Dec. 18, 1962 J. SHIFFMAN 3,068,558

TOOLS FOR HANDLING WATCH CRYSTALS

Filed Dec. 29, 1960 2 Sheets-Sheet 1

FIG. 1.

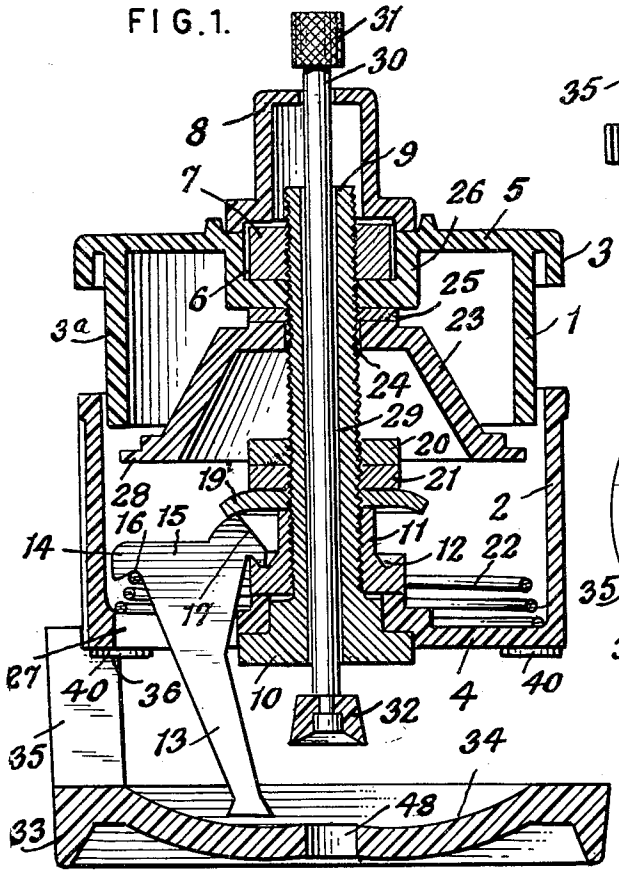


FIG. 3.

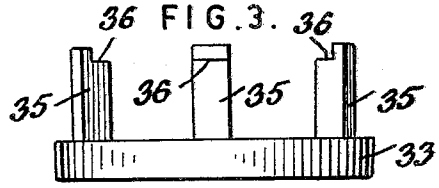


FIG. 4.

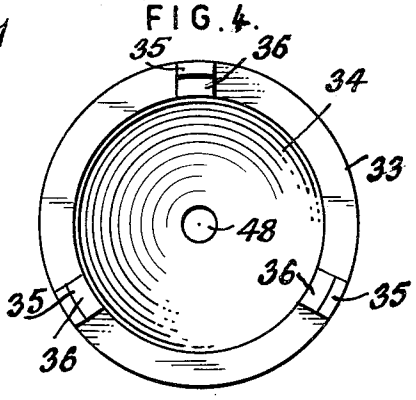


FIG. 5.

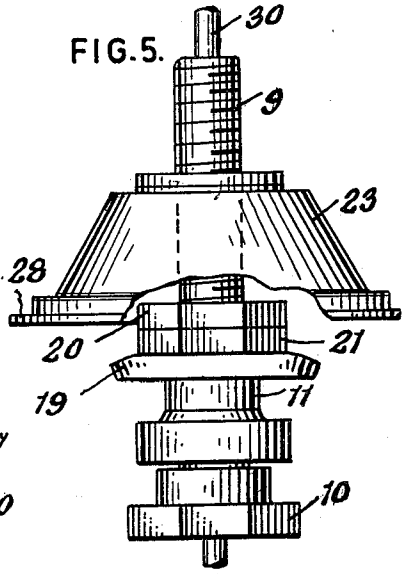
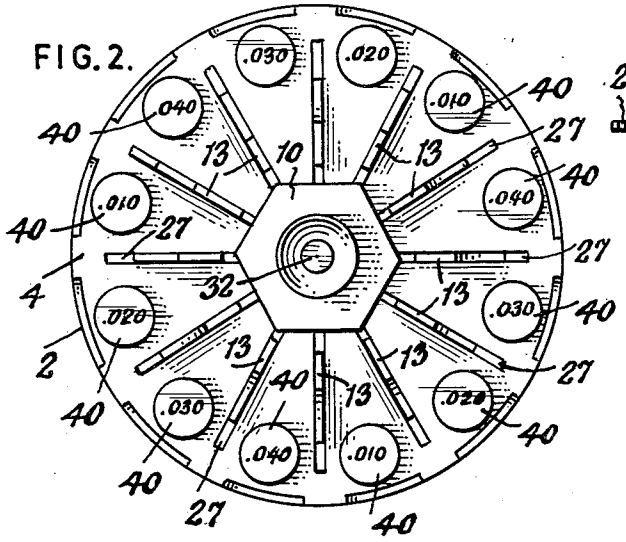


FIG. 2.



