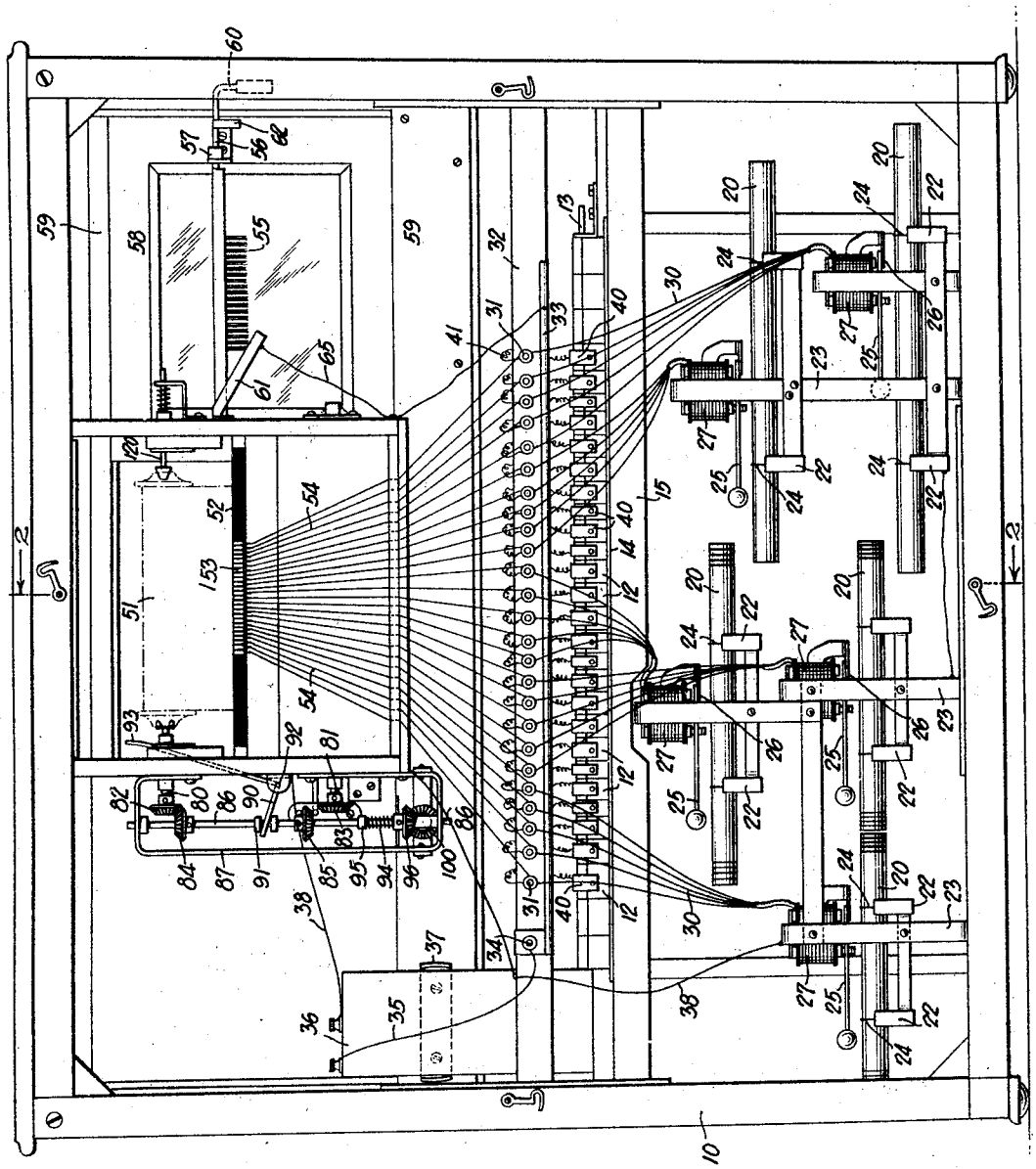
J. WALDMAN (NOW BY JUDICIAL CHANGE OF NAME J. WALKER).

AUTOMATIC ELECTRICAL PERCUSSION MUSICAL INSTRUMENT.

APPLICATION FILED JULY 12, 1920.

1,413,638. **Patented Apr. 25, 1922.**

4 SHEETS—SHEET 1.



WITNESSES

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Fig. 1.

