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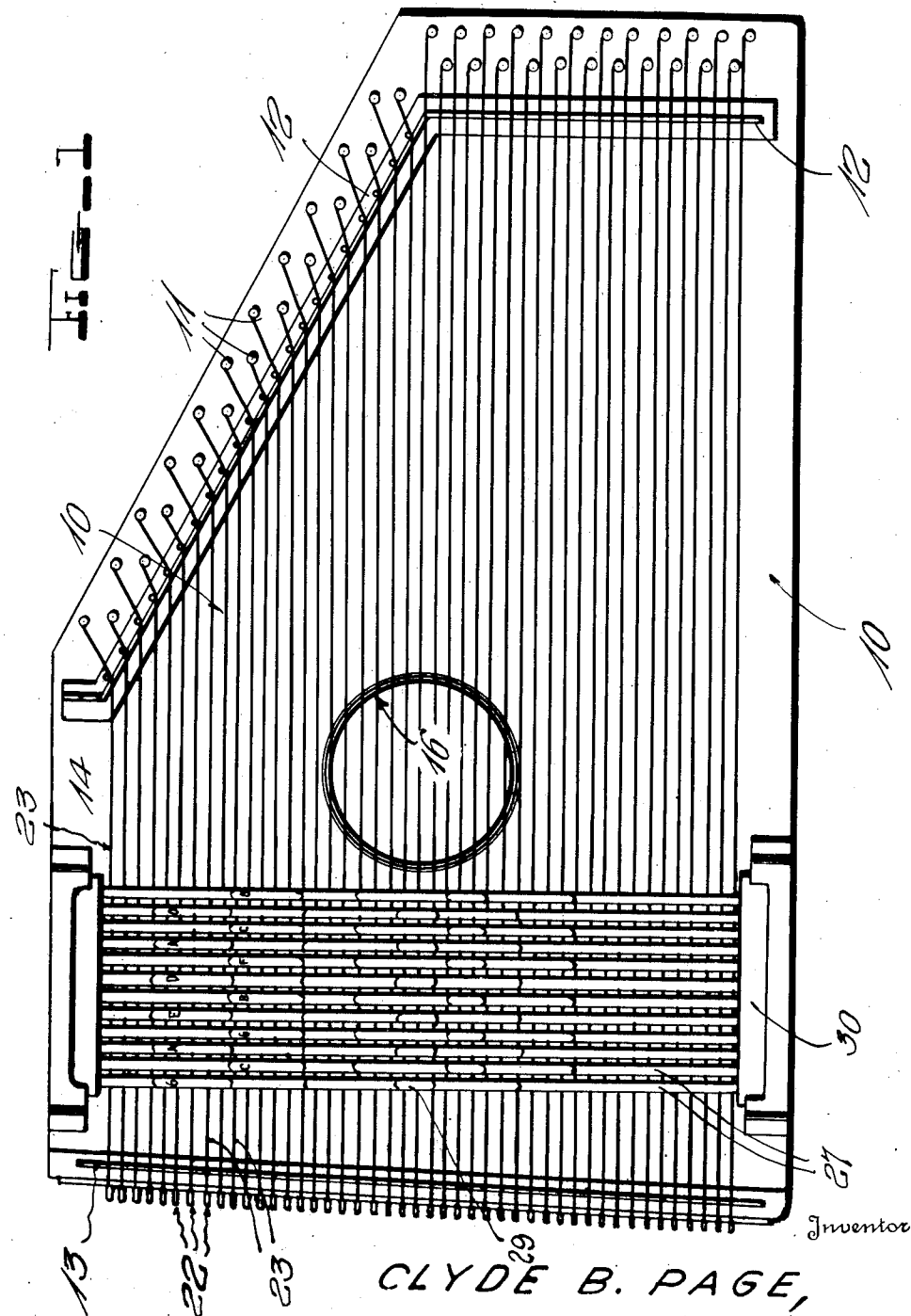
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2,473,442

