Oct. 20, 1925. 1,558,113

B. E. MILLS

REMOTE CONTROL OF THE PLAYING OF STRINGED INSTRUMENTS

Filed June 14, 1922 6 Sheets-Sheet 1

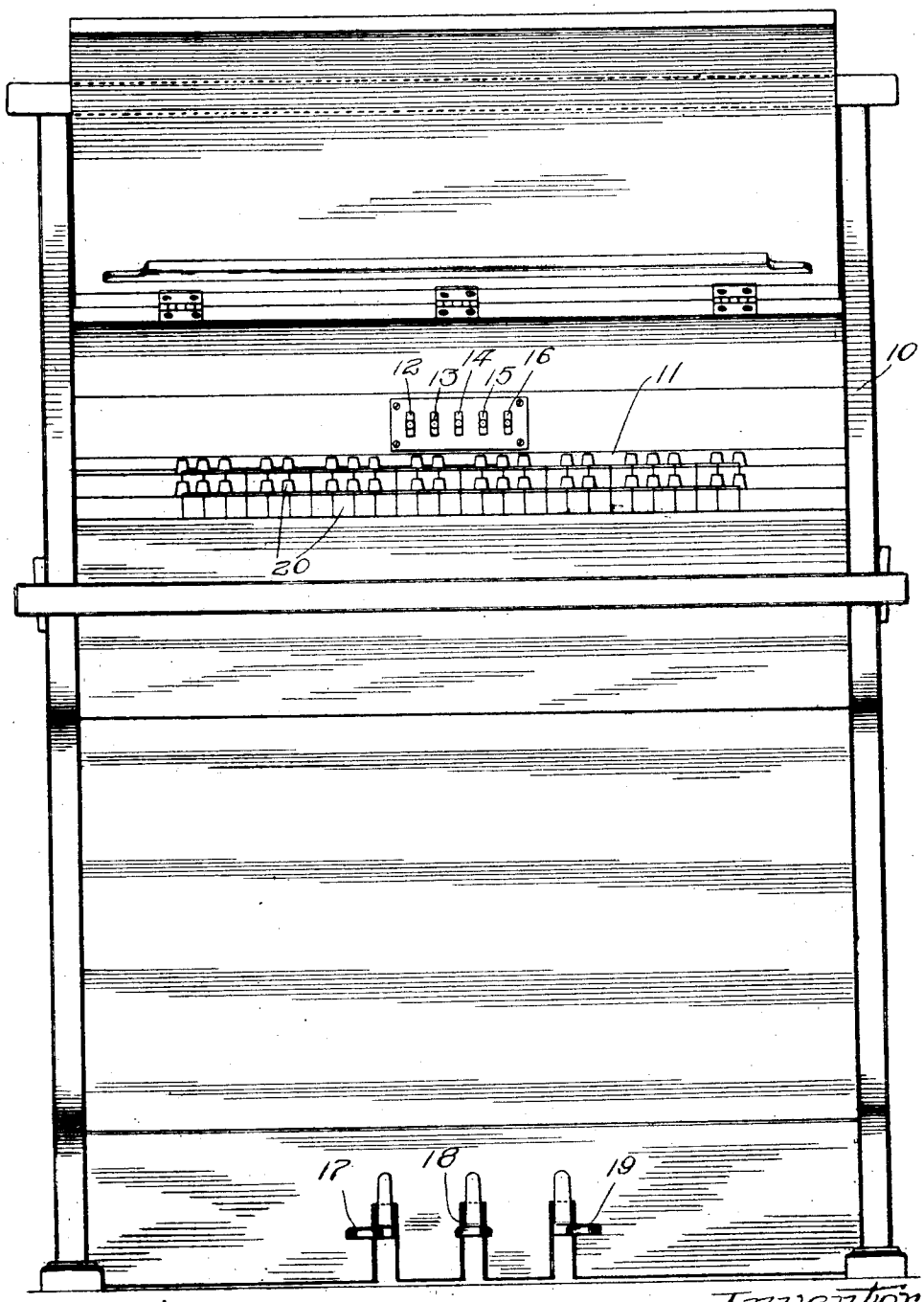


Fig. 1.

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By Dyrenforth, Lee, Chritton & Wiles, Attys.

