(No Model.) 2 Sheets—Sheet 1.

C. SUCKER.

AUTOHARP.

No. 557,290. Patented Mar. 31, 1896.

Fig 1

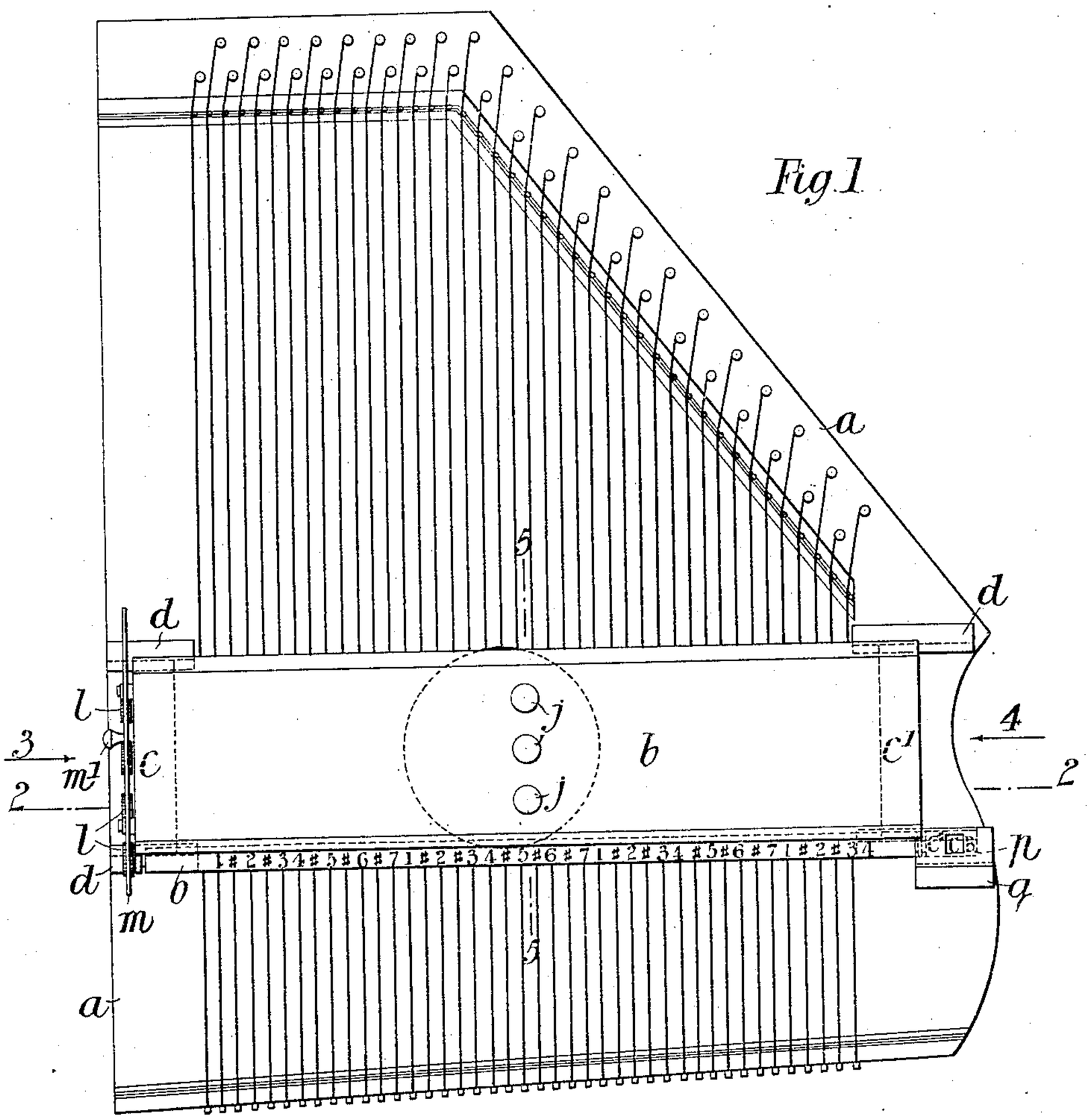
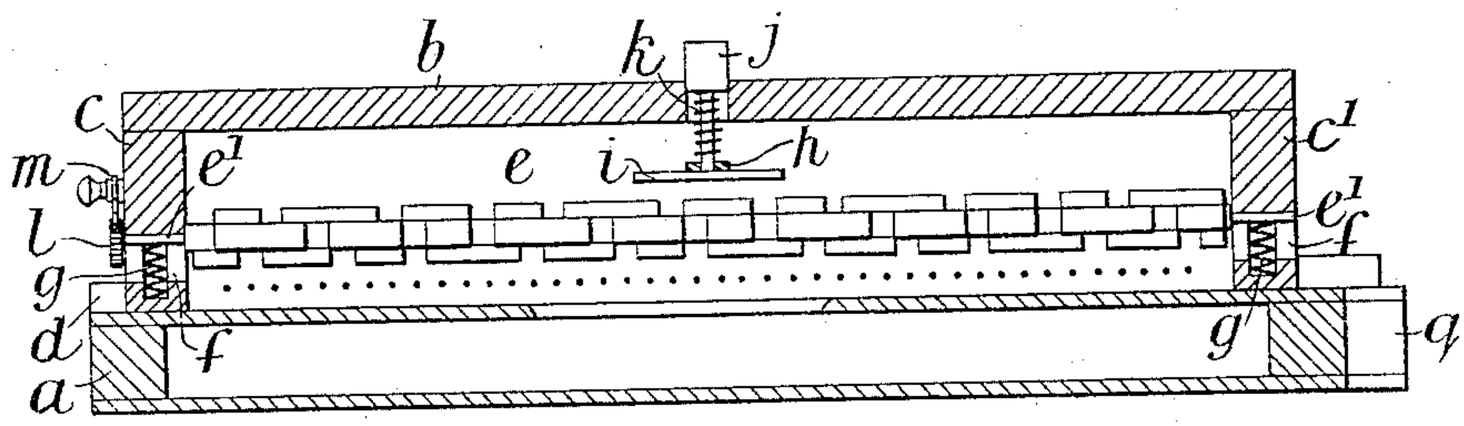


