Aug. 30, 1932. E. G. FRACKER 1,874,271

RESILIENT MOUNTING FOR ELECTRICAL DEVICES

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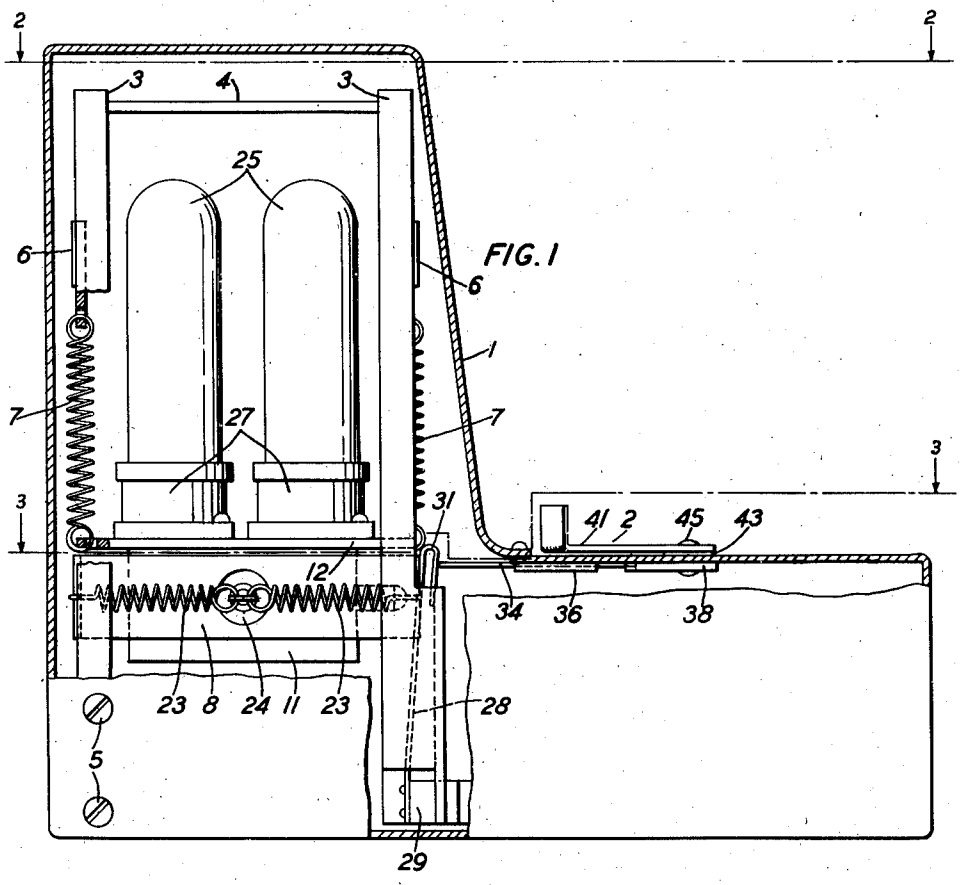
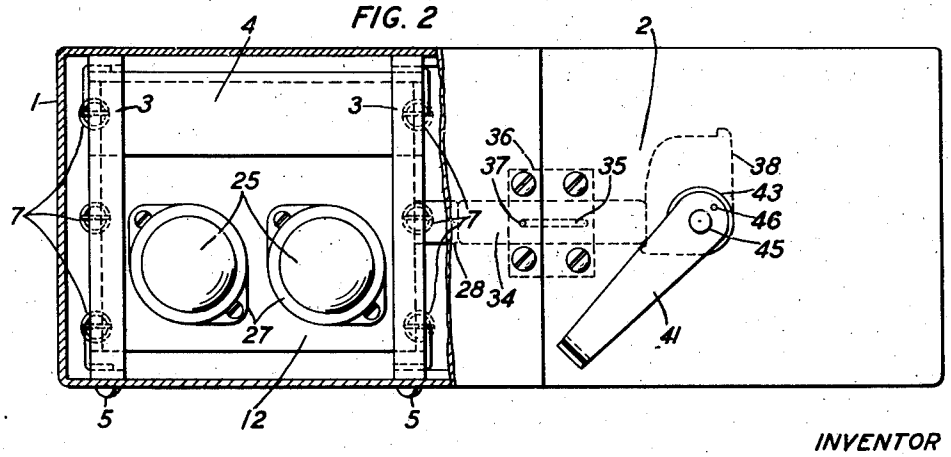


