparatively slight movement only to the plate being washed. An arrangement such as that just referred to is shown in Figs. 5 and 6 where 15ª indicates a swash-plate having a comparatively small throw.

The rotary bodies may be arranged with their axes in the vertical plane.

Whilst in practice very effective results are secured with discs such as those before described it may, where the cleaning liquid is liable to contain a considerable amount of grease, be preferable to employ brushes. Also where the cleaning liquid contains substances likely to act prejudicially upon the material of which said discs are composed brushes would be employed.

I claim:

1. A device for washing crockery and the like, comprising a tank, rotary cleaning members in said tank, to engage the opposite faces of an article, means for supporting and rotating the article including a revolving cam member for imparting a reciprocating motion to said article transversely to the acting surfaces of said cleaning members.

2. A device for washing crockery and the like, comprising a tank, rotary cleaning members therein, to act upon the opposite faces of an article, and means adjacent said members, for supporting said article, including a swash plate, engaging said article, whereby the latter has imparted thereto a rotary motion and a reciprocating motion with relation to the acting surfaces of said cleaning members.

3. A device for washing crockery and the like, comprising a tank, a shaft therein, a cleaning member on said shaft, to act upon one face of an article, a second shaft in said tank, substantially parallel to said first mentioned shaft, a cleaning member on said second shaft, to act on the opposite face of the article, means for rotating said shafts in opposite directions, means for supporting the articles in position to be acted on by said members, including rotary means on one of said shafts, for rotating the articles and imparting thereto a reciprocating motion transversely to the acting surfaces of said members.

4. A device for washing crockery and the like, comprising a tank, a shaft therein, a cleaning member on said shaft to act on one face of an article, a second shaft in said tank, substantially parallel to said first mentioned shaft, a cleaning member on said second shaft, to act on the opposite face of the article, means for rotating said shafts in opposite directions, means adjacent said cleaning members for supporting the articles in position, to be acted on by the cleaning member, including a swash plate engaging said article, whereby it has imparted thereto a rotary motion and a reciprocating motion with relation to the acting surfaces of said cleaning members.

5. A device for washing crockery and the like comprising a tank, a shaft therein, a cleaning member on said shaft, to act on one face of an article, a second shaft in said tank substantially parallel to said first mentioned shaft, a cleaning member on said second shaft, to act on the opposite face of the article, means for rotating said shafts in opposite directions, means adjacent said cleaning members for supporting the article in position to be acted on by the cleaning members, including a grooved roller and a swash plate engaging said article, whereby it has imparted thereto a rotary motion and a reciprocating motion transversely to the acting surfaces of said members.

Signed at 94 Victoria St. London S. W., this 9th day of Sept. 1929 A. D.

FRANK STAINES.