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MEANS FOR DISSOLVING SOLUBLE SOLIDS IN LIQUIDS

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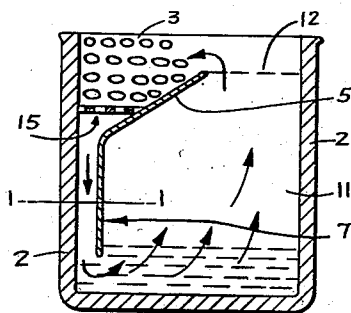


Fig. I

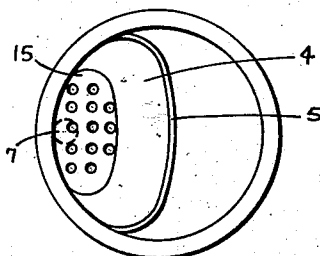


Fig. II

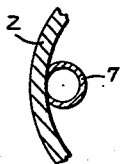


Fig. III

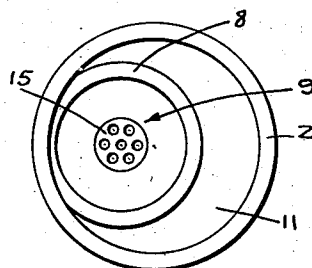


Fig. IV

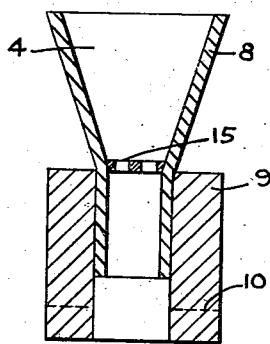


Fig. V

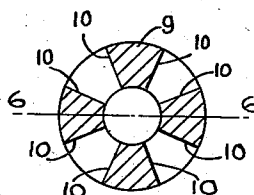


Fig. VI



Fig. VII

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MEANS FOR DISSOLVING SOLUBLE SOLIDS
IN LIQUIDS

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1 Claim. (Cl. 23—272.6)

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This invention relates to improvements in apparatus to be used for dissolving soluble solids in liquids automatically.

A principal object of the invention is to provide an improved container and apparatus for dissolving solid soluble materials automatically into a concentrated solution wherein the solid is exposed only to the fresh solvent and not to the concentrated solution after portions of the solid material have gone into solution.

Another object of the invention is to provide improved apparatus for dissolving soluble solids into solution automatically whereby the solid material is exposed only to the fresh solvent and not to the concentrated solution after some of the solid material has gone into solution.

Another object of the invention is to provide improved apparatus for dissolving solid materials into solution automatically whereby a concentrated solution of substantially uniform saturate concentration throughout is obtained and concentrations of different uniformity in layers are avoided.

Other objects and advantages of the invention will become apparent from the following description taken in conjunction with the accompanying drawings. It will be apparent that many changes in the details of construction and arrangement of parts of the apparatus can be made without departing from the invention as set forth in the accompanying claims.

I, therefore, do not wish to be limited to the exact details and arrangements shown and described as the preferred forms and means only have been shown by way of illustration.

Referring to the drawings:

Fig. I is a vertical cross section of one form of apparatus embodying the invention.

Fig. II is a top view of Fig. I.

Fig. III is a cross section on line 1—1 of Fig. I.

Fig. IV is a top view of another form of apparatus embodying the invention.

Fig. V is a vertical cross section of the apparatus of Fig. IV on line 6—6 of Fig. VI.

Fig. VI is a bottom view of Fig. V, and

Fig. VII is a partial side view of Fig. V, partly in cross section.

It is often desirable in chemical processes to dissolve soluble solids in solvents to obtain a desired concentrated solution. The usual method has been to place the solvent in a beaker or container and then introduce the solid materials, such as crystals into the solvent. This method introduces the difficulty that the concentration of the solution is constantly changing as the

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solid material is introduced into the solvent. When the first batches of the solid material are introduced into the fresh solvent this material dissolves as it is put in the solvent and the concentration of the solvent is changed. This concentration increases as more and more solid material is added. It is a principal object of this invention to provide means by which the fresh solvent when introduced to the solid material is always fresh and of the same concentration as the original solvent placed in the container.

