E. M. SCHANTZ.

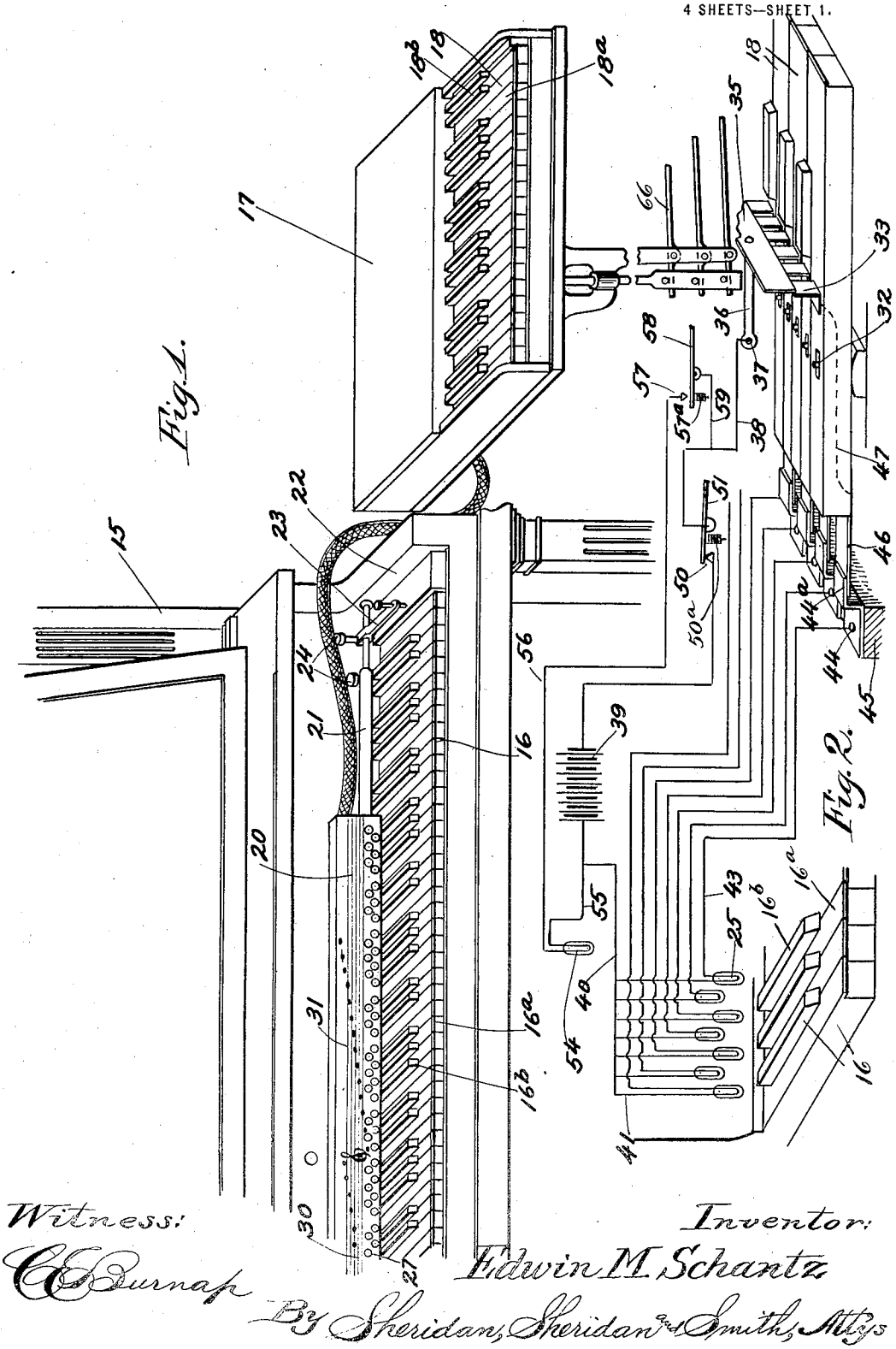
INSTRUCTING INDICATOR FOR MUSICAL INSTRUMENTS.

APPLICATION FILED AUG. 11, 1917.

1,324,276.

Patented Dec. 9, 1919.

4 SHEETS—SHEET 1.



Witness:

C. E. Burnap

Inventor:

Edwin M. Schantz

By Sheridan, Sheridan and Smith, Attys

E. M. SCHANTZ.

INSTRUCTING INDICATOR FOR MUSICAL INSTRUMENTS.

APPLICATION FILED AUG. 11, 1917.

1,324,276. Patented Dec. 9, 1919.

4 SHEETS—SHEET 2.

Fig. 3.

