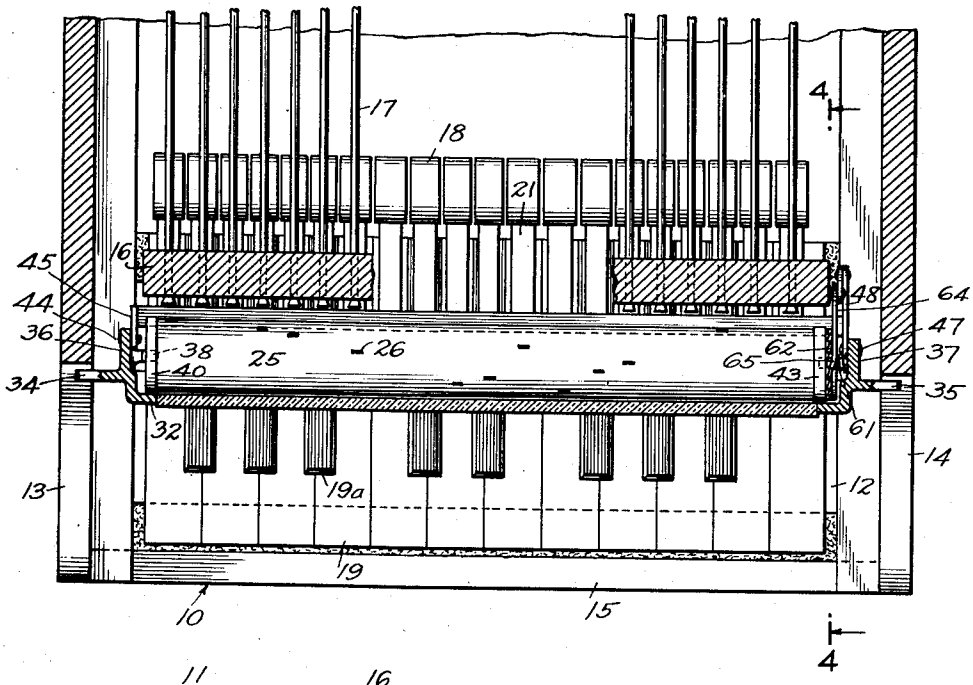
April 20, 1954 L. A. RUBEN 2,675,731

KEY INDICATOR FOR PIANO KEYBOARDS

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Fig. 1.



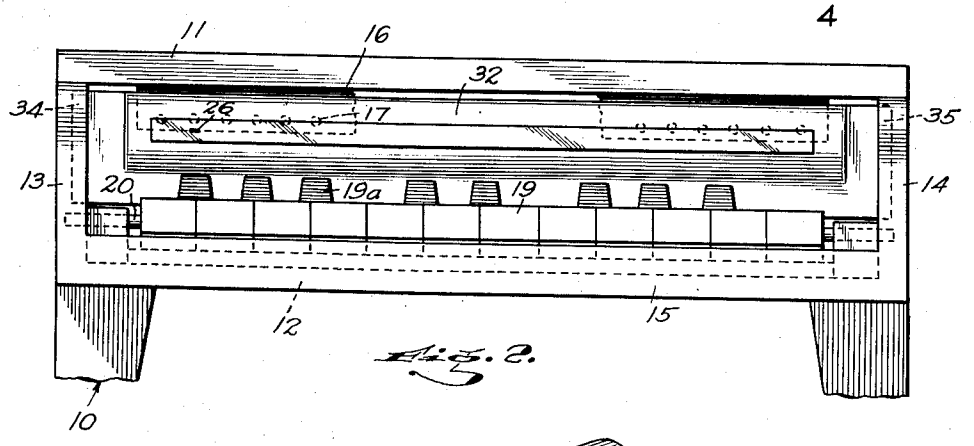
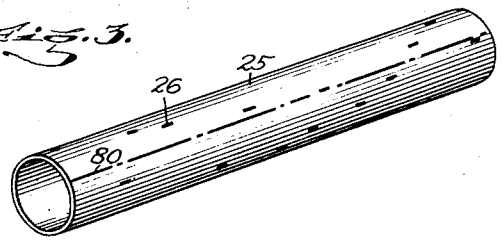


Fig. 2.

Fig. 3.



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Fig. 4.

