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F. E. MANN

CRYSTAL DETECTOR

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Fig. 1.

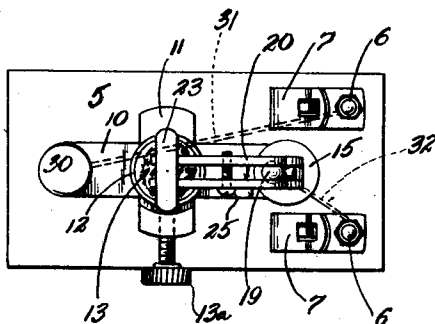


Fig. 2.

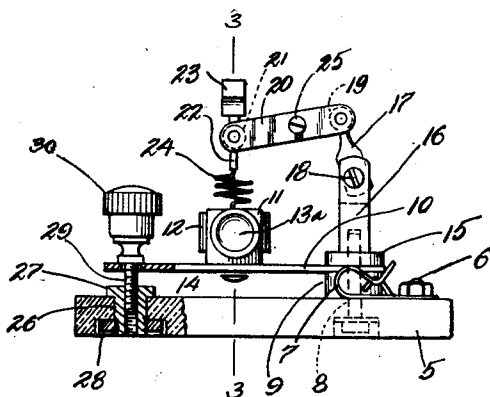
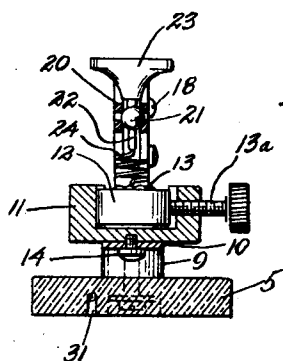


Fig. 3.



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CRYSTAL DETECTOR.

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This invention relates to crystal detectors particularly useful in connection with radio apparatus, and has particular reference to crystal detectors of that type embodying a contact spring mounted to be moved into engagement with and over the surface of the crystal element.

The primary object of the invention is to provide means for operating after the spring contact has been engaged with the crystal by rough manual adjustment for effecting a fine or vernier adjustment of the crystal toward or away from the contact spring whereby the pressure with which said contact spring engages the crystal may be finely adjusted for effecting a very sensitive tuning of the radio apparatus with which the detector is employed.

Another object of the invention is to embody the above mentioned fine or vernier adjustment in a crystal detector in such manner that the detector will be simple and durable in construction as well as extremely efficient in operation so as to meet with all of the requirements for a successful commercial use.

Another object of the invention is to provide a fine or vernier adjustment of the above character by means of a structure including a resilient spring upon which the crystal is mounted, and by which the same is normally urged toward the contact spring, and an adjusting screw associated with the spring for causing the latter to flex away from the contact spring or to allow the same to yield toward the contact spring as desired.

Still another object of the invention is to provide simple and efficient means for mounting the crystal carrying spring so that this mounting may serve for also mounting the supporting post of the crystal contacting spring.

Other objects will appear as the nature of the invention is better understood, and the same consists in the novel form, combination, and arrangement of parts hereinafter more fully described, shown in the accompanying drawing and claimed.

In the drawing, wherein like reference characters indicate corresponding parts throughout the several views:

Figure 1 is a top plan view of one form of crystal detector constructed in accordance with the present invention.

Figure 2 is a side elevational view thereof partly broken away and in section, and

Figure 3 is a vertical transverse sectional view, taken substantially upon the line 3—3 of Figure 2.

In the form of the invention shown, the device embodies a base plate 5 of suitable insulating material at the corners of one end of which are provided suitable threaded binding posts 6 upon which are snapped resilient clips 7 for quick detachable reception of the jacks upon the wires of the receiving circuit of a radio set.

A screw 8 extends upwardly through the base plate 5 between the clips 7, and this screw also extends centrally and upwardly through a hollow boss 9 provided upon the upper surface of the base plate 5, and upon which rests one end of an elongated spring strip 10 that is preferably constructed of sheet metal so as to normally tend to spring upwardly away from the base plate 5. Mounted upon the intermediate portion of the spring strip 10 is the usual holder 11 of U-shaped form in elevation and provided with the usual opposed side jaws having concaved faces, between which is held the usual cup 12 carrying the usual crystal 13, by means of a set screw 13^a threaded through one of the jaws of the holder 11. The crystal cup holder 11 is attached to the spring strip 10 by any suitable means such as a screw 14, and disposed upon the end of the strip 10 that rests upon the boss 9 is a washer 15 of insulating material through which the screw 8 also passes. A post 16 is provided upon the washer 15 and has a longitudinal socket in its lower end into which the screw 8 is threaded, whereby said post is rigidly attached upon the washer 15 and whereby the post, washer, spring strip 10 and boss 9 are firmly clamped in contiguous relation with the post 16 rigidly fastened to the base plate 5.

