

Sept. 4, 1928.

1,683,092

C. B. MIRICK

PIEZO ELECTRIC CRYSTAL HOLDER

Filed June 8, 1927

2 Sheets-Sheet 1

Fig. 2

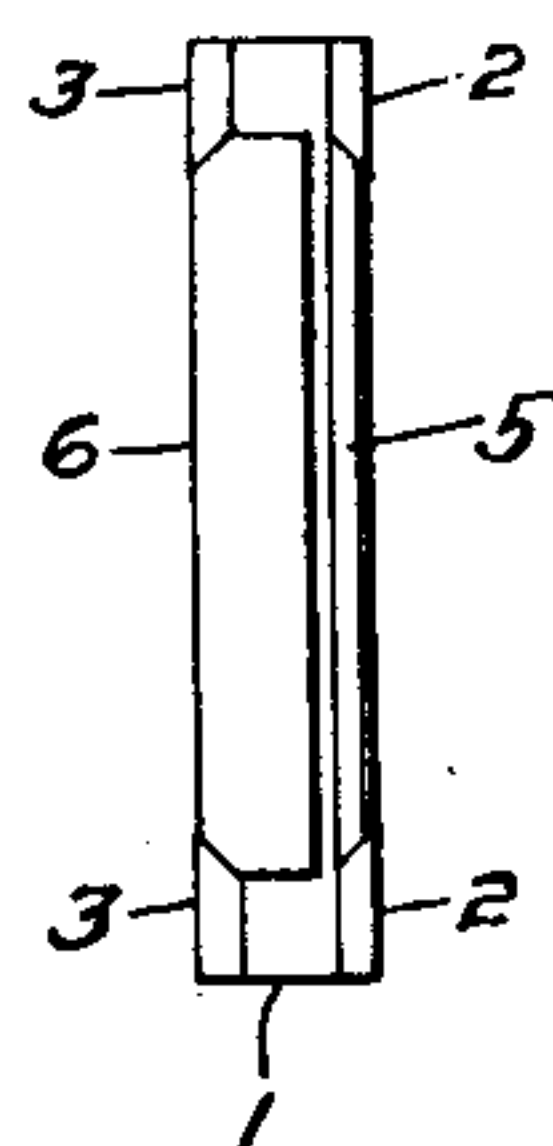


Fig. 1

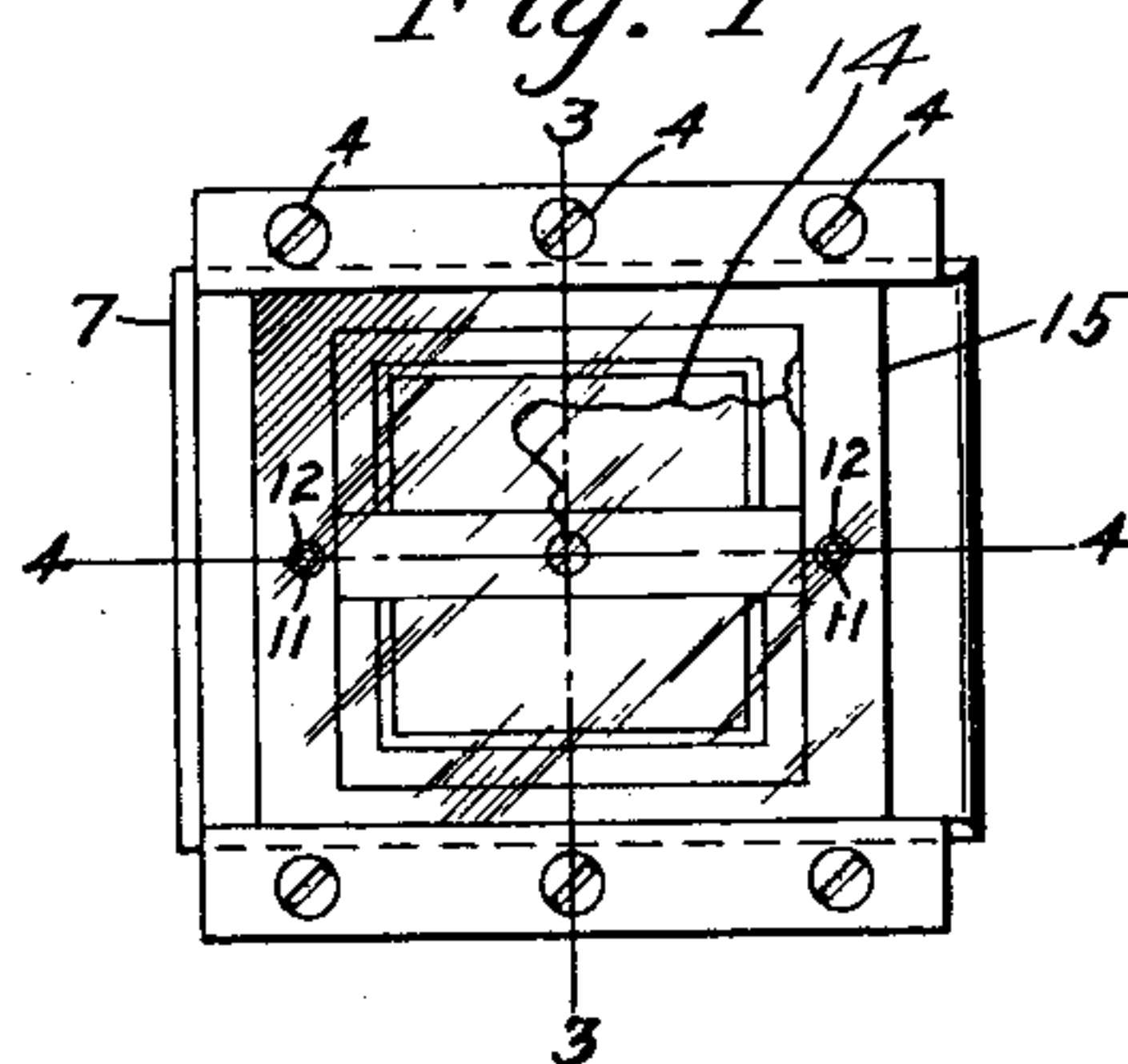


