No. 634,124. Patented Oct. 3, 1899.

J. H. SCOTT & S. H. BROWN.

AUTOMATIC FINGERING DEVICE FOR STRINGED INSTRUMENTS.

(Application filed June 5, 1899.

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

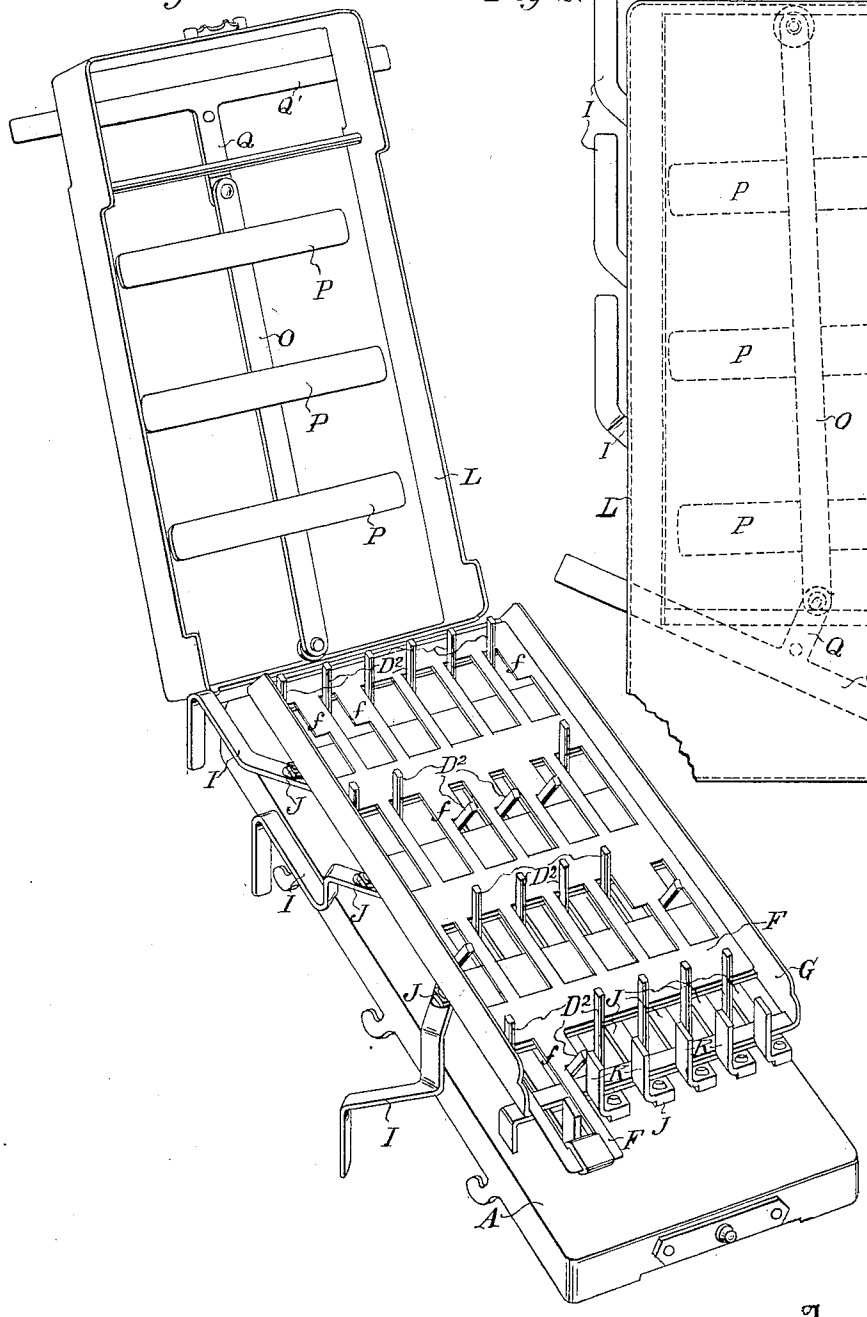


Fig. 2.