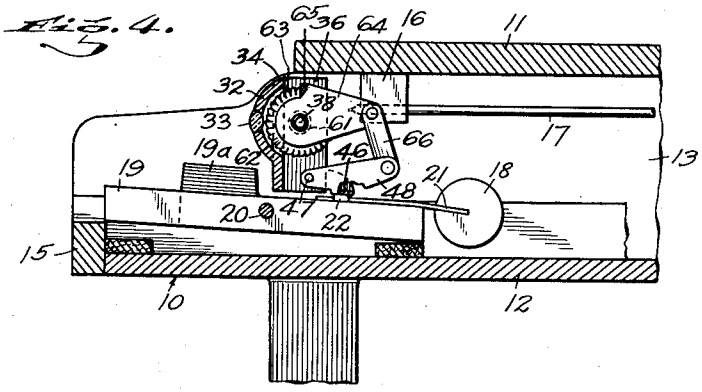


Fig. 5.

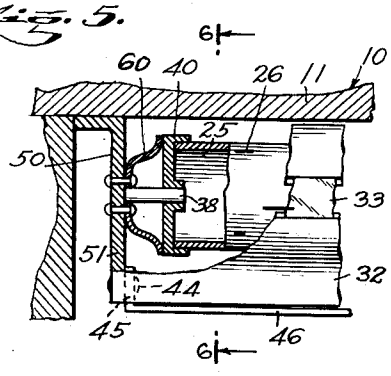


Fig. 6.

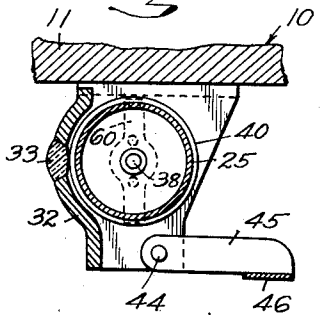


Fig. 7.

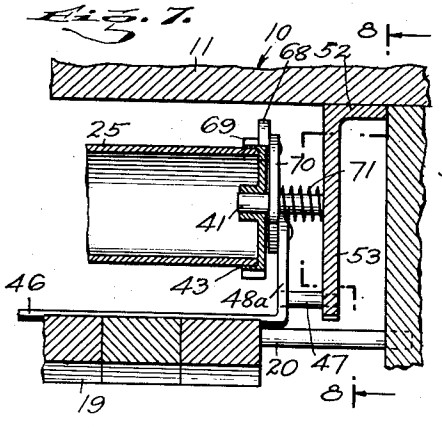
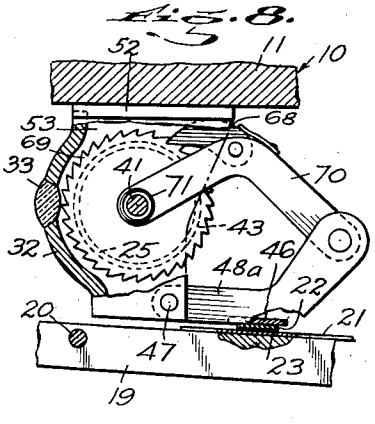


Fig. 8.



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KEY INDICATOR FOR PIANO KEYBOARDS

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Fig. 9.

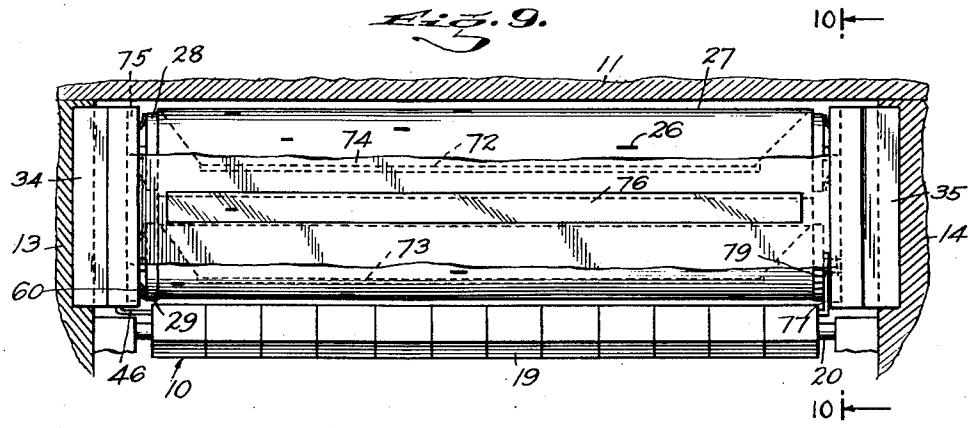


Fig. 10.

