

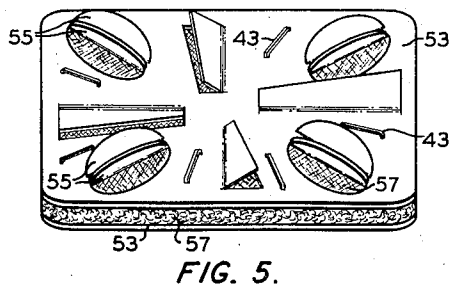
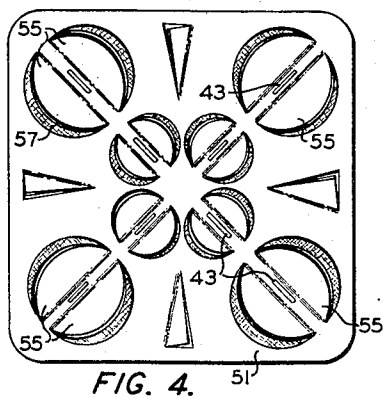
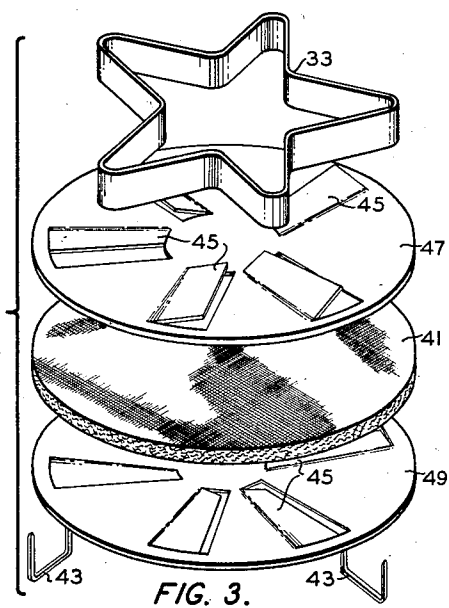
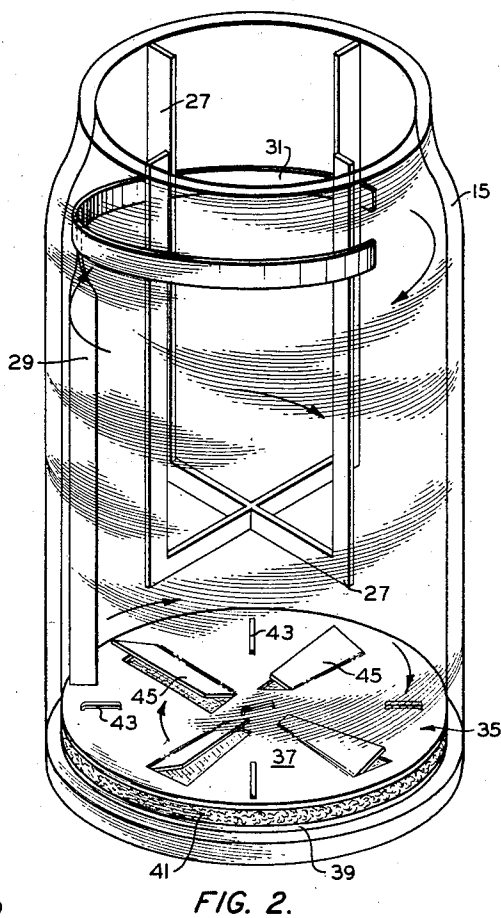
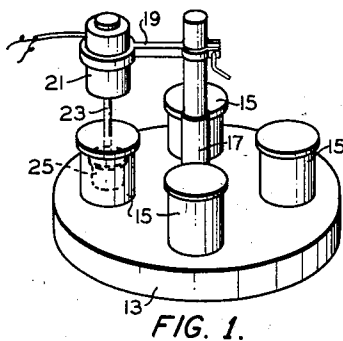
June 9, 1959