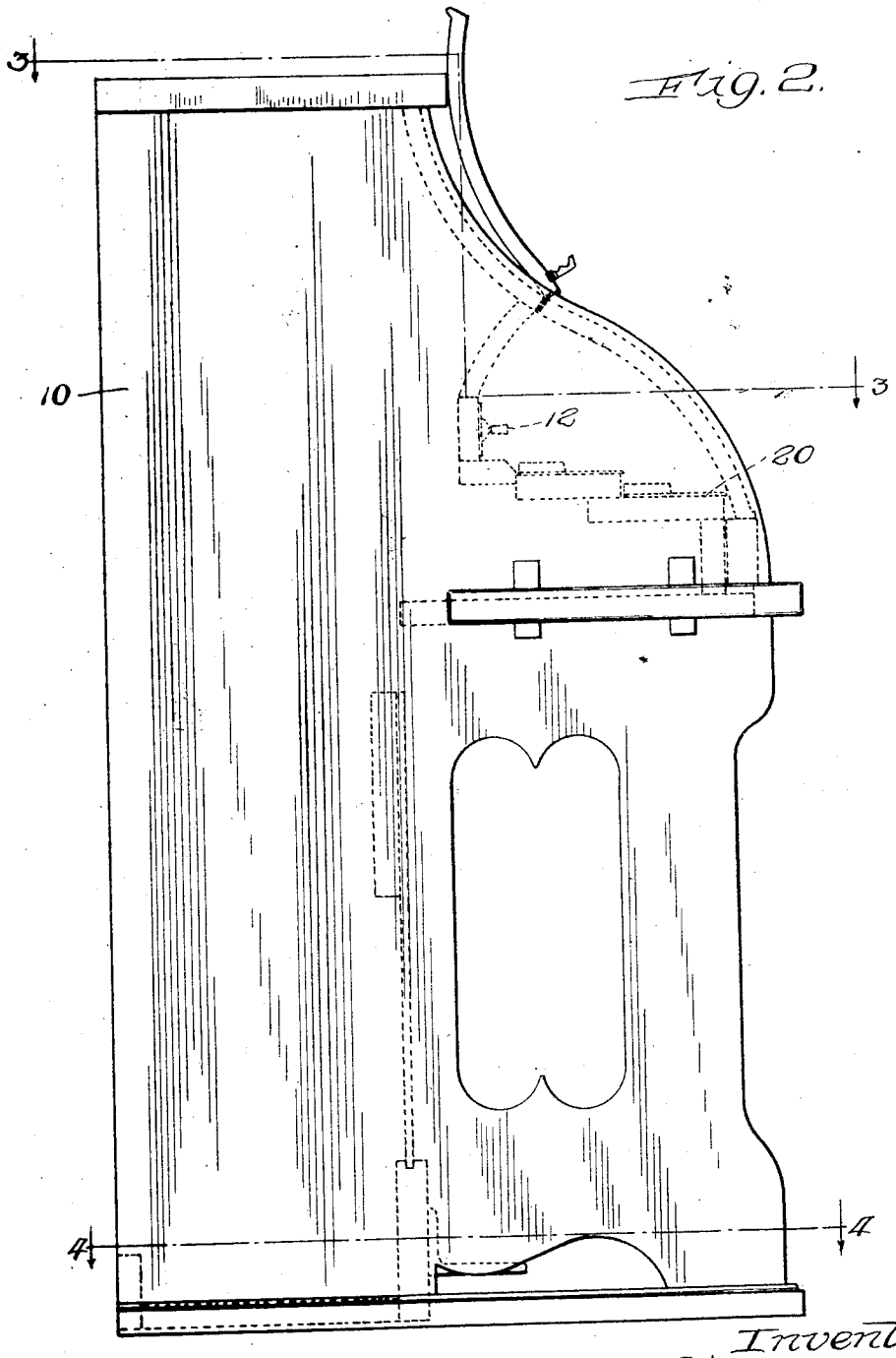
Oct. 20, 1925. 1,558,113

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REMOTE CONTROL OF THE PLAYING OF STRINGED INSTRUMENTS

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Fig. 2.



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Oct. 20, 1925. 1,558,113

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REMOTE CONTROL OF THE PLAYING OF STRINGED INSTRUMENTS

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Fig. 3.

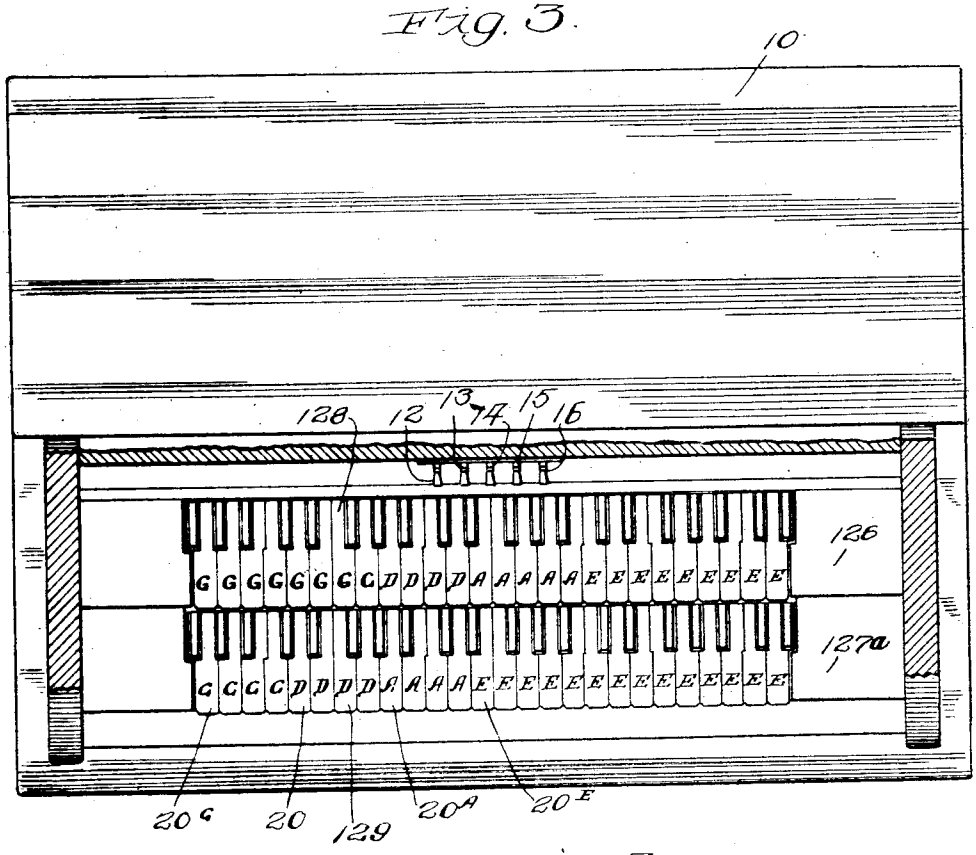
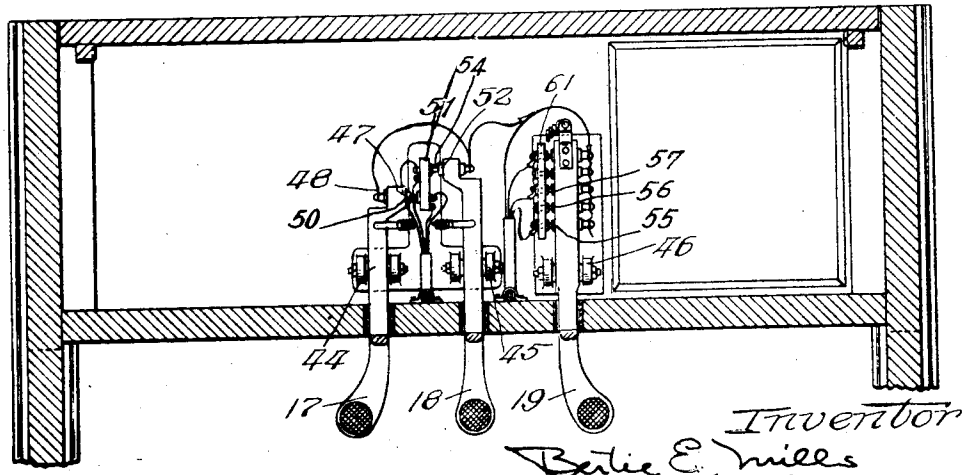


Fig. 4.



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REMOTE CONTROL OF THE PLAYING OF STRINGED INSTRUMENTS

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Fig. 5.