The upper end of the post 16 is longitudinally slotted to provide a pair of arms, between which is pivoted the lower end of an upwardly extending arm 17 by means of a screw 18 or the like, whereby said arm 17 is free to swing in a vertical plane toward and away from the crystal carrying cup 12. The upper end of the arm 17 is formed with a ball or ball shaped head 19 against opposite sides of which are clamped adjacent ends of spaced parallel plates 20, which adjacent ends of the plates 20 are provided with segmental spherical sockets in which the ball head 19 is seated. The other free

ends of the plates 20 are provided with segmental spherical opposed sockets or recesses upon their inner surfaces in which is seated the opposite sides of a ball element 21 provided rigidly upon the central portion of the stem 22 that has a finger piece or knob 23 rigid with the upper end thereof and to the lower end of which is provided the usual contact spring 24. The manner in which the plates 20 are clamped against opposite sides of the ball members 19 and 21 allow for a substantially universal movement of said plates relative to the arm 17 and a similar movement of the stem 22 relative to the plate 20, the clamping of the plate 20 against the ball members 19 and 21 being preferably effected by means of a screw 25 extending transversely through the central portion of the plate 20 and having threaded engagement with one of the latter furthest from the head of the screw 25.

The plate 5 is provided with a substantially central opening adjacent that end of the same opposite to the end to which the post 16 is connected, and within this opening is secured an internally threaded sleeve 26, the threads of which are of extremely fine pitch. The preferred manner of securing the sleeve 26 in place consists in providing the upper end of the same with an integral flange 27, adapted to engage the upper surface of the base plate 5 about the opening in which the sleeve is fitted, said flange 27 being clamped into engagement with the upper surface of the base plate 5, by means of a nut 28 threaded upon the lower end of the sleeve 26 within a recess provided in the under surface of the base plate 5.

An adjusting screw 29 is threaded into the sleeve 26 and passes through the free end of the spring strip 10. This screw 29 is provided upon its upper end with a suitable knob 30 that rests upon the upper surface of the spring strip 10 so that when the screw 29 is threaded into the sleeve 26, the spring strip 10 is caused to flex downwardly or away from the spring contact 24 supported by the post 16. The under surface of the base plate 5 may be provided with a groove 31 in which a wire may be positioned to electrically connect the sleeve 26 with one of the binding posts 6, while another groove 32 may be provided in the under surface of the base plate 5, in which a wire may be positioned for connecting the screw 8 and post 16 electrically with the other binding post 6.

In assembling the device, the screws 18 and 25 are adjusted sufficiently tight to obtain sufficient friction against the arm 17 and the ball members 19 and 21 so as to insure sufficient friction for maintaining the arm 17 in any desired angular adjustment relative to the post 16, to similarly maintain the plate 20 in any desired adjusted position relative to the arm 17 and to maintain the

stem 22 in any adjusted position to which it is fed relative to the plate 20.

In operation, assuming that the screw 29 is partly, at least, threaded into the sleeve 26, the operator will simply grasp the knob 23 so as to manipulate the stem 22, plate 20 and arm 17, for bringing the depending end of the spring contact 24 into engagement with the desired point on the surface of the crystal 13. When this is done, a rough adjustment of the spring contact 24 with relation to the crystal is had. The knob 30 is then turned, for threading the screw 29 into or out of the sleeve 26, so as to effect a very gradual or fine adjustment of the crystal toward or away from the contact spring 24, whereby the pressure with which said spring 24 engages the crystal may be regulated to a fine degree, whereby a very sensitive tuning of the radio receiving set with which the detector is used, may be had. It is of course, understood that when the screw 29 is threaded outwardly of the sleeve 26 in an upward direction, the spring strip 10 will automatically flex upwardly with its free end maintaining engagement with the lower end of the knob 30 so as to automatically move the crystal toward the contact spring 24, but when the screw 29 is threaded downwardly into the sleeve 26, the knob 30 engages the spring strip 10 for forcing the crystal in a direction away from the contact spring 24 by flexing the spring strip 10.

While I have herein shown and described the preferred embodiment of my invention, it is to be understood that numerous and various modifications may be made in the exact form, relationship and connection of parts without departing from the spirit and scope of the invention as claimed.

What I claim as new is:

1. In a crystal detector of the character described, a support, a resilient strip, a crystal element supported by said strip, a second support carried by the first named support and having a contact spring flexibly connected thereto for being manually moved into contact with the surface of the crystal element and over the surface of the latter, said resilient strip normally acting to move the crystal element carried thereby in one direction relative to the spring contact, and means engaged with the first named support for moving the resilient strip in an opposite direction relative to the spring contact, for effecting a fine adjustment of the crystal element and spring contact toward or away from each other and thereby regulate to a fine degree the pressure with which the contact spring engages the surface of the crystal element.

2. In a crystal detector, a support, a resilient strip carrying a crystal element, a contact spring flexibly connected to the sup-

- port for movement toward or away from and over the surface of said crystal element, said resilient strip normally acting to flex toward the spring contact, and means for
5 effecting a fine adjustment of the resilient strip away from the spring contact or toward the latter for regulating the pressure with which said spring contact engages the surface of the crystal element.
- 10 3. A crystal detector including a base, a spring strip mounted at one end on the base, a crystal holder mounted on the strip, a contact spring mounted on the base, and adjustable relative thereto for engagement with desired points on the surface of a crys- 15 tal in said holder, and manually operable means for holding said spring strip under tension, and adjusting the tension thereof, to effect a micrometric adjustment of contact pressure between the contact spring and 20 the crystal.

In testimony whereof I affix my signature.

FREDERICK E. MANN.