R. L. MALEY
FILTER MEANS

2,889,836

Filed Sept. 12, 1955

3 Sheets-Sheet 1



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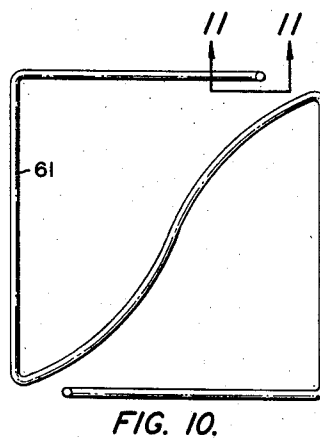
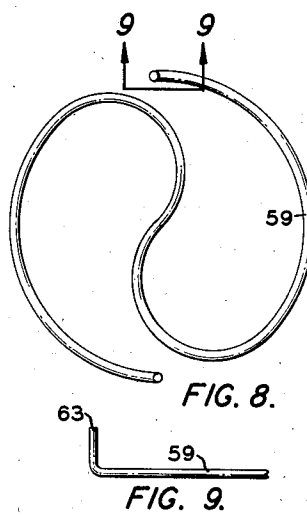
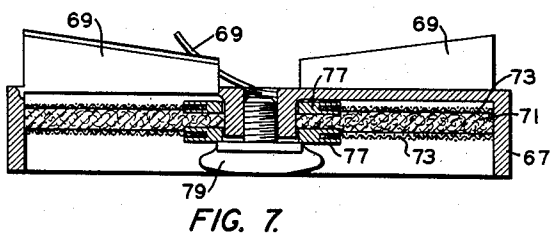
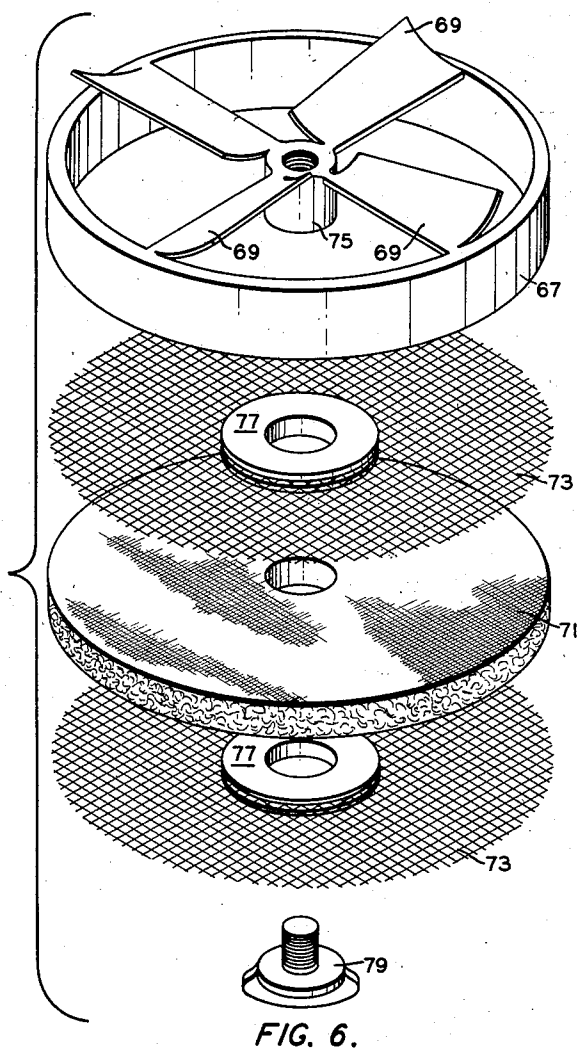
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R. L. MALEY
FILTER MEANS

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3 Sheets-Sheet 2



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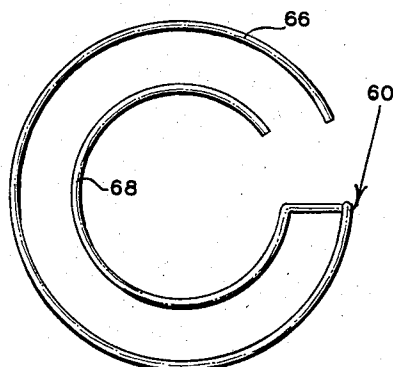
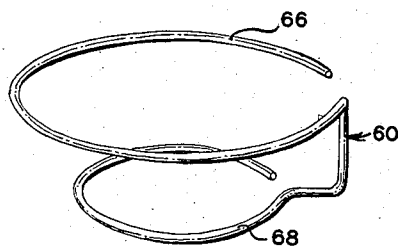
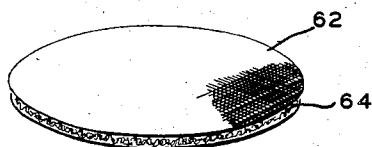
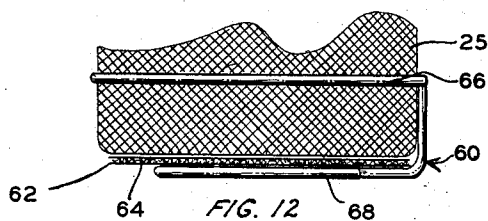
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R. L. MALEY
FILTER MEANS

