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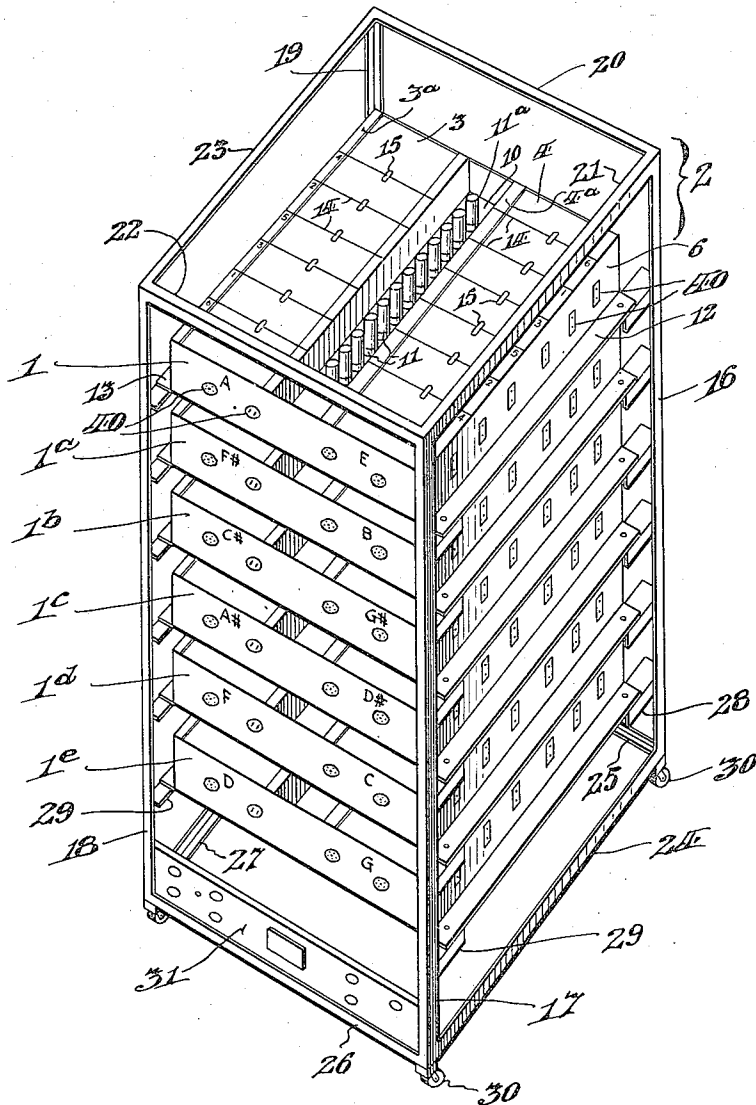
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2,495,339

SUPPORTING STRUCTURE FOR ELECTRICAL UNITS

Filed July 17, 1946

2 Sheets-Sheet 1

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2 Sheets-Sheet 2

FIG. 2.