MUSICAL INSTRUMENT OF THE STRING TYPE

Filed April 11, 1946

4 Sheets-Sheet 1



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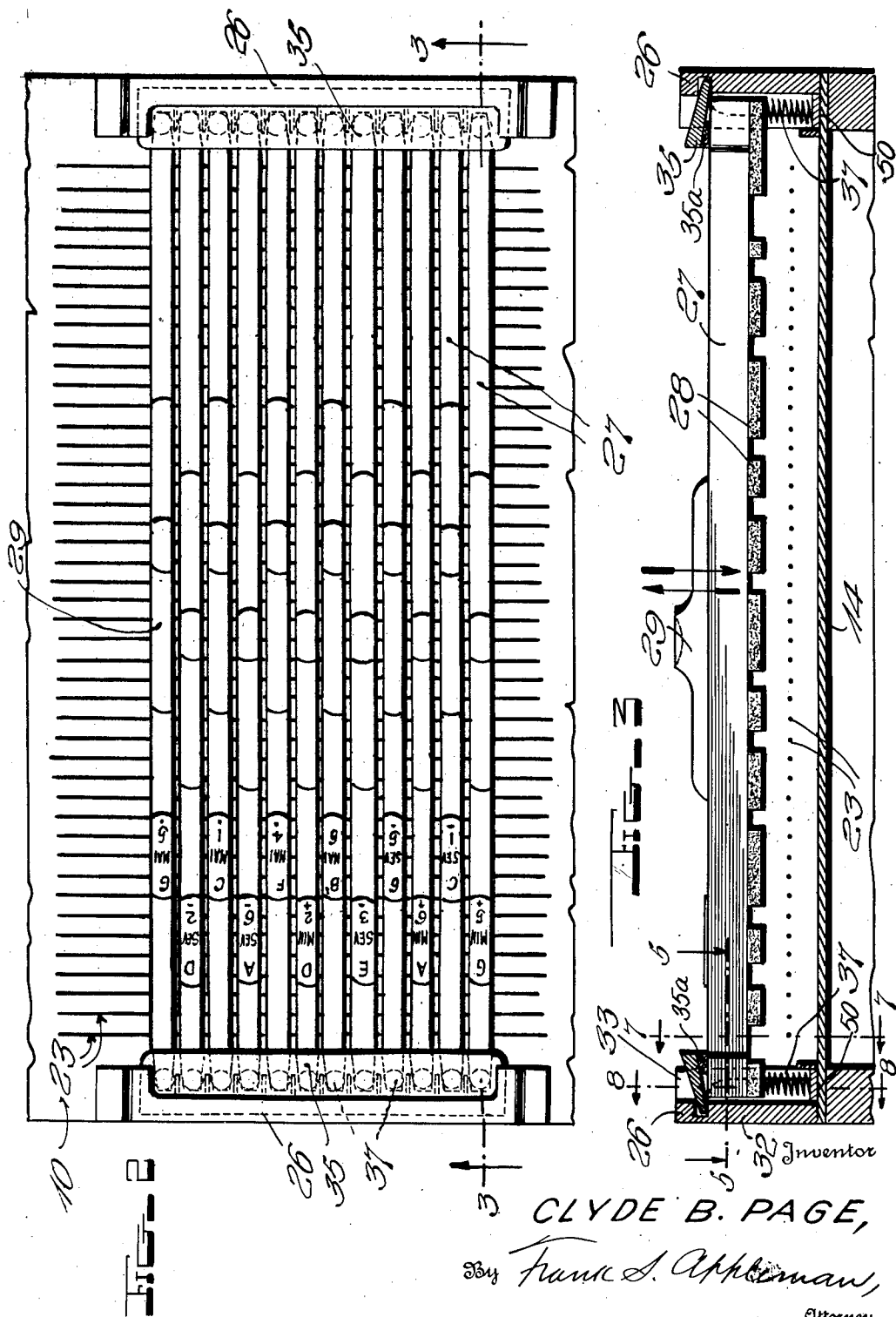