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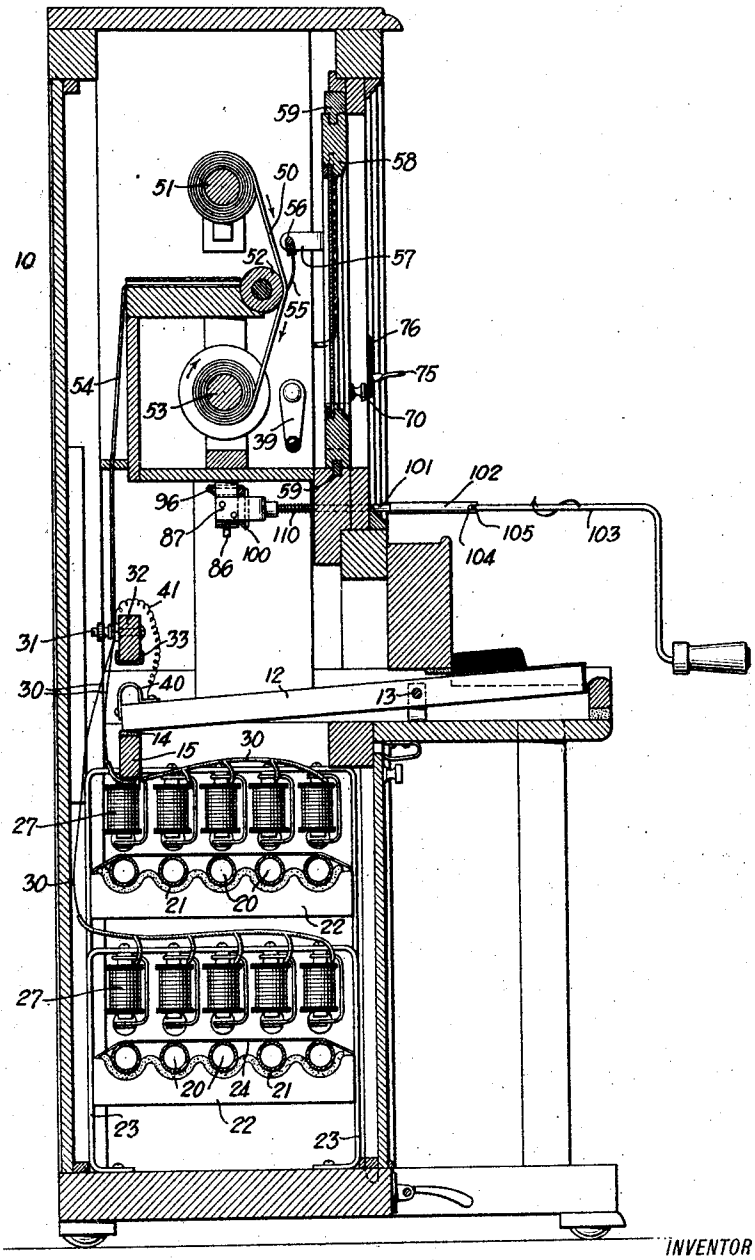
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4 SHEETS—SHEET 2.

Fig. 2.



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4 SHEETS—SHEET 3.