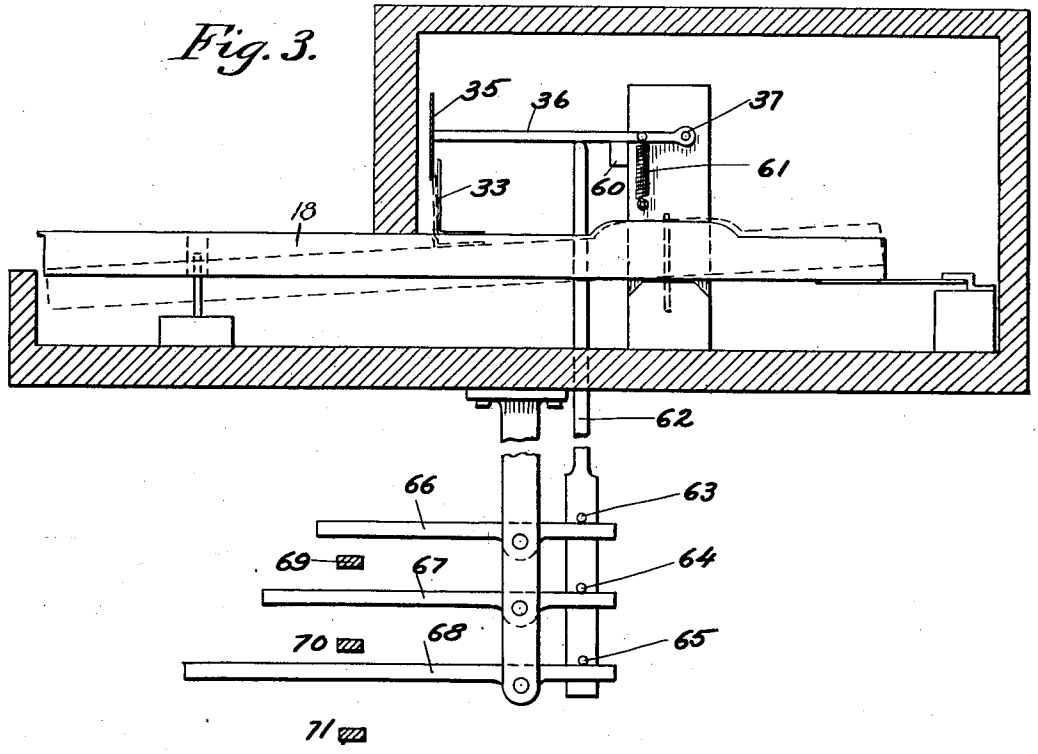


Fig. 4.

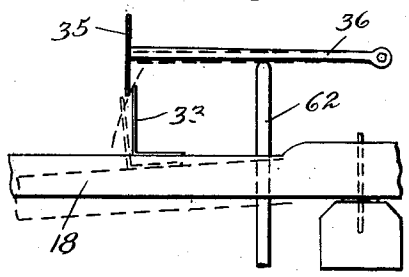


Fig. 5.

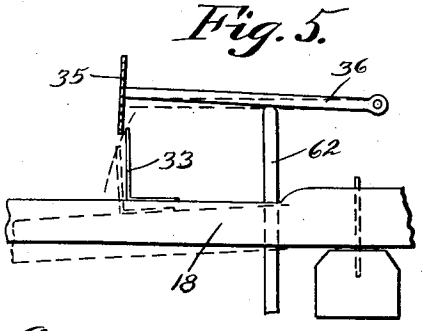
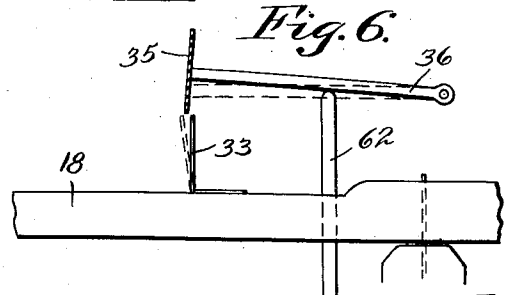


Fig. 6.



Witness:
C. C. Burnap

Inventor:
Edwin M. Schantz
By Sheridan, Sheridan & Smith, Attys

E. M. SCHANTZ.

INSTRUCTING INDICATOR FOR MUSICAL INSTRUMENTS.

APPLICATION FILED AUG. 11, 1917.

1,324,276. Patented Dec. 9, 1919.

4 SHEETS—SHEET 3.

Fig. 10.

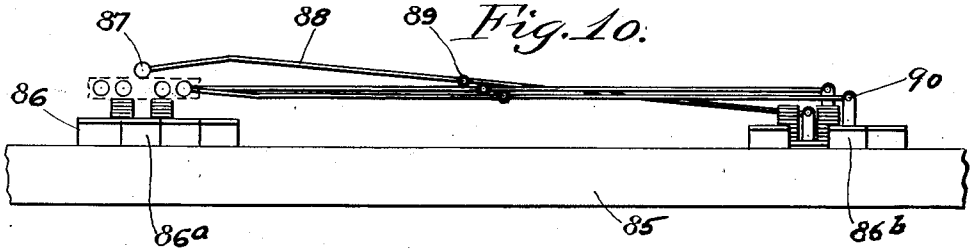


Fig. 9.