FIG. 1

FIG. 2



INVENTOR
E. G. FRACKER
BY
Walter C. Kiesel
ATTORNEY

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FIG. 3.

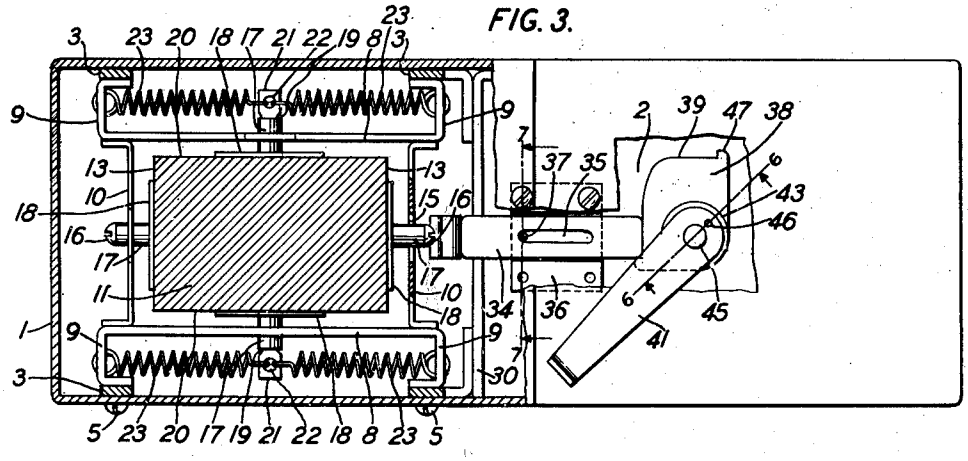


FIG. 4.

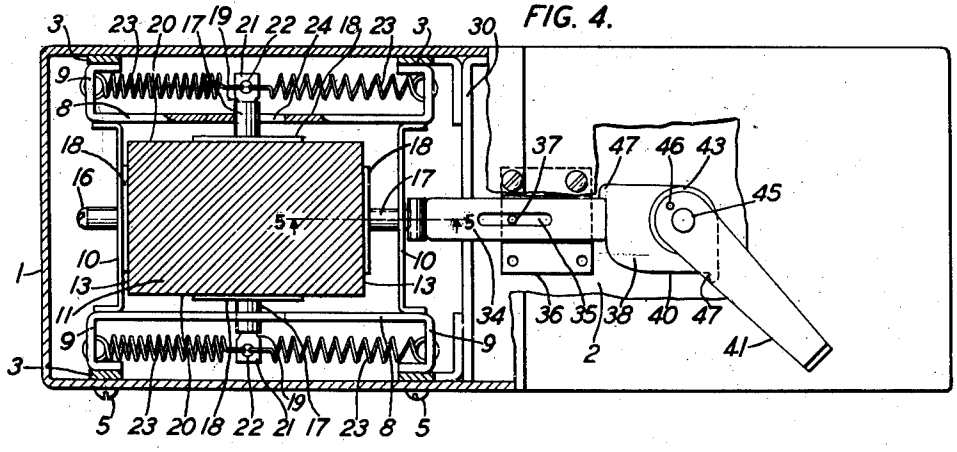


FIG. 5

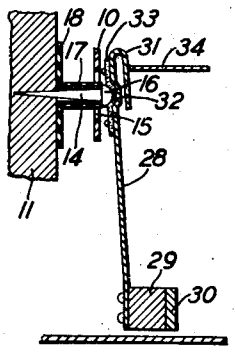


FIG. 6

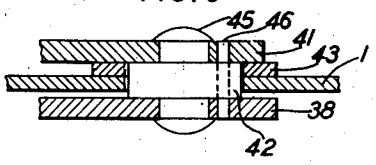
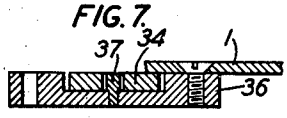


FIG. 7.



