

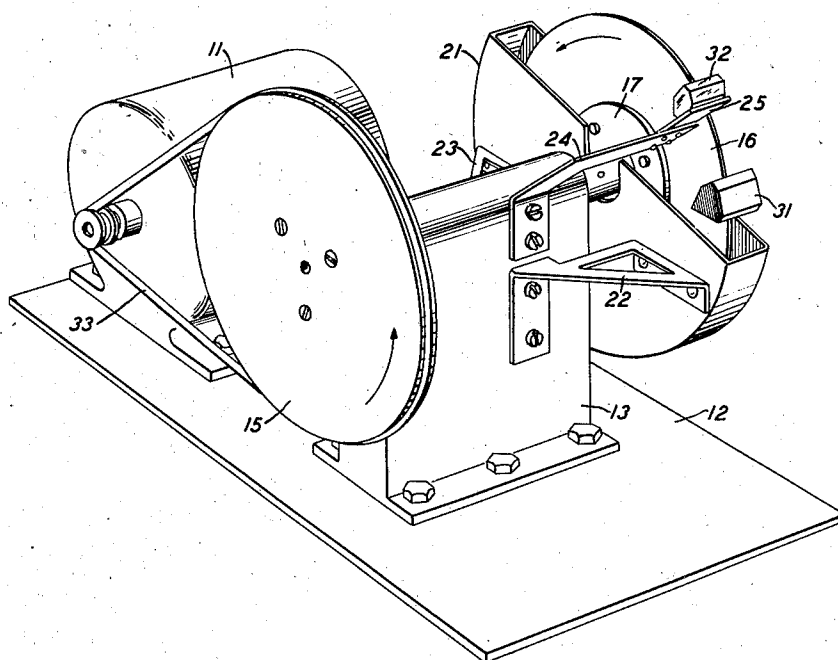
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CUTTING TOOL

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CUTTING TOOL

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This invention relates to a cutting tool and more particularly to a saw for cutting Rochelle salt and similar brittle, water soluble, materials.

An object of the invention is to facilitate cutting Rochelle salt and similar materials.

A more specific object of the invention is to prevent the accumulation on the edge of the blade of particles of the material being cut.

In the preparation of Rochelle salt plates, which have been utilized for some time as piezo-electric elements in electrical circuits such as oscillators and filters and which have more recently been proposed for use in electrical relays, as disclosed, for example, in Patent 2,166,763, issued July 18, 1939, to W. P. Mason, it is the usual practice to cut a number of relatively thin, substantially flat, plates or slabs from a larger crystal.

Various methods and means have been proposed in the past for cutting these thin plates including the "wet-string" cutter, the "mud saw" and saws utilizing toothed blades; none of these has, however, in applicant's experience, been entirely satisfactory. In some instances the operation has been entirely too slow to be commercially feasible, in others it has been practically impossible to produce plates of the desired thinness and with the necessary high degree of plane parallelism, while in still other instances excessive breakage of the fragile material has resulted.

In the case of the so-called mud saw, which commonly comprises a thin disc of steel or copper rotating in a liquid, such as water, containing abrasive, it is applicant's belief that unsatisfactory cutting of Rochelle salt and similar materials has resulted mainly from the fact that a salty accumulation tends to become glazed on the cutting edge of the disc thereby slowing down the cutting process to an unsatisfactory rate. Breakage of the fragile material also has resulted due to cooling of the material caused by evaporation of the liquid.

A feature of the present invention is means whereby the salty accumulation which tends to become glazed on the cutting edge of the blade is broken away.

A further feature of the invention is an abrasive carrying liquid which does not tend to cause cooling of the material being cut due to evaporation.

In accordance with a specific embodiment of the invention, a metal disc, for example of steel or copper, is provided which is rotated comparatively slowly, for example at a speed of 150 revolutions per minute, in an abrasive liquid which

comprises abrasive particles carried in kerosene. Means are provided for supporting the material to be cut in contact with the cutting edge of the disc. A portion of material substantially harder than the material being cut, for example if Rochelle salt is being cut the material may be quartz or glass, is held in cutting engagement with the edge of the disc. Engagement of the cutting edge of the disc with this material is effective to break away any accumulation which tends to become glazed on the edge of the blade. The "cleaning" material is cut very slowly as compared to the rate at which the other material is cut due to the greater hardness of the first-mentioned material.