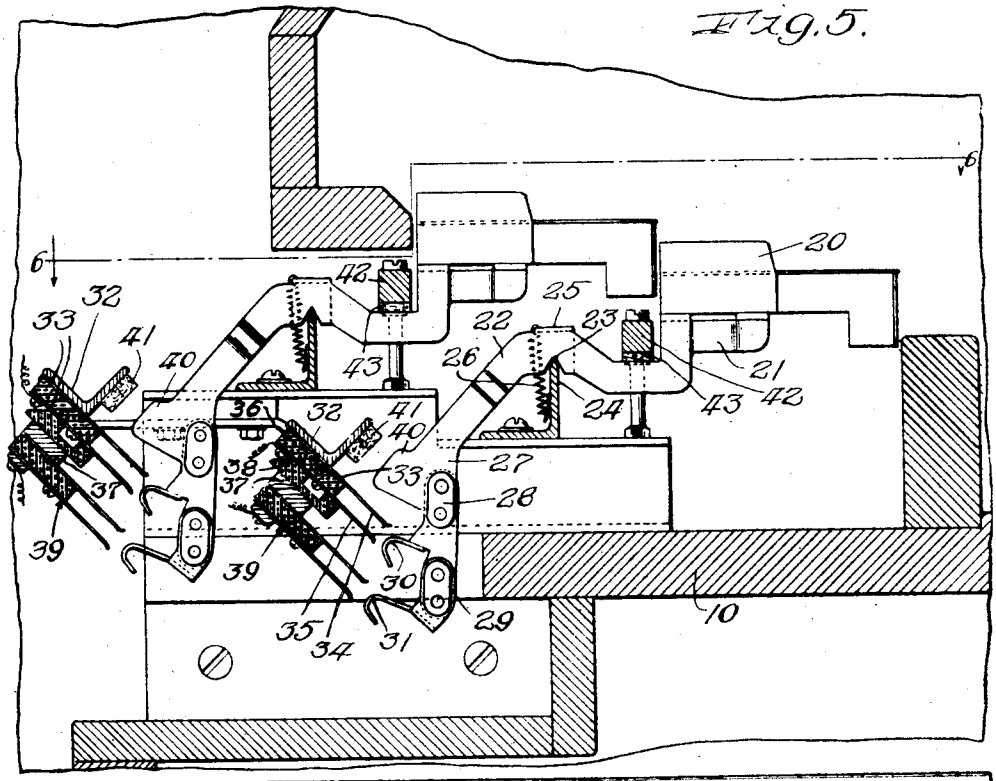
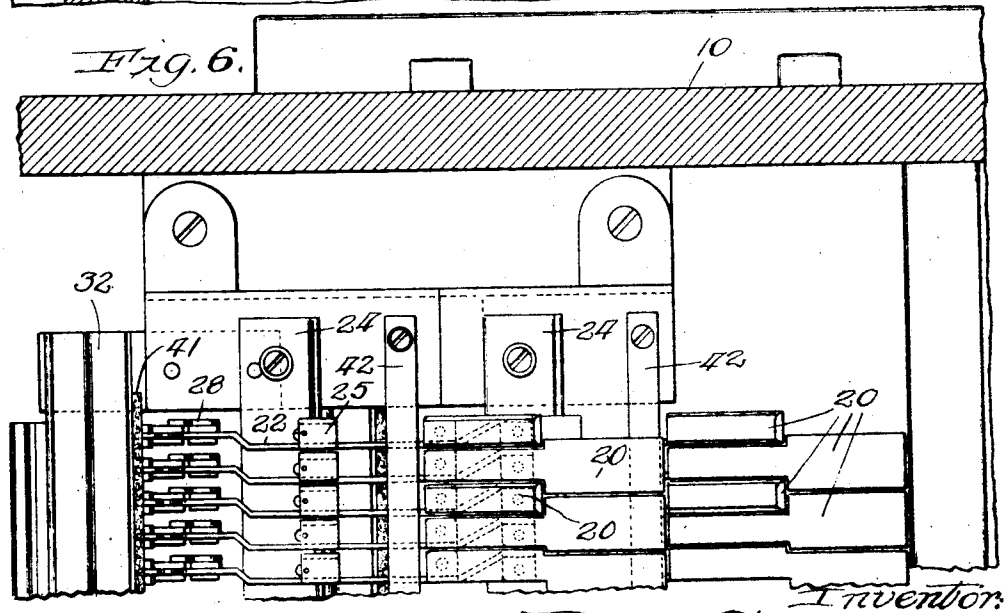


Fig. 6.



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Oct. 20, 1925. 1,558,113

B. E. MILLS

REMOTE CONTROL OF THE PLAYING OF STRINGED INSTRUMENTS

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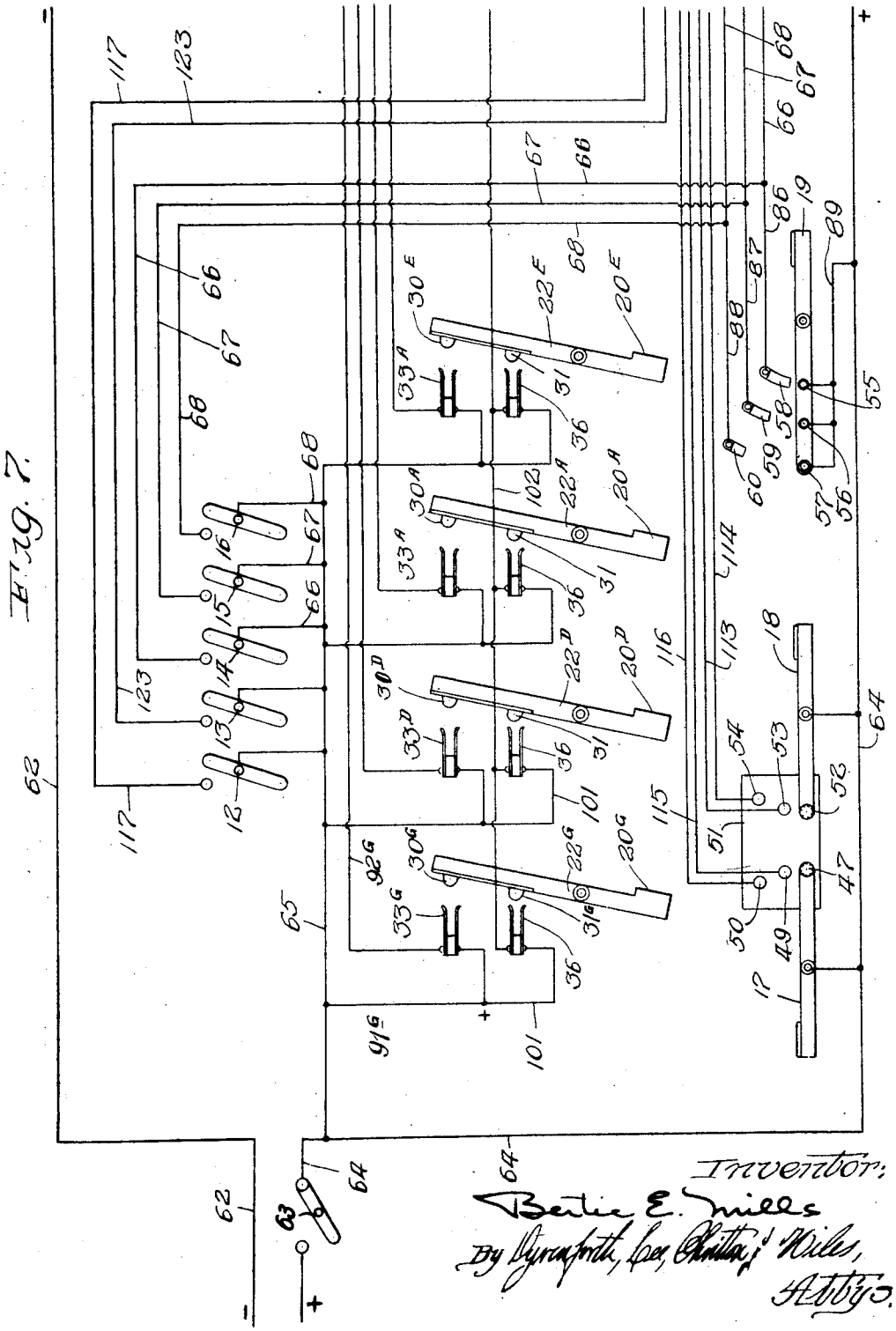


