

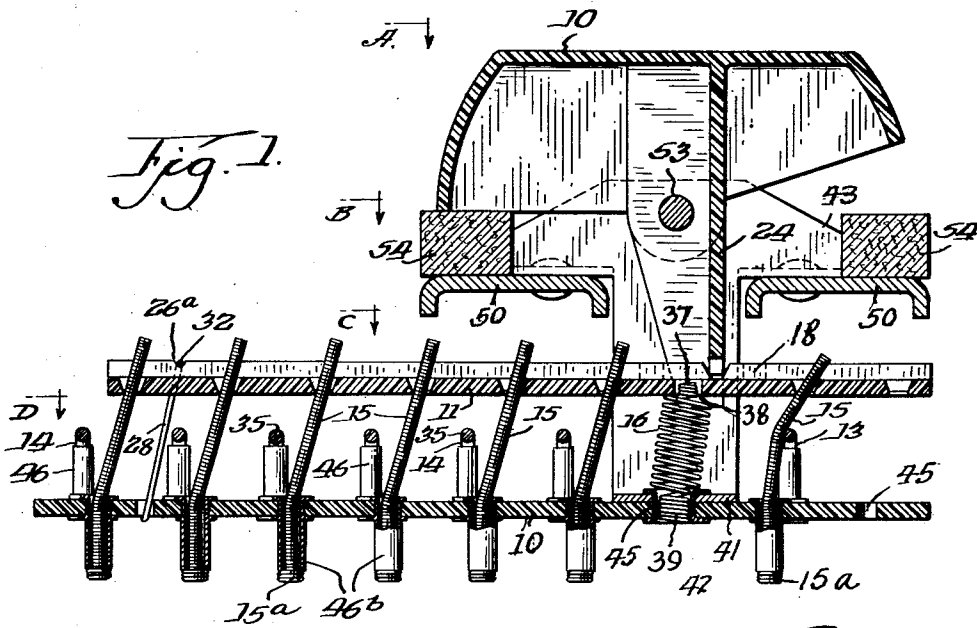
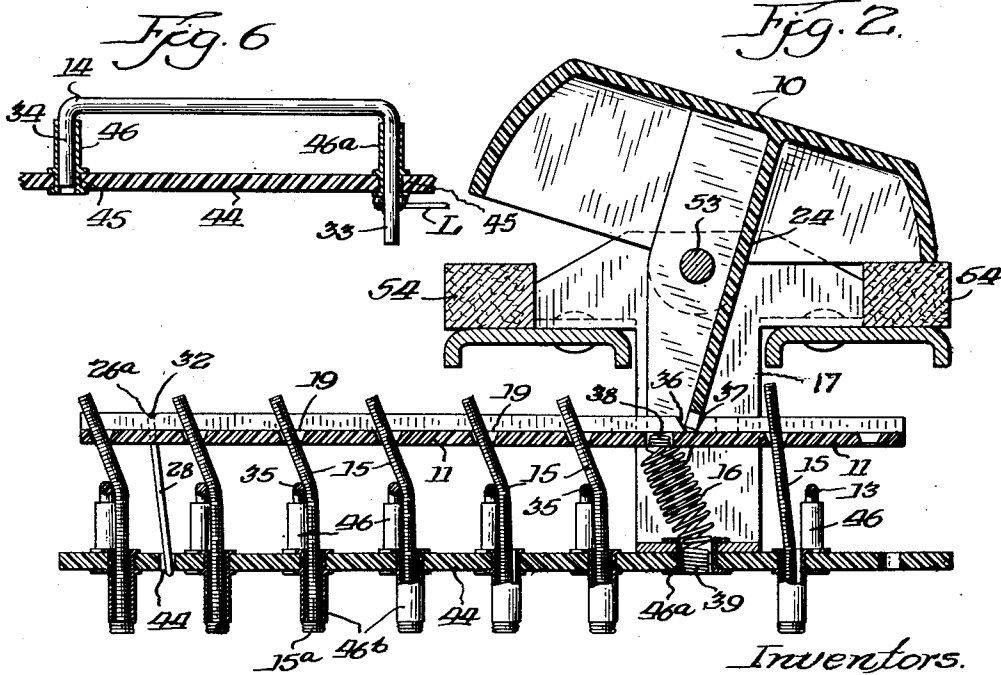
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H. H. MANN ET AL
SWITCH ORGANIZATION