Fig. 3

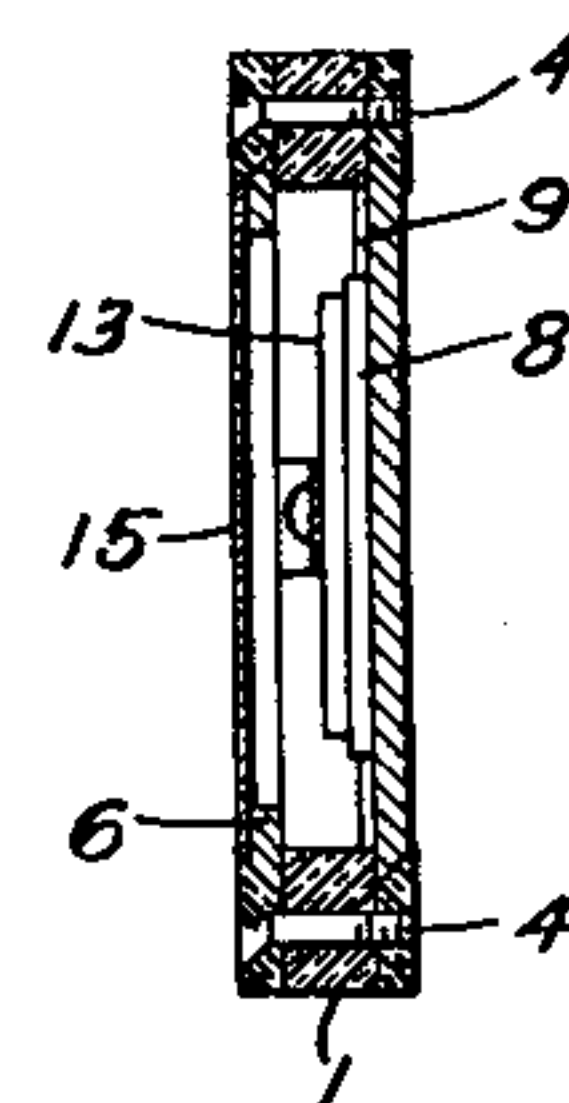


Fig. 4

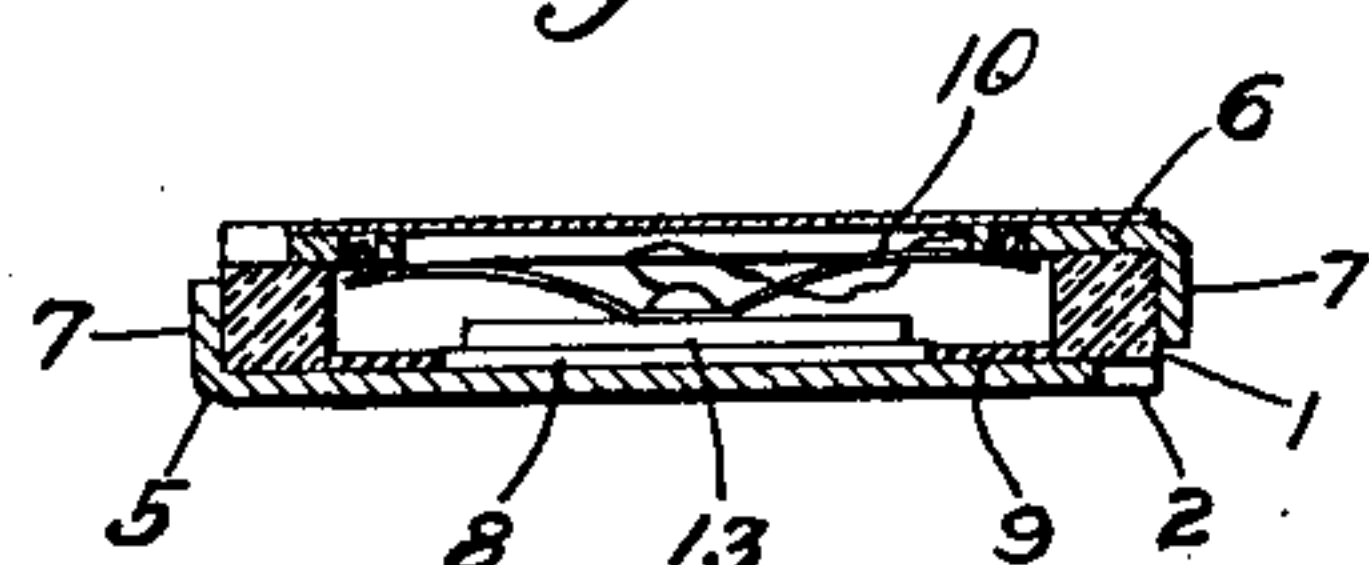