Fig 2.



Witnesses.

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(No Model.) 2 Sheets—Sheet 2.

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AUTOHARP.

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Fig. 3.

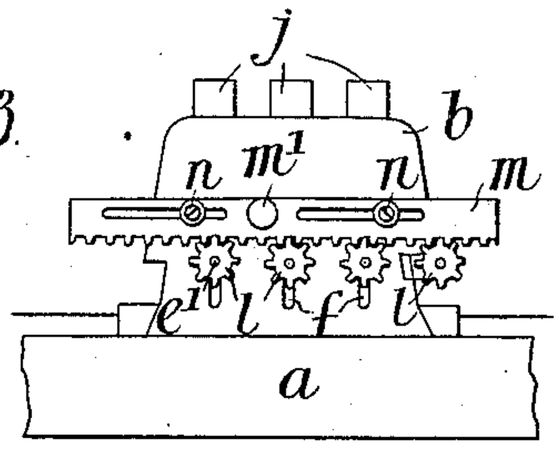


Fig. 4.

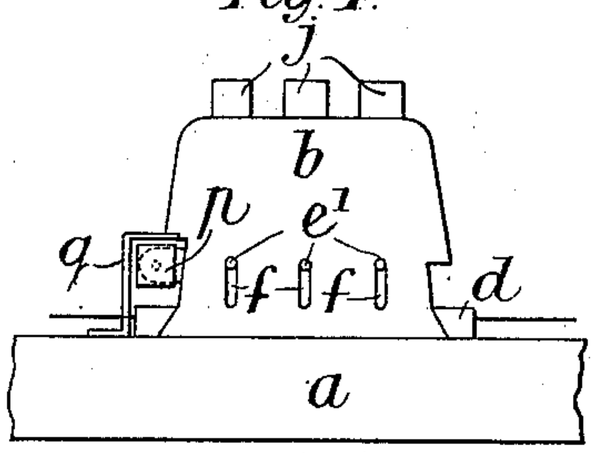


Fig. 5.

