

1,353,166.

J. JOHNSON,  
RAPID DISSOLVER.  
APPLICATION FILED FEB. 21, 1919.

Patented Sept. 21, 1920.  
2 SHEETS—SHEET 1.

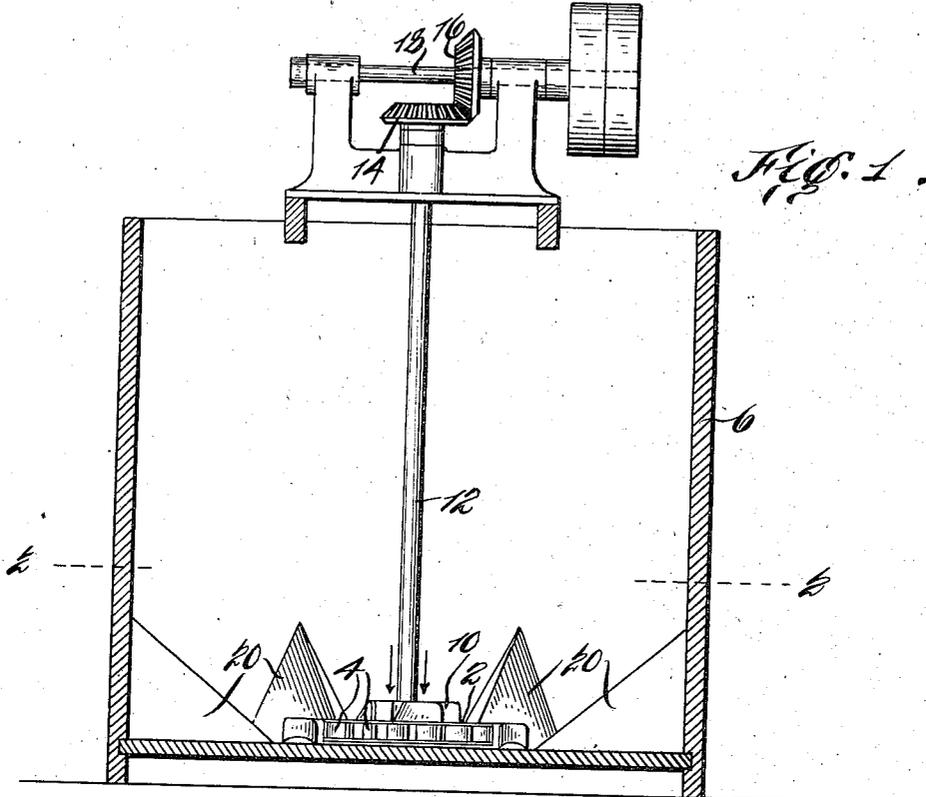


FIG. 1.

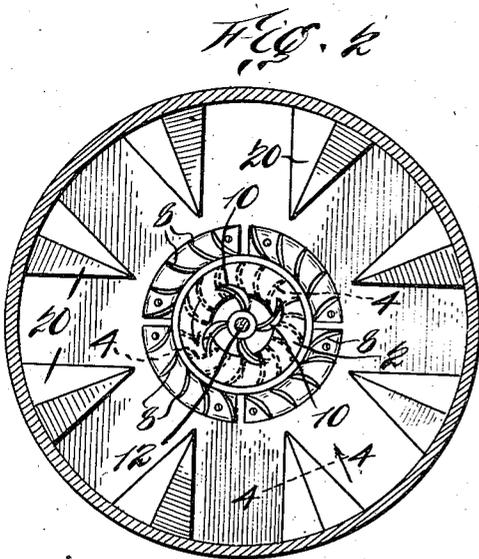


FIG. 2.

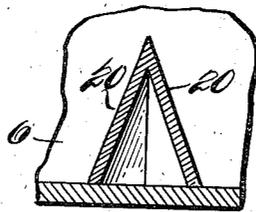


FIG. 5.

FIG. 4.

