Oct. 25, 1938. W. AMES 2,134,093

CRYSTAL AND BEZEL MOUNTING FOR DIAL GAUGES

Filed July 17, 1935

Fig. 1.

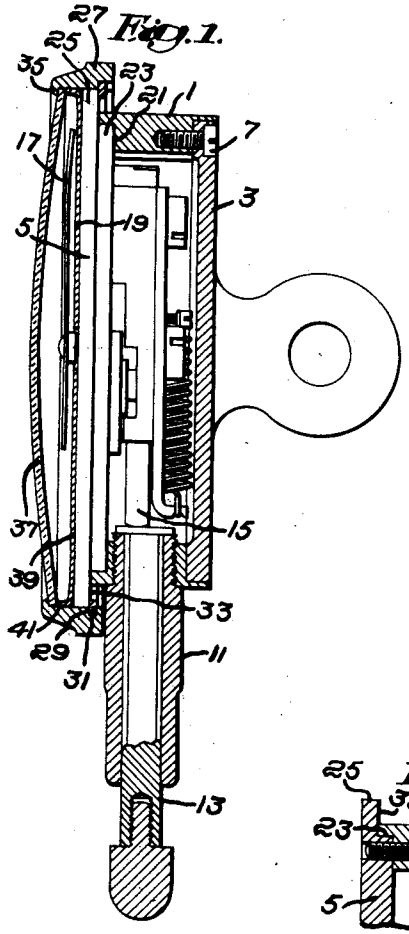


Fig. 2.

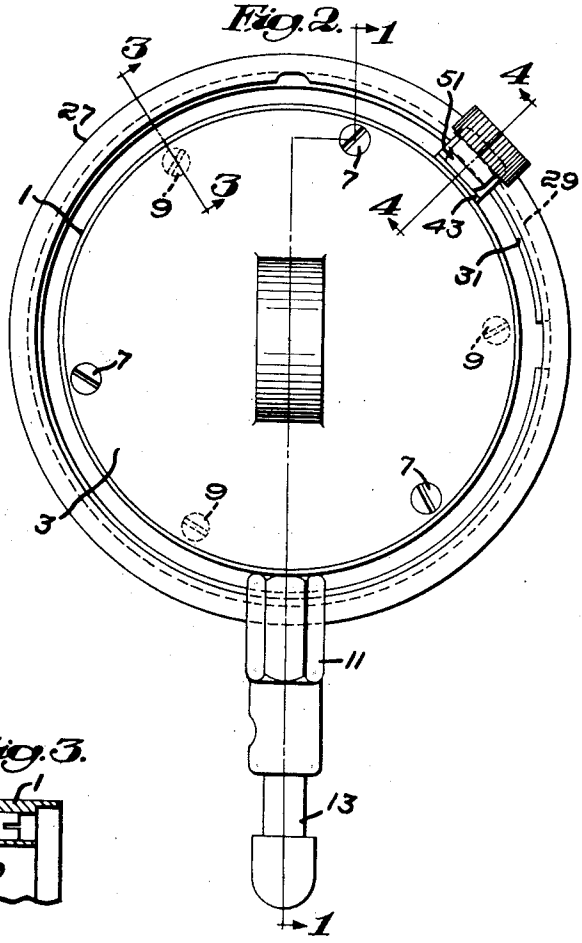


Fig. 3.

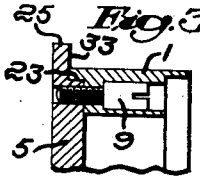


Fig. 4.

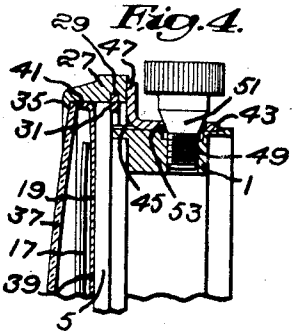


Fig. 5.

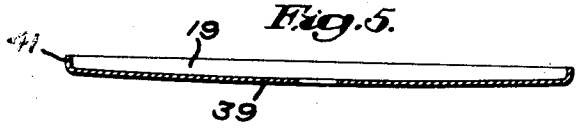
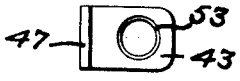


Fig. 6.



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Patented Oct. 25, 1938

2,134,093

UNITED STATES PATENT OFFICE

2,134,093

CRYSTAL AND BEZEL MOUNTING FOR DIAL GAUGES

Warren Ames, Newton, Mass.

Application July 17, 1935, Serial No. 31,844

9 Claims. (Cl. 73—151)

My invention relates to gauges, and particularly but not exclusively to dial micrometer gauges of the type shown by my United States Patent No. 1,966,424, issued July 17, 1934.

The present application is a continuation in part of my co-pending application Serial Number 5,051, filed February 5, 1935.

The present invention, which has among its objects an improved bezel, dial and crystal assembly, will be best understood from the following description when read in the light of the accompanying drawing of several embodiments of the invention, the scope of which latter will be more particularly pointed out in the appended claims.