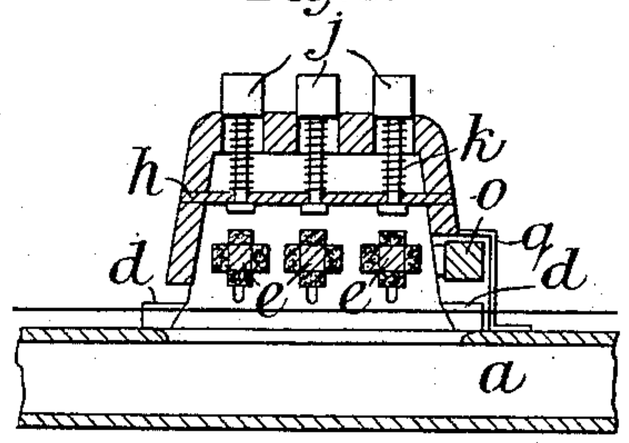
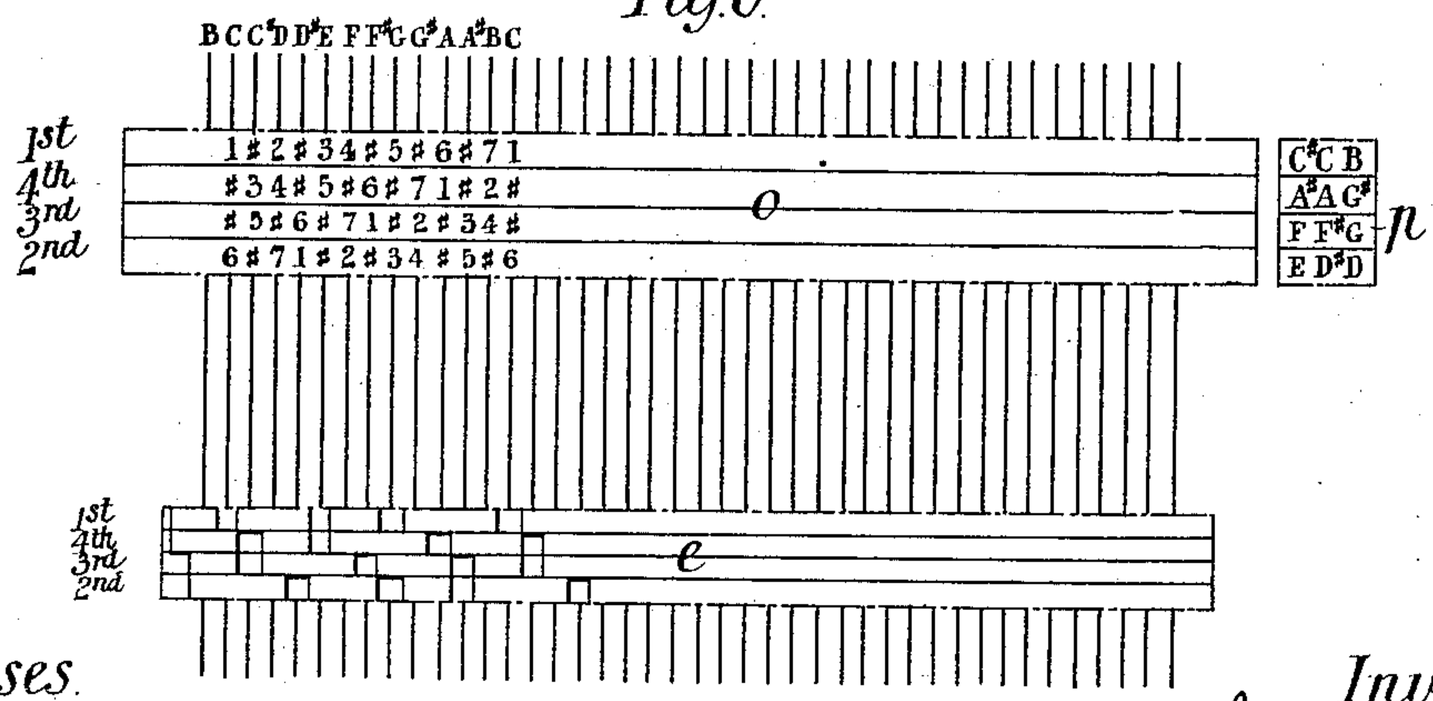


