

No. 836,003.

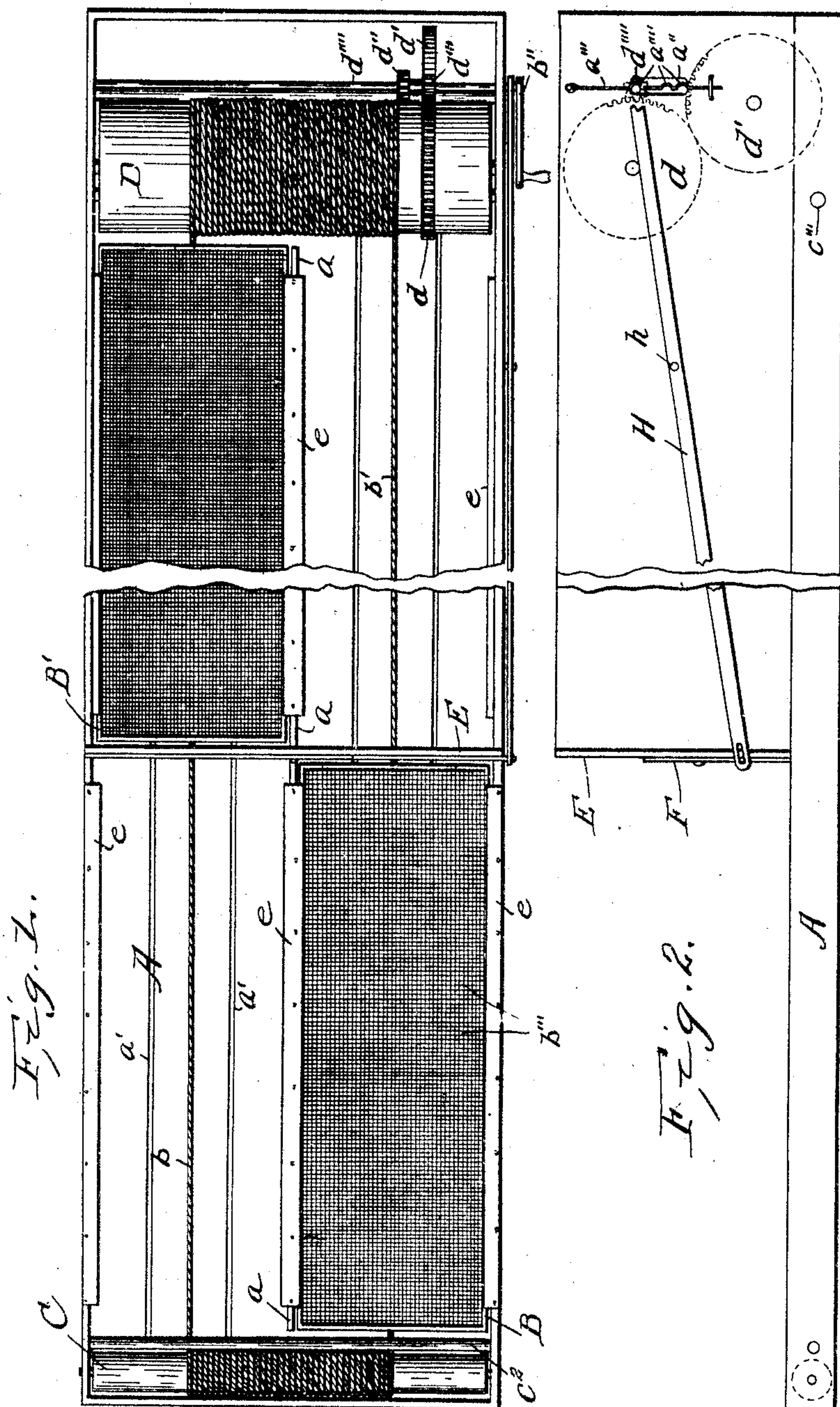
PATENTED NOV. 13, 1906.