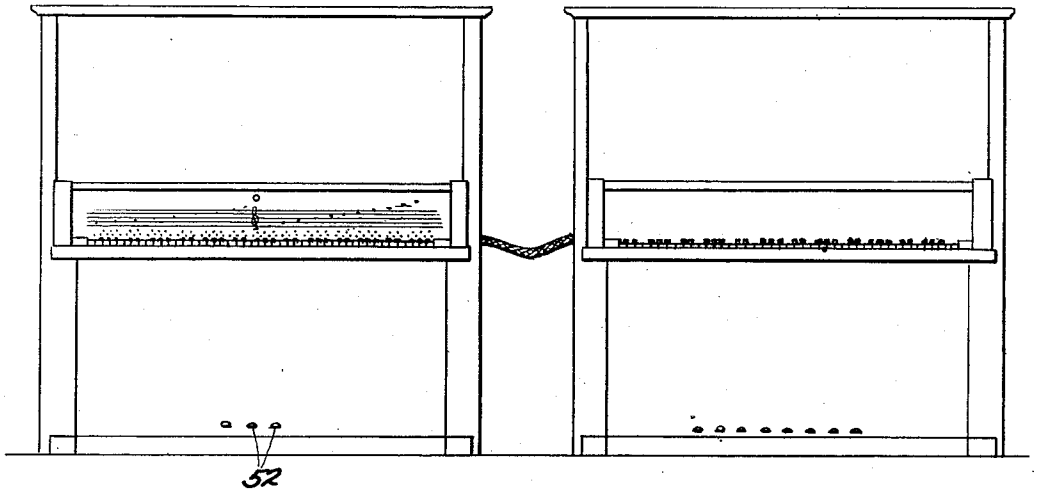


Fig. 8.

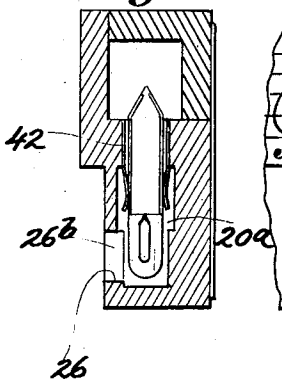
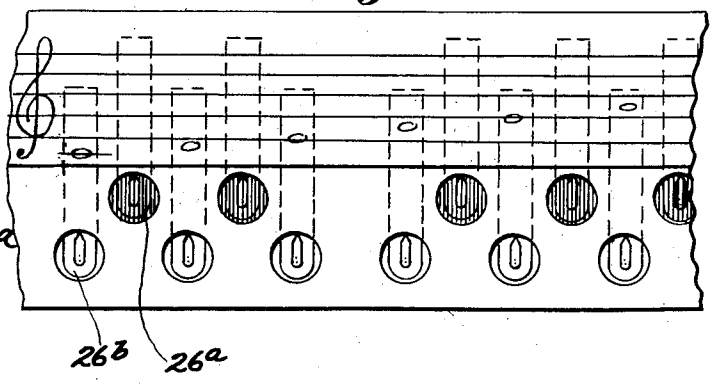


Fig. 7.



Witness:
C. C. Burnap

Inventor:
Edwin M. Schantz
By Sheridan, Sheridan & Smith, Atty's

E. M. SCHANTZ.

INSTRUCTING INDICATOR FOR MUSICAL INSTRUMENTS.

APPLICATION FILED AUG. 11, 1917.

1,324,276.

Patented Dec. 9, 1919.

