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TRANSPOSING APPARATUS FOR MECHANICAL PIANO PLAYERS.

APPLICATION FILED SEPT. 29, 1919.

1,364,722. Patented Jan. 4, 1921.

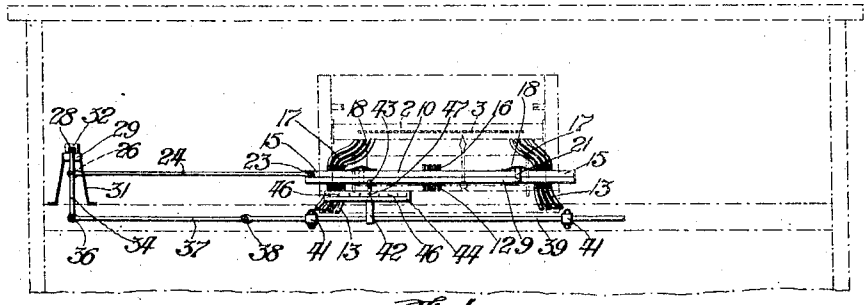


Fig. 1.

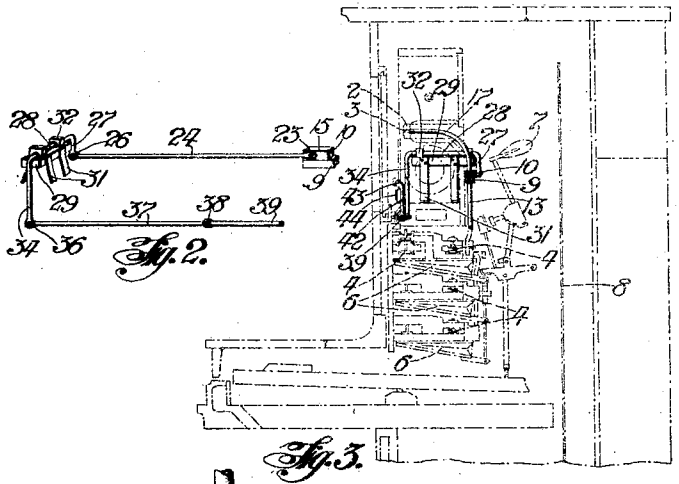


Fig. 2.

Fig. 3.

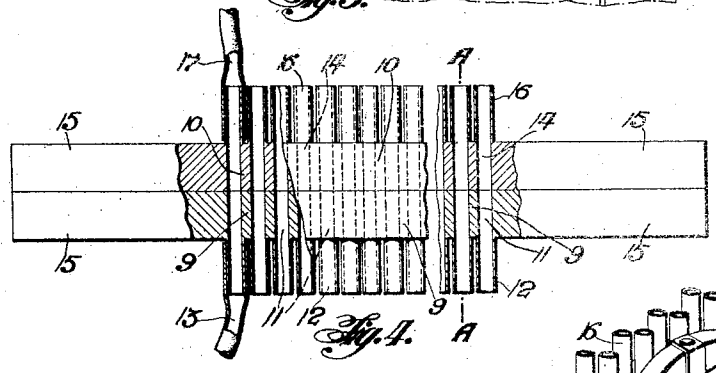


Fig. 4.

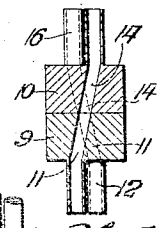


Fig. 5.

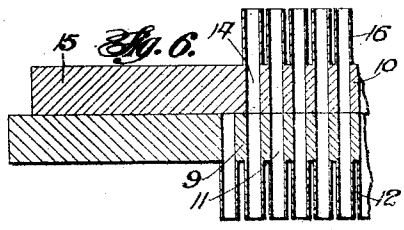


Fig. 6.

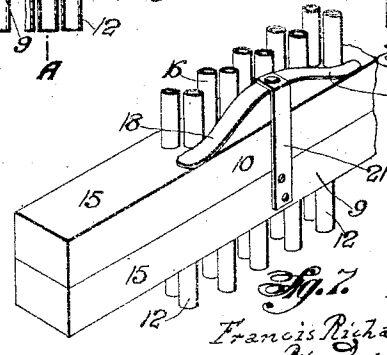


Fig. 7.

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UNITED STATES PATENT OFFICE.

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TRANSPOSING APPARATUS FOR MECHANICAL PIANO-PLAYERS.

1,364,722. Specification of Letters Patent. Patented Jan. 4, 1921.

Application filed September 29, 1919. Serial No. 327,205.

To all whom it may concern:

Be it known that I, FRANCIS RICHARD COOLING, a subject of the King of Great Britain and Ireland, and a resident of the postal district of Glenferrie, in the city of Hawthorn, a suburb of the city of Melbourne, in the county of Bourke, State of Victoria, Commonwealth of Australia, whose post-office address is 19 York street, Glenferrie, in the said city of Hawthorn, have invented a certain new and useful Improved Transposing Apparatus for Mechanical Piano-Players, of which the following is a specification.