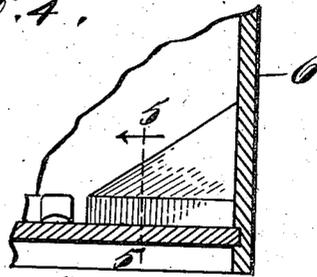


FIG. 3 Inventor  
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By his Attorney

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2 SHEETS—SHEET 2.

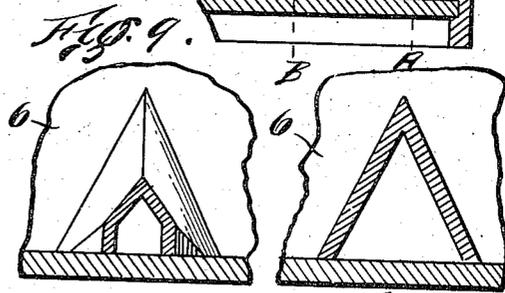
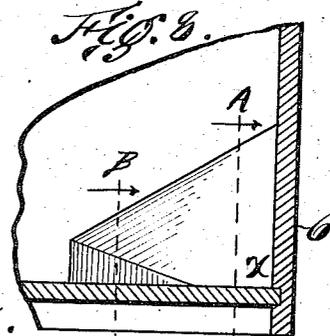
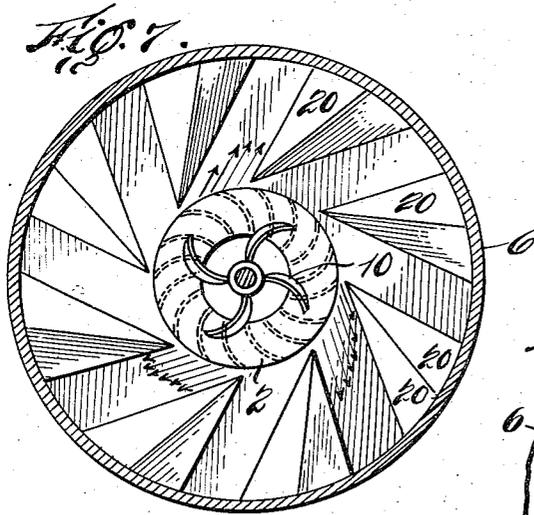
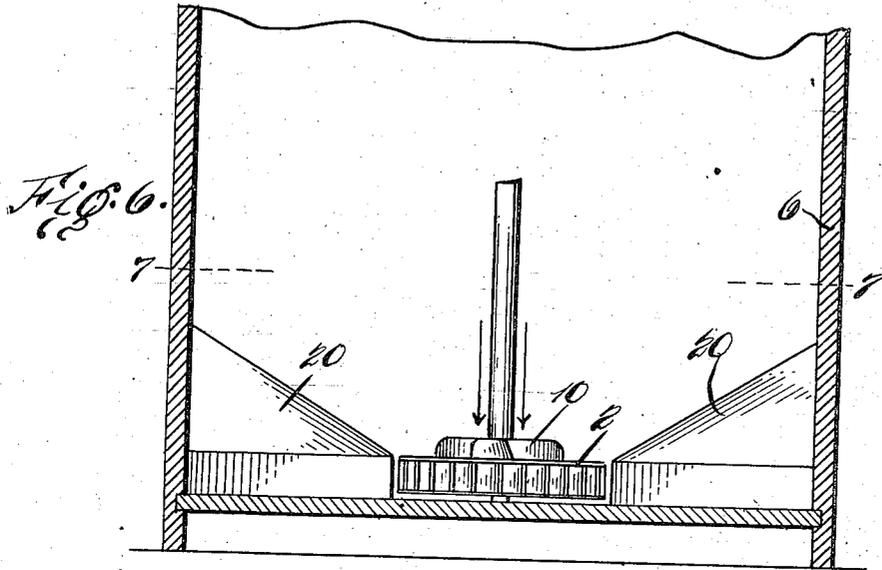


FIG. 10.

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# UNITED STATES PATENT OFFICE.