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3 Sheets-Sheet 1



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3 Sheets-Sheet 2

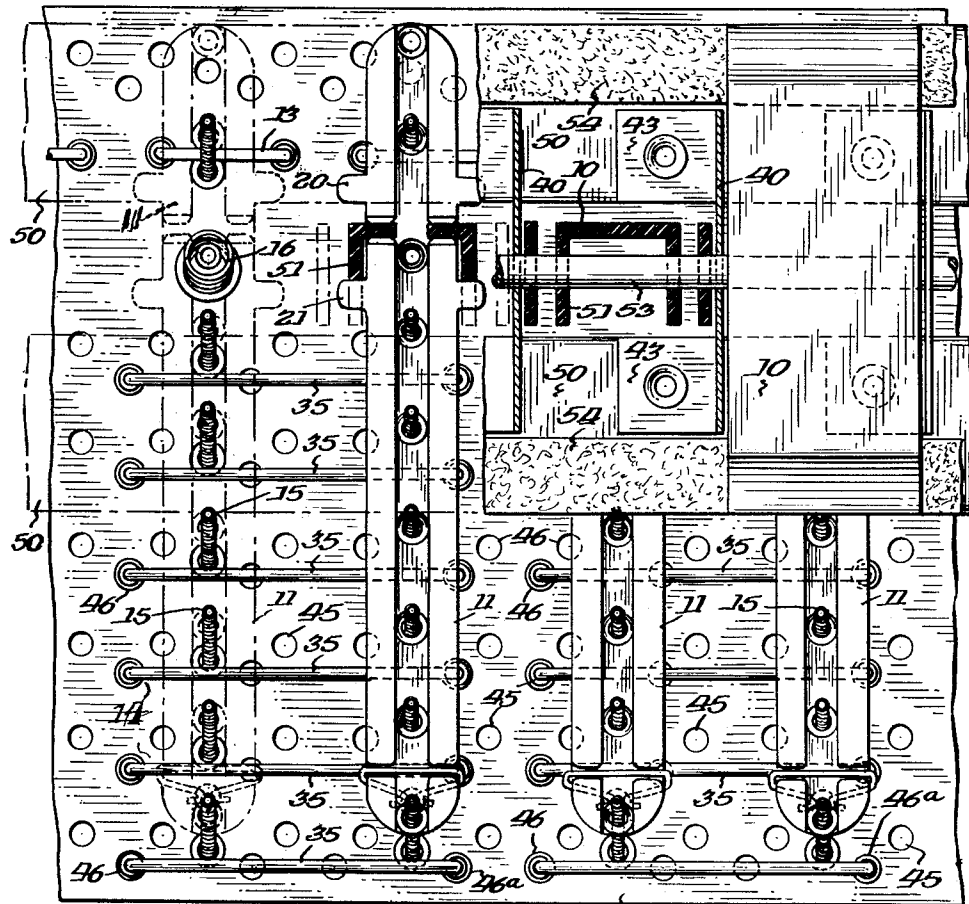
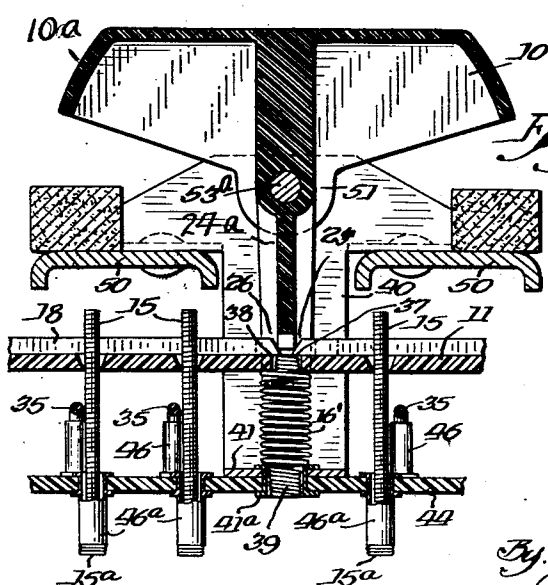
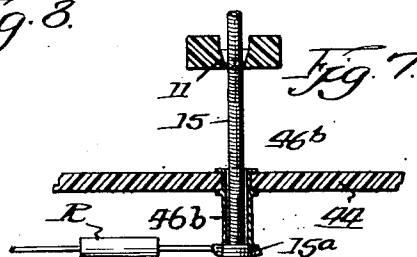


Fig. 3.