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3 Sheets-Sheet 3



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2,889,836

FILTER MEANS

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19 Claims. (Cl. 134—110)

This invention relates to filtering. In a more specific aspect, this invention relates to filtering cleaning medium used in cleaning parts during the cleaning operation. In a still more specific aspect, this invention relates to removing grit and/or grease from a wash solution used in cleaning watch and/or instrument parts during the cleaning operation, and particularly to a filter medium which is insertable into the cleaning solution tank of such cleaning equipment to filter the solution during cleaning operation.

Means to clean watch and/or instrument parts are known in the art, such means utilizing cleaning solution through which the parts are moved as by a mesh basket holding the parts being rotated and/or counterrotated while immersed in the solution. The usual and common apparatus has several wash solutions in which the parts are washed, the ones after the first commonly being referred to as rinse solutions. In all of the apparatus with which I am familiar, the wire mesh basket holding the parts is rotated while immersed in the solution either in one direction or alternately in both directions, and in either case, the liquid is set in spiral-type motion with the parts and solution moving relative to each other during the cleaning operation. In addition, most apparatus has horizontal and/or vertical baffle means to break up the vortexing of the solution during cleaning and to result in better washing contact with the parts. These wash solutions remove grit and/or grease from the watch and instrument parts to clean same, and the effectiveness of the cleaning solution depends to a great extent upon the amount of this foreign material carried by the cleaning solution. In the past frequent changing of the solutions has been necessary, and this is bothersome and expensive, since the cleaning solutions are specially prepared and relatively expensive. By the means of my invention, these cleaning solutions are filtered free of grit and/or grease during cleaning operation. The solutions last a great deal longer effecting a substantial savings in cleaning solution cost, and the cleaning equipment does a far better job even initially because clean solutions are continually used to wash the parts.

I have invented new means for filtering cleaning medium used in cleaning parts during the cleaning operation. The new means of my invention has a filter medium and the cleaning medium is passed in contact with the filter medium during the cleaning operation. In preferred specific embodiments, my new filter means has directioning vanes and is designed to function with apparatus having baffle means in the bottom of the cleaning jars or tanks with my new vaned filter medium fitting under the baffle which holds it in filtering position, or with the vaned filter medium in the bottom of the jar or tank with clip means holding it in filtering position, or with a vaned frame having a replaceable filter pad which fits in the bottom of the jar or tank and maintains itself in filtering position, or with a filter medium mounted on the bottom of the moving means to hold the parts during cleaning operation by either existing means or by clip means also mounted on the moving means, the latter filter

2

medium preferably has no directioning vanes and being usable alone or in conjunction with the other filtering means set forth hereinbefore. The new filter means of my invention is easy to use and economical to make and sell.

It is an object of my invention to provide new filter means.

It is another object of my invention to provide new means for filtering during operation cleaning medium used in cleaning parts.

Still another object of my invention is to provide means for removing grit and/or grease from a wash solution used in cleaning watch and/or instrument parts during cleaning operation, and particularly a filter medium which is insertable into the cleaning solution tank of such cleaning equipment to filter the solution during cleaning operation.

Yet another object of my invention is to provide filter means to prolong the life of cleaning solution used in cleaning watch and/or instrument parts and to provide for better cleaning of such parts.

Other objects and advantages of the new filter means of my invention will become apparent to those skilled in the art upon reading this disclosure.

Drawings accompany and are a part of this disclosure. These drawings depict preferred specific embodiments of the new filter means of my invention, and it is to be understood that such are not to unduly limit the scope of my invention.