INVENTOR
E. G. FRACKER

BY
Walter C. Kiesel

ATTORNEY

Patented Aug. 30, 1932 1,874,271

UNITED STATES PATENT OFFICE

EDWARD G. FRACKER, OF GRANT CITY, NEW YORK, ASSIGNOR TO BELL TELEPHONE LABORATORIES, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK

RESILIENT MOUNTING FOR ELECTRICAL DEVICES

Application filed February 10, 1931. Serial No. 514,791.

This invention relates to a resilient mounting for electrical devices and more particularly to a suspension mounting for electron discharge devices.

An object of this invention is to effectively lock or clamp a resilient support within a housing during transportation.

In accordance with this invention the resilient mounting comprises a housing within which a shock absorbing apparatus support is suspended. The support comprises an inertia mass which is resiliently suspended in the housing by a plurality of helical springs and prevented from rotating by other helical springs which are disposed between members projecting from the inertia mass and the housing. Associated with the apparatus support is a locking or clamping device, which is capable of rigidly securing it against movement within the housing, to prevent movement which may damage the mounting while it is being transported or handled.

In one embodiment of the invention, the locking device comprises a spring member adapted to engage a projecting portion of the inertia mass forming a part of the apparatus support, a slidable member contacting at one extremity with the spring member and a rotatable cam element. When it is desired to protect the mounting during handling or transportation the cam element is rotated to engage the slidable member. This causes the latter member to be thrust against the spring member, and the spring member bears against the projecting portion of the inertia mass. The mounting is held rigidly against the housing and secured against movement. When the cam is rotated in the opposite direction, the resilient mounting is released from its locked position and is normally suspended in the housing to prevent vibration from affecting the operation of the devices, for instance, electron discharge tubes, held in the mounting.

A more complete understanding of this invention will be obtained from the detailed description which follows taken in conjunction with the appended drawings, wherein:

Fig. 1 is a side view of the mounting made in accordance with this invention with a portion of the housing broken away to illustrate the locking or clamping arrangement;

Fig. 2 is a top view of the mounting of this invention partly in section along the line 2—2 of Fig. 1;

Fig. 3 is a cross-sectional view of Fig. 1 along the line 3—3 with a portion broken away to show the locking mechanism and the position of the cam element when the mounting is in a normal resilient position;

Fig. 4 is similar to Fig. 3 except that the locking mechanism is shown in locked position;

Fig. 5 is an enlarged cross-sectional view along the line 5—5 of Fig. 4 and shows the elements of the locking mechanism in locked position;

Fig. 6 shows in enlarged detail a cross-sectional view, along the line 6—6 of Fig. 3 of a detail of the locking mechanism; and

Fig. 7 illustrates in cross-section the support of the slidable element along the line 7—7 of Fig. 3.