Fig. 8

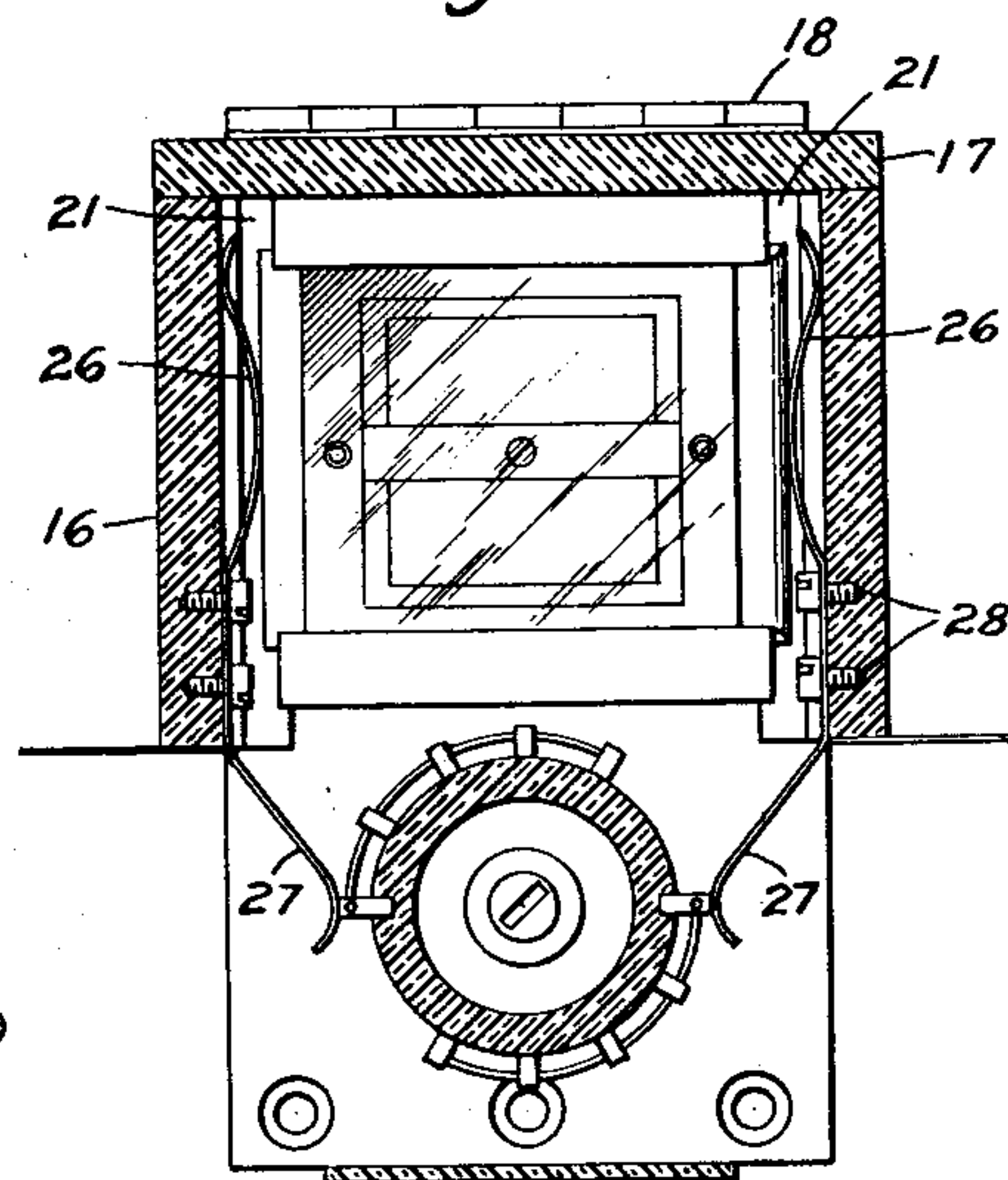
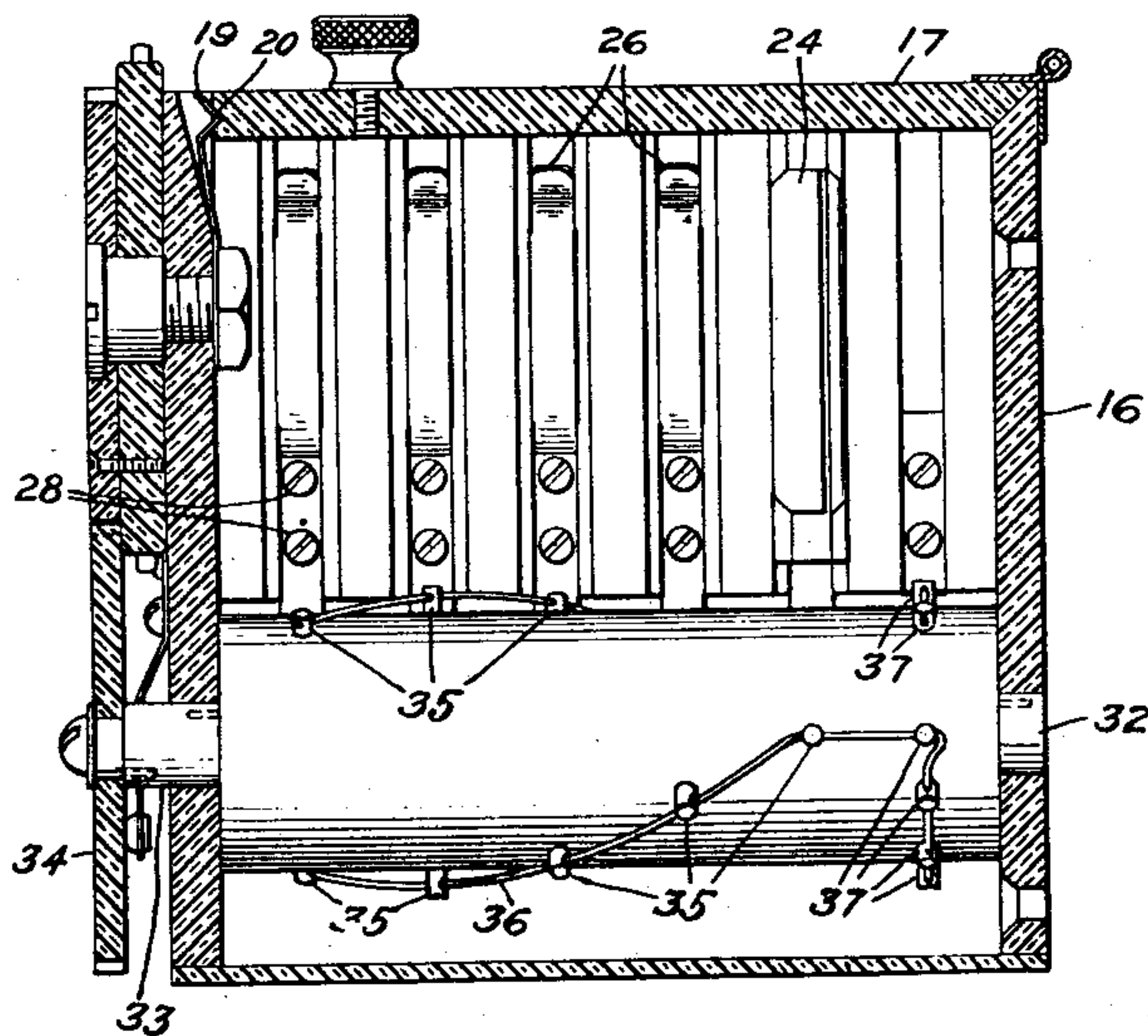