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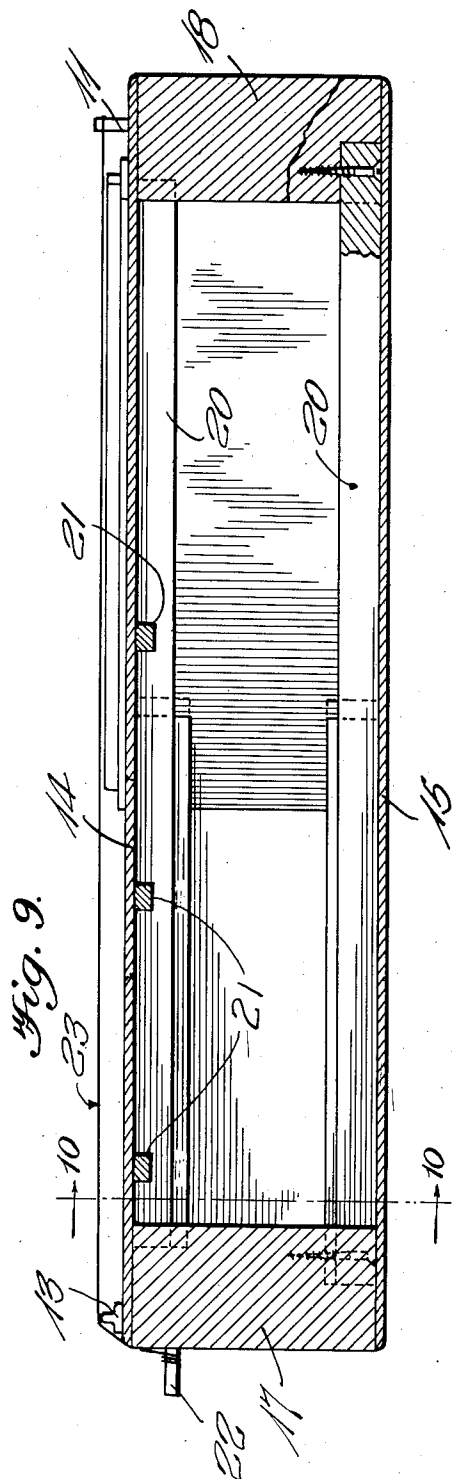
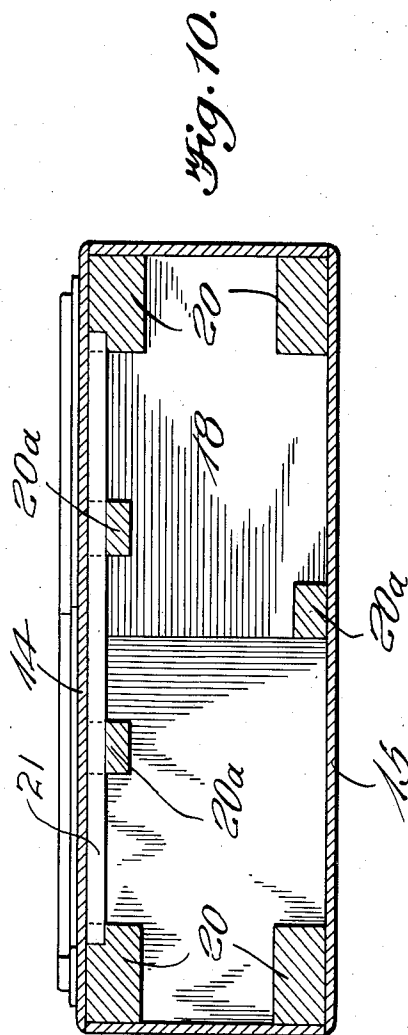
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MUSICAL INSTRUMENT OF THE STRING TYPE