In the drawings, Fig. 1 is a perspective view of an assembled cleaning apparatus for disassembled watch and/or instrument parts wherein the new means of my invention is preferably used.

Fig. 2 is an enlarged perspective view of a cleaning tank or jar used in the apparatus of Fig. 1, showing preferred specific filter means of my invention mounted therein.

Fig. 3 is an exploded perspective view of preferred specific filter means of my invention preferably used with the star shaped baffle depicted in a jar like that of Fig. 2.

Fig. 4 is a plan view of a preferred specific filter means preferably used with cleaning apparatus wherein the mesh basket holding the parts to be cleaned is rotated alternately in both directions.

Fig. 5 is a perspective view of a preferred specific filter means preferably used in apparatus wherein the basket holding the parts to be cleaned is rotated alternately in both directions.

Fig. 6 is an exploded perspective view of a preferred specific filter medium assembly which has a replaceable filter pad and which maintains itself in filtering position in a jar such as that of Fig. 2 during cleaning operation.

Fig. 7 is an assembled cross-sectional elevation view of the filter apparatus of Fig. 6.

Fig. 8 is a plan view of a preferred specific spring clip preferably used in round jars or tanks to maintain filtering mediums like those of Figs. 2 and 3 in filtering position in the absence of baffle means, or the like.

Fig. 9 is a view taken on line 9—9 of Fig. 8.

Fig. 10 is a plan view of a preferred specific spring clip preferably used in square jars or tanks to maintain filtering mediums like those of Figs. 2 and 3 in filtering position in the absence of baffle means, or the like.

Fig. 11 is a view taken on line 11—11 of Fig. 10.

Fig. 12 is an elevation view showing other preferred filtering means of my invention mounted on a basket used in cleaning operation.

Fig. 13 is a perspective view of the filter pad of Fig. 12.

Fig. 14 is a perspective view of the clip of Fig. 12.

Fig. 15 is a plan view of this clip.

Following is a discussion and description of the new filtering means of my invention made with reference to

the drawings whereon the same reference numerals are used to indicate the same or similar parts and/or structure. The discussion and description is of preferred specific embodiments of my invention, and it is to be understood that such is not to unduly limit the scope of my invention.

In Fig. 1 is shown a typical and common apparatus used to clean instrument and/or watch parts. A base 13 mounts four tanks or jars 15 which hold the wash and rinse cleaning solutions. Base 13 also mounts upright member 17 upon which arm 19 is rotatably and adjustably mounted. Arm 19 in turn mounts electric motor 21. On shaft 23 of the motor basket means 25 is preferably removably mounted, basket 25 is preferably and usually a wire mesh basket which holds the watch parts immersed in the cleaning solutions in jars 15 during the cleaning operation. Motor 21 rotates the basket 25 during cleaning operation, and arm 19 is raised and lowered, and rotated to move the basket from one jar 15 to another until the parts have been washed in each of the four jars. The jars normally contain a cleaner in the first step, followed by a rinser (sometimes two rinses) and then a final drier, depending on the manufacturer. Any number of cleaning, rinsing and/or drying operations with different solutions can be used, as desired.

Jars 15 usually have baffle means therein to break up the spiralling and vortexing of the cleaning solution which occurs when basket 25 is rotated in the solution during cleaning operation. These baffle means result in better contact for cleaning between the watch parts and solution which in turn results in cleaner parts as a result of the cleaning operation. Two typical baffle means are shown in the drawings. Fig. 2 shows them both. One is a baffle means 27 which has both horizontal and vertical baffles. The basket 25 during cleaning operation is rotated within the upright portions of baffle 27 whose horizontal portions rest on the bottom of the jar 15 during cleaning operation. In Fig. 2 baffle 27 is shown and in elevated position for demonstration purposes and so that the filter means can be seen in position in the bottom of jar 15. In operation baffle 27 rests on the filter means which is described hereinafter. The cleaning solution is set in motion and moves as indicated by the arrows in Fig. 2. Also, the cleaning solution moves vertically in the central portion of jar 15. However, there is relative movement between the basket and parts and the solution with the baffles resulting in agitation.