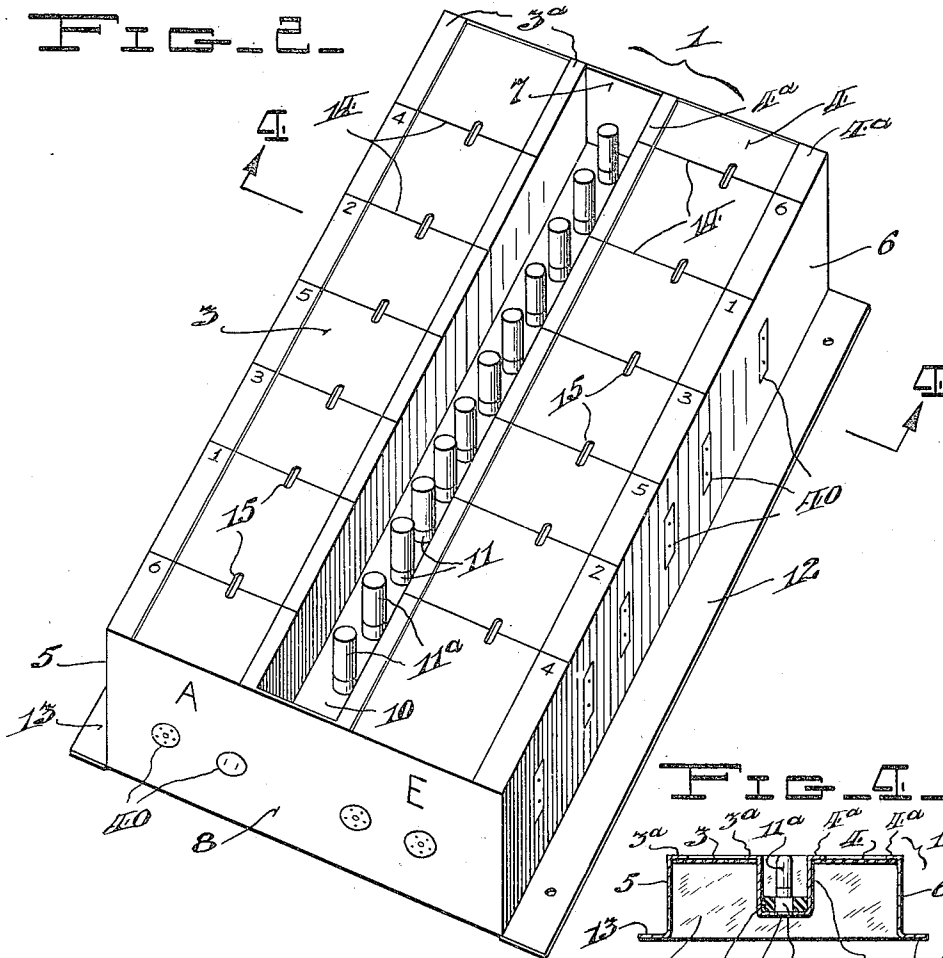


FIG. 4.

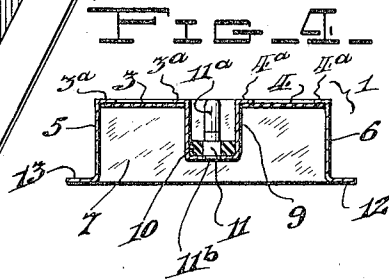
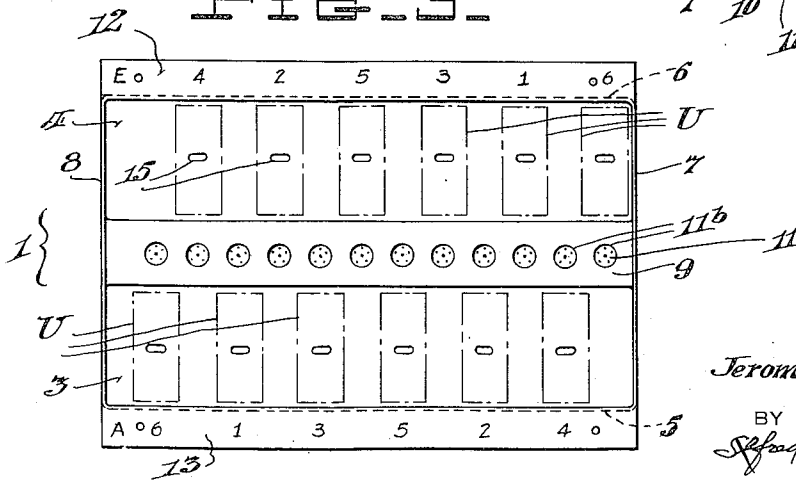


FIG. 3.



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SUPPORTING STRUCTURE FOR
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4 Claims. (Cl. 84-1.01)

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This invention concerns supporting means for combining certain electrical units or elements of an electrical musical instrument or the like, in such manner as to facilitate access to the respective units and to establish a logical identifying relationship between the individual units and the unit-operating elements of the instrument.