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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

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MUSICAL INSTRUMENT OF THE STRING TYPE

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7 Claims. (Cl. 84—285)

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This invention relates to improvements in musical instruments of the string type and has particular relation to such instruments of the type known colloquially as "auto-harps," one form of a general class which utilizes string-damping structures for producing the chord effects as the pick is drawn across the string zone, all strings being damped excepting those actually used in producing the particular chord that is selected.

A number of different forms of devices of this general type, known as the zither-type, have been developed, some of them being designed to permit of the playing of the more classical types of music, being of somewhat intricate and elaborate structure designed to permit the playing of a wide range of music; some, for instance, are arranged to permit shifting of the dampers from string to string to enable playing in different keys. All of these are not only expensive but require much training and careful operation in order to obtain the desired results, and hence reach in the direction of the virtuoso type of instruments, the players becoming specialists. Instruments of this type generally produce a tone timbre of a special type, mostly in the metallic direction, since the strings are generally of metal.

In order to reach in the direction of the public generally, there was early developed an inexpensive imitation of the type which became known as the "auto-harp," designed more particularly in the nature of a musical toy for youths. The arrangement was simplified with a less number of strings, and would permit of the playing of simple music without requiring much instruction. The instrument had considerable vogue in the earlier days, but its use gradually decreased, and during the present modern period is seldom seen or heard. This decadence commercially is probably due to a number of factors. For instance, not only was the music confined to simple types, such as could be learned with little instruction and practice, but the tone timbre was highly metallic and lacked sweetness, more on the "tin-panny" type; hence, as the public grew more educated musically, the instrument use grew less, with the users taking up more intricate and costly forms of the class.

The present invention is designed to overcome this decadence in use of the auto-harp, and to make it an acceptable and desirable instrument and yet preserve one of the features of its early aims, the production of a musical instrument of the type which can be produced at a low or reasonable cost, and thus permit its more general

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usage among those of the public unable to obtain the costly instrument, or who may lack the high musical talent needed as the incentive to devote the time required for lengthy training in developing efficient use of the costly instrument. The invention aims primarily to provide improved tone timbre, and to permit of the playing of higher grades of music including music unplayable on the earlier forms.

To these and other ends, therefore, the nature of which will be understood as the invention is disclosed, my invention consists in the improved constructions and combinations of parts hereinafter more particularly described, illustrated in the accompanying drawings, and more particularly pointed out in the appended claims.

In the accompanying drawings, in which similar reference characters indicate similar parts in each of the views—

Figure 1 illustrates a plan view of an auto-harp of the present invention;

Figure 2 illustrates a fragmentary top plan view of the damper bar zone, the parts being shown on an enlarged scale;

Figure 3 illustrates a sectional view taken on the line 3—3 of Fig. 2, the parts being shown in inactive damping positions;

Figure 4 illustrates a similar view with damping bar moved into damping position;

Figure 5 illustrates a fragmentary sectional view taken on line 5—5 of Fig. 3;

Figure 6 illustrates a sectional view taken on the line 6—6 of Fig. 4;

Figure 7 illustrates a sectional view taken on line 7—7 of Fig. 3;

Figure 8 illustrates a sectional view taken on the line 8—8 of Fig. 3;

Figure 9 illustrates a longitudinal section through the harp; and

Figure 10 illustrates a section taken on the line 10—10 of Fig. 9.

In the present invention, the body 10 of the instrument has the general configuration of the earlier form, but has larger dimensions, being wider and of greater depth. The greater width permits of an increase of the range of the instrument, the preferred form including the strings for the chromatic scale of a complete three octaves, beginning at F, and those of a fourth octave extending to D (with C sharp omitted), thus utilizing forty-five strings in producing the range of the instrument. In the preferred form, the overall length is 21.5", with the length of the shorter side reduced; the overall width (at the string base end) is 13.5", and at

the narrow end (the tuning peg end) is 7.125". The tuning pegs 11 are located in the vicinity of the narrow width and inclined side edges, the tail end of the instrument, while the opposite ends of the strings are secured in the vicinity of the overall width edge, suitable string rests 12 and 13 being supported by the top of the instrument, rest 12 conforming generally to and extending substantially parallel with the narrow width and inclined side edges, while rest 13 extends approximately parallel with the overall width edge.

