April 21, 1942. D. A. MAFFEI 2,280,593

HARMONIC SLIDE RULE

Filed Feb. 19, 1941 2 Sheets-Sheet 1

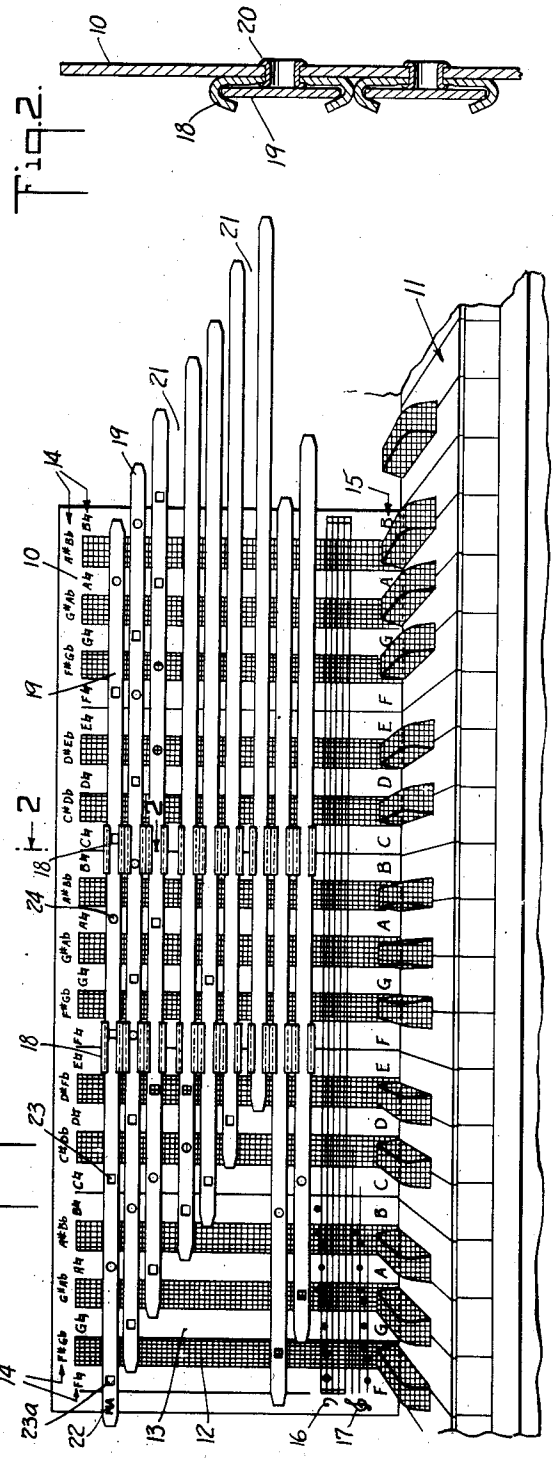


Fig. 1.

Fig. 2.

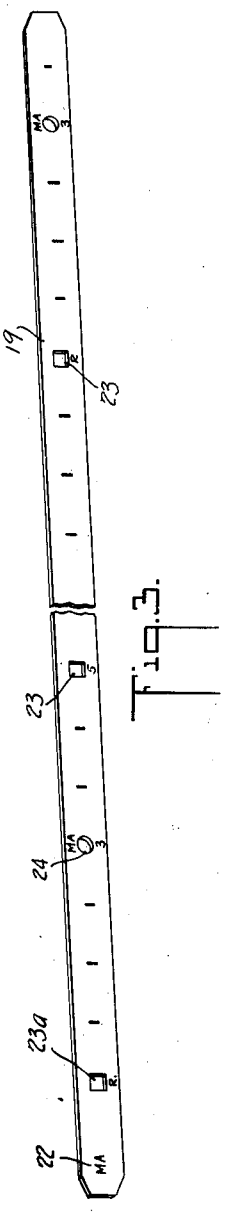


Fig. 3.

INVENTOR
DOMINICK A. MAFFEI
BY
ATTORNEY

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Fig. 5.