Referring now to the drawings, there is shown a housing or casing 1, formed preferably of sheet metal, providing an enclosure for a normally resilient mounting and having a locking or clamping mechanism 2 for rigidly fastening the mounting against movement within the housing when the assembly is handled or transported. The mounting comprises a frame of U-shaped elements 3 held in spaced relation at one extremity by a cross member 4 preferably welded thereto, and secured to one wall of the housing by screws 5. A supporting bar 6 extends between the vertical portions of each element 3 and is provided with apertures to receive the ends of a plurality of vertically disposed downwardly extending helical springs 7. A rectangular frame is disposed between the frame elements 3 intermediate their ends and comprises parallel metallic strips 8 having opposed bent extensions 9 joined to vertical portions of elements 3 and right angle metallic strips 10 extending between the metallic strips 8. The strips 8 and 10 are provided with openings intermediate their ends. The apparatus support comprises an inertia member or block 11, of a material such as lead, which carries a

flat plate 12, the apparatus support being carried by the springs 7. From each of two opposite surfaces or faces 13 of member 11 extends a screw 14 which projects through the opening 15 in the strip 10, the screw having a head portion 16 and being surrounded by a collar member 17. Between this member 17 and the face 13 is provided a member 18 of compressible material such, for instance, as soft rubber. A projecting element or screw 19 extends from each of the opposite surfaces or faces 20 of member 11 and is encircled, also by a collar member 17 but has an enlarged head 21 drilled to provide an aperture 22 through which the extremities of helical springs 23 may be thrust. The elements 19, 19 extend through the openings 24 in the strip 8. The helical springs 23, which extend between the enlarged heads of the screws 19 and the opposed extensions 9, function to center the apparatus support in its frame, to retard rotative movement thereof, and to damp vibrations tending to produce such movement. As typical of the apparatus which may be carried by the apparatus support described above, there is shown a plurality of electron discharge devices 25, the sockets 27 for which are suitably secured to the upper surface of the plate 12.

When electrical devices, particularly electron discharge tubes, are resiliently suspended in a mounting, the electrodes may be subject to excessive vibration during transportation or handling which vibration may affect their operating characteristics. In order to overcome this difficulty in accordance with this invention a locking or clamping mechanism 2 is associated with the mounting and comprises a resilient spring member 28 secured at one extremity to a block 29 fastened to the frame by a metallic strip 30. The member 28 has a folded portion 31 and, also, a depression 32. As shown in Fig. 5, this depression provides a recess into which the head 16 of the projecting member 14 fits when the mounting is in its rigidly secured position thus insuring, as hereinafter described, that the change in position of the member 28 from its normal in Fig. 1 to the position it occupies in Figs. 4 and 5 will cause a definite movement of the apparatus mounting against its frame. A thin layer or cushion disc 33, of a material such as felt, or rubber, or the like, is secured to the spring member by cement or rivets. In contact with the portion 31 of member 28 is a slidable transversely bodily movable bar or member 34, preferably of metal, having a guiding slot 35 therein. The member or bar 34 is supported and guided by a bracket member 36 secured to the interior surface of the housing 1 by suitable fastening means. This bracket has formed therewith a centrally disposed pin or projection 37 engaging with the slot 35 in the member 34. At the other extremity of the member 34 is a cam member 38 one of whose flat surfaces or faces 39, 40, which are at right angles, preferably, to one another, is in contact therewith. The cam member is, preferably unsymmetrical in outline and the face 40 at right angles to its short dimension is the one normally in contact with the member 34; the other face 39 at right angles to the long dimension of the cam is in contact with the member 34 only when the housing is being handled or transported and when it is desired to have the shock absorbing mounting locked or clamped against movement. This cam member is supported adjacent the inner surface of the housing and is adapted to be turned through an angle of 90 degrees by a crank arm or lever member 41 supported on the exterior of the housing. This crank arm is secured to the cam by the arrangement shown in Fig. 6. A collar member 42 is disposed in an aperture in the housing; a metallic washer 43 rests on the outer surface thereof and surrounds the collar. The lever member 41 rests on the washer and the cam member 38 against the lower surface of the collar 42. These elements are secured together by a rivet 45 and to prevent relative movement thereof while in use each of the members has, preferably, a coaxial opening therein into which a pin member 46 may be force fitted.