As usual, the body is hollow, but the overall depth of the instrument is increased to 4.125", a considerable increase over the depth of the prior forms, thus materially increasing the depth between the top 14 and bottom 15; the top carries the sound hole 16, of material dimensions, the internal depth being at least 4"; in the earlier forms of the auto-harp, the latter depth was 1.5". This difference in depth not only provides for greater volume, but changes the tone-timbre to a material extent. In addition, the sound hole 16 is of increased diameter (3.5" as compared with 2.5" of the earlier form) and is located at such point that the user, in picking the harp, provides the picking action over the zone carrying this hole.

Structurally, the top 14 and bottom 15 are separated and supported by an intermediate framework, made up primarily of a member 17 located in the end zone of greatest width, and an angular member 18 located at the end of smaller width and the inclined side; member 18 may be of separate parts secured together to provide the desired shape. These members are formed of wood, and in the illustrated form may have a width of 2" and a depth of 3.375". The members are connected by longitudinal braces 20, located at the opposite sides of the harp and are individual for the top and bottom zones of members 17 and 18; these may be 1.5" x .8125" in cross section and are dovetailed into position and glued; in addition, a brace 20a (.5" x .75") connects members 17 and 18 midway of the length of member 17 at the bottom of the framework (two of such braces, properly spaced, may be used, if desired). The framework is completed by cross-braces 21; these are preferably located at the top in spaced positions, being dovetailed and glued to braces 20 and member 18 (they may, if desired, extend diagonally from top to bottom).

No metal is used in securing the framework together, excepting the use of a single screw at the ends of the bottom braces 20 and 20a, to aid in withstanding the tension effects produced by the strings; by limiting the metal of the framework to the screws referred to, the tendency to provide a metallic tone timbre to the harp is largely reduced, so that the timbre is greatly enhanced.

The member 17 carries on its outer side the stationary pegs 22 over which the looped end of each string 23 is passed, these pegs being fitted into the member at the proper distances and extend outward a distance sufficient to receive the looped ends of the strings.

The tuning pegs 11 of the harp are carried by the top of the angular member 18, being properly positioned thereon to provide a string zone in which the strings are spaced uniformly, or substantially so, extending lengthwise of the harp; this zone is considered as the tail zone of the harp.

The top 14 and bottom 15 are secured to the

similar portions of the internal framework in suitable manner, as by gluing. To complete the harp frame, the periphery of the sides of the internal framework is enclosed by wood veneer-like faces which may, for purposes of appearance, also extend over the exposed margins of the member 18.

As with harps of this type, the assemblage is equipped with a succession of damper bars which individually carry felt members used for damping out string vibrations; spaces between the felt dampeners permit the undamped string or strings to have vibration and thus provide the tone. The bars, when brought into contact with the strings, serve to provide chord effects, as the pick is drawn across the strings. Generally, twelve of such bars are present in such harp assemblages, with each bar formed as an individual, with respect to the felt member positions, and generally provide three different chord effects in connection with each of four dominant strings, thus providing for playing in four different keys; while its might be possible to provide a set of each of such bars for each of the twelve tones of a chromatic scale, it is apparent that such an increase in the number of bars would set up confusion to the player who would be required to make his selection from such a large number, when, in playing a selection, but a few of the bars may actually be used. Twelve bars have generally been considered as the limit in this respect, and since the simpler selections are generally found in the ranges provided by the four sets of bars, the prior harps can meet the conditions with such a number of sets.

However, there are many selections which involve change of key (actual or pseudo) into keys not included in these sets; obviously, such selections are not playable on such prior harps unless the selection be re-arranged, tending to break down the designed characteristics of the selection. Other selections may require particular chord combinations which are not included within the three bars of a set; these, also, are not playable unless re-arranged.

The present invention is designed to meet this condition, not only by the use of additional strings, as above pointed out, but also by making possible the substitution of bars. In other words, the number of bars supplied with the instrument is not limited to the twelve usually found with prior harps, but includes additional bars which can be substituted within the bar zone for bars which would remain idle in playing a particular selection, thus making possible the playing of selections not possible with prior harps of the type. The instrument utilizes the usual arrangement of twelve bars, thus being capable of the playing of all music playable with the prior harps, and additionally makes possible the playing of selections not possible with such earlier instruments, doing this through substitution of bars which could, for instance, be individual to a single selection.