4 SHEETS—SHEET 4.

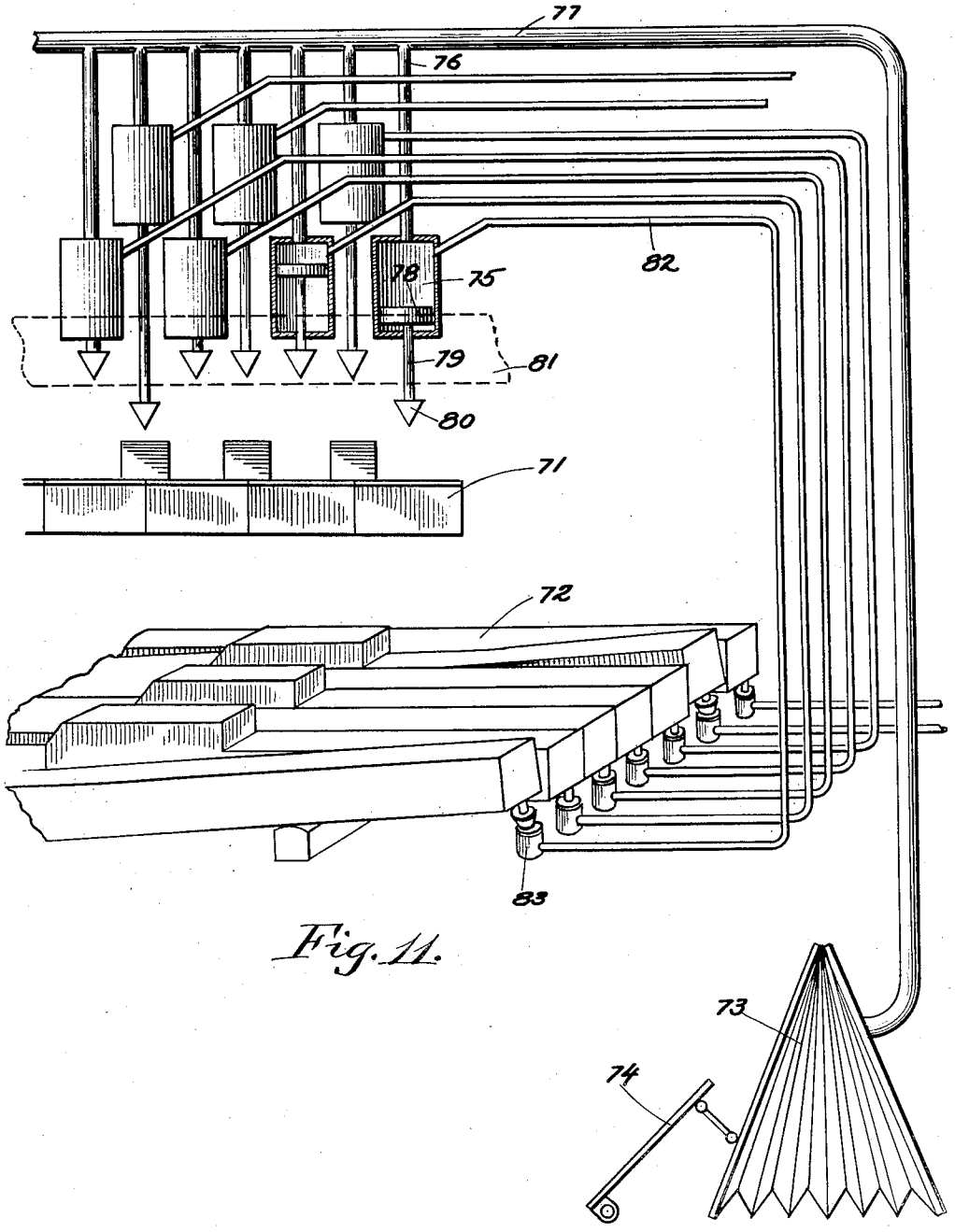


Fig. 11.

Witness:
C. C. Burnap

Inventor:
Edwin M. Schantz
By Sheridan, Sheridan & Smith, Atty's

UNITED STATES PATENT OFFICE.

EDWIN M. SCHANTZ, OF CHICAGO, ILLINOIS.

INSTRUCTING-INDICATOR FOR MUSICAL INSTRUMENTS.

1,324,276. Specification of Letters Patent. Patented Dec. 9, 1919.

Continuation of application Serial No. 794,953, filed October 13, 1913. This application filed August 11, 1917. Serial No. 185,740.

To all whom it may concern:

Be it known that I, EDWIN M. SCHANTZ, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Instructing-Indicators for Musical Instruments, of which the following is a specification.

This invention relates to improvements in apparatus for teaching music, and the present application is a continuation of my prior pending application, Serial No. 794,953, filed October 13, 1913, as to all subject matter common to the two applications. The form of my invention embodied in the present application is claimed broadly in my co-pending application, Serial 619,290, filed April 6, 1911, renewed Mch. 4, 1919, as Ser. No. 280,654.

My improved apparatus is adapted for use in the musical art for signaling or otherwise indicating on the keyboard of a piano, or the like, such subjects as tone duration, the key or keys to be played, the sequence in which the keys are to be played, the fingering to be used, and for other like purposes. The object of the invention is to provide improved apparatus for teaching music by means of visual signals which are actuated in the sequence in which the corresponding keys of a piano, or the like, should be operated to play a musical composition. The correct fingering is indicated in my improved device by actuating the signals representing one or more keys to be played and simultaneously actuating a number of additional signals to complete a group of five, thereby indicating to the pupil the exact portion of the keyboard upon which the hand should be placed, after which the added signals may be released or deënergized in order to indicate the key or keys to be played, and also the finger or fingers of the hand thus placed which should be used in playing said key or keys.

The chord formation, phrasing, and the like of a musical composition, is determined by the instructor from a study of the composition and then indicated by actuating the signals corresponding to the appropriate notes and keys.

An auxiliary signal is used for teaching meter, pedaling, rhythm, etc.; the use of this signal is first explained to the pupil who will then understand that when the signal is actuated the pedal, for instance, should be used. The present invention also provides means whereby the teacher can operate his instrument in unison with the student, thereby making it possible for the teacher to prompt the student efficiently. Means is further provided for actuating a number of signals and keeping such signals in operation, which is often desirable where there are more keys to be played than can be simultaneously operated by the teacher, and when it is desirous to have a number of the keys signaled at one time, for instance in teaching three or four octaves of an arpeggio. This improvement also provides means for maintaining a certain group of signals in operation continuously while all of the other signals that may be actuated are actuated for the periods only during which the corresponding keys should be played.