Ordinarily, the apparatus mounting and the locking or clamping mechanism are in the positions shown in Figs. 1, 2 and 3 and the mounting is centered within the frame as shown clearly in Fig. 3. When the housing is being handled or transported, however, it is desired to prevent the mounting from swinging about within the housing. The mounting is locked or clamped rigidly against movement by manually rotating or turning the lever member 41 thereby causing the cam member 38 to be turned counterclockwise through an angle of 90 degrees to bring the flat face 39 thereof against one extremity of the member 34. This being the long dimension of the cam, the member 34 will be moved forward against the resilient spring member 28 which will be thrust against the head 16 of the screw projecting from surface 13 of the inertia member 11 to cause the latter to be displaced and to assume the position shown in Fig. 4 wherein the flat surface of the member 18 is in contact with the inner flat surface of one of strips 10 and the collars 17 of the screws 19 are thrust against the bounding walls of the openings 24 in the strips 8. The mounting will be maintained in this position until it is desired to release it by rotating the lever member 41 to its original position, whereupon the resilient spring member 28 returns member 34 to its original position and the springs 24 once more center the apparatus mounting. The cam member is provided, preferably, with

flat faces at right angles to insure that when the locking device is in either its operating or shipping position sudden jars or shocks will not alter its position. It is to be noted, also, that the cam is provided with projecting portions 47 which act as stops to prevent the cam member from being turned other than through the necessary angle to accomplish the clamping or the unclamping of the resiliently suspended apparatus mounting within its frame.

It will be apparent that this invention is not limited to the specific structure described nor is it limited in its application to the support of electron discharge devices only, inasmuch as the invention in its described or in a modified form may be applied in general to the support of delicate apparatus or electrical devices.

What is claimed is:

1. In combination, a supporting frame, an apparatus support, means resiliently connecting said support to said frame, and a cam actuated locking mechanism adjacent said support to force said support into engagement with said frame and thereby counteract said resilient means.

2. In combination with a normally movable apparatus support, a device for clamping said support against movement comprising a resilient spring member, a movable member in contact with said spring member, a cam member in contact with said movable member, and means for turning said cam member through a desired angle.

3. In combination with a resiliently supported apparatus mounting, a clamping device comprising a spring member, an elongated movable member contacting at one of its extremities with said spring member, a cam member contacting with the other extremity of said movable member and means for turning said cam, the movement thereof causing said movable member to force said spring member against said apparatus support to hold it against movement.

4. In combination with an ordinarily movable apparatus support having a projecting portion, a clamping device comprising a spring member having a depressed portion in alignment with said projecting portion, a slidable member contacting with said spring member, a turnable member contacting with said slidable member, and means to cause said turnable member to displace said slidable member which is caused to bear against the apparatus support to maintain it against movement.

5. In combination a housing, a supporting frame having openings therein, a resiliently suspended apparatus support within said frame, said apparatus support having a plurality of portions projecting through said openings, a member secured to said frame and having a depressed portion with which one of the projecting portions of said support is in alignment, and means contacting with said member to cause it to bear against said projecting portion and to displace said apparatus support against said frame to secure it against movement.

6. In combination a housing, a supporting frame therein, a resiliently suspended apparatus support within said frame, said support having at least two projecting portions extending through openings in said frame, an elongated member secured to said frame and adjacent one of said projecting portions, a slidable member for engagement with said elongated member, and means engaging with said slidable member to cause it to press said elongated member against the projecting portion of said apparatus support to displace it within said supporting frame and to maintain it immovable against a portion thereof.

7. In combination, a housing, a supporting frame therein having a plurality of openings therein, a resilient apparatus support within said frame, said apparatus support having a plurality of pairs of oppositely disposed portions projecting through said openings, an elongated member rigidly secured at one extremity and having its free extremity adjacent one of said projecting portions, and means engaging said member to cause it to bear against said projecting portion to displace said support within and against the frame to secure it against movement.

In witness whereof, I hereunto subscribe my name this 6th day of February, 1931.

EDWARD G. FRACKER.