Fig. 7.

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Oct. 20, 1925. 1,558,113

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REMOTE CONTROL OF THE PLAYING OF STRINGED INSTRUMENTS

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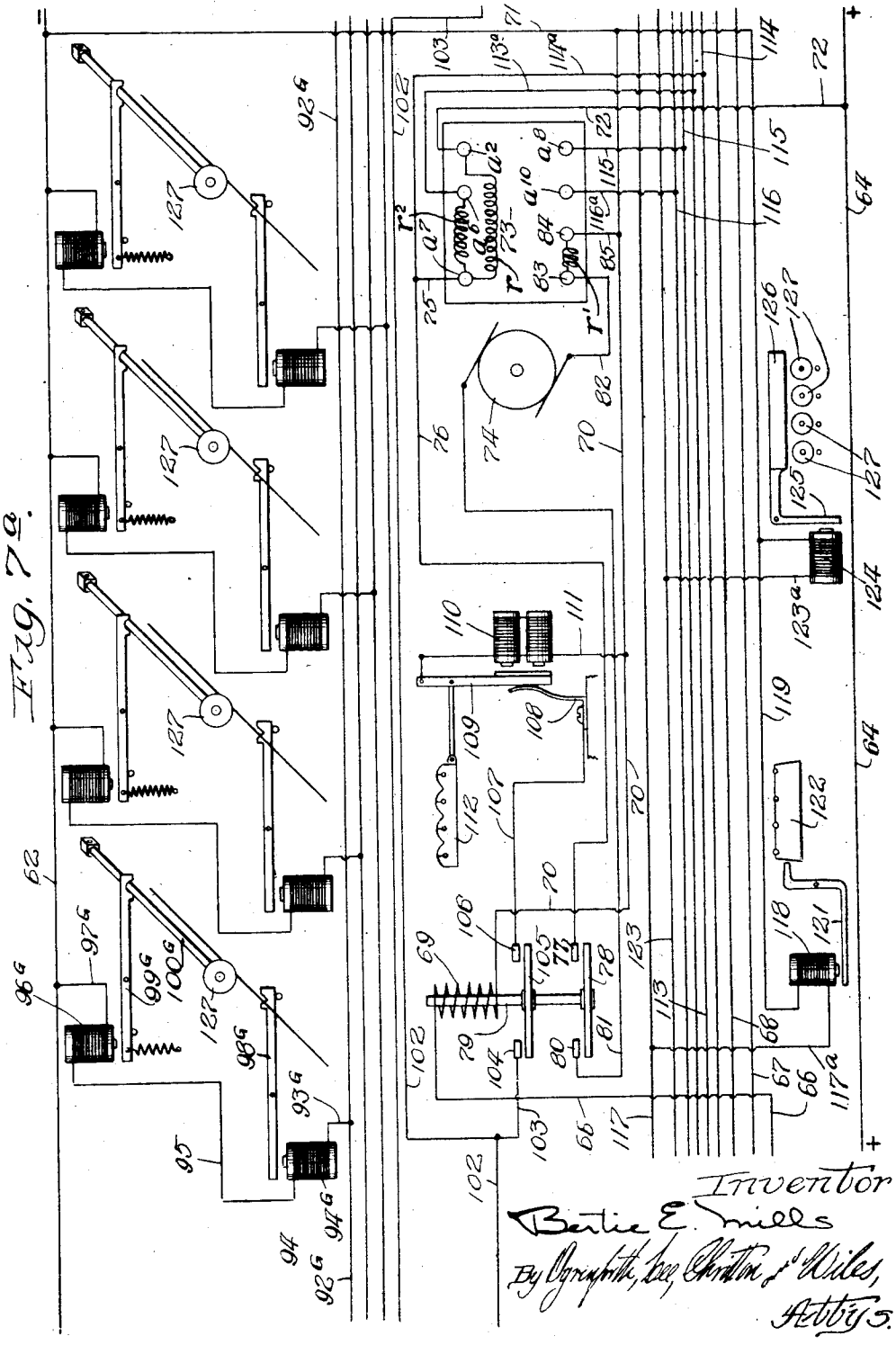


Fig. 7a.

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Patented Oct. 20, 1925. 1,558,113

UNITED STATES PATENT OFFICE.

BERTIE E. MILLS, OF DETROIT, MICHIGAN, ASSIGNOR TO MILLS NOVELTY COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

REMOTE CONTROL OF THE PLAYING OF STRINGED INSTRUMENTS.

Application filed June 14, 1922. Serial No. 568,248.

To all whom it may concern:

Be it known that I, BERTIE E. MILLS, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented a new and useful Improvement in Remote Control of the Playing of Stringed Instruments, of which the following is a specification.

The present invention relates to improvements in the remote control of the playing of stringed instruments of the viol class and more particularly of such instruments played by electrically operated devices, such as are described, for example, in the patent to Henry K. Sandell, No. 855021, granted May 28, 1907.