Fig. 6.



Witnesses.

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UNITED STATES PATENT OFFICE.

CHARLES SUCKER, OF LONDON, ENGLAND.

AUTOHARP.

SPECIFICATION forming part of Letters Patent No. 557,290, dated March 31, 1896.

Application filed June 12, 1895. Serial No. 552,588. (No model.)

To all whom it may concern:

Be it known that I, CHARLES SUCKER, a subject of the Queen of Great Britain, residing at London, England, have invented a new and useful Improvement in Autoharps and other Similar Stringed Instruments, of which the following is a specification.

My invention relates to autoharps and other similar stringed instruments of the kind tuned to the chromatic scale and provided with a damper-bar or damper-bars for enabling one or more chords to be readily produced. In instruments of this class as heretofore constructed each damper-bar is so arranged that a chord can only be produced in a limited number of keys.

Now the object of my invention is to provide means whereby a given piece of music and the various chords marked thereon may be played in or transposed into any key.

In carrying out my invention I employ a damper-bar of polygonal section adapted to revolve on its longitudinal axis and to be moved longitudinally, the said bar having felt or other damping material on each surface, with intervals therein, as usual, to leave certain strings free for sounding a chord. For instance, assuming the bar to have four sides, on the first side I leave open only the strings C, E, G, C, which sound a major chord in the key of C. If now the bar is slid or moved to the left a distance of one string, the strings formerly free will become damped; but instead of them the strings B, D♯, F♯, B will be freed, thus forming the same chord half a note lower, or in the key of B, while if the action be moved to the right then C♯, F, G♯, C♯ will become free and sound the chord half a note above, in the key of C♯, (D♭.) The second side of the bar will be arranged for the chord in E♭, (D♯,) the strings E♭, G, B♭, E♭ being left free, and by sliding the bar the distance of one string to the left the same chord in the key of D is obtained and the same distance to the right the same chord in the key of E. The third and fourth sides are similarly arranged for producing the same chord in the keys of B♭, (A♯,) A, A♭, (G♯,) and F, F♯, (G♭,) G, respectively. It will thus be understood that with a single damper-bar having four sides and moving as above described I can obtain the same chord in any key.

If it is desired to produce other chords, I increase the number of damper-bars. For example, I may arrange one bar for the production of a major chord, as above described, another for a minor chord, and another for the diminished seventh, and so on, each bar being suitable for the production of one chord in any key.

When I employ a series of damper-bars, the said bars are advantageously geared together and carried in a suitable frame, so that all will be rotated or moved longitudinally simultaneously and arranged in such relation to one another that all the damper-surfaces which are in operative position at any one time shall be adapted for the production of chords required for a tune in any key.