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Dec. 18, 1962 J. SHIFFMAN 3,068,558

TOOLS FOR HANDLING WATCH CRYSTALS

Filed Dec. 29, 1960 2 Sheets-Sheet 2

FIG. 6.

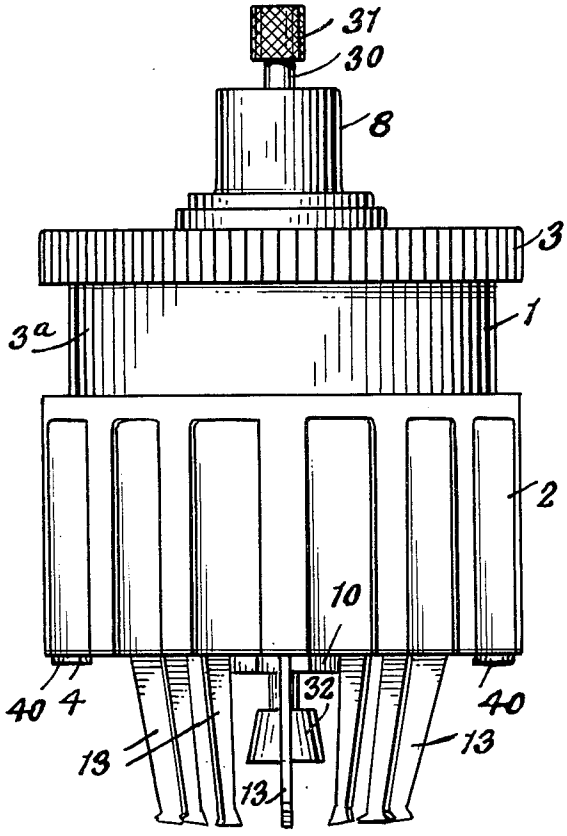


FIG. 8.

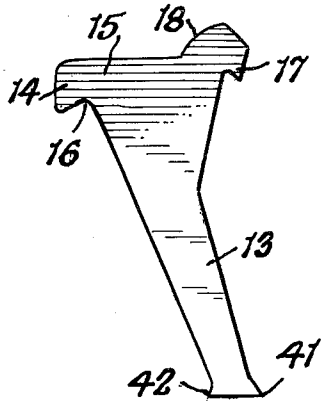


FIG. 7.

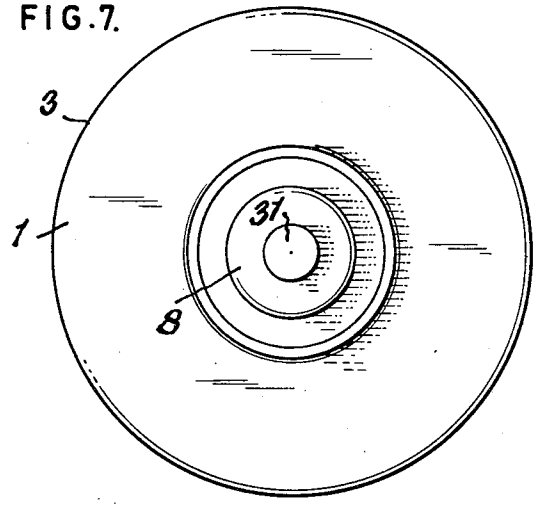
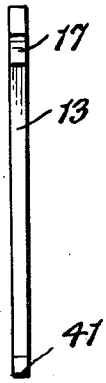


FIG. 9.



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TOOLS FOR HANDLING WATCH CRYSTALS

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Filed Dec. 29, 1960, Ser. No. 79,271
9 Claims. (Cl. 29—210)

This invention relates to tools for handling watch crystals, and more particularly to devices which handle crystals of the so-called unbreakable type which are composed of plastic material. The invention has particular reference to a device which will engage a watch crystal while it is in place in a watch and remove it therefrom; which will pick up a watch crystal from a supporting surface and hold it in such a manner that its fitment in position in a watch bezel is greatly facilitated.