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Fig. 4

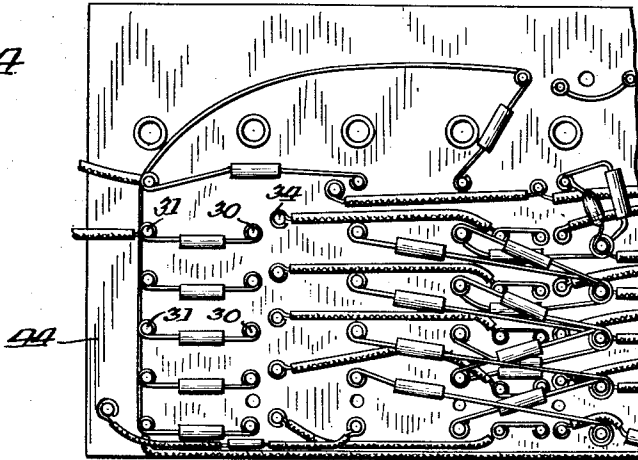
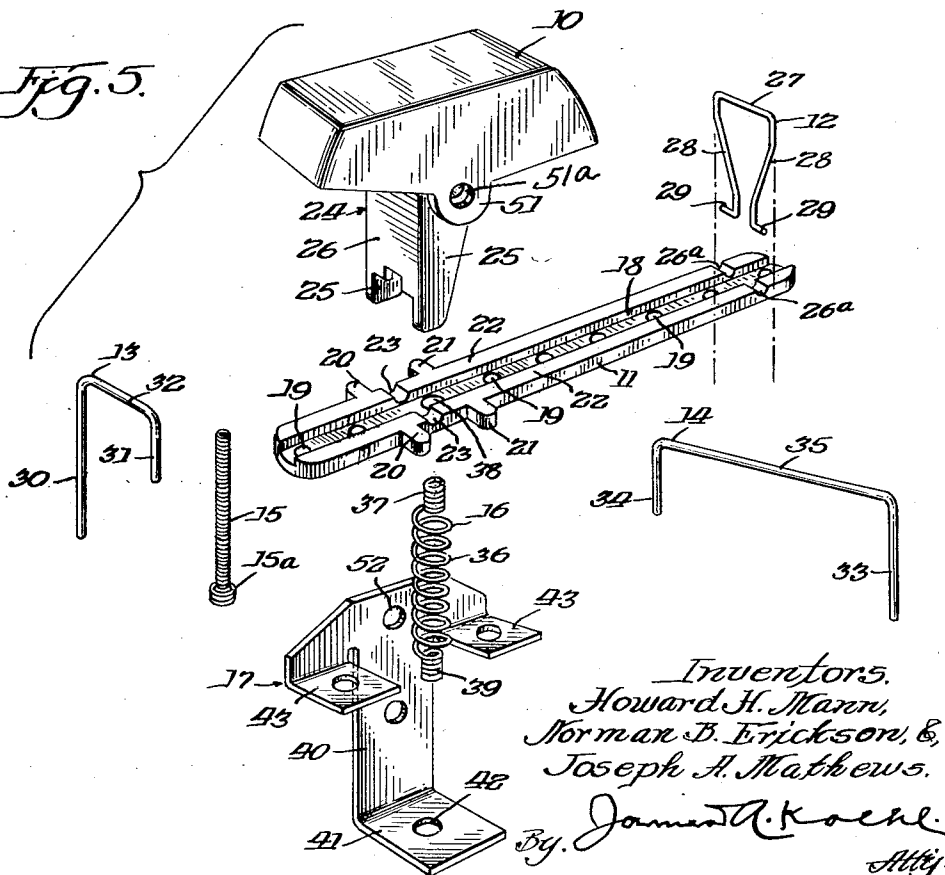


Fig. 5



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2,816,181

SWITCH ORGANIZATION

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2 Claims. (Cl. 200—6)

This invention relates to organ stop mechanisms and has particular reference to stop mechanisms for electronic organs employing generators producing output waveforms at the vibration frequencies of the different notes of the tempered scale and wherein and by means of tone-color filters or stops keyed waveforms are reproduced as audible sounds of desired timbre.

An object of the invention is the general simplification of a system of stops and compactness of an assembly of electrically coactive parts adapted to be installed in the electrical network of an electronic organ as a unitary structure, thus making for a saving in time in the manufacture en masse of such instruments and to reduce production costs.

Another object is the provision of a unique system of tiltable stop tablets for controlling operation of circuit-making and breaking elements when drawing and retiring the tablets and in a manner insuring necessary, good electrical coaction between the elements.