The various features and advantages of the invention will appear more clearly from the following specification taken in connection with the accompanying drawings in which one embodiment of the invention is illustrated. In the drawings—

Figure 1 is a perspective view of a piano to which the instructing apparatus has been applied, the primary or instructor's instrument being shown at the right of the piano;

Fig. 2 is a diagrammatic view of the electric connections of the apparatus shown in Fig. 1;

Fig. 3 shows a vertical sectional view through the key board and lower part of the auxiliary or teacher's instrument illustrating in detail the means for controlling the continued actuation of any signal or group of signals;

Fig. 4 is an enlarged detail view similar to Fig. 3 showing the common contact bar in its second position adapted to maintain a group of signals in actuation for a continued period after being actuated;

Fig. 5 is a view similar to Fig. 4 showing the common contact bar in its third position adapted to release any one or more of the signals after they have once been set for continued operation;

Fig. 6 is a view similar to Figs. 4 and 5 showing the common contact bar in a fourth position wherein it releases all of the signals;

Fig. 7 is an enlarged front elevation of

the indicating chart or board above the keyboard of the pupil's instrument;

Fig. 8 is a vertical sectional view through the same showing the mounting of one of the signals;

Fig. 9 shows a front elevation of the pupil's instrument and of the instructor's instrument when embodied in a second piano;

Fig. 10 shows means for actuating the signals mechanically, this form of the invention being illustrated as an attachment whereby the keys on one part of the keyboard may be used by the teacher for instructing the pupil in playing the keys on another part of the keyboard of the same piano; and

Fig. 11 is a detail perspective view with parts thereof broken away showing the invention embodied in apparatus wherein the signals are operated by pneumatic means.

In the drawings I have illustrated a piano 15 of ordinary construction having the usual keyboard 16 comprising the white keys 16^a and the black keys 16^b. Located at one side of the piano 15, which is to be used by the pupil, is the instructor's instrument 17 having a keyboard 18 comprising white keys 18^a and black keys 18^b which preferably correspond in size, shape, and arrangement to the keys of the piano. Other actuating members may be employed instead of keys if desired. Although the master's instrument has been illustrated in Fig. 1 as being embodied in a clavier not adapted to produce sound, it will be understood that the master's instrument may comprise an ordinary piano as illustrated in Fig. 9.

A bar 20 is mounted above the keyboard 16 of the piano and is supported at its opposite ends by extensible arms 21 which engage the check blocks 22 at opposite ends of the piano. Supporting arms 23 are attached to the extensible arms 21, and the length and position of the arms 21 and 23 may be adjusted by screws 24 in order to fix the bar 20 in the desired position above and in front of the keyboard. The bar 20 carries a series of signals 25 which, in this embodiment of the invention, are illustrated as electric lamps mounted within the bar 20 as shown in Fig. 8. These lamps are located in suitable recesses or sockets 20^a which are formed in the bar 20, and an aperture 26 closed by a glass plate 26^a, 26^b is provided in the bar opposite each of the lamps so that when a signal is actuated the light therefrom will shine through the corresponding aperture and indicate to the pupil that the adjacent key is to be played. It will be understood that these signals are arranged adjacent the keys 16, one signal being provided for each key and in the same vertical plane therewith. In order that the signals corresponding to the black keys 16^b may be distinguished from those corresponding to the white keys 16^a, the signals are preferably arranged in two rows or tiers 27, as shown in Fig. 1, the upper row of signals relating to the black keys and the lower row to the white keys. It will be understood, of course, that other schemes may be employed for distinguishing the signals relating to the different keys for instance, the glass plates 26^a in the upper row closing the apertures 26 may be made a different color from the plates 26^b in the lower row. In order that each of the keys and each corresponding signal may be identified in the mind of the pupil with the corresponding note, a staff 30 is provided on the front face of the bar 20, and the notes or musical characters 31 corresponding to each key of the piano are printed thereon immediately above the respective keys and signals.

The keys 18 of the master's instrument are pivoted at 32, as shown in Fig. 2, and each key is provided on the upper side thereof with a contact plate 33 extending in an upward direction, the contact plates for the various keys being arranged in alinement as shown. When the keys 18 are in their normal positions, the upper edges of the contact plates 33 terminate above the lower edge of and a short distance away from a common contact plate 35 which extends throughout the length of the keyboard 18 and which is carried by one or more arms 36 pivotally mounted at 37. The common terminal plate 35 is connected through an electrical conductor 38 with a battery 39, and the battery is in turn connected through a conductor 40 with a plurality of branch conductors 41, each of which leads to one of the signal lamps 25, being connected thereto within the bar 20 through the contact springs 42 by which the signal lamps 25 are held in position as shown in Fig. 8. Other branch conductors 43 lead from the other terminals of the signal lamps, each of the conductors 43 being connected to a plate 44 located opposite to the key of the series 18 which corresponds to the key of the series 16 opposite to which the corresponding signal lamp 25 is located. The plates 44 are mounted on an insulating bar 45 and are provided with offset flanges 44^a adapted to engage the leaf springs 46 carried by the keys of the keyboard 18. Each leaf spring 46 is connected through a conductor 47 with the contact plate 33 mounted on the same key. It will be seen, therefore, that when one of the plates 33 engages the common plate 35 a circuit will be established through the signal lamp 25 located adjacent the key of the piano which corresponds to the key 18 by which the particular plate 33 in question is carried. The circuits are established through the lamps when the keys 18 are moved downwardly about their pivots 32.