Fig. 7



INVENTOR.
Carlos B. Mirick
BY *Harold Todd*.
ATTORNEYS.

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C. B. MIRICK

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Fig. 5

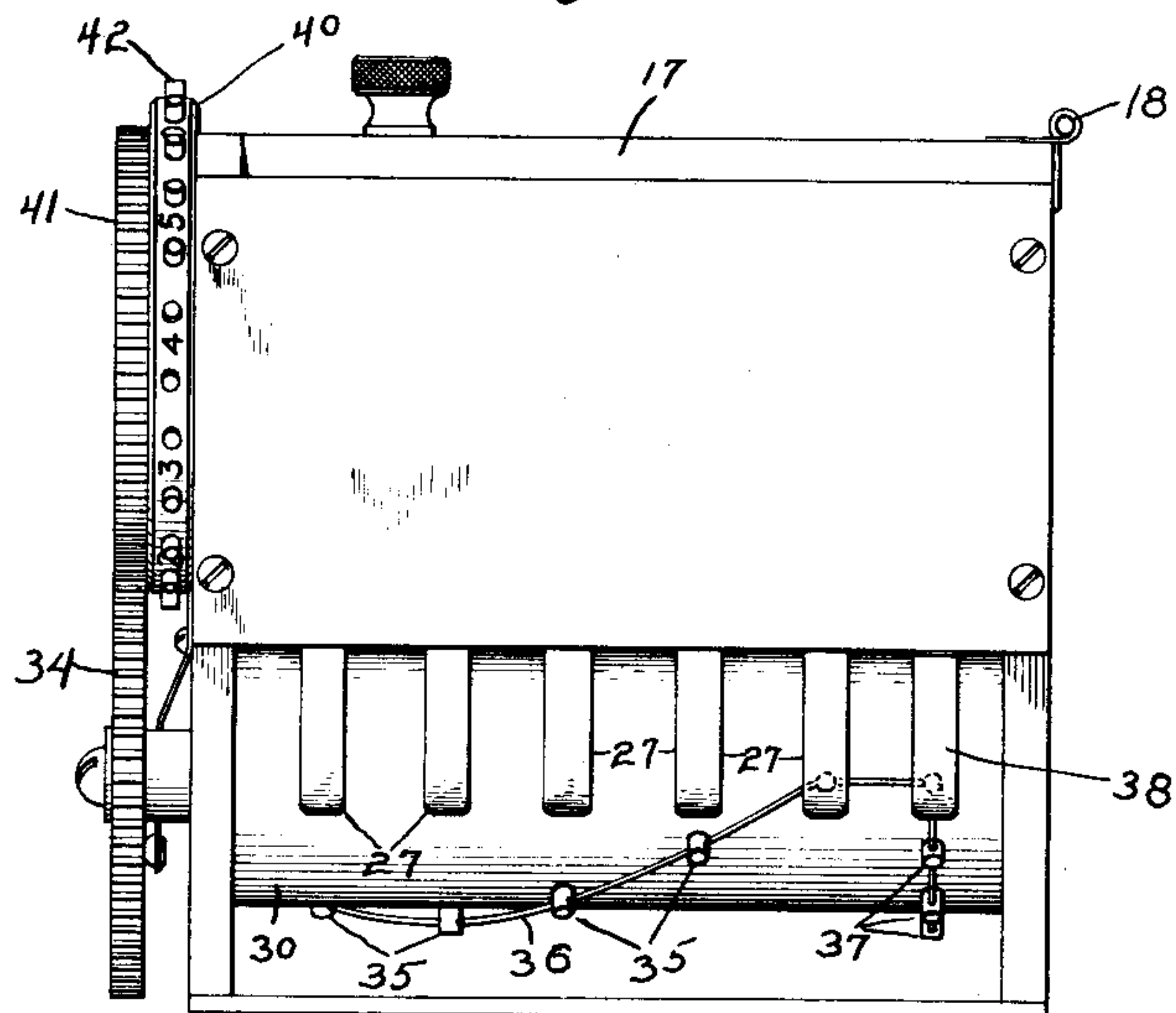
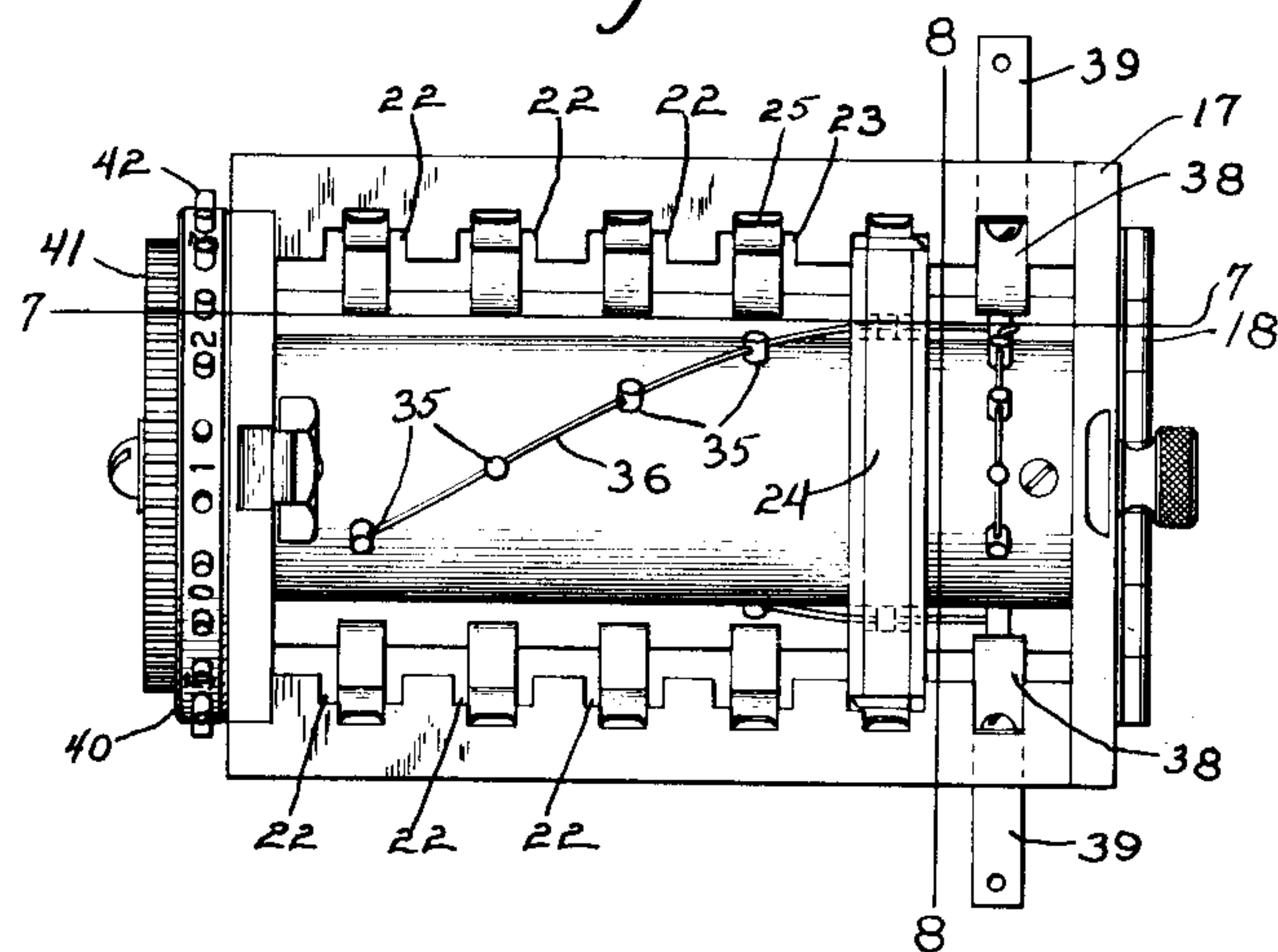


Fig. 6



Inventor

Carlos B. Mirick

By Robert A. Lawrence

Attorney

UNITED STATES PATENT OFFICE.