It is an object of the invention to provide a device of this character which can be readily manipulated; which will accurately and firmly engage and hold the crystal in such a manner that the placement of the crystal in a watch bezel can be easily and accurately performed, and which will be of sturdy construction. A tool of the kind to which the present invention relates is disclosed in my co-pending application for patent Serial No. 57,521, filed September 21, 1960.

It is an object of the invention to provide a tool and a crystal-support for use in connection with the same and with which the engagement of the gripping fingers of the device with a crystal can be regulated, thereby enabling crystals of different depths to be each engaged in such a manner that edge portions of them will be so disposed as to enable such portions to readily fit into the groove in a watch bezel.

With these and other objects to be hereinafter set forth in view, I have devised the arrangement of parts to be described and more particularly pointed out in the claims appended hereto.

In the accompanying drawings, wherein an illustrative embodiment of the invention is disclosed,

FIG. 1 is a vertical sectional view through a tool for removing and fitting crystals, constructed according to the invention;

FIG. 2 is a view of the under side of the device, with its supporting stand not shown;

FIG. 3 is an elevational view of the supporting stand;

FIG. 4 is a top plan view of the supporting stand;

FIG. 5 is a view of the central threaded stem, with certain parts of the device mounted on it;

FIG. 6 is an elevational view of the tool;

FIG. 7 is a top plan view of the same;

FIG. 8 is a face view of one of the crystal-engaging fingers, and

FIG. 9 is an edge view of the finger.

Referring to the drawings, the casing or housing of the tool is composed of two sections or halves, the upper section being that generally indicated at 1, and it is of cup-shaped formation and includes a top wall 5, a circumferential rim 3 and a skirt 3*a*. The rim 3 is for hand engagement to rotate the part 1 of the casing and it may be knurled as shown in FIG. 1.

The lower section of the casing is generally indicated at 2 and the same is also of cup-shape and it includes a bottom wall 4. Both the upper and lower cup-shaped parts of the casing may be, like other parts of the device, composed of plastic material if desired, or they may be made of metal. The lower cup 2 is of such internal diameter that the skirt 3*a* of the upper cup 1 fits within it so that the upper cap may be rotated as well as moved axially within the lower cup, and in telescopic fashion.

Centrally provided in the upper wall 5 of the upper cup 1 is a boss 26 providing a recess or well 6 which accommodates a hexagonal or other non-round nut 7, the well being complementary in shape to the exterior of the nut, said nut being confined in the recess or well 6 by means of a cap 8 secured to the top wall of the upper cup 1 over the recess 6. This arrangement is such, that by rotation of the upper cup 1 the nut 7 will be threadably moved up or down on a threaded stem 9 on which it is mounted and which extends centrally and axially through the casing and through the recess or well 6.

Said stem 9 is provided at one end, or at the lower end of the tool, with a hexagonal or non-round head 10, fitted within the bottom wall 4 of the lower cup 2, thereby maintaining the stem non-rotatively with respect to said lower cup.

Mounted on the stem 9 adjacent to the head end of the same, is a sleeve 11, provided with an annular groove 12 (FIG. 1) that is engaged by the crystal-gripping fingers 13. These fingers constitute crystal-engaging jaws and each of them is in the form of a flat, tapered metal plate having an enlarged head 15 at its upper end terminating in a rounded extremity 14, forming a notch 16. At its opposite end, the head 16 is formed with a nose portion 17 so shaped as to engage with the groove 12 in the sleeve 11 as clearly shown in FIG. 1. This engagement permits a rocking or pivotal movement of each of the fingers. The upper edge of the nose portion 17 is curved as shown at 18, which curved portion extends under the concave side of a cupped washer 19 fitted around the threaded stem 9 and confined between the top of the sleeve 11 and a pair of nuts shown respectively at 20 and 21 threaded on the stem 9. A conical coil spring 22 is seated on the bottom wall of the lower cup 2 and is seated at the top in the notches 16 of the fingers 13. This spring biases the fingers to open or spread position.