In order to enable a performer to transpose or play the music in any key, I provide what I term a "notation" or "indicator" bar having the usual numerical indications "1, 1♯, 2, 2♯, 3, 4, 4♯, 5, 5♯, 6, 6♯, 7" marked on its sides, which sides are the same in number as those of the damper-bars. This indicator-bar is advantageously geared to the damper bar or bars and carried in the same framing, so as to be rotated and moved longitudinally simultaneously therewith, and the numerical indications are placed upon its sides in such a manner that the number "1" on the side of the bar in view when placed opposite any string indicates that that string is the keynote of the tune to be played. Certain of the numerical indications—that is, those required to form a chord—also correspond with the intervals on the damper-bars. For instance, in playing in the key of C the numbers "1," "3," "5," and "1" upon the indicator-bar will be opposite the strings sounding C, E, G, C, and the intervals in the damper-bar for enabling such strings to be sounded in the chord C, E, G, C will also be opposite such strings.

To enable the instrument to be set so that the tune and the chords therein can be played in any key, I mark upon the indicator-bar near one end thereon the letters indicating the various keys, three upon each side, which letters can by the rotation or longitudinal

movement of the bar be disclosed one at a time through an aperture, each letter when disclosed corresponding to the key-string indicated by the number "1" on the side of the indicator-bar in view.

To enable my invention to be fully understood, I will describe the same by reference to the accompanying drawings, in which—

Figure 1 is a plan view of the instrument known as an "autoharp" having my improvements applied thereto; and Fig. 2 is a section of the same on the line 2 2, Fig. 1. Figs. 3 and 4 are end views looking in the direction of the arrows 3 and 4, respectively, Fig. 1, of the part of the apparatus containing the damper-bars. Fig. 5 is a section on the line 5 5, Fig. 1. Fig. 6 is a view showing developments of one of the damper-bars and of the notation or indicator bar, the latter having the key-indicator arranged in connection with it.

a is the body of the autoharp, which is constructed in the usual manner, and *b* is a box or casing containing my improved damper-bars, the ends *c c'* of the said box or casing being arranged to slide in dovetailed guides *d d* on the body of the harp in a manner which will be readily understood.

e e e are my improved damper-bars, the axes *e' e'* of which are arranged in slots *f f*, formed in the ends *c c'* of the box *b*. Springs *g g* are arranged beneath the said axes, as shown most clearly in Fig. 2, in order to normally hold the damper-bars out of contact with the strings.

In order to permit of depressing the damper-bars to bring them into contact with the strings, I arrange over each damper-bar a depressor which consists of a rod sliding through a bar *h*, Fig. 5, and carrying at the lower end a plate *i* and at the upper end a push-button *j*, the said depressor being so arranged that when the button is pushed down the plate will come into contact with the damper-bar and push it down also. A spring *k* is arranged in connection with each depressor, the said spring at one end bearing against the button and at the other end against the bar *h* and serving to normally maintain the depressor in its uppermost position.

l l are pinions arranged on the axes of the several damper-bars, and *m* is a rack engaging with the said pinions and serving to move the same simultaneously, the said rack, as shown, being arranged to slide upon screw-pins *n n* and provided with a projection *m'* to enable it to be operated.

o is the notation or indicator bar, which is arranged to rotate in bearings upon the box *b* and which is provided with the pinion *l*, engaging with the rack *m* in the same manner as the pinions of the damper-bars, so that the said indicator-bar will rotate simultaneously with the damper-bars. It will of course be obvious that the said indicator-bar must be arranged in such a position that the indications on one side are seen by the person playing the instrument. This is shown clearly in Fig. 1.

p is my key-indicator, which practically forms a continuation of the indicator-bar, which key-indicator has its several sides marked, as shown in Fig. 6, and *q* is a shield which projects over the said indicator and has an aperture formed therein, so that only one of the letters upon the indicator shall be seen at any one time—for instance, the letter C—as shown in Fig. 1.