the plates 33 moving through arcs which bring them into contact with the plate 35 after the keys have been depressed. The springs 46 operate to restore the keys after they have been released by the fingers of the teacher. The teacher sitting at the master's instrument may therefore operate the keys 18 in proper combination and sequence in accordance with the notes of a particular musical composition, and thereby actuate the signals 25 to indicate the order in which the keys of the piano should be manipulated by the pupil in order to play the composition in response to the teacher's instruction. As each signal is actuated the pupil will play the corresponding key and will continue the actuation of the key as long as the corresponding signal lamp is lighted, so that the order in which the signals are played as well as the tone duration is indicated to the pupil. At the same time that the signals are actuated the pupil may note the musical characters 31 on the staff 30 opposite to the signals which are actuated, thus learning the musical characters at the same time that the composition is played.

In order to permit the teacher to discontinue the operation of the signals when desired, a switch 50 is provided in the conductor 38 and this switch is normally closed by a spring 50^a and may be opened by an extra pedal 51 adapted to be controlled by the foot of the teacher to permit him to operate the device without actuating the signals.

For the purpose of indicating to the pupil the proper use of the pedals 52 of the piano, indicated in Fig. 9, or in order to teach meter, rhythm, and the like, the teacher may make use of an additional signal lamp 54 which is connected by a conductor 55 to one terminal of the battery 39 and through another conductor 56 to a switch 57 controlled by another pedal 58. The switch 57 is connected through another conductor 59 to the conductor 38 which leads to the other terminal of the battery. The switch 57 is normally maintained in open position by a spring 57^a, but when the pedal 58 is depressed by the foot of the teacher the signal lamp 54 will be energized to indicate to the pupil that one of the pedals 52 should be depressed. It will be understood that prior to beginning the instruction of the pupil by means of the signaling apparatus, instruction should be given as to the meaning to be attached to the operation of the additional signal 54.

It is often desirable when teaching the analysis of the composition, or when giving instruction in three or four octaves of an arpeggio, for example, to actuate a number of signals and keep such signals in operation while a number of other signals are being successively actuated and corresponding keys played. I have therefore provided means for maintaining a circuit through a number of the signals for a period after the corresponding keys of the master's instrument have been depressed, this apparatus being illustrated particularly in Figs. 3, 4, 5 and 6. The common contact plate 35, which has previously been described as being carried on pivotally mounted arms 36, is adapted to be moved about the pivots 37, and the arms 36 are normally maintained in their lowermost positions against the stop 60 by means of coil springs 61. When in this position the arms are engaged by a rod 62 which extends downwardly beneath the keyboard 18 and is provided with a series of pins 63, 64, and 65 arranged to be engaged by the inner ends of the pedals 66, 67, and 68, respectively. The lower limits of movement of the pedals are determined by the stops 69, 70, and 71. It will be understood that these pedals 66, 67, and 68, as well as the pedals 51 and 58 previously described, may be located adjacent the usual pedals of the piano when the master's instrument is embodied in an ordinary piano as illustrated in Fig. 9. The stops 69, 70, and 71 are spaced different distances from the corresponding pedals 66, 67, and 68 as shown in Fig. 3 for the purpose to be hereinafter described.

In Fig. 3 the contact plate 35 is shown in its normal position wherein the depression of a key will cause the contact plate 33 to engage the lower edge of the plate 35 and thereby establish a closed circuit through the corresponding signal 25. If the pedal 66 be depressed, however, until it engages the stop 69, the upward movement of the rod 62 will elevate the plate 35 until it assumes the position shown in Fig. 4. If, then, one or more of the keys 18 are played the upper edges of the plates 33 will spring past the lower edge of the plate 35 as shown, and then when the keys are released the plates 33 will pass upwardly on the opposite side of the plate 35 and thus maintain a contact therewith even when the corresponding keys are not depressed. In this way a number of keys may be played to indicate a chord or the like of the composition being studied, and then when these keys are released the circuits will be maintained through the corresponding signals to maintain a permanent indication for the pupil during the continued playing of the composition.

After a number of signals have been set to be continued in operation by the actuation of the pedal 66, it may be desired to release one or more of these signals at will as the instruction continues, and to accomplish this result the teacher may depress the pedal 67 which will then elevate the contact plate 35 to a higher position, and then

when the desired keys corresponding to the signals which have been continuously actuated are depressed, as shown in Fig. 5, they will pass to positions from which they will return to their normal positions inwardly of the plate 35 when again released by the teacher. In order to release all of the continuously operating signals after they have been set for operation by manipulation of the pedal 66, the teacher depresses the third pedal 68 until it engages its stop 71, thus moving the rod 62 to a higher position and causing a corresponding increased elevation of the plate 35, as illustrated in Fig. 6. All of the plates 33 will then be released from contact with the plate 35, and owing to their flexibility they will spring back to their normal positions as shown by full lines in Fig 6.