Another common vertical baffle means 29 for jar 15 is shown in operating position on Fig. 2. One or the other of baffle means 27 or 29 is widely used in the common cleaning equipment having a jar 15, or a jar very similar thereto. They are not used together. This upright baffle 29 is held in position by spring loaded clip 31 fitting inside jar 15 at the top, and it is preferably used with star shaped baffle 33 (Fig. 3) which is disposed horizontally in the bottom of the jar. Basket 25 holding the watch parts in this type of baffled apparatus rotates to the side of and over baffles 29 and 33, respectively, and in close relation thereto, during cleaning operation.

The new filter means 35 (Fig. 2) of my invention lies in the bottom of jar 15 during cleaning operation under the horizontal portions of baffle 27 which holds the filter 35 in stationary position. Filter 35 has an upper 37 and a lower 39 filter medium member or vane plate, preferably a neutral pressed cotton filter paper cut as shown, and an inner loose textured filtering pad 41, preferably made of neutral pressed cotton fibers or other suitable neutral fiber. The three portions are suitably held together such as by staples 43, making a removable filter which can be replaced when used by removing baffle 27 from jar 15. Upper and lower outer vane plate members 37 and 39, respectively, are preferably cut (as shown)

shown) direct the swirling cleaning solution into and through the textured filter medium 41. The vane plate members 37 and 39 are both preferably cut this way (see Fig. 3) and joined as mirror images so that the filter 35 is reversible, being capable of use with either side up. This assures complete use of the filtering power of filter 35. During operation the cleaning solution is filtered to remove grease and/or grit by the passing of solution in contact with the vane plate 37 and through pad 41, and when the solution is at rest, and the basket and parts removed therefrom, grit and/or heavy grease materials not filtered from the solution during cleaning operation settle to the bottom and come to rest on the face of filter paper vane plate 37. Upon the next cleaning operation when the solution is again put into motion, these materials are swept into the openings in paper 37 formed by forming vanes 45 and therein they are trapped by filter medium 41.

In Fig. 3 is shown the preferred filter to be used with apparatus having horizontal baffle 33 and vertical baffle 29. It differs from filter 35 in that the upper vane plate 47 and the lower vane plate 49 have five vanes 45 instead of the four of papers 37 and 39. This is desirable with the star-shaped baffle 33. The two filter mediums 41 are the same and the filters are constructed alike, and function the same.

In Figs. 4 and 5 are shown preferred specific embodiments of filters designed for apparatus wherein basket 25 holding the watch parts to be cleaned is alternately rotated in both directions during cleaning operation, giving rise to the cleaning solution spiralling in both directions. The outer vane plate filter paper members 51 and 53 of the filters of Figs. 4 and 5, respectively, are cut so that the cut-out portions when turned outwardly form dual vanes 55 which will direct cleaning solution passing over the surface into the openings in the filter and in contact with the inner textured filter pad 57 therein no matter the direction of movement of the cleaning solution. The embodiments of Figs. 4 and 5 are particularly designed for square cleaning jars or tanks. However, substantially the same design could be used for round jars wherein the basket is counterrotated.

Some watch and/or instrument parts cleaning apparatus does not have baffle means in the bottom of the cleaning jars thereof which can be used to hold down the new filter means of my invention during cleaning operation. In these instances, I prefer to use spring loaded clips 59 and 61 of Figs. 8 and 10, respectively, which fit in the bottom of the cleaning jar over the filter and press outwardly against the sides of the jar under tension to maintain the filters stationary. The clips 59 and 61 preferably have raised end portions 63 and 65, respectively, to aid in placing them into and removing them from the jars. Clip 59 is preferably used with filters of the type shown in Figs. 2 and 3 in round jars, and clip 61 is preferably used with filters of the type shown in Figs. 4 and 5 in square jars.