The adjusting head 23 for the jaws is in the form of a frustro-conical follower having a central aperture 24 fitting around the stem 9 and freely movable up and down thereon. A washer 25 is interposed between the top of the adjusting head 23 and the boss 26. In FIG. 1 of the drawing, the adjusting head 23 is shown in a raised or elevated position away from the fingers 13, and the one finger therein shown is in its innermost position. The parts are shown in these positions primarily for illustration, since normally the flange 28 on the head 23 is in constant contact against the tops of the fingers.

As will be apparent from FIG. 2, which shows the bottom of the lower cup, the bottom wall 4 of that cup is formed with a plurality of radial slots 27 through which the fingers 13 are extended to project below the bottom wall 4. These slots are of such length as to permit the required pivotal movement of the fingers to thereby enable the fingers to accommodate various sizes of watch crystals between them. In the drawings, twelve of these slots and twelve fingers are shown, but this number may be increased or decreased if desired, each of the slots accommodating one of the fingers as shown. In FIG. 1, only one of the fingers is shown for clarity in illustration.

From the structure thus far described, it will be apparent that when the upper cup 1 is rotated relatively to the lower cup 2, the adjusting head 23 will be moved up or down, so that its peripheral flange 28 will engage against the tops of the fingers 13 to move the fingers pivotally toward one another or to permit them to separate under the biasing pressure of the spring 22. The stem 9 is provided with an axial passage 29 and a rod 30 is freely slidable therethrough, the rod being provided at its upper end with a knob 31 forming a finger-piece, and at its lower end below the wall 4, with a conical head 32.

To facilitate the engagement of the crystals with the fingers 13 of the tool, a stand or support of the type

shown in FIGS. 1, 3 and 4 is provided. The same is provided with a base in the form of a disk **33** which is dished or formed with a concavity **34** located centrally and facing upwardly. A central aperture **38** is provided in the base.

Arising from the top of the base **33** is a plurality of vertical posts **35**, three in number being shown. At the top, each of the posts is provided with a notch, forming a seat or shoulder on which the tool is rested as shown in FIG. 4. In FIG. 1 only one of the posts is shown, but it will be understood that the tool rests on all three of the posts when in its supported position on the stand. The curvature of the upper or concave surface of the concavity is such that it conforms to the arc of swing of the fingers **13**.

Provided on the under surface of the bottom wall **4** of the lower cup **2** is a number of disk-shaped projections or steps **40** and these steps are arranged in groups of three of different heights. When the tool is rested on the seats **36** of the stand, and with the tool supported on three of the disks of the same predetermined height, the lower ends of the fingers will be located at a given distance from the upper surface of the concavity **34** so that the edge of the crystal then resting on the surafce of the concavity, will be engaged by the fingers at such given distance from the lower surface of the crystal. This allows a sufficient amount of the edge of the crystal to be exposed below the lower ends of the fingers **13** to permit such portion of the edge to be engaged in the groove in the bezel of the watch when fitting the crystal in place therein.

Since the crystals vary in height, and the lower ends of the fingers are required to be positioned at a number of different distances from the surface of the concavity **34**, the projections or steps **40** are arranged in groups of three of different height. For example, three of these projections are arranged for a clearance of .010; three arranged for a clearance of .020; three for a clearance of .030 and three arranged for a clearance of .040, with these clearances marked on the projections. Additional projections of other heights can also be provided as required.

From the foregoing, the operation of the tool will be readily understood. The crystal to be picked up preparatory to being inserted in the bezel of a watch, is centrally positioned in the concavity **34** of the stand with its convex face disposed uppermost. The tool is placed on the stand with the steps or projections **40** of the selected height seated upon the seats or shoulders **36** of the posts **35**. By depression of the rod **30**, the crystal will be held down on the concavity of the stand, while the upper cup **1** is rotated by finger engagement with its rim **3**. This will cause the adjusting head **23** to descend in a manner to pivotally bring the fingers **13** inwardly or toward one another to an extent to cause them to grip the crystal between them, allowing a part of the edge of the crystal to project below the points of engagement by the fingers **13**, which projecting portion of the edge of the crystal to project below the points of en- of the watch. After the crystal is engaged by the fingers **13** in the manner described, the tool is lifted from the stand with the crystal engaged by it and the crystal fitted into the groove in the watch bezel. The steps or projections **40** on the bottom of the lower cup enable the ends of the fingers to be selectively positioned at different heights from the concave surface of the stand so that crystals of different heights may be readily accommodated and properly engaged by the gripping fingers **13**. It will be noted that each of the fingers **13** has a pointed inner edge **41** on its lower end and the crystal will be engaged between these edges and firmly gripped between the fingers. It will also be noted that the finger terminals each have a rear or outer sharp edge **42**. This edge **42** can be used for cleaning out the groove in the rim or bezel of the watch preparatory to placing a new crystal therein.