Electrical units, such as the tone-producing units of electrical organs, comprise one or more space discharge devices, or vacuum tubes. Many such units are usually collectively supported within a cabinet, or housing, which housing is adapted to be located at a convenient place, so that the electrical equipment therein is readily accessible for repair or other purposes. When one or more of the said tubes or space discharge devices burns out, or otherwise fails to function properly, the respective tone-producing unit with which the impaired tube cooperates, will obviously fail to function as intended. A failure of this type becomes immediately apparent to the operator of the organ, when depression of a particular key on the keyboard of the instrument either fails to produce the tone represented by that key, or produces a faulty tone. In order to determine whether the defect is caused by an impaired tube, it becomes necessary to locate the tube of the tone-producing unit so affected. Finding, or tracing, a particular tube, among the numerous tubes within the cabinet or housing, ordinarily requires the knowledge and skill of someone familiar with the arrangement and location of the respective tone-producing units, and the tubes associated therewith. Persons who play, or practice on, electrical musical instruments, are usually not familiar with the electrical equipment of such instruments. Heretofore, such persons were consequently compelled to enlist the services of a qualified repair man to locate and replace the tube of the faulty tone-producing unit, and this entailed more or less expense, and considerable loss of time.

One object of my invention is to provide novel supporting or mounting means for combining certain electrical units or elements, such as the tone-producing units of electrical organs and the like, which eliminates the referred to and other difficulties.

Another object is to provide such supporting means having structural and functional features of advantage over the similar means of the prior art.

Another object is to provide such means which makes it possible for a person playing an electrical musical instrument, such as an organ, and

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knowing the note or letter which designates the tone produced by depressing a particular key of the keyboard, to quickly and easily locate the corresponding tone-producing unit and its co-operatively associated tube, so that said person can directly ascertain whether the tube of the unit is impaired and can then directly overcome this difficulty by substituting a new tube, or ascertain whether the tone defect is due to some other cause requiring more skilled attention.

Another object is to provide novel identified supporting means for certain electrical units, which will greatly facilitate the work of a repair or service man, in locating and overcoming any defects which develop in such units during use.

Another object is to provide novel electrical unit supporting means having identifying markings thereon in correspondence with certain effects produced by the units, or certain unit-operating parts, such as the notes or tones emitted by a musical instrument, or the respective keys of the keyboard which constitute the operating elements of the units.

A further object is to provide such supporting means which includes a plurality of separate sectional supporting members, each of which is adapted to combinedly support in a certain order all the electrical tone-producing units of an electrical musical instrument which produce a certain individual note, for example all the units which produce the note "A" in the various tone octaves of the instrument.

It is also an object to provide such supporting means for electrical organs, in which the said separate sectional supporting members are conveniently arranged in spaced superimposed relationship with respect to each other, so that the electrical units associated with said members are readily accessible for repair or other purposes, and in which each of said members has markings thereon corresponding with the musical tones or notes produced by the electrical units associated with said members, thereby to provide visual means which indicates the location of the respective units and their associated tubes, as related to the unit-operating keys of the organ which are depressed to produce the tones.

An additional object is to provide such supporting means comprising a novel frame structure for combinedly supporting a plurality of the said separate sectional mounting members in such manner that the tubes or space discharge devices associated with each tone-producing unit can be quickly and easily identified and removed.

A further object is to provide a supporting

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structure for the electrical oscillator units of an electrical organ, comprising an arrangement or related location of the component parts which can be readily understood by anyone familiar with the fundamentals of music.

Another object is to provide such a structure which will enable anyone familiar with musical fundamentals to quickly locate each particular tone-producing unit of the organ, and thereby facilitate making desired or required adjustments, such as tuning, voicing, etc.

With these and other objects in view, which will become more readily apparent from the following detailed description of one practical and illustrative embodiment of the improvements shown in the accompanying drawings, the invention comprises the novel supporting means, elements, features of construction and arrangement of parts in cooperative relationship, as more particularly defined by the hereto appended claims.

In the drawings:

Fig. 1 is a perspective view of one form of supporting means for mounting the tone-producing units of an electrical musical instrument, such as an electrical organ, which embodies my invention.

Fig. 2 is a perspective view of a separate sectional supporting member or device, which forms part of my invention.

Fig. 3 is a bottom plan view of the device shown in Fig. 2, and indicates one practical and illustrative way in which the tone-producing units of an electrical musical instrument may be combined or associated therewith.

Fig. 4 is a cross-sectional view taken substantially as indicated by the arrows 4—4 on Fig. 2.