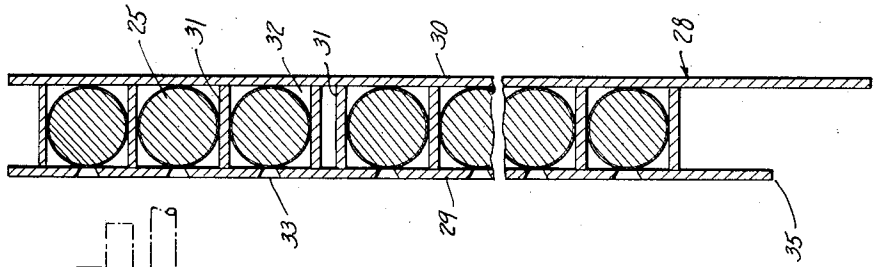


Fig. 4.

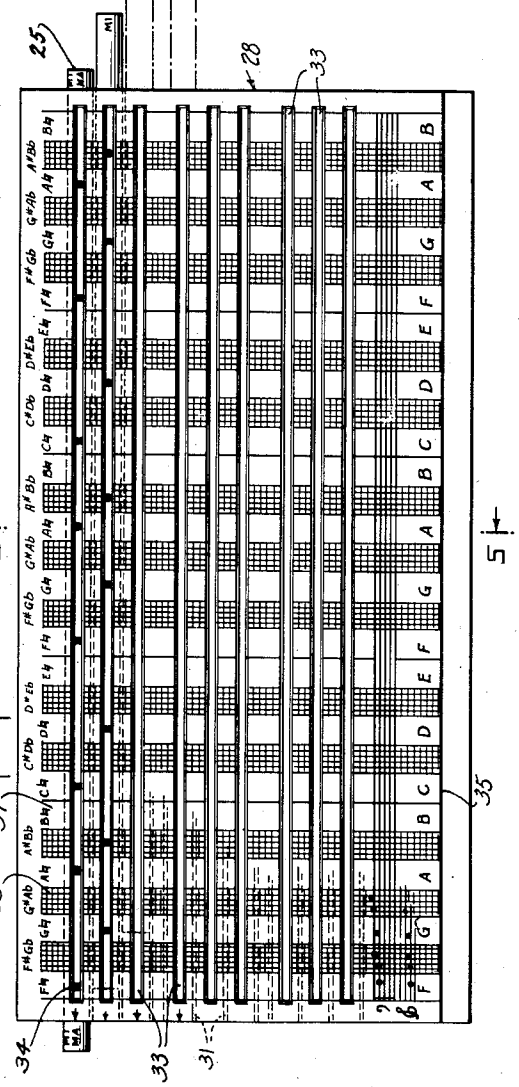
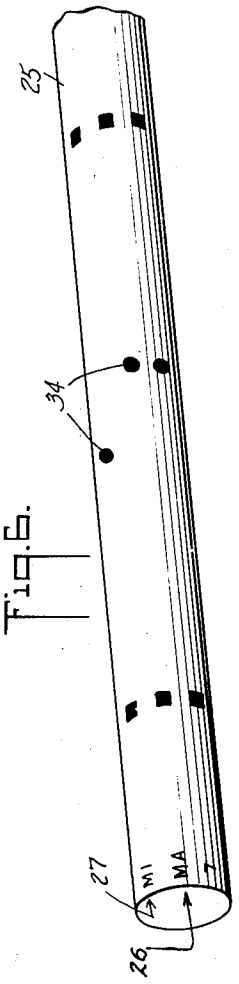


Fig. 6.



INVENTOR
DOMINICK A. MAFFEI
BY G. J. Rosander
ATTORNEY

Patented Apr. 21, 1942

2,280,593

UNITED STATES PATENT OFFICE

2,280,593

HARMONIC SLIDE RULE

Dominick A. Maffei, Bayside, Long Island, N. Y.

Application February 19, 1941, Serial No. 379,606

11 Claims. (Cl. 84—480)

This invention relates to harmonic slide rules, and more particularly to devices adapted to effect a ready determination of the constituent notes of certain selected musical chords.

It frequently becomes necessary, both for the beginner in music as well as the experienced musician, to determine the notes constituting any given chord for any selected key. In the case of the beginner, it is generally extremely difficult to ascertain the tone intervals in various chords; and unless a person has had some harmonic training, it is at times practically impossible to figure out the constituent parts of certain chords that are known only by technical terminology. Even the experienced musician may not be familiar with every chord combination, such as those employed, for example, in modern music—although he may have a thorough schooling in fundamental harmony. It is hence primarily within the contemplation of this invention to facilitate the ready determination of the constituent notes of any musical chord, and particularly to enable the simultaneous ascertainment of the component parts of a number of preselected chords.

In the above aspect of my invention, it is a further object to enable, by a simple manual manipulation, the ready determination of the constituent parts of any selected chord or chords in any key whatsoever.