JOHN JOHNSON, OF BROOKLYN, NEW YORK.

RAPID DISSOLVER.

1,353,166.

Specification of Letters Patent. Patented Sept. 21, 1920.

Application filed February 21, 1919. Serial No. 278,469.

To all whom it may concern:

Be it known that I, JOHN JOHNSON, a citizen of the United States, residing at Brooklyn, New York, have invented certain new and useful Improvements in Rapid Dissolvers, of which the following is a clear, full, and exact description.

My invention relates to mixers, and more particularly to mixers wherein a dissolving fluid is brought into contact with substances to be dissolved, and an object of my invention is to provide a mixer in which the dissolving action is very rapid and to otherwise improve mixers of this type.

To this end an important feature of my invention consists in the location of a turbine mixer in the bottom of a tank of preferably cylindrical form, and the provision of a series of pockets or sluiceways situated about the circumference of the tank and so shaped and arranged that substantially all of the fluid flowing from the turbine is directed along the sluiceways. Another important feature of my invention consists in the arrangement of the sluiceways so that the fluid passes along their entire length at substantially the same velocity as that given to it on leaving the turbine mixer.

In order that the substances to be dissolved may always be directed into the sluiceways when dropped into the mixing tank, I provide partitions having sloping sides.

Other objects and important features of the invention will be apparent from the following description and claims when taken in connection with the accompanying drawings, in which

Figure 1 is a part sectional and part elevational view of one form of my improved rapid dissolving device;

Fig. 2 is a section on the line 2—2 of Fig. 1;

Fig. 3 is a modified form of partition from that shown in Fig. 1;

Fig. 4 is a section on the line 4—4 of Fig. 2;

Fig. 5 is a section on the line 5—5 of Fig. 3;

Fig. 6 is a part sectional and part elevational view of a different form of dissolving device;

Fig. 7 is a cross section on the line 7—7 of Fig. 6;

Fig. 8 is a modified form of the partition shown in Fig. 6;

Fig. 9 is a section on the line B—B, Fig. 8; and

Fig. 10 is a section on the line A—A, Fig. 8.

To produce circulation of the fluid used as the dissolving agent, I provide a turbine mixer or impeller 2 which may be of any desired construction and which may advantageously be of the construction shown and described in application Serial No. 278,467, filed February 21, 1919.

As described in the said application, the turbine mixer is provided with a series of curved blades 4 shown in dotted lines, Fig. 2, said blades acting, when the turbine is rotated, to produce a tangential flow of the liquid from the turbine.

In the form of device shown in Fig. 1, I have provided means, which may advantageously be the same as that shown in my application above referred to, for changing the tangential direction of flow of the liquid from the turbine into a flow in a radial direction across the bottom of the tank 6.

These means, as described in said application, may comprise a ring of curved deflecting blades 8 which are so situated with respect to the turbine blades that the liquid as it comes from the turbine is changed in direction and flows radially across the bottom of the tank. In order to produce a smooth flow of liquid to the turbine and prevent eddies in the stream flowing downwardly toward the turbine, I may also advantageously use a centripetal member 10 which may be formed substantially like that disclosed in my application above referred to.

The member 10 and turbine 2 may be cast in one piece and may be connected to a shaft 12, which shaft may be driven through suitable gearing 14 and 16 connected to a power-shaft 18, all as set forth in detail in my application above referred to.

My present invention relates more particularly to the provision of means for producing a rapid rate of disintegration of solid substances by the dissolving fluid set in motion by the turbine.