The form of supporting or mounting means for electrical units, disclosed in the accompanying drawings, illustrates one practical embodiment of my invention. The particular supporting structure shown is provided for combining in novel manner the electrical tone-producing units of an electrical musical instrument, such as an electrical organ or the like. As the description proceeds, it will become apparent that the novel elements and features of the supporting structure and their cooperative arrangement, as disclosed, can be utilized in similar manner to provide the benefits and advantages of my invention in other forms of supporting structures and for other types of electrical units.

In general, the supporting structure of my invention comprises a multiplicity of separate or individual sectional casing members 1, 1^a, 1^b, 1^c, 1^d and 1^e, which are adapted to be removably mounted in relatively spaced superimposed relationship on a frame or chassis device 2. All the said sectional members are substantially alike, and only the one designated by the reference numeral 1 will, consequently, be specifically described, so as to avoid repetitive description.

The member 1 is partly formed of light-weight metal, such as aluminum, or some other suitable material, and, as shown, is of an elongated rectangular configuration. The top of the member 1 is preferably formed so as to include two separate substantially solid top wall panels or sections 3 and 4, of insulating material, such as Bakelite, plastic material, hard rubber, etc. The panels 3 and 4 are arranged to be secured in any suitable manner to flanges 3^a and 4^a of the casing member 1. Side walls 5 and 6, and end walls 7 and 8, are preferably, but not necessarily, arranged so as to form an integral casing of metal,

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such as aluminum, which is open at its bottom. Centrally located between the side wall sections 5 and 6, is a longitudinally extending channel-shaped section 9 arranged to receive, or have seated therein, a continuous element 10, which may be of metal or insulating material and is provided with sockets 11 adapted to receive the various space discharge devices, or vacuum tubes 11^a, arranged to be cooperatively associated with certain electrical units hereinafter more particularly described. The channel-shaped section 9 is also preferably, but not necessarily formed of metal, such as aluminum. Integral base or foot extensions 12 and 13 are formed at the bottom of each of the side wall sections 5 and 6, and the section 9 is provided with as many apertures 11^b as there are sockets 11 in the element 10, which apertures are located so that they will register with the bottom ends of said sockets.

Fig. 3 of the drawings more particularly indicates, in dot-and-dash outline, one practical arrangement of a multiplicity of individual electrical tone-producing units U, conveniently mounted within the casing member 1. Each of the units U is arranged to be fastened or secured to the casing member 1, in the position indicated, by suitable conventional means, such as bolts or other fastening devices (not shown), which devices are adapted to be inserted through apertures or slots 15 in the top wall sections 3 and 4. In this manner, each of said units is maintained at a location directly adjacent to a vacuum tube socket 11, as shown. By supporting the units U adjacent to, or against, the top panels or sections 3 and 4, which are of insulating material, losses are prevented or reduced from inductances or other electrical devices which form part of the oscillator circuits of the units U.

Normally, each tone-producing unit of the type here involved has cooperatively associated therewith at least one space discharge device, or vacuum tube 11^a. For further information relative to electrical tone-producing units of the type referred to and adapted to be associated with the casing member 1, reference may be had to my co-pending application Ser. No. 658,413, filed March 30, 1946, and later abandoned, or to the patents mentioned therein. It will be understood, however, that other types of electrical units may be mounted on the member 1, substantially as indicated by the dot-and-dash lines, each of which units has associated therewith a greater number of space discharge devices 11^a, and a correspondingly greater number of sockets 11 therefor. Consequently, a complete electrical, or tone-producing unit of the type hereinafter referred to, is to be understood as having at least one cooperating space discharge device, and a socket therefor, arranged substantially as shown.

In the arrangement shown in Fig. 3, six of the tone-producing units U are arranged in aligned order between and along the side wall 5 of the member 1, and the channel-shaped section 9. The said six tone-units U are all adapted to produce a certain tone, or note, as for example, the tone "A", but the respective tones "A" of the respective units U differ from each other in pitch by an octave, or octave number, and as many units U are arranged to be mounted in adjacent aligned relationship in this manner as there are "A" keys on the organ keyboard, as determined by the number of octaves of the organ tone range. In other words, there are six tone-producing units U shown

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mounted along one side of the casing member 1, and this indicates that the tone or note "A" is repeated six times on the keyboard of the electrical organ with which the supporting structure is associated, and that each note "A" produced by one of the units U constitutes one of the tones "A" of the progressive tone octaves of the organ.