E. E. BARAKAT.

AUTOMATIC SELF PLAYING AND TEACHING MUSICAL INSTRUMENT.

APPLICATION FILED MAR. 5, 1906.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

Fig. 6.

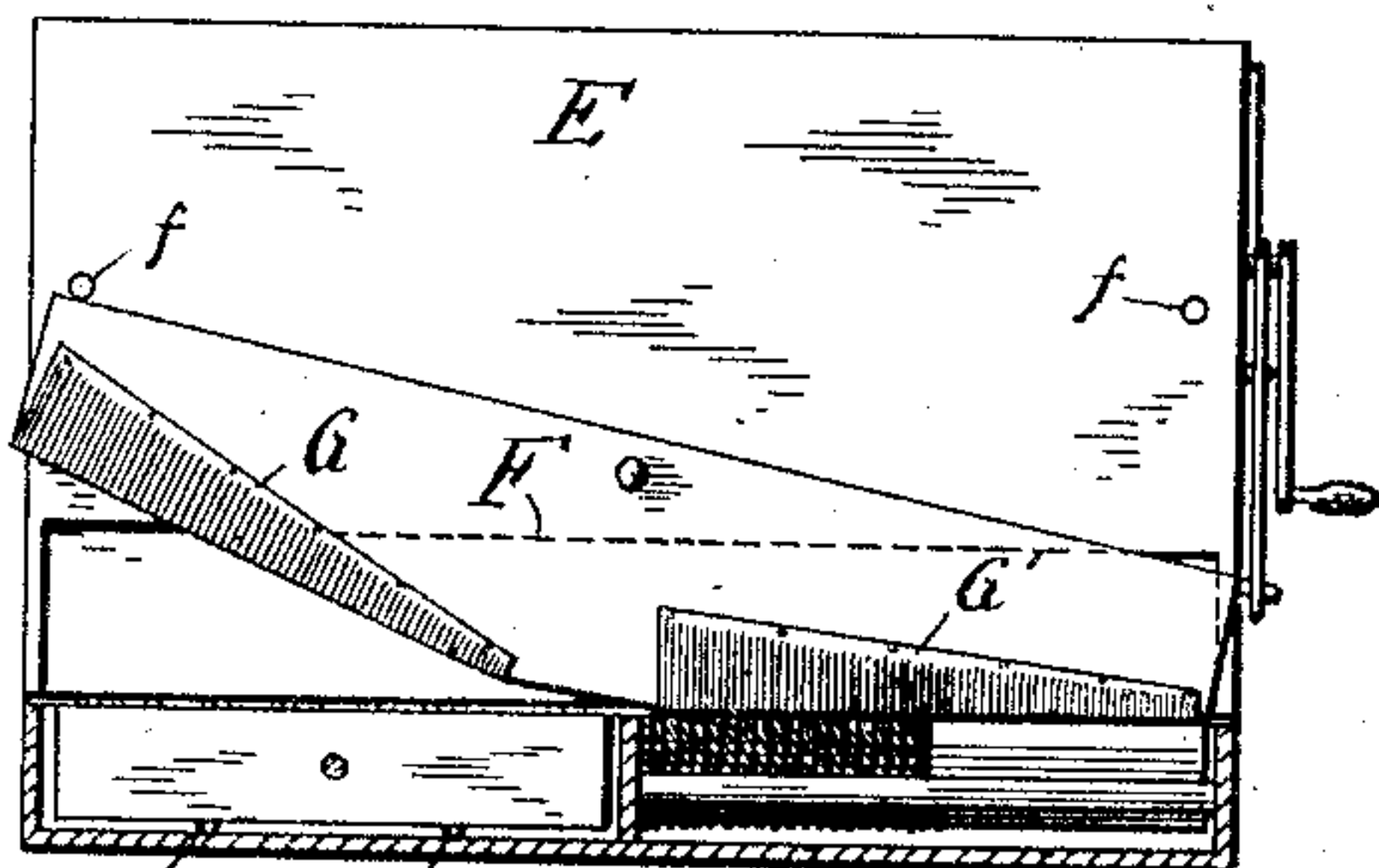
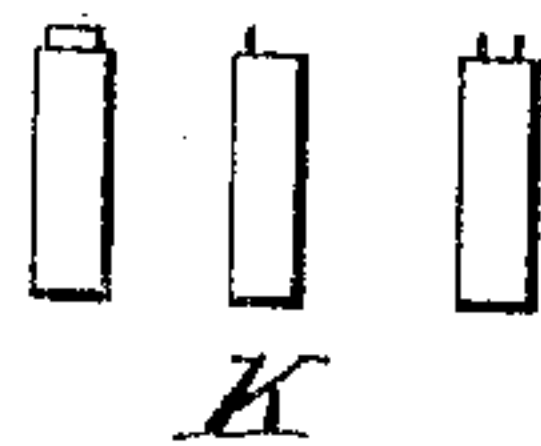