This result is obtained by making the damping bar zone of such form that while having a capacity of twelve bars, they are so mounted as to be capable of rapid change. The bars themselves, indicated as at 27, do not differ materially from the usual bars, each being elongated with the under face carrying the felt damping members 28 properly arranged to produce the desired chord effect on the assembly of strings, with each bar carrying its individual arrangement; the upper face of the bar carries a button,

or other form of mounting, indicated at 29, by which the bar can be readily depressed as well as identified. The number of such bars, however, exceeds twelve, the actual number found with an instrument being marketed being dependent upon the desires of the purchaser different combinations being provided; in fact, special bars may be readily fashioned and supplied the customer on order.

The bar zone, indicated generally at 30, is located between the sound hole 16 and string rest 13, the sound hole being positioned sufficiently distant from such end as to provide ample space for the positioning of the bar zone; this permits the player to sweep the strings with the pick when playing with the sweep directly crossing the sound hole, while the bar zone is convenient to the free hand of the player.

The mounting for the bars in the bar zone is in the form of two housings 31 into which the ends of the bars extend; since the housings are individual and are substantial duplicates, but one of them will be described in detail. It may be noted, however, that the housings are located respectively in marginal zones of top 14 beyond the string zone, being secured to the top 14 in suitable manner, as by gluing.

Housing 31 is an open top elongated structure, having a vertical side wall 32 and a pair of end walls 33, the latter projecting inwardly beyond the inner face of the side wall, thus providing a recessed formation on the inner side of the side wall. The inner exposed faces of the upper zone of the side and end walls are formed with a groove 34 which is adapted to receive a covering element 35 which is slid into position to overlie the recessed formation, the width of element 35 being such as to extend inwardly beyond the inner faces of ends 33. The cover 35 is provided with a felt member 35a secured to a marginal zone of the under face of the cover, this zone being located to overlie the bars 27.

In practice, this cover 35 is adapted to be inserted into the groove 34 through the open side of the housing, thus being positioned above the bars at the beginning of the inserted period, and then being moved lengthwise of the bars to its seated and service position. Since the groove extends along both of the end walls and the side wall of the housing, it will be readily understood that when the cover is in its service position, it forms a rigid abutment which limits the upward travel of the bars when they are depressed. Since the bars are supported by the springs 37, it is apparent that they will be moved upward above the groove 34 whenever the cover is withdrawn; however, it is necessary only to apply pressure on the cover with the latter extending over the bar assembly, with the pressure sufficient to lower the margins of the cover to where the margins can enter groove 34, after which the cover can be readily moved to its service position.

As will be understood, the open top of the housing permits free raising of any of the bars whenever the two covers are withdrawn and laid aside, the operator having free access to and from the housing and the bar spaces at such time. When the covers 35 are replaced into service position, the downward pressure on the bars serves to place springs 37 under compression such as will hold the bars in complete contact with the felt cushion 35a. When the pressure is removed from a depressed bar, the springs 37 for that bar throw it upward into engagement

with the cushion 35a, the contact being made without the production of any noise, due to the felt cushion 35a. Hence, the springs 37 may have sufficient power to provide for rapid movement of the bar in the upward direction, while the rigid abutment characteristic of the cover prevents the aggregate of bars from causing any derangement of the bar formation under the power produced by the aggregate of springs 37. As a result, the operator can shift rapidly from one bar to another in service with complete assurance that the buttons 29 will be properly located in inactive positions, and the return movements of the bars will be had with rapidity—an advantage where the operator is required to make rapid changes—and without any noise effect.

For convenience in constructing the housing, the walls 32 and 33 may be fabricated so that these walls would be shortened in depth, a thin wood layer mounted thereon with its inner recess that of the bottom of the groove, and a top then added overlying the side and end walls, these being secured together, as by gluing, thus providing the groove 34 in a simple manner.