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Fig. 3.

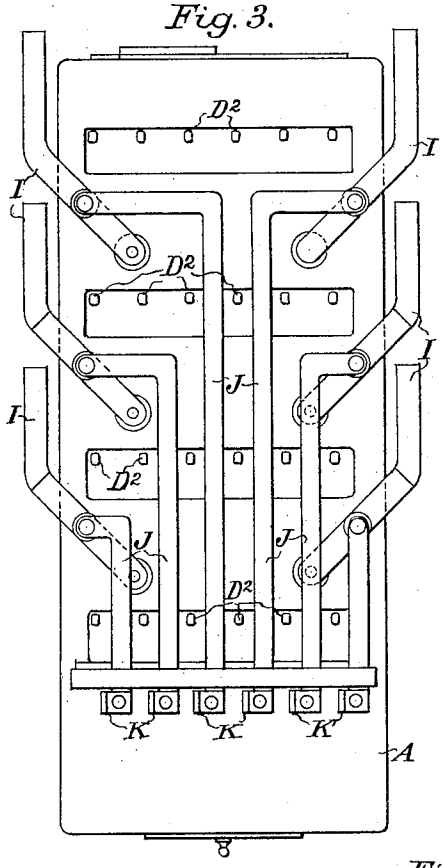


Fig. 4.

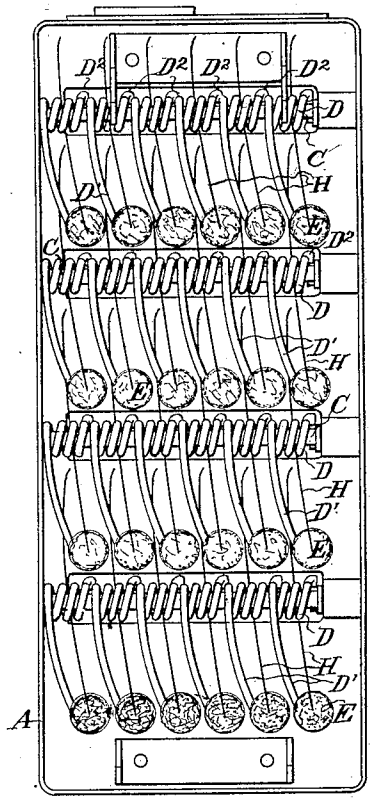


Fig. 5

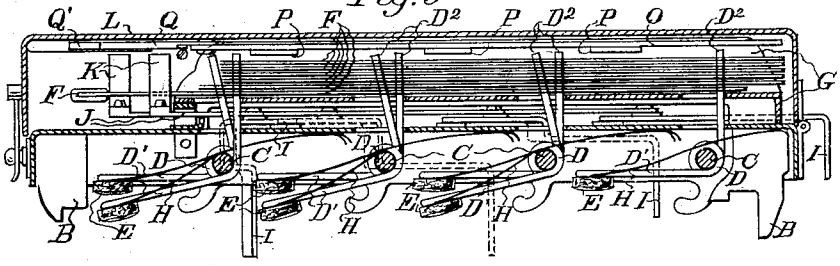
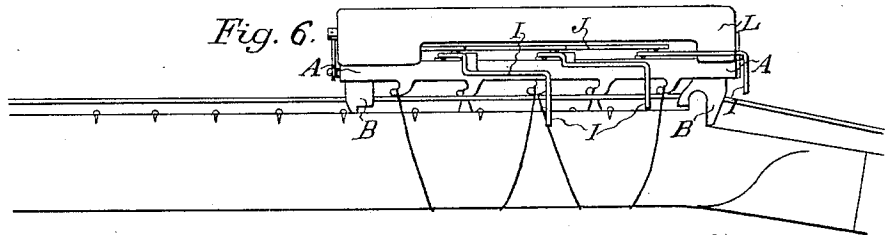


Fig. 6.



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UNITED STATES PATENT OFFICE.

JOSEPH H. SCOTT AND STANTON H. BROWN, OF SAN FRANCISCO, CALIFORNIA.