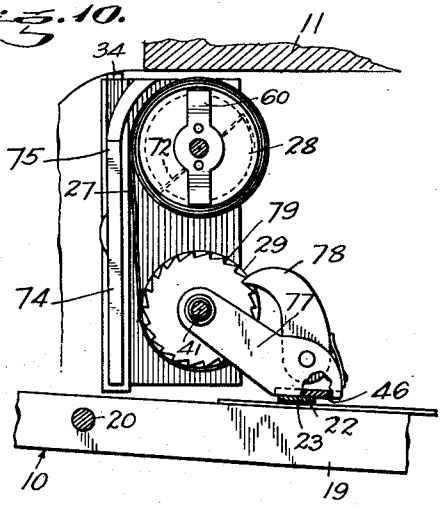


Fig. 11.

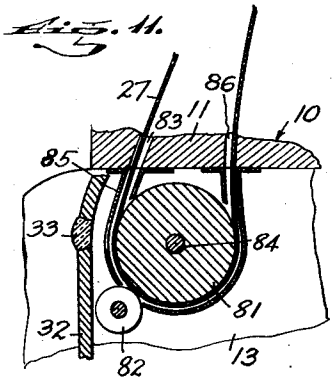


Fig. 12.

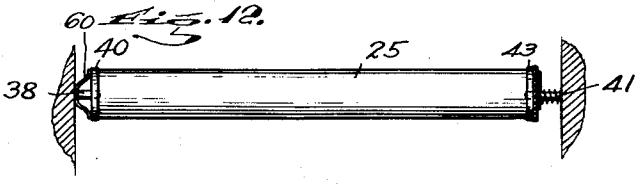
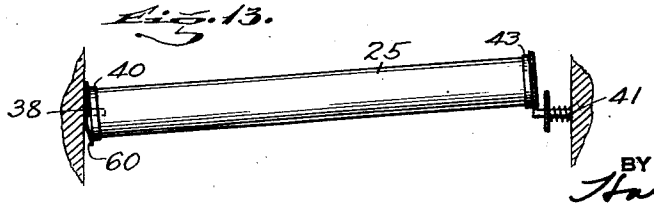


Fig. 13.



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KEY INDICATOR FOR PIANO KEYBOARDS

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Application February 10, 1951, Serial No. 210,383

5 Claims. (Cl. 84—478)

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This invention relates to pianos and particularly to indicating means associated with the keyboard of a piano to show the user what key to strike while playing.

The invention contemplates the provision of means for indicating to the player which keys he should strike to play the first and succeeding notes of a selected tune, said means being responsive to the operation of any key to expose the next indication in sufficient time to enable the player to strike the keys as rapidly as may be necessary, and whereby an error made by the player does not interfere with the correct exposure of the correct succeeding indications in proper consecutive order.

The invention further contemplates the provision of interchangeable means for indicating, for any selected tune, the next key to be struck before the preceding key is fully released, whereby the player is apprised in ample time of where said next key is located on the keyboard of the piano, the indicating means for said next key remaining exposed to view until said next key is depressed, and the indicating means for one tune being quickly and easily replaceable by another for a different tune.

The invention further contemplates the provision of simple and inexpensive mechanism suitable for use in a toy piano and operated by the piano key as the key is struck, to expose an indication designating which key is the next, the indication appearing adjacent said next key, so that the player need only move a finger to the key designated and strike it, thereby playing a tune as successive designated keys are depressed.

The invention further contemplates the provision of means including an intermittently movable member in the form of a tube or a flexible sheet bearing successively exposable indications each becoming visible and becoming arranged adjacent to and designating the next key to be struck while all the remaining indications are concealed, the member and means being adapted to be incorporated into or attached to a toy piano and being moved to expose indications in consecutive order by suitable ratchet means responsive only to the depression of a key, and powered solely by the movement of the key.

The various objects of the invention will be clear from the description which follows and from the drawings, in which

Fig. 1 is a fragmentary top plan view of a toy piano with the top removed and partly in horizontal section and showing the key designating means applied thereto.

Fig. 2 is a front elevational view thereof.

Fig. 3 is a perspective view of the tubular form of the indicating member, showing the circumferentially and longitudinally spaced arrangement of the indications thereon.

Fig. 4 is a fragmentary vertical sectional view of the piano and of its indicating means, taken on the line 4—4 of Fig. 1.

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Fig. 5 is a fragmentary enlarged vertical sectional view of an end portion of one form of the indicating member and of a modified form of the support therefor.

