A. R. TRIST.

NOTE SHEET FOR ELECTRICAL MUSICAL INSTRUMENTS.

APPLICATION FILED JAN. 23, 1912.

1,120,171.

Patented Dec. 8, 1914.

2 SHEETS—SHEET 1.

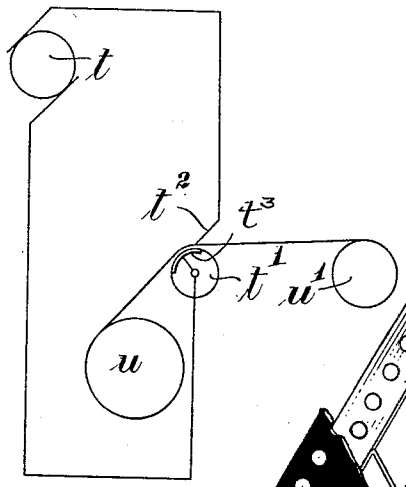


Fig: 4.

Fig: 1.

Fig: 5.

WITNESSES:

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2 SHEETS—SHEET 2.

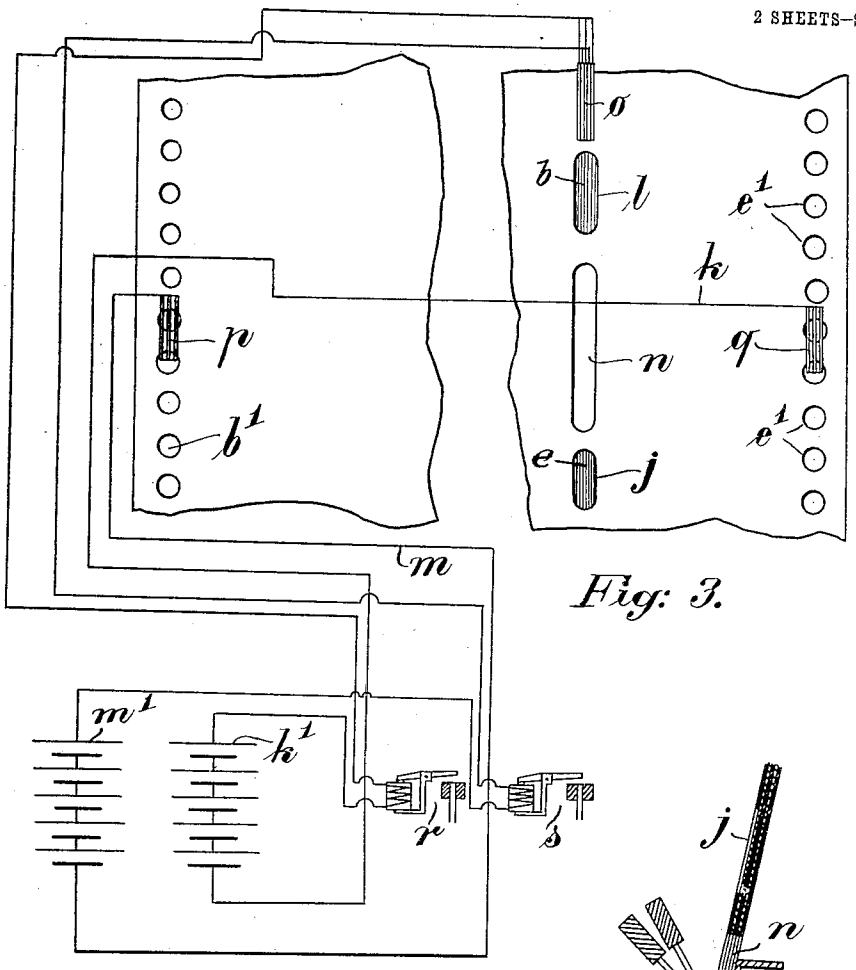


Fig: 3.