AUTOMATIC FINGERING DEVICE FOR STRINGED INSTRUMENTS.

SPECIFICATION forming part of Letters Patent No. 634,124, dated October 3, 1899.

Application filed June 5, 1899. Serial No. 719,381. (No model.)

To all whom it may concern:

Be it known that we, JOSEPH H. SCOTT and STANTON H. BROWN, citizens of the United States, residing in the city and county of San Francisco, State of California, have invented an Improvement in Automatic Fingering Devices for Stringed Instruments; and we hereby declare the following to be a full, clear, and exact description of the same.

Our invention relates to a device which is especially applicable to guitars and similar stringed instruments; and it consists of a mechanism hereinafter described and claimed by which the various chords which it may be desired to strike can be produced by the action of a lever or levers, press-buttons, and an intermediate mechanism by which said buttons are forced down at the proper places so that the desired chords may be produced by causing the strings to vibrate.

The invention also comprises details of construction, which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a perspective view of our device. Fig. 2 is a plan showing the top part. Fig. 3 is a plan showing the operating-rods. Fig. 4 is a plan of the underneath part. Fig. 5 is a longitudinal section. Fig. 6 shows the application of the device to a guitar.

In the playing of stringed instruments—such as guitars, banjos, mandolins, and the like—the great difficulty in striking the chords, and especially where full chords of all the strings are required, is to hold down the strings to produce the necessary chords and clear notes.

Our invention is designed to provide a mechanical device by which all the chords in major or minor keys can be produced and all the strings can be held down at one time instead of only a few, as in the case of the ordinary fingering of the guitar.

The apparatus consists of a light frame or casing A, having points B or similar devices for connecting it with the finger-board of the instrument. The present device is designed to fit the finger-board of a guitar and these points will rest in slight indentations at proper points on the finger-board, and by means of elastic or other holding bands the device will be held sufficiently close upon the finger-board, the bands retaining it in its proper position with relation to the strings. Journaled transversely across this casing are the shafts C. The number of these shafts, as here shown, is sufficient to correspond with the four frets included in what is known as the "first" position on the instrument, and these shafts have loosely coiled upon them the wires D, which form bearings and have arms $D' D^2$, projecting at right angles to each other. The arm D' carries a press-button or key E and extends, essentially, parallel with the finger-board in a longitudinal line, the device being so attached to the finger-board that these keys will when depressed press the strings down just above the frets, so as to give a clear tone when the string is vibrating. The other end D^2 of the wire projects upwardly, and each of these upwardly-projecting ends is engaged by the slotted sliding plate F when the latter is moved. These plates F have slots made through them, as shown, and certain offsets, as shown at *f*, which are adapted to engage a certain number of the upwardly-projecting levers D^2 when the plates are moved thus over the six strings of the guitar. There will be six of these plates F, superposed one above the other and slidable in a tray or guide G, which rests upon the base A, so that the lever-arms D^2 project up through the slots in all of these plates. The plates are so disposed that when one certain chord is desired one of the plates is moved and its guide sliding in the direction of the length of the finger-board a certain number of the slots or offsets *f* will engage with the corresponding levers D^2 and will press them forward, thus depressing the keys which are carried by these particular levers, and these keys pressing upon the corresponding strings above the frets will produce the desired chord. The keys return after being thus depressed by the action of light pressure-springs H.

In order to operate the plates F to produce the results above described, a series of levers I are properly fulcrumed upon the base A, and each of them is connected to its own longitudinal rod guided and slidable upon the base A. Each of these rods J has an upturned arm K, and these arms K engage with

the ends of the slides F. These slides F being laid one upon the other, and in the present case there being six of them, the projecting ends with which the arms K engage are so disposed that one of these ends of the plate F is in line to be engaged with one of the arms K, the next with another, and so on, and as each of the arms K and its connecting-rod J is actuated by one of the levers I it will be seen that the movement of either of these levers will advance the plate with which it is connected and will thus press a certain number of the keys to produce the desired chord.