A still further object is the provision of new and improved means for mounting the tablets for tilting motion and maintaining same in either a drawn or retired condition of adjustment, which means has none of the disadvantages of stop mountings of the prior art employing various precision machine parts such as toggle actions designed always to bias a tiltable tablet to either a drawn or retired condition of angular adjustment about the axis of movement of the tablet.

A still further object of the invention is the provision of means functioning at all times to apply a resilient, off-center increment of mechanical energy against a tiltable stop tablet and for utilizing said energy to establish either a circuit-making or circuit-breaking relation of coactive elements with full assurance of non-engagement of the elements with each other when a respective tablet is retired and similarly to assure a good electrical engagement of said elements with each other when the tablet is drawn.

Another object is the provision of an organization or assembly of coactive instrumentalities embodying a unique form of panel or base member of hard insulating material, which said member is adapted to receive and have attached to one side thereof all electrical components required to be used in the composite organization and similarly to have attached to its opposite side the chassis for the tilting tablets and their coactive circuit-making and breaking elements which may be readily connected in circuit with said electrical components.

A still further object is the provision of a device of the character aforementioned, the action of its operating portions being substantially noiseless.

The above and other objects of the invention will be clearly understood from the following detailed description and claims taken in connection with the accompanying drawings in which—

Fig. 1 is a transverse section through the device showing the "off" condition of a respective tiltable tablet;

Fig. 2 is a view similar to Fig. 1 showing the tiltable tablet in an "on" condition;

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Fig. 3 is a view in top plan looking down at the respective elevations A, B, C and D at Fig. 1;

Fig. 4 is a bottom plan view of a portion of the device with various of its elements connected in an electrical network;

Fig. 5 is a fragmentary perspective view of the various coacting elements of one of the tiltable tablets;

Fig. 6 is a section through a portion of the panel showing the manner of connecting one of the long contact elements in the wave filter and modifying network;

Fig. 7 is a view similar to Fig. 6 showing the manner of connecting one of the contact elements in said wave filter and modifying network, and

Fig. 8 is a view similar to either Fig. 1 or Fig. 2 showing a slightly modified form of the invention.

At Fig. 5 of the accompanying drawings is shown a tiltable tablet 10 and its electrically coactive and structural parts, the same comprising a member 11 having the form of a rectilinear bar of hard insulating material, a saddle or resilient clip 12, contact elements 13 and 14, a resilient contactor 15, a coil extensible spring 16 for resiliently supporting the member and coacting therewith to provide a new and improved form of toggle, and lastly, a mounting bracket 17 for said tablet. These elements constitute one complete set of elements in the herein-disclosed exemplified form of our invention wherein there is shown a plurality of tiltable tablets for controlling separate circuits in an electrical network.

Bar 11 is formed at its upper surface with a longitudinal groove 18 which extends throughout the length of the bar and, as shown, the bottom wall of said bar has a longitudinal series of equi-distantly spaced apart vertical holes 19. Adjacent to one end of the bar and formed as integral parts of the bar at the opposite sides thereof are lugs 20—20 and 21—21, the latter spaced apart longitudinally from said lugs 20—20, such that at each side of said bar there is a similar pair of lugs. Adjacent to the lugs 20 and formed in the ledge portions 22 of bar 11 are aligned seats 23. The tablet is preferably formed of a suitable plastic material and same has depending ears 51 provided with horizontally aligned holes 51a to receive a supporting pin about which the tablet is adapted to tilt. Depending from the crown of the tablet are side flanges 25 and a connecting wall or fin 26, the latter disposed at one side of the vertical center lines of said holes 51a. The lower end of said fin terminates a slight distance above the extreme lower ends of said side flanges 25, the general form and the shapes and relation of the flanges and said fin being such that the lower ends of the flanges straddle the bar 11 at the point between lugs 20 and 21 and the lower end of the fin is received in said seats 23, thereby allowing said portion 24 to rock to and fro, with resultant pressing action of the lower end of the fin with said lugs 20 and 21.

The side ledges 22 of bar 11 are formed with horizontally aligned concaves or seats 26a which receive the horizontal connecting portion 27 of a resilient metal clip or saddle 12, the same having relatively springy side stretches 28—28 terminating in lateral branches 29—29 at their lower ends.

The contact element 13 is a substantially U-shaped metallic element, preferably wire having good conductive properties, the same providing a long leg 30, a short leg 31 and a horizontally disposed effective contact portion 32. Contact element 14 is similarly formed with a long leg 33, a short leg 34 and a horizontally disposed effective contact portion 35.