A thorough understanding of the arrangement contemplated by the present invention as well as appreciation of the various desirable features thereof may be gained from consideration of the following detailed description and the accompanying drawing in which the single figure is a view in perspective of a cutting tool which embodies features in accordance with the present invention.

Referring now to Fig. 1, driving motor 11 is shown mounted on platform 12. Also mounted on platform 12 is upright supporting member 13. Pulley wheel 15 is attached to one end of a shaft (not shown) which is rotatably positioned in a transverse housing provided in the upper portion of support 13; cutting disc 16 is attached to the other end of the shaft. Disc 16 is of relatively thin metal, for example it may be of No. 16 to No. 20 gauge steel or copper, and is preferably provided with two reinforcing flanges, one of these flanges 17 being shown and the second, which is similar to flange 17 and mounted on the opposite face of disc 16, not being shown.

A tank 21 is supported from upright member 13 by bracket members 22 and 23; this tank serves as a container for the abrasive liquid, preferably kerosene carrying abrasive particles. Also supported from upright member 13, by means of a third bracket member 24, is table 25 which serves as a support for the material being cut.

A portion 31 of hard material, such as quartz or glass, is held against the blade in position where it is also cut during cutting of the material supported on table 25. This material may be held in position by hand or, if desired, a suitable work-holding table, similar to table 25, may be provided for the purpose.

In order to further describe the arrangement, let us assume that a slab is to be sawed from Rochelle salt crystal 32 which is shown in posi-

tion on table 25. Pulley wheel 15 and the driving wheel of motor 11 are coupled by a suitable belt 33 so that, as motor 11 is set into operation, pulley wheel 15 is rotated in the direction indicated by the arrow. This motion is, of course, transmitted to disc 16 by the connecting shaft so that disc 16 now rotates in the same direction as pulley 15; the rate at which disc 16 is rotated should preferably be relatively slow, for example, in the neighborhood of 150 revolutions per minute.

Tank 21 is filled with the abrasive mixture, preferably kerosene carrying abrasive particles, to a sufficient level to insure that a substantial portion of disc 16 is submerged in the liquid at all times. As the disc rotates, portions of the abrasive cling to the edge of the disc and are carried around to the sawing point where they are effective in furthering the cutting effect of the thin hard edge of disc 16. The use of kerosene rather than liquids used heretofore, particularly water, has proven advantageous as evaporation is avoided; evaporation is objectionable as the resulting cooling of the Rochelle salt causes excessive breakage of the fragile material. Further, the Rochelle salt is not dissolved or otherwise affected deleteriously by the kerosene.

It has previously been observed by applicant that, when saws of this general nature have been used for cutting Rochelle salt, a salty accumulation tends to become glazed on the cutting edge of the disc and that the rate of cutting is reduced thereby to an unsatisfactory degree. In the instance of the saw of the present invention, however, engagement of the edge of disc 16 with the extremely hard material 31 is effective to break away this brittle glazed coating

before it can build up sufficiently to be at all objectionable. While engagement of material 31 with the edge of disc 16 tends to break away the brittle accumulation of salt, it tends, on the contrary, to force the abrasive particles carried by the disc into somewhat more intimate contact with the disc material than would be achieved in the absence of material 31.

While material 31 is, of course, cut by disc 16 this cutting is at a very low rate compared to the rate at which the much softer material 32 is cut; when a cut of considerable depth has been made in block 31, its position may be changed to start a new cut and after several cuts have been made the block may be discarded and a fresh block provided.

While a specific embodiment of the invention has been selected for detailed description, the invention is not, of course, so limited in its application. The embodiment described should be taken as illustrative of the invention and not as restrictive thereof.

What is claimed is:

1. The method of cutting Rochelle salt by means of a rotatable disc passing through a liquid containing an abrasive which includes the step of holding a portion of quartz against the cutting edge of the disc in order to remove accumulated Rochelle salt therefrom.
2. The method of cutting relatively thin slabs from a body of Rochelle salt by means of a relatively thin rotatable disc passing through a liquid containing an abrasive which includes the step of simultaneously cutting with said disc a relatively thin slot in a body of quartz.

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