The strings will be struck with the fingers or in any other suitable manner to cause them to vibrate and the performer does not need to be expert in fingering the instrument, as it is only necessary to move certain levers to produce certain chords.

The tray G in which the slides F are placed rests, as before stated, upon the base A and is inclosed within a cap or cover L, which is here shown as hinged to the base A, so that it may be opened for the removal or inspection of the parts; but when in use it is closed down, thus inclosing the tray G within its side walls.

In the upper part of the cover L is fulcrumed an arm O, having upon it transverse bars P, which rest upon the uppermost of the plates F and act as guides to hold the plates down and prevent their being lifted out of proper position as they slide back and forward when operated by their actuating-levers.

The distance between the sides of the cover L is greater than the width of the tray G, which carries the plates F, and one of the arms P contacts with the inner sides of the tray G.

The bar O is pivoted at one end and the other end is connected with the central arm Q' of the rocking lever Q, which is pivoted to the cover L and has the ends of its arms projecting through slots in the side, so that by pressure upon one end of the lever it is tilted and the bar O moved to one side, carrying with it the tray G and the plates F. When tilted in the opposite direction, it moves the tray and plates to the opposite side. The object of this movement is to change the key in which the instrument is being played, and it produces this result by reason of the offsets *f*. Thus when the tray stands in such position that certain of the slots have their full length in the line of the upturned levers D^2 the movement of one of the levers I will cause the corresponding slide F to be moved by it; but whenever the long portion of the slot is in line with the lever-arm D^2 no action of the key will take place. Wherever there is an offset *f* projecting into the path of the lever the movement of that particular slide will cause that offset to actuate the lever which is in line with it. Thus the movement of one of the plates may actuate a certain number of the levers D^2 and depress the corresponding keys upon the springs to produce the chord. The movement of a certain other lever will produce another chord, and so on through the list. Now if the tray G is shifted to the opposite side within the cover L it will be manifest that the position of the slots and the offsets will be changed and that other offsets will be brought into line with the lever-arms D^2 and other portions of the long slots will be brought into line with the lever-arms D^2, so that those particular arms will not be acted upon by the movement of the sliding plate. This will produce an entire change in keys, so that with the six keys and the side adjustment of the tray the principal chords of three major and minor keys of the guitar may be played with a single set of six actuating-levers I and six of the sliding plates.

It will be manifest that modifications of this device may be made to suit other instruments having a different number of strings and a different arrangement of frets; but this illustration of the operation renders it easy to apply the device in essentially the same form to any similar instrument.

The key-carrying arms and the upwardly-extending arms by which they are actuated have a yielding connection which may be produced either by forming these arms with a yielding coil, which turns upon the supporting-shaft, or the arms themselves may have sufficient independent elasticity for the purpose and may be attached to sleeves, which are turnable upon the shafts. The object of this elasticity is to allow any one or more of the key-carrying arms to yield and adjust itself to the positions of any of the others, so that if the finger-board of an instrument be slightly convexed the keys nearest the center will have pressed their springs down before the others at the outside will have reached a bearing; but the yielding of the key-shanks will allow the other keys to also come to a proper bearing.

By changing the slides the instrument can be played in any key, and any different number of slides or actuating parts may be used without altering the character of the invention.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. A fingering device for stringed instruments comprising a base or support and means for attaching it to the finger-board of the instrument, sets of arms arranged one set substantially at right angles with the other, and adapted to turn about an axis common to both, each arm of one set connected with the corresponding arm of the other set and one set of arms lying substantially parallel with the finger-board, and mechanism by which one set of arms is actuated to cause the other set to hold down the strings of the instrument.

2. A fingering device for stringed instruments comprising a base, shafts extending transversely across the base, sleeves loosely

turnable upon said shafts having arms extending at right angles therefrom, one lying horizontally along the line of the finger-board and having a key fixed to its end, the other extending upwardly at right angles therewith, mechanism for moving said levers and depressing the keys, and springs by which the keys are returned when pressure is relieved.