It is another object of my invention to enable the constituent elements of selected chords to be readily ascertained not only by name or symbol, but also with respect to their relative positions on a piano. And in this aspect of my invention it is a further object to enable the structural embodiment thereof to be cooperatively employed with the keyboard of a piano whereby the precise positions of the notes constituting any selected chord will be readily indicated, and whereby the constituent notes thereof may be readily played upon the piano.

Another object of my invention is to enable a selected series of chord combinations to be interchangeably displayed and adapted for manual manipulation. In this manner when a sequence of chords is known or given, such as appears in almost every piece of popular music, the slide elements of my device can be arranged in such manner that the various chords will appear in the proper sequence, whereby they may be played in the order in which they appear in the music. And in this aspect of my invention, it is another object to enable the aforesaid sequence of chords to be shifted almost instantly to any key, so that the music may be played in a new key with all the chord notes properly indicated.

Another object of this invention is to enable it to be readily used not only by instrumentalists but also by vocalists and choruses where harmonic combinations must be carefully planned, and at times instantly varied.

It is commonly known amongst musicians that in certain chords there may be one or two notes that have special musical value or significance and which are sometimes characterized as "feature" notes. With a knowledge of what such special feature notes are for various chords, instrumentalists frequently are enabled to improvise musical phrases or sequences around such tones as a nucleus. It is hence another object of this invention to enable such feature notes to be indicated along with the other constituent parts of the chord.

Other objects, features and advantages will appear from the drawings and the description hereinafter given.

Referring to the drawings,

Figure 1 is a front perspective view of my invention shown in conjunction with the keyboard of a piano.

Figure 2 is a fragmentary section of Figure 1 taken substantially along line 2—2.

Figure 3 is an enlarged fragmentary perspective of a slide member used with my invention.

Figure 4 is a front view of a modified form of my invention employing tubular slides.

Figure 5 is an enlarged section of Figure 4 taken along line 5—5, and

Figure 6 is an enlarged fragmentary perspective of one of the slide elements employed in the form of my invention illustrated in Figures 4 and 5.

Referring to the form of my invention shown in Figures 1, 2 and 3 of the drawings, a flat backboard or slide support 10 is employed adapted for placement upon the keyboard 11 of a piano, preferably behind the black keys thereof. The said support 10 has marked thereon a series of black and white stripes 12 and 13, respectively, these stripes being preferably of equal width and being disposed vertically and spaced to correspond with the spacing of the black and white keys of the keyboard. In other words, when properly placed upon the keyboard of a piano, the black and white spaces of the support will correspond and be in longitudinal registry with the black and white keys of the piano, respectively. It is preferred that each space be lettered to correspond with the piano keys, at some suitable portion thereof. In the particular design illustrated, there are upper lines of notations 14 extending lengthwise of the support and giving the names of the keys in sharps and flats; and at the bottom of the board there is another line 15 of notations giving the notations only of the white keys. There are also, in the preferred form of my invention, two staffs 16 and 17 with notes thereon, corresponding to the keys

represented by the black and white spaces in which such notes appear. The said notations hence represent a chromatic sequence of notes, and should extend over a span of at least one octave.

The said board 10 is provided with slide retainers 18 adapted to slidably and visibly accommodate the slide members 19 therein. In the form of my invention illustrated the said retainers are secured in spaced relation on the support by the eyelets 20—it being understood, however, that other suitable securing means may be employed. It is also preferred that the retainers 18 be arranged to slidably accommodate a plurality of parallel horizontally disposed slides 19 in such manner that there be enlarged spaces 21 between groups of said slides. In Figure 1 the groupings are shown each to consist of three slides. The slides are movable along paths in the general direction of the extent of the said notations, parallel to lines 14 and 15, and transversely across the stripes 12 and 13.

Each of the slides 19 contains at an extreme terminal portion a chord insignia 22 indicating the technical designation of the chord. The slide also contains, in proper spaced relation with respect to the spaces 12 and 13 and the corresponding keys on the piano, note-indicating markings 23 and 24 to designate the particular position of the constituent notes of the designated chord. In the form of my invention illustrated these markings are in the form of apertures punched into the body of the slide. Certain of these markings or apertures are square, as designated by the reference numerals 23, and certain others are round as designated by the reference numerals 24. The round ones designate the above-referred-to feature notes, whereas the others represent the root or other constituent notes of the chord. Apertured markings 23 and 24 are preferred over other types of markings such as printed notations and the like, inasmuch as they can be more readily distinguished and read by blind performers. Each one of the said markings may also, if it is so desired, contain symbols adjacent thereto to indicate the particular interval designation of the corresponding note in the given key.