The contact biasing spring 16 is formed of spring wire and comprises an extensible coil 36, the upper end of which has a small closely wound stud-like extension 37 adapted to be received in a hole 38 in the bottom wall of the

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groove 18 in the sliding bar 11, said hole being situated slightly to the rear of said seats 23 so that, in the assembled form of the elements, the spring tends always to overthrow the tablet. The lower end of the spring is formed with a stud-like extension 39.

The bracket 17 has a vertical portion 40, a base flange 41 having a hole 42 in which, and in a perforation 45 in member 10, an eyelet 41a is passed and upset at its opposite ends against opposite sides of said member. When the bracket is attached in the manner just stated, stud 39 is received therein to form a fulcrum point from which the spring can tilt to and fro and flex laterally when stressed to bias the tablet to tilt in one or the other of two possible directions about a horizontal axis as when drawing or retiring the tablet.

Contactors 15 comprises a small diameter coil of closely wound wire having good conductive properties. In practice, the coil has a constant tendency to assume a position perpendicular to a plane surface upon which it is supported. The lower end of the coil is formed into a closely wound stub 15a of somewhat larger diameter than the body of the coil and same is adapted to be received in a tubular terminal connector and connected in circuit and in coaction with an associated contact element such as element 13 or element 14.

The bracket 17 is formed with horizontally aligned spaced apart flanges 43—43 and, as will be appreciated later in this description, said bracket comprises a structural element of a chassis or mounting for a set of tablets like the one above referred to.

At Fig. 3, the mechanism employs four tiltable tablets 10, of which only one complete tablet is shown. The figure is a plan view looking down upon the structure, Fig. 1, at elevations A, B, C and D. At 44 is a panel of hard insulating material of sufficient thickness to maintain the panel in a flat rigid condition. The panel presents flat upper and lower surfaces and extending clear through the thickness of the material of the panel are perforations 45, there being a multiplicity of them and, as shown, they are disposed in relation to each other to produce a new and useful function, as will be manifest from the following description. At the right of the figure, portions of two slidable bars 11 are shown. At the extreme left of the figure, a single bar 11 is shown in dot and dash lines. The figure also shows two sets of the long length contact elements 14, the same common to a pair of the slidable bars 11, and, as illustrated, said contactors are arranged in straight row formation transversely of said panel 44, with the contactors in longitudinally spaced apart relation to each other. Associated with each individual bar 11 is a single short length contact element 13.

Fig. 6 shows the method of attaching one of the long length contactors 14 to panel 44, and Fig. 7 shows the method of attaching one of the contactors 15 to said panel. The bottom plan view (Fig. 5) is illustrative of an arrangement of electrical components in a wave filter and modifying network at the bottom face of said panel. Now, and referring to Fig. 6, it is observed that the short leg 34 of contact element 14 extends through a tubular metal eyelet 46 contained in a respective perforation 45 in panel 44 and soldered to said eyelet, whereas the long leg 33 of said element passes completely through a similar eyelet 46a in another one of the perforations 45 and has its extremity projecting below the lower face of the panel for soldering thereto a circuit lead L. At Fig. 7 the stub 15a of contactor 15 is shown soldered to eyelet 46b at said lower face of the panel and same has connected thereto a resistor R. The body portion of contactor 15 extends through said eyelet 46b so as to lie in a plane perpendicular to said upper surface of said panel. Thus the body portion of contactor 15 is free to be flexed either in a forward direction or a rearward direction according as a respective tablet is tilted by a coating bar 11 when drawing or retiring a respective tiltable tablet.

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To this point in the description it is appreciated that by means of the panel 44, perforated as shown, metal eyelets can be placed therein wherever use thereof is required for circuit connection of contact elements 13 and 14 and contactors 15 with circuit paths and electrical components in the filter or waveform modifying network shown at one side of said panel, thus making for quick and convenient installation of the organization in the tone generating system of an electronic organ. The arrangement, in addition to making for ease and convenience in connecting a wave filter system in the tone generator and keying circuits of an electronic organ, enables all parts of the device to be closely related to each other so as to eliminate otherwise costly cabling. In addition thereto, the unitary structure thus provided is of light weight, can be handled speedily, is a workman item, and by mounting both the mechanical and the electrical parts on a common panel, access can be easily had to any of said parts for replacement and repair thereof, as may be required.