Fig. 7.

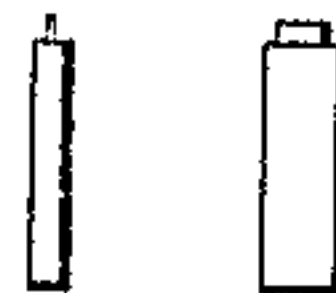


Fig. 3.

Fig. 4.

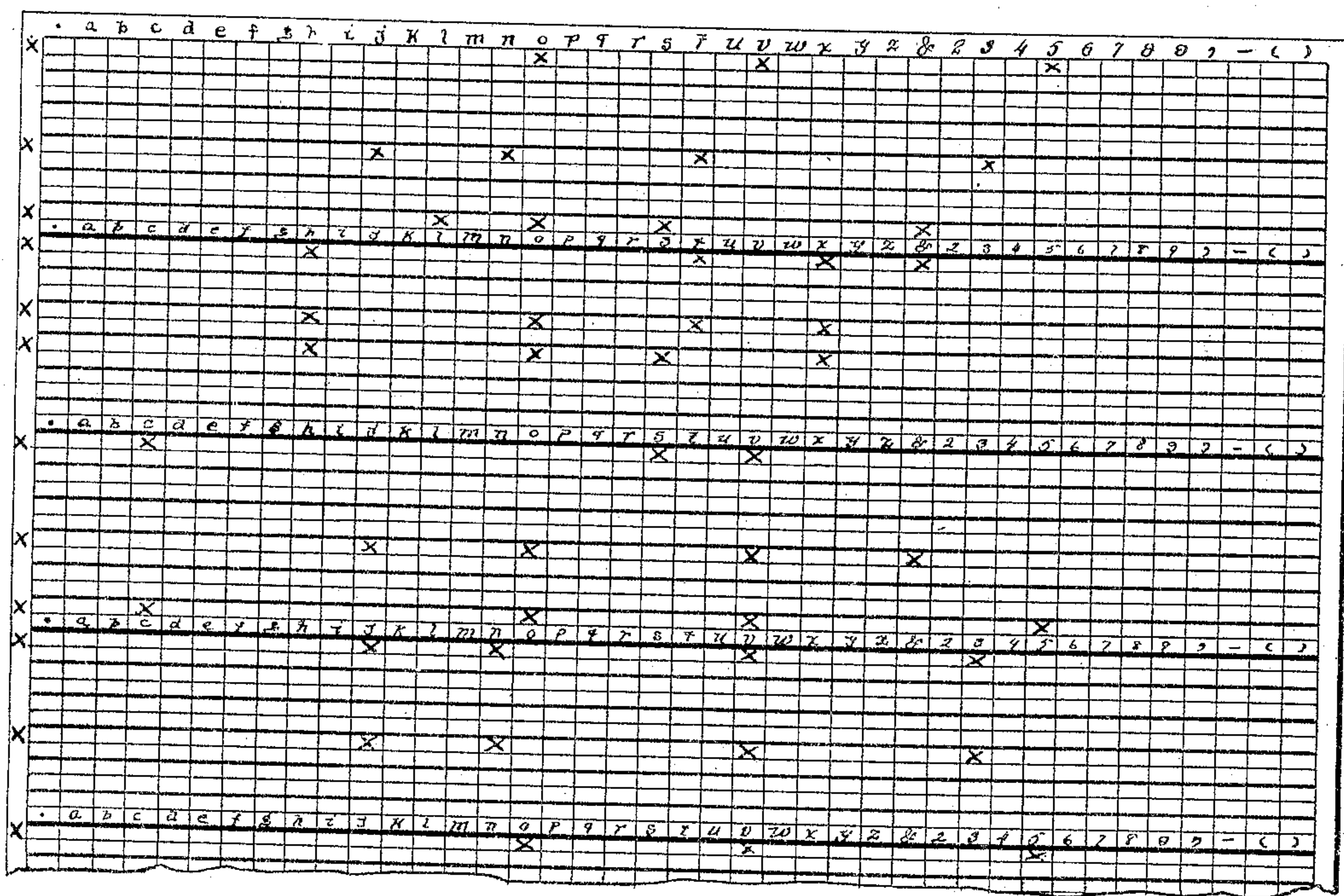
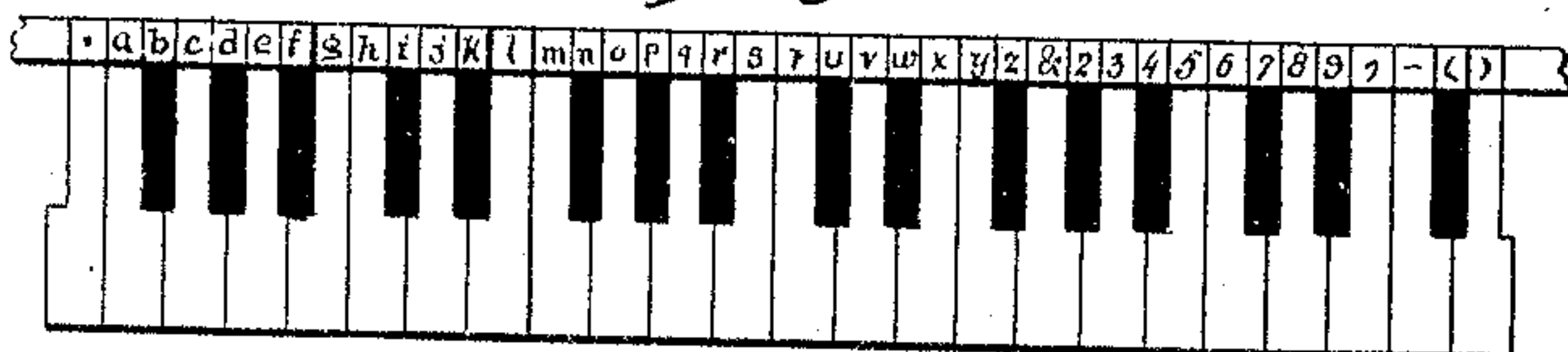


Fig. 5.

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ELIAS E. BARAKAT, OF WASHINGTON, DISTRICT OF COLUMBIA.

AUTOMATIC SELF PLAYING AND TEACHING MUSICAL INSTRUMENT.

No. 836,003.

Specification of Letters Patent.

Patented Nov. 13, 1906.

Application filed March 5, 1906. Serial No. 304,235.

To all whom it may concern:

Be it known that I, ELIAS E. BARAKAT, a subject of the Sultan of Turkey, residing at Washington, District of Columbia, have invented certain new and useful Improvements in Automatic Self Playing and Teaching Musical Instruments, of which the following is a specification.

My invention relates to music-players, and more specifically to an instrument adapted to be manually operated, having one or a pair of combs adapted, in case there are two, to be alternately used in playing and the tongues of which are actuated by movable projections which I call "type" and also to the means employed in recording the compositions. In this way any musical composition within the limits of the instrument can be set up from a written or a printed record and the same type can be used over and over again for different compositions.