The marking of the several sides of the notation or indicator bar *o* will be readily understood by referring to Fig. 6, where it will be noticed that for playing in the key of C—that is to say, when that sign is disclosed through the aperture in the shield *q*—number "1" is placed opposite to the string C and for playing in the key C♯ (D♭) the said bar must be moved through the medium of the box *b* one string to the right, so that "1" comes opposite C♯. For playing in the key of B the bar must be moved one string to the left, so that the number "1" comes opposite to the string B. On the second side I commence the numerical notation opposite the fourth string, so that when the box *b* is moved so that the sign D♯ is disclosed through the aperture in the shield *q* C string becomes No. 6, C♯ string becomes No. 6♯, D string becomes No. 7, D♯ string becomes No. 1 or the keynote, E string becomes No. 1♯, F string becomes No. 2, and so on. On the third side when the sign F♯ is disclosed through the aperture in the shield *q* the C string becomes No. 4♯, C♯ string becomes No. 5, D string becomes No. 5♯, D♯ string becomes No. 6, E string becomes No. 6♯, F string becomes No. 7, F♯ string becomes No. 1 or the keynote, G string becomes No. 1♯, and so on. On the fourth side when the sign A is disclosed through the aperture in the shield *q* the C string becomes No. 2♯, C♯ string becomes No. 3, D string becomes No. 4, D♯ string becomes No. 4♯, E string becomes No. 5, F string becomes No. 5♯, F♯ string becomes No. 6, G string becomes No. 6♯, G♯ string becomes No. 7, A string becomes No. 1 or the keynote, A♯ string becomes No. 1♯, B string becomes No. 2, and so on.

By the described movements of the box *b* to play in the various keys the damper-bars are also moved to enable the chords in harmony with such key to be produced.

In Fig. 6 are shown the four sides of the damper-bar *e* for forming the major chord C, E, G, C in the key of C or its equivalent in any other key, the intervals in the dampers corresponding with the strings for sounding such chord in the keys C, D♯, F♯, A—that is to say, when the indicator-bar *o* is in its central longitudinal position and either of the said signs is disclosed through the aperture in the shield *q* the sides of the said damper-bar marked "1st," "2nd," "3rd," and "4th" are each in position over the strings to enable the

chord to be produced when the corresponding side of the indicator-bar is in the position shown in Fig. 1.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. In an autoharp, the combination with a plurality of revoluble damper-bars, each having a series of longitudinal rows of dampers, arranged around the longitudinal axis of the bar, of devices for rotating said bars simultaneously, substantially as described.

2. In an autoharp the combination with a plurality of revoluble damper-bars, each having a series of longitudinal rows of dampers, arranged around the longitudinal axis of the bar, of devices for rotating said bars simultaneously and an independent depressing device for each bar, substantially as described.

3. In an autoharp the combination with a plurality of damper-bars, mounted revolubly, each bar having a series of longitudinal rows of dampers, said rows being arranged around the longitudinal axis of the bar, devices for rotating said damper-bars simultaneously, and an independent depressing device for each of said bars, and means for moving said bars simultaneously transversely of the strings, substantially as described.

4. In an autoharp the combination with a plurality of revoluble damper-bars each having a series of longitudinal rows of dampers arranged around the longitudinal axis of the bar, an indicator-bar provided with a series of rows of characters thereon, and means for rotating all of said damper-bars and said indicator-bar simultaneously, substantially as described.

5. In an autoharp the combination with the main body and the strings, of a carriage movable transversely of the strings, a plurality of damper-bars mounted revolubly in said carriage, each having a series of longitudinal rows of dampers arranged around the longitudinal axis of the bar, an indicator-bar revolubly mounted in said carriage having a series of rows of characters, the characters of each row being in line with the strings, said indicator having also a series of rows of characters out of line with the strings for indicating the key, and a stationary part secured to the main body and having a portion adjacent to said last-named characters on said indicator-bar, devices for rotating said damper-bars and said indicator-bar simultaneously, substantially as described.

6. In an autoharp the combination with a plurality of revoluble damper-bars each having a series of longitudinal rows of dampers arranged around the longitudinal axis of the bar, a pinion on each of said bars, a movable rack engaging the pinion of each bar and an independent depressing device for each bar, substantially as described.

CHARLES SUCKER.

Witnesses:
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F. W. PRICE.