CARLOS B. MIRICK, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR TO WIRED RADIO, INC., OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

PIEZO-ELECTRIC CRYSTAL HOLDER.

Application filed June 8, 1927. Serial No. 197,494.

My invention relates broadly to piezo-electric crystal holders and more particularly to a piezo-electric crystal holder of such a construction that a plurality of crystals may be mounted in one unit for quickly inserting any one of the crystals in a circuit.

The object of my invention is to produce a crystal holder unit of such a compact design that a plurality of crystals holders may be mounted therein in such a manner that electrical contacts may be made with any one of the crystals without changing the constants of the circuit other than those controlled directly by the crystal.

Further objects of my invention will appear more fully hereinafter as the description of the method and apparatus is developed.

My invention consists substantially in the construction, combination and arrangement of parts associated therewith or as will be more fully hereinafter set forth as shown by the accompanying drawings and finally pointed out in the appended claims.

Reference is to be had to the accompanying drawings forming a part of this specification in which like reference characters indicate corresponding parts throughout the several views, and in which;

Figure 1 is a plan view of my improved crystal holder,

Figure 2 is an end view of the same,

Figure 3 is a sectional view on the line 3—3 of Figure 1,

Figure 4 is a sectional view on the line 4—4 of Figure 1,

Figure 5 is an elevational view of the complete crystal holder unit,

Figure 6 is a plan view thereof with the cover open,

Figure 7 is a sectional view on the line 7—7 of Figure 6, and

Figure 8 is a sectional view on the line 8—8 of Figure 6.

Referring particularly to Figures 1—4 that represent a compact crystal holder described in detail and claimed in my co-pending application, Serial Number 197,133 filed 7 June 1927, numeral 1 represents a rectangular frame of insulating material such as bakelite or hard rubber. Upon the opposite surfaces of the rectangular frame 1 are mounted bevelled retainer strips 2 and 3 that are held

in place by screws 4 and form grooves into which are fitted the metallic cover plates 5 and 6. Plate 5 is a solid plate bent up at the end as shown at 7 and forms one electrode for the piezo electric crystal 8 that rests firmly thereon.

Surrounding the crystal is a retainer plate 9 of insulating material. This retainer plate is so designed that the crystal is firmly held in position relative to any horizontal movement over the cover plate 5.

The cover plate 6 has an aperture in its central portion that is somewhat larger than the crystal itself but smaller than the internal periphery of the frame 1. Upon the inner side of the plate is mounted an arcuate spring member 10 that is firmly held in position relative to the plate by means of pins 11 riveted to the ends of the arcuate member 10 and engaging holes 12 in the cover plate. Upon the center of the arcuate member 10 there is pivotally mounted an electrode plate 13 that engages the surface of the crystal 8. By means of the pivotal connection the electrode plate 13 exerts an even pressure over the surface of the crystal which in turn exerts an even distributed pressure upon the cover plate 5 which serves as the other electrode for the crystal.

In order that possible poor contact of the pivotal connection to the electrode plate 13 and the contacts at the points 11 and 12 will not introduce resistance in the circuit a flexible connection 14 is made from the cover plate 6 directly to the electrode plate. Over the opening in the cover plate 6 there is a piece of transparent material 15 such as celluloid or the like inlaid in the surface of the cover plate, or held in position thereon by a dovetail groove machined in the surface of the plate and allowing ready removal of the window. By this structure I have developed a crystal holder that is dust proof and constitutes substantially a moisture proof container for the crystal that rigidly holds the crystal in place and allows transportation without danger of breakage.

Referring particularly to Figures 5 to 8, numeral 16 represents a cabinet the top of which is closed by a cover 17 hinged at points 18 and held in closed position by a spring latch 19 which engages a groove 20 in one edge of the door when it is in closed position,

In the upper portion of the cabinet is a skeleton cabinet 21 in the sides of which and extending to within a short distance of the bottom thereof are a plurality of double
5 grooves 22. These double grooves consist of an inner groove 23, the width of which is the same as the thickness of the crystal holder 24 described in Figures 1-4, and an outer
10 groove 25 in which are mounted the contact strips 26. The width of the skeleton cabinet is such that the distance between the bottom of the grooves described is identical with the length of the crystal holder described in Figures 1-4.