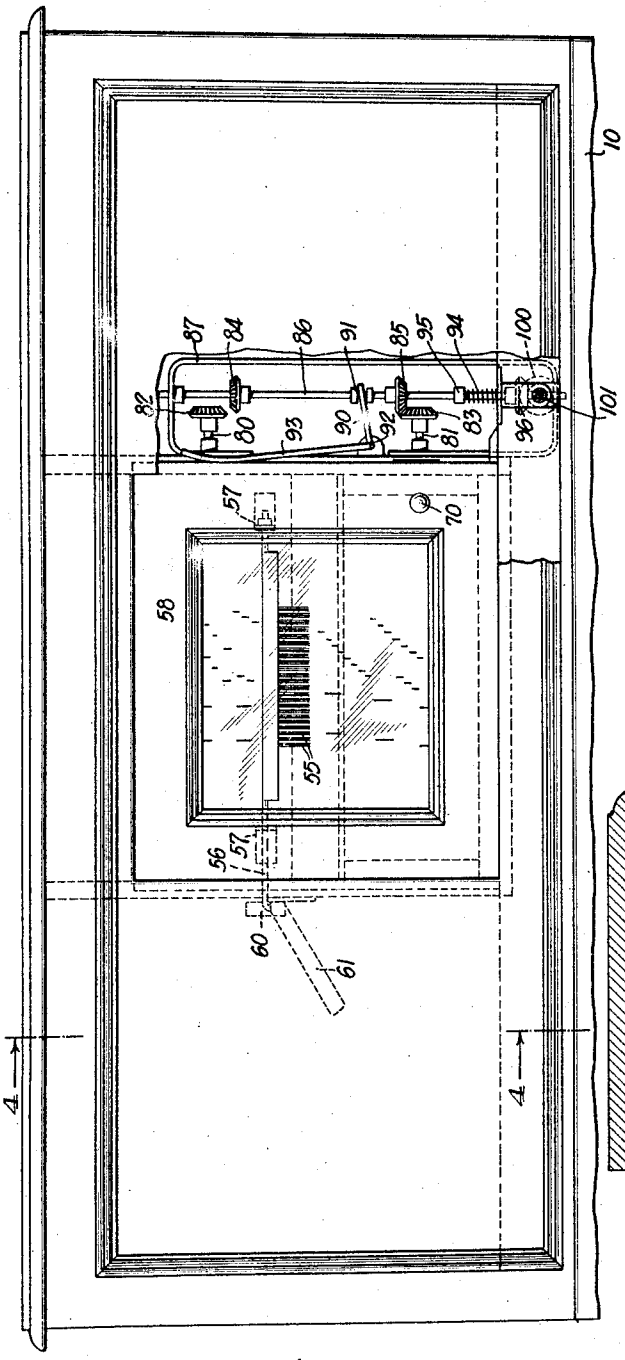


Fig. 3.

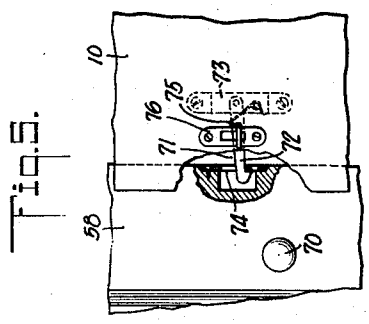


Fig. 5.

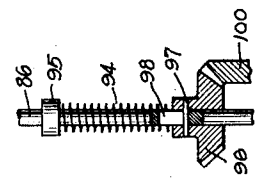


Fig. 6.

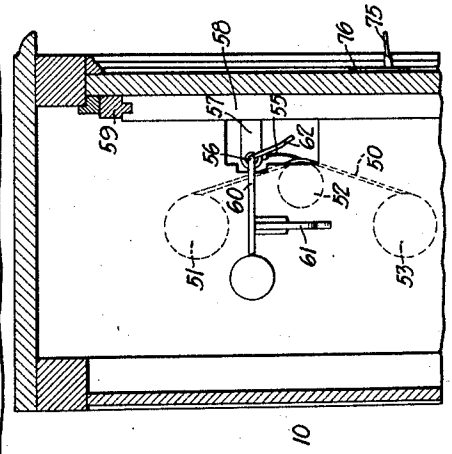


Fig. 4.

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4 SHEETS—SHEET 4.