The inner face of the side wall carries a succession of thin, vertically extending division strips 36 projecting inwardly, the space between adjacent strips being designed to receive an end of one of the bars 27—the number of strips is therefore such as to provide twelve of such spaces. Each of these spaces is provided with a light compression spring 37, which may be glued to the top 14 and on which the ends of the bars 27 are supported; the positioned cover element 35 prevents escape of the bars, while the springs normally retain the felt members 29 out of contact with the strings. If desired a thin leather strip 50 may be interposed between the lower ends of springs 37 and top 14, being secured to the top as by gluing, and the springs then be secured to the strip.

As is apparent, when the desired bars 27 are located in proper positions in the respective spaces, the slidable cover element 35 at each end of the bar zone is slid into position over the bars, thus retaining the latter in a common plane under the restraint of the element and the presence of the springs under light compression to retain the felt dampers out of contact with the strings, thus leaving the latter unmuted. When it is desired to utilize a different set of bars 27 for the playing of a particular musical selection, the cover elements 35 are moved out of their grooves, exposing the bar zone from which bars which may not be used in playing the selection are removed and replaced by the bars to be substituted, after which the cover elements are restored.

By this arrangement, it is possible to not only largely increase the types of musical selections playable on the instrument, but it is possible to arrange programs of selections covering a wide range of types. For instance, since the bar zone is so arranged that the bars are individual, it would be possible to use only a single set of three bars—if that is all that the program requires—or the program may be arranged in such way as to include four sets, of which one or more may have special bar arrangements, the proper bars being selected and positioned in the bar zone prior to beginning the program performance.

In other words, the instrument performance is not limited to the bar sets usually supplied with the prior instruments, but, with the supply of ad-

ditional bars, it is possible to largely augment the repertoire which can be rendered on the instrument by the player, although the total number of bars in service at one time does not exceed the twelve considered as the maximum number which can be utilized without confusion. And, obviously, the flexibility in substitution of bars is such that a program requiring more than the twelve bars can be readily rendered, since the time required to change bars is so short that substitution can be made between successive selections.

The invention thus not only provides for greatly improving the tonal qualities of the instrument through the effect of the changes in the construction of the body of the instrument which affect the tone timbre, and through the addition of strings to increase the playing range of the instrument, but, in addition, provides for greatly enlarging the repertoire possibilities, through the ability to make substitutions of bars, and without increasing the possibilities of confusion with rapid substitution of bars a possibility, the repertoire of an experienced player is almost limitless. In other words, through the changes indicated, the auto-harp is changed from the characteristics of an instrument of low musical possibilities—an instrument having some of the characteristics of a toy—to an instrument which, in the hands of the experienced player, becomes an instrument of real musical merit and of pleasing characteristics to a listening public. Excepting for tonal qualities, the instrument can duplicate the performance of the prior art auto-harps—by the use of the bar arrangement of the latter—the change in tonal qualities provides a much superior performance; but it can also present the pleasing performances of high grade instruments, and reach to repertoire possibilities heretofore believed unattainable by auto-harp performance.

The complement of damping bars designed to be used with the instrument materially exceeds the number which can be concurrently mounted within the bar zone, the bars of the complement including those for all of the major chords, together with bars for the minor chords and sevenths.

It should be noted that the housings 31 are preferably positioned opposite each other in such manner that the bars 27 cross the strings at right angles to the direction of length of the strings, thus permitting damping members 28 to be of right-angular form to assure non-interference with unmuted strings, and provide for simple mounting conditions; while the bars can be operatively positioned at a slightly different angular relation to the strings, such positions would require special forms of damping members to prevent such interference.

This preferred arrangement of the bar zone may, and preferably does, change the contour at the base end of the instrument, the string lengths of the opposite outer strings, due to the increase in range of the instrument, presenting a greater variance from the earlier forms. Hence, the outer face of member 17 extends angular to the direction of length of the bars 27; since the side faces of the instrument generally extend parallel with the strings, the preferred arrangement will present such outer face of member 27 as extending at other than a right angle to the direction of length of the longer side face, the form shown in the drawings.