My invention is educational as well as entertaining and is adapted also to be of great assistance to composers. Any and every tune can be set up and played whether before known or not, and any portion of a tune can be repeated as often as desired, as will be seen from the following description, taken in connection with the accompanying drawings, in which—

Figure 1 is a plan view of the instrument. Fig. 2 is a side view. Fig. 3 is an end sectional view. Fig. 4 represents a part of the keyboard of a piano or organ or a card bearing the representation of a part of a keyboard, the keys being marked by arbitrary symbols. Fig. 5 represents one of the record sheets or cards upon which the tunes are recorded, and Figs. 6 and 7 represent the type.

The instrument comprises a frame A in the form of a rectangular box divided centrally by a partition a , which does not run quite to the ends of the box. Each of the compartments thus formed has guides a' , on which two receptacles B and B' are slidably mounted.

At the ends of the box A are journaled rollers C and D, around which are wound cords or chains $b b'$, attached to the respective ends of the receptacles B B'. The roller D is driven by gearing, there being one gear d on the roller, a gear d' , having the same number of teeth, in mesh with the gear d , and a pair of driving-gears $d'' d'''$, one, as d'' , having one-sixth as many teeth as the gears d and d' and the other, d''' , having one-eighth as many. Either gear d'' or d''' , which are slidably

mounted on the shaft d'''' , can be placed in mesh with either gear d or d' , the shaft d'''' being movable in a vertical slot a'' , formed in the side of the box A, said slot being of sufficient width to permit either driving-pinion to come into mesh with gear d . A spring a''' is provided with three appropriate recesses a'''' to hold the shaft d'''' in either position for either driving-pinion. The end of the shaft d'''' is provided with a cranked handle b'' , by turning which the receptacles B B' are reciprocated in the box in opposite directions on the rollers C and D. Idle rollers C' C'' are provided, so as to cause the cords to exert their pull in the center of the line of movement of the receptacles.

Near the center of the box A is a bridge E, (see Fig. 3,) to which is pivotally attached a plate F, carrying the two tongue-combs G and G'.

A rod H is pivoted at h (see Fig. 2) on the outside of the wall of the box A and is connected at its left end by a pin and slot to the plate F. At its other end said rod has a slot which passes over the end of the shaft d'''' , so that when the latter is raised or lowered to reverse the direction of movement of the receptacles B B' the tongue-plate is rocked on its pivot so as to place one of the tongue-combs in position for playing and raise the other to an inoperative position. The receptacles B and B' are prevented from rising by flanges e , removably secured to the walls and partition of the box A, as clearly shown in Fig. 1.

For sake of economy I make use of ordinary printers' type as picks or practical means for effecting coaction or contact with the combs or reeds forming part of the instrument.

Each receptacle B B' is adapted to contain a set or several sets of type-compartments b''' , the number of which depends upon the range and length of the musical compositions which the instrument is capable of playing. Said sets of compartments are preferably removable in two or more sections from the receptacles and are provided with bottoms, so that the type may be removed therewith. Blocks may be used to fill up the receptacles when less than the full number of sets are used, or cross-bars may be slipped into notches formed in the sides of the receptacles to hold the filled section in place. The type K (see Fig. 6) are constructed to fit without turning in the said compartments, which I have shown as rectangular, but which may

be of any non-circular form, the type being, of course, of suitable shape to conform thereto.

