(No Model.)

A. RICHTER.

NOTE SHEET FOR MECHANICAL MUSICAL INSTRUMENTS.

No. 560,540. Patented May 19, 1896.

Fig. 1

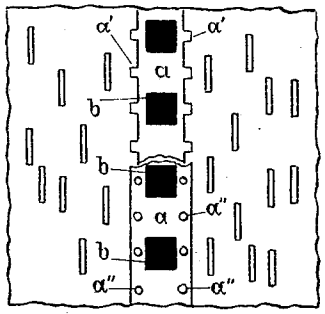


Fig. 2

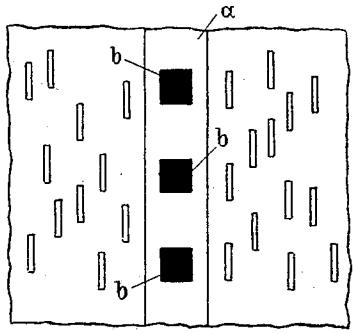


Fig. 3

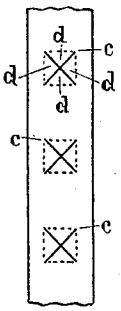


Fig. 4

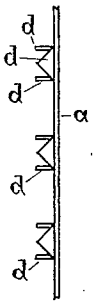


Fig. 5

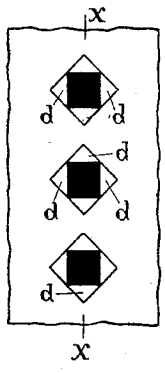


Fig. 6

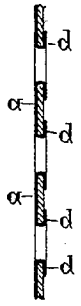


Fig. 7

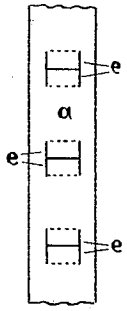


Fig. 8

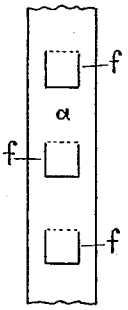


Fig. 9.

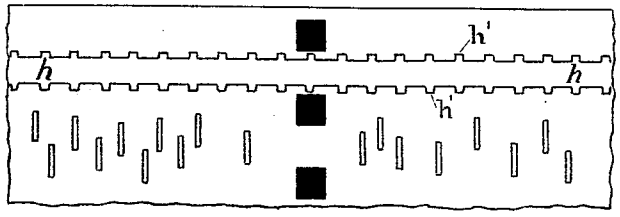
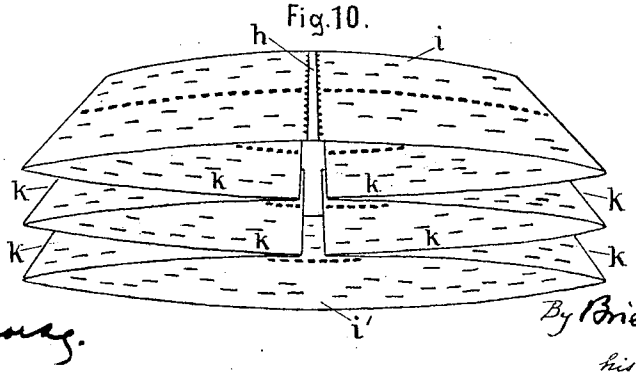


Fig. 10.



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UNITED STATES PATENT OFFICE.

ADOLF RICHTER, OF RUDOLSTADT, GERMANY.

NOTE-SHEET FOR MECHANICAL MUSICAL INSTRUMENTS.

SPECIFICATION forming part of Letters Patent No. 560,540, dated May 19, 1896.

Application filed September 19, 1895. Serial No. 562,954. (No model.)

To all whom it may concern:

Be it known that I, ADOLF RICHTER, a subject of the King of Bavaria, residing at Rudolstadt, in the principality of Schwarzburg-Rudolstadt, Germany, have invented certain new and useful Improvements in Note-Sheets for Mechanical Musical Instruments, of which the following is a specification.

My invention relates to improvements in music-sheets for mechanical musical instruments; and the objects of my improvements are, first, to strengthen with sheet metal the edges of the holes formed in the driving portion or portions of the music-sheet and which serve for the reception or engagement of the driving-teeth and to form a metallic connection between such holes, so that they are invariable with relation to each other, and, second, to fold such long endless music-sheets like the foldings of a harmonica, in order that the said sheets may be readily handled and operated without occupying much space.

My invention will be fully understood from the drawings, in which similar letters of reference denote similar parts.

Figure 1 is a plan view of a portion of a music-sheet constructed according to my invention and showing the strip of sheet metal strengthening the driving-holes fastened in two several manners. Fig. 2 is a plan view of a music-sheet with driving-holes strengthened by a strip of sheet metal of a somewhat different form from those represented in Fig. 1. Fig. 3 is a detail face view of the strip of metal shown in Fig. 2 previous to its connection to the music-sheet. Fig. 4 is a side elevation of the metal strip, having the metal which is struck up to form holes turned back at right angles to the strip. Fig. 5 is an under side view of a portion of a music-sheet, showing the opposite side from that shown in Fig. 2. Fig. 6 is a longitudinal section on line $x\,x$ of Fig. 5. Figs. 7 and 8 show other modified forms of strips made in accordance with my invention. Fig. 9 shows a plan view of a portion of a long endless music-sheet, the ends of which are connected to each other by a strip of metal. Fig. 10 is a perspective view of an endless music-sheet made according to the present invention.