While I have herein disclosed a preferred form

of instrument, it will be understood that changes and modifications thereof may be found desirable or essential in meeting the various exigencies of service and/or the desires of a user, and I therefore reserve the right to make any and all such changes and modifications as may be found necessary or essential, insofar as the same may fall within the spirit and scope of the invention as expressed in the accompanying claims, when broadly construed.

I claim:

1. In musical instruments of the auto-harp type, wherein the playing face includes a string zone formed of a succession of strings individually tuned to predetermined tonal values together with a bar zone containing a plurality of normally inactive individual damping bars individually arranged for muting predetermined strings of the string zone, and wherein the chord effects when rendering a musical selection are produced by the movement of a pick across the string zone with an individual damping bar depressed from its normal position to render it active to damp strings having tonal values undesired in the chord, the improvement therein which comprises having the ends of its individual damping bars yieldingly supported within permanent housings carried by the playing face at opposite sides of the string zone, each housing having a predetermined number of division spaces each adapted to receive an end of a damping bar to thereby permit the presence of bars equal in number to those of the division spaces of a housing, the top zone of each housing including a slidable removable cover element overlying an end of all of the positioned bars of the bar zone for normally retaining the bars therein, removal of said cover elements permitting substitution of damping bars having other string muting combinations without increase in the number of bars positioned in the bar zone, each housing presenting an open zone above the division space zone with each of the walls of such open zone including a groove formation open to the zone with the groove formation forming receiving portions for margins of the cover to thereby rigidly anchor the cover, the dimensions of the open zone being such as to permit of the free passage of damper bar ends therethrough.

2. An instrument as in claim 1, characterized in that each division space of the housing carries a light compression spring underlying the end of the bar positioned in the space, whereby the springs and the cover elements normally retain the damping bars inactive to mute the strings, the lower ends of the springs having a secured relationship with the playing face.

3. An instrument as in claim 1, characterized in that each division space of the housing carries a light compression spring underlying the end of the bar positioned in the space, whereby the springs and the cover elements normally retain the damping bars inactive to mute the strings, the playing face fixedly carrying a thin leather strip underlying the springs of a housing and to which the lower ends of the springs are individually secured.

4. In musical instruments of the auto-harp type, wherein the playing face includes a string zone formed of a succession of strings individually tuned to predetermined tonal values together with a bar zone containing a plurality of normally inactive individual damping bars individually arranged for muting predetermined strings of the string zone, and wherein the chord effects when rendering a musical selection are produced by

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the movement of a pick across the string zone with an individual damping bar depressed from its normal position to render it active to damp strings having tonal values undesired in the chord, the improvement in an instrument of this type for enhancing the playing and tonal values of the type, such improvement comprising a top face member, a bottom member, an intermediate frame formed of peg-carrying members at opposite ends of the frame with the pegs adapted to support the strings of the string zone in tuned condition, said end members being connected by relatively thin wooden elements to thereby form in connection with thin wooden cross members a skeleton frame for supporting the top and bottom members and to be peripherally closed by thin wooden elements to form the body of the instrument; the instrument also including supporting and positioning means for the damping bars of the bar zone, said means normally maintaining the bars of the bar zone in predetermined positions within the zone with the means including slidable cover elements removable at will to permit removal of bars and rapid positioning of substitute bars within the bar zone.

5. An instrument as in claim 4, characterized in that the playing face is provided with a sound hole exceeding three inches in diameter, with the hole exposed inward of the bar zone and positioned to underlie the path travelled by the pick during playing of the instrument, the depth of the skeleton frame being at least four inches.

6. An instrument as in claim 1, characterized

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in that the complement of service damper bars exceeds in number the number concurrently positionable in the bar zone, with the bars of the complement each presenting a muting arrangement varying from the muting arrangements of the remaining bars, with the complete complement including individual bars for all major chords together with bars for minor chords and sevenths.

7. An instrument as in claim 1 characterized in that each slidable cover has a width to project inwardly beyond the inner edge of the open top zone and includes a noise-deadening member carried by the under face of the cover in its inner projecting marginal zone, said member being in contact with each of the bars when the latter are in inactive position.

CLYDE B. PAGE.

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