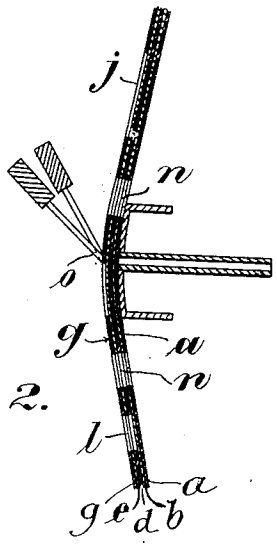


Fig: 2.

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UNITED STATES PATENT OFFICE.

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NOTE-SHEET FOR ELECTRICAL MUSICAL INSTRUMENTS.

1,120,171. Specification of Letters Patent. Patented Dec. 8, 1914.

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To all whom it may concern:

Be it known that I, ARTHUR RONALD TRIST, subject of the King of Great Britain and Ireland, residing at Coronation House, 4 Lloyds avenue, in the city of London, England, have invented new and useful Improvements in Note-Sheets for Electrical Musical Instruments, of which the following is a specification.

This invention relates to improvements in and relating to record sheets for players for pianos, organs and similar instruments and to conducting devices for use therewith, and has for its object the construction of a music record sheet with two or more electrically conducting layers and to contact devices for use in connection therewith whereby either two or more pianos can be operated simultaneously from the same sheet or a multi-manual organ can be similarly operated.

My invention consists of a record sheet which is composed of two or more layers of electrical conducting material separated from one another by means of insulating layers and cemented together as a whole so that in conjunction with suitably arranged contact devices and different electrical circuits, each circuit-controlling independent mechanism is energized from a source of electric current when contact is made with any one of the electrical conducting layers of the sheet by suitable brushes through perforations formed in the insulating layers so as to expose either one or other conducting layer to a note brush.

It is obvious that I may if necessary have a combination of electric and pneumatic control in which case the through perforations for the pneumatic control are placed and can be produced in the record sheet in the ordinary way and will co-act with the tracker bar in a similar manner to known music sheets.

In order to reduce as far as possible the amount of current which is likely to leak through from one conducting layer to another through the intervening insulating layer I prefer to make the conducting layers in separate sections insulated from one another by an air gap and in such case I provide for the supply of current to the sections by means of bridge brushes or other similar contact devices and I also collect the current from the section by means of bridge brushes for each note so that when the contacts are made no break in the continuity of the circuit occurs so long as a brush is in contact with an electric layer.

In order that the invention may be the better understood I will now proceed to describe the same in relation to the accompanying drawing, reference being had to the letters and figures marked thereon.

Like letters refer to like parts in the various figures in which,

Figure 1 is a view of my improved music sheet showing the various layers broken away to disclose the under layer in each case and also the subdivision of the conducting layer in each case. Fig. 2 is a sectional view of a music sheet running over a pneumatic tracker bar the various layers being shown with exaggerated thickness for clearness. Fig. 3 is a diagrammatic view of the two electrical circuits using a pneumatic tracker for controlling the third instrument or manual. Fig. 4 is a diagrammatic view of the apparatus for removing any overlapping of the foil in the perforations. Fig. 5 is an enlarged view of a note perforation after the fusing operation has taken place.

According to this invention the music sheet is composed of a bottom insulating layer *a* carrying a conducting layer *b* which is disposed in sections divided transversely to its length by an air gap *c*. Upon the layer *b* is another insulating layer *d* carrying a conducting layer *e* in sections as before described with an air gap *f* and over the layer *e* is disposed the third insulating layer *g*. Along the music sheet at each side of the insulating layers *a* and *d* I arrange a strip *h* or h^1 of conducting material separated by an air gap *i* or i^1 from the sections *b* and *e* respectively so that if the sheet becomes torn at the edge on either side to the width of the strip no short circuiting between conducting layers can take place as the strips *h* and h^1 are dead and if a short circuit does take

place no detrimental effect is produced. The perforation j for notes to be sounded through the control of the first electric circuit k is only made through the insulating layer g while the perforation l for the second electric circuit m is made through the two insulating layers d and g and one conducting layer e. The perforation n for pneumatic control is made through all the layers of the sheet. Current is fed to the layers b and e through perforations b^1 and e^1 at the two edges of the sheet by means of brushes p and q which have a sufficient span to bridge two perforations at least to maintain continuity of supply of current. In order to identify the exposed layers for the different instruments or manuals each note is shown with a different shading in Fig. 3. The brushes p q and the note brush o must be substantially in a line with one another across the music sheet.