This invention relates to mechanical piano players or player pianos and has particular reference to means whereby the tune produced from a perforated record or note sheet may be transposed from one musical key to another according to requirements.

Various devices have heretofore been proposed for the above purpose, the transposition being usually carried out by moving the note sheet along the tracker bar or the tracker bar crosswise of the note sheet. Such previous devices have been objectionable for various reasons, such as their complexity and interference with several important and delicate parts of the apparatus and also on account of their liability to cause improper tracking of the record sheet and consequent discord in playing.

The object of the present invention is to provide a simple, inexpensive and highly effective apparatus whereby a tune being played may be readily transposed in semitones or tones to a number of different keys, either above or below normal without moving the note sheet or the tracker bar, and without in any way interfering with the various automatic tracking and other devices. The invention involves a minimum number of parts which are not liable to disorder and may be easily applied to existing as well as to new instruments. When the apparatus in accordance with the invention is set at the desired key, music may be rendered from a note sheet without any possibility of defect or change until deliberately altered to another key. Furthermore the key in which a tune is being played may be changed during the rendering of the piece at the will of the operator, and without risk of producing discords.

According to the invention I interpose in the length of the pneumatic tubes passing from the air or note ducts of the tracker bar to the striker or hammer operating mechanism, two relatively movable members which are disposed in contact with each other. One of these members is provided with a series of air ducts or passages communicating with corresponding air ducts of the tracker bar while the other member is provided with corresponding air ducts or passages which are connected with the various striker operating mechanisms. When a record is being played in its normal key, the corresponding ducts of the two relatively moving members register with each other, but by relative movement of said members the respective air ducts in one may be brought into communication with various different ducts of the other member. This enables each of the note ducts of the tracker bar to be brought into communication with the striker operating mechanisms of various different notes of the instrument, consequently transposing the key any desired number of semitones according to the degree to which said members are relatively moved.

Referring to the drawings which form part of this specification:—

Figure 1 is a front view of the upper part of a player piano showing in full lines the invention applied thereto.

Fig. 2 is a perspective view showing the arrangement of the rock shaft and its connections for operating the transposing device.

Fig. 3 is a cross sectional view of the upper portion of a player piano showing the parts of the invention in full lines.

Fig. 4 is an enlarged detail view of the two relatively moving members of the transposing device in normal position, portions being broken away for convenience of illustration.

Fig. 5 is a cross sectional view on line A—A of Fig. 4.

Fig. 6 shows one of the members seen in Fig. 4 moved into position to alter the key a semi-tone from normal.

Fig. 7 is a perspective view showing one of the springs for holding the two relatively moving members of the transposing device in close contact with each other, while permitting of free relative movement of said members.

In the drawings the numeral 2 indicates the tracker bar having the usual air ducts 3 from which flexible air tubes (hereinafter

described) communicate with the pneumatic valves 4 controlling the operation of the striker pneumatics 6 which force the strikers or hammers 7 against the wires 8. All the parts above enumerated are of any ordinary or well known construction.

The transposing device according to the present invention comprises two relatively moving members which are preferably in the form of lower and upper parallel bars 9 and 10 respectively. These bars which are of brass or other suitable metal or material, may be disposed in any suitable position, preferably behind the tracker box, inside the instrument as shown.

The lower bar 9 is fixed to the back of the tracker box or any other convenient object and is provided with a row or air ducts or passages 11 corresponding to the note ducts 3 of the tracker bar and the notes of the piano. Nipples or ferrules 12 are fixed to the member 9 over each of the ducts 11 and to these nipples are connected the upper ends of lower flexible air tube sections 13.

The upper bar or member 10 is capable of sliding longitudinally over the lower bar 9 and through it are formed a row of air ducts or passages 14, corresponding to those of the lower bar 9. The upper bar 10 is provided with nipples or ferrules 16 over the air ducts 14, and to these nipples are connected the lower ends of upper flexible air tube sections 17. The upper ends of these tube sections connect with the ducts 3 of the tracker bar in the usual manner.

The upper member 10 or both the members 9 and 10 are provided with end portions 15 which extend beyond the ends of the rows of air ducts 11, 14 for a distance sufficient to keep the end ducts covered when the members are relatively moved to their extreme positions in either direction. This extension of the bar 10 prevents air being admitted to the pneumatic valves 4 of the end notes and consequent striking of said notes when the member 10 is moved and the bellows of the instrument are operated.

To reduce the length of the bars 9 and 10 as far as possible the air ducts or passages 11 and 14 are preferably drilled through the bars at a transverse angle as seen in Fig. 5, so that the nipples are arranged in staggered formation as shown. This permits of the nipples being placed close together while providing sufficient space for the attachment of the tubes 13 and 17.

The two members 9 and 10 are held closely together by suitable spring tensioning devices preferably in the form of plate springs 18 which press upon the upper bar 10 and are provided with legs 21 by which they are fixed to the lower bar. These springs form an air tight joint between the meeting faces of the members 9 and 10, but at the same time permit of free sliding movement one over the other.