In the drawing:—

Figure 1 is a longitudinal section on the line 1—1 of Fig. 2 of a gauge constructed according to the invention, Fig. 2 being a rear elevation of the gauge;

Figs. 3 and 4 are fragmentary sections on the lines 3—3 and 4—4 respectively of Fig. 2;

Fig. 5 is a diametrical axial section of the dial, according to Fig. 1, removed from the gauge; and

Fig. 6 is a plan of the locking member according to Fig. 4.

Referring to the drawing, the dial micrometer gauge illustrated comprises a ring-shaped casing member 1 to which are secured a back plate 3 and a front plate 5. As shown, the back plate is secured to the casing member 1 by the three spaced screws 7, and the front plate is secured thereto by the three spaced screws 9, the latter being made accessible after removal of the back plate.

Carried by the casing member 1 is a radially projecting tubular guide member 11, through which extends a contact feeler rod 13 into the interior of the casing. This contact feeler rod operates the reciprocatory actuating member 15 for a train of gearing (not shown) for moving the indicating hand or needle 17, the latter cooperating with a dial 19. The details of the mechanism for operating the needle, which mechanism may be constructed in accordance with the application of which this is a continuation in part, do not form part of the present invention.

As illustrated, the ring-shaped casing member 1 is provided, at its front side, with an annular recess 21, which recess receives the reduced diameter portion 23 of the front plate 5, the body of the front plate being of sufficient diameter to present an annular flange 25 projecting radially from the casing at the front side thereof. Fitted over this flange, and rotatable thereon, is a bezel ring 27 provided at its rearward end with an internal annular groove 29 which removably receives a resilient split ring 31. As shown, this ring is of rectangular cross-section, and projects radially inwardly from the bezel ring to form a forwardly facing shoulder which abuts against the rearwardly facing shoulder 33 on the front plate, so that when the split ring is positioned in the groove the bezel ring is restrained against axial movement forwardly relative to the front plate while permitted to rotate thereon.

At its forward end the bezel ring is provided with an inwardly extending annular bead 35, the rearward face of which bead forms an abutment against which the peripheral portion of the outer side of the crystal 37 rests. In the form of the invention illustrated by Figs. 1 to 6, the dial plate 19, which rests upon the forward side of the front plate 5, is cup-shaped, having a generally flat bottom 39 and a marginal annular flange 41. This flange 41 rests against the inner side of the crystal opposite the bead 35 on the bezel ring, and serves to insure that the crystal is held against the bead and thereby is spaced from the front plate.

As illustrated (Figs. 1 and 6), the generally flat bottom portion of the cup-shaped dial plate 19, on the interior surface of which portion the graduations (not shown) are formed, is very slightly dished, and being made of thin resilient metal forms a spring which acts to urge the bezel ring forwardly to cause the split ring 31 frictionally to bear against the rearwardly facing shoulder 33 of the annular flange formed by the front plate. The frictional engagement of the flange of the dial plate with the crystal causes it to rotate with the bezel, the slightly convex surface of the rearward side of the bottom portion of the dial plate causing it to bear against the forward side of the front plate 5 only adjacent the centermost portions thereof.

It will be understood that, in practice, the bezel is rotated relative to the casing to move the zero point, or other convenient graduation, of the dial under the needle when the contact feeler rod 13 is in its initial or other predetermined position.

For locking the bezel in its adjusted rotative position I have shown a locking member having a base portion 43, this member being slidably mounted in a longitudinally extending shallow groove 45 on the exterior surface of the ring member 1 of the casing. Integrally formed with the base member 43 is a radially extending portion 47 adapted to bear frictionally against the rearward face of the bezel ring. Associated with the base portion 43 of the locking member is a

screw 49, screw-threaded into the ring member 1, this screw having a conical portion 51 which serves as a wedge cooperating with the walls of the perforation 53 in the base member 43. As illustrated in Fig. 4, the perforation 53 is of greater diameter than that of that portion of the conical portion of the screw which is received in said perforation, and the wall of the perforation at the side thereof adjacent the bezel ring bears against said conical portion. Therefore, by screwing the screw to move the conical portion 51 inwardly of the perforation, the portion 47 of the locking member will be forced against the edge of the bezel ring, while by turning the screw to move the conical portion 51 outwardly of the perforation the pressure of the part 47 against the bezel ring will be relieved.

The crystal 37 may be of glass, or other transparent material, preformed to the shape illustrated. However, preferably the crystal is a disc of transparent resilient sheet material, such as Celluloid or the like, which disc, before insertion in the bezel ring, is preferably flat and has a diameter greater than the internal diameter of the bezel adjacent the bead 35. When inserted in the bezel ring from the rearward side thereof, this disc flexes and assumes the shape indicated in Fig. 1, that is to say, approximately conforms to a spherical surface. This construction permits the disc to be snapped into and out of the bezel ring, when the latter is removed from the front plate, by mere pressure of the fingers. Further, whether a preformed crystal or a resilient disc is employed, the present bezel construction entirely avoids the necessity for the use of special tools, ordinarily not possessed by the user of the gauge, for renewing the crystal when it becomes damaged. After the resilient disc is snapped against the bead 35, or the preformed crystal is slipped into the bezel ring to rest against said bead, the bezel ring may be placed over the large diameter portion 25 of the front plate, after which the retaining ring 31 may be entered into the groove 29 to hold the parts in assembled relation.