In accordance with the present invention, the playing of one or more such stringed instruments is controlled by a single operator from a central control device, which may suitably be provided with a key-board, preferably of the organ or piano type, and with means for control of the character of playing of the instruments and for the individual control of the several instruments played, where more than one is employed. The invention will be fully understood from the following description, illustrated by the accompanying drawings, in which:

Figure 1 is a front elevation of a suitable console or cabinet from which the instruments are controlled, the cover for the key-board being shown in open position ot display the latter;

Fig. 2 is a side elevation of the console, showing parts of the interior construction in dotted lines;

Fig. 3 is a sectional view on the line 3—3 of Fig. 2, showing the key-board in plan;

Fig. 4 is a sectional view on the line 4—4 of Fig. 2;

Fig. 5 is a vertical sectional view showing details of the key construction;

Fig. 6 is a horizontal sectional view on the line 6—6 of Fig. 5; and

Figs. 7 and 7ª together present a diagrammatic showing of the inter-connection of the several parts of the console or control cabinet with the musical instruments.

Referring more particularly to the drawings, the numeral 10 indicates a cabinet or console, in which is mounted the key-board 11, which is preferably of double-bank construction and will be described in detail hereinafter. Each of the keys controls the playing of the corresponding note upon the violin or violins which the player has in operation at the moment. In a convenient location, preferably just above the key-board, are arranged a number of switches, of which two, designated as 12 and 13, control the mute operating devices and the bow or sounder rosining devices, respectively. The remaining switches, designated as 14, 15 and 16 control individual violins. In the cabinet shown, provision is made for the playing of three violins; it is readiy apparent that any number of violins may be controlled in similar manner from the same cabinet.

A plurality of pedal control devices, designated as 17, 18 and 19, are likewise provided in convenient position for operation as in musical instruments generally of the console type. As illustrated in the present drawings, pedal 17 may be designated as the soft pedal, pedal 18 as the loud pedal and pedal 19 as the crescendo pedal. The soft pedal 17, and the loud pedal 18 affect all of the instruments in operation. The pedal 19, in the embodiment illustrated, is employed to give crescendo and decrescendo effects by increasing and decreasing the numbers of instruments in operation. The operation of these control devices will be fully set forth hereinafter.

In Figures 5 and 6 the mechanical details of construction and operation of the individual keys are illustrated. Each of the keys 20 is mounted upon a head 21 at the forward end of a key lever 22. This lever is provided with a fulcrum notch 23 resting upon the upturned edge of an angle bar 24 extending across the console. This angle bar serves as a fulcrum bar for an entire bank of keys. Approximately above the notch 23 the lever 22 is formed with an overhanging projection 25 extending rearwardly of the notch. From this projection a coil spring 26 extends downwardly to and is secured at its end to the bar 24 and this spring aids in holding the keys 20 in normal inoperative position. The rear

portion of the lever 22 extends obliquely downwardly and to its end 27 are secured, by suitable insulated mounting 28 and 29, the metallic contact members 30 and 31. An angle bar 32 is mounted to extend across the console and to it are secured a plurality of contact jacks 33, one of which corresponds to the contact member 30 of each of the key-levers 22. These contact jacks consist of spring contact members 34 and 35 spaced apart by a suitable insulating material 36. The contact jacks 33 are so secured to the angle bar 32 that there is direct metallic contact between the spring contact member 34 and the angle bar, so that the angle bar 32 serves as a common electrical conductor for all of the contact jacks 33. A metallic bar 37, separated from the jacks 33 by suitable insulating material 38, likewise extends across the console and to it are secured the contact jacks 39, each of which corresponds to the contact member 31 of one of the key-levers. One of the contact members of each of the contact jacks 39 is in direct metallic contact with the bar 37, so that the latter serves as a common electrical connection for these contact jacks. In the form illustrated in Fig. 5, the contacts 30 and 31 and the contact jacks 33 and 39 are so disposed that the contact members close the circuits through the contact jacks. At the same time that these contacts are closed by depression of the key, a projecting head 40 on the key-lever engages a cushioning member of felt or the like indicated by numeral 41, secured to the angle bar 32. When the key is depressed, its return movement is effected by the spring 26, as is readily apparent. Cushioned stops are provided to soften the return movement of the key-levers, these being conveniently formed as bars 42 extending across the console and above each bank of key-levers and provided on their under sides with cushions 43 of suitable material, such as felt. It is apparent that depression of a key results in the closure of two circuits, one through the jacks 33 and the other through the jacks 39. One of these circuits may, for example, control the mechanism upon the stringed instrument in operation for sounding the particular note corresponding to the key struck and the other contact may, for example, control a tremolo device. According to the length and position of the contact members 30 and 31, the note and the tremolo circuit may be simultaneously closed or the note circuit may be closed by a partial depression of the key and the tremolo circuit by its further depression.

The mechanical operation and construction of the pedals are shown in Fig. 4. These levers extend inwardly into the cabinet 10 and are mounted upon suitable pivot fulcrums 44, 45 and 46, respectively. At its inner end pedal 17 is provided with a contact point 47 in a suitable insulated mounting 48. On depression of the pedal 17 the contact point 47 engages successively two contact points 49 and 50 mounted upon a vertical standard 51 of insulating material. A similar contact point 52 is provided on the inner end of the pedal lever 18 and this, in turn, makes contact with the contact points 53 and 54 mounted on standard 51, in the proper positions of pedal 18. The crescendo pedal 19 is provided at its inner end with a series of insulated contact points 55, 56 and 57 which cooperate with the arcuate contact plates 58, 59 and 60 on a standard 61 of insulating material. The contact plates 58, 59 and 60 are so disposed that, as the pedal 19 is moved downwardly, they are successively engaged by the corresponding contact points on the pedal lever at different points in the travel of the pedal. After the several contact points 55, 56 and 57 engage the corresponding contact plates, they remain in contact during the continued travel of the pedal lever.

The operation of the violins from the console, the mechanical construction of which has been described, will appear from the diagram presented in Figs. 7 and 7ª, the former showing the left half of the diagram and the latter the right half. In Fig. 7 the operating mechanism in the console is shown diagrammatically in connection with the representation of the circuits employed and in Fig. 7ª the operative parts of an electrically played violin are shown diagrammatically in connection with the same circuit.

The detailed construction and operation of the violin may be substantially that described in the Sandell patent above referred to, with the exception of the tremolo device, which may be substantially that of my Patent No. 1,407,434 of February 21, 1922. The detailed circuits are shown in connection with a single violin and it will be readily apparent that any number of violins may be used, as desired.