Having thus described a single embodiment of the invention, it is obvious that the same is not to be restricted thereto, but is broad enough to cover all structures coming within the scope of the annexed claims.

What I claim is:

1. A device for handling watch crystals comprising, a pair of cups in telescoping relation and constituting a casing, one of said cups being a lower cup and the other cup being an upper cup, the upper cup being rotatively and axially adjustable relatively to the lower cup, the lower cup having a bottom provided with radially extending slots, crystal-engaging fingers mounted in the slots and capable of pivotal movement therein, spring means tending to pivotally urge the ends of the fingers apart, an adjusting head positioned within the casing and axially movable therein by rotative movement of the upper cup to thereby cause the fingers to be moved toward one another to grip a crystal between them.

2. A device for handling crystals as provided for in claim 1, wherein the upper cup has a skirt fitting within the lower cup, a threaded stem mounted in the upper cup and on which said cup is axially and rotatively adjustable, the lower cup having its bottom provided with a plurality of raised projections on which it may be rested on a supporting stand, the projections being of different heights to thereby elevate the ends of the fingers at different heights from the support.

3. In a device for handling crystals, a crystal-gripping device including a plurality of fingers movable toward one another to grip a crystal between them, a supporting stand having uprights upon which the device is rested, the supporting stand having a crystal-supporting surface, and projections on the crystal-gripping device for seating upon the uprights, the projections being arranged in groups of different height to thereby regulate the height of elevation of the ends of the fingers from the crystal-supporting surface of the stand when the crystal-gripping device is placed on the stand.

4. In a device for handling crystals, as provided for in claim 3, wherein the crystal-supporting surface is acruate and of a curvature conforming to the arc of swinging movement of the fingers, the fingers projecting below the body of the crystal-gripping device, and the projections being located on the body of the crystal-gripping device between the fingers.

5. In a device for handling crystals, a stand having a central concavity in which a crystal is rested, posts extending upwardly from the stand, seats at the tops of the posts, a crystal-gripping device having a casing adapted to be rested on the seats, the crystal-gripping device having fingers projecting from its bottom toward the concavity, the device including means for moving the fingers toward or away from one another, the bottom of the casing being provided with projections of different heights for selective placement on the seats to thereby regulate the height of elevation of the ends of the fingers from the surface of the concavity in which the crystal is rested.

6. In a device for handling crystals, a crystal-gripping device having gripping elements, a supporting stand on which the device is rested, said stand having a crystal-supporting surface, the gripping elements having extremities located above the supporting surface, and co-operating elements on the device and on the stand for regulating the distance between the gripping elements and the crystal-supporting surface when the device is placed on the stand.

7. In a device for handling crystals as provided for in claim 6, wherein the supporting surface for the crystals is in the form of a concavity; the gripping elements are fingers movable toward or away from one another; and the co-operating elements on the device and stand are disks of different heights on the bottom of the device and seats on the stand for the reception of said disks.

8. A device for handling crystals comprising, a cas-

ing composed of a pair of cups disposed in telescopic relation, one of said cups constituting a lower cup and the other cup constituting an upper cup, the upper cup having a skirt fitting within the lower cup, a threaded stem having an end portion anchored in the lower cup, said lower cup having a plurality of radial slots extending from the lower portion of the stem, a finger mounted for pivotal movement in each slot, a sleeve mounted on the stem, said sleeve having a groove, each finger having a nose portion rockably mounted in the groove, an element fitted on the stem and extending over the nose portion of each sleeve to hold the same in the groove, a coil spring surrounding the stem and operative on the fingers to bias the same toward spread-apart position, an adjusting head on the stem and axially movable thereon to urge the fingers toward one another in opposition to the force of the spring, and means for threadably connecting the upper cup to the stem whereby a rotative movement of the upper cup will force the adjusting head in a direction toward the fingers and cause it to adjust the fingers toward one another.

9. In a device for handling crystals as provided for in claim 8, including a stem axially movable through the threaded stem and having a head on its end, which head is located between the fingers, and the lower cup having a bottom wall provided with stepped projections on its surface.

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