3. The fingering device for stringed instruments consisting of a support and means for attaching it to the finger-board of the instrument, shafts fixed transversely across the support, elastic coils loosely turnable upon the shafts, each having an upwardly-projecting arm and a horizontally-projecting arm, keys carried upon the horizontally-projecting arm, levers and intermediate mechanism acting upon the upwardly-projecting arms whereby the keys are depressed to hold down the strings of the instrument, and springs by which the keys are raised when the levers are released.

4. A fingering device for stringed instruments consisting of a support, means for attaching it to the finger-board of the instrument, transverse shafts carried by said support, coil-springs loosely and independently turnable upon said shafts, each having a horizontal arm with a key fixed to its end and a returning spring, an upwardly-projecting arm, a series of longitudinally-movable slotted slides, through which slots the upwardly-extending arms project, offsets in said slides adapted to engage with certain of the arms when either of the slides is moved, levers and intermediate mechanism by which either of the slides may be moved independently of the others, and a series of keys controlled thereby depressed upon the strings to form chords when the strings are caused to vibrate.

5. A fingering device for stringed instruments consisting of a support, shafts carried thereby, sleeves mounted on the shafts and provided with key carrying and actuating arms arranged in pairs with one number of each pair lying substantially parallel with the finger-board and so that the keys may be depressed upon the finger-board, a tray mounted upon the key-support, a series of superposed sliding plates having slots through which the actuating-arms of the keys project, offsets made in the slotted plates adapted to engage and tilt certain arms and keys by the movement of either of the slides, and lever-arms projecting from the case and movable by the performer, each of said levers being connected with one of the slides, so that any of the slides may be moved independently of the others.

6. A fingering device for stringed instruments consisting of a support with transverse shafts, key-carrying arms supported from said shafts, extending above the strings of the instrument, upwardly-extending arms connected with each of said key-carrying arms, a tray having superposed slotted plates slidable therein, through which slots the upwardly-extending arms pass, offsets made in each of the slots with relation to the arms so as to engage and move certain arms and keys when either of the slides is moved, fulcrumed levers projecting from the sides of the case within reach of the performer, rods connecting with and movable by said levers having upturned arms, each of which engages one of the slides whereby the movement of each lever will actuate one of the slides independently of the other and depress the keys to produce the desired chords.

7. A fingering device for stringed instruments consisting of a support with movable key-actuating arms, slotted slides with offsets engaging said arms and levers by which the slides are movable independently, a tray or carrier within which the slides are movable, a housing inclosing said tray and means connected therewith by which the tray and its slides may be shifted to one side or the other so as to move certain offsets in the slides out of line with the key-actuating arms, and bring others into line therewith whereby the musical keys may be changed.

8. A fingering device for stringed instruments consisting of a support, key-carrying arms extending above the strings of the instrument, other arms extending at right angles therewith and movable each in unison with one of the keys, a tray having slotted sliding plates movable longitudinally therein, said plates having offsets and adapted to be brought into line with the key-actuating arms, a shifting device attached to the keys adapted to move the slides and their tray to one side or the other within the case whereby the different set of keys may be depressed and the musical key changed, lever-arms projecting through the side of the case, connecting-rods having one end united with the actuating-levers and the other having upturned ends, each engaging and moving one of the slidable plates so that the movement of either of the levers will hold down certain keys to produce the musical chord, and the shifting of the slidable plates, with the same mechanism, will produce a different set of musical chords.

9. A fingering attachment for stringed instruments consisting of a base, shafts carried thereby, sleeves loosely turnable upon said shafts with arms extending at right angles therefrom, one lying horizontally along the line of the finger-board and having a key fixed to its end, the other extending upwardly at an angle therewith, mechanism for moving said arms and depressing the keys, and to return the keys to their normal position when released, and yielding connections by which any runs of keys are depressed to fit varying curvatures of different finger-boards.

In witness whereof we have hereunto set our hands.

JOSEPH H. SCOTT.
STANTON H. BROWN.

Witnesses:
S. H. NOURSE,
GEO. H. STRONG.