In considering the circuits, it will be noted that one line, indicated as the negative line in Figures 7 and 7ª, is common to all the circuits and this line has been designated by the numeral 62. A main switch 63, which may be placed at any suitable point on the console, controls the circuits through the entire device. The positive main is indicated by the numeral 64. From a branch 65 of this line are taken off three lines 66, 67 and 68, which control the operation of the first, second, and third violins, respectively. These lines are continued in the diagram through Fig. 7ª. It will be noted, on consideration of the latter figure, that the line 66 leads to the contact closing solenoid 69 of the first violin, the circuit being completed through the line 70 to the line 71 which in turn connects directly with the return of negative main 62.

The current through the solenoid 69 energizes the latter, which closes two sets of contacts, one of which closes the tremolo circuit and the other the bow-motor circuit, as will be more fully described hereinafter.

From the incoming or positive main 64 a line 72 leads to the control panel 73 for the bow-motor 74. The arrangement of connections in the control panel for governing the speed of rotation of the bow-motor may be substantially that described in the patent of Henry K, Sandell, No. 1,085,943 of February 3, 1914. The point of connection of the line 72 to the control panel, corresponds to a^2 of that patent, and is so designated in Fig. 7ª. From a^2 the circuit passes to a^7 through a suitable resistance r, as shown in the Sandell patent just referred to, and from a^7 through line 75 to line 76 leading to the contact 77. The switch member 78 secured to solenoid core 79 closes the circuit between contact 77 and contact 80. From contact 80 a line 81 leads to one terminal of the motor 74. From the other terminal of the motor, line 82 leads to contact 83 on the panel 73. Contact 83 is connected through a resistance r' to contact 84, from which a line 85 leads to the line 70 connecting with the negative line 71. As long as the switch 14 is closed, the above-described bow-motor circuit, which is the circuit for normal speed of rotation, is closed. Switch 15 controls in a similar way the normal bow-motor circuit of a second violin and switch 16 of a third violin. Additional switches may be provided if additional violins are to be played.

The crescendo pedal 19 provides a set of switches controlling the bow-motor circuits of the different violins, these switches being in parallel with the switches 14, 15 and 16. The contact plates 58, 59 and 60 are connected by lines 86, 87 and 88, respectively, through the first, second and third violin control lines 66, 67 and 68. The contact points 55, 56 and 57 on the pedal 19 are directly connected by line 89 to the incoming or positive main 64. As the pedal 19 is pushed down, contact 55 engages plate 58, thereby causing a current to pass through line 66 and actuating the bow-motor of the first violin. As the pedal lever continues its movement, contact 57 engages plate 59, thereby bringing the second violin into action; further movement of the pedal lever causes the contact point 57 to engage the plate 60, thereby bringing the third violin into action. The arcuate shape of the several contact plates causes the respective violins may be brought in and cut out for ceeding one is closed by the movement of the pedal. As a result, for example, if the first violin is playing the melody, by movement of the pedal 19, the second and third violins may be brought in and out for crescendo and decrescendo effects, as desired, without operating the switches 15 and 16.

The notes played upon the violin in action are controlled by means of the keys 20, of which four are illustrated in the diagrammatic Figure 7. These are designated in that figure as 20^G, 20^D, 20^A and 20^E, and operate respectively notes on the G, D, A and E strings of the violin. As the circuits controlled by the several keys are in many respects similar, similar elements in connection therewith will be designated by the same reference numerals, and with suffixes indicating the strings affected. The circuit controlled by the key 20^G will be described in detail.

As has been described in connection with the mechanical construction of the key levers, the key 20^G is mounted upon key lever 22^G, which bears two insulated contact members 30^G and 31^G. The former controls the note circuit and the latter the tremolo circuit.

The contact member 30^G closes the circuit through jack 33^G, which is connected on the one hand to the line 91^G, which is a branch from the positive or incoming main. On the other hand, the jack 33^G is connected to the note control line 92^G, which is provided with a connection to each of the lines corresponding to the particular note. Referring to Figure 7ª, it will be seen that the line 92^G is connected to line 93^G to the fingering magnet 94^G, from which a connection 95^G leads to the bow-depressing magnet 96^G and from this in turn a connection 97^G leads to the negative or return line 62. Energization of the magnet 94^G actuates the fingering lever 98^G and simultaneously the energization of the magnet 96^G causes the operation of the lever 99^G to depress the constantly rotating sounder shaft 100^G, operated by the bow-motor. A similar circuit is provided for each of the notes capable of being sounded on each of the strings. It will likewise be apparent that each of the keys controls the same notes on all of the violins in operation at any time.

The contacts 31 control the tremolo circuit. Each of the jacks 36, with which these contacts co-operate, is connected, on the one hand, through a line 101 to the positive or incoming line 65 and, on the other hand, to the tremolo control line 102. The tremolo control line 102 is provided with a branch 103 for each violin, and this branch connection terminates at a contact 104. A switch member 105, operated by the solenoid 69 which effects the closing of the circuit through the bow-motor of the corresponding violin, closes the circuit between the contact 104 and the contact 106. From the latter contact a connection 107 leads to the contact spring 108 which engages the vi-

brating electromagnet armature 109, the circuit being completed through the electromagnets 110 and the line 111 leading to the line 70 which connects with the negative line 71. The vibrating armature 109 causes lateral movement of the string support 112, thereby producing the tremolo effect. It is readily apparent that each key is provided with means for closing the tremolo circuit through the violins in operation.

The pedals 17 and 18 control the expression of the violins in operation by varying the speed of the bow-motor. The pedal lever 18, which is connected to the positive line 64, when partly depressed closes the circuit through the contacts 52 and 53 and line 113, from which a branch 113^a leads to the terminal a^6 on each bow-motor control panel 73. From the terminal a^6 connection is made to the terminal a^7 through a resistance r^2 lower than the resistance r between the terminal a^2 and the terminal a^7. The circuit passes on through the bow-motor control a^6 and the bow-motor in the manner described above in connection with the bow-motor circuit. As the resistance in the bow-motor circuit is lowered by closing this circuit, a louder tone of the bows or sounders is produced.

Complete depression of the pedal 18 closes the circuit through the contacts 52 and 54, resulting in the passage of a current through the connector 114. From this connector 114^a connects directly with the bow-motor circuit connection 76, thereby cutting out additional resistance, further increasing the speed of the motor and producing the loudest tone.