Fig. 6 is a vertical sectional view thereof taken on the line 6—6 of Fig. 5.

Fig. 7. is a fragmentary enlarged vertical sectional view of the other end portion of the indicating member and of the support therefor.

Fig. 8 is a vertical sectional view thereof taken on the line 8—8 of Fig. 7.

Fig. 9 is a fragmentary front elevational view of a modified scroll form of the indicator, showing the rolls on which the indicator sheet is wound and unwound.

Fig. 10 is a fragmentary vertical sectional view thereof taken on the line 10—10 of Fig. 9.

Fig. 11 is a vertical sectional view of another modified form of the indicator, wherein a sheet is fed in between a pair of coacting rolls.

Fig. 12 is an elevational view of a removable indicator roll or an indicator winding roll, showing the roll in its normal operative position.

Fig. 13 is a similar view of the roll partly removed from its pin support and showing how the roll may be withdrawn.

While the invention is applicable to full sized pianos having standard keyboards, the embodiment thereof in a relatively inexpensive toy piano is preferred and has herein been illustrated. Such toy pianos of any of the well known types is indicated generally by the reference numeral 10 and comprises for example, the top 11, the bottom 12, the sides 13 and 14 and the front 15. Secured to the under face of the top 11 is the support 16 for the front ends of the sounding wires or rods 17, the other ends of which remain unsupported for free vibration in the particular form here shown. The rods 17 are struck and vibrated by the hammers 18 in the usual manner on the depression of any white key 19 or black key 19a of the relatively short keyboard which is shown as consisting of about a one and a half octave range. For the hammer action, all of the keys are pivotally mounted on the shaft 20 supported at its ends in the sides 13 and 14 and carrying the flat flexible strips 21. Said strips form flexible supports entering and secured to the hammer heads 18, each key being provided with an upstanding rigid inverted U-shaped projection 22 having a slot 23 therein at the top of the key for the passage of the hammer strip 21, the front portion of which is secured to the upper face of the rear part of the key. The strip pivots about the projection 22 when the key is depressed and the hammer head consequently thrown rapidly upwardly to strike a rod 17, the strip 21 flexing off the rear part of the key during such hammer action under the impetus of the key movement. As has been hereinbefore indicated, such toy piano structure is well known wherefore no further description nor illustration thereof is deemed necessary.

The indicator, designating the key to be struck by the player, may take various forms; that is, is may be a solid roll, or a tube as 25 or a flexible sheet as 27. In any case, it is intended that the indicator be easily removable and replaceable by another in the way that phonograph records or player piano rolls are replaceable so that the user may select an indicator from a number of such indicators to play the tune he prefers. For relatively long tunes, the use of a sheet indicator is advisable. The sheet is supported in any suitable manner for intermittent feed thereof as by unwinding it from one roll as 28 and winding it up on a similar driven roll 29 or by feeding the sheet between coacting rolls.

Whether the indicator is in the form of a solid roll, tube or sheet, the indications 26 are so arranged on the surface of the indicator as to become disposed adjacent to or in alignment with and preferably above the proper key 19 or 19a which is next to be struck. In the direction of the length of the keyboard or parallel to the axis of the tube or roll, or transversely of the sheet as the case may be, the distance between consecutive indications is the distance between those keys controlling consecutive notes of the music. The circumferential distance between indications is the distance through which said roll tube or sheet is rotated or moved on each key movement, said distance being preferably uniform. As shown, the indication 26 is in the form of a horizontal dash, but it may take any other convenient form. For example, the fractions and numeral ⅛, ¼, ½ or 1 may be used to represent eighth, quarter, half or full notes respectively, or dashes of different lengths as shown in Fig. 5 may be employed for the same purpose, or the notations customarily used in sheet music to indicate notes of different duration may be used for the indications.

The indicator is given an intermittent movement of constant length to expose to view that indication designating the next key to be struck on each depression of a key of the keyboard. In that form of the invention employing the tube 25 or a roll for the indicator, a suitable cover 32 for the indicator serves also to support the operating mechanism and is provided with a longitudinal slot through which one or more of the indications 26 is visible at any one time, the remainder being concealed by the tube or the cover. For simple tunes, only one indication would be visible at a time, but as the player acquires skill, indicators may be provided exposing more than one indication so that chords may be played. A suitable elongated lens as 33 is optionally secured in the slot to magnify the visible indication so that the player has no trouble in locating the indication and the key designated thereby.