Referring to the drawings in which similar reference characters denote similar parts throughout:

In Fig. I is shown a container, beaker or flask 2. In the interior of the container 2 is provided a funnel-like receptacle for the solid material, shown in crystal form at 3. This funnel-like receptacle 4 has the inclined supporting wall 5 which is inclined downwardly from the top towards the wall of the container 2. This wall 5 is curved around at the top as shown in Fig. II and joined to the wall of the container 2 and forms the supporting cavity or holder for the solid material 3. At the bottom of the cavity or holder 4 is a pierced strainer portion or member 15. The bottom of the cavity or holder portion 4 is shaped into a tube or conduit portion 7 which extends downwardly along the container wall 2. This tube-like portion 7 terminates at a spaced distance from the bottom of the container as shown in Fig. I.

If desired, a separate holder for the solid material may be used. Such a construction is shown in Figs. IV, V, VI and VII. In this device a funnel 8 is supported in a base member 9. The base member 9 has an opening for receiving the lower end or conduit portion of the funnel 8. This base member is made to hold the funnel 8 in erect position. The walls of the base member 9 are cut away at the bottom at the edges 10 of the base—see Fig. VI—to provided openings extending into the central opening in the base member 9, to provide channels through which the concentrated solution falling through the funnel or conduit part 9 may pass out through the base into the solvent space. The funnel has the pierced strainer member 15, Fig. V.

Hence, the solid material holder may be made integral with the container or it may be made as a separate member.

The solvent is placed in the space 11, Fig. I.

The operation is as follows:

The solid material, say for example, copper

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sulphate crystals, is placed in the holder portion 4. The solvent, say for example, water, is placed in the section 11 of the container up to the level of the top of the wall 5 at 12 and then a little more added so the solvent will overflow into the solid matter in the holder portion 4. The concentrated solution created by the solution of the solid material in the solvent is comparatively heavy and flows down to the bottom of the container continuously pushing the lighter fresh solvent up through the solid material. This dissolving action goes on until all the solid matter goes into solution, or the solution becomes saturated.

The solid material is exposed only to the fresh solvent above where rapid solution goes on and not to the concentrated solution beneath where the solvent action would be slight or not at all.

By conducting the concentrated solution through a conduit to the bottom of the container there is no mixing of dissolved material or solution with the solvent, so the solution is not diluted and the solvent remains fresh.

The operation of the device shown in Figs. IV, V, VI and VII is practically the same as that described for Fig. I. The base 9 is placed in the container 2 and the funnel 8 inserted in the base 9 as shown in Figs. IV and V. The solid material is placed in the cavity or holding portion 4 of the funnel and the solvent in the space 11 of the container 2. The solvent is poured in until it overflows the top of the funnel 9. The process is then the same as that for Fig. I. The concentrated solution feeds down through the funnel 3 and base 9 and escapes into the solution in space 11 through the openings at 10 in the base, see Figs. VI and VII.

The concentrated solution being heavier than the fresh solvent flows down to the bottom of the container and pushes the fresh solvent up into the solid material which is being dissolved.

The action is continuous as the concentrated solvent works upward from the bottom until all the solid material is dissolved.

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The solid material is insoluble in the concentrated solution, therefore the solid material and its concentrated solution should be kept as far away from each other as practicable.

The solid material and the solvent should be as close together as practicable.

This invention accomplishes both of these conditions.

From the foregoing it will be seen that there has been provided simple, efficient and economical means for obtaining all the objects and advantages of the invention.

Having described the invention, I claim:

Apparatus for dissolving a soluble solid material comprising a container receiving a solution of said material, a cylindrical base support having its lower end positioned on the bottom of the container to retain said support in an upright position, said base support having a slot extending through a side wall thereof from said lower end, said slot forming an outlet adjacent said bottom communicating with the inner bore of the base, and a relatively large funnel-shaped holder having a hollow stem extending within the bore of the cylindrical support and being so dimensioned that the upper edge thereof is located below the top of the container an amount sufficient to permit the solution in the container to be at a level above the upper edge of the funnel-shaped holder, said funnel-shaped holder having a straining member therein overlying the hollow stem thereof.

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REFERENCES CITED

The following references are of record in the file of this patent:

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Number	Name	Date
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