The chassis on which the tiltable tablets 11 are mounted consists of a bracket 17 for each individual tablet. These are horizontally aligned along a line at right angles to the long axes of the slidable bars 11, as shown at Fig. 3. To the flanges 43 of the brackets and riveted thereto are parallel spaced apart channel bars 50, in the space between which the depending portions 24 of the tablets are disposed and can tilt to and fro. Through the holes 51a in said ears 51 and through aligned holes 52 at the upper ends of the brackets, a shaft 53 is extended on which the tablets are each thereof free to tilt about the axis thereof. Attached to the bars 50 are longitudinal strips 54 of sound-deadening material, such as felt or equivalent material, against which the opposite ends of the tablets will come to bear when drawing and retiring the tablets.

Each tablet-operated bar 11 may have combined therewith any desired number of contactors 15 and contact elements 13 and 14 according to the number of tone colors intended to be supplied a work circuit in which circuit a sound reproducing system is connected for converting the outputs of tone frequency generators into audible sounds of different timbre.

To maintain the slidable bars in a substantially parallel relationship to the panel 44, the saddle members 12 (see Figs. 1 and 2) have their horizontal connecting portions 27 received in said seats 32, with their resilient side branches 28—28 straddling the bar and their lower ends pressed together and passed through a respective perforation 44, enabling the lateral branches 29—29 to spread apart at and engage the lower surface of member 44, thereby retaining the saddles in place and allowing them to rock to and fro during sliding motion of the bars.

Referring now to Figs. 1 and 2 and pointing first to the relationship of the elements when tablet 10 is retired, as shown at Fig. 1, all of the contactors 15 except the one at the extreme right of the figure are disengaged from their respective contact elements. Contact element 15 at the extreme right has been flexed away from its normal tendency to assume a straight condition and effectively engages contact element 13. It follows that in this condition of the tablet a single circuit connection is closed by contactor 15 engaging its contact element 13 and six circuits are broken by disengagement of six contactors from their respective contact elements 14. Spring 16, whose normal tendency is to expand and press in an upward direction against bar 11, has been tilted to the right of a vertical center line of shaft 53, thereby exerting an angular force against the lower end of the fin 26 at the lower end of portion 24 of the tablet, thereby biasing the tablet in a counter-clockwise direction about pin 53.

When the tablet is depressed to its drawn condition, as shown at Fig. 2, contactor 15 at the extreme right dis-

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engages its contact element 13 and all others of the contactors engage their respective contact elements 14. Spring 16 has been canted to the left and exerts an angular force against the lower end of portion 24 of the tablet, thereby biasing the tablet in a clockwise direction and maintaining the tablet in a retired condition.

At Fig. 8, wherein a modified form of our invention is shown, the parts are similar to the parts shown at Figs. 1 and 2, the difference being that portion 24a of tablet 10a is in the true center line of pin 53a and is coaxial relative to a line drawn vertically through spring 16'. As distinguished from the form of the invention shown at Figs. 1 and 2, this modified form can be placed in a neutral position, as shown, and will remain there until the tablet is manually tilted to either a retired or drawn angular position of adjustment, the function of the spring, relative to bar 11, remaining as in the first described form of our invention. Contactors 15 are related to their co-acting contact elements 35 with only a very slight tolerance between same.

While we have described more or less precisely the details of construction, we do not wish to be understood as limiting ourselves thereto, as we contemplate changes in form, the proportion of parts and the substitution of equivalents as circumstances may suggest or render expedient without departing from the spirit or scope of the invention.

What we claim as our invention is:

1. In an electric switch mechanism a member of hard electrical insulating material having a hollow tubular metal eyelet mounted thereon and opening onto one side of said member; a contact element mounted on said member in close proximity to said hollow tubular eyelet, a laterally resilient elongated contactor having one end retained in said eyelet and its other end exposed at said one side of said member and adapted when pressure is exerted thereagainst in any one of two possible directions to either engage the contactor with or disengage same from said

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contact element; and manually actuable means coactive with said other end of the contactor to move same in any selected one of said two possible directions.

2. In an electric switch mechanism, coating circuit-making and breaking elements mounted for relative motion for engagement of said elements with and disengagement thereof from each other; a yieldingly supported movable member coactive with one of said elements to respectively effect engagement thereof with and disengagement thereof from the other element according as the yieldingly supported member is moved to one or the other of two possible positions; and a manually adjustable tablet coactive with said yieldingly supported movable member; said yielding supported movable member including a coil spring mounted so as to support said member to maintain a coactive relationship of said member to said tablet and to urge off-center motion of the tablet and thereby hold the tablet in any one of said two possible positions of selected adjustment and prevent the tablet from occupying a position intermediate said two possible positions.

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