It will be understood that wide deviations may be made from the form of the invention above described without departing from the spirit of the invention.

I claim:

1. A gauge having, in combination, a casing, an indicator hand carried by said casing, a detachable bezel ring rotatably mounted on said casing, a dial cooperating with said hand and rotatatble with said ring, a crystal, said ring having interior shoulder means against which the outer side of said crystal abuts and an annular surface for engaging said crystal circumferentially thereof, which crystal is formed of a sheet of transparent resilient material of normally greater diameter than said annular surface, whereby said crystal by pressure of the fingers may be snapped into contact with said shoulder means from the casing side of said ring to present an approximately spherical surfaced crystal and may be similarly removed from said ring, means forming a thrust bearing for holding said ring against movement away from said casing, and resilient spacer means for positioning said crystal relative to said casing including said dial and acting on said crystal and casing as abutments for urging said ring away from said casing.

2. A gauge according to claim 1 in which the spacer means is constituted by a resilient cup-shaped dial the edge of which bears against the crystal.

3. A gauge having, in combination, a casing, a crystal, a removable bezel ring detachably carried by said casing, said ring having interior shoulder means facing said casing against which shoulder means the side of said crystal abuts and having surface means adjacent said shoulder means against which the edge of said crystal abuts, the interior portions of said ring which said shoulder means faces being at least as great a distance from the axis of said ring as said surface means, said crystal being formed of a sheet of flexible transparent material of normally greater radius than corresponds to the radial distance of said surface means from the axis of said ring, whereby when said ring is detached from said casing said crystal by pressure of the fingers may be snapped into contact with said shoulder means and surface means from the casing side of said ring to present an approximately spherical surfaced crystal and may be similarly removed from said ring.

4. A device of the character described having, in combination, a support, an angularly movable indicator member carried by said support, a bezel ring rotatably mounted on said support, a dial cooperating with said indicator member and rotatable with said ring, means for rotatably retaining said ring on said support and acting as a thrust bearing for restraining the two against separation under forces directed axially of said ring, a crystal carried by said ring, the latter engaging the periphery of said crystal to prevent it shifting transversely and having shoulder means against which the outer side of said crystal removably abuts, and resilient spacer means between and operatively acting on said support and crystal as abutments for urging said ring away from said support for taking up lost motion in said thrust bearing and for holding said crystal against said shoulder means.

5. A device of the character described having, in combination, a support, a bezel ring, shoulder means for rotatably retaining said ring on said support and restraining the two against separation under forces directed axially of said ring, a crystal carried by said ring, the latter having shoulder means against which the outer side of said crystal abuts and resilient spacer means between and operatively acting on said support and crystal as abutments for urging said ring away from said support, said spacer means comprising a cup-shaped dial rotatable with said ring, the rim of which dial bears against said crystal.

6. A device of the character described having, in combination, a support, a bezel ring, means for rotatably retaining said ring on said support and acting as a thrust bearing restraining the two against separation under forces directed axially of said ring, a crystal carried by said ring, the latter having shoulder means against which the outer side of said crystal removably abuts, and spacer means between and operatively acting on said support and crystal as abutments for holding said crystal against said shoulder means, said spacer means comprising a cup-shaped resilient dial member surrounded by and rotatable with said bezel ring whereby the latter is urged axially away from said support for taking up lost motion in said thrust bearing.

7. A device of the character described having, in combination, a support, a bezel ring rotatably carried by said support, a crystal carried by said

ring in spaced relation to said support, said ring and support operatively carrying cooperating shoulder parts for retaining said ring on said support while permitting its rotation; and resilient means operatively acting on said support and crystal as abutments for holding said shoulder parts in contact and said crystal in spaced relation to said support including a cup-shaped dial surrounded by and rotatable with said ring.

8. A device of the character described having, in combination, a support, a bezel ring rotatably mounted on said support, cooperating abutments formed on said ring and support respectively for restraining said ring against movement axially thereof away from said support while permitting rotation of said ring, and a resilient dial rotatable with said ring and operatively reacting between said support and ring for holding said abutments in contact.

9. A device of the character described having, in combination, a support, a bezel ring rotatably mounted on said support, cooperating abutments formed on said ring and support respectively for restraining said ring against movement axially thereof away from said support while permitting rotation of said ring, and a cup-shaped dial rotatable with said ring and having a rim operatively engaging said ring and a resilient base operatively engaging said support for holding said abutments in contact.

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