One or more of the springs 18 are attached to each side of the member 9 so that the legs 21 act as guides to prevent lateral displacement of the moving member 10.

In combination with the foregoing there is attached to one end of the upper or movable bar 10, by a pivot pin 23, one end of a connecting rod 24. The other end of this connecting rod is connected to a pivot pin 26 on the minor arm 27 of a rock shaft 28. This rock shaft is mounted upon a wooden support 29 carried by legs 31 which are attached to any convenient part of the instrument. The rock shaft 28 turns in felt lined wooden bearing blocks 32, on the support 29.

The rock shaft 28 is also provided with a major arm 34 carrying a pivot pin 36 to which is pivoted one end of a second connecting rod 37. The other end of this connecting rod is pivoted at 38 to a slide rod 39 which moves in felt lined guides 41 suitably positioned on the front of the instrument.

Carried by the slide rod 39 is an indicating arm 42 provided with a finger piece 43 adjacent an indicating chart 44 which is provided with graduations 46 corresponding to the different keys to which the music may be transposed.

In the drawings the chart 44 is provided with four graduations above and four below the normal center marking 47; this means that the key may be changed four semi-tones above and four below normal by moving the finger piece 43 into line with the appropriate graduation 46. It will be readily understood, however, that if desired a greater range of variation in the keys to which the tone may be transposed, may be had by moving the slide rod 39 and consequently the movable member 10 a greater distance and providing additional graduations on the indicating chart.

It will be seen from the foregoing that by moving the finger piece 43 to right or left the air ducts or passages in the member 10 may be brought into registry with any desired duct of the other member 9 thus bringing the ducts 3 of the tracker bar into communication with the striker pneumatics 6 of the required notes according to the key in which the record is to be played. This transposition of the key may obviously be done instantaneously and without any chance of derangement of the parts or of incorrect tracking of the record sheet. A piece may thus also be frequently transposed into different keys during playing without fear of discord in the rendering of the music.

The invention which is of great advan-

tage in rendering music to the accompaniment of singing, may obviously be modified and altered in various ways from the particular construction described without departing from the nature spirit and scope of the invention as defined by the appended claims.

Having now described my invention what I claim as new and desire to secure by Letters Patent is:—

1. Transposing mechanism for mechanical player pianos, comprising, in combination, a pair of juxtaposed bars, one bar having air ducts for connection with the tracker ducts and the other bar having corresponding ducts for connection with the striker-operating mechanism; and mechanism for moving one bar lengthwise relatively to the other bar embodying a rock shaft having a pair of spaced arms, a rod individual to each arm and pivotally connected therewith at one end, the other end of one of said rods being pivoted to the adjacent end of the movable bar, and an operating device attached to the other rod for shifting the same endwise so as to rock said shaft, both rods being located in the front portion of the instrument and disposed parallel with the transposer bars.

2. Transposing mechanism for mechanical player pianos, comprising, in combination, a pair of juxtaposed bars, one bar having air ducts for connection with the tracker ducts and the other bar having corresponding ducts for connection with the striker-operating mechanism; and mechanism for moving one bar lengthwise relatively to the other bar embodying a rock shaft having a pair of spaced arms, a rod individual to each arm and pivotally connected therewith at one end, the other end of one of said rods being pivoted to the adjacent end of the movable bar, an operating device attached to the other rod for shifting the same endwise so as to rock said shaft, an indicating finger provided upon said operating device, and a graduated chart arranged at the front of the instrument and across which said finger is movable.

3. Transposing mechanism for mechanical player pianos, comprising, in combination, a pair of juxtaposed bars, one bar having air ducts for connection with the tracker ducts and the other bar having corresponding ducts for connection with the striker-operating mechanism; and mechanism for moving one bar lengthwise relatively to the other bar embodying a rock shaft having a pair of spaced lateral arms, a connecting rod pivoted at one end to the movable bar and at the other end to one of said arms, a second connecting rod pivoted at one end to the other of said arms, a slide rod mounted in bearings in the front of the instrument and disposed in alinement with the second connecting rod, the other end of the latter being pivoted to the adjacent end of the slide rod, an operating element connected to said slide rod, an indicating chart located adjacent the slide rod, and an indicating finger associated with said slide rod and movable across said chart.

4. Transposing mechanism for mechanical player pianos, comprising, in combination, a pair of juxtaposed bars, one bar having air ducts for connection with the tracker ducts and the other bar having corresponding ducts for connection with the striker-operating mechanism, means for moving one of the bars relatively to the other, and a plurality of leaf springs mounted upon the movable bar to press the same against the other bar so as to form an air tight joint therebetween, said leaf springs having attaching legs which are secured one to one side face and another to the other side face of said other bar so as to form guides to prevent displacement of the movable bar during its operation.

In testimony whereof I affix my signature.

FRANCIS R. COOLING.

Witness:
CECIL W. LE CLASTRUR.