Figs. 12, 13, 14 and 15 depict other preferred specific embodiments of the new filtering means of my invention wherein the filter pad is mounted on the bottom of mesh basket 25, and these means can be used alone or in conjunction with the other means of my invention which are mounted in the bottom portion of cleaning jar 15. Clip 60 is spring loaded to stay in position on mesh basket 25 and to hold filter pad 62 close up against the bottom of basket 25. Clip 60 has an upper arcuate portion 66 which encircles basket 25. This portion is spring loaded to hold the assembly in place on the basket during cleaning operation. A lower clip portion 68 supports filter pad 62 in operating position. Filter pad 62 preferably has outer filter paper members which are very porous and an inner loose textured filter medium 64. The outer paper members can have a plurality of spaced holes therein, as desired. In operation this means filters the cleaning medium which moves upwardly in the center

portion of the jar as basket 25, containing the parts to be cleaned, is rotated during the cleaning operation. I have found that this means with one of my filtering means mounted in the bottom of jar 15 gives practically 100 percent filtering efficiency. Pad 62, being less expensive to make, can be disposed of and replaced conveniently after each cleaning operation, while my lower filter pad means can be used much longer, and in most instances changed only when the cleaning solution is changed.

In Figs. 6 and 7 is shown filter apparatus wherein a preferably metal frame 67 having vanes 69 therewith is used, and a replaceable preferably loose textured filter medium pad 71 is retained in frame 67 by upper and lower preferably wire mesh members 73. Frame 67 has a threaded hub 75. Keeper members 73 have a hub 77 through which thumb-screw 79 passes along with a central hole in pad 71, and to assemble the apparatus, thumb-screw 79 is threadably secured in hub 75, as shown in Fig. 7. This apparatus is used in the bottom of the cleaning jars, and during cleaning operation furnishes the lower horizontal baffling. And, by vanes 69 the cleaning solution is directed into frame 67 and through filter pad 71 to remove grit and/or grease therefrom. When the filter pad 71 gets soiled and used up, it is replaced with a new one. The embodiment of Figs. 6 and 7 is more expensive originally, but it is very easy to use and the replacement filter pads 71 are economical. Frame 67 can be constructed of any suitable material, metal being preferred, and if desired, or necessary because of use of light weight metal or alloys, spring means similar to that shown in Figs. 8-11 can be used to hold the assembly stationary in the bottom of the cleaning tanks or jars during cleaning operation.

My new filter medium works exceedingly well in actual use, grit and grime being eliminated from the cleaning solution so that it does not circulate with the solutions contacting the parts again, and the life of the cleaning solution is greatly increased. My new filter means has functioned to keep cleaning solution in good cleaning condition months longer than normal with the same amount of use, and, in addition to this economy, better cleaning was accomplished.

As will be evident to those skilled in the art, many modifications of my new filter means can be made, or followed, in view of this disclosure, without departing from the spirit or scope of my invention as set forth in the specification and claims.

I claim:

1. In apparatus for cleaning watch and/or instrument parts having a jar to hold cleaning solution, a mesh basket to hold said parts mounted on a vertically positioned rotatable shaft to rotate therewith with said basket movable in and out of said jar, a star shaped baffle horizontally and removably positioned in the bottom portion of said jar, and a vertical baffle near the side of said jar, said basket being adapted to be rotated near and above said star shaped baffle and near and to the side of said vertical baffle in cleaning operation, that means to remove material such as grease and/or grit from said cleaning solution during cleaning operation, comprising, in combination, a replaceable circular filter pad assembly having joined together an outer upper filter paper medium member, an inner loose textured filtering medium and an outer lower filter paper medium member, said upper and lower filter papers having a plurality of spaced openings therein formed by partially cutting portions from said papers with said portions projecting therefrom and forming vanes to catch and direct said cleaning solution during cleaning operation into said inner filtering medium, and said pad assembly being removably positioned in the bottom portion of said jar below said star shaped baffle and held there by said baffle during said cleaning operation.

2. The apparatus of claim 1 wherein said openings in said upper and lower filter paper medium members have some of said vane portions projecting so as to direct said

cleaning solution into said openings upon clockwise rotation of said basket and some of said vane portions projecting so as to direct said cleaning solution into said openings upon counterclockwise rotation of said basket.

3. In apparatus for cleaning watch and/or instrument parts having a jar to hold cleaning solution, a mesh basket to hold said parts mounted on a vertically positioned rotatable shaft to rotate therewith with said basket movable in and out of said jar, a removably positioned baffle member having a plurality of horizontally disposed baffles in the bottom portion of said jar and a plurality of vertical baffles extending upwardly from said horizontal baffles near the sides of said jar, said basket being adapted to be rotated near and above said horizontal baffles and near and between said vertical baffles in cleaning operation, that means to remove material such as grease and/or grit from said cleaning solution during cleaning operation, comprising, in combination, a replaceable circular filter pad assembly having joined together an outer upper filter paper medium member, an inner loose textured filtering medium and an outer lower filter paper medium, said upper and lower filter papers having a plurality of spaced openings therein formed by partially cutting portions from said papers with said portions projecting therefrom and forming vanes to catch and direct said cleaning solution during cleaning operation into said inner filtering medium, and said filter pad assembly being removably positioned in the bottom portion of said jar below said horizontal baffles and held there by said baffles during said cleaning operation.