The said slides 19 are selected in accordance with the chord insignia 22 thereon, the entire apparatus being supplied with slides to correspond with any and every type of chord that may be deemed necessary. If it is desired to determine the constituent parts of the chord represented by a selected slide, the extreme left or key-setting marking aperture 23*a* is placed on a space corresponding with the desired key. For example, by referring to Figure 1, the uppermost slide 19, designating a major chord by virtue of the notation "MA." at the left extremity thereof, is shown with the key-setting marking 23*a* over the extreme left space designated "F." The markings 23 and 24 will hence indicate the constituent notes of the major chord in the key of F, such notes being F, A, C, F, etc. Should a person desire to play a chord, all that he needs to do is to follow the spaces 12 or 13, as indicated by said markings, down to the keyboard, and strike the corresponding keys. Should it be desired to get the major chord for another key, such as G sharp, the said marking 23*a* is placed over the black space marked G sharp, and the other constituent parts of the chord in that key will be found in like manner.

Where a sequence of chords must be played as indicated by a sheet of music and where chord changes are shown by suitable conventional notations, a plurality of slides 19 are placed within the retainers 18 in the order in which they appear on the sheet music. The slides selected must conform with the chords indicated on the sheet music, and the position of each of said slides must be set in accordance with said conventional musical notations. With such a setting, all that need be done during a reading of the music is to play the chords in sequence as indicated progressively by the slides, beginning with the top slide and continuing down towards the last one. As each successive notation on the sheet music is reached, the chord indicated by the corresponding slide is played—the precise position on the keyboard of each note in such chord being indicated by the prolongation of the spaces 12 and 13 in the manner above described. To facilitate the use of such slides, particularly where a plurality of them are employed, the groupings above referred to are resorted to, the spaces 21 between groups being provided for this purpose.

By the method above described, a beginner can easily learn the location and constituent elements of various chords, and also may be able to accompany a singer or an instrumentalist by playing the chords in accordance with the setting of the slides. An experienced musician can experiment with various combinations of slides to determine or create musical effects, and can also employ the markings 24 to determine the so-called feature notes for whatever purpose he may find it expedient to use them.

In the form of my invention illustrated in Figures 4, 5 and 6, instead of flat slides 19, I employ a plurality of cylindrical slides 25 each containing on the surface thereof a plurality of longitudinally arranged groups of markings, each group consisting of a series of markings spaced to correspond with the particular chord designating symbol adjacent thereto. For example, there is the group of markings longitudinally disposed along level 26 representing, for example, a major chord—and then there is another parallel and longitudinally disposed group of markings arranged along level 27 representing a minor chord. And so each cylindrical slide 25 may contain on the outer surface thereof a plurality of groups of markings representing a corresponding plurality of chords. Although the slides illustrated are solid, they may obviously be hollow or of any other cylindrical form permitting the cylindrical surface thereof to contain the markings hereinabove referred to.

A selected number of such slides 25 are adapted to be slidably and rotatively held by the support 28 which, in the form illustrated, consists of a front panel 29 and a rear panel 30 separated by walls 31 to form compartments 32 for the said slides. The front panel 29 contains a plurality of horizontally disposed windows or apertures 33 to correspond with each of said compartments and through which a line of the markings 34 on said slide 25 may be visible. It is preferred that the front panel 29 be shorter than rear panel 30 so that the terminal edge 35 of said front panel may be sufficiently above the keyboard to clear the black notes.

In the operation of this form of my invention, a selection is made of one or more slides 25 in accordance with the desired chords. Then by

manipulating each slide rotatively, it is apparent that different rows **26**, **27**, etc., of markings will be successively visible through the windows **33**. Inasmuch as each row represents a different chord, the component parts of each chord can be quickly determined by suitable rotative manipulation of the slide until the desired row is visible, and noting the position of the markings with respect to the stripes **36** and **37**, or key notations, in the manner aforesaid. Should it be desired to determine the constituent parts of a designated chord for any other key, all that need be done is to slide said slide **25** longitudinally until the extreme left key-setting marking is disposed over the black or white stripes **36** or **37** corresponding with the desired key, and observations made accordingly. It is apparent that with this arrangement there will be less frequent occasion to change the slides, inasmuch as there are a number of different chord arrangements on each slide.