A tank 6, circular in cross-section, has a series of partitions 20 arranged about the inner circumference thereof, the partitions being triangular in cross-section where they meet the walls of the tank. In the form of the device shown in Figs. 1 and 2, the bases of the partitions form isosceles triangles, and the angle at the apex of each triangle

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may be such that the sides of the adjacent triangles are parallel, these sides forming sluiceways through which the liquid from the turbine flows. The sides of each partition slope upwardly and meet in a dihedral angle. With the partitions thus shaped, any substances dropped into the tank will slide down the sides and into the sluiceways where they will meet with a rapid current of dissolving fluid coming from the turbine mixer. The sides of each of the sluiceways may also be parallel to a radius passing midway between them so that the flow of liquid coming from the deflecting blades 8 passes directly into said sluiceways without any tendency to create eddies in the stream and also without any tendency to create a general rotation of the contents of the mixer in the direction of movement of the turbine. The combined width of the sluiceways is about equal to the circumference of the deflecting blade ring 8 and therefore substantially all of the dissolving liquid leaving the turbine passes up the sluiceways.

In the form of device shown in Fig. 1, the partitions are triangular in cross-section throughout, but in order to provide for an equal velocity of flow of liquid from the turbine throughout the entire length of the sluiceway, I may make the sides of each partition vertical for a distance equal in height to the depth of the turbine 2. This form of partition is shown in Figs. 3 and 6.

I may also use the form shown in Fig. 8 wherein the nose of the partition has flat sides for a part of the distance only. This form prevents the formation of a corner at *a*, Fig. 8, which might accumulate solid matter.

In the form of device shown in Figs. 6 and 10 inclusive, I am enabled to dispense with the use of the deflecting blade ring 8, as shown in the form of device heretofore described, by forming the partitions in such a way that the sides of adjacent bases may be parallel and so that one side is substantially tangential to the periphery of the turbine. I may use the turbine 2 and centripetal member 10 of the same form as that shown in Fig. 1 and described in my application above referred to, but in this form of device I do not use the deflecting blades 8 because of the particular arrangement of the partitions already described.

In this form also I continue each partition to a point very close to the turbine so that substantially all of the liquid leaving the turbine will be directed into the sluiceway at that point. This arrangement also prevents any tendency of the contents of the mixer to rotate in the direction of movement of the turbine. The shape of the partitions are of course somewhat modified to suit the conditions imposed upon them, the base triangles being no longer isosceles. The gen-

eral shape however of these partitions may be fully understood from Figs. 6 to 10 inclusive.

It will be seen that I have produced a mixer for dissolving substances in which the dissolving action is very rapid and one which is otherwise very efficient because the dissolving liquid circulates constantly through the turbine, along the sluiceways at substantially the same velocity as when leaving the turbine, up the sides of the tank and back to the turbine. No eddies are produced in the tank and in practice it is found that the dissolving action is about three times as rapid as in forms of device previously used.

Having thus described my invention, what I claim and desire to secure by Letters Patent, is:

1. In an apparatus for dissolving solids, the combination with a container having partitions in the bottom thereof forming pockets or sluiceways wherein the material to be dissolved is deposited and means for directing a dissolving fluid along said sluiceways.

2. In an apparatus for dissolving solids, the combination with a cylindrical container having partitions in the bottom thereof forming pockets or sluiceways where the material to be dissolved is deposited and means for directing a dissolving fluid along said pockets or sluiceways.

3. In an apparatus for dissolving solids, the combination with a cylindrical container having partitions in the bottom thereof forming pockets or sluiceways the sides of said pockets or sluiceways being parallel at the bases thereof and means for directing a dissolving fluid along said pockets or sluiceways.

4. In an apparatus for dissolving solids, the combination with a cylindrical container having partitions in the bottom thereof forming pockets or sluiceways, said partitions having a triangular base and sloping sides which intersect each other whereby material dropped into said container will be directed into said pockets or sluiceways.

5. In an apparatus for dissolving solids, the combination with a cylindrical container having partitions in the bottom thereof forming pockets or sluiceways, said partitions having triangular bases, the angle at the apex of each triangle being such that the sides of adjacent triangles are parallel with each other.

6. In an apparatus for dissolving solids, the combination with a cylindrical container having partitions in the bottom thereof forming pockets or sluiceways, said partitions having triangular bases, the angle at the apex of each triangle being such that the sides of adjacent triangles are parallel with each other, the sides of said partitions

intersecting each other, whereby material dropped into said container will be directed to said pockets or sluiceways.