Instead of operating the signals electrically, they may be actuated mechanically and the instruction given to the pupil may be by the manipulation of some of the keys on the same piano which is played by the pupil. This modification is illustrated in Fig. 10 where the bar 85 represents the frame member at the front edge of the keyboard 86. The pupil in this case manipulates some of the keys 86^a adjacent one end of the keyboard and the signals are embodied in a series of balls or disks 87 arranged in a row, one of them being in vertical alinement with each one of the keys. The disks or balls 87 are connected to rods 88 which are pivoted at intermediate points 89 and which are provided at their opposite ends with weights 90 suspended therefrom and resting upon the upper surfaces of the keys 86^b which are manipulated by the teacher. When one of the keys is depressed, as shown in Fig. 10, the associated weight 90 will cause the corresponding signal 87 to be elevated above a similar key on that part of the keyboard which is being played by the pupil, the movement of the disk 87 out of alinement with the others indicating to the pupil that the corresponding key should be played.

In Fig. 11 there is shown a modified form of the invention in which the signals are pneumatically actuated. The keys of the pupil's instrument are represented by the numeral 71 and those of the teacher's instrument by the numeral 72. The master's instrument is provided with a suction pump or bellows 73 operated by pedals 74 in a manner frequently employed in mechanical players. Located above the keys 71 of the pupil's instrument is a series of air cylinders 75, each connected by an outlet conduit 76 with a common suction conduit 77 leading to the pump or bellows 73. Located within each of the cylinders 75 is a piston 78 having a stem 79 carrying at its lower extremity a target or head 80. As long as suction is maintained within the cylinders by means of the pump 73, the partial vacuum so produced will hold the pistons 78 adjacent the upper ends of the cylinders and the targets will be concealed behind a screen 81. In order to actuate the targets 80 each cylinder 75 has leading therefrom a pipe 82 having at its opposite extremity an air inlet valve 83 controlled by the movement of the corresponding keys 72 of the master's instrument. When any one of the keys 72 is depressed, the valve 83 is opened to admit atmospheric air through the corresponding pipe 82 to the cylinder 75 above the corresponding key of the pupil's instrument. When the vacuum is thus relieved in the cylinder, the piston and associated target 80 will fall so that the target will be revealed beneath the screen 81 and indicate to the pupil that the adjacent key should be manipulated. When the key 72 is released the air inlet will be closed and thereupon the suction pump will reëstablish a partial vacuum in the corresponding cylinder and return the target to its normal position.

Although I have shown and described certain embodiments of the invention for purposes of illustration, it will be understood that my improvements may be constructed in various different forms without departing from the spirit of the invention as defined in the appended claims.

What I claim is:

1. The combination with a piano, of a series of signals each in register with one of the keys of the piano, an instrument having a plurality of members to be manually manipulated, and means for actuating said signals by the manipulation of said members to indicate the order in which said keys should be manipulated in playing a musical composition.

2. The combination with a piano, of a series of signals, one for each of the keys of the piano, a plurality of other keys arranged in the form of a piano keyboard, and operating connections from each of said last-named keys to one of said signals whereby the manipulation of said last-named keys will actuate said signals to indicate the succession in which the piano keys should be manipulated.

3. The combination with a series of piano keys, of a series of stationary signals arranged to correspond to the keys of the piano, a second series of keys arranged in the order of said first named keys, and operating connections from each of said last-named keys to the signal of the corresponding piano key.

4. The combination with a piano, of a supporting member mounted above the keyboard thereof, a plurality of signals carried by said supporting member each in register with one of the piano keys, and manually operated means for actuating said signals to

preindicate the order in which a musical composition should be played on said piano by the manipulation of said keys.

5. The combination with a piano, of a supporting member mounted above the keyboard thereof, a plurality of signals carried by said supporting member each in vertical alinement with one of the piano keys, means for actuating said signals in the order in which said keys should be manipulated to play a musical composition, and means in register with said signals for indicating the musical note represented by each signal.

6. The combination with a musical instrument having a plurality of elements to be manually manipulated by the player, of a plurality of signals each fixed in register with one of said elements, means to actuate said signals in sequence to indicate the order in which said elements should be manipulated to play a musical composition, and an additional signal at the control of the operator for indicating rhythm and the like.

7. The combination with a piano, of a series of signals each in register with one of the keys of the piano, an instrument having a plurality of members to be manually manipulated, means for actuating said signals by the manipulations of said members to indicate the order in which said keys should be manipulated in playing a musical composition, and an additional signal at the control of the operator for indicating rhythm and the like.

8. The combination with a musical instrument having a plurality of elements to be manually manipulated by the player, of a plurality of signals each in register with one of said elements, means for normally actuating said signals in the same order and for the same length of time that the corresponding elements should be manipulated to play a musical composition, and means to maintain in continued actuation one or more selected signals while the normal actuation of the remaining signals is continued.

9. The combination with a musical instrument having a plurality of elements to be manually manipulated by the player, of a plurality of signals each in register with one of said elements, means for normally actuating said signals in the same order and for the same length of time that the corresponding elements should be manipulated to play a musical composition, means to maintain in continued actuation one or more selected signals while the normal actuation of the remaining signals is continued, and means in combination with said last-named means to discontinue the actuation of said selected signals.