Both forms of my invention above described, and the various adaptations thereof, are effective not only in indicating the constituent notes of a given chord, but are useful also in visibly indicating the relationship of a successive series of notes constituting part of a given melody, with respect to a chord that may be musically associated with such notes, even if the notes of said series do not constitute component parts of the said chord. For example, if a slide for a given chord is properly set on the support **10**, a series of subsequent "melody" slides may be positioned below said chord slide to indicate, in succession, the individual melody notes which may be played with the said given chord. It is preferred that the extreme left marking **23***a* of each so-called melody slide be employed to indicate the said melody notes to be associated with the said given chord.

Although the drawings indicate slide supports containing stripes arranged for registry with the keys of a piano, it is understood that the stripes or analogous markings may be arranged for registry with key or note positions on other instruments, in accordance with the physical characteristics of the instrument, such as the fingerboard of a violin. It is to be further understood that although the slides above described are illustrated as being horizontally positioned, they may of course be movably arranged along differently disposed paths, and that numerous other changes and modifications, besides those hereinabove described, may be made within the scope of the appended claims without departing from the spirit of this invention.

What I claim is:

1. In a harmonic slide rule of the class described, a support having thereon a plurality of spaced notations representing a chromatic sequence of notes over a span of at least one octave, and a slide member in slidable engagement with said support and movable along a path extending in the general direction of said notations, said member having thereon a chord insignia representing the designation of a predetermined chord, and a plurality of markings spaced for cooperative registry with said spaced notations in accordance with and limited only to the tone intervals of said chord, said markings being disposed along a line parallel to said path, substantially the entire extent of said member along said line being unobstructed and exposed to view.

2. In a harmonic slide rule of the class described, a support containing a plurality of spaced notations representing a chromatic sequence of notes over a span of at least one octave and a plurality of substantially vertical stripes corresponding to and associated with said notations, and a slide member in slidable engagement with said support and movable transversely across said stripes along a predetermined path, said member having thereon a chord insignia representing the designation of a predetermined chord, a key-setting marking corresponding to the fundamental note of a selected key, and a plurality of note-indicating markings spaced from said key-setting marking and from each other in accordance with the tone intervals of said chord, all said markings being spaced for cooperative registry with said stripes, said markings being disposed along a line parallel to said path, substantially the entire extent of said member along said line being unobstructed and exposed to view.

3. In a harmonic slide rule of the class described, a flat support having thereon a plurality of spaced notations representing a chromatic sequence of notes over a span of at least one octave, and a plurality of substantially parallel slide members in detachable slidable engagement with said support and each movable along a path extending in the general direction of the extent of said rotations, each of said members having thereon a chord insignia representing the designation of a predetermined chord, and a plurality of markings spaced for cooperative registry with said spaced notations in accordance with and limited only to the tone intervals of said chord, the markings on each member being disposed along a line parallel to its path, substantially the entire extent of each of said members along said line being unobstructed and exposed to view.

4. In a harmonic slide rule of the class described, a support containing a plurality of spaced notations representing a chromatic sequence of notes over a span of at least one octave and a plurality of substantially vertical stripes corresponding to and associated with said notations, and a slide member in slidable engagement with said support and movable transversely across said stripes, said member having thereon a chord insignia representing the designation of a predetermined chord, and a plurality of apertured markings spaced for cooperative registry with said stripes in accordance with and limited only to the tone intervals of said chord, said apertured markings being each of predetermined configuration to indicate certain harmonic values of the notes corresponding with the stripes with which said respective markings are in registry, said markings being disposed along a line parallel to said path, substantially the entire extent of said member along said line being unobstructed and exposed to view.

5. In combination with the keyboard of a piano, a harmonic slide rule comprising a support adapted to rest upon said keyboard, said support containing a plurality of spaced notations representing a chromatic sequence of notes over a span of at least one octave and a plurality of substantially vertical stripes corresponding to and associated with said notations and in longitudinal registry with the keys of the piano, and a slide member in slidable engagement with said support and movable transversely across said stripes along a predetermined path, said member having thereon a chord insignia representing the designation of a predetermined chord, and a plurality

of markings spaced for cooperative registry with said stripes in accordance with and limited only to the tone intervals of said chord, said markings being disposed along a line parallel to said path, substantially the entire extent of said member along said line being unobstructed and exposed to view.