Partial depression of the soft pedal 17 closes the circuit from the positive line through the contacts 47 and 49 and the line 115, from which a connection 115^a passes to each control panel 73. The connections in the control panel are so arranged (in a known manner) that the closure of this circuit introduces a resistance in shunt across the bow-motor circuit, thereby weakening the current passing through the bow-motor and softening the tones produced.

Full depression of the soft pedal 17 closes the circuit from the positive line through the contact 47 and 50 and the connector 116, from which a branch connection 116^a passes to a terminal a^{10} in each control panel 73. The control panel is so arranged that closure of this circuit throws in shunt across the bow-motor circuit (in a known manner) a resistance lower than that introduced by closure of the circuit through the line 115, with a result that a still softer tone is produced.

Additional circuits are provided for applying the mute to the violins and for applying rosin to the bows or sounders. The control switch 12, which actuates the mute, closes a circuit from the line 65 through line 117, from which a branch 117^a passes to the mute magnet 118 of each violin. From the mute magnet the circuit is closed through the line 119 and the line 71 leading to the negative main 62. The mute magnet 118 operates a bent armature 121 to apply lateral pressure to the bridge 122 of each violin.

The rosin switch 13 closes the circuit from the positive line 65 through the line 123, from which a branch line 123^a makes connection with a suitable electromagnet 124, the circuit being completed through line 119 leading to the negative main. The magnet 124, when energized, operates a bent armature 125 to depress a rosin-holding device 126 and engage it with the sounders 127.

As is well known, in playing the upper positions on the G, D and A strings of a violin, the notes formed are the same, or overlap those of the first position on the next higher strings. In order to indicate the upper positions on the strings clearly to the operator at the console and to prevent any accidental attempt to operate the next mechanism for playing two notes on the same string, a key-board is provided in which two banks of keys are provided. The upper bank is indicated on the drawing by the numeral 126 and the lower by the numeral 127^a. The lower bank of keys controls the lower position notes for each of the four strings and these keys are followed on the lower bank by the upper position E string notes, so that with respect to G, D and A strings, the lower bank of keys can be operated to play the lower position notes only, while, with respect to the E string, keys are provided in the lower bank for both the lower and upper position notes. The upper bank of keys may, as illustrated, carry a duplicate set of the lower position G string notes; aside from these, it carries only upper position notes. Keys of the upper bank are located above the keys corresponding to identical notes on the lower bank. Thus note 128 in Fig. 3 is note F in an upper position on the G string and note 129 is the same F in the lower position on the D string. Either the upper or lower bank of keys forms a complete key-board, and by using both key-boards, all four strings of the instruments may be played upon at once.

It may be stated further with reference to the manuals, or banks of keys, that the manuals have keys arranged in associated groups, with a certain group of one manual controlling the lower position notes of one string and an associated group of the other manual controlling the corresponding upper position notes of a lower string. Thus, for example, the keys D of the lower manual correspond with the lower position notes of the D string, while the keys G of the associated group which is just above in the upper manual correspond with the same upper

position notes of the G string. Besides this, the manuals are completed by employing duplicate groups of keys. Thus the group of G keys in the lower manual corresponds exactly with the group of G-keys immediately above in the upper manual. So, also, at the right hand ends of the manuals, the E keys of the lower manual correspond with the E keys of the upper manual.

It should be kept in mind that in the embodiment illustrated, the actuation of any manual-key, causes the energization of the finger-actuating magnet and of the bow-depressing or bow-applying magnet, of each instrument, regardless of whether or not the bows are being driven (revolved). Otherwise stated, when any key is depressed, the fingering is performed for the selected note with reference to all instruments and the bows are depressed for all instruments, but the sounding of the selected note on any instrument occurs only if the bow is being driven (revolved). Thus, the selecting of the instruments is effected by closing the bow-motor circuits by means of the switches 14, 15 and 16 on the console.

I claim:

1. In a device for the remote control of the playing of musical instruments, means for sounding the individual notes for each of a plurality of stringed instruments of the viol class, a key-board provided with keys corresponding to the notes of said instruments, means actuated by each of said keys for actuating the corresponding note-sounding means of said instruments, and means for selecting the individual instruments upon which the notes are to be sounded.

2. In a device for the remote control of the playing of musical instruments, means for sounding the individual notes of each of a plurality of stringed instruments of the viol class, a key-board provided with keys corresponding to the notes of said instruments, means actuated by each of said keys for actuating the corresponding note-sounding means of said instruments, means for selecting the individual instruments upon which the notes are to be sounded, and independently operable means for controlling the operation of others of said instruments.

3. In a device for the remote control of the playing of musical instruments, means for sounding the individual notes of each of a plurality of stringed instruments of the viol class, a key-board provided with keys corresponding to the notes of said instruments, means actuated by each of said keys for actuating the corresponding note-sounding means of said instruments, a tremolo device in combination with each of said instruments, and means actuated by each of the keys for actuating the tremolo devices of the instruments in operation.

4. In a device for the remote control of the playing of musical instruments, means for sounding the individual notes of each of a plurality of stringed instruments of the viol class, a tremolo device in combination with each of said instruments, a key-board provided with keys corresponding to the notes of said instruments, means actuated by each of said keys for actuating the corresponding note-sounding means of said instruments and for actuating said tremolo devices, and means for selecting the individual instruments, the note-sounding means and tremolo devices of which are to be actuated.

5. In a device for the remote control of the playing of musical instruments, means for sounding the individual notes of a stringed instrument of the viol class, a tremolo device operatively connected with said instrument, a key-board provided with keys corresponding to the notes of the instrument, means actuated by each of said keys for actuating the corresponding note-sounding means of the instrument, and means actuated by each of said keys for actuating said tremolo device.

6. In a device for the remote control of the playing of musical instruments, means for sounding the individual notes of a stringed instrument of the viol class, said means including an open electrical circuit, a tremolo device operatively connected with said instrument, a normally open electrical circuit for the control of said tremolo device, a key-board provided with keys corresponding to the notes of said instrument, contact members on each of said keys arranged to close the circuit of the corresponding note-sounding means when the key is depressed, and contact means on each of said keys for closing the circuit through the tremolo device when any of said keys is depressed.

7. In a device for the remote control of the playing of musical instruments, means for sounding the individual notes of each of a plurality of stringed instruments of the viol class, said means including a single open electrical circuit for each note of all said instruments, a key-board provided with keys corresponding to the notes of said instruments, and contact members on each side of said keys for closing the electrical circuit of the corresponding note-sounding means when the key is depressed.