Referring to that form of the invention shown in Figs. 1 to 4, end extensions as 34, 35 are provided on the cover 32 for supporting the cover as well as the end walls 36, 37 thereon and the operating indicating mechanism carried thereby. The extension 34 is fixed in the side wall 13 and the opposite extension 35 is similarly fixed in a suitable slot in the wall 14. The end walls 36, 37 of the cover are spaced inwardly of the respective side walls 13 and 14, one end wall as 36 carrying a fixed pin as 38 adapted removably to support one end of the tube 25 and the other end wall 37 carrying a similar pin 41 to support the other end of the tube. For convenience, the ends of the tube are closed by suitable flanged caps as 40 and 43 of plastic or the like material, each preferably being provided with a bearing for the rotatable reception of the fixed supporting pins 38 or 41 (Figs. 5 and 7). The wall 36 also carries the supporting pin 44 rotatably supporting the arm 45 which projects transversely from one end of the key-operated bar 46, while the other end wall 37 carries a similar aligned bearing pin 47 supporting the projecting arm 48 which extends from the other end of the bar 46. Said bar lies on top of the keys 19 and 19a at points rearwardly past the pivot shaft 20 and normally rests on the upstanding projections 22, out of the way of and permitting movement of the hammer strips 21. Consequently, operation of any key by striking and depressing the front end thereof in the usual manner swings the key in a counterclockwise direction about the shaft 20 as viewed in Fig. 4, thereby raising the rear part of the key and the key-operated bar 46.

In that form of the support and drive for the indicator roll shown in Figs. 5 to 8, a bracket 50 having a flange secured to the under surface of the top 11, is provided with a wall 51 similar to the end wall 36 and similarly carrying the pins 38 and 44. At the other end of the indicator, the similar bracket 52 has a flange secured to the under face of the top as well as an end wall 53 from which projects the supporting pins 41 and 47 similar to those carried by the end wall 37 and for the same purposes, that is, for rotatably supporting the ends of the tube and the projecting end arms of the bar 46.

For preventing excess advancing movement of the tube 25 or over-running, a strip spring as 60 is interposed between the bracket wall 51 or end wall 36 as the case may be, and the end wall of the adjacent cap 40. As shown in Figs. 5 and 6, the inner part of the spring surrounds the pin 38 and is secured to the wall 51 or 36, the free ends of the spring abutting against the end wall of the cap. On the opposite supporting pin 41 for the tube, a coil spring as 61 around said pin serves to resist movement of the pawl-holding lever toward the wall 53 or 37. It will be seen from Figs. 12 and 13, that the tube 25 may readily be removed from its supporting pins 38 and 41 by first pressing the tube longitudinally toward the left as viewed in said figures whereby the spring 60 is flattened sufficiently to permit the right hand end of the tube to be withdrawn from the pin 41, whereafter the tube may be tilted and readily withdrawn from the pin 38. When a different tune is to be played, a tube with other indications is mounted on the pins 38 and 41 as is easily done by reason of the resilience of the spring 60.

Means controlled by the movement of the bar 46 are provided to rotate intermittently the tube carrying the indications. As best seen in Fig. 4, a sheet ratchet wheel as 62 having ratchet teeth 63 bent out of the plane of the remainder of the wheel, is loosely mounted on the pin 41 and may, if desired, be secured to the end wall of the cap 43. The pin 41 passes through the pawl lever 64 carrying the bent out pawl 65 adapted to engage the teeth of the ratchet wheel 62 when moved in a counterclockwise direction and to advance the wheel one tooth on each key operation, the link 66 connecting the arm 48 of said bar 46 and the pawl lever 64. It will be understood that each movement of the ratchet wheel and of the tube secured thereto moves the tube a uniform distance, which is the distance circumferentially of the tube between the indications. The spring 61 permits retraction of the

pawl lever and maintains the pawl in engagement with the ratchet wheel.

In that form of the ratchet mechanism shown in Figs. 7 and 8, the end cap **43** is provided with ratchet teeth **69** around its flange, the pawl **68** engaging said teeth and being carried by the lever **70**. At one end thereof, said lever is loosely mounted on the pin **41**, the other end thereof being pivoted to the arm **48***a* projecting from an end of the bar **46**. The spring **71** around the pin **41** serves to maintain the lever and pawl in their proper operative positions on the pin.