The number of teeth on the gears d d' d'' d''' is so chosen that one rotation of the crank will move the receptacles the length of one bar. For example, suppose the roller D is two inches in diameter or just a little less, so that one rotation thereof moves each receptacle six inches. If the gear d on said roller has forty-eight teeth, for example, then the smaller of the driving-pinions d''' has six teeth, so that one rotation of the latter or of the crank will move the receptacle three-quarters of an inch. Each type-compartment being one-eighth of an inch square, for example, then one rotation of the crank corresponds to a distance of six compartments, which is the length of one bar in three-fourths time. The other driving-pinion d'' , which has eight teeth in this instance, is used when a composition in four-four time is to be played. The receptacles then move one inch for each turn of the crank, corresponding to eight compartments, which is the length of one bar in four-four or common time. If the tune can be comprised in one of the receptacles only, the other receptacle may be left empty or used for another tune; but if the tune is too long for one receptacle then half of it is set up in one of the receptacles and the other half in the other receptacle and when the first half has been played, the handle b'' is moved to the other end of the slot a'' , so as to reverse the direction of rotation of the roller D without necessitating the reversal of the direction in which the handle is revolved. In this way no time is lost in running the receptacles back idly. Owing to the connection H between the shaft of the driving-pinions and the tongue-carrying plate F, the latter is swung on its pivot by the upward or downward movement of said shaft in its slot, so as to place the other tongue-comb in operative position without any attention on the part of the operator. Thus any portion of a composition can be repeated as often as desired, so that the same may be thoroughly learned or tried over, and when the receptacles reach the ends of the box the operator has only to raise or lower the handle and to continue to turn it in the same direction without losing time in waiting until the whole tune is played. The rod H is made slightly flexible, so that while the movement of the driving-shaft d''' in its slot a'' is sufficient to swing the tongue-plate F when the eight-tooth pinion is in use the movement when the six-tooth pinion is employed (which movement, of course, is slightly greater) will accomplish the same purpose, the rod H flexing slightly after the tongue-plate has moved to its extreme position. Stops f are employed to prevent the tongue-plate F from moving too far.

The manner of recording a tune and setting it up in type is as follows: Referring to Fig. 4, it will be seen that each of the keys of the keyboard of the piano or organ or of the pictured keyboard is indicated by a symbol, those selected by way of illustration being the letters of the alphabet, numerals, and some punctuation-marks sufficient in number to comprise three octaves and three keys. Where the keyboard of an instrument is available, a tape, such as shown in Fig. 4, is used, the same being pinned above the keyboard, while where the representation of a keyboard is used the same has the symbols printed thereon. If desired, the whole keyboard may be used, in which case capital letters and additional numerals may be used. The musician places his fingers on the keys of the first chord and notes down or reads off to an assistant the symbols with which said keys are indicated. This is repeated throughout the tune, the symbols of each successive chord written down being in columns under each other. The next thing to do is to indicate the time of each chord, which is done by placing a numeral indicating the number of units—for example, sixteenth or twelfth notes—at the left of each line indicating a chord.

A sheet or card like that shown in Fig. 5 is then taken, which is ruled vertically with as many columns as the notes of the keyboard which have been used, and said columns being marked at the beginning of each bar with the symbols corresponding to those of the keyboard. Horizontally said card is ruled to form as many columns as there are sixteenth or thirty-second notes in the composition, each bar in the example chosen, which is for a composition written in three-fourths or six-eighths time, containing twelve columns. Each twelfth horizontal line is drawn heavier than the others and each second line is drawn slightly heavier than the intermediate ones. For four-four time sixteen horizontal lines are used. The time or length of each chord is now indicated on the left of the card by placing a cross between the appropriate horizontal lines, as shown in Fig. 5. Every other horizontal line forms a square with the vertical lines. A cross is then marked in the compartments or one-half squares opposite said crosses and in the vertical columns bearing the requisite symbols. For example, the first bar of the composition chosen for illustration is represented by crosses in the first row of horizontal compartments in the vertical columns marked o , v , and 5 , and the second chord by crosses in the seventh horizontal compartment below in the vertical columns marked j , n , t , and 3 , and so on all the way down. For tunes having thirty-second notes, where more of the keyboard is used, record-sheets of greater width are used and each bar will be hori-

zontally ruled with twenty-four lines in three-four time and thirty-two lines for each bar in four-four time, so that the thirty-second note becomes the unit instead of the sixteenth. Of course the instrument will be correspondingly larger.