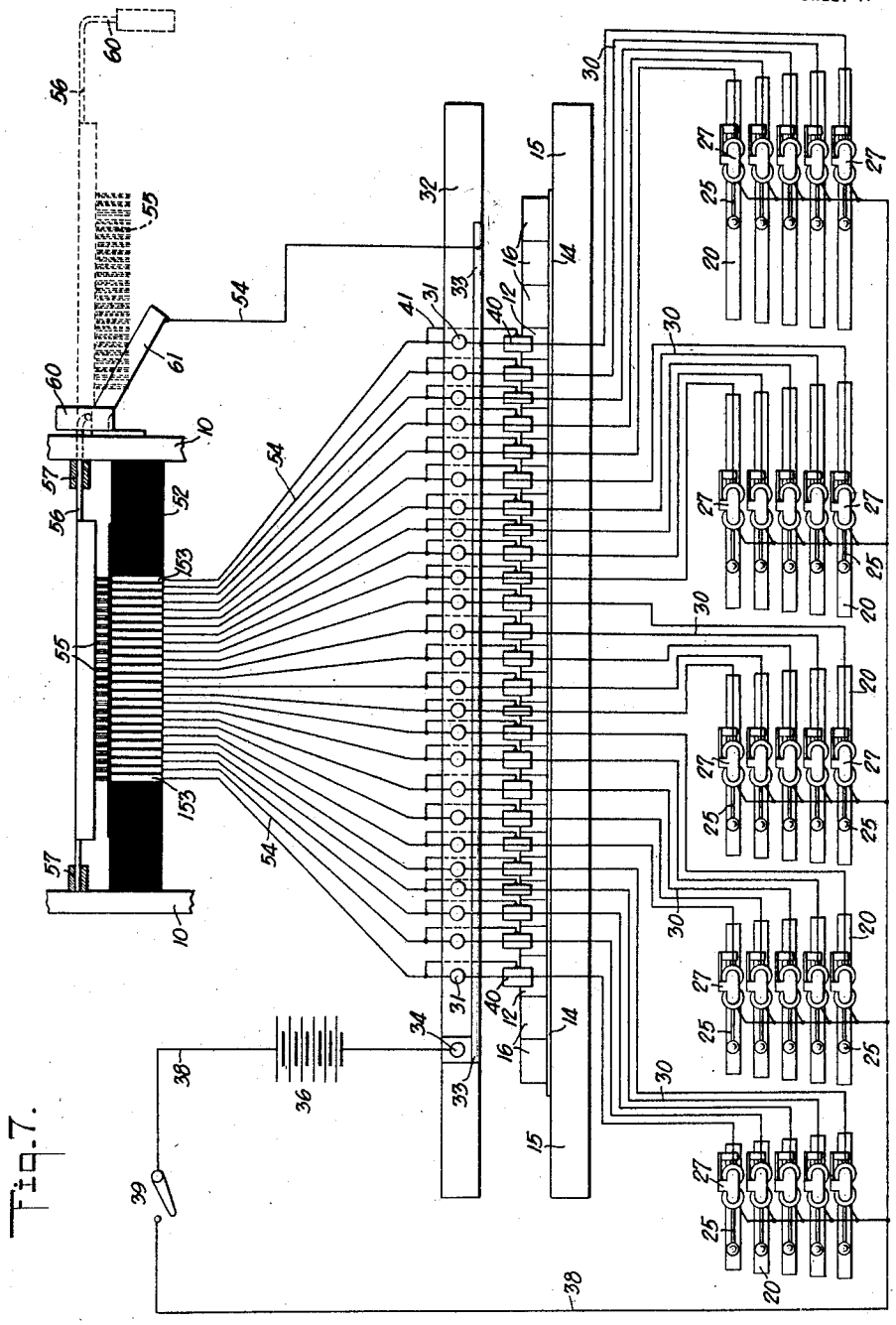


Fig. 7.

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UNITED STATES PATENT OFFICE.

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AUTOMATIC ELECTRICAL PERCUSSION MUSICAL INSTRUMENT.

1,413,638. Specification of Letters Patent. Patented Apr. 25, 1922.

Application filed July 12, 1920. Serial No. 395,445.

To all whom it may concern:

Be it known that I, JOSEPH WALDMAN, a citizen of the United States, and a resident of the city of New York, borough of the Bronx, in the county of Bronx and State of New York, have invented a new and Improved Automatic Electrical Percussion Musical Instrument, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved musical instrument more especially designed as a toy or a baby piano and arranged to enable a child to readily play the musical instrument either by actuating keys or by the use of a perforate note sheet and the turning of a crank.

Another object is to provide a musical instrument which can be cheaply manufactured and is not liable to get easily out of order or out of tune.

Another object is to permit of readily gaining access the various parts for inspection, repairs or other purposes.

A practical embodiment of the invention is represented in the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a rear elevation of the musical instrument with the back of the piano casing removed;

Figure 2 is a transverse section of the same on the line 2—2 of Figure 1;

Figure 3 is a front elevation of the upper portion of the musical instrument arranged for automatically playing with the use of a perforate note sheet, parts being shown in section;

Figure 4 is a cross section of the same on the line 4—4 of Figure 3;

Figure 5 is a front elevation of the locking mechanism for the sliding window or panel, parts being shown in section;

Figure 6 is an enlarged sectional side elevation of a portion of the driving mechanism for the note sheet rollers; and

Figure 7 is a diagrammatic view of the electric circuits.