Where the indicator is the flexible sheet **27** as shown in Figs. 9 and 10, the sheet is wound on the roll **29** by ratchet mechanism and correspondingly unwound from the roll **28** as the keys of the piano are operated. Both rolls are suitably slotted to receive and removably hold the respective tapered ends **72** and **73** of the sheet, the rolls being intermittently rotatable and being also removably mounted if desired, as has been described in connection with the tube **25**. To provide easy access to the rolls, the cover for the rolls includes a removable panel **74** slidably mounted in the grooves **75** in the end parts of the cover and adapted to be lifted out of the cover, the panel having a slot **76** therein through which the controlling indications are visible. The bar **46** in this case has an end arm **77** loosely pivoted on the pin **41** and carrying the pawl **78** engaging and operating the ratchet teeth **79** on a wheel secured to and rotatable with the roll or formed on an end cap for the roll similar to the cap **43**. The sheet **27** is rewound on the roll **29** manually after it has been unwound therefrom during the playing of the tune, the sheet and roll being removed and stored as a unit until again used, and being replaced by another similar sheet and roll having indications for a different song. The end of the sheet **27** is inserted into and held in the slot of the winding roll **29** preparatory to operation of the keys. A heavy or colored line **80** (Fig. 3) to contrast with the indications, is made longitudinally of the sheet or roll indicator to show where the first indication is to be arranged in the slot of the cover for the start of the playing.

Should it be desired to economize further in space and materials, the sheet indicator **27** (Fig. 11) is fed directly into and out of the bight of the coacting rolls **81** and **82** through a suitable slot as **83** in the top **11**. The main roll **81** is shown as rotatable on the shaft **84** which is fixed in the sides **13** and **14**. The roll **82** is of rubber or other suitable friction material coacting with the roll **81** to press the sheet **27** therebetween and to advance the sheet as the roll **81** is intermittently rotated. The curved guide **85** adjacent the slot **83** and around the roll **81** is secured to the under face of the top **11** and serves to guide the sheet into place between the rolls, the sheet being controlled to emerge through the slot **86** of the top. Ratchet mechanism such as has been hereinbefore described constitutes the operative connection between the key-operated bar **46** and the roll **81** to advance the sheet. The lower edge of said sheet is inserted through the slot **83** until it is stopped by the rolls and begins to enter into the height thereof, in which position the first indication is exposed in the slot of the cover **32**. Thereafter, rotation of the main roll advances the sheet until it emerges from the slot **86** and can be gripped and removed manually when playing is completed.

It will now be seen that I have provided simple means for indicating to children and other unskilled persons which keys of a piano keyboard are to be struck in order to play a tune, that the designation of the proper key is given automatically without possibility of error and in time to enable a beginner to locate and to strike the key, that the indications may be made in convenient forms such as sheets, rolls or tubes, that the device is ideally adapted for toy pianos and is inexpensive, and that it effectively carries out its intended purposes, and since the device is powered solely by the force derived on the manual depression of a key, no relatively expensive motors of any kind are required and the device is inherently durable and unlikely to get out of order.

While certain specific forms of the invention have herein been shown and described, various obvious changes may be made therein without departing from the spirit of the invention defined in the appended claims.

I claim:

1. An indicating device for a piano keyboard having a plurality of depressible playing keys comprising a rotatably mounted roller disposed behind said keyboard and extending parallel thereto, a well positioned in front of said roller and having a window formed therein extending parallel to said roller, a music sheet having longitudinally regularly spaced indicia and adapted to pass about said roller, means confronting the peripheral surface of said roller and spaced therefrom a distance not exceeding the thickness of said music sheet and adapted to urge said music sheet into frictional engagement with said roller and means for intermittently advancing said roller a predetermined amount upon depressing of any of said keys whereby to transport successive indicia into registry with said window.

2. An indicating device in accordance with claim 1, wherein said sheet urging means include a second rotatably mounted roller extending parallel to said first roller and defining a bight therewith.

3. An indicating device in accordance with claim 1, wherein said roller advancing means includes a ratchet secured to and coaxial with said roller, a movable bar extending above and along said keys and in the path of movement thereof and a pawl engaging said ratchet and actuated by said bar to intermittently advance said roller upon depression of any of said keys.

4. An indicating device in accordance with claim 1, including a guide member of substantially U-shaped cross-section, the lower inner face of which confronts and is in close proximity to the lower surface of said roller.

5. An indicating device in accordance with claim 4, including a wall disposed above said roller and having a pair of transversely spaced longitudinal slits formed therein on opposite sides of the axis of said roller, the legs of said guide member being secured to the bottom face of said wall adjacent the outer opposite edges of said slits.

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