10. The combination with a musical instrument having a plurality of elements to be manually manipulated by the player, of a plurality of signals each in register with one of said elements, means for normally actuating said signals in the same order and for the same length of time that the corresponding elements should be manipulated to play a musical composition, means to maintain in continued actuation one or more selected signals while the normal actuation of the remaining signals is continued, and means connected with said second-named means to discontinue the actuation of any number of said selected signals independently of the remainder of said selected signals.

11. The combination with a musical instrument having a plurality of elements to be manually manipulated by the player, of a series of signals each in register with one of said elements, a plurality of manually manipulated members, means for connecting each of said members with one of said signals to effect the actuation of said signals in the order in which said members are manipulated, and means operated by the manipulation of said members for maintaining the continued actuation of any selected group of said signals by said first-named means after said members having been released by the operator.

12. The combination with a musical instrument having a plurality of elements to be manually manipulated by the player, of a series of signals each in register with one of said elements, a plurality of manually manipulated members, means for connecting each of said members with one of said signals to effect the actuation of said signals in the order in which said members are manually manipulated, means operated by the manipulation of said members for maintaining the continued actuation of any selected group of said signals after said members have been released by the operator, and means actuated by the second manipulation of said members corresponding to said continuously actuated signals for discontinuing the continued actuation of said signals independently of each other.

13. The combination with a musical instrument having a plurality of elements to be manually manipulated by the player, of a series of signals each in register with one of said elements, a plurality of manually manipulated members, means for connecting each of said members with one of said signals to effect the actuation of said signals in the order in which said members are manually manipulated, means operated by the manipulation of said members for maintaining the continued actuation of any selected group of said signals after said members have been released by the operator, and means for simultaneously discontinuing the actuation of said selected signals.

14. The combination with a piano, of a series of signals each in register with one

of the keys of said piano, a plurality of other keys arranged in the form of a piano keyboard, an electric circuit comprising a plurality of branches each including one of said signals for actuating the same, and contacts in said branch circuits each operated by one of said second-named keys, said contacts being closed by the manipulation of said second-named keys.

15. The combination with a piano, of a series of signals each in register with one of the keys of said piano, a plurality of other keys arranged in the form of a piano key board, an electric circuit comprising a plurality of branches each including one of said signals for actuating the same, contacts in said branch circuits each operated by one of said second-named keys, said contacts being closed by the manipulation of said second-named keys, means for restoring said second-named keys to normal position after manipulation thereof, and means coöperating with said contacts to maintain the continued actuation of any selected signals by the corresponding branch circuits after said second-named keys have returned to normal position.

16. The combination with a piano, of a series of signals each in register with one of the keys of said piano, a plurality of other keys arranged in the form of a piano key board, an electric circuit comprising a plurality of branches each including one of said signals for actuating the same, contacts in said branch circuits each operated by one of said second-named keys, said contacts being closed by the manipulation of said second-named keys, means for restoring said second-named keys to normal position after manipulation thereof, means coöperating with said contacts to maintain the continued actuation of any selected signals after said second-named keys have returned to normal position, and means cooperating with said contacts whereby the actuation of any of said selected signals may be discontinued by a second manipulation of the particular one of said second named keys which corresponds thereto.

17. The combination with a piano, of a series of signals each in register with one of the keys of said piano, a plurality of other keys arranged in the form of a piano keyboard, an electric circuit comprising a plurality of branches each including one of said signals for actuating the same, contact members each carried by one of said second-named keys and each connected in one of said branch circuits, and a common contact member connected in said circuit and mounted adjacent said first-named contact members but normally out of contact therewith, said first-named contact members being connected with said common contact member by the manipulation of the corresponding second-hand keys.

18. The combination with a piano, of a series of signals each in register with one of the keys of said piano, a plurality of other keys arranged in the order of said piano keys, an electric circuit comprising a plurality of branches each including one of said signals for actuating the same, contact members each carried by one of said second-named keys and each connected in one of said branch circuits, a common contact member connected in said circuit and mounted adjacent said first-named contact members but normally out of contact therewith, said first-named contact members being connected with said common contact member by the manipulation of the corresponding second-named keys, and means at the control of the operator for changing the position of said common contact member to cause said first-named contact members to continue in contact therewith after the corresponding second-named keys have been released by the operator.

19. The combination with a piano, of a series of signals each in register with one of the keys of said piano, a plurality of other keys arranged in the order of said piano keys, an electric circuit comprising a plurality of branches each including one of said signals for actuating the same, contact members each carried by one of said second-named keys and connected in one of said branch circuits, a common contact member connected in said circuit and mounted adjacent said first-named contact members but normally out of contact therewith, said first-named contact members being connected with said common contact member by the manipulation of the corresponding second-named keys, means at the control of the operator for changing the position of said common contact member to cause said first-named contact members to continue in contact therewith after the corresponding second-named keys have been released by the operator, and means for moving said common contact member to another position wherein said first-named contact members may be automatically disconnected therefrom by a second manipulation of the corresponding second-named keys.

In testimony whereof I have subscribed my name.

EDWIN M. SCHANTZ.