4. The apparatus of claim 3 wherein said openings in said upper and lower filter paper medium members have some of said vane portions projecting so as to direct said cleaning solution into said openings upon clockwise rotation of said basket and some of said vane portions projecting so as to direct said cleaning solution into said openings upon counterclockwise rotation of said basket.

5. In apparatus for cleaning watch and/or instrument parts having a jar for cleaning solution, a mesh basket for holding said parts mounted for rotation in said solution and baffle means removably positioned in the lower portion of said jar below said basket, that filter means, comprising, in combination, a replaceable filter means having outer filter paper members and an inner textured filter medium, said outer members having a plurality of openings therein formed by portions partially cut therefrom, said portions being projectable from said members to form scoops to direct said cleaning solution into said openings during cleaning operation, said filter pad assembly being removably placed in said jar below said baffle means and held therein by said baffle means during said cleaning operation.

6. The apparatus of claim 5 wherein some of said scoops with said outer filter paper medium project in a direction to direct said cleaning solution into said openings upon clockwise rotation of said basket and some of said scoops direct said solution into said openings upon counterclockwise rotation.

7. Apparatus for cleaning watch and/or instrument parts comprising, in combination, a container for liquid cleaning medium, means principally constructed for holding said parts submerged in said cleaning medium and moving said parts therethrough in cleaning operation, a loose fibrous filter medium constructed to filter out material removed from said parts by said cleaning medium during cleaning operation and replaceably positioned in said container during said cleaning operation immersed in said cleaning medium and in position therein to be contacted by said cleaning medium in moving and filtering relation to filter material removed from said parts from said cleaning medium while said cleaning medium is passed in contact with said filter medium, and means easily removably positioned in said container during said cleaning operation, said last-named means having structure constructed to hold said filter medium stationary

and immersed in said cleaning medium and in filtering relation thereto and out of contact with said parts and operatively connected with said filter medium and directing means for directing said cleaning medium into filtering relation with said filter medium during said cleaning operation.

8. Apparatus for cleaning watch and/or instrument parts comprising, in combination, a container for liquid cleaning medium, means principally constructed for holding said parts submerged in said cleaning medium and for moving said parts and cleaning medium in relation to each other in cleaning operation, an easily replaceable filter medium constructed to filter out material removed from said parts by said cleaning medium during cleaning operation and positioned in said container during said cleaning operation immersed in said cleaning medium and in position therein to contact said cleaning medium in filtering relation to filter material removed from said parts from said cleaning medium, and means easily removably positioned in said container during said cleaning operation, said last-named means having structure constructed to hold said filter medium immersed in said cleaning medium in filtering relation thereto and operatively connected with said filter medium and directing means for directing said cleaning medium into filtering relation with said filter medium during said cleaning operation.

9. Apparatus for cleaning watch and/or instrument parts comprising, in combination, a container for cleaning solution, a mesh basket for holding said parts mounted for rotation in said solution, a replaceable filter means having outer filter paper members and an inner textured filter medium, said outer members having a plurality of openings therein formed by portions partially cut therefrom, said portions being projectable from said members to form scoops to direct said cleaning solution into said openings during cleaning operation, and removable spring loaded means mounted in said container and contacting said container and said filter means constructed to hold said filter means stationary in the lower portion of said container below said basket during said cleaning operation.

10. The apparatus of claim 7 wherein there is a removable spring loaded means mounted in and constructed to contact said container and said filter medium to hold said filter medium stationary during said cleaning operation.

11. Means for filtering during operation solutions used in cleaning watch and/or instrument parts, comprising, in combination, a replaceable circular filter pad assembly having joined together an outer upper filter paper medium member, an inner loose textured filtering medium and an outer lower filter paper medium member, said upper and lower filter papers having a plurality of spaced openings therein formed by partially cutting portions from said papers with said portions projecting therefrom and forming vanes to catch and direct said cleaning solution during cleaning operation into said inner filtering medium.