The musical instrument is mounted on a suitably constructed support, preferably in the form of a piano casing 10, provided at the front with a keyboard 11 having keys 12 (black and white) adapted to be played by a child or other person. The keys 12 are mounted to swing on a rod 13 mounted on the keyboard 11, and the rear ends of the keys 12 are overbalanced and rest at their rear ends on a piece of felt 14 secured to the top of a stop rail 15 mounted in the casing 10. A few fixed filling-in keys 16 are arranged on the sides of the keys 12 to give the musical instrument the appearance of having a keyboard with a large number of keys although in practice 25 pivoted keys 12 are provided, but I do not limit myself to this particular number of keys as more or less keys may be used.

Within the lower portion of the casing 10 are arranged sound producing elements 20, preferably in the form of horizontally disposed metallic tubes of different length, and the said sound producing elements 20 are preferably arranged in groups (say five groups of five elements each) to produce a sound-producing element for each key 12. The tubes of each group are spaced apart and rest in saddles formed by felt linings 21 on the top of notched bars 22 secured to a suitable framework 23 mounted in the lower portion of the casing 10, as plainly shown in Figures 1 and 2. The sound producing elements 20 are held in position in their saddles by strings 24 stretched over the tubes in a group and attached at their ends to the corresponding supporting bars 22, thus holding the tubes against accidental displacement. Each of the sound producing elements 20 is adapted to be sounded by a hammer 25 forming part of an armature 26 of an electromagnet 27 of the double spool type mounted on the framework 23. The hammers 25 are normally arranged above the corresponding sound producing elements 20, that is, as long as the corresponding electromagnets 27 are de-energized, but whenever an electromagnet 27 is energized then the corresponding hammer armature 25, 26 is actuated and the corresponding sound producing element 20 is sounded by the head of the hammer striking the same. It is understood that each hammer armature 25, 26 is provided with a circuit-making and breaking device to insure a single or repeated actuating of the hammer 25, whenever the corresponding electromagnet 27 is energized on keeping a corresponding key pressed a shorter or a longer time.

Each of the electromagnets 27 is connected by a circuit wire 30 with a binding post 31 mounted on a rail 32 of wood or other insulating material, and the under side of this rail 32 is provided with a metallic contact strip 33 provided at one end with a binding post 34 (see Figure 1) connected by a wire 35 with a source of electrical energy 36 preferably in the form of a battery removably mounted in a suitable holder 37 arranged in the casing 10. A return wire 38 connects the framework 23 supporting the electromagnets 27 with the source of electrical energy 36 and in this return wire 38 is arranged a switch 39 (see Figure 7) for cutting the circuit whenever it is desired to disconnect the source of electrical energy 36 from the electromagnets 27. The contact strip 33 is adapted to be engaged by contacts 40 mounted on the rear ends of the keys 12 and connected by wires 41 with the corresponding binding posts 31. Thus when a key 12 is played by the user of the musical instrument then the contact 40 carried by this key moves into engagement with the contact strip 33 of the rail 32 thus closing the circuit for the corresponding electromagnet 27 to actuate the hammer armature 25, 26 thereof and thereby sound the corresponding sound producing device 20.