The record-sheet being completed, it is placed over one of the receptacles B or B', so that the squares coincide. Pins pointed at both ends and tapering toward the middle are then forced through the sheet wherever one of the crosses appears, dropping into the corresponding compartment below. According to whether the cross is in the upper or lower half of the squares a white or black pin is used. As before stated, half of the record when the tune is too long for one receptacle only is thus transferred to one of the receptacles and the other half to the other. Then a type, as a lower-case "n," with one-half of the same cut away, is placed in each compartment containing a pin, the pins being of a length enabling them to be readily withdrawn, the projection or prong of the type being placed forwardly or rearwardly, according as to whether the pin is white or black. If one of the squares on the record had a cross-mark both in its upper and lower halves, two pins would be found in one compartment and a type with two prongs would be inserted, as a lower case "n."

The manner of playing a tune thus set up has been sufficiently described above. One or more of the sets of compartments can be moved and retained with the type therein, if desired, so that a permanent record can be kept.

As an alternative for a cheaper construction than the receptacles B B' and the sets of compartments therein I may use three-sided boxes, like printers' galleys, and set the type, which are similar to the lower-case "i" of printers' type, the length thereof being twice the width, the length being that required to properly actuate the teeth of the comb used therein just as printers set up ordinary type. The card (like that of Fig. 5) would be placed in the galley with three of its edges turned up to form a sort of a box and the type be then set transversely on the compartments of the card marked with a cross. Spaces or leads equal in length to one, two, four, and eight times the length of the type and of the same width as the type would be provided to separate the type horizontally, and blocks of wood or metal equal in length to the width of the galley or, rather, to the width of the ruled portion of the card and of widths varying from one half-square to fifteen half-squares would be provided to separate the chords. When all the tune or one-half of it has been thus set up, the end of the card can be cut off and the box-like remainder removed, the type being held therein by a string, if necessary, whereby the tune can

be maintained set up indefinitely. As this method is precisely like the manner of setting up printers' type and forms no part of my present invention, I do not consider it necessary to illustrate it.

The instrument can obviously be constructed to be actuated by a spring, as is common in music-boxes.

Various changes and modifications in design and construction may be made without departing from the spirit of my invention, the scope of which is expressed in the following claims.

What I claim is—

1. In an automatic music-player, the combination of a pivoted plate, two combs carried thereby, a pair of receptacles slidably mounted beneath said combs and having compartments, means to reciprocate said receptacles and means to swing said plate on its pivot to bring either comb in operative position.

2. A music-player, comprising a pair of combs, a pivoted plate carrying said combs, a pair of receptacles divided into compartments, means to reciprocate said receptacles beneath said combs and connections between said reciprocating means, and said plate, whereby the latter is swung on its pivot when the direction of movement of said receptacle is reversed so that the combs are alternately placed in operative position.

3. A music-player, comprising a box or frame, parallel guideways therein, two receptacles slidably mounted thereon, a series of non-circular compartments in said receptacles, a bridge centrally located over said box, a plate pivoted thereon to swing in a vertical plane, two combs secured thereto, a roller journaled in each end of said box, a cord attached to each end of each receptacle and coiled around one of said rollers, a driving-shaft carrying a driving-pinion, a gear on one of said rollers, an intermediate gear in mesh with said gear, said driving-pinion being movable so as to put it in mesh with either said first-mentioned gear or said intermediate gear and yielding means to hold said pinion in either position.

4. In a music-player, a pair of combs, two receptacles, and picks contained therein which actuate said combs, means to reciprocate said receptacles in opposite directions and connections from said reciprocating means to said combs whereby the latter are alternately placed in operative position whenever the direction of movement of said receptacles is reversed.

In testimony whereof I have affixed my signature in presence of two witnesses.

ELIAS E. BARAKAT.

Witnesses:

HOWARD A. COOMBS,
M. A. WOOD.