15 The contact springs 26 are arcuate in form and are placed with their tips in the bottom of the grooves. One tip of each spring is extended in length to form contact arms 27. Between the arcuate portion and the contact
20 arm the strips are securely fastened to the cabinet by means of screws 28.

In the lower portion of the cabinet there is positioned a contact drum 30 with its axis perpendicular to the position of the crystal
25 holders when placed in the cabinet. One end of shaft 31 of this drum rests in a bearing 32 in the side of the casing. The other end of the shaft extends through a bearing 33 in the opposite wall of the cabinet and
30 terminates in a gear 34.

Upon the face of the drum 30 are a plurality of contact posts 35 arranged in the form of two helixes, these two being substantially diagonal across the drum from
35 each other. The posts in each helix are connected together by a wire 36 which in turn is connected to a plurality of contact posts 37 arranged in one plane about the cylindrical surface of the drum. Each one of the
40 contact posts upon each helix is so located that as the drum is turned each one of these contacts cooperate in sequency with its corresponding contact arm 27. Located opposite the contact posts 37 that are arranged in
45 a plane on the surface of the drum, are contact arms 38 that are attached to the terminals 39 of the unit.

Mounted upon the upper portion of the casing is a dial plate 40 that carries a gear
50 41 in engagement with the gear 34 upon the end of the shaft of the drum 30. The dial plate carries a plurality of posts 42 that enable the operator to turn the mechanism above described without removing the heavy
55 gloves that it is the custom of such operators to wear, to connect any one of the crystals into the operating circuit. The dial may be calibrated to correspond to the calibration upon the casing of the cabinet to indicate
60 which of the crystals is controlling the operation of the circuit in which this device is employed.

It will be understood that the above description and accompanying drawings com-
65 prehend only the general and preferred em-

bodiment of my invention and that minor detail changes in the construction and arrangement of parts may be made within the scope of the appended claims without sacrificing any of the advantages of my invention. 70

What I claim is as follows:

1. In a multiple crystal unit, the combination of a cabinet, electrical terminals upon the cabinet, a plurality of grooves within the cabinet, individual crystal holders within
75 the grooves, and means for making electrical contact between each of the crystal holders and the terminals independently of the other crystal holders.

2. In a multiple crystal unit, the combination of a cabinet, electrical terminals upon the cabinet, a plurality of double grooves within the cabinet, individual crystal holders having contacts upon their sides inserted within the double grooves, contact strips
85 within the double grooves, electrical contact arms extending from the contact strips to the lower portion of the cabinet and means for producing individual electrical connection between each of the electrical arms and the
90 terminals upon the cabinet.

3. In a multiple crystal unit, the combination of a cabinet, electrical terminals upon the cabinet, a plurality of double grooves within the cabinet, individual crystal holders having
95 contacts upon their sides inserted within the double grooves, contact strips within the double grooves, electrical contact arms extending from the contact strips to the lower portion of the cabinet and means for producing individual electrical connection between each of the electrical contact arms and the terminals upon the cabinet said means comprising a drum of insulating material having a plurality of contacts upon its surface. 100

4. In a multiple crystal unit, the combination of a cabinet, electrical terminals upon the cabinet, a plurality of double grooves within the cabinet, individual crystal holders having contacts upon their sides inserted
110 within the double grooves, contact strips within the double grooves, electrical contact arms extending from the contact strips to the lower portion of the cabinet and means for producing individual electrical connection between each of the electrical contact arms and the terminals upon the cabinet, said means comprising a drum of insulating material, a plurality of contact posts upon the drum and means for producing electrical connection between the contact posts and said electrical terminals. 115

5. In a multiple crystal unit, the combination of a cabinet, electrical terminals upon the cabinet, a plurality of double grooves within the cabinet, individual crystal holders having contacts upon their sides inserted within the double grooves, contact strips within the double grooves, electrical contact arms extending from the contact strips to the
125 130

lower portion of the cabinet and means for producing individual electrical connection between each of the electrical contact arms and the terminals upon the cabinet, said 5 means comprising a drum of insulating material having a plurality of contacts upon its surface, and means for obtaining electrical connection between said terminals and said contacts said last mentioned means consisting of a plurality of contact posts arranged in a 10 plane perpendicular to the axis of the drum and electrical contact arms connected to the terminals upon the cabinet.

CARLOS B. MIRICK.