The musical instrument can be played automatically by the use of a perforate note sheet 50 held on a music roll 51 passing over a tracker 52 and winding up on a take-up roll 53, the said rolls 51 and 53 and the tracker 52 being arranged in the upper portion of the casing 10. The tracker 52 is preferably cylindrical in cross section and is provided with spaced insulated ring-shaped contacts 153 connected by wires 54 with the corresponding binding posts 31. The note sheet 50 is provided with perforations adapted to register with the contacts 153 during the travel of the note sheet 50 over the tracker 52. The contacts 153 are adapted to be engaged by brushes 55 secured in spaced and insulated relation on a rock shaft 56 journaled in brackets 57 attached to the back of a window or panel 58 mounted to slide sidewise in suitable guideways 59 arranged on the front upper portion of the casing 10. It is understood that the free ends of the brushes 55 rest against the front face of the note sheet 50 and when the note sheet opening moves in register with a brush 55 then the free end thereof passes into the note sheet opening and into engagement with the corresponding contact 153 to close the circuit for the corresponding electromagnet 27 to energize the same for sounding the corresponding sound producing element 20 the same as when a corresponding key 12 is played. One end of the rock shaft 56 is provided with a transversely extending weighted arm 60 adapted to engage a metallic incline 61 fixed in the casing 10 to impart a rocking motion to the shaft 56 on closing the window 58 with a view to move the free ends of the brushes 55 in firm contact with the outer face of the note sheet 50. When the window 58 is moved sidewise into an open position then the weighted arm 60 travels down the incline 61 and in doing so it imparts a reverse rocking movement to the shaft 56 whereby the brushes 55 move out of engagement with the front face of the note sheet 50 and hence the brushes are not liable to move into engagement with the contacts 153 during the sidewise opening movement of the window 58. The rock shaft 56 is provided with a stop arm 62 (see Figures 1 and 4) adapted to abut against the back of the window 58 to limit the return rocking movement of the rock shaft 56. The incline 61 is connected by a return wire 65 with the contact strip 33 of the rail 32 to complete the circuits whenever the corresponding brushes 55 move into engagement with the contacts 153. The window 58 is provided with a suitable knob or handle 70 to permit the user to conveniently open or close the window, and a suitable locking device 71 is provided for locking the window 58 when in closed position (see Figure 5). The locking device 71 comprises a spring-pressed latch 72 fulcrumed on a bracket 73 attached to the rear face of the front of the casing 10, and the latch 72 is adapted to engage a keeper 74 held on the window 58. The latch 72 is provided with a handle 75 extending through a slotted guide 76 to the front of the casing so as to be within convenient reach of the user of the instrument to unlock the window 58 whenever it is desired to do so.

In order to turn the take-up roll 53 for drawing the note sheet 50 from the music roll 51 over the tracker 52 the following arrangement is made: On the driving shafts 80 and 81 of the rolls 51 and 53 are secured bevel gear wheels 82, 83 adapted to mesh with bevel gear wheels 84, 85 secured on a vertically disposed shaft 86 journaled in suitable bearings arranged on a frame 87 held in the upper portion of the casing 10. The bevel gear wheels 84, 85 are so arranged that when one is in mesh with its corresponding gear wheel 82 or 83 then the other is out of mesh with its corresponding gear wheel 83 or 82. The up and down movement of the shaft 86 is controlled from the window 58 by the use of a shifting lever 90 engaging a shifting collar 91 arranged on the shaft 86. The shifting lever 90 is pivoted at 92 on the frame 87 and is provided with an upwardly extending arm 93 extending into the path of the right-hand end of the window 58 and hence when the latter is moved into a closed position then a swinging movement to the right is given to the arm 93 whereby the shifting lever 90 moves the

shaft 86 downward to disengage the bevel gear wheel 84 from the bevel gear wheel 82 and to move the bevel gear wheel 85 into mesh with the bevel gear wheel 83. When the window 58 is moved from the right to the left into an open position then the shaft 86 is moved upward by the action of a spring 94 to move the bevel gear wheel 85 out of mesh with the bevel gear wheel 83 and to move the bevel gear wheel 84 in mesh with the bevel gear wheel 82. The spring 94 is coiled on the shaft 86 and presses with its upper end on a collar 95 attached to the shaft 86, and the lower end of the spring 95 rests on a bevel gear wheel 96 having a sliding and rotating connection with the shaft 86. For the purpose mentioned the bevel gear wheel 96 is provided with a pin 97 extending through a slot 98 formed in the shaft 86 (see Figure 6). The bevel gear wheel 96 is in mesh with a bevel gear wheel 100 secured on a shaft 101 journaled on the frame 87 and extending through the front of the casing, as plainly shown in Figure 2. The outer end of the shaft 101 is provided with a socket 102 engaged by a removable crank 103 under the control of the user of the musical instrument to turn the shaft 101 in one direction. It is understood that the crank 103 is provided with the usual coupling pin 104 engaging a coupling slot 105 formed in the outer end of the socket 102. In order to prevent turning of the shaft 101 in a reverse direction use is made of a coil spring 110 having right-hand convolutions coiled with a close fit on the inner portion of the shaft 101 and having one end fixed on the frame 87. The coil spring 110 allows turning of the shaft 101 in a forward direction but prevents turning of the shaft in a reverse direction, it being understood that on turning the shaft in the direction of the arrow shown in Figure 2, the convolutions of the spring tend to open to allow free turning of the shaft and to close on turning the shaft in the inverse direction of the said arrow.