7. In a device for dissolving substances, the combination with a container, a turbine mixer in the bottom of said container, sluiceways also in the bottom of said container, said sluiceways having parallel sides, one side of each being tangential to the periphery of said turbine mixer.

8. In a device for dissolving substances, the combination with a container, a turbine mixer in the bottom of said container, partitions forming sluiceways also in the bottom of said container, said partitions extending to a point immediately adjacent the periphery of said turbine mixer to thereby prevent rotation of the contents of said container.

9. In a device for dissolving substances, the combination with a cylindrical container, radial sluiceways formed around the bottom of said container, and means for directing a dissolving fluid along said sluiceways.

10. In a device for dissolving substances, the combination with a container, a centrifugal turbine mixer in the bottom of said container, sluiceways situated around the periphery of said turbine mixer, and means for directing a dissolving fluid from said turbine mixer along said sluiceways.

11. In a device for dissolving substances, the combination with a cylindrical container, of a mixer in the bottom thereof for creating a flow of the dissolving fluid, and means for causing a rapid and substantially uniform flow of the dissolving fluid in contact with the substances to be dissolved.

12. In a device for dissolving substances, the combination with a cylindrical container, of a turbine mixer in the bottom thereof for creating a flow of the dissolving fluid, a series of sluiceways arranged around the periphery of said container adjacent said turbine mixer, said sluiceways having a combined width substantially equal to the periphery of said turbine mixer, the walls of said sluiceways being parallel, whereby the velocity of the dissolving fluid is substantially constant throughout said sluiceways.

13. In a device for dissolving fluid substances, the combination with a cylindrical container, of a series of sluiceways arranged about the periphery of said container, said sluiceways having parallel walls, means for directing a dissolving fluid into said sluiceways, said sluiceways being so arranged with respect to said directing means that substantially all of the fluid from said directing means enters said sluiceways.

14. In a device for dissolving fluid substances, the combination with a cylindrical container, of a series of sluiceways arranged

about the periphery of said container, means for directing a dissolving fluid into said sluiceways, said sluiceways being of such shape and so arranged with respect to said directing means that substantially all of the dissolving fluid from said directing means enters said sluiceways and moves with substantially equal velocity throughout the same.

15. In a device for dissolving fluid substances, the combination with a cylindrical container, of a turbine mixer in the bottom thereof for creating a flow of the dissolving fluid, a series of partitions forming sluiceways arranged about the periphery of said container, partitions having triangular bases and parallel walls forming rectangles, the height of each rectangle being equal to the thickness of the turbine mixer whereby the flow of the dissolving fluid as it leaves said mixer is directed along said sluiceways at substantially the same velocity throughout the length thereof.

16. In a device for dissolving fluid substances, the combination with a cylindrical container, of a turbine mixer in the bottom thereof for creating a flow of the dissolving fluid, a series of partitions forming sluiceways arranged about the periphery of said container, said partitions having triangular bases and parallel walls forming rectangles, the height of each rectangle being equal to the thickness of the turbine mixer whereby the flow of the dissolving fluid as it leaves said mixer is directed along said sluiceways at substantially the same velocity throughout the length thereof, said partitions having sloping sides above their rectangles, said sides meeting in a dihedral angle, whereby the substances to be dissolved, when dropped into said container, will be directed into said sluiceways.

17. In a device for dissolving substances, the combination with a container, a turbine mixer in the bottom of said container, sluiceways also in the bottom of said container, one side of each being tangential to the periphery of said turbine mixer.

18. In a device for dissolving fluid substances, the combination with a cylindrical container, of a series of sluiceways arranged about the periphery of said container, means for directing a dissolving fluid into said sluiceways, said sluiceways being so arranged with respect to said directing means that substantially all of the fluid from said directing means enters said sluiceways.

Signed at Brooklyn, N. Y. this 9th day of January 1919.

JOHN JOHNSON.

Witnesses:

DANIEL O. MICHEL,  
MARY E. MICHEL.