12. Means for filtering during operation solutions used in cleaning watch and/or instrument parts, comprising, in combination, a replaceable filter pad assembly having joined together outer filter paper medium members and therebetween an inner loose textured filtering medium, at least one of the outer filter paper medium members having a plurality of spaced openings therein formed by partially cutting portions from the filter paper medium member with said portions projecting therefrom and forming vanes to catch and direct said cleaning solution during cleaning operation into contact and filtering relation to said inner loose textured filtering medium.

13. The means for filtering of claim 11 wherein said openings in said upper and lower filter paper medium members have some of said vane portions projecting in a direction to direct solution passing counterclockwise over the surface into said openings and some of said vane

portions projecting in a direction to direct solution passing clockwise over the surface into said openings.

14. The means for filtering of claim 12 wherein some of said vanes with the outer filter paper medium project in a direction therefrom to direct said cleaning solution passing counterclockwise over the surface thereof into said openings and some of said vanes project in a direction to direct said cleaning solution passing clockwise over said surface into said openings.

15. Apparatus for cleaning watch and/or instrument parts comprising, in combination, a container for liquid cleaning medium, a perforated basket principally constructed for holding said parts to be cleaned submerged in said cleaning medium and for moving said parts relative to said cleaning medium during cleaning operation and rotatably mounted in said container, a filter medium removably inserted into said container immersed in said cleaning medium and in position to directly contact said cleaning medium during cleaning operation, easily removable means in said container positioning said filter medium, and directing vanes operatively connected with said filter medium for directing said cleaning medium into filtering relation with said filter medium during said cleaning operation.

16. Apparatus for cleaning watch and/or instrument parts comprising, in combination, a container for cleaning solution, a mesh basket for holding said parts mounted for rotation in said solution during cleaning operation, a horizontally positioned frame housing member having a centrally located threaded hub and radial vanes attached thereto and to a circumferential outer frame member, said vanes constructed and positioned to direct liquid passing over said filtering means down through said housing member and said housing member removably fitted into the lower portion of said container, an upper and a lower mesh keeper member fitted into the upper and lower portions of said housing, respectively, an inner replaceable loose textured filter medium fitted in said housing between said keeper members, and means passing through said keepers and filter medium and threadedly secured in said hub to assemble said filtering means.

17. Apparatus for cleaning watch and/or instrument parts comprising, in combination, a container for cleaning medium, means to submerge said parts for relative movement between said parts and cleaning medium during cleaning operation, frame means removably positioned immersed in said cleaning medium in said container during cleaning operation, said frame means having an opening and means directing said cleaning medium through said opening during said cleaning operation, a replaceable filter medium supported by said frame means in position in said container to contact said cleaning medium passing through said opening in filtering relation to filter said cleaning medium during cleaning operation, and keeper means to hold said filter medium in said frame.

18. Apparatus for cleaning watch and/or instrument parts comprising, in combination, a parts container mounted for rotation in a container having a cleaning medium, a replaceable filter medium, and a spring loaded clip, said clip removably mounting and holding said filter medium on the bottom portion of said parts container during rotation in cleaning operation and directing said cleaning medium into filtering relation with said filter medium to filter said cleaning medium in said operation.

19. Apparatus for cleaning watch and/or instrument parts comprising, in combination, a container for liquid cleaning medium, a perforated basket principally constructed for holding parts to be cleaned submerged in said cleaning medium and for moving said parts relative to said cleaning medium during cleaning operation, means for moving said basket through said cleaning medium in said cleaning operation, a filter means easily removably inserted in said container in position therein to be con-

tacted by said cleaning medium in filtering relation, said filter means having a loose fibrous filtering medium to filter said cleaning medium upon said cleaning operation and to trap and retain material removed from said cleaning medium out of contact with said parts, and said filter means having means contacting said apparatus for cleaning watch and instrument parts to maintain said filtering medium immersed in position during said cleaning operation to filter said cleaning medium and operatively connected with said filtering medium and directing means for directing said cleaning medium into filtering relation with said filter medium.

5

10

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