It will be noticed that when the window 58 is in closed position, as shown in Figures 3 and 4, and the crank 103 is turned in the direction indicated by the arrow in Figure 2 then the shaft 86 is rotated and as the latter is now geared with the shaft 81 of the take-up roll 53 the latter is rotated to wind up the note sheet 50 and thus draw the same from the music roll 51 over the tracker 52. It is understood that when the note sheet 50 is drawn over the tracker 52 the brushes 55 engage corresponding contacts 153 by way of corresponding openings in the note sheet whereby the sound producing elements 20 are sounded according to the perforations in the note sheet.

When it is desired to rewind the note sheet 50 after the piece is played, the user unlocks the window 58 and slides the same to the left to disengage the brushes 55 from the note sheet 50 and to allow the spring 94 to move the shaft 86 upward. By this movement of the shaft 86 the bevel gear wheel is moved out of engagement with the bevel gear wheel 83 and the bevel gear wheel 84 is moved into engagement with the bevel gear wheel 82. The user on again turning the crank 103 in the direction of the arrow indicated in Figure 2 reverses the shaft 86 and the shaft 80 of the music roll 51 whereby the latter winds up the note sheet 50. It is understood that the music roll 51 is removably held on its driving shaft 80 and the usual spring-pressed center 120 (see Figure 1) to permit of removing a roll and its note sheet and of replacing the same by another whenever it is desired to do so.

From the foregoing it will be seen that by the arrangement described a child is enabled to readily play the musical instrument either by actuating the keys 12 or by the use of a note sheet 50 and the turning of the crank 103.

It will further be noticed that the musical instrument shown and described is very simple in construction and is not liable to get out of order or out of tune easily as no tuning is required.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:—

1. In a musical instrument, sound producing elements, electromagnets having hammer armatures adapted to sound the said sound producing elements, a rail of insulating material and provided with a contact strip, a source of electrical energy connected with the said rail and with the said electromagnets, a tracker for the passage of a perforate note sheet and having spaced contacts, a window movable sidewise in front of the said tracker, and brushes carried by the said window and adapted to engage the said spaced tracker contacts through corresponding note sheet openings, an electric connection between the said brushes and the said contact strip, and wires connecting the said tracker contacts with the said electromagnets.

2. In a musical instrument, sound producing elements, electromagnets having hammer armatures adapted to sound the said sound producing elements, a rail of insulating material provided with a contact strip, a source of electrical energy connected with the said rail and with the said electromagnets, a tracker for the passage of a perforate note sheet and having spaced contacts, a window movable sidewise in front of the said tracker, a rock shaft journaled on the said window and provided with brushes adapted to engage the said spaced tracker contacts through corresponding note sheet openings

at the time the window is closed, a weighted arm on the said rock shaft, a fixed incline adapted to be engaged by the said arm on opening or closing the window to move the brushes into or out of operative position relative to the note sheet and tracker contacts, and an electric connection between the said incline and the said contact strip.

3. In a musical instrument, sound producing elements, electromagnets having hammer armatures adapted to sound the said sound producing elements, a rail of insulating material and provided with a contact strip, a source of electrical energy connected with the said rail and with the said electromagnets, a tracker for the passage of a perforate note sheet and having spaced contacts, a window movable sidewise in front of the said tracker, a rock shaft journaled on the said window and provided with brushes adapted to engage the said spaced tracker contacts through corresponding note sheet openings at the time the window is closed, a weighted arm on the said rock shaft, a fixed incline adapted to be engaged by the said arm on opening or closing the window to move the brushes into or out of operative position relative to the note sheet and tracker contacts, an electric connection between the said incline and the said contact strip, and a stop on the said shaft and adapted to engage the said window to limit the rocking movement of the said rock shaft in one direction.

4. In a musical instrument, a tracker for the passage of a perforate note sheet and provided with spaced contacts, a member movable in front of the said tracker, brushes adapted to engage the said contacts by way of the openings in the note sheet, a rock shaft carrying the said brushes and provided with a weighted arm, the rock shaft being journaled on the said movable member, and a fixed incline adapted to be engaged by the said arm.

JOSEPH WALDMAN.