In order to prevent the occurrence of electrical interference between the respective tone-producing units U, their juxtaposed relationship is such as to effect a non-progressive tone order of the adjacent units. This will become more apparent by referring to Fig. 3, which shows the units U that produce the note "A" arranged in accordance with the numbers on the bottom of the foot section 13. As shown, the unit U that produces the lowest tone "A" is mounted adjacent to the numeral 1, the next unit which produces the tone "A" one octave higher, is mounted adjacent to the numeral 2, and so on up to 6. The aligned arrangement of the units U is consequently in the order of 6, 1, 3, 5, 2, 4. This arrangement separates or spaces the units as much as possible and avoids the referred to electrical interference.

As further indicated in Fig. 3, the same arrangement is followed with respect to tone-units U which produce the tone or note "E," and six such E tone-units are mounted in aligned relationship in the casing member 1, in similar manner as the "A" tone-units, between the channel-shaped section 9 and the side wall 6 of the member 1.

On the outside of the end walls 7 and 8 of the casing member 1, the letters "A" and "E" are printed or otherwise applied, so as to designate the tones or notes produced by the respective tone units arranged or mounted within the casing in line with the said letters.

The top of the casing member 1 (see Fig. 2) is provided with lines 14, which extend cross-wise of the two top wall sections 3 and 4, above each tone-unit, and these lines function as indicators which point to the socket or space discharge device which is cooperatively associated with the respective tone-unit mounted within the casing member directly beneath each line.

From the foregoing, it will be realized that the casing member 1 is provided with visual means which makes it possible to quickly and easily locate any particular electrical tone-producing unit U and the socket 11 or space discharge device cooperatively associated therewith, as related to a corresponding key on the keyboard of the organ. The lines 14 indicate which space discharge device, or socket therefor, is associated with a respective tone-unit, the letters "A" and "E" on the end walls 7 and 8 of casing member 1 designate the particular tone produced by each tone-unit, and the numerals at the bottom of the foot sections 12 and 13, and the similar numerals on the flanges 3^a and 4^a, indicate the octave of the respective tone produced by the adjacent tone-producing unit U, in accordance or correspondence with the octave key arrangement of the organ keyboard.

The other sectional casing members 1^a, 1^b, 1^c, 1^d and 1^e of the supporting structure shown in Fig. 1, are arranged to have associated therewith all the additional tone-units of the electrical organ, in substantially the same manner as the member 1 combines the electrical units U which produce the respective tones "A" and "E." More particularly, the member 1^a combinedly supports all the electrical units U which produce the tones F-sharp and B; the member 1^b, all the electrical units

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which produce the tones C-sharp and G-sharp, and so on, as indicated in Fig. 1.

It will be noted that the relationship of A to E, or E to B, or B to F-sharp, etc., provides an arrangement commonly known as the fifth musical interval. This enables anyone desiring to tune the organ to do so with great facility because of the logical musical sequence and positioning of the individual tone-units relative to each other and in accordance with the octaves of a given note, for instance, the tone A, as above explained. Tuning of a musical instrument, such as an organ, is usually carried out by setting a temperament, that is, setting all the notes of a given octave in their proper relationship. Invariably, this is done in fifths. This procedure is greatly simplified by the layout of my supporting structure, since the sequence of musical fifths progresses in the correct order.

Adjacent to the lines 14, on the upper surface of the flanges 3^a and 4^a of the casing member 1, are provided tone-unit identifying numerals which correspond with the similar numerals on the base or foot sections 12 and 13. This arrangement of corresponding numerals which directly relate the tone-units U with the keys on the keyboard of the organ, makes it possible to quickly locate any of the units of the A-tone or E-tone series mounted on the member, and their respective space discharge devices, irrespective whether the casing member 1 is in normal position on the frame device 2, or taken therefrom and placed upside down for repair or other purposes.

The slots or apertures 15, in the panels 3 and 4 are arranged adjacent to each of the electrical units U, so as to permit the insertion therethrough of bolts or other fastening devices (not shown) adapted to secure the units U in fixed relation to said panels. As schematically indicated in outline, and generally designated by the reference numeral 46, apertures, sockets, switches or other devices may also be provided in or along the side wall sections 5 and 6, and the end wall sections 7 and 8, as required and in such manner with respect to the units U as to form with the latter a complete unitary electrical structure which is compact and can be readily connected into the electrical system of the organ.