In Fig. 3 two note control or key operating devices of an electrical character are shown at r and s and are each in circuit with battery k^1 and m^1 respectively.

In Fig. 4 the edge clearing or fusing device consists of a source of electric energy such as a dynamo t and bar t^1 of insulating material having contacts t^3 carried at the ends thereof adapted to contact under the pressure of a brush t^2 with one or other layer b or e through b^1 or e^1 respectively of the music sheet or with an edge of conducting layer b or e overhanging the insulating layer which may be trimmed off after the roll is completed. The contacts t^3 are included in the electrical circuit with the dynamo t. Rollers u and u^1 are provided on which the music sheet is wound. The brush t^2 is included in the electric current and rubs upon the insulating layer which may be of paper until a note perforation comes along when the current passes through the metallic bur produced in cutting the perforation and through metallic layer b or c into one of the contacts t^3 on the insulated roller or bar t^1 and fuses the bur. The generation of heat during the fusing operation is so momentary and so local that the insulating layer of paper is not burnt. It has been found that 100 volts 1 ampere is sufficient for the purpose. Fig. 5 shows a perforation with the conducting layer fused back from the edge of the insulating layer, the edge of the conductor layer being shown in dotted lines in the upper view and in section in the lower view. By making the insulating layer overhang the conducting layer all risk of getting an undesirable contact between the brush and the conducting layer, when the brush is passing through a perforation of one conducting layer and contacting with a lower conducting layer, is avoided.

A convenient method of forming the conducting layers into sections, where a long strip of conducting layer has been attached to a strip of insulating layer, is by means of an electric current passed through a stylus of conducting material put in circuit with the conducting layer and source of current so that by merely drawing the stylus across the face of the conducting layer the circuit is completed and the layer is fused during the passage of the stylus thus forming a dividing space.

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

1. A music record sheet consisting of two or more conducting layers interposed between insulating layers, the said conducting layers being divided cross-wise of their length into sections, rows of side perforations through one or more of said layers, each row being adapted to expose the surface of one of the conducting layers to enable current to be fed to same from an external source of electricity and note perforations through all the insulating and conducting layers for producing an effect on the playing mechanism independent of that of either of the conducting layers, substantially as described.

2. A music record sheet consisting of two or more conducting layers interposed between insulating layers, the said conducting layers being divided crosswise of their length into sections, rows of side perforations through one or more of said layers, each row being adapted to expose the surface of one of the conducting layers to enable current to be fed to same from an external source of electricity, and note perforations through all the insulating and conducting layers for producing an effect on the playing mechanism independent of that of either of the conducting layers, the edge of the insulating layer at each note perforation being disposed so as to overhang the edge of the adjacent conducting layer, substantially as described.

3. A music record sheet consisting of two or more conducting layers interposed between insulating layers, the said conducting layers being divided crosswise of their length into sections, rows of side perforations through one or more of said layers, each row being adapted to expose the surface of one of the conducting layers to enable current to be fed to same from an external source of electricity, note perforations through all the insulating and conducting layers for producing an effect on the playing mechanism independent of that of either of the conducting layers and a continuous conducting strip on each of the sheets disposed between two insulating lay-

ers and separated from the said sections of the conducting layer adjacent thereto and adapted to prevent any short circuited current passing between the conducting layers of the record sheet, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ARTHUR RONALD TRIST.

Witnesses:
O. J. WORTH,
C. P. LIDDON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."