The progressive movement of the well-known long paper-board music-sheets, formed or provided with perforated notes or characters, is generally effected by means of friction, whereby a great deal of power is consumed, or when a paper-board of very great thickness is employed motion is imparted to the music-sheets by means of toothed wheels, the teeth of the said wheels engaging in corresponding holes in the sheet; but the use of very thick and heavy paper-board increases the cost of a music-sheet to a very great extent and also renders the same unwieldy. Moreover, the propulsion of a heavy sheet requires much power and consequently a powerful driving apparatus. Now these drawbacks are obviated according to the present invention by strengthening wholly or partially with sheet metal the edges of the holes formed in the driving portions of the music-sheet and which serve as engaging means for the reception or engagement of the driving-teeth and forming metallic connections between the metal edges of the holes, so that the holes are maintained at all times in the same relation to each other, and additional strength is given to the sheet as a whole without materially increasing the weight or cost thereof.

The strip of sheet metal a, Fig. 1, which serves for strengthening, is provided at its edges with claws a' or with small stamped-out points a'', which pass through the music-sheet when the strip of sheet metal is pressed in, and thus unite the strip firmly with the music-sheet. The holes b, Fig. 1, for the teeth of the driving-wheel are preferably punched at one and the same time through both the sheet-metal strips and the paper-board together after the sheet-metal strip has already been fixed to the paper-board. Both parts may, however, be formed with the necessary holes prior to fastening the same together, if desired, and this is especially necessary in cases where the edges of the driving-holes are not merely covered over with the superposed sheet-metal strip, but are to be lined or bound internally wholly or partly with metal by means of lugs or sheet metal bent over into the same, which has the result of making the driving portion very much stronger. For this purpose these parts of the sheet-metal strip a, Fig. 2, where the holes b are formed for the engagement of the teeth

are first slit in cross-fashion, as at *c*, Fig. 3, and the four lugs *d* thereby formed are bent up or out in such a manner (see side elevation, Fig. 4) as to be adapted to be inserted into the driving-holes of corresponding size of the music-sheet. When this has been done, the sheet-metal lugs are bent around and pressed with sufficient force to cause them to bear very firmly against the lower edge of the music-sheet, Figs. 5 and 6, and thus at the same time to fasten the sheet-metal strip firmly to the music-sheet. The driving-holes in the sheet-metal strip may also be formed by slitting the sheet-metal strip *a* at the respective places, not in cross-fashion, but in **H** form, as shown in Fig. 7, so as to produce two lugs *e*, which are then pressed around two opposite edges of the driving-hole. In the case of small driving-holes one lug bent around is sufficient, in which case the sheet-metal strip is slit at the respective places in **U** form, as shown in Fig. 8, so that at each incision there is produced only one lug *f*. The driving-holes are rendered by the bent sheet-metal reinforcement extremely strong and in fact even stronger than those of music-sheets which are made wholly of sheet metal. The driving-holes when reinforced by sheet metal in the manner hereinbefore described cannot become distorted and torn by the action of the teeth, even when very thin paper-board is used, because the teeth of the wheel always engage with the sheet-metal edge.

It will be seen that by my invention I am enabled to provide a cheap, strong, light, and pliable music-sheet wherein the entire strain of the driving means is taken by the metallic strips, which likewise provide against the liability of wear upon the sheet ordinarily occasioned by the engagement of the driving means with the coöperating means upon the music-sheet.

When music-sheets are very long, their ends are often connected with each other to form an endless sheet. Heretofore the ends of such music-sheets have ordinarily been connected by pasting; but this pasting has the inconvenience that the distance of the driving-holes from each other near the connecting place of the sheet is not exactly the same as on the other parts of the sheet, and this causes the gearing of the toothed driving-wheel to be inaccurate. This inconvenience has been overcome by making the connection of the ends of the music-sheet by a strip of sheet metal *h*, Fig. 9, passing over the whole breadth of the sheet. The metal strip *h* is pressed with its claws *h'* firmly into the cardboard sheet, thereby connecting together the ends of the sheet.

Great difficulty has been found heretofore in folding endless music-sheets. If the music-sheet is, for example, three meters long, it is commonly once folded, so it has still a length of 1.5 meters, a length which makes endless music-sheets so unwieldy that they have not found favor with the public.

Now according to my invention I fold the endless music-sheets in the manner shown in Fig. 10, where the upper folding *i* and the under folding *i'* are about twice as long as the foldings *k*, these being arranged between the upper and the under folding like the foldings of a harmonica. By these means music-sheets may be placed in very small folds, so that they become wieldy in use, a result which cannot be attained by often folding of an endless music-sheet in the common manner, because in this case the tension in the outer parts of the sheet would become so great that the sheet would tear in the connecting place.

Having now particularly described and ascertained the nature of my invention, I declare that what I claim is—

1. The combination of a music-sheet of paper-board, paper or similar material, one or more metallic strips connected to said sheet and engaging means on said metallic strip or strips for coöperation with the driving means of a music-box.

2. The combination of a music-sheet of paper-board, paper or similar material, one or more metallic strips connected to said sheet and extending in the direction of the movement of the music-sheet throughout the extent thereof and apertures in said metallic strip or strips for engagement with driving means of a music-box, substantially as described.

3. The combination of a music-sheet of paper-board, paper or similar material, one or more metallic strips, each of which has tines struck up therefrom to form a plurality of holes, the tines being clamped to the music-sheet to connect the metallic strip or strips thereto and to form metallic facings for the holes in the music-sheets.

4. An endless music-sheet for mechanical musical instruments consisting of an upper and an under folding and at both sides between the same harmonica-like foldings, the upper and the under folding being about twice as long as the harmonica-like foldings, substantially as described.

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

ADOLF RICHTER.

Witnesses:
WM. HAUPT,
CHAS. H. DAY.