6. In combination with the keyboard of a piano, a harmonic slide rule comprising a support adapted to rest upon said keyboard, said support containing a plurality of spaced notations representing a chromatic sequence of notes over a span of at least one octave and a plurality of substantially vertical equally spaced stripes corresponding to and associated with said notations and in longitudinal registry with the keys of the piano, a slide member movable transversely across the said stripes of the support along a predetermined path, retaining means on said support slidably and visibly supporting said slide member, said member having thereon a chord insignia representing the designation of a predetermined chord, and a plurality of markings spaced for cooperative registry with said stripes in accordance with and limited only to the tone intervals of said chord, said markings being disposed along a line parallel to said path, substantially the entire extent of said member along said line being unobstructed and exposed to view.

7. In combination with the keyboard of a piano, a harmonic slide rule comprising a support adapted to rest upon said keyboard, said support containing a plurality of spaced notations representing a chromatic sequence of notes over a span of at least one octave and a plurality of substantially vertical stripes corresponding to and associated with said notations and in longitudinal registry with the keys of the piano, and a plurality of substantially parallel slide members in slidable engagement with said support and each movable transversely across the said stripes along a predetermined path, said slide members being arranged in spaced groups each containing a predetermined number of members, each of said members having thereon a chord insignia representing the designation of a predetermined chord, and a plurality of markings spaced for cooperative registry with said stripes in accordance with and limited only to the tone intervals of said chord, the markings on each member being disposed along a line parallel to its path, substantially the entire extent of each of said members along said line being unobstructed and exposed to view.

8. In a harmonic slide rule of the class described, a support having thereon a plurality of spaced notations representing a chromatic sequence of notes over a span of at least one octave, and a cylindrical slide member in slidable engagement with said support and movable along a path extending in the general direction of said notations, said member having on the outer surface thereof a plurality of chord insignia each representing the designation of a predetermined chord, and a group of markings for each of said insignia, the markings for each group being spaced for cooperative registry with said spaced notations in accordance with the tone intervals of the chord corresponding to the insignia associated with the particular group.

9. In a harmonic slide rule of the class described, a support having thereon a plurality of spaced notations representing a chromatic sequence of notes over a span of at least one octave, and a cylindrical slide in slidable and rotatable engagement with said support, said member being movable along a path extending in the general direction of said notations, said member having on the outer surface thereof a plurality of chord insignia each representing the designation of a predetermined chord, and a group of markings for each of said insignia, the markings for each group being disposed along a line longitudinally of the cylinder and being spaced for cooperative registry with said spaced notations in accordance with the tone intervals of the chord corresponding to the insignia associated with the particular group.

10. In a harmonic slide rule of the class described, a support having thereon a plurality of spaced notations representing a chromatic sequence of notes over a span of at least one octave, a window in said support extending over the span of said notations, a cylindrical slide member behind said window, and means to slidably and rotatably support said member, said member being rotatable about its axis and movable along a path extending in the general direction of said notations, said member having on the outer surface thereof a plurality of chord insignia each representing the designation of a predetermined chord, and a group of markings for each of said insignia, the markings for each group being spaced for cooperative registry with said spaced notations in accordance with the tone intervals of the chord corresponding to the insignia associated with the particular group, the said groups of markings being movable successively into registry with and visible through said window upon an operative rotation of the said member.

11. In combination with the keyboard of a piano, a harmonic slide rule comprising a support adapted to rest upon said keyboard, said support containing longitudinally thereof a plurality of spaced notations representing a chromatic sequence of notes over a span of at least one octave and a plurality of substantially vertical stripes corresponding to and associated with said notations and in longitudinal registry with the keys of the piano, a plurality of parallel windows in said support each extending transversely across said stripes, a plurality of parallel windows in said support each extending transversely across said stripes, a plurality of parallel cylindrical slide members each disposed behind one of said windows, and means to slidably and rotatably support each of said members, each of said members being rotatable about its axis and movable transversely across said stripes, each of the members having on the outer surface thereof a plurality of chord insignia each representing the designation of a predetermined chord, and a group of markings for each of said insignia, the markings for each group being disposed along a line longitudinally of the cylinder and being spaced for cooperative registry with said spaced notations in accordance with the tone intervals of the chord corresponding to the insignia associated with the particular group, each group of markings being adapted for registry with the adjacent window upon an operative manipulation of the corresponding member.

DOMINICK A. MAFFEI.