8. In a device for the remote control of the playing of musical instruments, means for sounding the individual notes of each of a plurality of stringed instruments of the viol class, said means including a single open electrical circuit corresponding to the sounding means for each note of all said instruments, tremolo devices for each of said instruments, an open electrical circuit for operating said tremolo devices, a key-board

provided with keys corresponding to the notes of the instruments, contacts on each of said keys for closing the circuit of the corresponding note-sounding means of the instruments, and contact means on each of said keys for closing the electrical circuit for operating the tremolo devices.

9. In a device for the remote control of the playing of musical instruments, means for sounding the individual notes of a plurality of stringed instruments of the viol class, said means including an electrical circuit for the control of the operation of each instrument and a circuit for the control of each note of all the instruments, and a centrally located control device including independently controllable circuit closing devices for each of said electrical circuits.

10. In a device for the remote control of the playing of musical instruments, means for sounding the individual notes of each of a plurality of stringed instruments of the viol class, said means including an electrical circuit for the control of the operation of each instrument and a circuit for the control of each note of all the instruments, a tremolo device co-operating with each instrument, a circuit for the control of the tremolo devices, and centrally located controls including circuit closing devices for the circuits controlling the operation of the instruments, independently controllable circuit closing devices for closing the circuits controlling the notes of the instruments, and circuit closing devices co-operating with the last-mentioned circuit closing devices for closing the circuits controlling the tremolo devices.

11. In a device for the remote control of the playing of musical instruments, means for sounding the individual notes of a plurality of stringed instruments of the viol class, said means including rotating sounders for sounding the strings of the instruments, an electrical circuit for the control of the operation of each instrument and a circuit for the control of each note of all the instruments, means for applying rosin to said sounders, an electrical circuit for controlling the rosin-applying devices of all said instruments, and a centrally located control device including independently controllable circuit closing devices for each of said electrical circuits.

12. In a device for the remote control of the playing of musical instruments, means for sounding the individual notes of a plurality of stringed instruments of the viol class, said means including an electrical circuit for the control of the operation of each instrument and a circuit for the control of each note of all the instruments, means for muting each of the instruments, an electrical circuit for controlling all said muting means, and a centrally located control device including independently controllable circuit closing devices for each of said electrical circuits.

13. In a device for the remote control of the playing of musical instruments, means for sounding the individual notes of a plurality of stringed instruments of the viol class, said means including an electrical circuit for the control of the operation of each instrument and a circuit for the control of each note of all the instruments, means for controlling the volume of sound produced by said instruments, said means including an electrical circuit controlling each gradation of volume varying from normal, and a centrally located control device including independently controllable circuit closing devices for each of said electrical circuits.

14. In a device of the character set forth, the combination of a console, mechanisms for driving the sounders of a plurality of stringed instruments of the viol class, electrical circuits controlling said driving mechanisms each including a controlling switch mounted on the console, whereby any selected driving mechanism may be thrown into use at the will of the operator, sounder-controlling magnets, and a key-board provided with keys corresponding with said magnets, each key controlling the circuits of the magnets of the several instruments for the same string of each instrument.

15. In a device of the character set forth, the combination of a console, mechanisms for driving the sounders of a plurality of stringed instruments of the viol class, electrical circuits controlling said driving mechanisms each including a controlling switch mounted on the console, whereby any selected driving mechanism may be thrown into use at the will of the operator, sounder-controlling magnets, finger-controlling magnets, and a key-board provided with keys, each key controlling corresponding sounder-controlling magnets of the several instruments and each key also controlling corresponding finger-controlling magnets of the several instruments.

16. In a device for the remote control of the playing of musical instruments, means for sounding the individual notes of a stringed instrument of the viol class, said means including electrical circuits corresponding with the notes, a key-board provided with keys corresponding with the notes of the instrument, and a contact device carried by each of said keys and controlling the circuit of the note-sounding means corresponding with said key, and sounder-driving means having an electrical controlling circuit provided with a control switch which is independent of said keys.

17. In a device for the remote control of the playing of musical instruments, the combination with sounder-controlling mag-

nets and finger-controlling magnets and suitable circuits therefor, of a key-manual provided with keys corresponding with the notes to be sounded, and circuit-controlling contacts for said circuits controlled by said keys.

18. In a device for the remote control of the playing of musical instruments, the combination with the sounder-controlling magnets and finger-controlling magnets of a stringed instrument of the viol class, and suitable circuits for said magnets, of a plurality of key-manuals, each provided with an orderly arrangement of keys, and circuit-controlling contacts controlled by said keys, said manuals having keys arranged in associated groups, with a certain group of one manual controlling the lower position notes of one string and an associated group of another manual controlling the corresponding upper position notes of a lower string.

19. In a device for the remote control of the playing of musical instruments, the combination with the sounder-controlling magnets and finger-controlling magnets of a stringed instrument of the viol class, and suitable circuits for said magnets, of a plurality of key-manuals, each provided with an orderly arrangement of keys, circuit-controlling contacts controlled by said keys, said manuals having keys arranged in associated groups, with a certain group of one manual controlling the lower position notes of one string and an associated group of another manual controlling the corresponding upper position notes of a lower string, and groups in each manual duplicating like groups in the other manual and thus making a complete register in each manual.

20. In a device for the remote control of the playing of stringed instruments of the viol class, a manual having its keys arranged in separate groups, each group controlling the sounding of a given string for the production of notes on said string, and fingering means for each of the several strings of said instrument controlled by said keys.

21. In a device for the remote control of the playing of a stringed instrument of the viol class, a manual having its keys arranged in separate groups, each group controlling the sounding of a given string for the production of a plurality of notes on said string and the several groups being arranged in succession to correspond with the playing of the strings in G, D, A, E order, and fingering means for each of the several strings of said instrument controlled by said keys.

22. In a device for the remote control of the playing of a plurality of stringed instruments of the viol class, a key-board provided with an upper key-manual and a lower key-manual, said manuals having keys arranged in associated groups, the lower manual having groups of keys corresponding with all of the lower position notes of all the strings and the upper manual having groups of keys corresponding with all the upper position notes of all the strings, and note-sounding means for each of the several strings of said instrument controlled by said keys.

23. In means of the character set forth, the combination of a plurality of sounder-driving mechanisms for a plurality of stringed instruments of the viol class, and electrical circuits controlling the operation of said mechanisms, a plurality of switches controlling said circuits, said switches being operable at the will of the operator as a means for selecting the instruments to be played, fretting devices and sounder-applying devices and controlling circuits therefor for each of the several instruments, and a key-board provided with keys equipped with means controlling said last-named circuits.

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