The frame or chassis device or member 2 of the supporting structure, comprises four similar vertically arranged metallic corner posts, or angle elements 16, 17, 18 and 19, which are joined at their top and bottom by transversely extending correspondingly shaped angle elements 20, 21, 22, 23 and 24; 25, 26 and 27. The various angle elements are welded together, or otherwise joined, so that they combinedly form a rigid frame device. Secured in intermediate spaced relationship between the top and bottom of the frame device 2, are similar opposed pairs of angle sections 28 and 29, arranged to slidably receive and support the various separate casing members 1, 1^a, 1^b, 1^c, 1^d and 1^e, as shown. The base or foot extensions 12 and 13 of the casing member 1, slidably engage or rest upon the top pair of angle sections 28 and 29, and the other casing members are similarly supported, so that all the casing members can be slidably inserted and removed from the frame device 2.

To facilitate moving the frame device 2 from one location to another, rollers or casters 30 are provided at the corners thereof at its bottom, as shown.

The frame device 2 may also be provided with a panel or other means 31, on which may be

mounted sockets, switches, or other electrical devices arranged to form part of the electrical equipment of the organ, and to facilitate operation, connection and use of the same, as desired.

Of course, the improvements herein specifically shown and described can be changed and modified in various ways without departing from the invention which is more particularly defined by the hereto appended claims.

I claim.

1. A supporting structure for a multiplicity of electrical musical tone-producing units that are individually operable by the keys of a musical instrument keyboard; comprising a vertical frame having mounted thereon in superimposed horizontal relation a plurality of elongated casings each adapted to have associated therewith in predetermined longitudinal order a plurality of separate electrical musical tone-producing units each of which includes at least one space discharge device; sockets for the space discharge devices associated with each casing and arranged in lengthwise spaced order along each casing; and surface portions on each casing having a visual system of identifying marks arranged to designate the musical tone produced by each respective musical tone-producing unit, the location of the unit relative to the casing, and the location of the space discharge device cooperatively associated with the unit.

2. A supporting structure for a multiplicity of electrical musical tone-producing units that are individually operable by the keys of a musical instrument keyboard; comprising a plurality of elongated casings mounted in superimposed aligned relationship with respect to each other, each of which casings is adapted to have associated therewith in predetermined longitudinal order a plurality of separate electrical musical tone-producing units each of which includes at least one space discharge device; sockets for the space discharge devices associated with the casing and arranged in lengthwise spaced order along said casing; and a visual system of identifying marks on said casing arranged to designate the musical tone produced by each respective musical tone-producing unit, the location of the unit relative to the casing, and the location of the space discharge device cooperatively associated with the unit.

3. A supporting structure for a multiplicity of electrical musical tone-producing units that are individually operable by the keys of a musical instrument keyboard; comprising two elongated casing members spacedly arranged in parallelism each of which members is adapted to have associated therewith in predetermined longitudinal

order a plurality of individual electrical musical tone-producing units each including at least one space discharge device; sockets for the space discharge devices arranged in aligned intermediate relationship with respect to the tone-producing units of said casing members; and surface portions on each casing having a visual system of identifying marks arranged to designate the musical tone produced by each respective musical tone-producing unit, the location of the unit relative to its casing member, and the location of the space discharge device associated with each respective unit.

4. A supporting structure for a multiplicity of electrical musical tone-producing units that are individually operable by the keys of a musical instrument keyboard; comprising a plurality of elongated rectangular units mounted in superimposed aligned relationship with respect to each other, each of which units includes two casing members spacedly arranged in parallelism each of which is adapted to have associated therewith in predetermined longitudinal order a plurality of separate electrical musical tone-producing units including at least one space discharge device; sockets for the space discharge devices arranged in aligned intermediate relationship with respect to the members; an a visual system of identifying marks on said casing arranged to designate the musical tone produced by each musical tone-producing unit, the location of the unit relative to the casing, and the location of the space discharge device cooperatively associated with the unit.

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